Investigating the relationships between project management performance, team empowerment and project success in Hong Kong

Yau Yuet Wah, Sindy

MSc (*HKUST*), MBA (*HKU*), BA (Hons) (*HKU*)

Student Number: 3173396

Supervisor: Dr. Kym Cowley

This dissertation is submitted in fulfilment of the requirements for the

Degree of Doctor of Business Administration

In

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

September 2016

Statement of Originality

I, Yau Yuet Wah, Sindy, hereby certify that this thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. I give consent to the final version of my thesis being made available worldwide when deposited in the University's Digital Repository**, subject to the provisions of the Copyright Act 1968.

**Unless an Embargo has been approved for a determined period.

Signed:_____

Name: Yau Yuet Wah, Sindy

Student Number: 3173396

Date: September 2016

Acknowledgements

I would like to express my sincere gratitude to everybody who has rendered me support in my pursuit of this DBA. Special thanks are given to my supervisor, Dr. Kym Cowley, for her patient guidance and advice. I also thank all lecturers of this DBA programme, especially A/Prof. Guilherme Pires and A/Prof. Suzanne Ryan. Without the assistance from Project Management Institute Hong Kong Chapter in engaging the Project Management Professionals and members, this research project will not be feasible. Thanks are also given to all project management practitioners who have joined this research. Their active participation significantly contributes to a better understanding of the development of the project management profession in Hong Kong.

I am grateful for the patronage from my company and the encouragement from my team members. I am very lucky to have a big group of friends standing by me all the time, especially Rosita. The generous sharing from my DBA colleagues, especially Alfred, Angie and Kelvin, makes this long DBA journey not lonely. Above all, the love and patience of my beloved husband and sons are the fuels to light me up along this inspiring, challenging and fruitful DBA journey.

Table of Content

List of Tables

List of Figures

Abstract

In reacting to global competition, many organizations have adopted project management practices to implement initiatives for enhancing their competitive advantages. Despite the continuous efforts of project management practitioners and project management professional associations in improving project management practices, the contribution of project management to project success is still limited. On the other hand, the effectiveness of team empowerment in enhancing team performance has drawn increasing attention from project management researchers.

The aim of this research was to investigate the relationship between project management performance and project success in Hong Kong, together with a consideration of the possible moderating effect of team empowerment on that relationship. The research was modelled on previous studies testing the relationship between project management performance and project success in United Arab Emirates and the works studying the impact of psychological team empowerment on team performance. Quantitative cross-sectional research with an online survey was conducted with participation of project management practitioners from various industries in Hong Kong.

A series of multiple regression analyses was conducted to test the research hypotheses. Analysis of data and subsequent results indicated that there was a significant and positive relationship between Project Management Performance and Project Success in Hong Kong. However, the moderating effect of psychological Team Empowerment on the relationship between Project Management Performance, with the exception of the sub factor of 'Project Management Key Performance Indicators', and Project Success in Hong Kong was positive but not significant. This research further revealed that psychological Team Empowerment was an independent variable creating positive and significant impact on Project Success. This research supports that Project Management Performance, especially the management of 'Project Management Policy and Strategies' and 'Project Management Key Performance Indicators', was effective in creating success for projects in Hong Kong. Project management practitioners in Hong Kong are further advised to make use of psychological team empowerment to motivate teams for achieving project success.

This research contributes to expanding the scope of project management research in Hong Kong and provides practical references for project managers to motivate project teams with team empowerment. In view of the limitations of a positivist quantitative research, more studies with other research paradigms and methodologies are recommended to further explore the impact of various contextual and contingency factors in affecting the impact of project management and the achievement of project success in Hong Kong.

Chapter 1   Introduction

1.1 Introduction

This chapter presents an overview on this research project that investigates the relationship between project management (PM) performance and project success (PS), together with the possible moderating effect of team empowerment (TE) on that relationship in Hong Kong.   Outlined in the following sections is the research background, a brief review of the relevant literature leading to the discovery of research gaps, the methodology adopted for the research, the organization of this dissertation, as well as the contributions and limitations of the research project.

1.2 Research Background

Due to intensifying global competition and changing needs of customers, the practices of PM and TE are increasingly utilised as solutions for improving organizational performance (Ford & Randolph, 1992; Kirkman & Rosen, 1999). However, extant research shows that PM only partially explains PS (De Wit, 1988; Joslin & Müller, 2016; Mir & Pinnington, 2014; Müller & Jugdev, 2012; Pinto & Slevin, 1988b; Shenhar, Dvir, Levy & Maltz, 2001).   High rates of project failure have still been reported over the last decade (Sage, Dainty & Brookes, 2014; Yazici, 2009).   Although earlier research has found that TE is effective in enhancing team performance (Kirkman & Rosen, 1999; Kirkman, Rosen, Tesluk & Gibson, 2004), many empirical studies on the impact of TE consider the structural definition, meaning the delegation of power (Harbone & Johne, 2003; Nauman, Khan & Ehsan, 2010), rather than regarding it as a

psychological construct.   This indicates that more studies exploring how PM and psychological TE contribute to PS are desirable.

In addition, the extant studies on PM, PS and TE in the Hong Kong context are confined to the construction industry only (Tuuli & Rowlinson, 2009a, 2009b & 2010; Tuuli, Rowlinson, Fellows & Liu, 2012).   It is therefore suggested that further studies concerned with PM performance, PS and TE involving participants from a variety of industries in Hong Kong are warranted.

1.3 Key Concepts and Research Gaps

This research aims to explore the relationship between PM performance and PS in Hong Kong in various industries, together with a consideration of the possible moderating effect of TE on that relationship.   The research is modelled on the study of Mir and Pinnington (2014) who tested the relationship between PM performance and PS in project-based organizations in United Arab Emirates (UAE) and also the work of Kirkman, Rosen and colleagues (2004) who studied the impact of TE on team performance.   The key concepts of PM, PS and TE are briefly outlined in the following paragraphs.   However, relevant literature and deeper exploration of extant research is addressed in Chapter Two.

1.3.1   Project Management

'Project' in the context of PM literature, is defined as a temporary time limited organization for the purpose of achieving a specific goal (Gaddis, 1959; Turner, 2014).   PM is the processes of and actions in managing all the required

resources necessary for the achievement of the project goal (Munns & Bjeirmi, 1996; Turner, 2014).

The effectiveness of PM can be measured with a Project Management Performance Assessment (PMPA) model (Bryde, 2003a). The PM performance construct in the PMPA model (PM Performance) consists of six elements, namely PM leadership, PM staff, PM policy and strategy, PM partnership and resources, project lifecycle management processes and PM KPIs. This model has been tested to be a valid representation of PM performance (Mir & Pinnington, 2014; Qureshi, Warraich & Hijazi, 2009).

1.3.2 Project Success

'Project success' and 'project management success' are not the same. Cook-Davies (2002) stated that PM success is measured against quantitative performance on time, cost and quality whereas PS is measured against the overall objectives of a project. If a project team meets the time, cost and quality requirements, it is deemed to be successful in achieving PM success but the overall PS may not be secured (Baccarini, 1999; Shenhar, et al., 2001). Indeed, extant research shows that PM success is only part of PS (De Wit, 1988; Pinto & Slevin, 1988b; Shenhar et al., 2001).

Criteria in determining the success of a project is dependent on stakeholders (De Wit, 1988; Freeman & Beale, 1992) who include all the concerned parties in addition to the project manager and the project team (Lipovestsky, Tishler, Dvir & Shenhar, 1997). The measurement of PS should be extended

beyond the project life cycle to the whole product cycle (Baccarini, 1999; Munns & Bjeirmi, 1996; Jugdev & Müller, 2005).

1.3.3 Team Empowerment

Empowerment is a new paradigm of motivation (Maynard, Gilson & Mathieu, 2012) that can be practiced at individual and team levels (Seibert, Silver & Randolph, 2004). TE is also classified into structural empowerment, meaning the delegation of power to teams (Harborne & Johne, 2003), and psychological empowerment, concerning the motivation of all team members as a whole (Kirkman & Rosen, 1999). Psychological TE has been found to contribute to enhancement of team performance (Chen, Kirkman, Kanfer, Allen & Rosen, 2007; Kirkman & Rosen, 1999; Seibert, Wang & Courtright, 2011).

1.3.4 The Research Gaps

Extant research shows that PM performance does contribute to PS (De Wit, 1988; Pinto & Slevin, 1988b; Shenhar, et al., 2001). However, Mir & Pinnington (2014) found that the practice of PM itself only explains 44.9% changes in PS. Additional literature shows that the practice of psychological TE has been effective in enhancing the performance and satisfaction of teams (Kirkman, Rosen, et al., 2004; Seibert et al., 2011). However, studies on the impact of psychological TE on project teams are limited. To date only one study has considered whether PM contributes to enhancement of project team performance and PS through the practice of psychological TE (Tuuli & Rowlinson, 2009b). Previous studies on PM in

Hong Kong were limited to a single industry: construction (Chan & Chan, 2004; Chan, Scott & Chan, 2004; Chan & Tam 2000; Tuuli & Rowlinson, 2007, 2009a, 2009b, 2010; Tuuli et al., 2012).   Therefore, it is desirable to explore if the findings on the relationship between PM Performance and PS identified by Mir and Pinnington (2014) can be generalized to various industries and whether the results apply in the Hong Kong context or not. Findings will help to expand the scope of PM studies in Hong Kong with the consideration of impact of psychological TE.

1.3.5   Research Questions and Research Hypotheses

Basing on the identified research gaps, two research questions are developed:

RQ1: To what extent does PM performance contribute to project success in Hong Kong?

RQ2: To what extent does team empowerment moderate the relationship between PM performance and project success in Hong Kong?

Previous studies found that PM Performance only partially explains PS (Mir & Pinnington, 2014).   Since the commitment of team members is identified as a critical success factor for projects (Belassi & Tukel, 1996), it is worthwhile to explore if TE, which is found to be effective in enhancing performance of teams (Kirkman & Rosen, 1999; Kirkman, Rosen, et al., 2004), will contribute to enhancing PS or not.   A research model basing on the concepts of PM performance, PS and TE is constructed as follows (Figure 1.1, p.6):
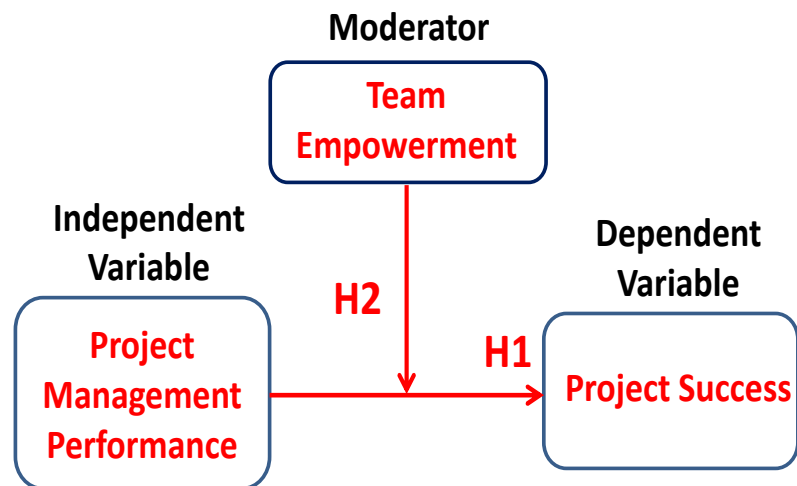
Figure 1.1: The research model

Seven hypotheses are proposed to guide the research effort in answering the first research question:

H1: The relationship between PM performance and PS in Hong Kong is statistically significant and positive.

H1a-f: The relationship between each item of PM Performance, namely PM Leadership (H1a), PM Staff (H1b), PM Policy and Strategy (H1c), PM Partnership and Resources (H1d), Project Lifecycle Management Processes (H1e) and PM KPIs (H1f), and PS in Hong Kong is statistically significant and positive.

Seven hypotheses are developed for conducting this research to answer the second research question:

H2: TE has a positive and significant moderating effect on the relationship between PM performance and PS in Hong Kong.

H2a-f: TE has a positive and significant moderating effect on the relationship between each item of PM Performance, namely PM Leadership (H2a), PM Staff (H2b), PM Policy and Strategy (H2c), PM Partnership and Resources

(H2d), Project Lifecycle Management Processes (H2e) and PM KPIs (H2f), and PS in Hong Kong.

Totally fourteen hypotheses were developed for conducting this research to answer two research questions.

1.4 Research Methodology

This research is designed as quantitative cross-sectional survey research within a positivist research paradigm exploring the relationship between an independent variable (PM Performance), a dependent variable (PS) and a moderator (TE). The research model is derived from earlier empirical work of Mir and Pinnington (2014) testing the relationship between PM Performance and PS within project-based organizations in the UAE and that of Kirkman, Rosen and colleagues (2004) studying the impact of psychological TE on team performance.

The population of this research was the certified Project Management Professionals (PMP®) in organizations located in Hong Kong and members of the Project Management Institute Hong Kong Chapter (PMIHK), who are representatives of PM practitioners from diverse industries in Hong Kong (around 5000). Emails were sent via PMIHK to invite them to participate in an online survey which was developed by modifying questionnaires of Mir and Pinnington (2014) and Kirkman, Rosen and colleagues (2004). The survey comprised 59 questions regarding PM performance (20 items), PS (21 items), TE (12 items) and the personal background of participants (6 items).

The data was analyzed using SPSS. Univariate, bivariate and multivariate analyses were conducted to test normality, validity and reliability of the data collected. Multiple and hierarchical regression analyses were conducted for hypothesis testing, including the evaluation of the moderating effects of TE.

1.5 Organization of the Dissertation

This dissertation is organized into five chapters as following:

Chapter 1 Introduction covered the background of the research, the major literature reviewed and the research gaps identified, the methodologies adopted for the research, an overview of the structure of dissertation, the research limitations and the potential contributions of the research.

Chapter 2 Literature Review discusses and overviews the extant literature on projects, project management, project success, project teams and team empowerment, finding the gaps for further study in this research. A research model regarding the relationship between PM performance and PS as well as the moderating effect of TE is developed from the literature to answer two research questions. Seven research hypotheses are developed for each research question.

Chapter 3 Research Methodology and Design outlines the positivist research paradigm and the quantitative research method covering the sampling approach, survey instruments, data collection methods and data analysis techniques. In addition, the ethical issues concerned and limitations of the

study are discussed.

Chapter 4 Results and Analysis lists and analyzes the results from the univariate analysis, bivariate analysis, multivariate analysis and hypothesis testing conducted with SPSS program. Answers to the research questions and hypothesis testing are summarized.

Chapter 5 Conclusion discusses the findings from the research results, draws theoretical and managerial implications, lists the research contributions, evaluates the research limitations and suggests areas for further research in future.

1.6 Research Contributions and Limitations

This research will contribute to expanding the scope of studies on PM and assist in understanding the impact of TE on the relationship between PM performance and PS. It empirically tests the relationship between PM Performance and PS (Mir & Pinnington, 2014), finding that PM Performance contributes to 49.1% changes in PS in Hong Kong. As it involves PM practitioners from various industries in Hong Kong, it will add to knowledge about PM in the Hong Kong context because previous research mainly covered the construction industry. This research will provide insight to project managers in Hong Kong to strengthen their PM performance, to improve project team performance and to enhance the achievement of PS.

The research has some limitations however. Its involvement with PM practitioners from one PM association and one geographical location may make generalization of the research findings unreasonable. The self-reporting approach of the data gathering process also implies the possibility of participant self-reporting bias. The limitations of a cross sectional quantitative research may indicate that further studies with other research paradigms and methodologies are desirable.

1.7 Conclusion

This chapter overviewed the research project regarding the relationship between PM performance, PS and TE. It briefly touched upon some of the previous research, discussed the research methodology and introduced the structure of this dissertation. The next chapter reviews the relevant literature to the research problems and develops the research hypotheses.

Chapter 2   Literature Review

2.1 Introduction

This capture outlines and discusses the extant literature on project management (PM) and team empowerment (TE), identifying the gaps for study in this research.   In combating the challenges created by increased globalization and intensified international competition, many companies have set up project teams and adopted project management practices to implement initiatives to enhance their competitive advantages (Ford & Randolph, 1992; Hobday, 2000; Shenhar, Levy & Dvir, 1997).   However, the high project failure rate (Pinto & Mantel, 1990; Suaser, Reilly & Shenhar, 2009) and the fact that many projects even though implemented on time, within budget and to quality requirements are still regarded as unsuccessful is disturbing for the project management community (Atkinson, 1999; De Wit, 1988). On the other hand, empowerment has become popular over the last few decades with an increasing number of organizations adopting it as one of the "alternative forms of management that encourage commitment, risk-taking, and innovation" to combat foreign competition (Thomas & Velthouse, 1990, p.667). Empowerment has been found to be effective in enhancing team performance for achieving business objectives (Kirkman & Rosen, 1999; Kirkman, Rosen, Gibson, Tesluk & McPherson, 2002).

In this chapter, literature regarding these two prevalent management concepts, (1) project management and (2) team empowerment, is reviewed (See Table 2.1 on page 12).

Table 2.1: Overview of literature reviewed

Project Management	Project Success
· Besner & Hobbs (2006, 2008 & 2012)	· Atkinson (1999)
· Bryde (2003 a & b)	· Baccarini (1999)
· Burke, Stagl, Klein, Goodwin, Salas & Halpin (2006)	· Belassi & Tukel (1996)
· Crawford & Pollack (2004 & 2007)	· Bryde (2005 & 2008)
· Engwall (2003)	· Cooke-Davies (2002)
· Evaristo & van Fenema (1999)	· Cooke-Davies & Arzymanow (2003)
· Garel (2013)	· De Wit (1988)
· Hanisch & Wald (2011)	· Dvir, Lipovetsky, Shenhar, & Tishler (1998)
· Hobday (2000)	· Fortune & White (2006)
· Hyväri (2006)	· Freeman & Beale (1992)
· Lechler & Dvir (2010)	· Harborne & Johne (2003)
· Leonard-Barton (1992)	· Holland, Gaston & Gomes (2000)
· Lundin & Söderholm (1995)	· Hyvari (2006)
· Might & Fisher (1985)	· Ika (2009)
· Milosevic & Patanakul (2005)	· Jugdev & Müller (2005)
· Mir & Pinnington (2014)	· Jugdev, Perkins, Fortune, White & Walker (2013)
· Müller & Turner (2007)	· Jugdev & Thomas (2002)
· Muller, Geraldi, & Turner (2012)	· Lim & Mohamed (1999)
· Munns & Bjeirmi (1996)	· Lipovetsky, Tishler, Dvir, & Shenhar (1997)
· Packendorff (1995)	· Morris & Hough (1987)
· Papke-Shields, Beise & Quan（2010）	· Pinto & Mantel (1990)
· Patanakul, Lewwongcharoen & Milosevic (2010)	· Pinto & Prescott (1988)
· Pollack (2007)	· Pinto & Slevin (1987, 1988 a & b)
· Qureshi, Warraich, & Hijazi (2009)	· Shenhar, Dvir & Segev (1993)
· Shenhar (2001)	· Shenhar, Dvir, Levy, & Maltz (2001)
· Shenhar & Dvir (1996)	· Shenhar, Levy, & Dvir (1997)
· Söderlund, J. (2004)	· Shenhar, Tishler, Dvir, Lipovestsky & Lechler (2002)
· Thamhain (2004)	· Wateridge (1998)
· Turner & Müller (2003)	· Westerveld (2003)
· Turner (2006)	

Project Team	Team Empowerment
• Badir, Büchel, & Tucci (2012)	· Chen, Kirkman, Kanfer, Allen & Rosen (2007)
• Cohen & Bailey (1997)	· Z. Chen, Lam & Zhong (2007)
• Ford & Randolph (1992)	· Chen, Sharma, Edinger, Shapiro & Farh (2011)
• Gerwin (1999)	· Hambley, O'Neill, & Kline (2007)
• Hoegl & Gemuenden (2001)	· Hardy & Leiba-O'Sullivan (1998)
• Hoegl & Parboteeah (2006)	· Hempel, Zhang & Han (2012)
• Hoegl, Weinkauf & Gemuenden (2004)	· Hershock, Cowman, & Peters (1994).
• Lovell (1993)	· Hyatt & Ruddy (1997)
• McDonough (2000)	· Kirkman & Rosen (1999)
• Nauman, Mansur Khan & Ehsan (2010)	· Kirkman,Rosen, Gibson, Tesluk & McPherson (2002)
• Parolia, Goodman, Li & Jiang (2007)	· Kirkman, Rosen, Tesluk & Gibson (2004)
• Scott-Young & Samson (2008)	· Kirkman, Tesluk & Rosen (2004)
• Tampoe (1989)	· Seibert, Silver & Randolph (2004)
• Williams (1997)	· Seibert, Wang & Courtright (2011)
• Zhang & Bartol (2010)	

Project Management in Hong Kong	
· Assaf, Al-Khalil & Al-Hazmi (1995)	· Dissanayaka & Kumaraswamy (1999)
· Chan & Chan (2004)	· Lo, Fung & Tung (2006)
· Chan, Chan, Chiang, Tan, Chan & Ho (2004)	· Ng & Walker (2008)
· Chan & Kumaraswamy (1997)	· Rowlinson, Ho & Po-Hung (1993)
· Chan & Tam (2000)	· Sun & Wing, 2005
· Chan, Scott & Chan (2004)	· Tuuli & Rowlinson (2007, 2009a, 2009b, 2010)
· Chuah, Tummala & Nkasu (1995)	· Tuuli, Rowlinson, Fellows, & Liu (2012)
· Davison & Martinsons, 2002	· Wan, Ma & Banerjee (2009)

The various schools of thought about the emergence of these theories, their definitions and impact, as well as the key topics attracting major research attention are discussed in the following sections.   Key topics of PM include the fundamental nature of projects, the major PM tools, the measurement of PM performance, the definition of project success (PS) and factors contributing to PS.   For empowerment, the various definitions differentiating between individual empowerment and team empowerment (TE), as well as the differences between structural TE and psychological TE are discussed.   The impact of psychological TE on enhancing performance of teams is investigated in details.   The review of literature reveals gaps for which further research is recommended.   One of the key concerns is that the performance of PM itself only partially explains the variance in PS (Mir & Pinnington, 2014).   Although TE enhances team performance, empirical studies on the effects of TE on project team performance are limited (Kirkman & Rosen, 1999).   A research model about the relationship between PM, PS and TE, together with the research hypotheses, is suggested at the end of this chapter.

2.2 Projects and Project Management

2.2.1 Definition of a 'Project'

The evolution of the definition of 'project' over the last few centuries is reviewed in this section.   The use of the term 'project' can be dated back to the 15th century when "architecture produced a language of design that constituted a theory of its own project" (Garel, 2013, p.666).   The earliest mention of 'project management' in modern management literature was the

description of a project manager in Harvard Business Review in 1959 (Garel, 2013; Söderlund, 2004), in which a project was defined as "an organization unit dedicated to the attainment of a goal – generally the successful completion of a developmental product on time, within budget, and in conformance with predetermined performance satisfaction" (Gaddis, 1959, p.89). This application of organization theory to define projects as temporary organizations (PMI, 2013; Turner, 2014) is an action–oriented approach (Lundin & Söderholm, 1995), highlighting the key characteristics of projects with limited time and defined tasks to be delivered by teams (Turner & Müller, 2003). This definition of project was instrumental and dominant in the early PM research (Packendorff, 1995; Pollack, 2007).

Other salient features of projects include multi-discipline, time-focus, autonomy, complexity, and integration (Söderlund, Hobbs, & Ahola, 2014, p.1085). Some ways to classify project are by the level of technological uncertainty and system scope (Shenhar & Dvir, 1996), the number of projects and sites involved (Evaristo, Scudder, Desouza & Sato, 2004; Evaristo & van Fenema, 1999) and the complexity (Baccarini, 1996) of projects.

There are other definitions of a 'project' mentioned by researchers with differing research foci (Pollack, 2007). Many contemporary researchers have suggested further research with a critical paradigm to define project in view of the increasing use of PM to resolve complicated business problems under increased complexities (Engwall, 2003; Söderlund, 2004). Project is regarded as: an integrating mechanism enabling cross-functional integration; contractual arrangements between markets and hierarchies; time-limited teams working

towards stipulated deadlines; or the natural work form in modern IT-companies (Engwall, 2003, pp.789-790). Alternatively, researchers adopting a contingency approach regard every project as unique and dependent on the organizational environment in which they occur (Dvir, Lipovetsky, Shenhar & Tishler, 1998; Pollack, 2007). The diversified views on the definition of project lead to the development of various tools, skills and knowledge for effective management of projects.

2.2.2 Theory of Project Management

Theories around PM appear to have evolved from a practitioner-driven normative theory in the 1970s (Engwall, 2003; Svejvig & Andersen, 2015). PM is a process of managing all the required resources for the realization of certain objectives within a specific period of time (Munns & Bjeirmi, 1996; Turner, 2014). As each project is unique, undertaken with novel processes and transient, it is subject to uncertainty and urgency, requiring an integration of resources to complete (Turner & Müller, 2003). This PM theory is based on a theory of project and a theory of management, consisting of three sub-theories of planning, execution and controlling (Koskela & Howell, 2002).

In the 2000s, PM developed into a true scientific discipline with recognized status, being supported by its own academic journal, conferences, languages and association (Gauthier & Ika, 2012; Shenhar & Dvir, 2007). Many PM associations, such as the Project Management Institute (PMI), the Association for Project Management (APM), the Australian Institute of Project Management (AIPM) and the International Project Management Association (IPMA), have developed standardized PM approaches, tools, techniques,

education and training to help the management of projects (Papke-Shields, Beise & Quan, 2010). International Journal of Project Management and Project Management Journal are some of the major PM journals (Crawford, Pollack & England, 2006). The recognition on PM expertise is proven by the actions of local governments and communities to specify in their project tenders the requirement for recognized PM personnel starting from the 1980s. These actions further increased the demand for structured PM practices and encouraged the popularization of professional PM trainings (Garel, 2013).

2.2.3 Project Management Tools

The temporary nature of project requires the management and integration of resources in a way that is different from that of permanent organizations (Lundin & Söderholm, 1995; Packendorff, 1995; Turner, 2006). Packendorff (1995) defined PM as a set of models and techniques for the planning and control of a complex undertaking. PM tools and practices are developed and applied to projects to achieve the desired product or service value, efficiency and effectiveness goals and strategic intents (Jugdeve & Müller, 2005). For instance, in A Guide to the Project Management Body of Knowledge (PMBOK[@] Guide) (PMI, 2013), Project Management Institute (PMI) classifies the project life cycle into five processes, namely initiating, planning, executing, controlling and closing. The concerned skills, tools and techniques are grouped into ten knowledge areas, including 1) integration management; 2) scope management; 3) time management; 4) cost management; 5) quality management; 6) human resources management; 7) communication management; 8) risk management; 9) procurement management; and 10) stakeholder management (Appendix 1, p.157).

The appropriate types of PM practices may vary between projects of different types, sizes, complexity, industries and countries (Besner & Hobbs, 2008, 2012; Crawford & Pollack, 2007; Golini Kalchschmidt & Landoni, 2015; Payne & Turner, 1999).   Bryde (2003b) differentiated between project focus and PM focus and found that the use of PM practices varied between different combinations of the two foci.   According to Shenhar (2001), different project organization types and communication protocols as well as risk and opportunity assessment should be deployed according to the varying level of technological uncertainty and system scope within a given project.   In this sense, more PM tools are needed for larger and more complex projects lasting over longer duration (Besner & Hobbs, 2006, 2008; Papke-Shields et al., 2010).   The use of PM tools has increased significantly over the last ten years (Besner & Hobbs, 2006, 2008 & 2012; Fortune, White, Jugdev & Walker, 2011; Papke-Shields et al., 2010; White & Fortune, 2002).   The most widely used PM tools are project plan, project schedule, decision making methods, risk assessment tools and information communication technology support tools (Fortune et al., 2011, Papke-Shields et al., 2010).   The increase in the use of PM tools is in part due to a significant growth in the membership of various PM associations (Besner & Hobbs, 2008; Fortune et al., 2011; Patanakul, , Lewwongcharoen & Milosevic 2010; Urli & Urli, 2000), like that of PMI which has grown to over half a million in 185 countries since 2014.   Unfortunately, many of the PM tools and techniques have been found to be used on a piece-meal rather than coordinated basis (Jugdev, Perkins, Fortune, White & Walker, 2013).

One way of assessing the readiness of an organization to adopt PM practices is a project management maturity model (Jugdev & Thomas, 2002).   For

instance, the petrochemical and defense industries were found to be more mature in adopting PM practices than the pharmaceutical, construction, telecommunications and financial industries (Cooke-Davies & Arzymanow, 2003). According to Jugdev and Thomas (2002), high PM maturity will give organizations a competitive parity (p.4).

2.2.4 Project Management Performance Model

Much empirical research has been conducted to identify the impact of various PM factors on PM performance (Bryde, 2003a; Qureshi et al., 2009). Bryde (2003a) developed the Project Management Performance Assessment (PMPA) model (Figure 2.1, p.19) basing on the European Foundation for Quality Management (EFQM) business excellence model of total quality management to evaluate PM performance with six variables:

1) **PM leadership -** awareness on the role of projects in managing various kinds of business changes and the development of a project culture.

2) **PM staff** - measures used for enhancing the PM capability and mechanisms for recognizing and rewarding PM performance.

3) **PM policy and strategy -** development of the PM on an organization wide level.

4) **PM partnerships and resources -** partnership with customers and other project stakeholders, including internal customers and suppliers.

5) **Project life cycle management processes** - formation of models, processes and procedures for managing the project life cycle, as well as their smooth operations.

6) **PM KPIs** - multi-attribute character and methods for managing project PM KPIs, entailing a diverse range of task and psychological outcomes.
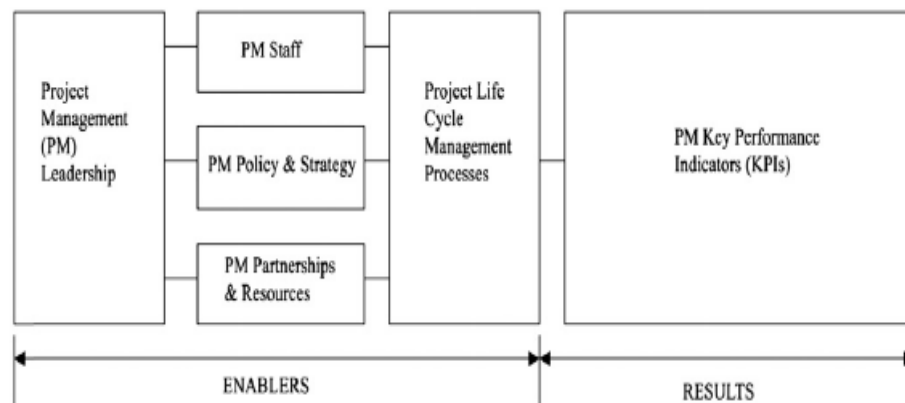
Figure 2.1: The PMPA model (Source: Bryde, 2003a)

All criteria listed in the PMPA model are found to be closely related to the PM Performance construct (Qureshi et al., 2009). Mir and Pinnington (2014) also used the PMPA model to demonstrate that PM Performance can explain at least 44.9% variance in PS.

2.3 Project Success

PS is the most "frequently discussed and yet so rarely agreed upon" topic of PM research (Pinto and Slevin, 1988b, p.68). It is a "rarely agreed-to construct" (Jugdev & Müller, 2005, p.24) and difficult to define because the concept is ambiguous, inclusive and multidimensional (Ika, 2009). Studies concerned with PS expanded in scope through the definition of success, success criteria and critical success factors in the 1980s-1990s, focusing on project life cycles, to the development of success frameworks linking critical success factors to the PS criteria throughout the whole product life cycle in the twentieth century. Figure 2.2 (p.20) summarizes the discussion on project success research by Jugdev and Müller (2005) and Ika (2009), illustrating this progression.

		Conception	Planning	Production Implementation	Handover	Utilization	Close Down
		Project Life Cycle					
		Product Life Cycle					
Period 1: 1960s-1980s	Project Implementation and Handover			- Iron Triangle: time, cost & scope			
Period 2: 1980s-1990s	Critical Success Factor (CSF) Lists		- Iron Triangle - Stakeholder satisfaction, micro and macro viewpoint (Lim & Mohamed, 1999) - 10 Critical Success Factors (Pinto & Mantel, 1990)				
Period 3: 1990s-2000s	Critical Success Factors (CSF) Framework		- Link success criteria to critical success factors - Project success = project functionality, project management, contractors' commercial performance and project termination (Morris & Hough, 1987) - Project succes = project efficiency, impact on customer, bsiness and direct success and preparing for the future (Shenhar et al., 1997) - CSF classified into factors related to the project, the project manager and team, the organization and the external environment (Belassi & Tukel, 1996)				
Period 4: 21ˢᵗ Century	Strategic Project Management	- Linking project goals to organizational strategies. - Project management as a strategic asset. - - Role of project owners (Muller, 2003)					

Figure 2.2: Studies on project success summarized from Jugdev & Müller (2005) and Ika (2009)

2.3.1 Differences between Project Success and Project Management Success

It is useful at this point to make a distinction between PM success and PS because their criteria of success as well as the critical success factors are different. Traditionally, a project is regarded as successful if the time, cost and quality objectives, called the Iron Triangle, are met (Atkinson, 1999; Pinto & Slevin, 1988b). However, other research has shown that projects with time and costs significantly above the planned levels are still regarded as successful, for example the Sydney Opera House project (Lim & Mohamed, 1999; Shenhar et al., 2001). It shows that PM success is neither necessary nor adequate for PS (Ika, 2009). Although "good project management can contribute towards project success, it is unlikely to be able to prevent failure" (De Wit, 1988, p.164). Cook-Davies (2002) makes the following distinction:

- ***Project management success*** is "measured against the widespread and traditional measures of performance against cost, time and quality";

- ***Project success*** is "measured against the overall objectives of the project" (p.185)

Meeting time, cost and quality requirements will lead to PM success but not necessarily PS (Shenhar et al., 2001). PS should be a combination of the product success and PM success, covering the goal, purpose, outputs and inputs of a project (Baccarini, 1999).

Two major factors make the definition of PS confusing, namely the evaluation criteria and the measurement timeframe. Firstly, "project success is dependent on perspectives" and it is a "perceived" result according to the criteria used by different stakeholders (Lim & Mohamed, 1999, p.247). Project managers appear to be more concerned about the micro view of success regarding the completion within the time, cost, quality, performance and safety requirements (Atkinson, 1999; Belassi & Tukel, 1996; Munns & Bjeirmi, 1996). However, other stakeholders like senior management, shareholders and customers hold a more macro view of success (De Wit, 1988), concerning more with the satisfaction of users (Lim & Mohamed, 1999) and contribution to the future success of the organization (Shenhar et al., 2001; Shenhar, Levy, & Dvir, 1997).

Secondly, success is time dependent (Shenhar et al., 1997) so the measurement of PM success and PS may be made using different time frames. As the success of a product can only be revealed over a long time after project completion, the measurement of PS should be extended to the

whole product cycle well beyond the project life cycle (Baccarini, 1999; Munns & Bjeirmi, 1996; Jugdev & Müller, 2005). In this way, the measurement system needs to be flexible, adaptable over time and covering the interests of different stakeholder groups (Bryde, 2005).

2.3.2 Project Success Criteria

PS criteria are those principles and standards used for judging the outcome of a project (Ika, 2009; Lim & Mohamed, 1999). The scope of PS criteria has expanded from the "Golden Triangle" of time, cost and quality (Atkinson, 1999; Pinto & Slevin, 1988a) to include the satisfaction of various stakeholders (Ika, 2009; Jugdev & Müller, 2005). According to Pinto and Slevin (1988b), the PS criteria should include both the Project criteria, concerning the time, cost and performance, and the Client criteria, regarding the use, satisfaction and effectiveness during and after project implementation. Atkinson (1999) proposed the 'Square Root' model (See Figure 2.3, p.22), incorporating the 'Iron Triangle', the information system, benefits to the organization and benefits to the stakeholders as the PS criteria. The focus is "doing it right" during the delivery stage and "getting it right" at the post-delivery stage (Atkinson, 1999, p.339).
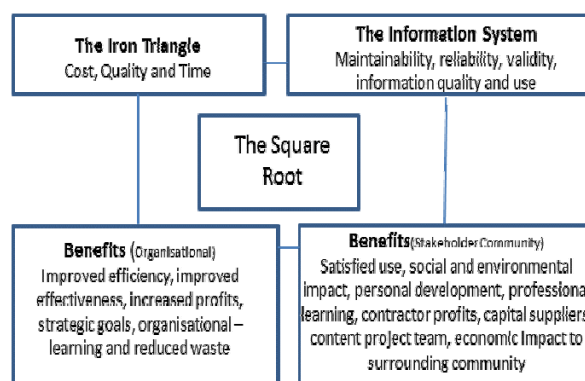
Figure 2.3: The Square Root Model (Source: Atkinson, 1999, p.341)

22

The concerns of various stakeholders in evaluating project outcomes are highlighted by many researchers (De Wit, 1988; Liu & Walker, 1998; Lipovetsky et al., 1997; Wateridge, 1998). The success criteria of sponsor and project manager are technical performance, efficiency of project execution, managerial and organizational implications, personal growth, project termination, technical innovativeness, as well as manufacturability and business performance (Freeman & Beale, 1992). However, other stakeholders, whom can be classified according to their strategies, positions in the organization, involvement in the project, ownership of any intrinsic power and the time perspective (Bryde, 2005), may have different success evaluation criteria. The diversified and inter-related objectives of various stakeholders make the development of a set of commonly agreed success criteria too difficult to be realized (Bryde, 2005; De Wit, 1988).

Different evaluation criteria are proposed by various researchers on PS. Shenhar et al. (1997) formed a more comprehensive view on evaluating PS from the angles of project efficiency, impact on customer, business success and preparing for the future.

1. *Project efficiency* – effectiveness in managing project resources constraints, like cost and time.   It can be evaluated in the very short term during the project execution phase and immediately after the project completion.

2. *Impact on the customer -* the importance a project places on customer requirements and the ability of meeting their needs.   The assessment can be made at a short time after the project outputs are delivered.

3. *Business success* - immediate and direct impact that a project creates to the organization, including the increase in sales, income and profits or

improvement in operational processes. It takes much longer time after the project completion for the accumulation of the significant business results.

4. ***Preparing for the future*** *-* the creation of organizational and technological infrastructure for meeting the future needs of the organization. A much longer time, like two to five years, is needed for the realization of such impact.

The importance of these four dimensions changes at different stages of the project life cycle and with different levels of technological uncertainty of a project (Shenhar, 2001, Shenhar et al., 2001).

The PS criteria need to be well defined and communicated before a project starts because they affect how the project is managed, as well as how measurement metrics and evaluation mechanism are developed (Baccarini, 1999; Bryde, 2005; Shenhar et al., 1997). Organisations with clearly defined success criteria and serious measurement of the project results have shown better project performance (Thomas & Fernández, 2008).

2.3.3 Critical Factors for Project Success

In last few decades, much research was conducted to identify factors that can bring about PS. Critical success factors for a project are those circumstances, facts or influences that contribute to the success of a project (Lim & Mohamed, 1999). The major factors found in literature (Cooke-Davies, 2002; Fortune & White, 2006; Morris & Hough, 1987; Pinto & Slevin, 1987 & 1988a; Turner, 2014) are summarized in Table 2.2 (p.25).

Table 2.2: Critical success factors for projects listed in previous studies

Morris & Hough (1987)	Pinto & Slevin's Project Implementation Profile (1987 & 1988a)	Cooke-Davies (2002)	Fortune & White' Formal System Model (2006)	Turner (2014)
· Project definition · Planning · Schedule urgency · Finance · Legal agreements · Contacting · Project implementation · Human factors	· Project mission · Top management support · Project schedule/plans · Client consultation · Personnel · Technical tasks · Client acceptance · Monotring and feedback · Communication · Trouble shooting · Characteristics of project team leader · Power and politics · Environmental events · Urgency	· Project mission · For project management success: 8 factors · For project success: 1 factor · For corporate success: 3 factors	· Goals and objectives: · Clear realistic objectives · Strong business case/sound basis for project · Performance monitoring: · Effective monitoring/control · Planned close down/review/ acceptance of possible failure · Decision-maker(s): · Support from senior management · Competent project manager · Strong/detailed plan kept up to date · Realistic schedule · Good leadership · Correct choice/past experience of project management methodology/tools · Transformations: · Skilled/suitably qualified/ sufficient staff/team · Communication: · Good communication/feedback · Environment: · Political stability · Environmental influences · Past experience (learning from) · Organisational adaptation/culture/ structure · Boundaries: · Project size/level of complexity/ number of people involved/duration · Resources · Adequate budget · Sufficient/well allocated resources · Training provision · Proven/familiar technology · Good performance by suppliers/contractors/consultants · Continuity: · Risks addressed/ assessed/managed · User/client involvement · Different viewpoints (appreciating) · Project sponsor/champion · Effective change management	External: · Context · Definition · Sponsorship · Attitude Internal: · System · People · Organization

Many success factors found in the extant literature are related to the projects, such as the effectiveness of PM (Milosevic & Patanakul, 2005; Mir & Pinnington, 2014), the project planning (Clarke, 1999; Dvir & Lechler, 2004; Dvir, Raz & Shenhar, 2003), the project manager (Burke, Stagl, Klein, Goodwin, Salas & Halpin, 2006; Clarke, 2012; Hambley, O'Neill & Kline, 2007; Kaulio, 2008; Keegan & Den Hartog, 2004; Müller & Turner, 2010; Pandya, 2014; Somech, 2006; Turner & Müller, 2005; Turner, Müller & Dulewicz, 2009;

Tyssen, Wald & Spieth, 2014; Wilemon & Cicero, 1970), the project team (Ahearn, Ferris, Hochwarter, Douglas & Ammeter, 2004; Ammeter & Dukerich, 2002; Scott-Young & Samson, 2008; Slevin & Pinto, 2007; Thamhain, 2004) and the PM tools (Fortune et al., 2011; Jugdev et al., 2013; Papke-Shields et al., 2010).   Although many researchers have found the leadership of project manager essential in creating PS (Dvir, Sadeh & Malach-Pines, 2006; Geoghegan & Dulewicz, 2008; Harborne & Johne, 2003; Müller & Turner, 2007; Muller, Geraldi & Turner, 2012; Yang, Huang & Wu, 2011; Zhang & Bartol, 2010), many success factors are beyond the control of the project manager (Munns & Bjeirmi, 1996) or project team (Hyväri, 2006b), such as organizational structure (Lechler and Dvir, 2010; Might and Fischer, 1985), the organization's core capabilities (Leonard-Barton, 1992), power and politics (Pinto & Slevin, 1988a), and the external environment (Belassi & Tukel, 1996).

The framework of Belassi and Tukel (1996) presents a more comprehensive view by grouping PS factors into four categories: 1) the project; 2) the project manager and team members; 3) the organization and 4) the external environment (Table 2.3, p.27).   Some frameworks and models linking PS factors to the success evaluation criteria are developed to depict a better description and consideration of various elements affecting PS (DeCotiis & Dyer, 1977; Lim and Mohamed, 1999; Westerveld, 2003).   For instance, Fortune and White (2006) highlighted the inter-relationship between various success factors in a Formal System Model.   Westerveld (2003) used a Project Excellence Model to link six critical success factors to six success criteria in five models.

Table 2.3: The critical success factor groups listed by Belassi and Tukel (1996)

Factors related to				
Project	**Project Manager and Team Member**		**Organization**	**External Environment**
• The size and the value	*Project Manager*	*Team Members*	• Top management	• Political
• Uniqueness of the	• Ability to delegate	•Technical background	support	environment
project activities	authority	• Communication	• Project	• Economic
• Density of the project	• Ability to trade off	• Trouble shooting	organizational	environment
network	• Ability to coordinate	• Commitment	structure	• Social
(independencies	• Perception of his		• Functional	environment
between activities)	role and		managers' support	• Technological
• Project life-cycle	responsibilities		• Project champion	environment
• Urgency	• Competence			• Nature
	• Commitment			• Client
				• Competitors
				• Sub-contractors

However, the impact of each factor on a project may vary at different stages of the project life cycle (Patanakul et al., 2010; Pinto & Mantel, 1990; Pinto & Prescott, 1988). The importance of a factor may also vary in projects of different scopes (Dvir et al., 1998), different industries (Chan, Ho & Tam, 2001; Chan, Scott & Chan, 2004; Chua, Kog & Loh, 1999; Pinto & Covin, 1989; Sanvido, Grobler, Parfitt, Guvenis & Coyle, 1992; Songer & Molenaar, 1997; Summer, 1999), different technological uncertainties (Shenhar, 2001; Shenhar, Dvir & Segev, 1993) and different organizational conditions (Hyväri, 2006b). The research effort to look for a reliable formula for PS is still in progress.

2.4 Project Teams

Project team is one of the critical PS factors (Belassi and Tukel, 1996; Scott-Young & Samson, 2008; Slevin & Pinto, 2007). A 'team' is a group of individuals having independent tasks and sharing responsibility for outcomes

(Cohen & Bailey, 1997, p.241). A 'project team' is different from the permanent hierarchical work team due to its temporary nature, being formed for achieving a specific purpose within some defined time, cost and performance standards (Ford & Randolph, 1992; Turner & Müller, 2003). The differences on task design, group composition, organizational context, internal processes, external processes, group psychological traits and environmental factors between a permanent team and a project team are significant (Cohen & Bailey, 1997; Hollan, Gaston & Gomes, 2000). Hence, factors impacting the effectiveness of project team are different from those of permanent work team. The use of virtual team and matrix structure in PM also became popular in the 1990s due to their flexibility and responsiveness in helping organizations to implement initiatives to combat the challenges of intensifying market competition (Evaristo & van Fenema, 1999; Ford & Randolph, 1992; Kirkman et al., 2002; Lipnack & Stamps, 1999; Townsend, DeMarie & Hendrickson, 1998). These further add complexity to project team.

2.4.1 Characteristics of Project Team

One of the key characteristics of project team is their cross-functional nature. Project team generally has the characteristics of an overlay on the traditional hierarchy, with multiple lines of reporting and having staff from various functional areas working together for a common task for a finite time horizon (Ford & Randolph, 1992). The organizational context and team processes of project team are usually more complex because they are often intertwining between the functional areas that the members come from (Denison, Hart, & Kahn, 1996). The cooperation of cross-functional project teams can be

improved by setting superordinate goals, increased proximity of team members, formal project rules and informal ways of communication (Pinto & Pinto, 1990; Pinto, Pinto & Prescott, 1993).

Another characteristic of project team is its virtual nature.   As many project teams are virtual with members geographically and/or organizationally dispersed, they have to rely on telecommunications and information technologies to facilitate communication and cooperation (Cascio, 2000; Kirkman & Mathieu, 2005; Townsend et al., 1998; Verburg, Bosch-Sijtsema & Vartianinen, 2013).   The challenges associated with the virtual operation of project teams are difficulties in creating trust, gaining managerial and organizational support, managing the team process, role ambiguity and the lack of recognition (Kirkman et al., 2002; Kirkman, Rosen, et al., 2004; Lee-Kelley & Sankey, 2008; Townsend et al., 1998).

2.4.2   Project Team as a critical success factor for project

The importance of cross functional project team in creating PS is identified in much previous literature.   The use of cross-functional team is found to be effective in enhancing the success of new product development (McDonough, 2000).   Belassi and Tukel (1996) regarded the commitment of team members as the most critical success factor for large projects (p.149), but a favorable environment or project climate is essential for team members to perform (Harborne & Johne, 2003; Loo, 2003).   The performance of project team is affected by composition, task design, context and leadership (Stewart 2006), teamwork quality (Hoegl & Gemuenden, 2001; Hoegl & Parboteeah, 2006; Hoegl, Weinkauf & Gemuenden, 2004), team dynamics (Gelbard &

Carmeli, 2009), and proximity of team members (Hoegl & Proserpio, 2004). As the empowerment of project team has been found to be important for PS (Badir, Büchel, & Tucci, 2012; Nauman et al., 2010; Parolia, Goodman, Li, & Jiang, 2007), further discussion on TE is made in the next section.

2.5 Team Empowerment

The concept of empowerment is a new paradigm of motivation (Maynard et al., 2012), encompassing the ideas of intrinsic motivation, job design, social learning theory and self-management concepts (Conger and Kanungo, 1988; Zimmerman, 1990). Empowerment is an internal process of feeling in control of the power (Liden, Wayne & Sparrowe, 2000; Spreitzer, 1995, 1996), leading to enhanced individual, team and organizational outcomes (Quinn & Spreitzer, 1997; Robbins, Crino & Fredendall, 2002). The widespread adoption of empowerment as an alternative form of management made the 1990s an "empowerment era" (Hardy & Leiba-O'Sullivan, 1998).

2.5.1 Definitions of Team Empowerment

The definition of empowerment can be classified into the social-structural approach and the psychological approach. The social-structural perspective regards empowerment as a relational construct with the sharing of power and decision making authority with employees (Mathieu, Gilson & Ruddy, 2006; Mathieu, Maynard, Rapp & Gilson, 2008). On the other hand, the psychological approach defines empowerment as an intrinsic motivation experienced by employees on the dimensions of meaning, competence, self-determination and impact regarding their work roles (Conger and

Kanungo, 1988; Menon, 2001; Spreitzer, 1995 & 1996; Thomas & Velthouse, 1990).

The studies on empowerment expanded from individuals to team level in the late 1990s. The structural approach regards TE as the transfer of some managerial functions to teams (Arnold, Arad, Rhoades & Drasgow, 2000; Mills & Ungson, 2003) with two constructs of authority and responsibility being identified (Hyatt & Ruddy, 1997; Maynard, Mathieu, Gilson, O'Boyle, & Cigularov, 2013). The psychological school defines TE as the collective increase in task motivation felt by all team members with a positive assessment of their organizational tasks (Kirkman & Rosen, 1999). In addition to the feeling of having more power and autonomy, like that of self-managing teams, members of the empowered teams believe that "they have the autonomy and capability to perform meaningful work that can impact their organization" (Chen et al., 2007, p.332). TE is an emergent-state construct that describes the cognitive, motivational and affective states of teams (Kirkman, Rosen, et al., 2004). It is dynamic in nature, being affected by the team context, inputs, processes and outcomes (Marks, Mathieu & Zaccaro, 2001).

The team-level model of Kirkman and Rosen (1999) defines the four dimensions of TE as follows (Figure 2.4, p.32):

1. Potency: a belief that the team is effective;

2. Meaningfulness: the intrinsic caring of the team members for their tasks;

3. Autonomy: the freedom of the team on decision making; and

4. Impact: the feeling that the tasks performed by the team are making

significant contributions to the organization.
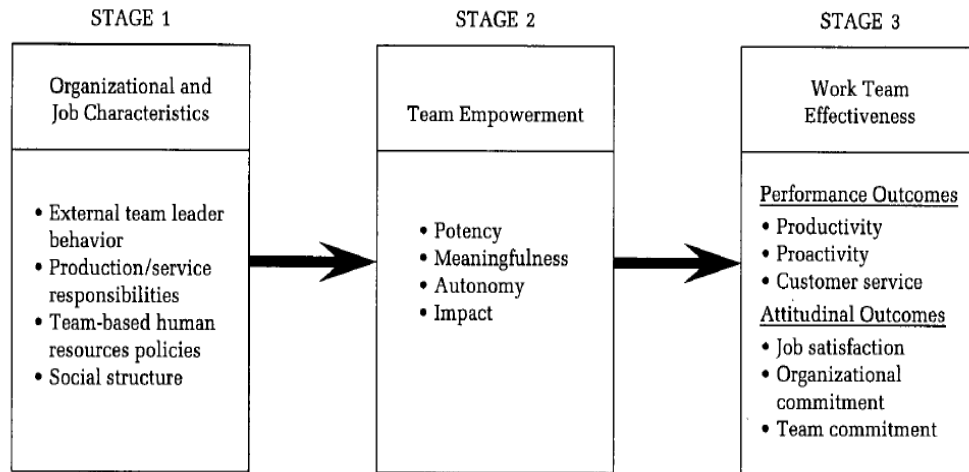
Figure 2.4: A model of work team empowerment (Source: Kirkman and Rosen, 1999)

The four dimensions are related, mutually reinforcing one another and combining additively to create an overall construct of TE. It is a socially constructed collective cognition that reflects "a team's motivation level at a given point in time" (Kirkman, Rosen, et al., 2004, p.177). The team members collectively believe that "they have the authority to control their proximal work environment and are responsible for the team's functioning" (Mathieu et al., 2006, p.98). Some researchers use an additive approach, taking the average of psychological empowerment level of individual team members as TE (Jung & Sosik, 2002; Mayard et al., 2013) or regard it as a matter of degree instead of an absolute level (Ford & Fottler, 1995).

Some integrated models are formed by incorporating both structural and psychological approaches covering both individual and team empowerment (Chen, Lam & Zhong, 2007, Menon, 2001; Robbins et al., 2002; Seibert et al., 2004; Seibert et al., 2011). However, individual psychological

empowerment was found to be only a unitary second-order construct mediating the relationship between empowerment climate and individual outcomes (Seibert et al., 2004; Seibert et al., 2011).   In highly empowered teams, the psychological empowerment of individual team members may be low but the "high levels of team empowerment could compensate for low levels of individual empowerment" (Chen et al., 2007, p.343), implying that team leaders could practice psychological TE to save the effort in empowering individually each team member.   The multilevel study of Tuuli and colleagues (2012) on structural and psychological empowerment further confirms the view of the concepts at both individual and team levels (p.167).

2.5.2 Antecedents of Team Empowerment

Kirkman and Rosen (1999) defined the antecedents of TE as external team leader behavior, production/service responsibilities, team-based human resources policies and social structure.   Transformational and empowering leadership are also regarded as antecedents to psychological empowerment of team members (Burke et al., 2006; Jung & Sosik, 2002; Kark, Shamir & Chen, 2003; Özaralli, 2003; Srivastava, Bartol, & Locke, 2006).   As team leaders may choose to empower individual members differently, leadership is expressed as a personal relationship in individual empowerment.   However, it is a climate generally shared by all members at team level that leads to TE (Chen et al., 2007; Seibert et al. 2004).

Tuuli and Rowlinson (2010) studied empowerment at individual, team, organization and project levels, finding that the project level antecedents for the construction industry are information processing, stakeholder

configuration, organization's role on the project, common goal or vision, project lifecycle, project pace, project priorities, project size, project type and uncertainty (p.16). Face-to-face meetings (Kirkman, Rosen, et al., 2004) and demographic diversity (Kirkman, Tesluk & Rosen, 2004) also have moderating impact on TE.

2.5.3 Outcomes of Team Empowerment

Members of an empowered team will perform better because of their collective belief in having the autonomy and capability to perform meaningful work that affects their organizations. The TE climate will enhance the psychological empowerment of individual team members and further improve their in-role performance (Chen et al., 2007; Seibert et al., 2004; Seibert et al., 2011; Zhong, Lam & Chen, 2011). Empowered teams are more productive and proactive in producing better outcomes, like higher levels of customer service, job satisfaction, as well as organizational and team commitment (Kirkman and Rosen 1999). The four-dimension empowerment measures of Kirkman and Rosen (1999) are more significantly related to team performance than the two-dimension measures of structural approach (Maynard et al., 2013). Tuuli and Rowlinson (2009a) also found that the promotion of team's "taskwork and teamwork behaviours" through empowerment will enhance "the integration of the individual contributions to the collective outcome" (p.492). Other positive outcomes of TE are team processes improvement (Mathieu et al., 2006), team innovation (Burpitt & Bigoness, 1997; Chen, Sharma, Edinger, Shapiro & Farh, 2011) and employee creativity (McCrimmon, 1995; Paper & Johnson, 1997).

However, there is still skepticism on TE outcomes (Malone & Team, 2013; Maruping & Magni, 2012). According to Forrester (2000), appropriate measures like enlarging power, clarity of what to do, differentiation among employees, power sharing, appropriate systems and focus on results should be undertaken to ensure that the benefits of empowerment can be realized.

2.5.4 Empowerment and Project Team Performance

The empowerment of project team is encouraged because "members themselves are perhaps best positioned to align those talents to the changing requirement dynamics" (Marks et al., 2001, p.373). Self-managing team is powerful in controlling team member actions because of the dual guards of peer pressure and rational rules formed by team members (Barker, 1993). However, empowered team appears to be more effective than self-managing team because its members share a sense of meaning and contribution to organizational development (Kirkman & Rosen, 1999, p.58).

Early work on project team management focuses on the task rather than the people (Munns & Bjeirmi, 1996). Empowerment is not encouraged by project managers who emphasize control and standardization because empowerment may increase the project risk and uncertainties (Cohen & Bailey, 1997; Williams, 1997). However, more project managers were compelled to pay attention to the adoption of empowering management style in the 1990s in face of the increasing project complexity and uncertainties (Lovell, 1993; Nauman et al., 2010; Pearce & Sims Jr, 2002; Reilly, Chen & Lynn, 2003; Tampoe, 1989; Zhang & Bartol, 2010).

More research on the effectiveness of empowerment in creating PS was forthcoming in the 2000s. Empowerment is found to be effective in improving performance of projects in product development (Badir et al., 2012; Gerwin, 1999; Holland, Gaston & Gomes, 2000; McDonough, 2000; Zhang & Doll, 2001), process development (Burke et al., 2006; Leonard-Barton, 1992), system development (Paper & Johnson, 1997; Parolia et al., 2007) and for improving the speed to market (Menon, Chowdhury & Lukas, 2002). The practice of empowerment has also helped construction project teams to improve team performance to encounter the challenges posed by the transformation from traditional system model to the new construction management approach (Dainty, Bryman, Price, Greasley, Soetanto & King., 2005; Hammuda & Dulaimi, 1997; Newcombe, 1996, Price, Bryman & Dainty, 2004).

Nevertheless, the diversified meaning of 'empowerment' used in the extant PM studies makes it difficult to capture a clear picture on the impact of TE on project performance. An analysis of the definitions of empowerment adopted in various PM studies depicted in Table 2.4 (p.37) shows that the social-structural definition of TE, meaning the delegation of the decision making authority to the project teams, is more popular than the psychological TE approach suggested by Kirkman, Rosen and colleagues (2004).

Table 2.4: Definitions of empowerment in empirical project management studies

Authors	Approach	Definition of Empowerment
Badir, Büchel & Tucci (2012)	Structural	"the freedom and ability of the project team to make and execute the decisions that are critical to the operation or direction of their project." (p.916)
Gerwin (1999)	Structural	"the range of decision the team is authorized to make in order get its work done" (p.30)
Harborne & Johne (2003)	Structural	"the modern version of the older term 'delegation' – giving junior employees both the responsibility and the authority to perform specific tasks" (p.125)
Holland, Gaston & Gomes (2000)	Structural	Defined team empowerment as one of the task design factors, focusing on the decision making authorities. (p.238)
Kirkman & Rosen (1999)	Psychological	"we define team empowerment as having four dimensions: potency, meaningfulness, autonomy, and impact." (p.59)
Leonard-Barton (1992)	Structural	"Empowerment is the belief in the potential of every individual to contribute meaningfully to the task at hand and the relinquishment by organization authority figure to that individual of the responsibility for that contribution." (p.117)
Lovell (1993)	Psychological	'empowering include the expression of confidence in subordinates, including giving positive emotional support during experiences associated with stress and anxiety, the fostering of opportunities for team members to participate in decision making, the provision of autonomy from bureaucratic constraint, the observation of others' effectiveness, ……, the setting of inspirational and/or meaningful goals, and, above all, the establishment of a trusting and cooperative culture." (p.76)
McDonough (2000)	Structural	"The decision-making authority or responsibility that has been givecn to the team." (p.231)
Nauman, Mansur Khan & Ehsan (2010)	Structural (Empowerme nt Climate)	"As the focus of this study is on work environment we take the empowerment climate construct." "……empowerment climate proposed by Scott and colleagues (2004) is a shared perception regarding the extent to which an organization makes use of structures, policies, and practices supporting employee empowerment. It refers to work environment." (p.638)
Parodia, Goodman, Li & Jiang (2007)	Psychological	"empowerment of team leaders will help members learn and elicit behaviors consistent with an experimenting and changing culture with a positive impact on project performance." (p.636)
Paper & Johnson (1997)	Structural	"empowerment is the delegation of decision making authority to lower-level employees" (p.20)
Reilly, Chen & Lynn (2003)	Structural	"Team empowerment is defined as the range of decisions the team is authorized to make" (p.282)
Tampoe (1989)	Structural (Empowerme nt Climate)	"an encouraging organization style and culture supported by the appropriate resources which together provide the opportunity which enables the employee to apply competence and commitment" (p.15)
Tuuli & Rowlinson (2007)	Structural and psychological	"It shows empowerment climate as having a causal role in determining individual and team psychological empowerment," (p.245)
Tuuli & Rowlinson (2009a)	Structural and psychological	"the perception of empowerment (psychological empowerment) is shaped through interaction with environmental factors (empowerment climate), to produce behavioural outcomes (job performance)." (p.474)
Williams (1997)	Structural	"they are empowered to share managerial functions and plan and control work processes, and they often create their own schedules, set their own goals, prepare their own budgets and keep inventories" (p.219)
Zhang & Bartol (2010)	Psychological	Psychological empowerment, is defined as a psychological state that is manifested in four cognitions: meaning, competence, self-determination, and impact" (pp.107-108)

Some researchers define empowered team as a self-directed team which shares part of the management responsibilities of the project managers (Williams, 1997) or simply regard the term 'empowerment' as "the modern version of the older term 'delegation'" (Harborne & Johne, 2003, p.125). Many studies use the terms 'autonomy' and 'empowerment' interchangeably (Stewart, 2006). The empowering leadership and behaviour mentioned in much literature can be regarded as the 'empowering climate' in Figure 2.5 (p.38) which is summarized from the psychological TE models of Chen and colleagues (2007 & 2011), Kirman & Rosen (1999 & 2004) and Seibert and colleagues (2004 & 2011).
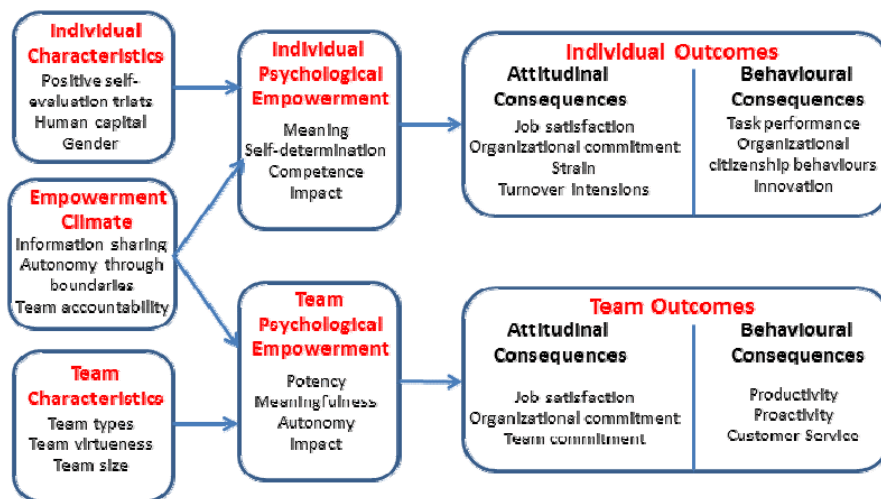
Figure 2.5: An integrative model of empoerment (Conolidated from Kirkman & Rosen,1999, Seibert et al., 2004 and Seibert et al., 2011)

In summary, the number of studies on psychological TE of project team, meaning the collective empowerment of the whole project team, is limited. The integrative multi-level study of Tuuli & Rowlinson (2009a), considering the impact of both structural and psychological empowerment at individual and team levels, shows that team psychological empowerment is more effective in enhancing project team performance because it saves the need

of project managers to "selectively empower individuals" (p.494). Hence, more studies on the impact of psychological TE on project team performance and PS are desirable as this may reap economies for the project.

The research on PM in Hong Kong is reviewed and discussed in the next section.

2.6 Project Management in Hong Kong

The PM community in Hong Kong has significantly grown over the last two decades. For instance, the membership of Project Management Institute Hong Kong Chapter (PMIHK) grew from 5 in 1997 to over 1250 in 2007 (PMIHK, 2015). The world-recognized PM credential of Project Management Professional (PMP$^{@}$) is regarded as the preferred qualification in staff recruitment of big corporations and project tenders of the HKSAR government as shown in their recruitment advertisements.

Most research on PM in Hong Kong is conducted in the construction industry (Chan & Chan, 2004; Chan, Chan, Chiang, Tan, Chan & Ho, 2004; Tuuli & Rowlinson, 2007, 2009a, 2009b, 2010; Tuuli et al., 2012). The success of construction projects in Hong Kong encompasses a wide range of factors, including the project-related, procurement-related, PM related, participant-related and external ones (Chan, Scott, et al., 2004, Chan & Tam, 2000). According to some researchers, the leadership style of construction project managers in Hong Kong is more relationship-oriented while other styles, including the directive, supportive, participative and achievement-oriented ones, are generally used at different stages of the

project life cycle in Hong Kong (Rowlinson, Ho & Po-Hung, 1993). However, the frequent occurrence of delays in construction and civil engineering projects, leading to huge costs and losses in profits, has attracted many researchers to explore the causes of project failure and the development of improvement actions (Assaf, Al-Khalil & Al-Hazmi, 1995; Chan & Kumaraswamy, 1997, 2002; Dissanayaka & Kumaraswamy, 1999; Lo, Fung & Tung, 2006; Shen, 1997).

In Hong Kong, the most widely used PM structure by the public utilities, manufacturing, government agencies and engineering services is project matrix in which a manager is assigned to be responsible for the project while the functional managers only help in assigning needed personnel (Chuah, Rao Tummala & Nkasu, 1995). PM was regarded in a study as more important at the definition and specification stages of new product development in toy industry (Sun & Wing, 2005). Some studies also suggest that IT project managers need to expand their technical competencies to soft skills and knowledge (Ng & Walker, 2008; Wan, Ma & Banerjee, 2009).

However, there are only limited number of studies about projects and TE in Hong Kong. The integrative multi-level study of Tuuli & Rowlinson (2009a) found team psychological empowerment effective in enhancing performance of construction project teams. However, an action research study on an accounting firm in Hong Kong shows that structural team empowerment might cause adverse impact if a facilitating organizational and social culture is absent (Davison & Martinsons, 2002).

2.7 Research Gaps and Research Questions

2.7.1 Research Gaps

From a review of the extant literature on PM and TE, gaps for further research are identified.   The first gap identified is the limited number of empirical studies about the relationship between PM and PS.   Although PM is well acknowledged as very important for implementing a successful project (Belassi & Tukel, 1996; Cooke-Davies, 2002; Morris & Hough, 1987; Pinto & Slevin, 1987 & 1988a&b), there is only one empirical research study that evaluates the contribution of PM performance to PS (Mir & Pinnington, 2014).   The research of Mir & Pinnington (2014) evaluates the contribution of PM performance, represented by the Project Management Performance Assessment model (Bryde, 2003a), and finds that PM Performance can only explain 44.9% of variance in PS in the PM community in the UAE (p.215).   Therefore, it is worthwhile to continue studying the relationship between PM Performance and PS in other contexts to evaluate the generalizability of the findings of Mir & Pinnington (2014).   As PM Key Performance Indicators, Project Lifecycle Management Processes and PM Staff were found to be the most influential on PS in the UAE markets, more studies will help to confirm if they have similar impact in other countries.   Further research with the model of Mir & Pinnington (2014) to be conducted in Hong Kong will help to increase the number of empirical studies on the relationship between PM Performance and PS, as well as expanding the coverage of such studies to other countries.

The second gap is the lack of empirical studies on the impact of psychological TE, meaning the feeling of potency, autonomy, meaningfulness and impact shared by a team (Kirkman & Rosen, 1999; Kirkman, Rosen, et al., 2004), on PM performance and PS. The previous research on the effectiveness of psychological TE to enhance team performance is mostly about functional teams (Kirkman & Rosen, 1999; Kirkman, Rosen, et al., 2004) as opposed to project teams. The term 'empowerment' mentioned in most PM studies is about structural TE meaning the delegation of decision making power to project teams (Please see Table 2.4 on p.36). A better understanding of the moderating effect of psychological TE on the relationship between PM Performance and PS may expand the scope of PM research to cover the theories of team motivation. Besides, a more comprehensive understanding of the impact of psychological TE on different types of teams including project teams may also give project managers more insight into the effective management of project teams.

The third gap is the restriction of PM studies in Hong Kong to a single industry, the construction industry, as evidenced by studies of Chan and colleagues (2000, 2001, 2002 & 2004), Rowlinson and colleagues (1993 & 2008) and Tuuli and colleagues (2007. 2009a, 2009b, 2010 & 2012). Research involving PM practitioners from different industries in Hong Kong may help to enhance the understanding of PS in different industries. The number of research studies on the practice of psychological TE by project teams in Hong Kong is also low, except that of Tuuli and colleagues (2007, 2009a&b, 2010 & 2012) within the construction industry. A study covering the concepts of

PM, PS and psychological TE with PM practitioners from various industries in Hong Kong is therefore suggested.

2.7.2 Research Questions & Hypotheses Development

From the review of the literature on PM, PS and TE, the following research questions are developed for this study:

RQ1: To what extent does PM performance contribute to PS in Hong Kong?

RQ2: To what extent does TE moderate the relationship between PM performance and PS in Hong Kong?
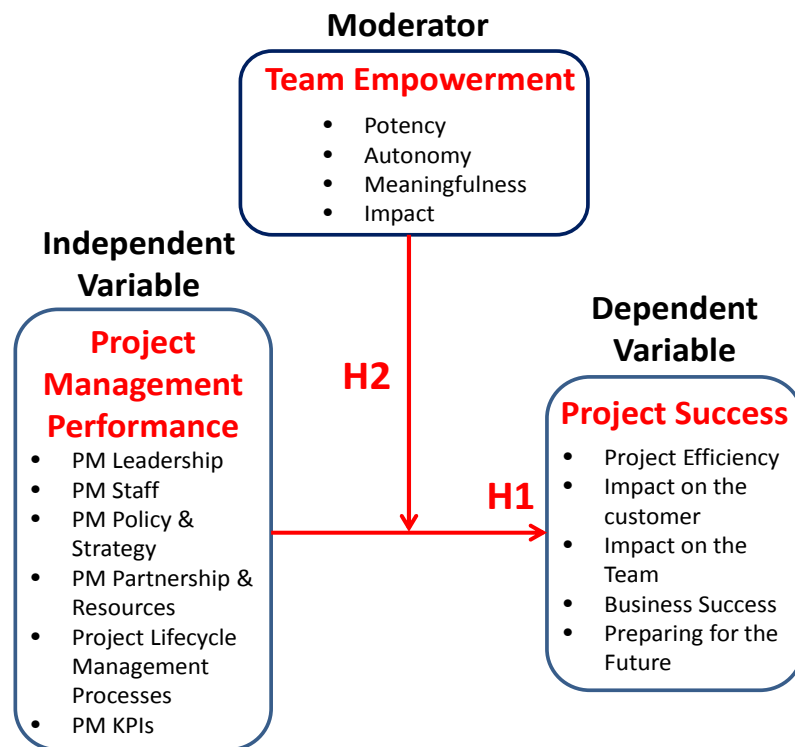
Figure 2.6: Theoretical framework and research model

Previous studies found that PM Performance only partially explains PS (Mir & Pinnington, 2014). Since the commitment of team members is identified as a critical success factor for projects (Belassi & Tukel, 1996), it is worthwhile to explore if TE, which is found to be effective in enhancing

performance of teams (Kirkman & Rosen, 1999; Kirkman, Rosen, et al., 2004), will contribute to enhancing PS or not.   A research model is proposed and shown in Figure 2.6 (p.43) to answer the two research questions.   The relationship between PM Performance and PS is hypothesized based on the study of Mir and Pinnington (2014) which concludes from the questionnaires of 154 project management practitioners in UAE organizations that PM Performance explains at least 44.9% variance in PS (p.215).   The independent variable is PM Performance which is defined as a latent construct combining the effects of PM leadership, PM staff, PM policy and strategy, PM partnership and resources, project lifecycle management processes and PM KPIs (Bryde, 2003a).   The dependent variable is the latent construct of PS as found by Shenhar and colleagues (2001), comprising project efficiency, impact on the customer, business success and preparing for the future, plus the impact on the team (Mir & Pinnington, 2014).   The following hypotheses (Figure 2.7, p.46) are developed from the first research question:

- Hypothesis 1: The relationship between PM Performance and PS in Hong Kong is statistically significant and positive.

➢ Hypothesis 1a: The relationship between PM Leadership and PS in Hong Kong is statistically significant and positive.

➢ Hypothesis 1b: The relationship between PM Staff and PS in Hong Kong is statistically significant and positive.

➢ Hypothesis 1c: The relationship between PM Policy and Strategy and PS in Hong Kong is statistically significant and positive.

➢ Hypothesis 1d: The relationship between PM Partnership and Resources and PS in Hong Kong is statistically significant and positive.

➢ Hypothesis 1e: The relationship between Project Lifecycle Management Processes and PS in Hong Kong is statistically significant and positive.

➢ Hypothesis 1f: The relationship between PM KPIs and PS in Hong Kong is statistically significant and positive.

The moderator is TE defined as the team psychological empowerment construct of Kirkman and Rosen (1999), namely potency, meaningfulness, autonomy and impact.   Kirkman and Rosen (1999) studied 111 work teams in four organiations and found that TE increases work team performance in terms of productivity, proactivity, customer service, job satisfaction, organizational commitment and team commitment (pp.62-64).   The effects of TE on improving virtual team performance were further tested to be positive by Kirkman, Rosen and colleagues (2004, p.185).   The hypotheses developed for answering the second research question are:

• Hypothesis 2: TE has a positive and significant moderating effect on the relationship between PM Performance and PS in Hong Kong.

➢ Hypothesis 2a: TE has a positive and significant moderating effect on the relationship between PM Leadership and PS in Hong Kong.

➢ Hypothesis 2b: TE has a positive and significant moderating effect on the relationship between PM Staff and PS in Hong Kong.

➢ Hypothesis 2c: TE has a positive and significant moderating effect on the relationship between PM Policy and Strategy and PS in Hong Kong.

➢ Hypothesis 2d: TE has a positive and significant moderating effect on the relationship between PM Partnership and Resources and PS in Hong Kong.

- ➢ Hypothesis 2e: TE has a positive and significant moderating effect on the relationship between Project Lifecycle Management Processes and PS in Hong Kong.

- ➢ Hypothesis 2f: TE has a positive and significant moderating effect on the relationship between PM KPIs and PS in Hong Kong.
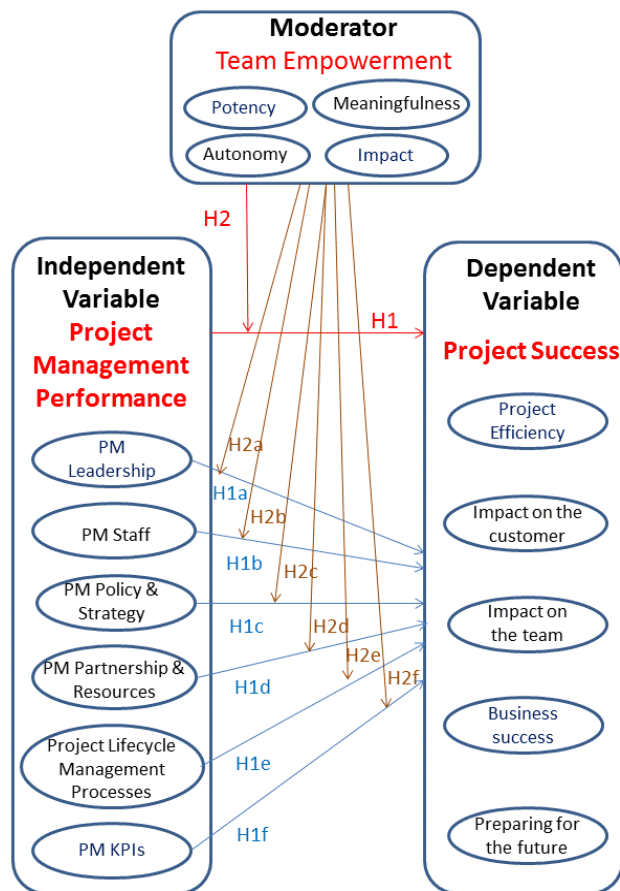
Figure 2.7: Research hypotheses and key variables

This research will provide empirical support to the relationship between PM and PS.   It will also contribute to an expanded scope of studies on PM and PS to include TE.   The findings will provide a better understanding of the effectiveness of PM Performance and TE in helping project managers in Hong Kong to create PS.   It will involve PM practitioners from different

industries in Hong Kong to address the limitations of previous PM studies in Hong Kong, which were restricted to the construction industries. This research aims to provide project managers from various industries in Hong Kong with insights into managing projects and practicing TE to enhance project team performance and likelihood of PS.

2.8 Conclusion

In this chapter, the research concerned with theories of PM and TE was reviewed. PM is regarded as important, but not adequate, for PS. TE is suggested as effective in enhancing project team performance. In view of the research gaps identified, a study to explore the relationship between PM Performance, PS and TE in Hong Kong is suggested. A research model and fourteen hypotheses for answering two research questions are developed. In particular, this research hopes to expand the scope of study on PM in Hong Kong from the construction industry to other industries with the participation of a large population of PM practitioners. The consideration of TE in enhancing project team performance for PS also enriches the theory of PM. The methodology in conducting this research is discussed in details in next chapter, including the research paradigm, the research design, the data collection method, the data analysis method and research limitations.

Chapter 3   Research Methodology and Design

3.1 Introduction

In this chapter, the research methodology adopted in conducting this study is discussed.   Research methodology is the procedural framework that guides how research is conducted, leading the whole process from gathering data to analysis of data in order to answer a research question and to elaborate on the significance of the findings (Amaratunga, Baldry, Sarshar, & Newton, 2002).   The aim of this study as stated previously is to explore the relationship between project management (PM) performance and project success (PS) in Hong Kong, together with a consideration of the possible moderating effect of team empowerment (TE) on that relationship.   The research methodology is therefore modelled on the study of Mir and Pinnington (2014) that tested the relationship between PM Performance and PS and also on the work of Kirkman, Rosen, Tesluk and Gibson (2004) that studied the impact of psychological TE on team performance.   This chapter proceeds to discuss the research design and methodology employed to conduct the research.   The research paradigm adopted for this study together with the theoretical framework is described.   The research design and methodology, including the sampling method, the data collection techniques and the data analysis approaches, are explained in details. Importantly, the ethical issues concerned with the conduct of the study and the limitations of this study are also discussed.

3.2 Research Philosophy and Paradigms

This research is guided by the research paradigm outlined in the following paragraphs. A paradigm is the basic belief system or the worldview that guides a researcher in making ontological, epistemological and methodological decisions (Guba & Lincoln, 1982, 1994). A researcher has his/her own view about the answers to the ontological question which is about the form and nature of reality, the epistemological question which is about the nature of relationship between the researcher and the reality, and the methodological question which is concerned with how a researcher finds out what can be known (Guba & Lincoln, 1994). A choice of paradigm lays down "the intent, motivation and expectations for the research" (Mackenzie & Knipe, 2006, p. 193). Various research paradigms are formed with different views to these questions (Meredith, Raturi, Amoako-Gyampah, & Kaplan, 1989; Willmott, 1993). Burrell and Morgan (1979) classified the paradigms into functionalist, interpretive, radical humanist and radical structuralist (Figure 3.1, p.49).

THE SOCIOLOGY OF RADICAL CHANGE

'Radical humanist'	'Radical structuralist'

SUBJECTIVE ——————————————— OBJECTIVE

'Interpretive'	'Functionalist'

THE SOCIOLOGY OF REGULATION
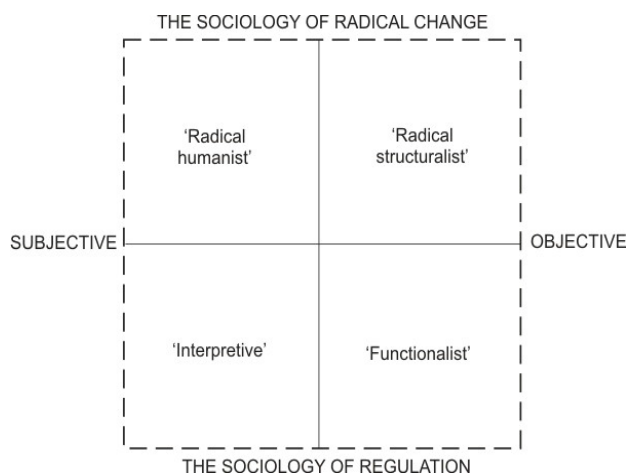
Figure 3.1: Four paradigms of Burrell and Morgan (Source: Burrell and Morgan, 1979)

Guba and Lincoln (1994) classified the research paradigms as positivism,

post-positivism, critical theory and constructivism. Positivism involves a realism ontology, dualist and objectivist epistemology as well as experimental and manipulative methodology. Regarding post-positivism, the ontology is critical realism, together with modified dualist/objectivist epistemology and modified experimental/manipulative methodology. For critical theory paradigm, the ontology is historical realism, the epistemology is transactional and subjectivist while the methodology is dialogic and dialectical. The constructivist paradigm takes a relativist ontology, a transactional and subjectivist epistemology, as well as a hermeneutical and dialectical methodology (Guba & Lincoln, 1994, pp.109-111).

A positivist research paradigm was adopted to conduct this research with the aim of understanding the relationship between PM Performance and success of projects in Hong Kong, as well as identifying the possible moderating effect of TE on that relationship. A positivist research paradigm is rooted in the natural science aiming at discovering the universal laws that exist out there (Bryman & Bell, 2011; Cavana, Delahaye, & Sekeran, 2001), with an advantage of maintaining independence of the researchers from the study subject to ensure objectivity in the testing of hypothetical-deductive generalizations (Amaratunga et al., 2002). As the ontology of positivism is naïve realism and the epistemology is objectivist assumption, a quantitative research methodology is desirable for verification of hypotheses in this study (Guba & Lincoln, 1994). A quantitative method, which involves using deductive inquiry approach to collect data using predetermined instruments for testing of theories (Bryman & Bell, 2011; Creswell, 2009), was used for

this study.   Scientific methods with deductive logic plus observation and experiment, like quantitative survey research, are suitable for positivists to refute propositions, confirm probabilistic causal laws and make generalizations (Fossey, Harvey, McDermott & Davidson, 2002).

3.3 Conceptual Framework

The theoretical framework of this study encompasses the major concepts of PM performance, PS and TE as described in Chapter 2.   Basing on the findings of Mir and Pinnington (2014) that "Project Management Performance explains at least 44.9% variance in Project Success" (p.215) and the effectiveness of TE in enhancing team performance identified by Kirkman and other researchers (Kirkman & Rosen, 1999; Kirkman, Rosen, et al., 2004), a research framework was established to guide the research (Figure 2.6 in Chapter 2 on p.43).   The framework and its relationships was established and articulated in Chapter Two.

In order to fill the research gaps mentioned previously, fourteen hypotheses were developed basing on the theories of PM and TE to guide this research to answer two research questions (Figure 2.7 in Chapter 2 on p.46).   The first seven hypotheses (H1 and H1a-f) explored if the relationship between PM Performance and PS identified by Mir and Pinnington (2014) can be generalized to the Hong Kong PM environment or not.   Another seven hypotheses (H2 and H2a-f) were established to test whether TE creates moderating impact on the relationship between PM Performance and PS or not.

3.4 Key Variables and Measurement Instruments

A variable is "an attribute on which cases vary" (Bryman & Bell, 2011, p. 42). There are different types of variables: independent variable, dependent variable and moderating variable. An independent variable is an attribute that leads to an outcome while a dependent variable is the result of the influence of an independent variable on it (Creswell, 2009). A moderating variable exerts a contingent effect on the relationship between the independent variable and dependent variable (Sekaran & Bougie, 2013). Figure 2.7 on page 46 shows that the independent variable of this research was PM Performance, the dependent variable was PS and TE was a moderating variable.

The measurement of research is the determination of numbers or any valid symbols to denote the objects of a research according to a specific set of rules (Sekaran & Bougie, 2013, p.211). A measure should be both valid and reliable to ensure validity and reliability of a research. According to Sekaran and Bougie (2013), it is better to "use the instruments already reputed to be 'good' rather than laboriously developing" new ones (p.228). The measures in this study were therefore adopted from previous published studies, including Bryde's (2003a) measure of PM Performance, Shenhar and colleagues' (2001) measure of PS, Mir and Pinnington's (2014) measure of 'Impact on the Team' which is adopted from Stefanovic's (2008) teamwork effectiveness measure, and Kirkman, Rosen and colleagues' (2004) measure of TE. The survey instrument (Appendix 2, p.159) was developed by combining the questionnaires of Mir and Pinnington (2014) and that of Kirkman, Rosen and colleagues (2004). It includes 59 questions related to

PM Performance (20 questions in Section A), PS (21 questions in Section B), TE (12 questions in Section C) and the background of the respondents (6 questions in Section D).   The measures of PM Performance and PS were denoted with 5-point Likert scales from strongly agree (5) to agree (4), neutral (3), disagree (2) and strongly disagree (1). The TE measures were denoted with 7-point Liket scales including strongly agree (7), agree (6), slightly agree (5), neutral (4), slightly disagree (3), disagree (2) and strongly disagree (1).   Likert scales are used by researchers to measure attitudes and opinions (Hair, Wolfinbarger Celsi, Money, Samouel, & Page, 2011).   A Likert scale depicts answers to a series of questions which are combined to show an attitudinal measurement scale (Boone & Boone, 2012).

3.4.1 Project Management Performance Measure

The independent variable of this research was PM Performance.   According to Bryde (2003a), PM Performance can be evaluated with a Project Management Performance Assessment (PMPA) model (Figure 2.1 in Chapter 2 on p.18).   The PM Performance measure developed by Bryde (2003a) was chosen for this study because of its comprehensiveness in covering various PM aspects and its validity shown by Qureshi et al., (2009), Din, Abd-Hamid, and Bryde (2011) and Mir and Pinnington (2014).   The questions concerned with PM Performance were adopted from the questionnaire of Mir and Pinnington (2014) with the approval of Dr. Pinnington (Appendix 3, p.165), including 20 questions covering:

1. PM Leadership (4 questions): about the awareness of the role of projects as a vehicle for change and a common project language culture;

2. PM Leadership (2 questions): about development of the PM capability of staff and the concerned performance measurement as well as reward systems;

3. PM Policy and Strategy (3 questions): about the systematic development of PM   practices across an organization;

4. PM Partnerships and Resources (3 questions): about the establishment of win-win partnership with all stakeholders;

5. Project Lifecycle Management Processes (4 questions): about the management of all processes of the whole project life cycle;

6. PM KPIs (4 questions): about establishment of performance indicators against requirements of different stakeholders and systems to improve performance in meeting the KPIs.

3.4.2 Project Success Measure

The dependent variable of this study was PS.   PS has been a widely researched PM topic over the last four decades (Ika, 2009; Jugdev & Müller, 2005; Müller & Jugdev, 2012).   It is a "multi-dimensional and networked construct", perception of which is influenced "by individual personality, nationality, project type, and contract type" (Müller & Jugdev, 2012, p.768). After reviewing different frameworks for evaluating PS (Atkinson, 1999; Baccarini, 1999; Cooke-Davies, 2002; Lim & Mohamed, 1999; Lipovetsky et al., 1997; Pinto & Mantel Jr, 1990; Westerveld, 2003), the four dimensional framework of Shenhar et al. (2001) was chosen for accessing PS in this study because it is more comprehensive covering the short-term and long-term objectives of various kinds of stakeholders.   It was also cited in many previous PM studies (Bryde, 2008; Dvir et al., 2006; Jugdev & Müller, 2005).

In the work of Mir & Pinnington (2014), the 13 measures of PS developed by Shenhar et al. (2001) were adapted and modified into 18 items under four dimensions:

1. Project efficiency (3 items): Meeting schedule and budget goals;

2. Impact on the customer (7 items): Meeting functional performance, technical specifications, fulfilling customer needs, solving a customer's problem, customer use and customer satisfaction;

3. Business success (4 items): commercial success and creating a large market share;

4. Preparing for the future (4 items): creating a new market, creating a new product line and developing a new technology.

Mir and Pinnington (2014) also took consideration of the importance of teamwork effectiveness (Stefanovic, 2008) in determining PS which is "influenced by competencies and quality of teamwork" (Müller & Jugdev, 2012, p.768).   They added the fifth dimension of PS as:

5. Impact on the project team (3 items): growth of team members, members being energized and increased loyalty of team members.

As a result, PS became a 21-item measure in the study of Mir and Pinnington (2014) and is adopted for this research.

3.4.3 Team Empowerment Measure

The moderator to be tested in this study was TE.   TE is the collective psychological motivation of a team towards their organizational tasks (Kirkman & Rosen, 1999).   The four-dimension model of Kirkman and Rosen (1999) is a widely quoted definition of TE (Chen et al., 2007; Kirkman &

Rosen, 1999; Kirkman, Rosen et al., 2004; Seibert et al., 2004; Seibert et al., 2011), including a 26-item scale (pp.66-67):

1. Potency: an 8-item team-level measure of Guzzo and colleagues (1993, cited in Kirkman & Rosen, 1999), assessing the level of confidence of team members on performing well;

2. Meaningfulness: a 6-item individual-level measure of Thomas and Tymon (1993, cited in Kirkman & Rosen, 1999) adapted for the team level, assessing the level of feeling of team members about the meaningfulness of their group tasks;

3. Autonomy: a 6-item individual-level measure of Thomas and Tymon (1993, cited in Kirkman & Rosen, 1999) adapted to the team level, assessing the level of feeling of the team members about the capability to control and make choices about what to do;

4. Impact: a 6-item individual-level measure of Thomas and Tymon (1993, cited in Kirkman & Rosen, 1999) adapted to the team level, assessing the level of feeling of team members about the impact and influence they have on one another and the company.

In this study, a version of psychological TE developed by Kirkman, Rosen and colleagues (2004) was used. That version has shortened the 26-item measure into 12 items, taking 3 items from each of the four dimensions. Kirkman, Rosen and colleagues (2004) used confirmatory factor analysis to validate the scale, finding support for the scale of TE as a valid and reliable team-level construct (p.181). The validity of this 12-item scale of TE was also supported by Tuuli and Rowlinson (2009a) and Tuuli, Rowlinson, Fellows and Liu (2012).

3.5 Research Design

A research design is the framework for the collection and analysis of data chosen by a researcher after considering the connection between variables, generalization of the results, meaning of the behaviour and the social context (Bryman & Bell, 2011).   A design that provides the relevant information for answering the research questions and enables completing research in the most efficient manner should be chosen (Hair et al., 2011).   Some examples of research design are experimental design, cross-sectional design, longitudinal design, case study design and comparative design (Bryman & Bell, 2011).   On the other hand, Hair and colleagues (2011) grouped various designs into three types, namely exploratory design, descriptive design and causal design.   Exploratory design is used when the researcher has little information about the research problem.   Descriptive design collects data to show characteristics of a research topic.   Causal design explores if one event will lead to another or not, especially whether a change in one event will cause a corresponding change in another event.

The design used in this research was a cross-sectional design which involves the collection of data about two or more variables on more than one case at a single point in time "to detect patterns of association" (Bryman & Bell, 2011, pp.53-54).   Social survey research or structured observation is typical of quantitative cross-sectional design while qualitative interviews or focus groups at a single point in time are usually used in qualitative cross-sectional design.   A survey design, that "provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population" (Creswell, 2009, p.153), was used in this study to

look into the relationship between PM performance and success of project in Hong Kong, together with consideration of the effects of TE on such a relationship.

3.5.1 Sampling

A sample, which is the subset of a population, needs to be used in research because it is practically impossible to test every element with the entire population in view of the time, costs and other human resources to be incurred (Sekaran & Bougie, 2013, pp.242-243).   Proper management of the sampling process can enable the selection of a sufficient number of the right elements so that the research findings can be generalized to the entire population (Cavana et al., 2001).   The process includes the definition of the population, determination of the sample frame, sample design with an appropriate sample size, and finally execution of the sampling process.

A population is "the entire group of people, events or things of interest that the researcher wishes to investigate" (Cavana et al., 2001, p.252).   The population for this study was the Project Management Professionals (PMP®) certified by the Project Management Institute (PMI) (http://www.pmi.org/About-Us.aspx) located in HK with contact information held by Project Management Institute Hong Kong Chapter (PMIHK) (http://www.pmi.org.hk) and the members of PMIHK.   All PMP® are experienced project managers who have passed the certification examination of PMI, together with a university education, more than three years' PM experience out of which four thousand and five hundred hours should be at leading and directing projects, and at least thirty five hours of

PM education. There are about 5000 PMP® in Hong Kong and PMIHK members whose contact information is held by PMIHK for supporting their certification and continuous professional development needs. Those PMP® and PMIHK members failing to provide or update their email addresses with PMIHK were not included.

A sampling design can be either probability or nonprobability based. The elements in probability sampling have some known chance or probability of being selected as sample subjects, but not for those in a nonprobability sampling (Cavana et al., 2001; Sekaran & Bougie, 2013). Examples of probability sampling are simple random sampling, which is the least biased but cumbersome with an equal probability of inclusion for every unit of the population, as well as various types of restricted sampling, including systematic sampling, stratified random sampling, cluster sampling, single-stage and multistage cluster sampling and double sampling. Examples of non-probability sampling designs are convenience sampling and purposive sampling for example judgement sampling and quota sampling. A simple random sampling design was used for this study to ensure wider generalizability of the research findings. In order to avoid the sampling error committed by many web-based surveys (Sills & Song, 2002; Van Selm & Jankowski, 2006), whereby a subset of heterogeneous population were selected to represent the whole population (Sills & Song, 2002), the entire population of PMP® in Hong Kong and PMIHK members was engaged in this research. The sample frame was set as all PMP® in Hong Kong and PMIHK members who have provided update email addresses to PMI and accessible by PMIHK. However, a sample size of over 500 is prone to committing Type

II errors (Cavana et al., 2001, p.279), which are errors of failing to reject the null hypothesis given that the alternate hypothesis is actually true because a large sample size may make a weak relationship appear significant (Sekaran & Bougie, 2013). In this research, a 95 percent confidence level was taken together with the consideration of the precision level and the PMP[R] and PMIHK members as a homogenous group (Hair et al., 2011). In determining the desirable sample size for this study, a reference was made to the table for determining sample size created by Krejcie and Morgan (1970) basing on the following formula:

$$s = X^2 NP\ (1\text{-}P) / d^2\ (N\text{-}1) + X^2 P(1\text{-}P)$$

where s = required sample size;

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841);

N = the population size;

P = the population proportion (assumed to be .50 since this would provide the maximum sample size);

d = the degree of accuracy expressed as a proportion (.05)

The required sample size suggested for a population of 5000 is therefore 357 (Krejcie & Morgan, 1970, p.608). A letter stating the objectives and possible contribution of this research was sent to the executive committee of PMIHK to seek their support in reaching the targeted research population (Appendix 4, p.167). To encourage support from PMIHK, a summary of the research results and findings will be given to PMIHK for sharing with their

members and the PMP® in Hong Kong.   Upon acknowledgement of PMIHK in assisting in this study (Appendix 5, p.170), an invitation email listing the research details together with the link for participating in an anonymous online survey (Appendix 6, p.172) was sent by PMIHK to the target participants.   Respondents joined the research on voluntary basis by accessing the survey link without the need to supply any personal information.

3.5.2   Data Gathering Techniques

The data collection method was an online electronic survey which was constructed by combining the questionnaires of Mir and Pinnington (2014) and Kirkman, Rosen and colleagues (2004).   Online survey is regarded as a double-edged sword for conducting research because both the advantages and disadvantages are significant (Couper, 2000).   A survey has the advantages of higher efficiency, lower cost, less time consumed and the ability to reach a larger population in comparison with other methods like interview, focus group or observation (Sekaran & Bougie, 2013).   An electronic survey was preferred to paper survey in this study for a wide range of benefits, including global reach, flexibility, speed and timeliness, convenience, ease of data entry and analysis, low administration cost and ease of follow-up (Evans & Mathur, 2005).   The use of online survey is increasingly more popular following the rapid penetration of personal computer and internet to the population (Van Selm & Jankowski, 2006). However, the problem of low response to online survey is still worrying (Brick, 2011; Couper, 2000) although no significant difference in the response rate between mail and online surveys has been observed (Millar &

Dillman, 2011; Kaplowitz, Hadlock & Levine, 2004). It is necessary therefore to manage the possible risk of low response rate from online surveys because "a probability sample with a low response rate is itself a volunteer sample" (Brick, 2011, p.884). It was realized that "large groups of people still do not feel comfortable in responding via the computer" (Sekaran & Bougie, 2013, p.148). Actions suggested to improve the response rate to online surveys include improvement in the layout of survey, highlight on the relevance of the survey topic to respondents and mentioning of the time needed to complete the survey (Sills & Song, 2002). An offer of nominal incentive has also been suggested by many researchers to enhance the response rate to online surveys (Millar & Dillman, 2011; Van Selm & Jankowski, 2006). The incentives highlighted in this research were the contribution to a better understanding of the PM Performance in Hong Kong and the sharing of the research results with the respondents through PMIHK, such as publishing in their newsletters.

The electronic survey used for this research was developed on the online survey platform of Survey Monkey (https://www.surveymonkey.com/) under a paid package which allows more customization of the survey design. Survey Monkey is a widely used online survey tool due to its large number of features offered at reasonable pricing structure and the ease of use (Marra & Bogue, 2006). The data was protected in the survey platform by advanced security control measures like SSL, Norton and TURSTe validation (https://www.surveymonkey.com/mp/take-a-tour/?ut_source=header).
Safety and security of the survey platform was also highlighted in the

participant invitation email (Appendix 6, p.172).   Control was set to ensure that respondents reply all questions before moving on to the next section, thus reducing the risk of missing data.   The responses were frequently downloaded in SPSS format into the researcher's personal computer to ensure timely and secured backup (Marra & Bogue, 2006).

3.5.3 Administration Procedures

The data collection process was carefully managed with dual concern for the ethical requirements of the university and personal data privacy requirements under the Personal Data Privacy Ordinance of the HK SAR Government.   All data was collected on needs basis and used only for this research.

The online survey data stored on the online survey platform of surveymonkey.com was accessible only by the Student Researcher and supervisor with password protection.   The survey platform was closed and removed from the Survey Monkey website on the deadline of survey submission.   All respondent data was downloaded and stored in a personal computer of the Student Researcher, as well as a backup computer, accessible by the Student Researcher and supervisor with password control for access.   The response data was directly downloaded in SPSS format for analysis in SPSS software version 21 to save the need for manual data entry and to prevent input errors (Marra & Bogue, 2006).   All data analysis files and reports were prepared with version control and password protection. The data will be kept for five years after the approval of the DBA dissertation

and then discarded in accordance with the University of Newcastle guidelines for the disposal of data.

3.6 Data Analysis Methods

Data analysis is a process involving the steps of (1) getting the data ready; (2) getting a feel for the data; (3) testing the goodness of the data; and (4) testing the hypotheses (Cavana et al., 2001). Upon closure of the data collection period, the responses to online survey were collected, coded, transformed when needed, and analyzed in SPSS program version 21. In getting the data ready for analysis, the data was examined to identify if any inconsistencies existed. The problem of blank responses, which was managed by dropping the questionnaires with more than 15 per cent of the questions unanswered and assigning the mean value of all responses to those with less missing data (Hair et al., 2011, p.296), was fixed before further analysis. Then, the data was analyzed in the SPSS program.

A series of quantitative analyses, including univariate analysis, bivariate analysis and multivariate analysis, were conducted with the aim of using the results to answer the research questions and test the research hypotheses (Tharenou, Donohue & Cooper, 2007). Steps for analysis included reviewing the conceptual framework and postulated relationships, preparing the data, determining the needs for descriptive analysis or hypothesis testing, conducting the analysis and evaluating the findings for meanings (Hair et al., 2011). It is an iterative process requiring a researcher to review both the data and research objectives (Kent, 2015).

3.6.1 Univariate Analysis

To get a feel for the data, for example for identifying the variability, outliers and biases, univariate analysis was conducted to make some preliminary review of the mean, range, standard deviation and variance in the data. Univariate analysis is the analysis of one variable at a time so that the response to each construct can be better understood (Bryman & Bell, 2011; Tharenou et al., 2007). It produces a presentation of the distribution of values inside variables one at a time in the forms of tables, charts or graphs so that an initial understanding on how well the respondents have responded and how good the measures are can be formed by "eyeball" (Kent, 2015).

The descriptive statistics of each construct including the central tendency, dispersion and distribution shape were presented in tables and charts as well as evaluated to "encapsulate the essence of the story the data are telling" (Kent, 2015, p.80). Frequency tables and distribution histograms were checked to ensure normal distribution of the data. An evaluation of the central tendency, dispersion and distribution shape was made to ensure sufficient statistical inferences of the collected data.

Before undertaking further analyses, goodness of the data was tested with reference to reliability and validity measures. The reliability of a measure can be shown by testing its consistency and stability in terms of the Cronbach's alpha coefficient which indicates how well the variables are positively correlated to one another (Tharenou et al., 2007). The Cronbach's alpha coefficient was calculated by using the average correlation

among the items and it has a value of zero to 1.   If the Cronbach's alpha is <0.7, the variable is not significant so removal of that item may enhance the inter-item consistency of the measure (Sekaran & Bougie, 2013, p.295). The validity of a measure is the extent to which it "measures what it is supposed to measure" (Hair et al., 2011, p.238).

3.6.2 Bivariate Analysis

By conducting bivariate analysis, the relationship between two variables can be identified (Tharenou et al., 2007).   Once construct reliability and validity was determined, a bivariate correlation analysis was conducted to produce the parametric Pearson's correlation matrix which shows the direction, strength and significance of the relationship between each variable of the PM Performance construct, the PS construct and the TE construct.   The r values were reviewed to see whether the association between PM Performance and PS was positive or negative.   A r value close to 1 indicates a perfect model fit while a low r value close to 0 hints the lack of association (Cavana et al., 2001, Tharenou et al., 2007).   Multicollinearity effects of those highly correlated independent variables, i.e. those having the squared multiple correlations near or equal to 1 or -1 (Sekaran & Bougie, 2013), were also evaluated.

3.6.3 Multivariate Analysis

Multivariate analysis was conducted to assess the simultaneous effects of multiple variables (Tharenou et al., 2007).   Multivariate analysis reveals the relationship between three or more variables, together with the underlying

patterns, the interrelated influence and a prediction on the values of outcome variables (Kent, 2015; Tharenou et al., 2007). The multivariate analyses conducted for this research were multiple regression and hierarchical multiple regression.

Multiple regression and hierarchical multiple regression analyses were conducted for hypotheses testing. The significance of all hypothesis testing results were reviewed to prevent committing Type 1 error which is the probability of rejecting the null hypothesis when it is actually true (Sakaran & Bougie, 2013). If $p < 0.05$ and the t-statistic is larger than the appropriate table value, the null hypothesis can be rejected and the hypothesis proposed in this study can be confirmed. First, multiple regression tests were conducted to see how far PM Performance has caused variance in PS in Hong Kong. The results were also compared in Chapter 5 with that of Mir and Pinnington (2014) who found that PM Performance explains 44.9% of the variance in PS for professionals working in PM organizations in the UAE. Then, a series of hierarchical multiple regressions were conducted to find the independent effect of PM Leadership, PM Staff, PM Policy & Strategy, PM Partnership & Resources, Project Lifecycle Management Processes and PM KPIs on PS in comparison to the simultaneous effects of all PM Performance constructs together. The regression results were also analysed to identify the PM Performance variables that have the strongest impact on variance of PS in Hong Kong.

Furthermore, hierarchical multiple regressions were run with the addition of

the TE construct to see if it is a moderator on the relationship between PM Performance and PS or not. The interactions of TE construct on various constructs of PM Performance variable were evaluated by including the products of the two variables in the regression model (Sekaran & Bougie, 2013, p.320). In addition to identifying TE as a moderator or quasi-moderator on PM Performance, a series of hierarchical multiple regression analysis were conducted to find out the level of moderating effect of TE on each construct of the PM Performance variable.

3.7 Ethical Issues

In conducting this research, the ethical requirements under the National Statement on Ethical Conduct in Research Involving Humans (Australia) were strictly followed. Approval has been sought from the Human Research Ethics Committee of the University of Newcastle (Approval No. H-2015-0375). All participants have joined on a voluntary basis and no intrusive techniques were used. As an anonymous survey was used, consent was implied when a PMP® or PMIHK member responded to the online survey link (https://www.surveymonkey.com/r/PMTeamEmpowermentSurvey) which was assessable only at the third last paragraph of the invitation email (Appendix 6, p.174). Before starting the survey, participants needed to read the Participant Information Sheet (Appendix 6, pp.172-174) to understand the survey procedures.

Confidentiality of personal data of respondents was handled and managed with reference to the Personal Data (Privacy) Ordinance of the Office of the

Privacy Commissioner and Personal Data (PCPD Office, 2013) in Hong Kong. The anonymity of respondents was also guaranteed by eliminating the need to fill in the names of the participants and their organisations. All data collected is restricted for use in this research. The results drawn from analysis of the data were presented in the DBA dissertation of University of Newcastle, plus a summary of the results findings and recommendation given to PMIHK for sharing with the PMP® community and PMIHK members. The data will be kept for five years after the approval of the DBA dissertation and then discarded in accordance with the University of Newcastle guidelines for the disposal of data.

3.8 Research Limitation

The major limitation of this research was the involvement of only one PM credential in Hong Kong. Further research to involve project managers with PM credentials accredited by other PM associations, like the Association for Project Management (APM), the Australian Institute of Project Management (AIPM) and the International Project Management Association (IPMA), are desirable to enhance generalizability of the findings. Furthermore, this research was conducted in one location, Hong Kong, which is mainly influenced by the Chinese culture. It may limit the generalization of the findings to other cultures.

Another limitation of this study concerned with the research method. A quantitative research approach can only indicate the extent and strength of the relationships between PM Performance, TE and PS in Hong Kong.

Further study using a qualitative or mixed method approach may be required if the questions on why such relationships were established are to be answered.

3.9 Conclusion

This chapter provided an important framework for the conduct of this research in order to answer the research questions. The research framework and paradigm guiding the decision for choosing a quantitative method with an online survey instrument have been discussed. The sampling method, data collection process and data analysis methods were described together with the research limitations paving the way for further explaining the survey results in Chapter 4.   In the next chapter, results of the data collected are analysed and presented.

Chapter 4 Results and Analysis

4.1 Introduction

The results of analysis of the data collected for the research project are presented in this chapter.   Quantitative research evaluating the relationship between project management (PM) performance and project success (PS), as well as the moderating effect of team empowerment (TE) on that relationship, was implemented whereby electronic surveys were collected from two hundred and four Project Management Professionals (PMP®) and members of the Project Management Institute Hong Kong Chapter (PMIHK). This chapter is arranged as follows.   First, the response rates of this research are described and evaluated.   As data analysis involves the processes of distillation, classification, identification and communication so that the data collected can be turned into meaningful information (Lancaster, 2007), validity of the data is evaluated and descriptive statistics are presented. Furthermore, the results in testing the fourteen hypotheses in answering two research questions are exhibited and discussed.   Findings related to the data are outlined and summarized at the end of this chapter.

4.2 Research Results

The research data was first analyzed with the objective of making sense of the dataset as a whole so that a well-rounded view about the evidence could be generated (Kent, 2015).   The data was edited, coded and transformed before further analysis was conducted.

4.2.1 Response Rate and Data Preparation

Two hundred and four responses were received from a sample population of 5000. This results in a response rate of 4%. Although this sample size was smaller than hoped for, the number of responses was adequate for testing the construct items. According to rules of thumb used in evaluating latent constructs (Roscoe, 1975, cited in Hill, 1998), 10 times the number of construct items is required. According to the '20+5k' principle of Khamis & Kepler (2010), recommending a sample of 20 plus 5 times the number of items of independent variable, a sample of 120 would be adequate for this study which has twenty items in the independent variable of PM Performance. It also met the recommendation for at least 100 responses for conducting factor analysis (Gorsuch, 1990; MacCallum & Widaman, 1999). Conversely, Guadagnoli and Velicer (1988) regarded sample size as not essential for determining stability of the component patterns. Given a sample size of 154 was obtained in the study of Mir and Pinnington (2014), it was determined by the researcher not to continue with data collection after forty two days had elapsed for responses. Hill (1998) also stated that the determination of sample size for online survey research requires arbitrary judgment and personal choice on the part of the researcher.

The data was downloaded from the online survey site in SPSS format for analysis in IBM SPSS software v21 so that errors in data input could be prevented. The data was reviewed and edited to ensure completeness and consistency. Missing data were found in eight responses. Two rules of handling missing data, including deletion of responses and filling in the average of the total responses, were used (Hair et al., 2011). Four responses

had more than half of the questions unanswered so these responses were discarded. Four responses were found with the third section unanswered so means of the total responses were adopted to fill in the missing fields. In addition, three respondents declared their jobs not to be related to PM so their responses were also deleted from the dataset. Therefore, 197 valid responses were obtained and the final response rate was 3.94%.

4.2.2 Demographic Profiles

193 respondents provided information about their demographic background as shown in Table 4.1 (p.74). 140 (73%) respondents were male and 44 (23%) were female, while 7 (3.7%) did not disclose gender. These percentages reflect the gender distribution of project managers in Hong Kong. 190 (99%) of the respondents had a university degree education or higher while the remaining 2 (1%) were high school graduates. Most of the participants were university graduates because university education is one of the requirements for going for the PMP® certification. A majority of respondents were from the telecommunication and IT (n= 64; 33.1%) or banking and financial services (n= 58; 30.1%). About 46 (23%) respondents were from other industries like electricity public utilities (n= 8; 4.1%), transport and travelling (n= 7; 3.6%), government and social services (n= 5; 2.6%), as well as education and training (n= 4; 2%). It represents the adoption of PM in a good cross section of industries in Hong Kong. 182 (94.3%) respondents indicated that their experience in managing projects ranged from 2 years to 30 years. The average years of experience were 12.2 years. 102 (52.8%) respondents were project managers, 40 (20.7%) were project team members, 16 (8.3%) were steering committee members,

20 (10.4%) were program managers and 3 (1.6%) were end users. The remaining 12 (6.2%) respondents held various project related roles. About 127 (65.8%) respondents had PM certification, with 120 (62.2%) holding Project Management Professional (PMP$^@$) certification and 7 (3.6%) having other PM credentials. The other 66 (34.2%) did not have any PM certification. It might be due to the reason that some members of PMIHK may not go for the PMP$^®$ certification while some PMP$^®$ may not renew their credential which expires every three years and renewal requires the accumulation of certain professional development units.

Table 4.1 Demographic profile of the respondents

Demographic Information		Count	%
Gender	Male	140	73.3
	Female	44	23
	Prefer not to disclose	7	3.7
	Total responded:	191	100
Education Level	High school	2	1
	University degree and above	190	99
	Total responded:	192	100
Industry	Telecommunication and IT	64	33.1
	Banking or Financial Services	58	30.1
	Construction or Engineering	9	4.7
	Manufacturing	15	7.8
	Oil and Gas	1	0.5
	Other	46	23.8
	Total responded:	193	100
Years of project management experience	Total years:	2213	NA
	Average years:	12.2	NA
	Total responded:	182	NA
Usual role in projects	Project manager	102	52.8
	Project team member	40	20.7
	Steering committee member	16	8.3
	Programme manager	20	10.4
	End user	3	1.6
	Other project related role	12	6.2
	Total responded:	193	100
Project management certification	No PM certification	66	34.2
	Project Management Professional	120	62.2
	Other certification	7	3.6
	Total responded:	193	100

4.3 Descriptive Statistics

Descriptive statistics are the output from the transformation of raw data into the form that provides information to describe a set of data in a situation (Cavana et al., 2001). The descriptive statistics of each item of the independent variable, dependent variable and moderator of this study generated from SPSS are shown in Appendix 7 on page 176. As the independent variable and dependent variables were measured in five-point Likert scales while the moderating variable was measured in a seven-point Likert scale, a composite scale measuring the average of all concerned items was created for each construct of the various variables. The descriptive statistics for the composite scores of all constructs are shown in Table 4.2-4.4 (pp.77-83).

In addition, normality of the collected data was checked by evaluating the skewness and kurtosis of the responses. Skewness shows the departure of the distribution from normality that is 0 in a symmetrical distribution (Hair et al., 2011). A negative skewness value indicates a tail stretching to the left of the mean (smaller values) while a positive skewness is showing a stretch towards the right (larger values). Kurtosis measures how peaked is the distribution clustered to the centre, which equals to 0 in a normal distribution (Hair et al., 2011). A negative kurtosis value indicates that the distribution is flat while a positive kurtosis value is a sign of peaked distribution (Coakes, 2013). Skewness and kurtosis values in the range of +2 and -2 indicate normality of the data distribution (Hair, Wolfinbarger, Ortinau and Bush, 2008). For samples of 200 and more, the skewness and

kurtosis values up to +/-2.58 are still acceptable for indication of normality (Ghasemi & Zahediasl, 2012).

The histograms of various constructs were also examined to ensure that a normal-shaped curve existed in each graph (Figure 4.1-4.3 on pp.76-80). Distribution of the data was found to be normal with the histograms of all constructs of this study showing a symmetrical bell-shaped curve with the greatest frequency of scores centering in the middle and with smaller frequencies stretching towards the extremes (Pallant, 2011).

4.3.1 Project Management Performance Constructs

Table 4.2 (p.77) shows the descriptive statistics of the composite scales of the six constructs of the independent variable PM Performance, namely PM Leadership ('Leader'), PM Staff ('Staff'), PM Policy and Strategy ('Policy'), PM Partnership and Resources ('Partnership'), Project Lifecycle Management Processes ('Lifecycle') and PM KPIs ('KPI').   The mean response to 'Leader' was 3.87 with a standard deviation of 0.55.   The distribution was slightly leaning towards the left with a skewness value of -0.71 and a high peak kurtosis value of 1.186.   The mean response to 'Staff' was 3.51 with a standard deviation of 0.87.   The skewness value was -0.636 and kurtosis value was 0.43, suggesting a peak distribution stretching towards the left. The mean response to 'Policy' was 3.78 with a standard deviation of 0.65. The skewness value was -0.509 and kurtosis value was 0.812, suggesting a peak distribution stretching towards the left.   The mean response to 'Partnership' was 3.78 with a standard deviation of 0.59.   A skewness value

of -0.558 and a kurtosis value of 1.185 suggested a very high peak distribution stretching towards the left.   The mean response to 'Lifecycle' was 3.5 with a standard deviation of 0.74.   A skewness value of -0.540 and a kurtosis value of 0.043 suggested a low peak distribution stretching towards the left. The mean response to 'KPI' was 3.35 with a standard deviation of 0.76.   A skewness value of -0.563 and a kurtosis value of 0.48 also revealed a distribution with a low peak stretching towards the left. The mean values of various PM Performance constructs, ranging from 3.35 to 3.87, indicated that the respondents tended to slightly agree that PM was practiced in their organizations with recognizable performance.   As the skewness and kurtosis values of various constructs did not exceed the acceptable value of +2 to -2 (Hair et al., 2008), normality of the data distribution was proven.   A normal distribution of the responses was also shown in the histograms of the various PM Performance constructs (Figure 4.1, p.78).

Table 4.2 Descriptive statistics of Project Management Performance Constructs

	Descriptives					
		Leader	Staff	Policy	Partnership	Lifecycle	KPI
N Valid		197	197	197	197	197	197
Missing		0	0	0	0	0	0
Mean		3.8668	3.5102	3.7766	3.7733	3.5051	3.3452
Median		4.0000	3.5000	3.6667	4.0000	3.5000	3.5000
Variance		.303	.752	.424	.353	.546	.575
Std. Deviation		.55011	.86744	.65099	.59421	.73885	.75813
Minimum		2.00	1.00	1.67	1.67	1.25	1.00
Maximum		5.00	5.00	5.00	5.00	5.00	5.00
Range		3.00	4.00	3.33	3.33	3.75	4.00
Skewness		-.710	-.636	-.509	-.558	-.540	-.563
Kurtosis		1.186	.043	.812	1.185	.074	.048
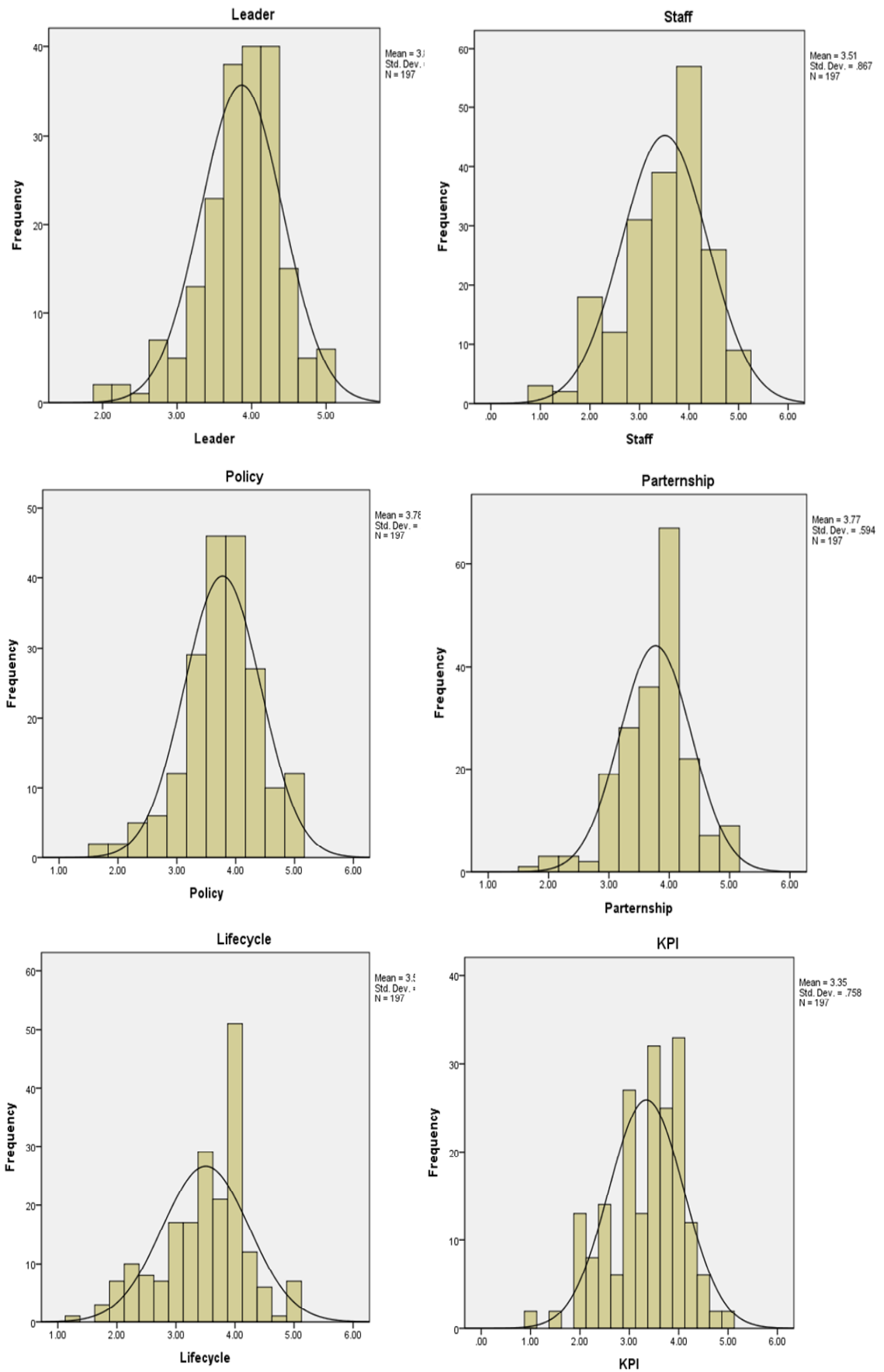
Figure 4.1: The histograms of six PM Performance constructs

4.3.2 Project Success Constructs

Table 4.3 (p.80) shows the descriptive statistics of the composite scales of the five constructs of the dependent variable PS, namely Project Efficiency ('Efficiency'), Impact on the Customer ('Customer'), Impact on the Team ('Team'), Business Success ('Business') and Preparing for the Future ('Future'). The mean response to 'Efficiency' was 3.61 with a standard deviation of 0.85. The skewness value was -0.499 and kurtosis value was -0.348, suggesting a flat distribution stretching towards the left. The mean response to 'Customer' was 3.91 with a standard deviation of 0.45. The skewness value was -0.082 and kurtosis value was 0.714, suggesting a peak distribution stretching towards the left. The mean response to 'Team' was 3.51 with a standard deviation of 0.8. A skewness value of -0.795 and a kurtosis value of 0.558 implied a peak distribution stretching towards the left. The mean response to 'Business' was 3.67 with a standard deviation of 0.61. A skewness value of -0.388 and a kurtosis value of 0.913 revealed a high peak distribution stretching towards the left. The mean response to 'Future' was 3.69 with a standard deviation of 0.62. A skewness value of -0.849 and a kurtosis value of 1.936 also revealed a very high peak distribution stretching towards the left.

Mean values of PM Success constructs ranging from 3.15 to 3.91 indicated that the respondents tended towards viewing their projects as successful. As the skewness and kurtosis values of various constructs did not exceed the acceptable value of +2 to -2 (Hair et al., 2008), normality of the data

distribution was proven.   A normal distribution of the responses was also

shown in the histograms of the various PS constructs (Figure 4.2, p.81).

Table 4.3 Descriptive statistics of Project Success Constructs

		Efficiency	Customer	Team	Business	Future
Descriptives						
N	Valid	197	197	197	197	197
	Missing	0	0	0	0	0
Mean		3.6125	3.9101	3.5127	3.6662	3.6853
Median		3.6667	3.8571	3.6667	3.7500	3.7500
Variance		.728	.202	.640	.367	.382
Std. Deviation		.85343	.44921	.80000	.60554	.61802
Minimum		1.00	2.57	1.00	1.50	1.25
Maximum		5.00	5.00	5.00	5.00	5.00
Range		4.00	2.43	4.00	3.50	3.75
Skewness		-.499	-.082	-.795	-.388	-.849
Kurtosis		-.348	.714	.558	.913	1.936
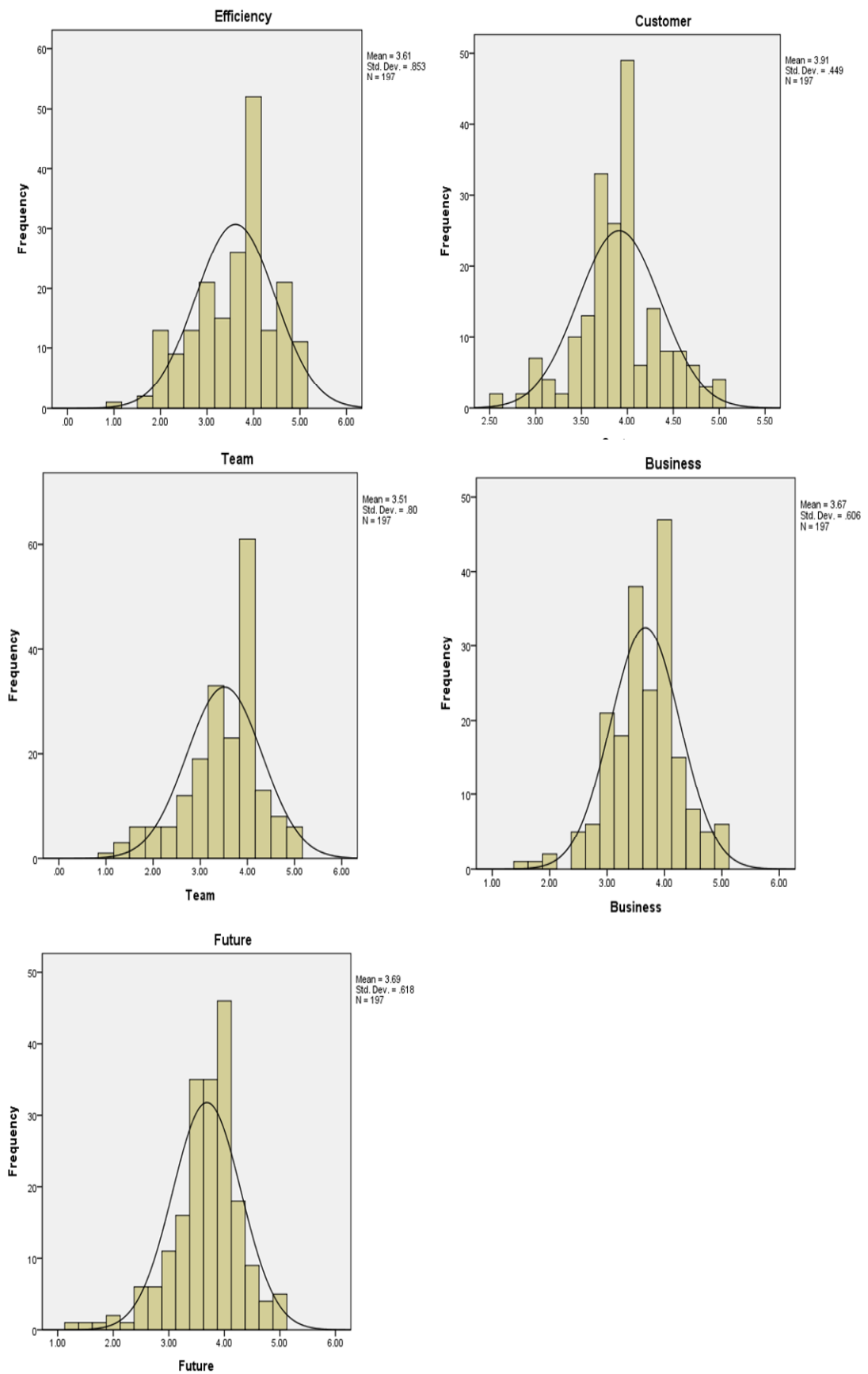
Figure 4.2: The histograms of five Project Success constructs

4.3.3 Team Empowerment Constructs

Table 4.4 (p.83) shows the descriptive statistics of the composite scales of the four constructs of the moderator TE, namely Potency ('Potency'), Meaningfulness ('Meaning'), Autonomy ('Autonomy') and Impact ('Impact'). The mean response to 'Potency' was 5.5 with a standard deviation of 0.92. The skewness value was -1.001 and kurtosis value was 2.533, suggesting a high-peak distribution stretching towards the left.   The mean response to 'Meaning' was 5.35 with a standard deviation of 1.1.   The skewness value was -0.978 and kurtosis value was 1.312, also suggesting a high-peak distribution stretching towards the left.   The mean response to 'Autonomy' was 4.99 with a standard deviation of 1.1.   A skewness value of -0.63 and a kurtosis value of 0.422 revealed a peak distribution stretching towards the left. The mean response to 'Impact' was 5.4 with a standard deviation of 0.85.   A skewness value of -0.421 and a kurtosis value of 0.474 also revealed a peaked distribution stretching towards the left.   Mean values of TE constructs ranging from 4.99 to 5.5 indicated that the respondents only slightly agreed that their teams were empowered with potency, meaningfulness, autonomy and impact.   As the skewness and kurtosis values of various constructs of TE were within the acceptable level of +/-2.58 (Ghasemi & Zahediasl, 2012), normality of the data distribution was assured. A normal distribution of the responses was also shown in the histograms of the various TE constructs in Figure 4.3 (p.83).

Table 4.4 Descriptive statistics of Team Empowerment Constructs

Descriptives

		Potency	Meaning	Autonomy	Impact
N	Valid	197	197	197	197
	Missing	0	0	0	0
Mean		5.4958	5.3469	4.9932	5.4010
Median		5.6667	5.6667	5.0000	5.3333
Variance		.845	1.203	1.219	.727
Std. Deviation		.91944	1.09671	1.10398	.85246
Minimum		1.00	1.33	1.33	2.00
Maximum		7.00	7.00	7.00	7.00
Range		6.00	5.67	5.67	5.00
Skewness		-1.001	-.978	-.630	-.421
Kurtosis		2.533	1.312	.422	.474
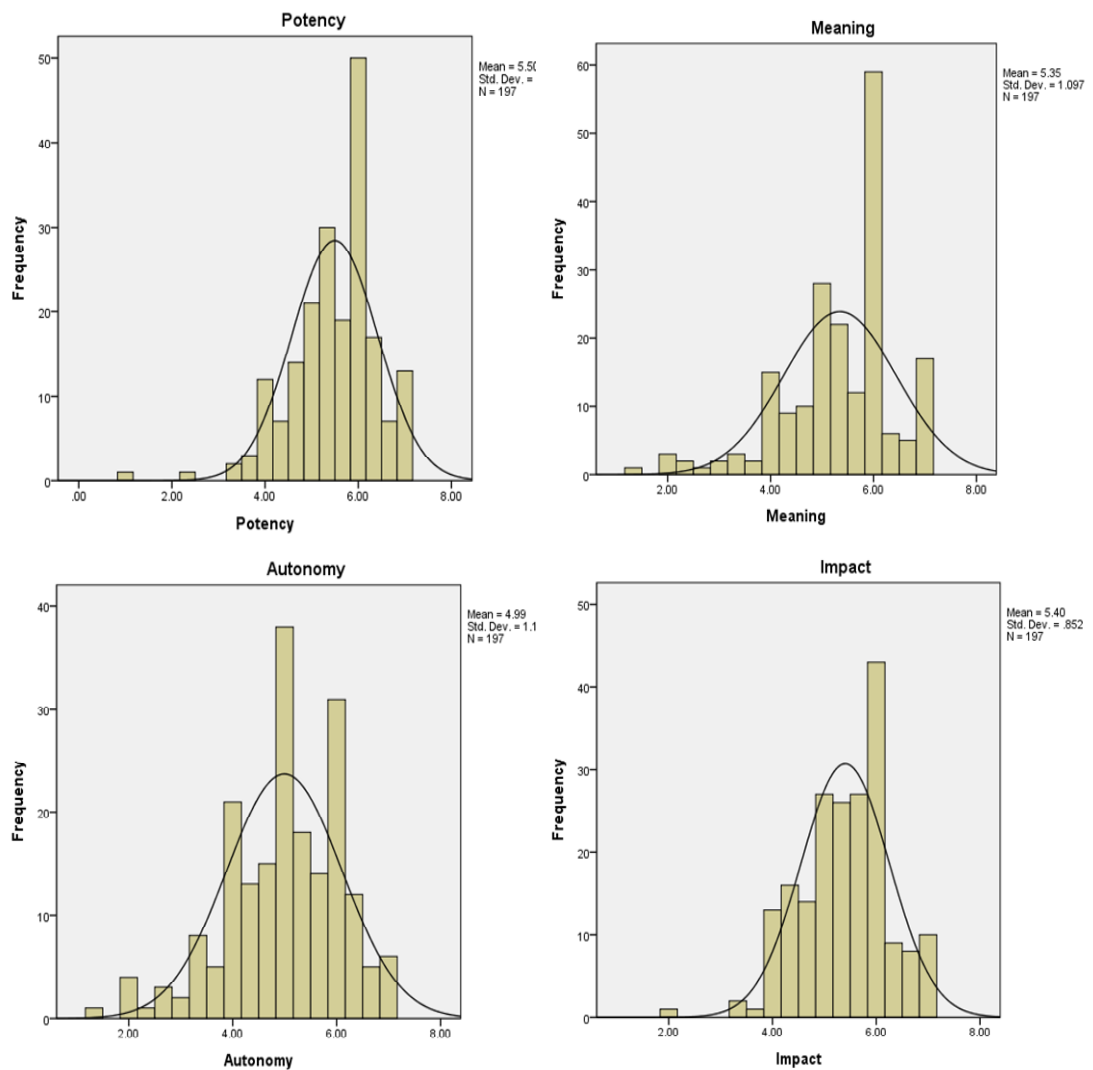
Figure 4.3: The histograms of four Team Empowerment constructs

83

4.4 Reliability Tests

Reliability of a survey instrument is its ability to produce consistent scores in its repeated application (Tharenou et al., 2007). It reflects the stability and consistency of the instrument in measuring the concept and the goodness of a measure (Cavana et al., 2001). The internal consistency reliability of all measurement scales, which indicates the homogeneity of various items in the measure constituting a construct (Sekaran & Bougie, 2013), was reviewed to ensure the least random measurement error (Tharenou et al., 2007). The closer the Cronbach's alpha coefficient to 1.0 the higher is the reliability, but a coefficient higher than 0.7 is still acceptable (Cavana et al., 2001, Hair, et al., 2011). To improve the reliability of a construct, those items with Cronbach's alpha value below 0.7 can be removed (Gliem & Gliem, 2003).

Table 4.5 (p.85) shows that all constructs had Cronbach's alpha coefficients greater than 0.7, ranging from 0.715 (PM Staff) to 0.938 (Meaningfulness), with the exception of the PM Leadership construct. As a Cronbach's alpha coefficient of 0.656 was found for PM Leadership, the first item was removed thereby raising the coefficient value to an acceptable level of 0.703 for subsequent analysis. Although the minimum number of items in a scale to measure a concept should be at least three (Hair et al., 2011), the PM Staff construct, which has only two items, was still reliable with a Cronbach's alpha coefficient of 0.715.

Table 4.5 Cronbach's Alpha coefficients for all scales

Construct	Cronbach's αlpha	Valid and Reliable (Cronbach 's α >0.7)
Project management performance		
1. PM Leadership	.656	No. After removing Item 1, Cronbach's alpha becomes .703
2. PM Staff	.715	Yes
3. PM Policy and Strategy	.728	Yes
4. PM Partnership and Resources	.726	Yes
5. PM Lifecycle Management Processes	.852	Yes
6. PM KPIs	.847	Yes
Project Success		
1. Project Efficiency	.851	Yes
2. Impact on Customer	.828	Yes
3. Impact on Project Team	.868	Yes
4. Business Success	.822	Yes
5. Preparing for Future	.759	Yes
Team Empowerment		
1. Potency	.853	Yes
2. Meaningfulness	.938	Yes
3. Autonomy	.836	Yes
4. Impact	.807	Yes

4.5 Correlation Analysis

Correlation analysis identifies the linear association between two metric variables. Pearson correlation coefficient (r) shows the strength and direction of the linear relationship between two variables, which can be either positive or negative (Coakes, 2013). It indicates the covariation between variables, showing that systematic change of one variable relative to another variable (Hair et al., 2011). Pearson correlation efficient ranges from -1 to 1, with 0 indicating no relationship and 1 meaning a perfect

association.   It should also be statistically significant (p<0.05 or 0.01) so as to be meaningful.   A Pearson correlation matrix was generated for analyzing the direction, strength and significance of the bivariate relationships between various constructs of the independent variable, the dependent variable and the moderator (Table 4.6, p.83).   It has been suggested that r value of 0.10 indicates a small effect size, 0.3 indicates a medium effect size and 0.5 indicates a large effect size (Tharenou et al., 2007).

The correlations between various constructs of PM Performance, PS and TE are shown in Table 4.6 (p.87).   It shows that all constructs of PM Performance were positively and significantly correlated (p<0.01) with PS, with Pearson correlation coefficients ranging from 0.437 (with 'Staff') to 0.609 (with 'Policy').   The correlations between PS and 'Leader' (0.524), 'Partnership' (0.503) and 'Lifecycle' (0.558) and 'KPI' (0.576) were all strong with correlation coefficient greater than 0.5.   It confirms that change in PM Performance will lead to positive and significant change in PS.

Table 4.6: Pearson's correlation of independent variable, dependent variable and moderator

Correlations

	Leader	Staff	Policy	Partnership	Lifecycle	KPI	PM Perform	Efficiency	Customer	Team	Business	Future	PM Success	Potency	Meaning	Autonomy	Impact	Team Empower
Leader	1																	
Staff	.610**	1																
Policy	.633**	.536**	1															
Partnership	.485**	.424**	.525**	1														
Lifecycle	.588**	.540**	.522**	.438**	1													
KPI	.633**	.568**	.580**	.455**	.682**	1												
PM Perform	.828**	.799**	.790**	.678**	.803**	.834**	1											
Efficiency	.294**	.241**	.390**	.311**	.397**	.325**	.409**	1										
Customer	.404**	.310**	.487**	.485**	.401**	.423**	.520**	.565**	1									
Team	.493**	.451**	.549**	.440**	.437**	.489**	.600**	.591**	.618**	1								
Business	.398**	.340**	.479**	.376**	.486**	.494**	.540**	.468**	.456**	.483**	1							
Future	.453**	.369**	.499**	.402**	.476**	.557**	.579**	.325**	.469**	.513**	.653**	1						
PM Success	.517**	.437**	.609**	.503**	.558**	.576**	.670**	.791**	.764**	.840**	.767**	.733**	1					
Potency	.260**	.216**	.298**	.259**	.195**	.202**	.297**	.281**	.346**	.399**	.128*	.288**	.372**	1				
Meaning	.327**	.243**	.414**	.282**	.245**	.276**	.371**	.401**	.441**	.569**	.296**	.338**	.530**	.692**	1			
Autonomy	.274**	.145*	.336**	.312**	.164*	.276**	.308**	.205**	.255**	.382**	.205**	.256**	.337**	.498**	.464**	1		
Impact	.316**	.242**	.347**	.267**	.198**	.315**	.351**	.232**	.397**	.473**	.321**	.369**	.451**	.634**	.641**	.573**	1	
Team Empower	.356**	.253**	.425**	.341**	.243**	.323**	.401**	.341**	.433**	.553**	.287**	.375**	.511**	.843**	.850**	.779**	.844**	1

**. Correlation is significant at the 0.01 level (1-tailed).

*. Correlation is significant at the 0.05 level (1-tailed).

The linear associations between TE and PM Performance as well as PS were also evaluated. Table 4.6 (p.87) shows a positive and significant moderate correlation between TE and various PM Performance constructs, with the Pearson correlation coefficient ranging from 0.243 (with 'Staff') to 0.425 (with 'Policy'). It indicates that change in TE only slightly affected PM Performance. On the other hand, a positive and significant correlation between TE and PS was found. The effects of TE on 'Efficiency' (0.341), 'Customer' (0.433), 'Business' (0.287) and 'Future' (0.375) were all moderate with correlation coefficients smaller than 5. However, a strong correlation between TE and 'Team' (0.553) was found. It means that change in TE only led to low level of changes in various constructs of PS except 'Team'. The change in TE will create large effect on team performance. The degrees of change in PS caused by PM Performance and TE were later evaluated in Section 4.7.

The review of Pearson correlation also helps to identify multicollinearity which occurs when two or more independent variables are highly correlated. This is important because high correlation of an independent variable to other independent variables will create less unique information about the potential contribution of that variable to the prediction of the dependent variable (Cohen, Cohen, West, & Aiken, 2003). Multicollinearity can distort the statistical significance of the individual regression coefficients, making the interpretation of the individual effect of a particular variable out of a group of independent variables on the dependent variable unreliable (Cohen et al., 2003; Hair et al., 2011). If the correlation value between two

independent variables is greater than 0.60, indicating a potential of multicollinearity, they can be removed or combined into a single summated variable to prevent the problem of multicollinearity (Hair et al., 2011).

4.6 Hypothesis Testing:

Hypothesis testing was conducted to decide accurately if the null hypothesis can be rejected in favour of the alternate hypothesis (Sakaran & Bougie, 2013). The results of multiple regression analysis were reviewed to understand if the research hypotheses are supported or not.

4.6.1 Multiple Regression

Multiple regression analyses were conducted to test those research hypotheses established in Chapter 2 (Figure 2.7, p.46). Multiple regression analysis evaluates the relationship between several independent variables and a dependent variable. Various constructs of the PM Performance were entered into SPSS as independent variables to find out their overall impact on PS (Hypothesis 1). A hierarchical multiple regression analysis was also conducted to understand the contribution of each PM Performance construct to the variance of PS (Hypotheses 1a to 1f). Multicollinearity of the independent variables was checked in the regression analyses. A rule of thumb states that any variance inflation factor (VIF) of 10 or more and/or a tolerance value of 0.10 or less are signs of high multicollinearity (Cohen et al., 2003). For Hypothesis 1 and 1a to 1f, with regression analysis results shown in tables 4.10-4.16 (pp.93-101), the VIF of all items are below 10 and the tolerance values are all above 0.10, indicating that the problem of

multicollinearity did not exist.

Moreover, a hierarchical multiple regression analysis was conducted to find out the moderating effects of TE on the relationship between PM Performance and PS (Hypothesis 2). A moderator is a variable (say z) that modifies the relationships among other variables (say x and y), making the relationship between x and y a function of the level of z (Aguinis, 1995; Baron & Kenny, 1986; James & Brett, 1984). The moderating effect of variable z on the relationship between x and y can be found by three regression equations (Sharma, Durand & Gur-arie, 1981; Zedeck, 1971):

$$y = a + b_1x \qquad (1)$$
$$y = a + b_1x + b_2z \qquad (2)$$
$$y = a + b_1x + b_2z + b_3xz \qquad (3)$$

If equations 2 and 3 are not significantly different, with $b_3=0$ and $b_2 \neq 0$, z is an independent variable instead of a moderator. If equations 1 and 2 are not significantly different but are different from equation 3, with $b_2 =0$ and $b_3 \neq 0$, z is a pure moderator. If equations 1, 2 and 3 are significantly different from one another, with $b_2 \neq 0$ & $b_3 \neq 0$, z is a quasi moderator (Zedeck, 1971). A pure moderator has no direct effect on the dependent variable but a quasi moderator has (Sekaran & Bougie, 2013). Three models of hierarchical multiple regression (Figure 4.4, p.91), involving the PM Performance and PS in Model 1, PM Performance, TE and PS in Model 2, and PM Performance, TE, the interaction effect (PM Performance x TE) and PS in Model 3, were run in SPSS. In addition, a series of hierarchical

multiple regression analyses were conducted to find out if TE had moderated the relationship between each PM Performance construct and PS (Hypotheses 2a to 2f) or not.
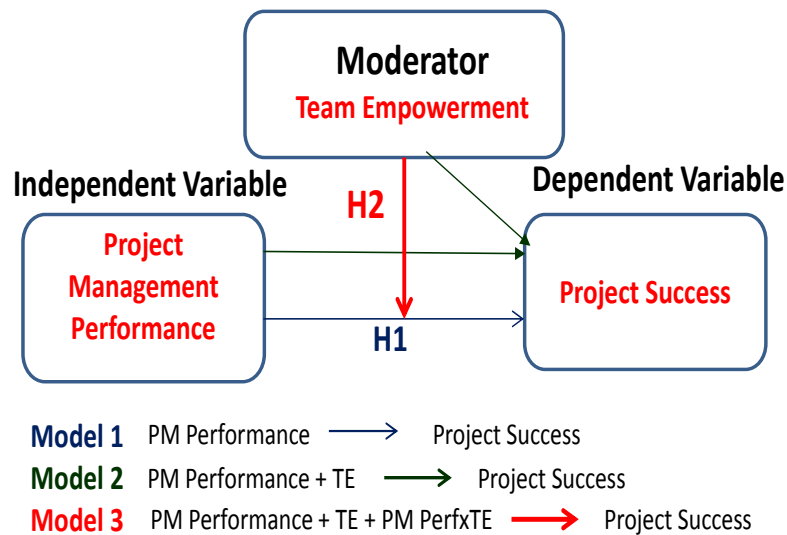
Figure 4.4: The three models for testing moderating effect of Team Empowerment

4.6.2 Hypothesis 1 and 1a to 1f

H1: The relationship between PM Performance and PS in HK is statistically significant and positive.

The results of multiple regression analysis on the impact of PM Performance on PS are shown in Figure 4.5 (p.92). The direction of relationship between PM Performance and PS was positive, with PM Performance explaining 49.1% of the variance (R^2) in PS. The F-ratio of 30.534 at 6 and 190 degrees of freedom was statistically significant at the $p<0.05$ level (p = 0.000). It means that the null hypothesis that the relationship between PM Performance and PS is neither significant nor positive could be rejected. Hypothesis 1 was supported.
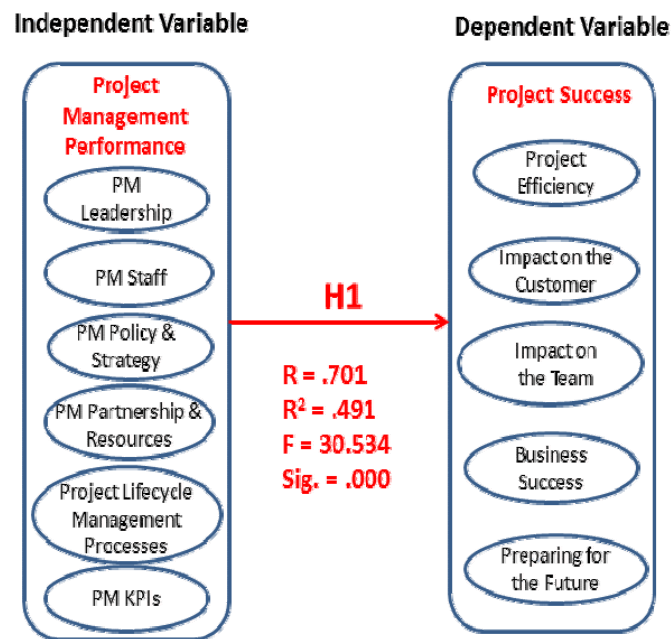
Figure 4.5 Regression analysis results of Hypothesis 1

Table 4.7 (p.92) indicates that the Beta value of 'Policy' (0.310) was the highest among all constructs of the PM Performance variable. It was followed by 'Lifecycle' (Beta value = 0.197), 'KPI' (Beta value = 0.187) and 'Partnership' (Beta value = 0.170). Their impact was all significant at the $p<0.05$ level. The Beta values of 'Leader' (Beta value = 0.020) and 'Staff' (Beta value = -0.026) were not significant at $p<0.05$ level ($p = 0.790$ and 0.584 respectively), meaning that 'Leader' and 'Staff' were not significant predictors of change in PS.

Table 4.7: Standardized coefficients of PM Performance constructs

Coefficients[a]							
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	1.253	.199		6.305	.000		
Leader	.016	.063	.020	.247	.805	.430	2.324
Staff	-.015	.042	-.026	-.363	.717	.541	1.848
1 Policy	.248	.059	.310	4.204	.000	.493	2.030
Partnership	.149	.056	.170	2.675	.008	.662	1.510
Lifecycle	.139	.053	.197	2.617	.010	.473	2.112
KPI	.129	.055	.187	2.340	.020	.420	2.379

a. Dependent Variable: PS

The results of hierarchical multiple regression analysis on the impact of 'Leader' on PS, after controlling the influences of the other five PM Performance constructs, are shown in Figure 4.6 (p.93). The direction of relationship was positive, with 'Leader' explaining 26.7% of the variance (R^2) in PS. The F-ratio of 71.015 at 1 and 195 degrees of freedom was statistically significant at the $p<0.05$ level ($p = 0.000$). It means that the null hypothesis that the relationship between PM Leadership and PS is neither significant nor positive could be rejected. Hypothesis 1a was supported.

Independent Variable **Dependent Variable**

PM Leadership
Item 2
Item 3
Item 4

H1a

R = .517
R^2 = .267
F = 71.015
Sig. = .000

Project Success

Figure 4.6 Regression analysis result of Hypothesis 1a

Table 4.8 (p.94) indicates that the standardized coefficient of 'Leader' was 0.517 when it was isolated from the impact of the other PM Performance constructs in Model 1. After adding the other five constructs into the regression Model 2, the total variance in PS explained by six constructs altogether has increased to 49.1%. 'Staff', 'Policy', 'Partnership', 'Lifecycle' and 'KPI' together have contributed an additional variance of 22.4% in PS (R^2 change = 0.224). The F change (6, 190) of 16.715 was significant at the $p<0.05$ level ($p = 0.000$). 'Leader' became an insignificant predictor of PS with the

Beta value dropped to 0.020 and *p*>0.05 (*p* = 0.805) when acting together with the other PM Performance constructs. It indicates that 'Leader' was highly correlated with the other PM Performance constructs so it had been subsumed by other PM Performance constructs in the regression Model 2 (Coakes, 2013).

Table 4.8: Coefficients of PM Leadership in hierarchical regression analysis

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.114	.188		11.226	.000		
	Leader	.415	.049	.517	8.427	.000	1.000	1.000
2	(Constant)	1.253	.199		6.305	.000		
	Leader	.016	.063	.020	.247	.805	.430	2.324
	Staff	-.015	.042	-.026	-.363	.717	.541	1.848
	Policy	.248	.059	.310	4.204	.000	.493	2.030
	Partnership	.149	.056	.170	2.675	.008	.662	1.510
	Lifecycle	.139	.053	.197	2.617	.010	.473	2.112
	KPI	.129	.055	.187	2.340	.020	.420	2.379

a. Dependent Variable: PS

Hypothesis 1b: The relationship between PM Staff and PS in HK is statistically significant and positive.

The results of hierarchical multiple regression analysis on the impact of 'Staff' on PS, after controlling the influences of the other five PM Performance constructs, are shown in Figure 4.7 (p.95). The direction of relationship was positive, with 'Staff' explaining 19.1% of the variance (R^2) in PS. The F-ratio of 46.003 at 1 and 195 degrees of freedom was statistically significant at the *p*<0.05 level (*p* = 0.000). It means that the null hypothesis that the relationship between PM Staff and PS is neither significant nor positive could be rejected. Hypothesis 1b was supported.

Independent Variable   **Dependent Variable**

PM Staff — Item 1, Item 2 — **H1b** → Project Success

R = .437
R² = .191
F = 46.003
Sig. = .000

Figure 4.7 Regression analysis result of Hypothesis 1b

Table 4.9 (p.95) indicates that the standardized coefficient of 'Staff' was 0.437 when it was isolated from the impact of the other PM Performance constructs in Model 1.   After adding the other five constructs into the regression Model 2, the total variance in PS explained by six constructs altogether has increased to 49.1%.   'Leader', 'Policy', 'Partnership', 'Lifecycle' and 'KPI' together have contributed an additional variance of 30.0% in PS (R^2 change = 0.300).   The F change (6, 190) of 22.384 was significant at the $p<0.05$ level (p = 0.000). 'Staff' became an insignificant predictor of PS with the Beta value dropped to -0.023 and $p>0.05$ (p = 0.736) when acting together with the other PM Performance constructs.   It indicates that 'Staff' was highly correlated with the other PM Performance constructs so that 'Staff' has been subsumed by other PM Performance constructs in regression Model 2 (Coakes, 2013).

Table 4.9: Coefficients of PM Staff in hierarchical regression analysis

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.755	.140		19.675	.000		
	Staff	.263	.039	.437	6.783	.000	1.000	1.000
2	(Constant)	1.248	.215		5.808	.000		
	Staff	-.014	.042	-.023	-.338	.736	.559	1.788
	Leader	.013	.075	.014	.180	.857	.428	2.335
	Policy	.249	.060	.311	4.175	.000	.483	2.071
	Partnership	.150	.056	.171	2.679	.008	.661	1.512
	Lifecycle	.139	.053	.197	2.606	.010	.468	2.136
	KPI	.129	.055	.188	2.357	.019	.421	2.375

a.   Dependent Variable: PS

The results of hierarchical multiple regressions on the impact of 'Policy' on PS, after controlling the influences of the other five PM Performance constructs, are shown in Figure 4.8 (p.96).   The direction of relationship was positive, with 'Policy' explaining 37.1% of the variance (R^2) in PS.   The F-ratio of 115.056 at 1 and 195 degrees of freedom was statistically significant at the $p<0.05$ level (p = 0.000).   It means that the null hypothesis that the relationship between PM Policy and Procedure and PS is neither significant nor positive could be rejected.   Hypothesis 1c was supported.
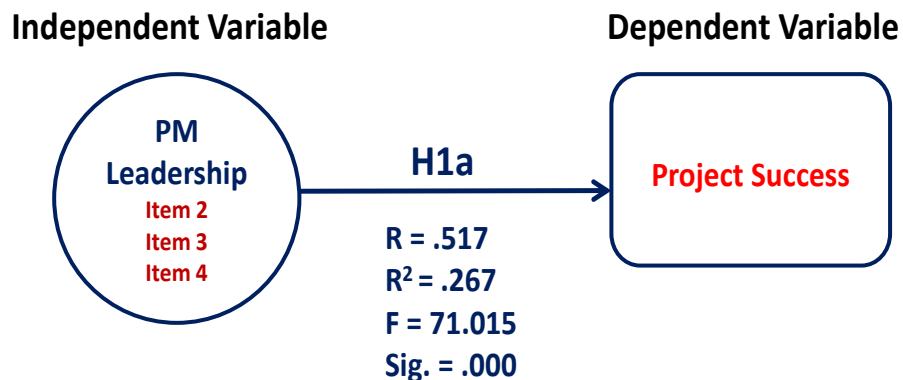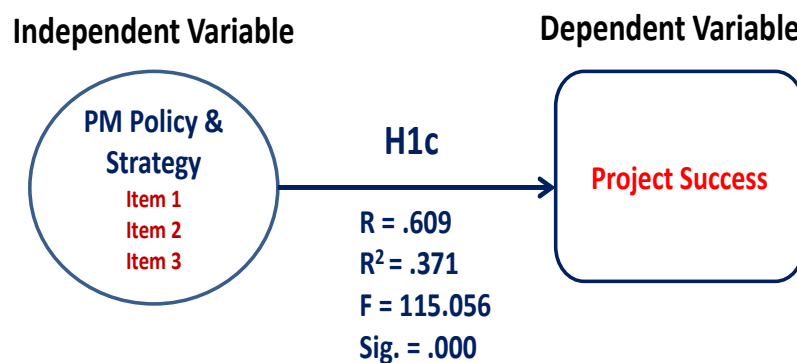

Figure 4.8 Regression analysis result of Hypothesis 1c

Table 4.10 (p.97) indicates that the standardized coefficient of 'Policy' was 0.609 when it was isolated from the impact of the other PM Performance constructs in Model 1.   After adding the other five constructs into the regression Model 2, the total variance in PS explained by six constructs altogether has increased to 49.1%.   'Leader', 'Staff', 'Partnership', 'Lifecycle' and 'KPI' together had contributed an additional variance of 12.0% in PS (R^2 change = 0.120).   The F change (6, 190) of 8.936 was significant at the $p<0.05$ level (p = 0.000).   'Policy' was still a significant predictor of PS at $p<0.05$ (p = 0.000) when the Beta value dropped to 0.311 in regression Model 2.

Table 4.10 Coefficients of PM Policy & Procedure in hierarchical regression analysis

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.834	.174		10.518	.000		
	Policy	.488	.046	.609	10.726	.000	1.000	1.000
2	(Constant)	1.248	.215		5.808	.000		
	Policy	.249	.060	.311	4.175	.000	.483	2.071
	Leader	.013	.075	.014	.180	.857	.428	2.335
	Staff	-.014	.042	-.023	-.338	.736	.559	1.788
	Partnership	.150	.056	.171	2.679	.008	.661	1.512
	Lifecycle	.139	.053	.197	2.606	.010	.468	2.136
	KPI	.129	.055	.188	2.357	.019	.421	2.375

a. Dependent Variable: PS

Hypothesis 1d: The relationship between PM Partnership and Resources and PS in HK is statistically significant and positive.

The results of hierarchical multiple regressions on the impact of 'Partnership' on PS, after controlling the influences of the other five PM Performance constructs, are shown in Figure 4.9 (p.97).   The direction of relationship was positive, with 'Partnership' explaining 25.3% of the variance (R^2) in PS.   The F-ratio of 65.998 at 1 and 195 degrees of freedom was statistically significant at the $p<0.05$ level (p = 0.000).   It means that the null hypothesis that the relationship between PM Partnership and Resources and PS is neither significant nor positive could be rejected. Hypothesis 1d was supported.
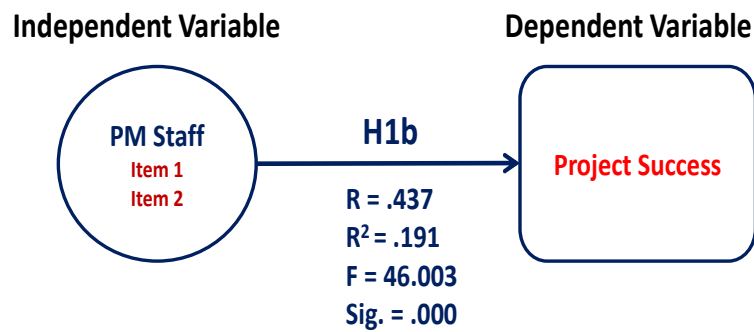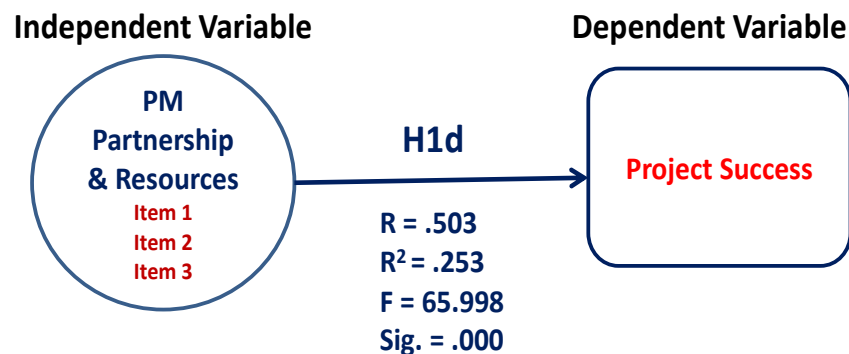

Figure 4.9: Regression analysis result of Hypothesis 1d

Table 4.11 (p.98) indicates that the standardized coefficient of 'Partnership' was 0.503 when it was isolated from the impact of other PM Performance constructs in Model 1. After adding the other five constructs into the regression Model 2, the total variance in PS explained by the six constructs altogether has increased to 49.1%. 'Leader', 'Staff', 'Policy', 'Lifecycle' and 'KPI' together have contributed an additional variance of 23.8% in PS (R^2 change = 0.238). The F change (6, 190) of 17.758 was significant at the $p<0.05$ level (p = 0.000). 'Partnership' was still a significant predictor of PS at $p<0.05$ (p = 0.008) when the Beta value dropped to 0.171 in regression Model 2.

Table 4.11 Coefficients of PM Partnership & Resources in hierarchical regression analysis

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.012	.208		9.694	.000		
	Partnership	.441	.054	.503	8.124	.000	1.000	1.000
2	(Constant)	1.248	.215		5.808	.000		
	Partnership	.150	.056	.171	2.679	.008	.661	1.512
	Leader	.013	.075	.014	.180	.857	.428	2.335
	Staff	-.014	.042	-.023	-.338	.736	.559	1.788
	Policy	.249	.060	.311	4.175	.000	.483	2.071
	Lifecycle	.139	.053	.197	2.606	.010	.468	2.136
	KPI	.129	.055	.188	2.357	.019	.421	2.375

a. Dependent Variable: PS

Hypothesis 1e: The relationship between Project Lifecycle Management Processes and PS in Hong Kong is statistically significant and positive.

The results of hierarchical multiple regressions on the impact of 'Lifecycle' on PS, after controlling the influences of the other five PM Performance constructs, are shown in Figure 4.10 (p.99). The direction of relationship was positive, with 'Lifecycle' explaining 31.2% of the variance (R^2) in PS. The F-ratio of 88.345 at 1 and 195 degrees of freedom was statistically significant at the $p<0.05$ level (p = 0.000). It means that the null hypothesis that the relationship between Project Lifecycle Management Processes and

PS is neither significant nor positive could be rejected.   Hypothesis 1e was

supported.

Independent Variable

PM Lifecycle
Management
Processes
Item 1
Item 2
Item 3
Item 4

H1e

R = .558
R^2 = .312
F = 88.345
Sig. = .000

Dependent Variable

Project Success
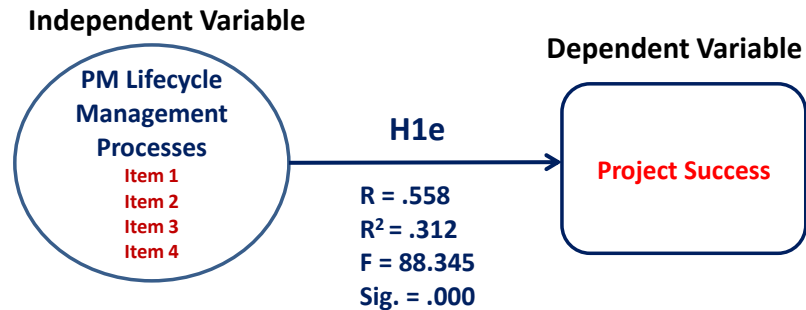
Figure 4.10 Regression analysis result of Hypothesis 1e

Table 4.12 (p.99) indicates that the standardized coefficient of 'Lifecycle' was

0.558 when it was isolated from the impact of the other PM Performance

constructs in Model 1. After adding the other five constructs into the regression

Model 2, the total variance in PS explained by six constructs altogether has

increased to 49.1%. 'Leader', 'Staff', 'Policy', 'Partnership' and 'KPI' together

have contributed an additional variance of 17.9% variance in PS (R^2 change =

0.179).   The F change (6, 190) of 13.361 was significant at the $p<0.05$ level (p =

0.000).   'Lifecycle' was still a significant predictor of PS with $p<0.05$ (p = 0.010)

when the Beta value dropped to 0.197 in regression Model 2.

Table 4.12: Coefficients of Project Lifecycle Management Processes in hierarchical
regression analysis

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.296	.150		15.282	.000		
	Lifecycle	.394	.042	.558	9.399	.000	1.000	1.000
2	(Constant)	1.248	.215		5.808	.000		
	Lifecycle	.139	.053	.197	2.606	.010	.468	2.136
	Leader	.013	.075	.014	.180	.857	.428	2.335
	Staff	-.014	.042	-.023	-.338	.736	.559	1.788
	Policy	.249	.060	.311	4.175	.000	.483	2.071
	Partnership	.150	.056	.171	2.679	.008	.661	1.512
	KPI	.129	.055	.188	2.357	.019	.421	2.375

Coefficients[a]

a. Dependent Variable: PS

Hypothesis 1f: The relationship between PM KPIs and PS in HK is statistically significant and positive.

The results of hierarchical multiple regressions on the impact of 'KPI' on PS, after controlling the influences of the other five PM Performance constructs, are shown in Figure 4.11 (p.100).   The direction of relationship was positive, with 'KPI' explaining 33.2% of the variance (R^2) in PS.   The F-ratio of 96.864 at 1 and 195 degrees of freedom was statistically significant at the $p<0.05$ level (p = 0.000).   It means that the null hypothesis that the relationship between PM KPIs and PSPS is neither significant nor positive could be rejected.   Hypothesis 1f was supported.

Independent Variable　　　　　　　**Dependent Variable**

PM KPIs
Item 1
Item 2
Item 3
Item 4

H1f

**Project Success**

R = .576
R^2 = .332
F = 96.864
Sig. = .000
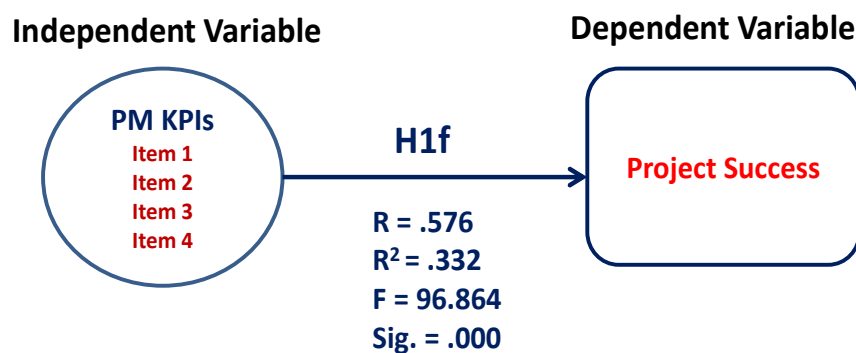
Figure 4.11 Regression analysis result of Hypothesis 1f

Table 4.13 (p.101) indicates that the standardized coefficient of 'KPI' was 0.576 when it was isolated from the impact of the other PM Performance constructs in Model 1.   After adding the other five constructs into the regression Model 2, the total variance in PS explained by six constructs altogether has increased to 49.1%.   'Leader', 'Staff', 'Policy', 'Partnership' and 'Lifecycle' together have contributed an additional variance of 15.9% in PS (R^2 change = 0.159).   The F change (6, 190) of 11.862 was significant at the $p<0.05$ level (p = 0.000).   'KPI' was still a significant predictor of PS with $p<0.05$ (p = 0.019) when the Beta value dropped to 0.188 in regression Model 2.

Table 4.13 Coefficients of PM KPIs in hierarchical regression analysis

<div align="center">Coefficients^a</div>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.351	.138		17.025	.000		
	KPI	.396	.040	.576	9.842	.000	1.000	1.000
2	(Constant)	1.248	.215		5.808	.000		
	KPI	.129	.055	.188	2.357	.019	.421	2.375
	Leader	.013	.075	.014	.180	.857	.428	2.335
	Staff	-.014	.042	-.023	-.338	.736	.559	1.788
	Policy	.249	.060	.311	4.175	.000	.483	2.071
	Partnership	.150	.056	.171	2.679	.008	.661	1.512
	Lifecycle	.139	.053	.197	2.606	.010	.468	2.136

a. Dependent Variable: PS

4.6.3 Hypothesis 2 and 2a to 2f

Hierarchical multiple regression is a desirable analysis method for identifying the moderating effect of a quantitative variable on the relationship between two other quantitative variables (Baron & Kenny, 1986; Cramer, 2003). A series of hierarchical multiple regression analyses with three models were executed to test the moderating effect of TE regarding hypotheses 2 and 2a to 2b.

H2: TE has a positive and significant moderating effect on the relationship between PM Performance and PS in HK.

The results of a hierarchical regression analysis with three models to test the moderating effect of TE on the relationship between PM Performance and PS are shown in Figure 4.12 (p.102). PM Performance caused 49.1% variance in PS in Model 1. In Model 2, TE was added as an independent variable and has caused an additional variance of 5.8% in PS. The F change (6, 190) was 24.108 and significant at the $p<0.05$ level ($p = 0.000$). In Model 3, the interaction effect of PM Performance and TE (PMxTE) has slightly increased the variance in PS by 0.4%, with F change (8, 188) = 1.515 and Sig. F change = 0.220.
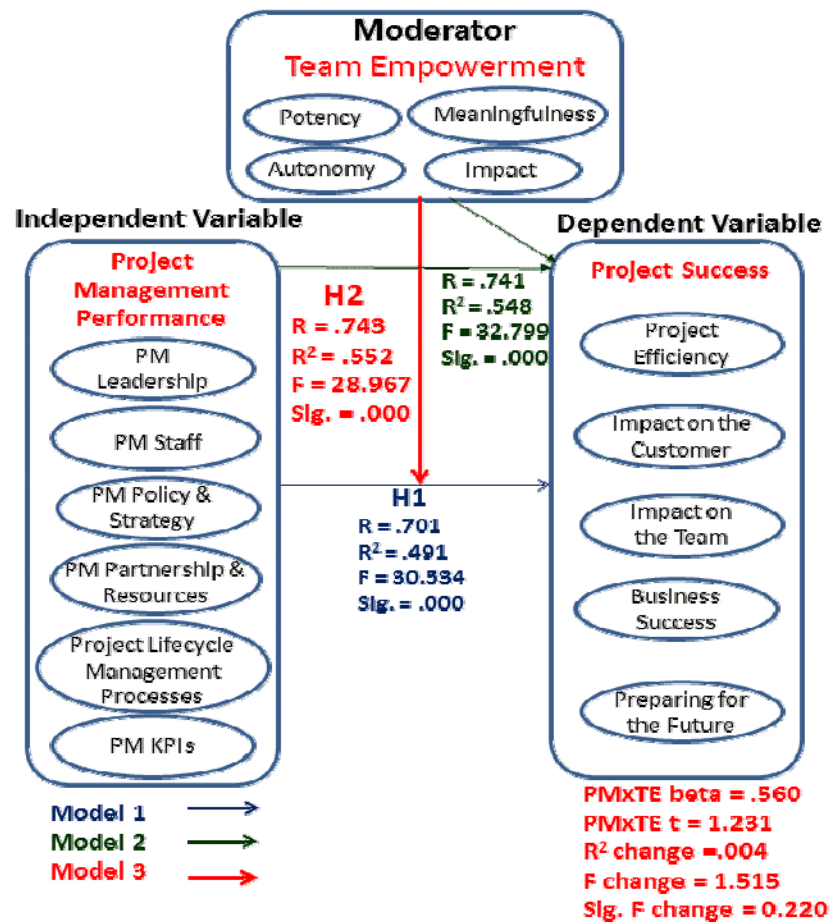
Figure 4.12 Regression analysis result of Hypothesis 2

The moderating effect of TE on the relationship between PM Performance and PS was evaluated with the regression analysis results in Table 4.14 (p.103). According to the moderator equations on p.91, the impact of TE can be explained by the formulae: PS = 1.893 - 0.079(Leader) - 0.096(Staff) + 0.173(Policy) + 0.071(Partnership) + 0.131(Lifecycle) + 0.091(KPI) − 0.058(TE) + 0.560(PMxTE). As the standardized coefficients of TE and the interaction effect of PMxTE were greater than 0, there was a potential that TE was a quasi moderator (Sharma et al., 1981; Zedeck, 1971). However, a standardized coefficient value of 0.560 with a p value of 0.220 showed that PMxTE was not a significant predictor of PS (p>0.05). The additional variance to PS contributed

by the interaction effect was less than 1% (R^2 change = 0.004).   To prevent the risk of committing Type 1 error which means the probability of rejecting the null hypothesis when it is actually true (Sakaran & Bougie, 2013), Hypothesis 2 could not be accepted.

Table 4.14 Hierarchical regression results of Hypothesis 2

Variables	Project Success		
	Model 1	Model 2	Model 3
Control variables			
PM Leadership	0.020	-0.013	-0.079
PM Staff	-0.026	-0.014	-0.096
PM Policy & Procedures	0.310*	0.234*	0.173*
PM Partnership & Strategy	0.170*	0.131*	0.071
Project Lifecycle Management Processes	0.197*	0.219*	0.131
PM KPIs	0.187*	0.160*	0.091
Main effects			
Team Empowerment		0.270*	-0.058
Interaction effects			
PM x TE			0.560
R Square	0.491	0.548	0.552
Adjusted R Square	0.475	0.532	0.533
△R Square	0.491	0.058	0.004
△F	30.534	24.108	1.515
Sig△F	0.000	0.000	0.220

Standardized regression coefficients are reported, N= 197

* = Significant at p<0.05

Hypothesis 2a: TE has a positive and significant moderating effect on the relationship between PM Leadership and PS in HK.

The results of a hierarchical regression analysis with three models to test the moderating effect of TE on the relationship between 'Leader' and PS are shown in Figure 4.13 (p.104).   'Leader' caused 26.7% variance in PS in Model 1.   In Model 2, TE was added as an independent variable and has caused an additional variance of 12.3% in PS.   The F change (2, 194) was 39.008 and significant at the *p*<0.05 level (*p* = 0.000).   In Model 3, the interaction effect of 'Leader' and TE ('Leader'xTE) has slightly increased the variance in PS by 1.1%, with F change (3, 193) = 3.510 and Sig. F change = 0.063.

Figure 4.13 Regression analysis result of Hypothesis 2a

The regression results for Hypothesis 2a are shown in Table 4.15 (p.105). According to the moderator equations on p.91, the impact of TE can be explained by the formulae: PS = 3.059 - 0.233('Leader') - 0.161(TE) + 0.955('Leader'xTE). As the standardized coefficients of TE and the interaction effect of 'Leader'xTE were greater than 0, there was a potential that TE was a quasi moderator (Sharma et al., 1981; Zedeck, 1971). However, a standardized coefficient value of 0.955 with a p value of 0.063 showed that 'Leader'xTE was not a significant predictor of PS (p>0.05). The additional variance to PS contributed by the interaction effect was only close to 1% (R^2 change = 0.011). To prevent the risk of committing Type 1 error, Hypothesis 2a could not be accepted.

Table 4.15 Hierarchical regression results of Hypothesis 2a

Variables	Project Success		
	Model 1	Model 2	Model 3
Control variables			
PM Leadership	0.517*	0.383*	-0.233
Main effects			
Team Empowerment		0.375*	-0.161
Interaction effects			
PM Leadership x TE			0.955
R Square	0.267	0.390	0.401
Adjusted R Square	0.263	0.383	0.391
△R Square	0.267	0.123	0.011
△F	71.015	39.008	3.510
Sig△ F	0.000	0.000	0.063

Standardized regression coefficients are reported, N= 197
* = Significant at p<0.05

Hypothesis 2b: TE has a positive and significant moderating effect on the relationship between PM Staff and PS in HK.

The results of a hierarchical regression analysis with three models to test the moderating effect of TE on the relationship between 'Staff' and PS are shown in Figure 4.14 (p.105). 'Staff' caused 19.1% variance in PS in Model 1. In Model 2, TE was added as an independent variable and has caused an additional variance of 17.1% in PS. The F change (2, 194) was 52.168 and significant at the $p<0.05$ level (p = 0.000). In Model 3, the interaction effect of 'Staff' and TE ('Staff'xTE) had slightly increased the variance in PS by 1.0%, with F change (3, 193) = 2.930 and Sig. F change = 0.089.

Figure 4.14 Regression analysis result of Hypothesis 2b

The regression results for Hypothesis 2b are shown in Table 4.16 (p.106). According to the moderator equations on p.91, the impact of TE can be explained by the formulae: PS = 2.609 - 0.195('Staff') + 0.108(TE) + 0.687 ('Staff'xTE).   As the standardized coefficients of TE and 'Staff'xTE were greater than 0, there was a potential that TE was a quasi moderator (Sharma et al., 1981; Zedeck, 1971).   However, a standardized coefficient value of 0.687 with a p value of 0.089 showed that 'Staff'xTE was not a significant predictor of PS (p>0.05).   The additional variance to PS contributed by the interaction effect 'Staff'xTE was only 1% (R^2 change = 0.010).   To prevent the risk of committing Type 1 error, Hypothesis 2b could not be accepted.

Table 4.16 Hierarchical regression results of Hypothesis 2b

Variables	Project Success		
	Model 1	Model 2	Model 3
Control variables			
PM Staff	0.437*	0.329*	-0.195
Main effects			
Team Empowerment		0.428*	0.108
Interaction effects			
PM Staff x TE			0.687
R Square	0.191	0.362	0.372
Adjusted R Square	0.187	0.356	0.362
△R Square	0.191	0.171	0.010
△F	46.003	52.168	2.930
Sig△ F	0.000	0.000	0.089

Standardized regression coefficients are reported, N= 197
* = Significant at p<0.05

Hypothesis 2c: TE has a positive and significant moderating effect on the relationship between PM Policy and Strategy and PS in HK.

The results of a hierarchical regression analysis with three models to test the moderating effect of TE on the relationship between 'Policy' and PS are shown in Figure 4.15 (p.107).   'Policy' caused 37.1% variance in PS in Model 1.   In Model 2, TE was added as an independent variable and has caused an additional variance of 7.8% in PS.   The F change (2, 194) was 27.388 and

significant at the *p*<0.05 level (*p* = 0.000).   In Model 3, the interaction effect of 'Policy' and TE ('Policy'xTE) had slightly increased the variance in PS by 0.2%, with F change (3, 193) = 0.655 and Sig. F change = 0.419.
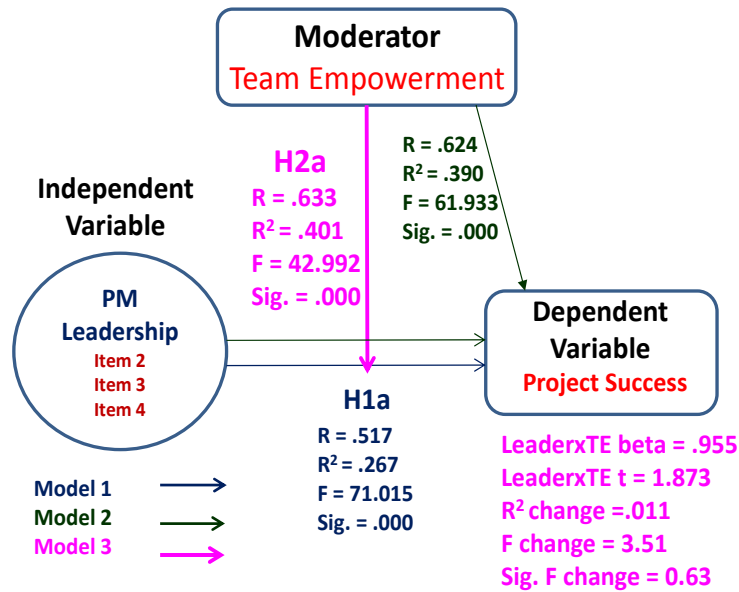

Figure 4.15 Regression analysis result of Hypothesis 2c

The regression results for Hypothesis 2c are shown in Table 4.17 (p.108). According to the moderator equations on p.91, the impact of TE can be explained by the formulae: PS = 1.853 + 0.255('Policy') + 0.105(TE) + 0.363('Policy'xTE).   As the standardized coefficients of TE and 'Policy'xTE were greater than 0, there was a potential that TE was a quasi moderator (Sharma et al., 1981; Zedeck, 1971).   However, a standardized coefficient value of 0.363 with a p value of 0.419 showed that 'Policy'xTE was not a significant predictor of PS (p>0.05).   The additional variance in PS contributed by the interaction effect 'Policy'xTE was less than 1% (R^2 change = 0.002).   To prevent the risk of committing Type 1 error, Hypothesis 2c could not be accepted.

Table 4.17 Hierarchical regression results of Hypothesis 2c

Variables	Project Success		
	Model 1	Model 2	Model 3
Control variables			
PM Policy & Strategy	0.609*	0.478*	0.255
Main effects			
Team Empowerment		0.308*	0.105
Interaction effects			
PM Policy & Strategy x TE			0.363
R Square	0.371	0.449	0.451
Adjusted R Square	0.368	0.443	0.442
△R Square	0.371	0.078	0.002
△F	115.056	27.388	0.655
Sig△ F	0.000	0.000	0.419

Standardized regression coefficients are reported, N= 197

* = Significant at p<0.05

Hypothesis 2d: TE has a positive and significant moderating effect on the relationship between PM Partnership and Resources and PS in HK.

The results of a hierarchical regression analysis with three models to test the moderating effect of TE on the relationship between 'Partnership' and PS are shown in Figure 4.16 (p.108). 'Partnership' caused 25.3% variance in PS in Model 1. In Model 2, TE was added as an independent variable and has caused an additional variance of 13.1% in PS. The F change (2, 194) was 41.122 and significant at the *p*<0.05 level (*p* = 0.000). In Model 3, the interaction effect of 'Partnership' and TE ('Partnership'xTE) has slightly increased the variance in PS by 0.4%, with F change (3, 193) = 1.373 and Sig. F change = 0.243.
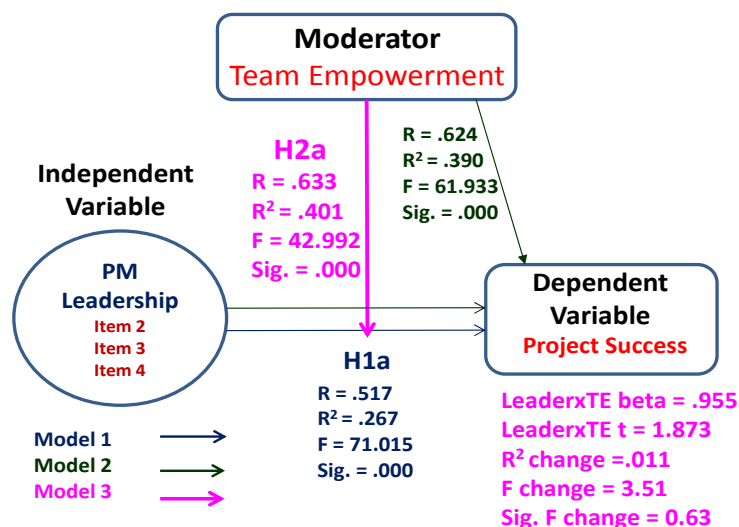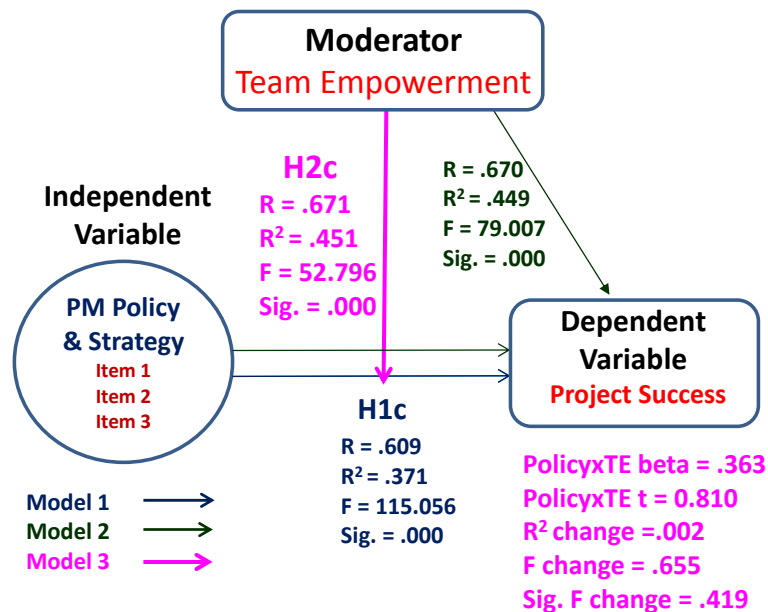

Figure 4.16 Regression analysis result of Hypothesis 2d

The regression results for Hypothesis 2d are shown in Table 4.18 (p.109). According to the moderator equations on p.91, the impact of Model 3 was represented by the formulae: PS = 2.4 - 0.015 ('Partnership') + 0.012(TE) + 0.625('Partnership'xTE). As the standardized coefficients of TE and 'Partnership'xTE were greater than 0, there was a potential that TE was a quasi moderator (Sharma et al., 1981; Zedeck, 1971). However, a standardized coefficient value of 0.625 with a p value of 0.243 showed that 'Partnership'xTE was not a significant predictor of PS (p>0.05). The additional variance in PS contributed by the interaction effect 'Partnership'xTE was also less than 1% (R^2 change = 0.004). To prevent the risk of committing Type 1 error, Hypothesis 2d could not be accepted.

Table 4.18: Hierarchical regression results of Hypothesis 2d

Variables	Project Success		
	Model 1	Model 2	Model 3
Control variables			
PM Partnership & Resources	0.503*	0.372*	-0.015
Main effects			
Team Empowerment		0.384*	0.012
Interaction effects			
PM Partership & Resources x TE			0.625
R Square	0.253	0.384	0.388
Adjusted R Square	0.249	0.377	0.378
△R Square	0.253	0.131	0.004
△F	65.998	41.122	1.373
Sig △F	0.000	0.000	0.243

Standardized regression coefficients are reported, N= 197

* = Significant at p<0.05

Hypothesis 2e: TE has a positive and significant moderating effect on the relationship between Project Lifecycle Management Processes and PS in HK.

The results of a hierarchical regression analysis with three models to test the moderating effect of TE on the relationship between 'Lifecycle' and PS are shown in Figure 4.17 (p.110). 'Lifecycle' caused 31.2% variance in PS in Model

1. In Model 2, TE was added as an independent variable and had caused an additional variance of 15.0% in PS. The F change (2, 194) was 54.030 and significant at the $p<0.05$ level ($p = 0.000$). In Model 3, the interaction effect of 'Lifecycle 'and TE ('Lifecycle'xTE) had slightly increased the variance in PS by 0.6%, with F change (3, 193) = 2.262 and Sig. F change = 0.134.

Figure 4.17 Regression analysis result of Hypothesis 2e

The regression results for Hypothesis 2e are shown in Table 4.19 (p.111). According to the moderator equations on p.91, the impact of TE can be explained by the formulae: PS = 2.521 - 0.060('Lifecycle') - 0.004(TE) + 0.731('Lifecycle'xTE). As the standardized coefficients of both TE and 'Lifecycle'xTE were greater than 0, there was a potential that TE was a quasi moderator (Sharma et al., 1981; Zedeck, 1971). However, a standardized coefficient value of 0.731 with a p value of 0.134 showed that 'Lifecycle'xTE was not a significant predictor of PS (p>0.05). The additional variance to PS contributed by the interaction effect was also less than 1% (R^2 change = 0.006). To prevent the risk of committing Type 1 error, Hypothesis 2e could not be accepted.

Table 4.19: Hierarchical regression results of Hypothesis 2e

Variables	Project Success		
	Model 1	Model 2	Model 3
Control variables			
Project Lifecycle Management Processes	0.558*	0.461*	-0.060
Main effects			
Team Empowerment		0.399*	0.004
Interaction effects			
Project Lifecycle Management Processes x TE			0.731
R Square	0.312	0.462	0.468
Adjusted R Square	0.308	0.456	0.46
△R Square	0.312	0.150	0.006
△F	88.345	54.03	2.262
Sig ├ F	0.000	0.000	0.134

Standardized regression coefficients are reported, N= 197

* = Significant at p<0.05

Hypothesis 2f: TE has a positive and significant moderating effect on the relationship between PM KPIs and PS in HK.

The results of a hierarchical regression analysis with three models to test the moderating effect of TE on the relationship between 'KPI' and PS are shown in Figure 4.18 (p.111).   'KPI' caused 33.2% variance in PS in Model 1.   In Model 2, TE was added as an independent variable and has caused an additional variance of 11.8% in PS.   The F change (2, 194) was 41.626, significant at the p<0.05 level (p = 0.000).   In Model 3, the interaction effect of 'KPI' and TE ('KPI'xTE) had slightly increased the variance in PS by 1.6%, with F change (3, 193) = 5.631 and Sig. F change = 0.019.
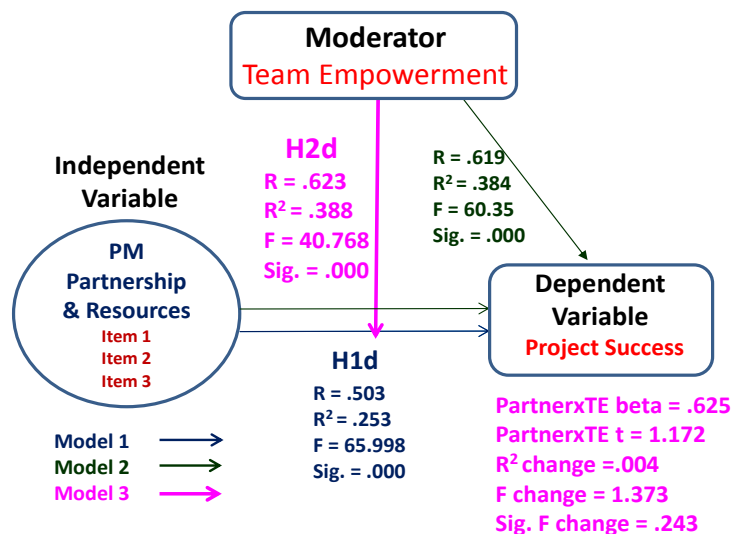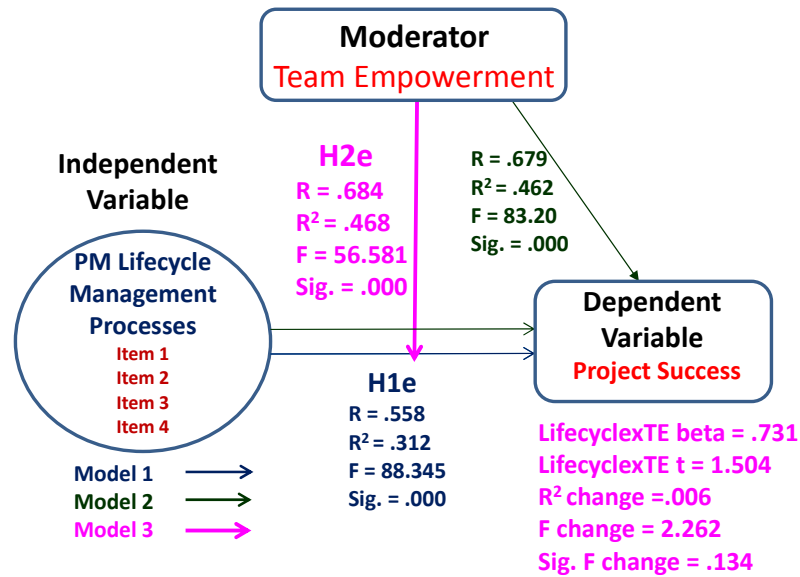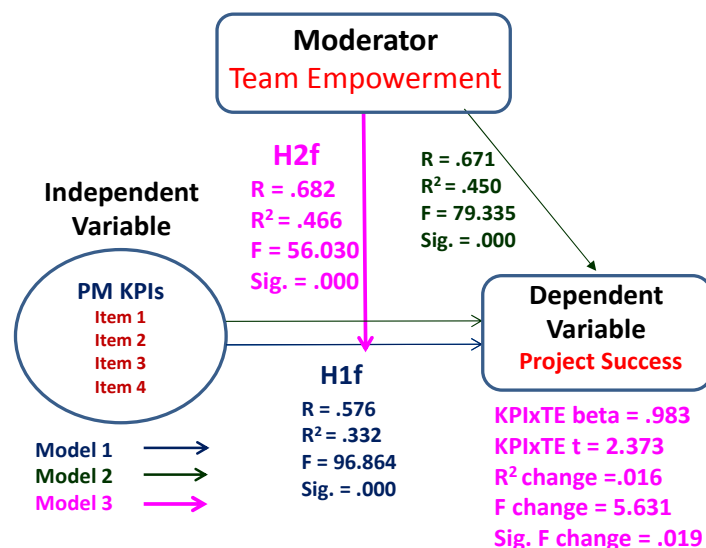

Figure 4.18 Regression analysis result of Hypothesis 2f

The regression results for Hypothesis 2f are shown in Table 4.20 (p.112). According to the moderator equations on p.91, the impact of TE can be explained by the formulae: PS = 2.995 - 0.248('KPI') - 0.118(TE) + 0.983('KPI'xTE).   As the standardized coefficients of both TE and 'KPI'xTE were greater than 0, there was a potential that TE was a quasi moderator (Sharma et al., 1981; Zedeck, 1971).   A standardized coefficient value of 0.983 with a p value of 0.019 showed that 'KPI'xTE was a significant predictor of PS ($p<0.05$). The additional variance to PS contributed by the interaction effect was greater than 1% (R^2 change = 0.016).   The null hypothesis that TE does not moderate the relationship between 'KPI' and PS can be rejected.   Hypothesis 2f could be accepted without the risk of committing Type 1 error.

Table 4.20: Hierarchical regression results of Hypothesis 2f

Variables	Project Success		
	Model 1	Model 2	Model 3
Control variables			
PM KPIs	0.576*	0.459*	-0.248
Main effects			
Team Empowerment		0.363*	-0.118
Interaction effects			
PM KPIs x TE			0.983*
R Square	0.332	0.45	0.466
Adjusted R Square	0.328	0.444	0.457
△R Square	0.332	0.118	0.016
△F	96.864	41.626	5.631
Sig△F	0.000	0.000	0.019

Standardized regression coefficients are reported, N= 197

* = Significant at p<0.05

4.7 Summary of Findings

The majority of respondents to this research were males with university education or executives employed in project manager roles.   Most of them worked in telecommunication and IT industries as well as banking and financial services.   The average PM experience was 12.2 years.   More than half of them had PMP[@] certification.   197 responses were analysed using

univariate, bivariate and multivariate analyses. Review of the descriptive statistics confirmed normality of responses. Stability and validity of the survey instrument was checked. High correlations of some variables were found. Each variable was found to have a principal component factor causing the majority of variance. Results of the hypothesis testing are summarised in Table 4.21 (p.113). Eight hypotheses were supported through the data analysis and six were rejected.

Table 4.21 Results of hypothesis testing

Number	Hypothesis	Results	Supported/ Rejected
H1	The relationship between PM Performance and PS in Hong Kong is statistically significant and positive	$R^2 = 0.491$ Sig. = 0.000	Supported
H1a	The relationship between PM Leadership and PS in Hong Kong is statistically significant and positive	$R^2 = 0.267$ Sig. = 0.000	Supported
H1b	The relationship between PM Staff and PS in Hong Kong is statistically significant and positive	$R^2 = 0.191$ Sig. = 0.000	Supported
H1c	The relationship between PM Policy and Strategy and PS in Hong Kong is statistically significant and positive	$R^2 = 0.371$ Sig. = 0.000	Supported
H1d	The relationship between PM Partnership and Resources and PS in Hong Kong is statistically significant and positive	$R^2 = 0.253$ Sig. = 0.000	Supported
H1e	The relationship between Project Lifecycle Management Process and PS in Hong Kong is statistically significant and positive	$R^2 = 0.312$ Sig. = 0.000	Supported
H1f	The relationship between PM Key Performance Indicators and PS in Hong Kong is statistically significant and positive	$R^2 = 0.332$ Sig. = 0.000	Supported
H2	TE has a positive and significant moderating effect on the relationship between PM Performance and PS in Hong Kong	$R^2 = 0.552$ $R^2 \triangle = 0.004$ Sig. F $\triangle = 0.220$	Rejected
H2a	TE has a positive and significant moderating effect on the relationship between PM Leadership and PS in Hong Kong	$R^2 = 0.401$ $R^2 \triangle = 0.011$ Sig. F $\triangle = 0.063$	Rejected
H2b	TE has a positive and significant moderating effect on the relationship between PM Staff and PS in Hong Kong	$R^2 = 0.372$ $R^2 \triangle = 0.010$ Sig. F $\triangle = 0.089$	Rejected
H2c	TE has a positive and significant moderating effect on the relationship between PM Policy and Strategy and PS in Hong Kong	$R^2 = 0.371$ $R^2 \triangle = 0.002$ Sig. F $\triangle = 0.419$	Rejected
H2d	TE has a positive and significant moderating effect on the relationship between PM Partnership and Resources and PS in Hong Kong	$R^2 = 0.388$ $R^2 \triangle = 0.004$ Sig. F $\triangle = 0.243$	Rejected
H2e	TE has a positive and significant moderating effect on the relationship between Project Lifecycle Management Processes and PS in Hong Kong	$R^2 = 0.468$ $R^2 \triangle = 0.006$ Sig. F $\triangle = 0.134$	Rejected
H2f	TE has a positive and significant moderating effect on the relationship between PM Key Performance Indicators and PS in Hong Kong	$R^2 = 0.466$ $R^2 \triangle = 0.016$ Sig. F $\triangle = 0.019$	Supported

4.8 Conclusion

This chapter summarized the results of quantitative analysis of the data collected from the online survey about the relationship between PM Performance, PS and TE. After checking the normality, reliability and validity of data collected, the data were analyzed with univariate, bivariate and multivariate analyses. The hypotheses developed in Chapter 2 were tested and verified by multiple regression and hierarchical regression analyses, finding that only eight out of the fourteen hypotheses were supported. The implications drawn and recommendations made from these results are discussed in the next chapter.

Chapter 5   Discussion and Conclusion

5.1 Introduction

This chapter discusses the findings from the quantitative research undertaken to investigate the relationship between Project Management (PM) Performance and Project Success (PS) and the moderating effect of Team Empowerment (TE) on this relationship.   First, the research results are reviewed with reference to earlier findings in other studies and discussed against the extant literature.   Then, the implications of these findings on the development of business theories and managerial practices are evaluated. Some suggestions are also made for PM practitioners to improve their project team performance and enhance the possibility of success in projects. In addition, the limitations of this research are listed and discussed together with some recommended areas for conducting further research.   Finally, conclusions about this research are made at the end of the chapter.

5.2 Discussion of Findings

Seven hypotheses were developed for each of the two research questions for this study.   The data analysis results revealed that eight hypotheses were supported and six were not supported as shown in Table 5.1 (p.116) and Figure 5.1 (p.116).

Table 5.1 Research questions and hypothesis testing results

Number	Hypothesis	Supported/ Rejected
RQ1	**To what extent does PM Performance contribute to PS in Hong Kong?**	
H1	The relationship between PM Performance and PS in Hong Kong is statistically significant and positive	Supported
H1a	The relationship between PM Leadership and PS in Hong Kong is statistically significant and positive	Supported
H1b	The relationship between PM Staff and PS in Hong Kong is statistically significant and positive	Supported
H1c	The relationship between PM Policy and Strategy and PS in Hong Kong is statistically significant and positive	Supported
H1d	The relationship between PM Partnership and Resources and PS in Hong Kong is statistically significant and positive	Supported
H1e	The relationship between Project Lifecycle Management Process and PS in Hong Kong is statistically significant and positive	Supported
H1f	The relationship between PM Key Performance Indicators and PS in Hong Kong is statistically significant and positive	Supported
RQ2	**To what extent does TE moderate the relationship between PM Performance and PS in Hong Kong?**	
H2	TE has a positive and significant moderating effect on the relationship between PM Performance and PS in Hong Kong	Rejected
H2a	TE has a positive and significant moderating effect on the relationship between PM Leadership and PS in Hong Kong	Rejected
H2b	TE has a positive and significant moderating effect on the relationship between PM Staff and PS in Hong Kong	Rejected
H2c	TE has a positive and significant moderating effect on the relationship between PM Policy and Strategy and PS in Hong Kong	Rejected
H2d	TE has a positive and significant moderating effect on the relationship between PM Partnership and Resources and PS in Hong Kong	Rejected
H2e	TE has a positive and significant moderating effect on the relationship between Project Lifecycle Management Processes and PS in Hong Kong	Rejected
H2f	TE has a positive and significant moderating effect on the relationship between PM Key Performance Indicators and PS in Hong Kong	Supported
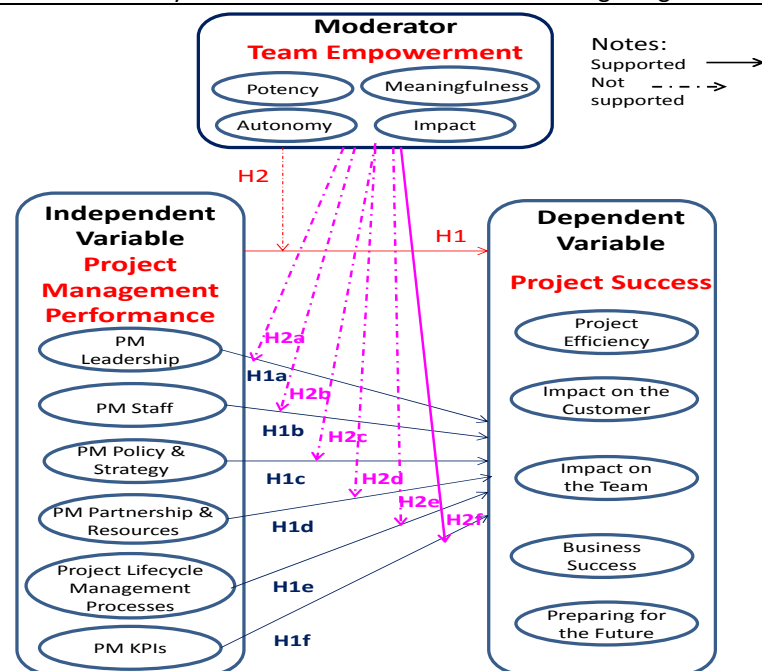
Figure 5.1 Results of hypothesis testing

5.2.1 Relationship between PM Performance and Project Success

Hypothesis 1 postulated that PM Performance was positively and significantly correlated to PS. The quantitative survey showed that PM Performance, with the six constructs of PM Leadership ('Leader'), PM Staff ('Staff'), PM Policy and Strategy ('Policy'), PM Partnership and Resources ('Partnership'), Project Lifecycle Management Processes ('Lifecycle') and PM KPIs ('KPI') acting together, explained 49.1% variance in PS. These findings are consistent with previous research which found that PM contributes to the success of projects (Golini et al., 2015; Hyväri, 2006a; Mir & Pinnington, 2014; Papke-Shields et al., 2010). However, the impact of PM Performance on PS found in this study was stronger than that found in Mir & Pinnington's study (2014). Table 5.2 (p.117) is a comparison on the findings of these two studies. Given that the current study was conducted in Hong Kong and Mir and Pinnington's (2014) study was conducted in the United Arab Emirates (UAE), this may indicate a possible cultural effect impacting PM Performance in the PM communities of these two countries. Previous research has also found that cross country cultural differences affect PS (de Carvalho, Patah & de Souza Bido, 2015; Papke-Shields et al., 2010).

Table 5.2 Impact of PM Performance on Project Success in HK and the UAE

Variable/Items	R^2 – Current Study	R^2 – Mir & Pinnington (2014)
PM Performance	0.491	0.449
PM Leadership	0.267	0.29
PM Staff	0.191	0.325
PM Polity and Strategy	0.371	0.227
PM Partnership and Resources	0.253	0.232
Project Lifecycle Management Processes	0.312	0.31
PM KPIs	0.332	0.334

Table 5.2 (p.117) also shows that each PM Performance construct was positively and significantly affecting PS in the current study. Hence, hypotheses 1a to 1f, each postulating a positive and significant relationship between a PM Performance construct and PS, were supported. The relationship between PS and each PM Performance construct is discussed in the following paragraphs.

5.2.2 Relationship between PM Leadership and Project Success

'Leader' refers to the promotion of projects as a tool for managing change and the establishment of a shared PM culture as well as common PM language (Bryde, 2003a; Mir & Pinnington, 2014; Qureshi et al., 2009). In this study, 'Leader' explained 26.7 % variance in PS. This level of impact is close to the variance of 29% in PS found in Mir & Pinnington's (2014) earlier research. Previous research has suggested that the gearing of corporate strategies and resources towards PM needs contributes to PS (Isik, Arditi, Dikmen, & Birgonul, 2009). For instance, the study of Mathur, Jugdev and Fung (2013) found that PM knowledge sharing through established processes and tools or techniques on a company-wide level has helped to improve project performance (2013).

5.2.3 Relationship between PM Staff and Project Success

'Staff' refers to the planning and management arranged for maximizing the PM capability of staff and the reward mechanisms acknowledging their performance in managing projects (Bryde, 2003a; Mir & Pinnington, 2014; Qureshi et al., 2009). The finding of a positive and significant relationship between 'Staff' and PS is consistent with results of previous research

highlighting the importance of PM training (Cooke-Davies & Arzymanow, 2003; Fortune & White, 2006). However, 'Staff' was the least influential PM Performance construct on PS in this study, creating only 18.8% variance in PS, while it was the second most impactful item causing 32.5% variance in PS in the research of Mir & Pinnington (2014). This may again indicate a difference in the cultural contexts of these studies. In the current research in the Hong Kong context, it may be plausible that this indicates a lack of organizational effort in developing the PM capability of staff and perhaps a failure to recognize the PM performance of staff in a structured manner by many organizations in Hong Kong.

5.2.4 Relationship between PM Policy & Strategy and Project Success

'Policy' refers to how PM is developed in a planned and systematic manner across an organization from tactical to strategic levels (Bryde, 2003a; Mir & Pinnington, 2014; Qureshi et al., 2009). It was found to be the most influential PM Performance construct creating 37.1% variance in PS in the current study. The importance of standardized PM practices at the organizational level in contributing to PS has been previously highlighted (Besner & Hobbs, 2006; Jugdev et al., 2013; Milosevic and Patanakul, 2005). This is referred to as PM maturity (Grant & Pennypacker, 2006) and is a measurement on the degree of adoption of PM practices by an organization (Cooke-Davies & Arzymanow, 2003; Jugdev & Thomas, 2002). For example, Yazici (2009) found that high PM maturity was significantly related to improved business performance in terms of cost saving, increased sales and enhanced competitiveness.

The strong influence of 'Policy' in the current study reflects the effectiveness of organizations in Hong Kong, in which participants to this research worked in, to adopt structured policies and procedures to make the strategic goals of projects visible in aligning efforts of all PM staff to achieve PS.

5.2.5 Relationship between PM Partnership & Resources and Project Success

'Partnership' is the establishment of effective partnerships with all stakeholders in managing projects (Bryde, 2003a; Mir & Pinnington, 2014; Qureshi et al., 2009).   The level of variance in PS created by 'Partnership' in HK found in this study was 25.3%.   This is consistent with the result of the earlier research conducted by Mir & Pinnington (2014).   Management of stakeholders is very important because projects are by definition temporary endeavors often involving stakeholders with different positions in an organization, varied levels of involvement in the projects and owning different intrinsic power (Bryde, 2005).

Stakeholder management requires a proper analysis covering the identification of stakeholders, an understanding of their characteristics and the development of an effective engagement strategy (Jepsen & Eskerod, 2009).   The stakeholders' expectations of a project and their criteria in evaluating the project performance should be effectively gauged in developing and monitoring the project KPIs (Todorović, Mitrović, & Bjelica, 2013; Todorović, Petrović, Mihić, Obradović, & Bushuyev, 2015).   The contribution to PS of partnering with stakeholders, in pragmatic forms like the use of charters, contractual incentives and team building workshops or

informal forms like social relationships (Bresnen, 2007), was emphasized in previous studies (Bresnen & Marshall, 2000 & 2002; Chan, Chan & Ho, 2003). In the study of Larson (1997), the variance in PS explained by partnering activities ranged from 19% (for technical performance) to 34% (for overall project results).

5.2.6 Relationship between Project Lifecycle Management Processes and Project Success

'Lifecycle' refers to the various processes and procedures in managing projects along the whole project life cycle (Bryde, 2003a; Mir & Pinnington, 2014; Qureshi et al., 2009).   A project life cycle is a series of phases indicating the changes in project dynamics from the beginning to the completion of a project (Patanakul et al., 2010; PMI, 2013).   Although the names and numbers of phases in project life cycles may vary among organizations and industries (Patanakul et al., 2010), the most popular definition is the four-phase version: conceptualization, planning, execution and termination (Patanakul et al., 2010; Pinto & Prescott, 1988; Pinto & Slevin, 1988a).   PMI also emphasizes the importance of control and monitoring throughout the four phases (PMI, 2013, p.42).   'Lifecycle' was responsible for 31% of the variance in PS in the current study.   This outcome is also consistent with the findings of Mir & Pinnington (2014).   The relative importance of various critical factors for PS changes over different stages of the project life cycle (Pinto & Prescott, 1988; Pinto & Slevin, 1988a).   Hence, different PM tools and techniques should be used at different phases of the project life cycle to create success for projects (Patanakul et al., 2010).

5.2.7 Relationship between PM KPIs and Project Success

'KPI' is the system and indicators measuring whether a project meets the requirements of stakeholders or not, as well as the concerned methods to improve the capability of a PM system in achieving such targets (Bryde, 2003a; Mir & Pinnington, 2014; Qureshi et al., 2009).   The level of variance in PS caused by 'KPI' was found to be 33.2% and is consistent with several other studies (Mir & Pinnington, 2014; Aubry & Hobbs, 2011; Chan & Chan, 2004; Todorović et al., 2015). Research has shown that simply the act of defining KPIs and establishing a measurement system contributes to PS (Thomas & Fernández, 2008).   As different stakeholders may have varied evaluation criteria (Aubry & Hobbs, 2010; Davis, 2014; De Wit, 1998; Freeman & Beale, 1992; Lipovestsky et al., 1997; Toor & Ogunlana, 2010; Turner & Zolin, 2012), project managers need to take the appropriate implementation and corrective actions along the whole project life cycle in a timely and effective manner when they know what the KPIs for PS are (Chan & Chan, 2004; Wateridge, 1998).   An integrated KPI measurement system is also recommended to take into consideration of performance at different stages along a project life cycle to produce an overall evaluation of project performance (Pillai, Joshi & Rao, 2002).

5.2.8 The Moderating Impact of TE on PM Performance and PS

It was found in Chapter 4 that the interaction effect of TE and PM Performance on PS was positive but not significant in the current study.   The answer to the second research question was that TE did not significantly moderate the relationship between PM Performance and PS.   Instead, TE was found to be a significant independent variable leading to an additional

5.8% variance in PS when acting together with the PM Performance variable (as shown in Table 4.1, p.103). It implied that TE was exerting a direct influence on project performance in terms of PS. This is consistent with previous research findings that TE enhances team performance and team outcomes (Burke et al., 2006; Kirman & Rosen, 1999; Kirkman, Rosen et al., 2004; Seibert et al., 2004; Seibert et al., 2011; Tuuli & Rowlinson, 2009b). Yazici (2009) also suggested that employee empowerment is a must for facilitating organizational change to cope with the project issues about time, budget and expectations.

5.2.9 The Moderating Impact of TE on each PM Performance Construct and PS

The moderating impact of TE on the relationship between PS and most items of PM Performance were positive but not significant, except for 'KPI'. The data analysis results listed in Chapter 4 show that the interaction effect of TE and 'KPI' on the relationship between 'KPI' and PS was positive and significant, effectively increasing the variance in PS by 1.9% (Table 4.23 on p.111).

'KPI' refers to the criteria of various stakeholders in evaluating project results and the methods for improving the project performance (Bryde, 2003a; Mir & Pinnington, 2014, p.204). When the project team members are all psychologically empowered, they are more motivated to manage the 'KPI' for achieving successful project results. A positive and significant moderating effect of TE on the relationship between 'KPI' and PS supports the recommendation of Mir & Pinnington (2014) that "employing motivated

team members is more likely to achieve better project results, higher employee engagement and improved retention rates". Yazici (2009) also commented that "organizational culture change toward sharing, collaboration, and empowerment is a must" in managing projects (p.14).

Extant literature reveals that TE is effective in motivating teams and enhancing performance of teams as a whole (Chen et al., 2007; Kirkman & Rosen, 1999; Kirkman & Rosen et al., 2004; Tuuli & Rowlinson, 2007 & 2009a). However, among the six elements of PM Performance, only PM KPI can be affected by project teams. The other five elements, including PM Leadership meaning the promotion of project as a change management tool, PM Staff meaning the training and reward system for project staff , PM Policy and Strategy meaning standardization and maturity of PM practices, PM Partnership and Resources meaning cooperation of various stakeholders, as well as Project Lifecycle Management Processes meaning the classification of a project into different phases (Mir & Pinnington, 2004), are all defined and set at organizational levels beyond the control of project teams. Hence, the moderating effects of TE on these PM Performance elements are insignificant.

5.3 Implications

The findings of this research have enabled a better understanding of the impact of PM Performance and TE on PS. The findings have also provided valuable implications for theoretical development and improvement of managerial practices in the field of PM.

5.3.1 Theoretical Implications

This research enriches the development of PM theories. First, it has confirmed the importance of PM in contributing to PS as emphasized in previous PM literature (Belassi & Tukel, 1996; Cooke-Davies, 2002; Mir & Pinnington, 2014; Munns & Bjeirmi, 1996; Dvir et al., 1998). Furthermore, the suitability of the six constructs of the Project Management Performance Assessment (PMPA) model, developed by Bryde (2003a) and tested by Qureshi et al. (2009), Din et al. (2011) and Mir and Pinnington (2014), in representing PM Performance has been further validated. It has also provided empirical evidence to show the relative importance of various PM Performance items in contributing to PS, further supporting the work of Mir & Pinnington (2014). Amongst various factors in the PM Performance variable, PM Policy and Strategy was found to be the most influential items on PS in Hong Kong. This finding aligns with previous research on the importance of standard PM tools (Besner & Hobbs, 2006; Jugdev et al., 2013; Milosevic and Patanakul, 2005) and PM maturity (Yazici, 2009) in contributing to PS. The scope of PM research in the Hong Kong context has also been extended from the construction industry to varied industry sectors, such as telecommunication, banking and finance as well as manufacturing.

In addition, this study integrates the theory of psychological TE into PM and PS research, which has not been previously undertaken. The finding of positive and significant moderating effects exerted by psychological TE on the relationship between PM KPIs and PS suggests that PM researchers ought to pay more attention to theories of team motivation in exploring the achievement of project KPIs and PS. In addition, psychological TE has been

identified as a significant independent variable effective in creating an additional variance of 5.8% in PS, explaining totally 54.8% variance in PS together with PM Performance (as shown in Table 4.1, p.103). The result is consistent with previous research indicating the effectiveness of TE in enhancing team performance (Burke et al., 2006; Kirman & Rosen, 1999; Kirkman, Rosen et al., 2004; Seibert et al., 2004; Seibert et al., 2011; Tuuli & Rowlinson, 2009b). This study has further proven that the impact of psychological TE is applicable to project teams when previous studies on psychological TE were mainly concerned with permanent and functional teams (Chen et al., 2007; Kirman & Rosen, 1999; Kirkman, Rosen et al., 2004). As this research has found that psychological TE influences the success of project teams, in future, theories of PM should also be expanded to include the impact of psychological TE.

5.3.2 Managerial Implications

This research provides important implications to practitioners of PM. The result that PM Performance explained 49.1% variance of PS provides encouragement to project managers that successful management of PM Performance items may contribute half to the success of a project. The research results have further indicated which PM Performance items are more impactful on PS, giving organizations and practitioners a direction on which PM Performance item to focus on. For organizations starting to adopt the Project Management Performance Assessment (PMPA) model (Bryde, 2003a), they may pay more attention to 'Policy', 'KPI' and 'Lifecycle'. However, for organizations that have already developed 'Policy', 'KPI' and 'Lifecycle' well, more investment on 'Staff', especially in relation to the

nurturing of PM capabilities and establishment of reward systems, may be desirable.

Moreover, this study has suggested that, in the HK context at least, the development of PM capabilities of staff has not been enough to make a significant impact on PS.   The importance of training, appraisal systems and reward mechanism on PM staff for creating PS was highlighted in previous PM research (Fortune & White, 2006; Schindler & Eppler, 2003). Nevertheless, PM practitioner training has been criticized for its narrow focus on competency standards describing performance criteria in the Body of Knowledge (BOK) developed by PM associations and the execution-focused roles of Project Manager and project team members (Crawford, Morris, Thomas & Winter, 2006).   Due to the increased applications of PM practices for realizing more complicated organizational initiatives in increasingly complex environments, the focus and breadth of PM training should be reviewed and perhaps expanded to cover a broader range of skills to cater for the needs of a wider range of roles that involve project responsibilities, such as that of Program Manager, Portfolio Manager and Project or Executive Sponsor (Crawford, Morris, et al., 2006).

Furthermore, this study has found that Project Lifecycle Management Processes is an important factor contributing to PS.   Due to the increased application of PM practices to a wider range of organizational initiatives other than product and service development (Winter, Smith, Morris & Cicmil, 2006), some researchers have suggested extending the definition of 'project life cycle' from the 'execution-focused' view of 'initiation to implement' to a

'whole-of-life concept of projects – from initiation, through operation to cancellation' to cope with the increasing complexity of projects (Crawford, Morris, et al., 2006, p. 725).

Finally, this study has found evidence that team motivation, in terms of psychological TE, is a significant contributor to PS. The finding of psychological TE as a significant independent variable of PS suggests that PM practitioners should consider adopting this together with PM to enhance PS. The recommendations of Mir and Pinnington (2014) that the perception of a successful project motivates team members and enhances member commitment for better project results align with the psychological TE concept (p.213). It is therefore desirable for project managers to increase the practice of psychological TE to create motivated project teams. Although the moderating effect of TE was not significant on most PM Performance constructs, this study has shown that an empowered project team was more effective in managing the PM KPIs. The outcomes of psychological TE, like proactivity and commitment (Kirkman & Rosen, 1999), may enable project team members to better gauge and meet the requirements of different stakeholders at all stages of the project life cycle and then contribute to the achievement of PS.

5.4 Contributions of this research

This research makes significant contributions to the study of PM and TE. PS is the most widely studied topic in PM research (Jugdev & Müller, 2005; Müller & Jugdev, 2012). This study contributes to a better understanding

on the relationship between PM and PS, especially regarding the contribution of various PM Performance factors to the variance in PS.   It is the first empirical study in the HK context evaluating the impact of PM Performance on PS, thus expanding the context of studies using the Project Management Performance Assessment model (PMPA) from UK (Bryde, 2003a), Pakistan (Qureshi et al., 2009) and the UAE (Mir & Pinnington, 2014) to HK.   It supports the effective representation of PM Performance by the PMPA framework.   It also assists in the generalization of earlier findings from UAE environment (Mir & Pinnington, 2014) to other locations.

Additionally, this research expands the applicability of the impact of PM on PS in Hong Kong from construction industry to more varied industries. Respondents in the current research were from various industries, including telecommunication and information technology industries (33.1%), banking and finance industries (30.1%), as well as manufacturing industries (7.8%). This distribution also indicates that PM practices are widely adopted in various industries in HK.

Furthermore, this study contributes to a better understanding on the impact of psychological TE on PM and PS.   It expands the study of psychological TE from functional teams in previous literature (Chen et al., 2007; Kirman & Rosen, 1999; Krikman, Rosen et al., 2004) to project teams.   It also extends the study of empowerment in PM from the empowering leadership of project managers (Nauman et al., 2010) and the practice of structural TE in cultivating an empowering climate (Forrester, 2000; Menon et al., 2002; Seibert et al., 2004) to the impact of psychological empowerment of the

whole project team instead of individual team members.

5.5 Limitations of this research

The limitations of this research are discussed in this section. They are mainly related to the research design and the research methodology. First, this research was conducted in one geographical location, Hong Kong. The findings may only apply to the HK environment, which is heavily affected by Chinese culture, and may not be able to be fully generalized further, although many findings are consistent with that in other cultural contexts. The absence of a global vision about the contribution of PM performance to organizational performance was identified as a research gap in previous studies (Aubry & Hobbs, 2011). De Carvalho and colleagues (2015) also found that country differences, inclusive of political, economic and social factors, significantly affect project performance, especially regarding the availability of skilled PM professionals and PM associations. Future research to include project managers from different countries in the Asia-Pacific region, such as Macau, Taiwan and Singapore, will help to better understand if the impact of PM Performance on PS are similar in other Asian countries or not.

Second, most of the participants (over 62%) in this research were credential holders of only one PM association, covering only the Project Management Professionals (PMP[@]) certified by Project Management Institute (PMI). There were only seven respondents (3.6%) holding PM credentials from other PM organizations. Expansion of the sample frame to include

members of other PM associations, like the Association for Project Management (APM), the Australian Institute of Project Management (AIPM) and the International Project Management Association (IPMA), is desirable to enhance generalizability of the research results.

The third limitation concerns the industry impact on project performance. The results of this research represented only generalized findings from various industries in HK.   As different industries have different maturity in the adoption of project management practices (Cooke-Davies & Arzymanow, 2003) due to varied levels of project scales and complexity (Besner & Hobbs, 2008; Crawford & Pollock, 2007), the impacts of PM Performance on PS may vary across industries (de Carvalho et al., 2015).   Many researchers have also pointed out that different industries have varied critical success factors for projects (Chan et al., 2001; Chua et al., 1999; Cooke-Davies & Arzymanow, 2003; Dvir et al., 1998; Shenhar, Tishler, Dvir, Lipovetsky, & Lechler, 2002). Further studies with industry specific analysis to explore the varied impact of PM Performance on success of project in different industries are recommended.   The identification of industry specific influences of various PM Performance constructs may better help project managers from different industries to achieve PS.

Fourth, quantitative cross sectional design with a positivist paradigm has the limitation of only depicting the situation at the point of study without identifying the reasons or factors leading to those results.   The prevalent research on PS has been criticized for adopting "a narrowly managerialist, funtionalist-positivist mode of enquiry" (Sage et al., 2014, p.545).

Qualitative research could be executed to further understand why each PM Performance item has exerted a particular level of impact on PS in HK during the time of this study. Additionally, a comparative study looking at the environmental factors affecting PM Performance in HK and the UAE with the consideration of such contextual factors as culture, popularity of PM training and project complexity may help to find out the reasons for the different levels of effects of PM Policy & Strategy and PM Staff in these two regions. Critical research approach looking into the environment, political factors and social context is also recommend by many researchers on PM (Cicmil, 2006; Cicmil & Hodgson, 2006; Cicmil, Williams, Thomas & Hodgson, 2006; Neverauskas, Bakinaite, & Meiliene, 2013, Sage et al., 2014; Smyth & Morris, 2007). Longitudinal studies are also suggested in previous PM and TE literature (de Carvalho et al., 2015; Maynard et al., 2012).

The fifth limitation of the study is the self-reporting method by the PM practitioners. Participants' bias and the common method variance problem could not be prevented (Mir & Pinnington, 2014). To resolve the problem, for instance, De Carvalho and colleagues (2015) used independent audit results rather than perceptions of people involved to evaluate performance of the projects researched. Involvement of various stakeholders, like project sponsors, users and customers, in future research to evaluate the success of those projects in study may help to remove the biases (Mir & Pinnington, 2014). Many structured project performance evaluation systems are suggested to involve stakeholder evaluation (Turner & Zolin, 2012) and multi-dimensional evaluation criteria like effectiveness, efficiency and relevance (Marques, Gourc & Lauras, 2010).

Last but not least, the finding from this study that PM Performance caused 49.1% variance of PS in HK does not enlighten us in understanding the remaining factors determining the balance of variance. Extant literature shows that there are many critical success factors that are beyond the control of project managers (Hyväri, 2006b; Munns & Bjeirmi, 1996), such as organizational structure (Lechler and Dvir, 2010; Might and Fischer, 1985), organizations' core capabilities (Leonard-Barton, 1992), power and politics (Pinto & Slevin, 1988a) and the external environment (Belassi & Tukel, 1996). Other key factors affecting PM Performance also include project nature (Dvir et al., 1998; Hyväri, 2006b) and project complexity (Shenhar et al., 1993; Shenhar, 2001). The relative importance of these factors and PM Performance in leading to PS cannot be discerned by this study.

5.6 Recommendations for Future Research

Some directions are suggested in this section for future research on PM and TE. First, it would be worthwhile to conduct qualitative research with PM practitioners from diversified industries to explore how they have managed PM Performance to better understand the impact of each PM Performance construct on PS. Next, a cross industry analysis is recommended to further understand the impacts of PM Performance on the PS of different industries in Hong Kong. Additionally, it would be desirable to conduct surveys in other Asian countries to further validate the findings of the relationship between PM Performance and PS in Hong Kong, indicating whether these can be generalized to the Asian culture. A comparative study with participants from different countries with varied cultural and social

background would also be helpful in identifying the cross cultural impact on the relationship between PM Performance, TE and PS. Of course, a longitudinal study would assist in identifying how the relationship identified between PM Performance, PS and TE changes over time. In addition, future research should include participants from other professional PM associations and holders of other PM credentials. More detailed analysis of the research results based on industry should also be conducted.

In recent years, an increasing numbers of scholars have suggested the adoption of critical approach in future research about PM (Engwall, 2003; Smyth & Morris, 2007; Söderlund & Lenfle, 2013; Winter et al., 2006). Pinto and Winch (2016) suggested to shift the PM research from an execution-based approach of PM to a "management of project" perspective with the consideration of the larger context in which a "project is idealized, validated and shaped by multiple stakeholder forces" (p.238). The consideration of social, political and economic factors may enable understanding of how and why a project outcome is classified as a success or failure (Sage et al., 2014).

5.7 Conclusion

This research has found a positive and significant relationship between PM Performance and PS in Hong Kong. Amongst various items in the PM Performance variable, PM Policy and Strategy was the most influential factor on PS in this study. More attention to PM Staff, especially regarding the training and reward system, was recommended to enhance their

contribution to PS. Although this research has demonstrated that the moderating effect of TE on PM Performance and PS was not significant, the research results showed that TE was a significant independent variable affecting PS. The finding of a positive and significant moderating effect of TE on PM KPIs and PS was also inspiring. These are important messages to PM practitioners in Hong Kong, giving them valuable insight into the possibilities of practising psychological TE together with PM to enhance the possibility of PS.

Despite the limitations listed in previous section, this research has given project managers from various industries in Hong Kong a practical reference to improve PM Performance and to deliver more successful projects. The research effort on PM, PS and TE is recommended to be continued with various research paradigms and methodologies, involving PM practitioners from more diversified background and conducting more focused analysis regarding the cultural and industry impact.

References

Aguinis, H. (1995). Statistical power problems with moderated multiple regression in management research. *Journal of Management, 21*(6), 1141-1158.

Ahearn, K. K., Ferris, G. R., Hochwarter, W. A., Douglas, C., & Ammeter, A. P. (2004). Leader political skill and team performance. *Journal of Management, 30*(3), 309-327.

Amaratunga, D., Baldry, D., Sarshar, M., & Newton, R. (2002). Quantitative and qualitative research in the built environment: application of "mixed" research approach. *Work Study, 51*(1), 17-31

Ammeter, A. P., & Dukerich, J. M. (2002). Leadership, team building, and team member characteristics in high performance project teams. *Engineering management journal, 14*(4), 3-10.

Arnold, J. A., Arad, S., Rhoades, J. A., & Drasgow, F. (2000). The empowering leadership questionnaire: The construction and validation of a new scale for measuring leader behaviors. *Journal of Organizational Behavior*(21), 249-269.

Assaf, S. A., Al-Khalil, M., & Al-Hazmi, M. (1995). Causes of delay in large building construction projects. *Journal of Management in Engineering, 11*(2), 45-50.

Atkinson, R. (1999). Project management: cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria. *International Journal of Project Management, 17*(6), 337-342.

Aubry, M., & Hobbs, B. (2011). A fresh look at the contribution of project management to organizational performance. *Project Management Journal, 42*(1), 3-16.

Baccarini, D. (1996). The concept of project complexity—a review. *International Journal of Project Management, 14*(4), 201-204.

Baccarini, D. (1999). The logical framework method for defining project success. *Project Management Journal, 30,* 25-32.

Badir, Y. F., Büchel, B., & Tucci, C. L. (2012). A conceptual framework of the impact of NPD project team and leader empowerment on communication and performance: An alliance case context. *International Journal of Project Management, 30*(8), 914-926.

Barker, J. R. (1993). Tightening the iron cage: Concertive control in self-managing teams. *Administrative Science Quarterly*, 408-437.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and

statistical considerations, *Journal of Personality and Social Psychology, 51*(6), 1173-1182.

Belassi, W., & Tukel, O. I. (1996). A new framework for determining critical success/failure factors in projects. *International Journal of Project Management, 14*(3), 141-151.

Besner, C., & Hobbs, B. (2006). The perceived value and potential contribution of project management practices to project success. *Project Management Journal, 37*(3), 37-48.

Besner, C., & Hobbs, B. (2008). Project management practice, generic or contextual: a reality check. *Project Management Journal, 39*(1), 16-33.

Besner, C., & Hobbs, B. (2012). An empirical identification of project management toolsets and a comparison among project types. *Project Management Journal, 43*(5), 24-46.

Blomquist, T., Hällgren, M., Nilsson, A., & Söderholm, A. (2010). Project-as-practice: In search of project management research that matters. *Project Management Journal, 41*(1), 5-16.

Boone, H. N., & Boone, D. A. (2012). Analyzing likert data. *Journal of Extension, 50*(2), 1-5.

Bredillet, C. N. (2007). Exploring research in project management: nine schools of project management research. *Project Management Journal, 38*(2), 3-4.

Bresnen, M. (2007). Deconstructing partnering in project-based organisation: Seven pillars, seven paradoxes and seven deadly sins. *International Journal of Project Management, 25*(4), 365-374.

Bresnen, M., & Marshall, N. (2000). Partnering in construction: a critical review of issues, problems and dilemmas. *Construction Management & Economics, 18*(2), 229-237.

Bresnen, M., & Marshall, N. (2002). The engineering or evolution of co-operation? A tale of two partnering projects. *International Journal of Project Management, 20*(7), 497-505.

Brick, J. M. (2011). The future of survey sampling. *Public Opinion Quarterly, 75*(5), 872-888.

Bryde, D. (2008). Perceptions of the impact of project sponsorship practices on project success. *International Journal of Project Management, 26*(8), 800-809.

Bryde, D. J. (2003a). Modelling project management performance. *International Journal of Quality & Reliability Management, 20*(2), 229-254.

Bryde, D. J. (2003b). Project management concepts, methods and application. *International Journal of Operations & Production Management, 23*(7), 775-793.

Bryde, D. J. (2005). Methods for managing different perspectives of project success. *British Journal of Management, 16*(2), 119-131.

Bryman, A., & Bell, E. (2011). *Business Research Methods* (3rd ed.): Oxford University Press.

Burke, C. S., Stagl, K. C., Klein, C., Goodwin, G. F., Salas, E., & Halpin, S. M. (2006). What type of leadership behaviors are functional in teams? A meta-analysis. *The Leadership Quarterly, 17*(3), 288-307.

Burpitt, W. J., & Bigoness, W. J. (1997). Leadership and innovation among teams The impact of empowerment. *Small Group Research, 28*(3), 414-423.

Burrell, G., & Morgan, G. (1979). *Sociological Paradigms and Organisational Analysis* (Vol. 248): London: Heinemann.

Carvalho, M. M. D., & Rabechini Junior, R. (2015). Impact of risk management on project performance: the importance of soft skills. *International Journal of Production Research, 53*(2), 321-340.

Cascio, W. F. (2000). Managing a virtual workplace. *The Academy of Management Executive, 14*(3), 81-90.

Cavana, R., Delahaye, B. L., & Sekeran, U. (2001). *Applied business research: Qualitative and quantitative methods*: John Wiley & Sons Australia.

Chan, A. P. C., & Chan, A. P. L.(2004). Key performance indicators for measuring construction success. *Benchmarking: An International Journal, 11*(2), 203-221.

Chan, A. P. C., & Tam, C. M.(2000). Factors affecting the quality of building projects in Hong Kong. *International Journal of Quality & Reliability Management, 17*(4/5), 423-442.

Chan, A. P. C., Chan, D. W. M., Chiang, Y. H., Tang, B. S., Chan, E. H. W., & Ho, K. S. K. (2004). Exploring critical success factors for partnering in construction projects. *Journal of Construction Engineering and Management, 130*(2), 188-198.

Chan, A. P. C., Ho, D. C.K., & Tam, C. M. (2001). Design and build project success factors: multivariate analysis. *Journal of Construction Engineering and Management, 127*(2), 93-100.

Chan, A. P. C., Scott, D., & Chan, A. P. L. (2004). Factors affecting the success of a construction project. *Journal of Construction Engineering and Management, 130*(1), 153-155.

Chan, A. P. C., Scott, D., & Lam, E. W. M. (2002). Framework of success criteria for design/build projects. *Journal of Management in Engineering, 18*(3), 120-128.

Chan, A. P., Chan, D. W., & Ho, K. S. (2003). An empirical study of the benefits of construction partnering in Hong Kong. *Construction Management and*

Economics, 21(5), 523-533

Chan, D. W., & Kumaraswamy, M. M. (1997). A comparative study of causes of time overruns in Hong Kong construction projects. *International Journal of Project Management, 15*(1), 55-63.

Chan, D. W., & Kumaraswamy, M. M. (2002). Compressing construction durations: lessons learned from Hong Kong building projects. *International Journal of Project Management, 20*(1), 23-35.

Chen, G., Kirkman, B. L., Kanfer, R., Allen, D., & Rosen, B. (2007). A multilevel study of leadership, empowerment, and performance in teams. *Journal of Applied Psychology, 92*(2), 331.

Chen, G., Sharma, P. N., Edinger, S. K., Shapiro, D. L., & Farh, J.-L. (2011). Motivating and demotivating forces in teams: cross-level influences of empowering leadership and relationship conflict. *Journal of Applied Psychology, 96*(3), 541.

Chen, Z., Lam, W., & Zhong, J. A. (2007). Leader-member exchange and member performance: a new look at individual-level negative feedback-seeking behavior and team-level empowerment climate. *Journal of Applied Psychology, 92*(1), 202.

Chua, D. K. H., Kog, Y.-C., & Loh, P. K. (1999). Critical success factors for different project objectives. *Journal of Construction Engineering and Management, 125*(3), 142-150.

Chuah, K., Rao Tummala, V., & Nkasu, M. (1995). Project management structures in Hong Kong industries. *International Journal of Project Management, 13*(4), 253-257.

Cicmil, S. (2006). Understanding project management practice through interpretative and critical research perspectives. *Project Management Journal, 37*(2), 27-37.

Cicmil, S., & Hodgson, D. (2006). New possibilities for project management theory: A critical engagement. *Project Management Journal, 37*(3), 111.

Cicmil, S., Williams, T., Thomas, J., & Hodgson, D. (2006). Rethinking project management: researching the actuality of projects. *International Journal of Project Management, 24*(8), 675-686.

Clarke, A. (1999). A practical use of key success factors to improve the effectiveness of project management. *International Journal of Project Management, 17*(3), 139-145.

Clarke, N. (2012). Leadership in projects: what we know from the literature and new insights. *Team Performance Management, 18*(3/4), 128-148.

Coakes, S. J. (2013). *SPSS: Analysis without anguish using SPSS version 20.0 for Windows*: John Wiley & Sons, Inc.

Cohen, J., Cohen, P., West, S., & Aiken, L. (2003). *Applied multiple correlation/ regression analysis for the behavioral sciences. Third Edition.* Lawrence Erlbaum Associates: Mahwah, NJ.

Cohen, S. G., & Bailey, D. E. (1997). What makes teams work: Group effectiveness research from the shop floor to the executive suite. *Journal of Management, 23*(3), 239-290.

Conger, J. A., & Kanungo, R. N. (1988). The empowerment process: Integrating theory and practice. *Academy of Management Review, 13*(3), 471-482.

Cooke-Davies, T. (2002). The "real" success factors on projects. *International Journal of Project Management, 20*(3), 185-190.

Cooke-Davies, T. J., & Arzymanow, A. (2003). The maturity of project management in different industries: An investigation into variations between project management models. *International Journal of Project Management, 21*(6), 471-478.

Couper, M. P. (2000). Review: Web surveys: A review of issues and approaches. *Public Opinion Quarterly*, 464-494.

Cramer, D. (2003). *Advanced quantitative data analysis.* McGraw-Hill Education (UK).

Crawford, L., & Pollack, J. (2004). Hard and soft projects: a framework for analysis. *International Journal of Project Management, 22*(8), 645-653.

Crawford, L., & Pollack, J. (2007). How generic are project management knowledge and practice? *Project Management Journal, 38*(1), 87-97.

Crawford, L., Morris, P., Thomas, J., & Winter, M. (2006). Practitioner development: From trained technicians to reflective practitioners. *International Journal of Project Management, 24*(8), 722-733.

Crawford, L., Pollack, J., & England, D. (2006). Uncovering the trends in project management: Journal emphases over the last 10 years. *International Journal of Project Management, 24*(2), 175-184.

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (Second Edition ed.): Sage publications.

Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin, 52*(4), 281.

Dainty, A. R., Bryman, A., Price, A. D., Greasley, K., Soetanto, R., & King, N. (2005). Project affinity: the role of emotional attachment in construction projects. *Construction Management and Economics, 23*(3), 241-244.

Davis, K. (2014). Different stakeholder groups and their perception of project success. *International Journal of Project Management, 32*(2), 189-201.

Davison, R., & Martinsons, M. G. (2002). Empowerment or enslavement?: A case of process-based organisational change in Hong Kong. *Information*

Technology & People, 15(1), 42-59.

de Carvalho, M. M., Patah, L. A., & de Souza Bido, D. (2015). Project management and its effects on project success: Cross-country and cross-industry comparisons. *International Journal of Project Management, 33*(7), 1509-1522.

De Wit, A. (1988). Measurement of project success. *International Journal of Project Management, 6*(3), 164-170.

DeCotiis, T. A., & Dyer, L. (1977). The dimensions and determinants of project performance. *Industrial Marketing Management, 6*(5), 370-378.

Denison, D. R., Hart, S. L., & Kahn, J. A. (1996). From chimneys to cross-functional teams: Developing and validating a diagnostic model. *Academy of Management Journal, 39*(4), 1005-1023.

Din, S., Abd-Hamid, Z., & Bryde, D. J. (2011). ISO 9000 certification and construction project performance: The Malaysian experience. *International Journal of Project Management, 29*(8), 1044-1056.

Dissanayaka, S. M., & Kumaraswamy, M. M. (1999). Evaluation of factors affecting time and cost performance in Hong Kong building projects. *Engineering Construction and Architectural Management, 6*(3), 287-298.

Dvir, D., & Lechler, T. (2004). Plans are nothing, changing plans is everything: the impact of changes on project success. *Research Policy, 33*(1), 1-15.

Dvir, D., Lipovetsky, S., Shenhar, A., & Tishler, A. (1998). In search of project classification: a non-universal approach to project success factors. *Research Policy, 27*(9), 915-935.

Dvir, D., Raz, T., & Shenhar, A. J. (2003). An empirical analysis of the relationship between project planning and project success. *International Journal of Project Management, 21*(2), 89-95.

Dvir, D., Sadeh, A., & Malach-Pines, A. (2006). Projects and project managers: the relationship between project managers' personality, project types, and project success. *Project Management Quarterly, 37*(5), 36.

Engwall, M. (2003). No project is an island: linking projects to history and context. *Research Policy, 32*(5), 789-808.

Evans, J. R., & Mathur, A. (2005). The value of online surveys. *Internet Research, 15*(2), 195-219.

Evaristo, J. R., Scudder, R., Desouza, K. C., & Sato, O. (2004). A dimensional analysis of geographically distributed project teams: a case study. *Journal of Engineering and Technology Management, 21*(3), 175-189.

Evaristo, R., & van Fenema, P. C. (1999). A typology of project management: emergence and evolution of new forms. *International Journal of Project Management, 17*(5), 275-281.

Ford, R. C., & Fottler, M. D. (1995). Empowerment: A matter of degree. *The Academy of Management Executive, 9*(3), 21-29.

Ford, R. C., & Randolph, W. A. (1992). Cross-functional structures: A review and integration of matrix organization and project management. *Journal of Management, 18*(2), 267-294.

Forrester, R. (2000). Empowerment: Rejuvenating a potent idea. *The Academy of Management Executive, 14*(3), 67-80.

Fortune, J., & White, D. (2006). Framing of project critical success factors by a systems model. *International Journal of Project Management, 24*(1), 53-65.

Fortune, J., White, D., Jugdev, K., & Walker, D. (2011). Looking again at current practice in project management. *International Journal of Managing Projects in Business, 4*(4), 553-572.

Fossey, E., Harvey, C., McDermott, F., & Davidson, L. (2002). Understanding and evaluating qualitative research. *Australian and New Zealand Journal of Psychiatry, 36*(6), 717-732.

Freeman, M., & Beale, P. (1992). Measuring project success. *Project Management Journal, 23*(1), 8-17.

Gaddis, P. O. (1959). The project manager. *Harvard Business Review, May-June*, 89-97.

Garel, G. (2013). A history of project management models: From pre-models to the standard models. *International Journal of Project Management, 31*(5), 663-669.

Gauthier, J. B., & Ika, L. A. (2012). Foundations of Project Management Research: An Explicit and Six-Facet Ontological Framework. *Project Management Journal, 43*(5), 5-23.

Gelbard, R., & Carmeli, A. (2009). The interactive effect of team dynamics and organizational support on ICT project success. *International Journal of Project Management, 27*(5), 464-470.

Geoghegan, L., & Dulewicz, V. (2008). Do project managers' leadership competencies contribute to project success? *Project Management Journal, 39*(4), 58-67.

Gerwin, D. (1999). Team empowerment in new product development. *Business Horizons, 42*(4), 29-36.

Ghasemi, A., & Zahediasl, S. (2012). Normality Tests for Statistical Analysis: A Guide for Non-Statisticians, *International Journal of Endocrinology Metabolism, 10*(2), 486-489

Gliem, R. R., & Gliem, J. A. (2003). Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. *Midwest Research-to-Practice Conference in Adult, Continuing, and Community*

Education.

Golini, R., Kalchschmidt, M., & Landoni, P. (2015). Adoption of project management practices: The impact on international development projects of non-governmental organizations. *International Journal of Project Management, 33*(3), 650-663.

Gorsuch, R. L. (1990). Common factor analysis versus component analysis: Some well and little known facts. *Multivariate Behavioral Research, 25*(1), 33-39.

Grant, K. P., & Pennypacker, J. S. (2006). Project management maturity: an assessment of project management capabilities among and between selected industries. *Engineering Management, IEEE Transactions on, 53*(1), 59-68.

Guadagnoli, E., & Velicer, W.F. (1988). Relation to sample size to the stability of component patterns. *Psychological Bulletin, 103*(2), 265-275.

Guba, E. G., & Lincoln, Y. S. (1982). Epistemological and methodological bases of naturalistic inquiry. *Educational Communication and Technology, 30*(4), 233-252.

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. *Handbook of Qualitative Research, 2*(163-194).

Hair, J., Celsi, M. W., Money, A. H., Samouel, P., & Page, M. (2011). *Essentials of Business Research Methods*. New York: ME Sharpe: Inc.

Hair, J.F., Wolfinbarger, M.F., Ortinau, D. J. & Bush, R. P. (2008). *Essentials of Marketing Research,* McGraw-Hill, Higher Education.

Hambley, L. A., O'Neill, T. A., & Kline, T. J. (2007). Virtual team leadership: The effects of leadership style and communication medium on team interaction styles and outcomes. *Organizational Behavior and Human Decision Processes, 103*(1), 1-20.

Hammuda, I., & Dulaimi, M. F. (1997). The theory and application of empowerment in construction: a comparative study of the different approaches to empowerment in construction, service and manufacturing industries. *International Journal of Project Management, 15*(5), 289-296.

Hanisch, B., & Wald, A. (2011). A project management research framework integrating multiple theoretical perspectives and influencing factors. *Project Management Journal, 42*(3), 4-22.

Harborne, P., & Johne, A. (2003). Creating a project climate for successful product innovation. *European Journal of Innovation Management, 6*(2), 118-132.

Hardy, C., & Leiba-O'Sullivan, S. (1998). The power behind empowerment: Implications for research and practice. *Human Relations, 51*(4), 451-483.

Hempel, P. S., Zhang, Z. X., & Han, Y. (2012). Team Empowerment and the Organizational Context Decentralization and the Contrasting Effects of Formalization. *Journal of Management, 38*(2), 475-501.

Hill, R. (1998). What sample size is "enough" in internet survey research. *Interpersonal Computing and Technology: An Electronic Journal for the 21st Century, 6*(3-4), 1-12.

Hobday, M. (2000). The project-based organisation: an ideal form for managing complex products and systems? *Research Policy, 29*(7), 871-893.

Hoegl, M., & Gemuenden, H. G. (2001). Teamwork quality and the success of innovative projects: A theoretical concept and empirical evidence. *Organization Science, 12*(4), 435-449.

Hoegl, M., & Parboteeah, P. (2006). Autonomy and teamwork in innovative projects. *Human Resource Management, 45*(1), 67-79.

Hoegl, M., & Proserpio, L. (2004). Team member proximity and teamwork in innovative projects. *Research Policy, 33*(8), 1153-1165.

Hoegl, M., Weinkauf, K., & Gemuenden, H. G. (2004). Interteam coordination, project commitment, and teamwork in multiteam R&D projects: A longitudinal study. *Organization Science, 15*(1), 38-55.

Holland, S., Gaston, K., & Gomes, J. (2000). Critical success factors for cross-functional teamwork in new product development. *International Journal of Management Reviews, 2*(3), 231-259.

Hyatt, D. E., & Ruddy, T. M. (1997). An examination of the relationship between work group characteristics and performance: Once more into the breech. *Personnel Psychology, 50*(3), 553-585.

Hyväri, I. (2006a). Project management effectiveness in project-oriented business organizations. *International Journal of Project Management, 24*(3), 216-225.

Hyväri, I. (2006b). Success of projects in different organizational conditions. *Project Management Journal, 37*(4), 31.

Ika, L. A. (2009). Project success as a topic in project management journals. *Project Management Journal, 40*(4), 6-19.

Isik, Z., Arditi, D., Dikmen, I., & Birgonul, M. T. (2009). Impact of corporate strengths/weaknesses on project management competencies. *International Journal of Project Management, 27*(6), 629-637.

James, L. R., & Brett, J. M. (1984). Mediators, Moderators, and Tests for Mediation. *Journal of Applied Psychology, 69*(2), 307-321.

Jepsen, A. L., & Eskerod, P. (2009). Stakeholder analysis in projects: Challenges in using current guidelines in the real world. *International Journal of Project Management, 27*(4), 335-343.

Joslin, R., & Müller, R. (2016). The relationship between project governance and project success. *International Journal of Project Management, 34*(4), 613-626.

Jugdev, K., & Müller, R. (2005). A retrospective look at our evolving understanding of project success. *Project Management Journal, 36*(4), 19-31.

Jugdev, K., & Thomas, J. (2002). Project management maturity models: The silver bullets of competitive advantage. *Project Management Journal, 33*(4), 4-14.

Jugdev, K., Perkins, D., Fortune, J., White, D., & Walker, D. (2013). An exploratory study of project success with tools, software and methods. *International Journal of Managing Projects in Business, 6*(3), 534-551.

Jung, D. I., & Sosik, J. J. (2002). Transformational leadership in work groups the role of empowerment, cohesiveness, and collective-efficacy on perceived group performance. *Small Group Research, 33*(3), 313-336.

Kaplowitz, M. D., Hadlock, T. D., & Levine, R. (2004). A comparison of web and mail survey response rates. *Public Opinion Quarterly, 68*(1), 94-101.

Kark, R., Shamir, B., & Chen, G. (2003). The two faces of transformational leadership: empowerment and dependency. *Journal of Applied Psychology, 88*(2), 246.

Kaulio, M. A. (2008). Project leadership in multi-project settings: Findings from a critical incident study. *International Journal of Project Management, 26*(4), 338-347.

Keegan, A. E., & Den Hartog, D. N. (2004). Transformational leadership in a project-based environment: a comparative study of the leadership styles of project managers and line managers. *International Journal of Project Management, 22*(8), 609-617.

Kent, R. (2015). *Analysing Quantitative Data: Variable-based and Case-based Approaches to Non-experimental Datasets*, Sage Publications Ltd.

Khamis, H. J., & Kepler, M. (2010). Sample size in multiple regression: 20+ 5K. *Journal of Applied Statistical Science, 17*(4), 505-517.

Kirkman, B. L., & Mathieu, J. E. (2005). The dimensions and antecedents of team virtuality. *Journal of Management, 31*(5), 700-718.

Kirkman, B. L., & Rosen, B. (1999). Beyond self-management: Antecedents and consequences of team empowerment. *Academy of Management Journal, 42*(1), 58-74.

Kirkman, B. L., Rosen, B., Gibson, C. B., Tesluk, P. E., & McPherson, S. O. (2002). Five challenges to virtual team success: lessons from Sabre, Inc. *The Academy of Management Executive, 16*(3), 67-79.

Kirkman, B. L., Rosen, B., Tesluk, P. E., & Gibson, C. B. (2004). The impact of

team empowerment on virtual team performance: The moderating role of face-to-face interaction. *Academy of Management Journal, 47*(2), 175-192.

Kirkman, B. L., Tesluk, P. E., & Rosen, B. (2004). The impact of demographic heterogeneity and team leader-team member demographic fit on team empowerment and effectiveness. *Group & Organization Management, 29*(3), 334-368.

Koskela, L., & Howell, G. (2002). *The underlying theory of project management is obsolete.* Paper presented at the Proceedings of the PMI Research Conference.   Project Management Institute, 293-302.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30,*670-610.

Lancaster, G. (2007). *Research Methods in Management,* Routledge.

Larson, E. (1997). Partnering on construction projects: a study of the relationship between partnering activities and project success. *IEEE Transactions on Engineering Management, 44*(2), 188-195.

Lechler, T. G., & Dvir, D. (2010). An alternative taxonomy of project management structures: linking project management structures and project success. *IEEE Transactions on Engineering Management, 57*(2), 198-210.

Lee-Kelley, L., & Sankey, T. (2008). Global virtual teams for value creation and project success: A case study. *International Journal of Project Management, 26*(1), 51-62.

Leonard-Barton, D. (1992). Core capabilities and core rigidities: A paradox in managing new product development. *Strategic Management Journal, 13*(S1), 111-125.

Liden, R. C., Wayne, S. J., & Sparrowe, R. T. (2000). An examination of the mediating role of psychological empowerment on the relations between the job, interpersonal relationships, and work outcomes. *Journal of Applied Psychology, 85*(3), 407-416.

Lim, C., & Mohamed, M. Z. (1999). Criteria of project success: an exploratory re-examination. *International Journal of Project Management, 17*(4), 243-248.

Lipnack, J., & Stamps, J. (1999). Virtual teams: The new way to work. *Strategy & Leadership, 27*(1), 14-19.

Lipovetsky, S., Tishler, A., Dvir, D., & Shenhar, A. (1997). The relative importance of project success dimensions. *R&D Management, 27*(2), 97-106.

Liu, A. M., & Walker, A. (1998). Evaluation of project outcomes. *Construction Management & Economics, 16*(2), 209-219.

Lo, T. Y., Fung, I. W., & Tung, K. C. (2006). Construction delays in Hong Kong civil engineering projects. *Journal of Construction Engineering and Management,*

132(6), 636-649.

Loo, R. (2003). Assessing "team climate" in project teams. *International Journal of Project Management, 21*(7), 511-517.

Lovell, R. J. (1993). Power and the project manager. *International Journal of Project Management, 11*(2), 73-78.

Lundin, R. A., & Söderholm, A. (1995). A theory of the temporary organization. *Scandinavian Journal of Management, 11*(4), 437-455.

MacCallum, R. C., Widaman, K. F. (1999). Sample size in factor analysis. *Psychological Methods, 4*(1), 84-99.

Mackenzie, N., & Knipe, S. (2006). Research dilemmas: Paradigms, methods and methodology. *Issues In Educational Research, 16*(2), 193-205.

Malone, T. W., & Team, L. Y. (2013). Is empowerment just a fad? Control, decision making, and IT. *Sloan Management Review, 38*(2), 23-35.

Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. (2001). A temporally based framework and taxonomy of team processes. *Academy of Management Review, 26*(3), 356-376.

Marques, G., Gourc, D., & Lauras, M. (2010). Multi-criteria performance analysis for decision making in project management, *International Journal of Project Management, 29*(8), 1057-1069.

Marra, R. M., & Bogue, B. (2006). A critical assessment of online survey tools. Proceedings of the 2006 WEPAN Conference, *Women in Engineering ProActive Network*.

Maruping, L. M., & Magni, M. (2012). What's the weather like? The effect of team learning climate, empowerment climate, and gender on individuals' technology exploration and use. *Journal of Management Information Systems, 29*(1), 79-114.

Mathieu, J. E., Gilson, L. L., & Ruddy, T. M. (2006). Empowerment and team effectiveness: an empirical test of an integrated model. *Journal of Applied Psychology, 91*(1), 97-108.

Mathieu, J., Maynard, M. T., Rapp, T., & Gilson, L. (2008). Team effectiveness 1997-2007: A review of recent advancements and a glimpse into the future. *Journal of Management, 34*(3), 410-476.

Mathur, G., Jugdev, K., & Fung, T. S. (2013). Project management assets and project management performance outcomes: Exploratory factor analysis. *Management Research Review, 36*(2), 112-135.

Maynard, M. T., Gilson, L. L., & Mathieu, J. E. (2012). Empowerment—fad or fab? A multilevel review of the past two decades of research. *Journal of Management, 38*(4), 1231-1281.

Maynard, M. T., Mathieu, J. E., Gilson, L. L., O'Boyle, E. H., & Cigularov, K. P.

(2013). Drivers and outcomes of team psychological empowerment A meta-analytic review and model test. *Organizational Psychology Review, 3*(2), 101-137.

McCrimmon, M. (1995). Teams without roles: empowering teams for greater creativity. *Journal of Management Development, 14*(6), 35-41.

McDonough, E. F. (2000). Investigation of Factors Contributing to the Success of Cross-Functional Teams. *Journal of Product Innovation Management, 17*(3), 221-235.

Menon, A., Chowdhury, J., & Lukas, B. A. (2002). Antecedents and outcomes of new product development speed: An interdisciplinary conceptual framework. *Industrial Marketing Management, 31*(4), 317-328.

Menon, S. (2001). Employee empowerment: An integrative psychological approach. *Applied Psychology, 50*(1), 153-180.

Meredith, J. R., Raturi, A., Amoako-Gyampah, K., & Kaplan, B. (1989). Alternative research paradigms in operations. *Journal of Operations Management, 8*(4), 297-326.

Might, R. J., & Fischer, W. A. (1985). The role of structural factors in determining project management success. *IEEE Transactions on Engineering Management, 32*(2), 71-77.

Millar, M. M., & Dillman, D. A. (2011). Improving response to web and mixed-mode surveys. *Public Opinion Quarterly, 75*(2), 249-269.

Mills, P. K., & Ungson, G. R. (2003). Reassessing the limits of structural empowerment: Organizational constitution and trust as controls. *Academy of Management Review, 28*(1), 143-153.

Milosevic, D., & Patanakul, P. (2005). Standardized project management may increase development projects success. *International Journal of Project Management, 23*(3), 181-192.

Mir, F. A., & Pinnington, A. H. (2014). Exploring the value of project management: linking project management performance and project success. *International Journal of Project Management, 32*(2), 202-217.

Morris, P. W., & Hough, G. H. (1987). *The anatomy of major projects: A study of the reality of project management*: John Wiley & Sons.

Müller, R., & Jugdev, K. (2012). Critical success factors in projects: Pinto, Slevin, and Prescott–the elucidation of project success. *International Journal of Managing Projects in Business, 5*(4), 757-775.

Müller, R., & Turner, J. R. (2007). Matching the project manager's leadership style to project type. *International Journal of Project Management, 25*(1), 21-32.

Müller, R., & Turner, R. (2007). The influence of project managers on project

success criteria and project success by type of project. *European Management Journal, 25*(4), 298-309.

Müller, R., & Turner, R. (2010). Leadership competency profiles of successful project managers. *International Journal of Project Management, 28*(5), 437-448.

Muller, R., Geraldi, J., & Turner, J. (2012). Relationships between leadership and success in different types of project complexities. *Engineering Management, IEEE Transactions on, 59*(1), 77-90.

Munns, A., & Bjeirmi, B. F. (1996). The role of project management in achieving project success. *International Journal of Project Management, 14*(2), 81-87.

Nauman, S., Mansur Khan, A., & Ehsan, N. (2010). Patterns of empowerment and leadership style in project environment. *International Journal of Project Management, 28*(7), 638-649.

Neverauskas, B., Bakinaite, L., & Meiliene, E. (2013). Contemporary approach to the possibility of project's success increase. *Economics & Management, 18*(4), 829-836.

Newcombe, R. (1996). Empowering the construction project team. *International Journal of Project Management, 14*(2), 75-80.

Ng, C.-H., & Walker, D. H. (2008). A study of project management leadership styles across life cycle stages of an IT project in Hong Kong. *International Journal of Managing Projects in Business, 1*(3), 404-427.

Özaralli, N. (2003). Effects of transformational leadership on empowerment and team effectiveness. *Leadership & Organization Development Journal, 24*(6), 335-344.

Packendorff, J. (1995). Inquiring into the temporary organization: new directions for project management research. *Scandinavian Journal of Management, 11*(4), 319-333.

Pallant, J. (2011). *SPSS Survival Manual: A step by step guide to data analysis using SPSS 4th edition.* Allen & Unwin, Australia.

Pandya, K. D. (2014). The Key Competencies of Project Leader Beyond the Essential Technical Capabilities. *IUP Journal of Knowledge Management, 12*(4), 39-48.

Paper, D. J., & Johnson, J. J. (1997). A theoretical framework linking creativity, empowerment, and organizational memory. *Creativity and Innovation Management, 6*(1), 32-44.

Papke-Shields, K. E., Beise, C., & Quan, J. (2010). Do project managers practice what they preach, and does it matter to project success? *International Journal of Project Management, 28*(7), 650-662.

Parolia, N., Goodman, S., Li, Y., & Jiang, J. J. (2007). Mediators between

coordination and IS project performance. *Information & Management, 44*(7), 635-645.

Patanakul, P., Iewwongcharoen, B., & Milosevic, D. (2010). An empirical study on the use of project management tools and techniques across project life-cycle and their impact on project success. *Journal of General Management, 35*(3), 41-65.

Payne, J.H., & Rodney Turner, J. (1999). Company-wide project management: the planning and control of programmes of projects of different type. *International Journal of Project Management, 17*(1), 55-59.

PCPD Office. (2013). *Personal Data (Privacy) Ordinance (Cap 486), http://www.pcpd.org.hk/english/data_privacy_law/ordinance_at_a_Glance/ ordinance.html*, Hong Kong SAR Government. Retrieved 29 March, 2015

Pearce, C. L., & Sims Jr, H. P. (2002). Vertical versus shared leadership as predictors of the effectiveness of change management teams: An examination of aversive, directive, transactional, transformational, and empowering leader behaviors. *Group dynamics: Theory, Research, and Practice, 6*(2), 172-197.

Pillai, A. S., Joshi, A., & Rao, K. S. (2002). Performance measurement of R&D projects in a multi-project, concurrent engineering environment. *International Journal of Project Management, 20*(2), 165-177.

Pinto, J. K., & Covin, J. G. (1989). Critical factors in project implementation: a comparison of construction and R&D projects. *Technovation, 9*(1), 49-62.

Pinto, J. K., & Mantel Jr, S. J. (1990). The causes of project failure. *Engineering Management, IEEE Transactions on, 37*(4), 269-276.

Pinto, J. K., & Prescott, J. E. (1988). Variations in critical success factors over the stages in the project life cycle. *Journal of Management, 14*(1), 5-18.

Pinto, J. K., & Slevin, D. P. (1987). Critical factors in successful project implementation. *IEEE Transactions on Engineering Management,* (1), 22-27.

Pinto, J. K., & Slevin, D. P. (1988a). Critical success factors across the project life cycle. *Project Management Journal, 19*(3), 67-75.

Pinto, J. K., & Slevin, D. P. (1988b). Project success: definitions and measurement techniques. *Project Management Journal, 19*(1), 67-73.

Pinto, M. B., & Pinto, J. K. (1990). Project team communication and cross-functional cooperation in new program development. *Journal of Product Innovation Management, 7*(3), 200-212.

Pinto, M. B., Pinto, J. K., & Prescott, J. E. (1993). Antecedents and consequences of project team cross-functional cooperation. *Management Science, 39*(10), 1281-1297.

Pinto, J. K., & Winch, G. (2016). The unsettling of "settled science:" The past

and future of the management of projects. *International Journal of Project Management, 34*(2), 237-245.

PMI. (2013). *A Guide to the Project Management Body of Knowledge (PMBOK® Guide).* Project Managment Institute(5th Edition).

PMIHK. http://www.pmi.org.hk/about/historyofpmihk.aspx. Retrieved 29 March, 2015

Pollack, J. (2007). The changing paradigms of project management. *International Journal of Project Management, 25*(3), 266-274.

Price, A. D. F., Bryman, A., & Dainty, A. R. J. (2004). Empowerment as a Strategy for Improving Construction Performance. *Leadership & Management in Engineering, 4*(1), 27-37.

Quinn, R. E., & Spreitzer, G. M. (1997). The road to empowerment: Seven questions every leader should consider. *Organizational Dynamics, 26*(2), 37-49.

Qureshi, T. M., Warraich, A. S., & Hijazi, S. T. (2009). Significance of project management performance assessment (PMPA) model. *International Journal of Project Management, 27*(4), 378-388.

Reilly, R. R., Chen, J., & Lynn, G. S. (2003). *Power and empowerment: the role of top management support and team empowerment in new product development.* Paper presented at the Management of Engineering and Technology, 2003. PICMET'03. Technology Management for Reshaping the World. Portland International Conference.

Robbins, T. L., Crino, M. D., & Fredendall, L. D. (2002). An integrative model of the empowerment process. *Human Resource Management Review, 12*(3), 419-443.

Rowlinson, S., & Cheung, Y. K. F. (2008). Stakeholder management through empowerment: modelling project success. *Construction Management and Economics, 26*(6), 611-623.

Rowlinson, S., Ho, T. K., & Po-Hung, Y. (1993). Leadership style of construction managers in Hong Kong. *Construction Management and Economics, 11*(6), 455-465.

Sage, D., Dainty, A., & Brookes, N. (2014). A critical argument in favor of theoretical pluralism: Project failure and the many and varied limitations of project management. *International Journal of Project Management*, *32*(4), 544-555.

Sanvido, V., Grobler, F., Parfitt, K., Guvenis, M., & Coyle, M. (1992). Critical success factors for construction projects. *Journal of Construction Engineering and Management, 118*(1), 94-111.

Sauser, B. J., Reilly, R. R., & Shenhar, A. J. (2009). Why projects fail? How

contingency theory can provide new insights – A comparative analysis of NASA's Mars Climate Orbiter loss. *International Journal of Project Management, 27*(7), 665-679.

Schindler, M., & Eppler, M. J. (2003). Harvesting project knowledge: a review of project learning methods and success factors. *International Journal of Project Management, 21*(3), 219-228.

Scott-Young, C., & Samson, D. (2008). Project success and project team management: Evidence from capital projects in the process industries. *Journal of Operations Management, 26*(6), 749-766.

Seibert, S. E., Silver, S. R., & Randolph, W. A. (2004). Taking empowerment to the next level: A multiple-level model of empowerment, performance, and satisfaction. *Academy of Management Journal, 47*(3), 332-349.

Seibert, S. E., Wang, G., & Courtright, S. H. (2011). Antecedents and consequences of psychological and team empowerment in organizations: a meta-analytic review. *Journal of Applied Psychology, 96*(5), 981- 1003.

Sekaran, U., & Bougie, R. (2013). *Research methods for business: A skill building approach.* Wiley (Sixth Edition ed.): London.

Sharma, S., Durand, R. M., Gur-arie, O. (1981). Identification and analysis of moderator variables, Journal of Marketing Research, Vol.XVIII, 291-300.

Shen, L. (1997). Project risk management in Hong Kong. *International Journal of Project Management, 15*(2), 101-105.

Shenhar, A. J. (2001). One size does not fit all projects: exploring classical contingency domains. *Management Science, 47*(3), 394-414.

Shenhar, A. J., & Dvir, D. (1996). Toward a typological theory of project management. *Research Policy, 25*(4), 607-632.

Shenhar, A. J., & Dvir, D. (2007). Project Management Research --The Challenge and Opportunity. *Project Management Journal, 38*(2), 93-99.

Shenhar, A. J., Dvir, D., Levy, O., & Maltz, A. C. (2001). Project success: a multidimensional strategic concept. *Long Range Planning, 34*(6), 699-725.

Shenhar, A. J., Levy, O., & Dvir, D. (1997). Mapping the dimensions of project success. *Project Management Journal, 28*(2), 5-13.

Shenhar, A. J., Tishler, A., Dvir, D., Lipovetsky, S., & Lechler, T. (2002). Refining the search for project success factors: a multivariate, typological approach. *R&d Management, 32*(2), 111-126.

Shenhar, A., Dvir, D., & Segev, E. (1993). Technology's varying impact on the success of strategic business units within the miles and snow. *Strategic Management Journal, 14*(2), 155-161.

Sills, S. J., & Song, C. (2002). Innovations in survey research an application of web-based surveys. *Social Science Computer Review, 20*(1), 22-30.

Slevin, D. P., & Pinto, J. K. (2007). An overview of behavioral issues in project management. *The Wiley Guide to Project Organization & Project Management Competencies*, 1-19.

Smyth, H. J., & Morris, P. W. (2007). An epistemological evaluation of research into projects and their management: methodological issues. *International Journal of Project Management, 25*(4), 423-436.

Söderlund, J. (2004). Building theories of project management: past research, questions for the future. *International Journal of Project Management, 22*(3), 183-191.

Söderlund, J., & Lenfle, S. (2013). Making project history: Revisiting the past, creating the future. *International Journal of Project Management, 31*(5), 653-662.

Söderlund, J., Hobbs, B., & Ahola, T. (2014). Project-based and temporary organizing: Reconnecting and rediscovering. *International Journal of Project Management, 32*(7), 1085-1090.

Somech, A. (2006). The effects of leadership style and team process on performance and innovation in functionally heterogeneous teams. *Journal of Management, 32*(1), 132-157.

Songer, A. D., & Molenaar, K. R. (1997). Project characteristics for successful public-sector design-build. *Journal of Construction Engineering and Management, 123*(1), 34-40.

Spreitzer, G. M. (1995). Psychological empowerment in the workplace: Dimensions, measurement, and validation. *Academy of Management Journal, 38*(5), 1442-1465.

Spreitzer, G. M. (1996). Social structural characteristics of psychological empowerment. *Academy of Management Journal, 39*(2), 483-504.

Srivastava, A., Bartol, K. M., & Locke, E. A. (2006). Empowering leadership in management teams: Effects on knowledge sharing, efficacy, and performance. *Academy of Management Journal, 49*(6), 1239-1251.

Stefanovic, J. V. (2008). *An integrative strategic approach to project management and a new maturity model*. ProQuest.

Stewart, G. L. (2006). A meta-analytic review of relationships between team design features and team performance. *Journal of Management, 32*(1), 29-55.

Sumner, M. (1999). *Critical success factors in enterprise wide information management systems projects.* Paper presented at the Proceedings of the 1999 ACM SIGCPR conference on Computer personnel research.

Sun, H., & Wing, W. C. (2005). Critical success factors for new product development in the Hong Kong toy industry. *Technovation, 25*(3), 293-303.

Svejvig, P. & Andersen, P. (2015). Rethinking project management: a structured literature review with a critical look at the brave new world. *International Journal of Project Management, 33,* 278-290.

Tampoe, M. (1989). Project managers do not deliver projects, teams do. *International Journal of Project Management, 7*(1), 12-17.

Thamhain, H. J. (2004). Linkages of project environment to performance: lessons for team leadership. *International Journal of Project Management, 22*(7), 533-544.

Tharenou, P., Donohue, R., & Cooper, B. (2007). *Management Research Methods*, Cambridge University Press, Melbourne, Australia.

Thomas, G., & Fernández, W. (2008). Success in IT projects: A matter of definition? *International Journal of Project Management, 26*(7), 733-742.

Thomas, K. W., & Velthouse, B. A. (1990). Cognitive elements of empowerment: An "interpretive" model of intrinsic task motivation. *Academy of Management Review, 15*(4), 666-681.

Todorović, M. L., Petrović, D. Č., Mihić, M. M., Obradović, V. L., & Bushuyev, S. D. (2015). Project success analysis framework: A knowledge-based approach in project management. *International Journal of Project Management, 33*(4), 772-783.

Todorović, M., Mitrović, Z., & Bjelica, D. (2013). Measuring project success in project-oriented organizations. *Management, 68,* 41-48.

Toor, S., & Ogunlana, S. O. (2010). Beyond the 'iron triangle': Stakeholder perception of key performance indicators (KPIs) for large-scale public sector development projects. *International Journal of Project Management*, *28*(3), 228-236.

Townsend, A. M., DeMarie, S. M., & Hendrickson, A. R. (1998). Virtual teams: Technology and the workplace of the future. *The Academy of Management Executive, 12*(3), 17-29.

Turner, J. R. (2006). Towards a theory of project management: The nature of the project. *International Journal of Project Management, 24*(1), 1-3.

Turner, J. R. (2010). Evolution of project management research as evidenced by papers published in the International Journal of Project Management. *International Journal of Project Management, 28*(1), 1-6.

Turner, J. R. (2014). *Handbook of Project-Based Management* (4th ed.): McGraw-Hill Education.

Turner, J. R., & Müller, R. (2003). On the nature of the project as a temporary organization. *International Journal of Project Management, 21*(1), 1-8.

Turner, J. R., & Müller, R. (2005). The project manager's leadership style as a success factor on projects: a literature review. *Project Management Journal,*

36(1), 49-61

Turner, J. R., Müller, R., & Dulewicz, V. (2009). Comparing the leadership styles of functional and project managers. *International Journal of Managing Projects in Business, 2*(2), 198-216.

Turner, R., & Zolin, R. (2012). Forecasting Success on Large Projects: Developing Reliable Scales to Predict Multiple Perspectives by Multiple Stakeholders Over Multiple Time Frames. *Project Management Journal, 43*(5), 87-99.

Tuuli, M. M., & Rowlinson, S. (2007). *Empowering project teams: toward an integrative conceptualization of empowerment.* Paper presented at the Fourth International Conference on Construction in the 21st Century, Loughborough University (https://dspace.lboro.ac.uk/), 240-247.

Tuuli, M. M., & Rowlinson, S. (2009a). Empowerment in project teams: a multilevel examination of the job performance implications. *Construction Management and Economics, 27*(5), 473-498.

Tuuli, M. M., & Rowlinson, S. (2009b). Performance consequences of psychological empowerment. *Journal of Construction Engineering and Management, 135*(12), 1334-1347.

Tuuli, M. M., & Rowlinson, S. (2010). What empowers individuals and teams in project settings? A critical incident analysis. *Engineering, Construction and Architectural Management, 17*(1), 9-20.

Tuuli, M. M., Rowlinson, S., Fellows, R., & Liu, A. M. (2012). Empowering the project team: impact of leadership style and team context. *Team Performance Management, 18*(3/4), 149-175.

Tyssen, A. K., Wald, A., & Spieth, P. (2014). The challenge of transactional and transformational leadership in projects. *International Journal of Project Management, 32*(3), 365-375.

Urli, B., & Urli, D. (2000). Project management in North America, stability of the concepts. *Project Management Journal, 31*(3), 33-43.

Van Selm, M., & Jankowski, N. W. (2006). Conducting online surveys. *Quality and Quantity, 40*(3), 435-456.

Verburg, R. M., Bosch-Sijtsema, P., & Vartiainen, M. (2013). Getting it done: Critical success factors for project managers in virtual work settings. *International Journal of Project Management, 31*(1), 68-79.

Wan, K. S., Ma, L. C., & Banerjee, P. (2009). *The Importance of Project Manager's Soft Competence on IT Project Success: An Exploratory Study in the Banking Context.* Paper presented at the International Research Workshop on IT Project Management 2009.

Wateridge, J. (1998). How can IS/IT projects be measured for success? *International Journal of Project Management, 16*(1), 59-63.

Westerveld, E. (2003). The Project Excellence Model®: linking success criteria and critical success factors. *International Journal of Project Management, 21*(6), 411-418.

White, D., & Fortune, J. (2002). Current practice in project management—An empirical study. *International Journal of Project Management, 20*(1), 1-11.

Wilemon, D. L., & Cicero, J. P. (1970). The project manager—anomalies and ambiguities. *Academy of Management Journal, 13*(3), 269-282.

Williams, T. M. (1997). Empowerment vs risk management? *International Journal of Project Management, 15*(4), 219-222.

Willmott, H. (1993). Breaking the paradigm mentality. *Organization Studies, 14*(5), 681-719.

Winter, M., Smith, C., Morris, P., & Cicmil, S. (2006). Directions for future research in project management: the main findings of a UK government-funded research network. *International Journal of Project Management, 24*(8), 638-649.

Yang, L.-R., Huang, C.-F., & Wu, K.-S. (2011). The association among project manager's leadership style, teamwork and project success. *International Journal of Project Management, 29*(3), 258-267.

Yazici, H. J. (2009). The role of project management maturity and organizational culture in perceived performance. *Project Management Journal*, *40*(3), 14-33.

Zedeck, S. (1971). Problems with the use of 'modertor' variable. *Psychological Bulletin, 76*(October). 295-310.

Zhang, Q., & Doll, W. J. (2001). The fuzzy front end and success of new product development: a causal model. *European Journal of Innovation Management, 4*(2), 95-112.

Zhang, X., & Bartol, K. M. (2010). Linking empowering leadership and employee creativity: The influence of psychological empowerment, intrinsic motivation, and creative process engagement. *Academy of Management Journal, 53*(1), 107-128.

Zhong, J. A., Lam, W., & Chen, Z. (2011). Relationship between leader–member exchange and organizational citizenship behaviors: Examining the moderating role of empowerment. *Asia Pacific Journal of Management, 28*(3), 609-626.

Zimmerman, M. A. (1990). Taking aim on empowerment research: On the distinction between individual and psychological conceptions. *American Journal of Community Psychology, 18*(1), 169-177.

Appendices

Appendix 1 – The Project Management Process Group and Knowledge Area Mapping

Knowledge Area	Project Managemet Process Groups				
	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring and Controlling Process Group	Closing Process Group
4. Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Managmenet Plan	4.3 Direct and Manage Project Work	4.4 Monitor and Control Project Work 4.5 Perform Integrated Change Control	4.6 Close Project or Phase
5. Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
6. Project Time Management		6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Resources 6.5 Estimate Activity Durations 6.6 Develop Schedule		6.7 Control Schedule	
7. Project Cost Management		7.1 Plan Cost Manageemnt 7.2 Estimate Costss 7.3 Determine Budget		7.4 Control Costs	
8. Project Quality Management		8.1 Plan Quality Management	8.2 Perform Quality Assurance	8.3 Control Quality	
9. Project Human Resources Management		9.1 Plan Human Resource Management	9.2 Acquire Project Team 9.3 Develop Project Team 9.4 Manage Project Team		
10. Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Control Communications	
11. Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Qualitative Risk Analysis 11.5 Plan Risk Responses		11.6 Control Risks	
12. Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	12.4 Close Procurements
13. Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Management	13.3 Management Stakeholder Engagement	13.4 Control Stakeholder Engagement	

Source: A Guide to the Project Management Body of Knowledge (PMI, 2013, p.61)

Appendix 2 – Survey Questionnaire

Investigating the relationship between project management performance, team empowerment and project success in Hong Kong

You are invited to participate in the abovementioned research project about the relationship between project management performance, project success and team empowerment as practiced by project management practitioners in Hong Kong. Project management is an important factor contributing to the success of projects. Team empowerment is also effective in enhancing performance of project teams. This research will contribute to a better understanding of the effectiveness of project management performance in creating project success and to encouraging the practice of team empowerment to enhance performance of project teams.

A. PROJECT MANAGEMENT PERFORMANCE

Within the context of practicing project management in the organization that you have worked/are working in, please indicate the extent to which you agree or disagree with the following statements. "1" means strongly disagree and "5" means strongly agree.

* 1. Project Management Leadership and Culture

	1 Strongly disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly agree
a. Projects are a vehicle for tackling business-led change within an organization	◯	◯	◯	◯	◯
b. The benefits of proejct management are being promoted within the organization	◯	◯	◯	◯	◯
c. Assistance is received in identifying the appropriate persons to manage projects	◯	◯	◯	◯	◯
d. Features of "project culture" are developed in the organization you work in (for example, project focused meetings are held, a common project language exists)	◯	◯	◯	◯	◯

* 2. Project Management Staff

	1 Strongly disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly agree
a. Formal project-related training is provided to increase the capabilities of project team members	◯	◯	◯	◯	◯
b. There is a process for evaluating performance of staff against project-related objectives	◯	◯	◯	◯	◯

* 3. Project Management Policy and Strategy

	1 Strongly disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly agree
a. Awareness of project management is raised by selling the benefits of project management	○	○	○	○	○
b. Project management is successful when it is developed as a formal practice within the organization	○	○	○	○	○
c. Obstacles to projects are recognized and overcome with a positive effect on the organization	○	○	○	○	○

* 4. Project Management Partnership and Resources

	1 Strongly disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly agree
a. Open two-way partnerships with customers exists	○	○	○	○	○
b. Open two-way partnerships with suppliers exists	○	○	○	○	○
c. The project stakeholders are formally involved in the project execution	○	○	○	○	○

* 5. Project Management Lifecycle Management Processes

	1 Strongly disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly agree
a. A model of critical business processes was used throughout the project life cycle	○	○	○	○	○
b. The role of life cycle models is recognized in developing features of a project culture	○	○	○	○	○
c. Documented procedures exist covering all stages of the project life cycle, including pre and post implementation stages	○	○	○	○	○
d. Procedures are updated and benchmarked in response to changing requirements	○	○	○	○	○

* 6. Project Management Key Performance Indicators (KPIs)

	1 Strongly disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly agree
a. Methods are developed in the organization to manage the important Project Management KPIs	○	○	○	○	○
b. Methods for managing project objectives are linked to the delivery of project benefits post-implementation	○	○	○	○	○
c. There is a procedure for measuring stakeholder perceptions	○	○	○	○	○
d. Methods are developed against a wide range of KPIs, in particular those relating to increase in organizational capability, such as learning and continuous improvement	○	○	○	○	○

B. PROJECT SUCCESS

Please choose a recently completed project you have involved from the organization that you have worked/are working in. Within the context of that project, please indicate the extent to which you agree or disagree with the following statements. "1" means strongly disagree and "5" means strongly agree.

* 7. Project efficiency

	1 Strongly disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly agree
a. The project was completed on time	○	○	○	○	○
b. The project was completed within budget	○	○	○	○	○
c. The completed project was managed in an efficient manner	○	○	○	○	○

* 8. Impact on the Customer

	1 Strongly disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly agree
a. The project met functional performance requirements	○	○	○	○	○
b. The project met technical specifications	○	○	○	○	○
c. The project fulfilled customer's needs	○	○	○	○	○
d. The customer is using the product	○	○	○	○	○
e. The customer was highly satisfied	○	○	○	○	○
f. The project improved the customer's organizational performance	○	○	○	○	○
g. There is a high chance that the customer would come back for additional business	○	○	○	○	○

* 9. Impact on the Project Team

	1 Strongly disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly agree
a. Team members felt fulfilled and able to grow personally and professionally by working in this project	○	○	○	○	○
b. Team members were highly energized at the end of the project	○	○	○	○	○
c. The project increased the loyalty of team members to the organization	○	○	○	○	○

* 10. Business Success

	1 Strongly disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly agree
a. The project resulted in commercial success for the organization	○	○	○	○	○
b. The project increased the organization's profitability or helped other organization goals	○	○	○	○	○
c. The project improved organizational reputation and stature	○	○	○	○	○
d. The project increased the organization's market share	○	○	○	○	○

* 11. Preparing for the future

	1 Strongly disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly agree
a. The project will lead to additional new business or new products/services	○	○	○	○	○
b. The project will help creating new markets or new customers/users for the organization	○	○	○	○	○
c. The project created new technologies or new capabilities for future use	○	○	○	○	○
d. The organization learnt many lessons from the project to improve future performance	○	○	○	○	○

C. TEAM EMPOWERMENT

Within the context of the team that was formed for managing the project mentioned in Section B, please indicate the extent to which you agree or disagree with the following statements. "1" means strongly disagree and "7" means strongly agree.

* 12. Potency

	1 Strongly disagree	2 Disagree	3 Slightly disagree	4 Neutral	5 Slightly agree	6 Agree	7 Strongly agree
a. My team has confidence in itself	○	○	○	○	○	○	○
b. My team can get a lot done when it works hard	○	○	○	○	○	○	○
c. My team believes that it can be very productive	○	○	○	○	○	○	○

* 13. Meaningfulness

	1 Strongly disagree	2 Disagree	3 Slightly disagree	4 Neutral	5 Slightly agree	6 Agree	7 Strongly agree
a. My team believes that its projects are significant	○	○	○	○	○	○	○
b. My team feels that its tasks are worthwhile	○	○	○	○	○	○	○
c. My team feels that its work is meaningful	○	○	○	○	○	○	○

* 14. Autonomy

	1 Strongly disagree	2 Disagree	3 Slightly disagree	4 Neutral	5 Slightly agree	6 Agree	7 Strongly agree
a. My team can select different ways to do its work	○	○	○	○	○	○	○
b. My team determines as a team how things are done in the team	○	○	○	○	○	○	○
c. My team makes its own choices without being told by management	○	○	○	○	○	○	○

* 15. Impact

	1 Strongly disagree	2 Disagree	3 Slightly disagree	4 Neutral	5 Slightly agree	6 Agree	7 Strongly agree
a. My team has a positive impact on this company's customers	○	○	○	○	○	○	○
b. My team performs tasks that matter to this company	○	○	○	○	○	○	○
c. My team makes a difference in this organization	○	○	○	○	○	○	○

D. BACKGROUND INFORMATION

Please provide your background information.

16. The industry that you work in is:

○ Telecommunication and IT

○ Banking or Financial Services

○ Construction or Engineering

○ Manufacturing

○ Oil and Gas

○ Other (please specify)

[   ]

* 17. Your usual role in projects is:

○ Project manager

○ Project team member

○ Steering committee member/sponsor

○ Programme manager

○ End user

○ Not project related

○ Other project related roles (please specify)

[   ]

18. Years of experience in managing projects are:

[   ]

19. Your gender is:

○ Male

○ Female

○ Other

○ Prefer not to disclose

20. Your highest level of education is:

○ High school diploma, associate's degree or the global equivalent

○ University degree and above

21. Your project management certification is:

○ No PM certification

○ Project Management Professional certified by Project Management Institute

○ Other (please specify)

[   ]

END OF THE SURVEY

Please press "Done" to submit. Thank you.

164

Appendix 3 – Approval from Dr. Pinnington

Email 1 (RE: Research Questionnaire):

From: Ashly Pinnington <ashly.pinnington@buid.ac.ae>
Sent: 31/10/2014 (週五) 14:55
To: 'Yau Sindy'
Cc:
Subject: RE: Research Questionnaire

Message | FarzanaAsadMir_Questionnaire.docx (274 KB)

Dear Sindy,

Thank you for your email. Here attached is a copy of the survey instrument you requested. Good luck with your research study.

Best regards,

Ashly

Professor Ashly H. Pinnington
Academic FCIPD, PhD, MSc, Dip Educ Tech, PGCE, BA(Hons).
Professor of Human Resource Management
Dean of Research
The British University in Dubai
PO Box 345015
Dubai, UAE
www.buid.ac.ae
Tel: +971 4 367 1952
Fax: +971 4 366 4698
Email: ashly.pinnington@buid.ac.ae

Email 2 (Research Questionnaire):

From: Yau Sindy <yausindy@yahoo.com.hk>
Sent: 31/10/2014 (週五) 14:12
To: ashly.pinnington@buid.ac.ae
Cc: Yau Sindy
Subject: Research Questionnaire

Message | Untitled attachment 00129.pdf (337 KB) | Proposal Model.pdf (245 KB)

> Dear Professor Pinnington,
>
> I am a DBA student of University of Newcastle, Australia.   I am highly
> inspired by your study on the link between project management
> performance and project success, as published in Exploring the value
> of project management: Linking Project Management Performance and Project Success.   I am planning to conduct a similar research in Hong Kong, together with a study on the moderating effect of team empowerment.
> Hence, I would like to request for a sample of your research
> questionnaire so that I can make reference to your research constructs
> of project management performance and project success.
>
> Attached is a proposal of my research for your reference.   I sincerely
> look forward to your kind support.   If you need any more information,
> please kindly let me know.
>
> Regards,
>
> Sindy Yau
>

Appendix 4 – Letter to PMI Hong Kong Chapter

Dr. Kym Cowley
Newcastle Business School
Faculty of Business and Law
University of Newcastle
+61 02 492 17471
kym.cowley@newcastle.edu.au

Ms. Sindy Yau Yuet Wah
Newcastle Business School
Faculty of Business and Law
University of Newcastle
+852 90339788
yuetwah.yau@uon.edu.au

**Organisation Information Statement for the Research Project:
Investigating the relationships between project management performance, team empowerment and project success in Hong Kong**

The Project Management Institute Hong Kong Chapter (PMIHK) is invited to participate in the abovementioned research project that is being conducted by Dr. Kym Cowley and Ms. Sindy Yau Yuet Wah from the Newcastle Business School at the University of Newcastle, Australia. The research is being carried out as a requirement of Ms. Sindy Yau's Doctor of Business Administration Degree. Dr. Kym Cowley is Ms. Sindy Yau's research supervisor.

Why is the research being done?
This research investigates the effects of project management performance and team empowerment on project success as practiced by Project Management Professionals in Hong Kong. The project is in response to a deficit of research on project success in this sector. It will contribute to a better understanding of the effectiveness of project management performance in contributing to project success and encourage the practice of team empowerment to enhance performance of project teams.

What is being asked of the PMIHK?
We request the consent of the PMIHK to:

1. Email Project Management Professionals (PMP®) in Hong Kong whose email addresses are held by PMIHK, inviting them to participate in the research. Potential participants would receive an email invitation to participate including full information about the research. In addition a link to an outside web address will take participants to an online survey.
2. With consent, to publish a summary of the research results in the PMIHK newsletter, once Ms. Sindy Yau's dissertation has been approved; and
3. Where consent is denied for point 2 above, your approval that individual participants who are members of PMIHK have an option to seek the research findings directly from the research Chief Investigator Dr. Kym Cowley by email.
4. With consent, permit the researchers to identify PMIHK in Ms. Sindy Yau's dissertation and in related scholarly publications.
5. Where consent is denied for point 4 above, PMIHK approves that any references to it in Ms. Yau's dissertation and scholarly publications be removed and substituted with generic references.
6. PMIHK will have the right of review and editing prior to submission of Ms. Yau's dissertation as well as any publications arising from the research.

The consent of PMIHK would be subject to full approval of the research project by the University of Newcastle Human Ethics Committee.

What choice do you have?
Participation in this research by PMIHK is **entirely voluntary**. The decision to participate or not will not affect its relationship with the University of Newcastle in anyway.

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

What are the risks and benefits of participating?
Participation in this study entails neither risk nor direct benefit to PMIHK. However, the research findings may assist PMIHK in further understanding the professional practice of project management and contribute to creating more success for projects in Hong Kong.

How will privacy be protected?
Although PMIHK will be identified in the research and its subsequent publications, the PMP® responses are anonymous and the data reported in aggregate. The anonymity of PMP® responses is guaranteed as they are not required to provide any identifying information. An electronic copy of the aggregated data will be securely stored on password protected computers accessible only to the researchers. The data will be kept for a minimum of five years from the date of approval of the Ms. Sindy Yau's dissertation and then destroyed.

How will the information collected be used?
The findings of this study will form part of Ms. Sindy Yau's Doctor of Business Administration dissertation and may be published in scholarly and professional journals. PMIHK will be provided with a summary of results, and we are hopeful that the same summary will be allowed to be made available to the PMP and members of PMIHK through the PMIHK newsletter once the dissertation has been approved.

What do you need to do to participate?
Once this Information Statement has been read and understood, should PMIHK wish to provide its consent to the research project as stated above, you are requested to sign the attached organisational consent form on behalf of PMIHK so providing informed written consent from PMIHK. The Participant Information Statement for PMP® and copy of the survey are also attached for information. Please return the organisational consent form to Dr. Kym Cowley by email kym.cowley@newcastle.edu.au

Further information
If you would like more information about this study, please contact Ms. Sindy Yau's or Dr. Kym Cowley at the above emails or phone numbers. Thank you for considering this invitation.

Yours sincerely,

Dr. Kym Cowley   Ms. Sindy Yau Yuet Wah
Chief Investigator   Student Researcher

17 December, 2015

Complaints about this research:
This project has been approved by the University's Human Research Ethics Committee, Approval No. **H-2015-0375** Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to to Ms. Yuet Wah Yau at 852-90339788 in Hong Kong; email: c3173396@uon.edu.au, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email Human-Ethics@newcastle.edu.au.

Appendix 5 – Consent from PMI Hong Kong Chapter

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Dr. Kym Cowley
Newcastle Business School
Faculty of Business and Law
University of Newcastle
+61 02 492 17471
kym.cowley@newcastle.edu.au

Ms. Sindy Yau
Newcastle Business School
Faculty of Business and Law
University of Newcastle
+852 90339788
yuetwah.yau@uon.edu.au

Organisation Consent Form for the Research Project:
Investigating the relationships between project management performance, team
empowerment and project success in Hong Kong

On behalf of the Project Management Institute Hong Kong Chapter (PMIHK), I, __Rossana Ho, President__ , have read the Information Statement on the above named research project to be conducted by Ms. Sindy Yau under the supervision of Dr. Kym Cowley from the University of Newcastle, Australia. I have had the opportunity to have questions answered to my satisfaction.

As duly authorised by the PMIHK, I consent to the following:
1. the above named researchers inviting all Project Management Professionals (PMP®) in Hong Kong with email addresses held by the Chapter to participate in an online survey about their opinions on the relationship between project management performance and project success as well as the impacts of team empowerment on that relationship.
2. the Administration Office of PMIHK emailing all Project Management Professionals (PMP®) in Hong Kong using addresses held by PMIHK inviting them to participate in the research by completing an anonymous online survey.
3. The PMIHK publishing a summary of the research results in its newsletter after Ms. Sindy Yau's dissertation has been approved; and
4. Granting permission to the researchers to identify the PMIHK in any subsequent research related publications.

On behalf of the PMIHK, I give my consent freely and I understand that the project will be conducted in accordance with the Organisational Information Statement and the full approval granted to the researchers by the University of Newcastle Human Ethics Research Committee, copies of which I have retained.

Print Name: _____Mrs. Rossana Ho_____

Signature: _____

Date: ____Jan 26, 2016____

Appendix 6 – Invitation Email sent by PMI Hong Kong Chapter

From: "PMI Hong Kong Chapter" <admin1@pmi.org.hk>

Date: Jan 28, 2016 5:48 PM

Subject: Research on "Investigating the relationships between project management performance, team empowerment and project success in Hong Kong"

To:

Cc:

Dear

PMI Hong Kong Chapter is supporting the captioned research project. Please see details below.

Regards,

Adrian Li

VP, Professional Practice

PMI Hong Kong Chapter

Invitation to participate in the Research Project: Investigating the relationships between project management performance, team empowerment and project success in Hong Kong

You are invited to participate in the abovementioned research project being conducted by Dr. Kym Cowley and Ms Yuet Wah Yau a Doctor of Business Administration student researcher from the Newcastle Business School, Faculty Business and Law, University of Newcastle, Australia. The research is being carried out as a requirement of the student researcher's Doctor of Business Administration Degree. Dr. Kym Cowley is the research supervisor.

Why is the research being done?
The findings of the research will contribute to a better understanding of the effectiveness of project management performance in contributing to project success. In addition, findings may also indicate that team empowerment enhances project team performance and hence project success.

Who can participate in the research?

If you are Project Management Professional (PMP®) certified by Project Management Institute (PMI), you are eligible to participate in the survey.

What choice do you have?

Participation in this research is entirely voluntary. Should you choose NOT to take part in the research, this decision will have no impact whatsoever on your membership or standing with PMIHK.

This invitation to participate is sent to you by the Project Management Institute Hong Kong Chapter (PMIHK) who support this research fully and have provided access to the opinions of our members by canvassing your participation directly. The researchers do not have access to any identifying details of our members nor any of their contact details. The survey, should you choose to complete it, is completely anonymous. No individuals can be identified though responses. In addition there will be no record of your decision to participate. If you do decide to participate, you may withdraw from the project at any time prior to the electronic submission of your survey. Submission of the survey implies consent and you will have another opportunity to withdraw from the research prior to submission. Once the online survey is completed and submitted you will not be able to withdraw.

What you are being asked to do?

If you agree to participate, please complete the online survey accessible through the web address included in the section entitled "What do you need to do participate", at the conclusion of this invitation.

How much time will it take?

The questionnaire will take approximately twenty minutes to complete.

What are the risks and benefits of participating?

There are no perceived risks to any individual participant. Benefits of the research include a contribution to the scope of studies on project management and greater understanding of the impact of team empowerment and its relationship with project management performance and project success.

How will your privacy be protected?

The survey is created in surveymonkey.com which allows for server authentication and data encryption over SSL/TLS connections, ensuring that user data in transit is safe, secure and available only to research team under user authentication and password protection. No individual respondent or survey is able to be identified; information from all surveys is

aggregated for analysis. The aggregated data will be stored in password-protected computers accessible only to the researchers and will be disposed of in accordance with the University of Newcastle's policy and procedures for the disposal of confidential material.

How will the information collected be used?
The findings of this study will form part of Student Researcher's Doctor of Business Administration dissertation and may be published in scholarly and professional journals. PMIHK will be provided with a summary of results, and members of PMIHK will be informed through the PMIHK newsletter once the dissertation has been approved.

What do you need to do to participate?
Please print and retain a copy of this email. Please also ensure that you read the information stated and be sure you understand its contents before you commence the survey. If there is anything you do not understand, or you have questions, contact the researcher. Once you have read and understood the statement and wish to proceed, please click on this link to https://www.surveymonkey.com/r/PMTeamEmpowermentSurvey and complete the survey.

Further information
If you would like further information or a copy of the research findings once the project is completed, please contact Dr. Kym Cowley at kym.cowley@newcastle.edu.au or 612 49217471. Thank you for considering this invitation.

Complaints about this research
This project has been approved by the University's Human Research Ethics Committee, Approval No. H- 2015 - 0375. Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to Ms. Yuet Wah Yau at 852-90339788 in Hong Kong; email: c3173396@uon.edu.au or if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (612) 49216333, email: Human-Ethics@newcastle.edu.au.

Best Regards
PMI Hong Kong Chapter
2784 1880

To be removed from our mailing list, please click here

Appendix 7 – Descriptive Statistics

(a) Project Management Performance

		Leader 1	Leader 2	Leader 3	Leader 4	Staff 1	Staff 2	Policy 1	Policy 2	Policy 3
Frequency	1 Strongly disagree	0	3	1	4	5	7	2	0	4
	2 Disagree	3	7	17	11	32	26	22	5	11
	3 Neutral	21	41	50	40	35	53	58	28	53
	4 Agree	113	113	107	110	96	93	94	107	106
	5 Strongly agree	60	33	22	32	29	18	21	57	23
N	Total	197	197	197	197	197	197	197	197	197
	Missing	0	0	0	0	0	0	0	0	0
Mean		4.168	3.843	3.670	3.787	3.569	3.452	3.558	4.096	3.675
Median		4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000
Mode		4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Std. Deviation		.668	.796	.807	.854	1.011	.955	.865	.726	.831
Variance		.446	.633	.651	.730	1.022	.912	.748	.526	.690
Skewness		-.517	-.876	-.566	-.914	-.608	-.624	-.445	-.554	-.787
Std. Error of Skewness		.173	.173	.173	.173	.173	.173	.173	.173	.173
Kurtosis		.497	1.630	.223	1.282	-.327	.004	-.080	.277	1.094
Std. Error of Kurtosis		.345	.345	.345	.345	.345	.345	.345	.345	.345
Range		3.00	4.00	4.00	4.00	4.00	4.00	4.00	3.00	4.00

		Partnership 1	Partnership 2	Partnership 3	Lifecycle 1	Lifecycle 2	Lifecycle 3	Lifecycle 4	KPI 1	KPI 2	KPI 3	KPI 4
Frequency	1 Strongly disagree	3	1	0	4	6	2	3	4	2	9	7
	2 Disagree	10	14	8	27	16	27	30	25	28	42	35
	3 Neutral	42	51	33	50	66	45	51	53	58	72	60
	4 Agree	121	115	125	100	99	97	98	97	95	65	83
	5 Strongly	21	16	31	16	10	26	15	18	14	9	12
N	Total	197	197	197	197	197	197	197	197	197	197	197
	Missing	0	0	0	0	0	0	0	0	0	0	0
Mean		3.746	3.665	3.909	3.492	3.462	3.599	3.467	3.508	3.462	3.117	3.294
Median		4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	3.000	3.000
Mode		4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.00	4.00
Std. Deviation		.774	.749	.694	.901	.836	.918	.895	.901	.860	.948	.950
Variance		.599	.561	.481	.812	.699	.843	.801	.812	.740	.900	.903
Skewness		-.996	-.689	-.617	-.632	-.831	-.515	-.547	-.593	-.464	-.236	-.441
Std. Error of		.173	.173	.173	.173	.173	.173	.173	.173	.173	.173	.173
Kurtosis		1.785	.640	.873	-.014	.840	-.265	-.234	.029	-.254	-.454	-.368
Std. Error of Kurtosis		.345	.345	.345	.345	.345	.345	.345	.345	.345	.345	.345
Range		4.00	4.00	3.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

(b) Project Success

		Efficiency 1	Efficiency 2	Efficiency 3	Customer 1	Customer 2	Customer 3	Customer 4	Customer 5	Customer 6	Customer 7
Frequency	1 Strongly disagree	4	2	4	1	0	1	0	1	0	0
	2 Disagree	33	32	19	2	4	2	3	12	4	2
	3 Neutral	35	35	55	20	19	31	24	64	56	44
	4 Agree	93	92	93	145	145	133	130	104	116	115
	5 Strongly agree	32	36	26	29	29	30	40	16	21	36
N	Total	197	197	197	197	197	197	197	197	197	197
	Missing	0	0	0	0	0	0	0	0	0	0
Mean		3.589	3.650	3.599	4.010	4.010	3.959	4.051	3.619	3.782	3.939
Median		4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000
Mode		4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Std. Deviation		1.014	0.992	0.907	0.580	0.571	0.630	0.621	0.744	0.653	0.667
Variance		1.029	.984	.823	.337	.326	.396	.385	.553	.427	.445
Skewness		-.556	-.517	-.568	-.950	-.662	-.713	-.421	-.454	-.189	-.139
Std. Error of Skewness		.173	.173	.173	.173	.173	.173	.173	.173	.173	.173
Kurtosis		-.445	-.531	.187	4.540	2.529	2.568	1.024	.379	.068	-.178
Std. Error of Kurtosis		.345	.345	.345	.345	.345	.345	.345	.345	.345	.345
Range		4.00	4.00	4.00	4.00	3.00	4.00	3.00	4.00	3.00	3.00

		Team 1	Team 2	Team 3	Business 1	Business 2	Business 3	Business 4	Future 1	Future 2	Future 3	Future 4
Frequency	1 Strongly disagree	1	7	8	1	1	1	4	5	6	4	2
	2 Disagree	17	30	23	9	10	4	15	10	14	10	6
	3 Neutral	33	54	68	48	50	64	87	40	65	51	47
	4 Agree	124	85	86	114	114	104	79	121	93	112	116
	5 Strongly agree	22	21	12	25	22	24	12	21	19	20	26
N	Total	197	197	197	197	197	197	197	197	197	197	197
	Missing	0	0	0	0	0	0	0	0	0	0	0
Mean		3.756	3.421	3.360	3.777	3.741	3.741	3.406	3.726	3.533	3.680	3.802
Median		4.000	4.000	3.000	4.000	4.000	4.000	3.000	4.000	4.000	4.000	4.000
Mode		4.00	4.00	4.00	4.00	4.00	4.00	3.00	4.00	4.00	4.00	4.00
Std. Deviation		0.783	0.990	0.913	0.743	0.742	0.714	0.800	0.818	0.878	0.804	0.740
Variance		.614	.980	.834	.552	.550	.509	.640	.669	.771	.647	.547
Skewness		-.892	-.481	-.615	-.595	-.605	-.256	-.383	-1.149	-.673	-.899	-.735
Std. Error of Skewness		.173	.173	.173	.173	.173	.173	.173	.173	.173	.173	.173
Kurtosis		.910	-.280	.203	.802	.766	.469	.576	2.025	.692	1.461	1.514
Std. Error of Kurtosis		.345	.345	.345	.345	.345	.345	.345	.345	.345	.345	.345
Range		4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

(c) Team Empowerment

		Potency 1	Potency 2	Potency 3	Meaning 1	Meaning 2	Meaning 3	Autonomy 1	Autonomy 2	Autonomry 3	Impact 1	Impact 2	Impact 3
Frequency	1 Strongly disagree	1	1	1	0	1	1	0	1	6	0	0	0
	2 Disagree	2	2	1	5	6	6	7	4	18	1	1	3
	3 Slightly disagree	5	3	4	5	7	6	12	7	21	2	3	9
	4 Neutral	29	21	27	24	32	32	27	33	30	29	23	46
	5 Slightly agree	49	49	51	47	51	49	63	64	66	55	51	53
	6 Agree	86	89	94	91	80	79	69	69	45	91	97	64
	7 Strongly agree	25	32	19	25	20	24	19	19	11	19	22	22
N	Total	197	197	197	197	197	197	197	197	197	197	197	197
	Missing	0	0	0	0	0	0	0	0	0	0	0	0
Mean		5.442	5.589	5.457	5.467	5.264	5.310	5.178	5.223	4.579	5.472	5.553	5.178
Median		6.000	6.000	6.000	6.000	6.000	6.000	5.000	5.000	5.000	6.000	6.000	5.000
Mode		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	5.00	6.00	6.00	6.00
Std. Deviation		1.085	1.049	1.002	1.100	1.187	1.200	1.188	1.125	1.474	0.929	0.928	1.140
Variance		1.176	1.100	1.005	1.209	1.410	1.439	1.412	1.266	2.174	.863	.861	1.300
Skewness		-.903	-1.068	-.986	-1.008	-.913	-.904	-.736	-.754	-.614	-.574	-.738	-.334
Std. Error of Skewness		.173	.173	.173	.173	.173	.173	.173	.173	.173	.173	.173	.173
Kurtosis		1.250	2.075	1.765	1.149	.879	.874	.321	.922	-.288	.272	.688	-.342
Std. Error of Kurtosis		.345	.345	.345	.345	.345	.345	.345	.345	.345	.345	.345	.345
Range		6.00	6.00	6.00	5.00	6.00	6.00	5.00	6.00	6.00	5.00	5.00	5.00