IMPACT OF PROJECT AND ORGANIZATIONAL-RELATED FACTORS ON PROJECT PERFORMANCE OF CONSTRUCTION COMPANIES IN MALAYSIA

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ABSTRACT

The objective of this study was to examine and investigate the impact of project-related factors and organizational-related factors on the project performance of construction companies in Malaysia. The performance of construction companies is crucial for the economic development of the country and there are various factors which affect their performance. Past studies on project performance have been skewed towards project-related factors such as client, contractor, consultant, material, labor and equipment, contract, external and project management tools/techniques. Through the literature review, it was noticed that a research gap exists, whereby, for the success of a project, not only are project-related factors important, organizational-related factors are important too. Taking a lead from here, the most important organizational-related factors, such as leadership, organizational culture, innovation and learning organization were chosen and used in this study to examine and investigate the impact of these organizational factors on project performance. A pilot study was carried out and the instrument reliability was ascertained. The population for this study was the construction companies in Malaysia registered with the Construction Industry Development Board (CIDB) under the Grade 7 category. This quantitative study was carried out with a survey questionnaire. 1,071 questionnaires were sent to project managers of construction companies and 360 responses were received with a response rate of 33.61%. The collected data were analyzed using the Statistical Package for Social Science version 22 (SPSS) for descriptive, reliability, validity and relative importance index analysis. The results of the study indicate that organizational-related factors have a greater significant impact on project performance over project-related factors. Thus, the outcome of the study is useful for the construction industry practitioners to understand the importance of organizational factors and to implement them in their organizations to improve project performance.

Keywords: construction, project performance, project-related factors, organizational-related factors.

ABSTRAK

Objektif kajian ini adalah untuk mengkaji dan menyiasat kesan faktor-faktor yang berkaitan dengan projek dan organisasi terhadap prestasi projek syarikat pembinaan di Malaysia. Prestasi syarikat pembinaan sangat penting untuk pembangunan ekonomi negara dan terdapat pelbagai faktor yang mempengaruhi prestasi syarikat berkenaan. Kajian lepas tentang prestasi projek adalah lebih cenderung kepada faktor-faktor yang berkaitan dengan projek seperti klien, kontraktor, perunding, bahan, buruh dan peralatan, kontrak, faktor luaran dan alat atau teknik pengurusan projek. Melalui kajian literatur, didapati bahawa wujudnya jurang penyelidikan, iaitu untuk mencapai kejayaan dalam sesuatu projek bukan sahaja faktor-faktor yang berkaitan dengan projek yang penting, malah faktor-faktor yang berkaitan dengan organisasi juga adalah penting. Oleh itu, faktor-faktor yang berkaitan dengan organisasi seperti kepimpinan, budaya organisasi, inovasi dan organisasi pembelajaran telah dipilih dan digunakan dalam kajian ini untuk mengkaji dan menyelidik kesan faktor-faktor organisasi ini terhadap prestasi projek. Kajian perintis dijalankan dan kebolehpercayaan instrumen telah dikenal pasti. Populasi untuk kajian ini adalah syarikat pembinaan di Malaysia yang berdaftar dengan Lembaga Pembangunan Industri Pembinaan (CIDB) di bawah kategori Gred 7. Kajian ini adalah suatu kajian kuantitatif yang dilaksanakan dengan menggunakan kaedah soal selidik tinjauan. Sejumlah 1 071 soal selidik telah dihantar kepada pengurus projek syarikat pembinaan dan 360 borang telah diterima dengan kadar tindak balas sebanyak 33.61%. Data yang dikumpulkan dianalisis dengan menggunakan Pakej Statistik untuk Sains Sosial versi 22 (SPSS) untuk analisis indeks deskriptif, kebolehpercayaan, kesahihan dan analisis relatif. Hasil kajian menunjukkan bahawa faktor-faktor yang berkaitan dengan organisasi mempunyai kesan yang lebih besar terhadap prestasi projek berbanding faktor-faktor yang berkaitan dengan projek. Oleh itu, hasil kajian ini berguna bagi pengamal industri pembinaan agar dapat memahami kepentingan faktor-faktor organisasi dan melaksanakannya dalam organisasi masing-masing bagi meningkatkan prestasi projek.

Kata kunci: pembinaan, prestasi projek, faktor-faktor berkaitan dengan projek, faktor-faktor berkaitan dengan organisasi

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LIST OF ABBREVIATIONS

BCM	-	Billion Cubic Meters
B/D	-	Barrel / Day
BETA (ß)	-	Standard co-efficient value
BIM	-	Building Information Modeling
BNM	-	Bank Negara Malaysia
BRT	-	Rapid Transport Bus
C	-	Cost
C,B&I	-	Civil, Building & Infrastructure construction sector
CITP	-	Construction Industry Transformation Program
CIDB	-	Construction Industry Development Board
CPM	-	Critical Path Method
CRM	-	Customer Relationship Management
CSF	-	Critical Success Factors
CV	-	Control Variable
DOSH	-	Department of Occupational Safety & Health
DLOQ	-	Dimensions of Learning Organization Questionnaire
DLP	-	Defect Liability Period
DV	-	Dependent Variable
EDMS	-	Electronic Data Management Systems
EOT	-	Extension Of Time
EPC	-	Engineering, Procurement and Construction
ERP	-	Enterprise Resource Planning
ETP	-	Economic Transformation Program
F	-	Financial
FMCS	-	Field Control Management Systems
G1	-	Grade 1
G7	-	Grade 7
GANTT	-	Project schedule
GDP	-	Gross Domestic Product
GST	-	Goods and Services Tax
H	-	Hypothesis
HMS	-	History Management Systems
HSE	-	Health, Safety & Environment
IBS	-	Industrial Building Systems
ISO	-	International Organization for Standardization
IT	-	Information Technology
IV	-	Independent Variable
KL	-	Kuala Lumpur
KM	-	Kilo Meter
KPI	-	Key Performance Indicator
KPQ	-	Key Performance Questions
KVMRT	-	Klang Valley Mass Rapid Transport
LRT	-	Light Rail Transport

L&VL	-	Large & Very Large construction companies
LTA	-	Lost Time Accident
MBAM	-	Mega Builders Association of Malaysia
M&E	-	Mechanical & Electrical
MS	-	Micro Soft
N	-	Number of samples
NCR	-	Non-Conformance Report
NIOSH	-	National Institute of Occupational Safety & Health
NPEC	-	Net Project Execution Cost
NPOV	-	Net Product Operation Value
O&G	-	Oil & Gas
OVERALL	-	Overall construction industry
P	-	Project
P VALUE	-	Significant Value
PEP	-	Project Execution Plan
PERT	-	Program Evaluation and Review Technique
PEMANDU	-	Performance Management And Delivery Unit
PETRONAS	-	Petroliam Nasional Berhad
PM	-	Project Management
PMBOK	-	Project Management Body Of Knowledge
PMI	-	Project Management Institute
PMP	-	Project Management Professional
PMS	-	Performance Measurement Systems
PPMS	-	Project Performance Monitoring Systems
PQP	-	Project Quality Plan
Q	-	Quality
QCMS	-	Quality Control Management Systems
QLASSIC	-	Quality Assessment System In Construction
QMS	-	Quality Management Systems
R&D	-	Research & Development
RII	-	Relative Important Index
ROA	-	Return On Asset
ROE	-	Return On Equity
ROI	-	Return On Investment
RM	-	Ringgit Malaysia
RQ	-	Research Question
S	-	Safety
S&M	-	Small & Medium
SME	-	Small & Medium Enterprise
SOP	-	Standard Operating Procedures
SPSS	-	Statistical Package for Social Science
T	-	Time
TCE	-	Transaction Cost Economics
TOC	-	Table Of Contents
UCUA	-	You See You Act
UK	-	United Kingdom

USA	-	United States of America
USD	-	United States Dollar
VIF	-	Variation Inflation Factor
VO	-	Variation Order
WBS	-	Work Breakdown Structure
Y-O-Y	-	Year Over Year

CHAPTER ONE

INTRODUCTION

"Project management is like juggling three balls – time, cost and quality. Program management is like a troupe of circus performers standing in a circle, each juggling the three balls and swapping balls from time to time (Reiss, 2013)."

1.1 Background of the study

The construction industry is the backbone of economic transformation in any country. Universally, the performance of the construction industry is a direct indicator of the state of a country's economy and its performance is vital and crucial for the country's economic activities. The higher the performance of the construction industry, the higher the economic growth and vice versa. As most of the economic activities of nations are spun around the construction industry, it is of paramount importance for every country to ensure that the construction industry is doing well and the organizations involved in these activities are also doing well. The following Tables 1.1 and 1.2 show the world's gross domestic product (GDP) growth rate in the year 2015 for the key regions in the world and the construction industry's market size of the major economies as well as the predicted key construction markets in the year 2020. It can be seen from the these Tables that the GDP growth rate for Asia, including Malaysia, is the highest in the world at around 6.0%, which is an indicator that economic activities, including construction activities in Malaysia, are contributing to the high GDP growth rate. The Malaysian government has rolled out a construction industry transformation program (CITP) in the year 2015 to support the construction industry to ensure its performance, which is a facilitator for achieving the national economic transformation program (ETP) of Malaysia.

The contents of the thesis is for internal user only

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Appendix A – Literature review matrix

	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
	Project related factors and its impact on project performance - literature review				
1	Kim, B. C. (1989), Project scope and project performance: The effect of parts strategy and supplier involvement and product development, Journal of Management Science.	Objectives: 1) To examine the impact of project scope with project performance. H1) There exist a relationship between project scope and project time, cost.	No instrument used. 29 major new vehicle development projects in 20 companies from US, EU & Japan. Secondary data from new vehicle development projects on parts development, scope, time, cost, performance. SPSS software used to perform regression, correlation etc.	1) Scope impacts lead time and productivity. 2) Different structures and supplier relationships exists in US, EU & Japan. 3) The different structures lead to different project performance in these countries. 4) Scope differs significantly in the industry even for comparable projects.	1) Little studies were conducted on the effect of unique parts strategies on development. 2) To explore further on the project scope variation and its impact on project cost and time.
2	Belassi, W., & Tukel, O. I., (1996), A new framework for determining critical success / failure factors in projects, International Journal of Project Management.	New scheme that classifies the critical success factors and describes the impacts of these factors on project performance. Also, emphasis is given to grouping of success factors and their interactions. Classification on grouping of success factors and studying the impact and interactions.	Primary data - Survey – Questionnaire. 200 project managers. Pilot study, instrument validation and final research. SAS - Descriptive statistics and frequency analysis.	A new scheme developed by the researcher to represent critical factors for project success in a systematic way. Many neglected factors identified in the study such as 1) Project manager's management skills. 2) Team member's commitment and their technical background. 3) Project attributes and environmental factors. 4) MIS.	1. Cause and effect relationship between critical factors and on measurement techniques. 2) New technological changes happening today could change the identified critical success factors.

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
3	Munns, A. K., & Bjeirmi, B. F., (1996), The role of project management in achieving project success, International Journal of Project Management.	Objectives: 1) To identify the overlap between the definition of project and project management and their relationship. 2) To identify the individuals involved in project and project management and their influence on project success. Research Question: Is there a relationship between project success and project management?. 1. Project and project management are distinctive to each other. 2) Project management and project success are interrelated.	No instrument used. Secondary data from scholarly articles on project and project management. Number of articles referred is 15. Scholarly review of literature related to project, project management and project success. Theoretical analysis of various project management concepts and their relationships.	The author concludes as below: 1) There is an overlap between project and project management. 2) The objectives of project and project management are different. 3) PMT is not fully responsible for the project success / failure. 4) Client should take an increasing role in the project & project management. 5) Project management role should be appreciated in the project. 6) Successful project management techniques will help to achieve project success. 7) Selecting the right project and dropping the potentially unsuccessful projects is the key to project success.	1. Limited articles were analyzed (15). 2) The concept of increased appreciation for project management is a good indicator. 3) Application of successful techniques for project success in another area which can be studied further. 4) Role of clients in project success is another area, which can be studied further.
4	Shrnhur, A. J., Levy, O., & Dvir, D., (1997), Mapping the dimensions of project success, Project Management Journal.	Objectives: 1) To study the existing dimensions of project success and to explore additional dimensions in project management. Research question: Is the available project success dimensions exhaustive and covers sufficiently or not?. H1) Project success has 3 different dimensions.	Structured survey questionnaire (Quantitative research study). 127 projects from Israel. 182 project managers issued with questionnaires and 127 (70%) responses received. 7 point Likert scale with 13 measures of success in the questionnaire stating "very low" to "very high". SPSS - Factor analysis	1) Study suggests a multi-dimensional framework to assess project success with four primary dimensions such as project efficiency, impact on the customers, direct and indirect business success and preparing for the future. 2) Management must specify project objectives as early as possible even before the project starts.	1. The four dimensions developed may change over time, hence, to generalize this multi-dimensional model, application of this model in a wide range of projects is necessary. 2) Project success criteria and its linkages to the organizational short term and long term goals should be studied further for meaningful exploration of this concept.

Appendix A – Literature review matrix

	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
			technique, Pearson's correlation, ANOVA.		
5	Atkinson, R. (1999). Project Management: Cost, time and quality, the two best guesses and a phenomenon, it's time to accept other success criteria, International Journal of Project Management.	New framework to consider project success criteria. Success criteria for projects other than Time, Cost & Quality.	Scholarly analysis of related literature. Secondary data from project management journals. New framework / model design to assess project success criteria (The square root model). No analysis techniques used.	Author suggests other than the Iron Triangle (Time, Cost, Quality), to look into other project success criteria such as "stakeholders" and "benefits to the stakeholders" as new criteria to measure project success.	1) It's not an empirical study and hence data are not available. 2) There could be other project success criteria as well which need to be explored.
6	Lim, C. S., & Mohamed, M. Z. (1999). Criteria of project success: an exploratory re-examination, International Journal of Project Management.	Objectives: 1) To explore what and who determine project success?. 2) To explore the issues from different perspectives of people looking at the project and its success. H1) Individuals perspectives vary on project success. H2) There exists macro and micro views on project success.	Unstructured interviews (Qualitative case study). 40 experienced project professionals. Opinion survey using unstructured questions, open ended questions, casual discussions. Compilation of data collected through logical arrangements and grouping as factors for project success. Three frameworks developed for better understanding on project success and on different perspectives.	1) Preliminary finding from the exploratory studies re - enforced the observation that project success is dependent upon perspectives. 2) There are two view points for project success (macro and micro). 3) Macro view point covers completion criteria and satisfaction criteria, whilst, micro view point covers only completion criteria.	1) To explore the criteria models and factor models further to find more efficient ways to improve projects and project performance. 2) Project considered as success as one party will be treated as failure by another party for various reasons, which need to be studied further.
7	Cooke - Davies, T. (2002). The "real" success factors on projects, International Journal of Project	1) What factors lead to project management issues?. 2) What factors lead to successful projects?.	Primary data - Survey - Questionnaire. 136 projects from23 organizations. Identification of most	12 major factors leading to project success. Eight factors are hard factors and four factors soft factors. Hard Factors are, 1) Adequacy of	1. Human factors are not considered in this research as the research is basically focused on what people do in projects rather than focusing on their interactions, decision making

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Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
Management.	3) What factors lead to consistently successful projects?. H1) Factors leading to project management issues. H2) Factors critical to project success.	important project management issues and factors leading project success. Co-relation analysis.	companywide education on the concept of risk management. 2) Maturity of an organization's processes for assigning ownership of risks. 3) Adequacy with which a visible risk register is maintained. 4) Adequacy of an up-to-date risk management plan. 5) Adequacy of documentation of organizational responsibilities on the project. 6) Keep project (or project duration) as far below three years (one year is better). 7) Allow changes to scope only through a mature scope change control process. 8) Maintain the integrity of the performance measurement baseline. The soft factors are, 1) The existence of an effective benefits delivery and management process that involves the mutual co-operation of project management and line management functions. 2) Portfolio and programme management practices that allow the enterprise to fully a suite of projects that are matched to the corporate strategy and business objectives. 3) System of project metrics for projects performance and success. 4) Learning from experience on	styles and motivation. 2) Study is limited to European projects. 3) Study mainly focused on risk management in projects.

Appendix A – Literature review matrix

	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
				project and continuous improvement.	
8	White, D., & Fortune, J. (2002). Current practice in project management - an empirical study, International Journal of Project Management.	Objectives: 1) To identify the reasons for the mismatch between the promise offered by the project management methods and techniques and the outcomes delivered. Research Question: How effective are the project management tools and techniques?. H1) Project management tools and techniques influence project success.	Survey questionnaire (Quantitative research study). 995 project managers from 620 organizations. Response rate 23.7%. Pilot study (30 project managers), instrument validation and final research. Simple statistical analysis like average, mean, median, mode, histogram.	1) Most respondents used only small number of methods, tools & techniques with project management software and Gantt charts. 2) Half of them reported drawbacks on the tools and techniques that they used. 3) Other than time, cost and specification (quality), two other criteria emerged in the study (fit between the project and the organization & the consequences of the project for the performance of the business). 4) 65% do not use risk management tools. 5) Organization side effects due to projects and its impact were also studied.	1. Application, efficiency & effectiveness of project management tools / techniques can be further studied in other parts of the world. 2) Critical examination of the failure of project management software and in-house developed project management solutions could be another research area.
9	Jagboro, G. O., & Aibinu, A. A. (2002). The effects of construction delays on project delivery in Nigerian construction industry, International Journal of Project Management.	Objectives: 1) To identify and evaluate the effects of delays on building project execution in Nigeria. 2) To assess the effects of delay on completion cost of building projects. 3) To assess the effects of delay on completion time of building projects. 4) To investigate how effects of delays can be minimized. H1) There exist a	Questionnaire. (Quantitative research). 61 Nigerian building projects (200 questionnaires issued and 102 responses received). 51% response. Self-administrated survey on practitioners. Chan and Kumarasamy's relative importance index (RII), SPSS software for linear regression, correlation.	1) Cost overrun and time overrun are the two important factors for delay in construction projects of Nigeria. 2) Delay had significant impact on project duration. 3) Loss, expense claims during delay period significantly effect cost overrun. 4) Acceleration programs are not successful in Nigeria due to client's project management procedures. 5) Contingency budgets estimated at the pre contract stage are not adequate to	1) The model relating delay and actual project duration provided a benchmark for future research work in the study of project management in Nigeria. 2) Similar comparative empirical studies can be conducted in other parts of the world too.

Appendix A – Literature review matrix

	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
		relationship between construction delay and cost of the project. H2) There is a relationship between client influence and project completion with cost and time.		cover the cost overrun or losses.	
10	Westerveld, E. (2003). The project excellence model: Linking success criteria and critical success factors, International Journal of Project Management.	Objectives: 1) To establish a new concept to link the CSF and project success. 2) To relate CSF and project success criteria. H1) There exists a relationship between CSF and project success.	No instrument used. 15 articles related to CSF & project success. Scholarly review of the journals. Research and analysis of CSF and project success in details.	1) New project excellence model linking CSF and project success developed. 2) Applied the newly developed model in practice and the results were analyzed. 3) Found the following six CSF are critical for project success (leadership and team, policy and strategy, stakeholder management, resources, contracting, project management features such as scheduling / budget / organization / quality / information / risks).	1) To apply the project excellence model in all the projects. 2) To study the conflict between project goals and organizational goals and its impact on organizations / project (policy & strategy). 3) To study further on linking organizational areas to project result areas.
11	Jugdev, K., & Muller, R. (2005). A retrospective look at our evolving understanding of project success, Project Management Journal.	The purpose is to present a retrospective look at project success in literature over the past 40 years and to provide an understanding on project success. Research Question: What are the critical project success factors across the project and project life cycles?. Project management is	Scholarly analysis of related literature. Secondary data from project management journals approximately 30 articles. A new concept - strategic project management to identify CSF holistically. Strategic analysis of 40 years of project success literature to conclude strategic management concepts for project success.	Project success is a complex and ambiguous concept and it changes over the project. They suggest the following: 1) Think about CSFs as a guide and develop appropriate indicators of project success. 2) Take stakeholders interest in project success as part of your project success. 3) Develope and maintain good relationship with project sponsors. 4) Consider product life cycle as part of project life	1. Continue to identify CSFs holistically with product life cycle as part of project life cycle. 2) Think strategically on project success taking stakeholders and project sponsors critically as part of project success. 3) Review done on articles before year 2005 only after 2005, there is no analysis done. 4) Review done on 30 articles, not exhaustively covered.

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
		an operational concept without strategic value. Project management success and project success are not the same.		cycle.	
12	Angus, G. Y., Flett, P. D., & Bowers, J. A. (2005). Developing a value centered proposal for assessing project success, International Journal of Project Management.	Objectives: To provide a different dimension to measure project success (a product based and value based approach). Research question: Are the current measurements of project success adequate to address the value stream point of view?. H1) There exists value based approach to measure project success.	No instrument used. 37 scholarly articles on project success and value addition related were studied. Scholarly review of the journals. Accounting and financial calculations such as NPV, ROI, and CBA were used to analyze the concept.	1) Study proposes a product oriented and value centered scheme for project success (Net project execution cost - NPEC and net product operation value - NPOV concept). 2) 12 possible project outcomes were outlined based on the values of NPEC and NPOV (value generated from 12 different options were studied and compared for decision making).	1) Full scale case studies of this approach have not been done so far, hence this will be an area for future research empirically. 2) NPEC, NPOV will vary for different type of projects and hence, it will be interesting to study the NPEC / NPOV of different types of projects for cost benefit analysis (CBA). 3) This new approach could be used practically for project abandonment or selection decision making process, which need to be tested empirically in future research.
13	Assaf, S. A., & Al-Hejji, S. (2006). Causes of delay in large construction projects, International Journal of Project Management.	Objectives: 1) To identify the causes of delay in construction projects in Saudi Arabia. 2) To test the importance of delay between the parties such as contractors, clients and consultants. 3) To study the different perceptions of delay. H1) Causes influence delay in construction projects. H2) Perceptions on delay varies between	Questionnaire (Quantitative research). 23 contractors, 19 consultants & 15 owners. Self-administrated survey. SPSS software is used to test Spearman's correlation, severity index (SI) & importance index (IMP.I) were also analyzed.	1) 73 causes were identified during the research. 2) The average time overrun is about 10 to 30% of the original schedule. 3) Most common cause for the delay is due to change order. 4) 70% projects experienced time overrun. 5) Labor-related factors are significant for the project success. 5) Study indicated that, awarding the project to the lowest bidder is the highest frequent factor of delay.	1) Similar studies can be conducted in other parts of the world. 2) Different types of projects such as infrastructure, dams could be studied. 3) Effect of financing, cash flow problems and its impact to project delay can be studied.

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
		stakeholders in projects.			
14	Sambasivan, M., & Soon, Y.W. (2007)., Causes and effects of delays in Malaysian construction industry, International Journal of Project Management.	The main purpose of the study is to identify the delay factors and their impact (effect) on project completion. Specific causes lead to project delays & specific effects on Project delays.	Primary data - Survey – Questionnaire. 150 respondents. Convenience and snow ball sampling (non-probability sampling technique). Identification of most important causes and effects of project delays. Demographic analysis / RII Analysis on causes / Ranking of causes / Spearman's correlation analysis.	Ten most important causes delays are: 1) Contractor's improper planning. 2) Contractor's poor site management. 3) Inadequate contractor experience. 4) Inadequate client's finance and payments for completed work. 5) Problems with subcontractors. 6) Shortage in materials. 7) Labor supply. 8) Equipment availability and failure. 9) Lack of communication between parties. 10) Mistakes during the construction stage. Six most important effects are: 1) Time overrun. 2) Cost overrun. 3) Disputes. 4) Arbitration. 5) Mitigation. 6) Total abandonment.	1) Similar studies can be conducted in other parts of the world. 2) Some causes and effects may be unique to certain countries. 3) Limited sample (only 150 respondents)
15	Alaghbari, W., Kadir, M. R. R., Salim, A., & Ernawati. (2007). The significant factors causing delay of construction projects in Malaysia, Journal of Engineering, Construction and Architecture management.	Objectives: 1) To identify the major factors causing delay in construction projects of Malaysia. Research questions: 1) What causes the delay in construction projects?. 2) Who are responsible for the delays in construction projects?. H1) Contractors, owners, consultants and	Questionnaire (Quantitative research). 450 questionnaires issued and 78 responses received. Random sampling and feedback from consultants, contractors, clients, subcontractors, engineers, developers and architects. SPSS software is used for analyzing descriptive statistics, correlation, regression.	1) Financial problem is the main factor causing delay in construction projects in Malaysia. 2) The second important factor is the coordination problems causing delay. 3) Contractor related factors, owner related factors, consultant related factors and external factors were the four main factors which were causing delays in the construction projects of Malaysia. 4) The study also	1) The study was conducted only in Klang valley of Malaysia and hence it is geographically limited. Further study can be extended to other parts of Malaysia. 2) The study was conducted mainly on building construction projects and hence, the scope is limited. Further studies can be conducted in other type of construction projects for better understanding. 3) Impact of financial problems (lack of financial support) and technical problems (lack of technical support) on project performance could be another area of research to reinforce

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
		external factors are positively associated with project delay.		found overall there are 31 factors contributing to the delay, which can be attributed to contractors, owners, consultants and external factors.	the findings of this study.
16	Pollack, J. (2007). The changing Paradigms of project management, International Journal of Project Management.	Objectives: 1) To examine the evidence of influence of hard paradigmatic factors on project management as well as the influence of soft paradigms. Research question: 1) Is there a relationship between hard paradigm and project management. 2) Is there is link between soft paradigm and project management. 1) Hard paradigm influence project management. 2) Soft paradigm influence project management.	No instrument used. Secondary data from 84 scholarly articles on project and project management. Scholarly review of literature related to hard paradigms, soft paradigms and project management. Theoretical analysis of influence of hard paradigms and soft paradigms on project management.	1) Traditional PM is deeply rooted to the hard paradigm. 2) Influence of soft paradigm on PM is less substantial, but growing. 3) Theoretical framework on PM research is expanding. 4) Newer paradigms are evolving in PM. 5) One paradigm is dependent upon the other.	1) Limited to traditional PM and does not cover nontraditional PM areas. 2) Paradigmatic expansion on PM is anticipated for further contribution in this area.
17	Chan, W. K. (2007). Factors influencing the success of project management amongst manufacturing companies in Malaysia: A conceptual framework, 7th Global conference on Business & Economics.	Objectives: 1) To identify factors which contribute to the successful implementation of project. 2) To identify the factors relative importance as the project journeyed throughout its life cycle in Malaysian	No instrument used. 38 scholarly articles related to project success and factors influencing project success. Scholarly review of articles and critical analysis of factors influencing project success. Critical evaluation of project success influencing factors and suggesting Pinto's project	Manufacturing today executes large number of projects and it is important to understand the factors influencing project success to avoid cost, time and other potential issues that may arise. 2) It is also important to understand the factors influencing project success during various life cycle of projects to take	1) The study is a conceptual paper and not supported by empirical study to prove the usefulness of the framework suggested. Hence, to study the usefulness of the framework in Malaysian context empirically and in other parts of the world too.

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
		context. Research questions: 1) What are the criteria used to measure the success of a manufacturing based project?. 2) What are the significant factors, which leads project success in manufacturing sector?. H1) A clear project mission is positively related to project success in manufacturing. H2) High support from the top management is positively related to project success in manufacturing. H3 to H10) Pinto's factors (factor 3 to 10) for project success are set as hypothesis as positively related to project success in manufacturing sector.	success model for application in manufacturing related projects.	actions that may be necessary to ensure project success.	
18	Khang, D. B., & Moe, T. L. (2008). Success criteria and factors for international development projects: A life-cycle based framework, Project Management Journal.	Objectives: 1) To identify the CSF for not for profit international projects in developing countries. Research Questions: What are the CSF for non for profit projects in developing countries. H1) There exists specific CSF for non	Survey questionnaire (Quantitative research study). Selected south east Asian countries (Vietnam & Myanmar). 1000 questionnaires distributed. Response received 368 (37%). Progressive research phase wise using different set of questions for each phase. SPSS software used to analyze reliability,	A new framework is developed for non for profit projects in international projects in developing countries. The following are the workable phases for such projects. 1) Success judgment by stakeholders. 2) Conceptualization phase. 3) Planning phase. 4) Implementation phase. 5) Closing phase. Additionally,	1) The new framework, identification of CSF for phase wise (project life cycle) project success is tried only in non for profit organizations. Need to study further in conventional for profit projects too. 2) The study was conducted only in Vietnam and Myanmar and similar studies can be conducted in other parts of the world too.

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
		for profit projects.	correlation, factor analysis, regression analysis.	success criteria and factors for each of the above phase are identified in the research. Project partners such as planners, designers, consultants are important for project success in addition to project manager.	
19	Ling, F. Y. Y., Low, S. P., Wang, S.Q., & Lim, H. H. (2009). Key project management practices affecting Singaporeans firms' project performance in China, International Journal of Project Management.	Objectives: 1) To study the PM practices of Singaporean AEC firms doing projects in China. 2) To recommend best PM practices for project success in China. Research question: What are the factors which affects project success of Singaporean AEC companies in China?. H1) There are specific CSF factors that are relevant for projects handled by foreigners in China.	Survey questionnaire (Quantitative research study). 200 questionnaires send to 130 consultants and 70 contractors. 33 responses received (17%). Pilot study, instrument validation and final research. SPSS software used to analyze significance, correlation, and linear relationship between variables. ANOVA was also analyzed.	The most important factors that affect the project success of Singaporean AEC companies in China are: 1) Scope management. 2) Quality of the contract document. 3) Quality of response to perceived variations. 4) Extent of changes to the contract. The above factors are the most predominant factors in the pool of 60 identified factors from scope, time, cost, quality, risk, HR, communication, procurement, integration management areas.	1) Limited response for this study and hence, the study can be extended to other countries with similar approach. 2) Study was conducted at few locations in China and hence cannot be generalized. 3) The study was conducted only on Singaporean firms and the same can be extended to other companies from other countries too.
20	Truman, D. (2014). Assessment of problems associated with poor project management performance, International Project Management Arbitrators Handbook.	Objectives: To explain the methodology adopted in assessing the problems associated with poor project management performance. Research question: What are the causes for poor project	No instrument used. Review of mediation, arbitration and court cases related to project performance management handled by Long International. Scholarly review of PMI / CII guidelines on project	The study concluded the following reasons for project failure: 1) Failure of the PMT to adequately plan and execute the project. 2) Failure to provide adequate human resources. 3) Failure to develop accurate planning schedules and achieving those	1) Project success does not end at the project completion, it will also be measured at the time of disputes in the projects. Further research can focus on how disputes are handled successfully in the projects. 2) The other area of future research is cause and effect relationship of various issues in projects.

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
		management performance?. H1) Sound project management principles have influence on project performance.	management. Comparative analysis of PM concepts and actual practice at project management companies with respect to each problems, causes and effects.	schedules. 4) Failure to control cost and changes throughout the project.	
21	Memon, A. H., Rahman, I. A., Abdullah, M. R., & Aziz, A. A. A. (2014). Factors affecting construction cost performance in project management projects: Case of MARA large projects, International Journal of Civil Engineering and Built Environment.	Objectives: 1) To investigate the procurement strategies adopted in MARA (Majlis Amanah Rakyat) large construction projects. 2) To identify various factors affecting construction cost performance of MARA large construction projects. H1) Procurement strategies influence cost overrun in projects. H2) Various factors influence cost overrun in MARA construction projects.	Questionnaire & Interviews. 36 participants from MARA projects. Self-administrated survey & interviews. SPSS software is used to analyze descriptive statistics, reliability.	1) Fluctuation in price of raw materials, cash flow and financial difficulties faced by contractors, shortage of site workers, lack of communication between parties, incorrect planning and scheduling by contractors are most severe factors. 2) Frequent design changes and owner interference are least affecting factors.	1) The study was conducted only on MARA projects and hence extension of this study to other sectors / types of projects will give further insight on this subject.
22	Marzouk, M. M., & El-Rasas, T. I. (2014). Analyzing delay causes in Egyptian construction projects, Journal of advanced research.	Objectives: 1) To study the causes of construction delays in Egyptian construction projects. H1) There exists a relationship between the causes of delay and its effect on project success.	Personal interviews and survey questionnaire. 33 construction professionals including clients, consultants and contractors). Self-administered survey. SPSS software, ANOVA, Correlation, Frequency index, Severity index,	Findings: 1) Owner responded causes are: ineffective planning & scheduling, inability to finance the project by contractors, change management related causes, poor site management, low productivity, sub soil conditions, shortage of materials, unqualified	1) Similar studies can be conducted in other parts of the world too. 2) The study is limited to less number of respondents and the study can be extended to a large number of samples to ascertain the findings.

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
			Importance index analyzed.	workforce, delay by subcontractors. 2) Contractor responded causes are: delay in payment by client, delay in approvals of scope changes, design mistakes, stoppage of work, owner interference, slow decision making, and type of contract (lowest price). 3) Consultant responded causes are: A combination of (1) and (2) mentioned above by owner and contractor respondents.	
23	Olaniran, J. (2015). The effects of cost-based contractor selection on construction project performance, Journal of financial management of property and construction.	Objectives: 1) To study the impact of cost based contractor selection of project performance. H1) There is an impact on cost based contractor selection on project performance.	Quantitative research questionnaire. 54 construction practitioners. Online survey. Frequency, Severity and Importance index analysis.	Findings: 1) Choosing contractors solely based on the cost may cause poor performance. 2) There are project delays and non-compliance to standards in projects due to cost based contractor selection. 3) The major reason for the above delay and non-compliance to standards is due to reduced margins for contractors.	1) Similar studies can be conducted in other parts of the world where bigger population. 2) Bigger sample can be considered to firm up the findings of this research.
24	Hussein, B. A., Ahmad, B. A., & Zidane, Y. J. T. (2015). Problems associated with defining project success, International conference on project management.	Objectives: 1) To examine the scope of the potential threats and challenges influencing the initial definition of project success criteria. 2) To examine and analyze the correlations between these problems and other factors that usually	Quantitative research questionnaire. 155 respondents. Web based survey. Descriptive and analytical statistics for reliability, validity and correlation.	Findings: 1) Problems related to the definition of project success criteria at the initiation phase are correlated with each other and could be attributed to poor stakeholder identification and involvement. 2) Top management support could be improved by taking measures to include success criteria that embody both project management and project success and concurrently balancing the expectations to avoid unrealistic criteria. 3) Alignment in	1) The study was conducted with a small sample in Norvey. Similar studies can be conducted in other parts of the world with larger sample size.

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
		arises during execution and evaluation phases. H1) There is a correlation between the problems of defining success criteria and the following factors: a) Lack of top management support. b) Lack of alignment in the project organization to project success criteria during execution phase. c) Subjectivity of measuring the achievement of the targeted success criteria at close out and evaluation phase.		the project can be improved by establishing realistic targets to create a sense of believe and trust in the project.	
25	Rolstadas, A., Pinto, J. K., Falster, P. & Venkataraman, R. (2015). Project decision chain, Project Management Journal.	Objectives: 1) To analyze the different type of decisions and the associated decision making techniques in project management. 2) To analyze how these can be conceptualized to improve project performance. H1) There exists a relationship between decision making in projects and project success.	No instrument used. 53 scholarly articles on decision making and project success. Scholarly review of decision making techniques and linking the decisions to project success. Theoretical and conceptual analysis of decision making styles, supply chain and project performance.	1) A well-established decision analysis process integrated into the overall project management process is vital for improving project performance. 2) Authors proposed a project decision chain framework (similar to a supply chain) that will that decisions made at each stage of the project life cycle add value to project performance.	1) To apply the newly developed project decision chain framework in the projects in the decision making processes and to measure the project success in comparison to the projects which did not use the project decision chain.
26	Haniff, A. &	Objectives: 1) To	Case study (semi	Findings: 1) Lack of strategic fit is	1) Further empirical studies

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
	Ogunlana, S. O. (2015). Strategic alignment within a TMO: Perceptions of project success, Conf. paper, 31st Association of Researchers in construction management.	identify the source of tensions in the alignment of organizational strategies by investigating how various organizational actors' measure success on a single construction project. H1) There exist varied perceptions among organizational actors within an organization on project success.	structured interviews) and literature review. One project (11 samples) and 42 scholarly articles. Scholarly review of related articles on project success perceptions and application in a project. Theoretical analysis and practical application in a project.	inherent in construction projects. 2) TMO organization members will focus short term project management objectives and likely to priories completion of the project as key success factor as compared to cost and quality. 3) Clients at corporate level perceive project success as different considering their long term strategic benefits of the investment. 4) Lack of integration to the procurement processes inherent within the construction industry. 5) Perception of project success will vary between hierarchical levels, business units, departments and within the client system.	need to be conducted in highly complex client systems, where single point leadership of a TMO is challenged. 2) To study further with multifaceted organizational structure with varied internal stakeholders.
27	Sadkowska, J. (2016). Stakeholders risk in project management - case study of polish family firms, Journal of entrepreneurship and management.	Objectives: 1) To identify and describe risks generated by stakeholders for family firms. 2) To identify the relationship among the type of stakeholders risk, the sector (production, trade, services) and size of the family firm. H1) There exists a relationship between stakeholder generated risks and family owned business type and company size.	No instrument used. 30 scholarly articles on project stakeholder's risks and project success. Scholarly review of project success, project stakeholder's risks and family businesses. Theoretical and conceptual analysis of related data.	Findings: 1) Family businesses are same as other business entities operating in the market, increasingly manage projects. 2) Family businesses are aware of stakeholder presence in their environment, who may be active both in supporting operational activities of family businesses as well as aiming to destruct particular projects. 3) Acceptance of stakeholders, or at least maintaining their "neutral approach" to projects implemented by the company can significantly affect the success of the project.	1) Limited articles were reviewed and hence further studies can be continued in this area. 2) Only 50 family owned businesses were studied in the research, which can be extended to more number of organizations to ascertain the results. 3) To extend this study to other parts of the world too.
28	Freek, J. F. W., Van Berkel., Ferguson, J. E. & Groenewegen, P.(2016). Speedy	Objectives: 1) To analyze how time pressure affects coordination between	Case study, Descriptive survey research and interviews. 111	Findings: 1) Time pressure generated difference in work pace. 2) Project teams were accustomed to fast way of working while permanent	1) To expand the study in other parts of the world. 2) To study how trans active memory can affect

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
	delivery versus long term objectives: How time pressure affects coordination between temporary projects and permanent organizations, Long range planning journal.	temporary projects and permanent organizations involved in projects. H1) Time pressure affects the coordination between temporary project teams and permanent organizations.	responses. Qualitative analysis. MAXQDA software for iterative process.	organization teams are not. 3) Coordination problems exist as permanent organization members trans active memory is low and knowledge is locked up with individuals. 4) Political interference amplifies the time pressure and coordination on project teams. 5) Temporary projects plays an important role in achieving the objectives of the permanent organizations.	relationship between temporary project teams and project organizations.
29	Marjolein, A. G., Van Offenbbek. & Vos, j. F. J. (2016). An integrative framework for managing project issues across stakeholder groups, International journal of project management.	Objectives: 1) To analyze the linkages between the stakeholders and the issues they bring in projects. H1) There is a relationship between stakeholders management and their issues on project performance.	Quantitative research questionnaire + interview. 20 participants. Self-administered survey. Deductive coding method, Semantic analysis, Communality analysis.	Findings: 1) New frame work developed to analyze stakeholder issue connections from a knowledge perspective. 2) This framework helps to identify the stakeholder issues in a landscape format, which enables to understand the issues and solve them accordingly. 3) Large complex projects with multiple stakeholder groups need proper stakeholder identification and issues management.	1) To try this framework in all types of projects. 2) Impact of this framework on project performance could be another interesting area to study.
30	Ghazi, M., Kheyroddin, A. & Rezayfar, O. (2016). Diagnosing the success of the construction projects during the initial phases, Decision science letters.	Objectives: 1) To provide a model to forecast the level of realization of success criteria according to the level of realization of success factors at the initial phase. H1) There exists project success criteria according to the level	Quantitative research questionnaire + interview. 189 participants. Exploratory research. Scholarly review, semi structured interviews and Delphi method, regression, propagation neutral network.	Findings: 1) A model based neural networks was developed for anticipation of the success of construction projects depending on the level of realization of success factors during the initial phase of a project. 2) Using this model anticipated project success can be determined by the stakeholders about the	1) The model is developed based on the criteria and factors related to Iran's conditions. Similar studies can be conducted in other countries construction sector. 2) Application of this model can be tried as such in other countries as well.

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		of realization of success factors.		viability of the project.	
31	Sambasivan, M., Deepak, T. J., Ali, S., & Ponniah, V. (2016). Analysis of delays in Tanzanian construction industry: TCE and structural equation modeling (SEM) approach, Journal of Engineering, Construction and Architecture management.	Objectives: 1) To develop theoretical underpinnings using TCE. 2) Run the analysis and advanced tool such as SEM. H1) There exists a relationship between caused and effects of delays in construction industry and TCE. H2) SEM is a good tool to analyze the complex relationship between variables.	Quantitative based survey. 308 respondents. Self-administered survey. Structural equation modeling.	Findings: 1) Cost overrun can be explained by consultant and material related factors. 2) Disputes can be explained by cost overrun. 3) Arbitration can be explained by consultant related, cost overruns and disputes factors. 4) Litigation can be explained by client related, disputes and arbitration factors. 5) Abondment can be explained by consultant related, external related, disputes, arbitration and litigation factors. 6) TCE can be used to understand the impact of causes on effects and delays. 7) SEM application and its usefulness in analyzing the complex relationship between causes and effects of delays have been demonstrated.	1) Researchers and practitioners in other parts of the world can use the approach to understand and deal with delays in construction industry. 2) Number of samples are less and hence studies with larger samples can be conducted.

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Organizational related factors and its impact on project performance - literature review					
1	Garvin, D. A. (1985). Building a learning organization, Organizational Development & Training	Objectives: 1) To define what is a learning organization. 2) To define the processes involved in a learning organization. H1) Is there a relationship between organizational learning and organizational performance.	No instrument used. Four successful US companies and their experience on learning organization (Analog devices, Chaparral steel, Xerox, GE). Scholarly review of experiences of the four giant companies and their experiences. Theoretical and case study analysis of learning organization and organizational performance.	1) Many of the continuous improvement programs in organizations fail. 2) Three critical issues must be addressed by organizations for success as a learning organization. They are, well grounded definition of a learning organization, clear operational guidelines for practice, and better tools for measurement of organizational learning. 3) Five main activities are identified for successful learning organization concept implementation. They are: systematic problem solving, experimentation with new approaches, learning from past experience, learning from the best practices of others and transferring the knowledge quickly and efficiently throughout the organization.	1) Learning organization concept implementation in project management companies can be studied. 2) Contribution of learning organization to project success can be studied further.
2	Gordon, J. (1992). Performance technology: Blueprint for the learning organization, Training.	Objectives: 1) To determine the human performance problems which are seen as organizational problem. 2) To review	No instrument used. Literature related to learning organization. Scholarly review of related literature. Theoretical and	1) Performance technology (PT) is often focused on individual performance. 2) Training managers (Performance technologists) should	1) Organizational objective is to achieve team performance. Hence, learning organization and its impact to organizational performance could be further studied. 2) Causes for human

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
		critically training and learning as tools to address the human performance problems and to facilitate organizational performance. H1) There exist a relationship between organizational learning and organizational performance. H2) Learning organization influence the employee performance behaviors.	comparative analysis of learning organization concepts and theories.	treat the employees as their clients for improved performance delivery by the training division as well as improved performance from the employees. 3) Employees in a learning organization should master the following five principles such as systems thinking, shared vision, learning, personal mastery and mental models. 4) Employees in a learning organization should have, common purpose, common language, common processes, resources needed and authority to make decisions to enhance organizational performance.	performance problems in an organization and its impact to organizational performance can be further studied.
3	Argyris, C., Bellman, G. M., Blanchard, K., Block, P., & al, e. (1994). The future of workplace learning and performance, Training & Development.	Objectives: 1) To assess the future of workplace learning and its relationship to performance of individuals as well as organizations. H1) Learning influences individual and organizational performance.	No instrument used. Qualitative research. 15 leading consultants and trainers of corporate companies (Tom peters, Noel Tichy, Chris Argyris, etc.). Scholarly discussion on learning, training, learning organization, future of learning and its impact on individuals and organizations. Critical evaluation of the	1) Learning is inevitable in the future as changes are happening so fast in the organizations and work places. 2) Learning is to achieve performance and it will become part of our culture in the coming days. 3) Technology and the rate of change are making jobs dysfunctional. 4) Workplace learning will change the way the business operates in the	1) Impact of technology on individuals and organizations with respect to learning could be another area of research. 2) What are the factors which triggers learning needs of organizations today could be another area of study? 3) Role of training as part of learning organization could be another area of study.

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			future of training, learning, learning organizations and their contribution to individuals and organizations.	years to come. 5) Experience, learning and training will become more important factors for individual and business performance in the coming years. 6) Organizations will become like universities training and imparting learning will become culture of the organizations. 7) Organizations are becoming intelligent with lavish communications and a confederation of entrepreneurial units, which demands learning as part of the culture for creative working.	
4	Calvert, G., Mobley, S., & Marshall, L. (1994). Grasping the learning organization, Training & Development.	Objectives: 1) To explore the beliefs, values and perceptions of real life practitioners of learning organization on what they feel about learning organizations. Research questions: 1) What definitions of learning organizations make sense?. 2) What does learning organizations look like and how it can be measured?. H1) Individual learning	No instrument used. Qualitative research. 50 practitioners from various leading US companies such as Apple, HP, GE, Universities etc. David Bohm's concept of dialogue and collection of inputs from participant's inquiry (Focus group discussions). Collection of concepts, inputs, experiences from real life and analyzing them for critical relationships	1) Many of the practitioners know a lot about learning organizations, but many do not know how to apply it. 2) Learning organizations are work in progress both conceptually and practically. 3) Learning organizations employ distinctive set of learning strategies and tactics, which differ from other organizations and achieve improved business performance in terms of efficiency, productivity	1) Learning organization interventions and its impact on organizational profitability is an interesting area of research. 2) Role of HRD managers in implementing learning organization interventions could be another area of interest to study.

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		and organizational learning are distinctly different to each other. H2) Training and development specialists play an active role in establishing learning organizations.	related to learning organization concepts.	and in achieving goals.	
5	Kotter, J. P. (2001). What leaders really do?., Harvard Business Review.	Objectives: 1) To explain the differences between managers and leaders. 2) To compare and contrast between managers and leaders. H1) There exists relationship and differences between manager and leader.	No instrument used. Three Harvard business review journal articles. Scholarly review of related literature. Theoretical and case study analysis of management versus leadership.	1) Leadership and management are two distinctive and complimentary systems of action. 2) Both leadership and management are necessary for success. 3) Most of the organizations are over managed and under led. 4) Management is about coping with complexity and leadership is about coping with change. 5) Motivation and inspiration energize people. 6) Successful well-led businesses tend to recognize and reward people who successfully develop leaders.	1) Impact of PRMs management and leadership qualities on project success can be studied further. 2) Different management and leadership qualities required for different type / sector projects could be another interesting area for research.
6	Elkjaer, B. (2001). The learning organization: An undelivered promise, Management learning.	Objectives: 1) To understand the reasons for the failure of learning organization initiatives of an organization, which	No instrument used. Qualitative research. Administrative case consideration (ACC), a Danish public enterprise. Case study	1) Learning organization initiatives will not succeed, if the top management level changes are not taking place. 2) Learning does	1) Employee perception on learning organization concepts would be an interesting area for further study. 2) Employees commitment and its impact on learning organization success

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		tried learning organization concepts for five years with their employees. H1) Training programs influence organizations to become learning organizations. H2) Learning organization influence organizational change process and facilitates to achieve organizational goals.	(personal interviews with the employees of ACC). Observations on the organizational learning process of ACC. Real life case study and analysis of causes and effects of learning organization initiatives and outcomes.	not end with only employees. 3) Managerial structures, work practices should also change alongside employees training in a learning organization. 4) Personal mastery inducts learning culture on individuals and hence, learning organization is a result of learning by individuals. 5) Management's sincerity in building a learning organization is vital for the success of learning organization initiatives. 5) Employees participation with full commitment is vital for the success of the learning organization concepts in an organization.	could be another area of research. 3) Effect of training program / design and its impact on learning organization outcome could be another area of research. 4) This is a case study done on a single organization, perhaps extending this study empirically to many organizations would help to validate the results of this study and to understand the learning organization concepts and its impact on individuals as well as organizations.
7	Dubois, A., & Gadde, L. E. (2002). The construction industry as a loosely coupled system: Implications for productivity and innovation, Construction management and economics.	Objectives: 1) To analyze the operations and behavior of firms as a means to deal with complexity. H1) There exist uncertainty factors in construction industry, which impacts innovation. H2) There is a relationship between interdependencies and complexity of the project.	No instrument used. 35 journal articles related to construction and innovation. Scholarly review of related literature. Theoretical review, analysis of available coupling systems and its impact on innovation and learning in construction industry.	1) Pattern of couplings studied and concluded that, construction industry's pattern of coupling seems to favor short term productivity, while hampering innovation & learning. 2) Authors conclude construction industry as a loosely coupled system as the firms engaged in this line of business behave differently from one another. 3) Complexity of	1) Study is mainly on a house building project and hence limited. Future research can be extended to other type of projects too. 2) The study can be further extended empirically to find out the relationship of tight and loose coupling nature of the construction industry and its impact on innovation and learning.

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				the project needs tight coupling as well as loose coupling systems to deal effectively the projects. 4) Project organization does not promote learning and innovation due to its temporary nature. 5) Government regulations and industry standards too hamper innovation.	
8	Abdul, R. Z., Sambasivan, M., & Johari, J. (2003). The influence of corporate culture and organizational commitment on performance, Journal of Management Development.	Objectives: 1) To examine the influence of corporate culture and organizational commitment on financial performance of Malaysian companies. Research question: What type of corporate culture lead to organizational employee's commitment?. H1) There exist a relationship between corporate culture and organizational commitment. H2) Corporate culture and organizational commitment influence financial performance.	Questionnaire (Quantitative research). 202 managers of Malaysian public listed companies. (1,036 questionnaires sent and 202 responses received). Self-administrated survey. SPSS software used to test 1) Descriptive statistics. 2) Pearson correlation. 3) Multivariate analysis of variance (MANOVA). 4) Reliability. 5) Regression and ANOVA.	1) There is a significant relationship between corporate culture and organizational commitment. 2) Both corporate culture and organizational commitment has influence on the financial performance of the companies.	1) Further research is needed to examine the effects of organizational factors such as age, size, activity, sectors and managerial factors like job involvement, job satisfaction, job motivation and job performance with corporate culture and organizational commitment. 2) The study can be extended to other geographic locations and also on project management companies.
9	Belout, A., & Gauvreau, C. (2004). Factors influencing project success: the impact of human	Objectives: The paper attempts to re test the conclusions of Pinto and Prescott, which states human resource	Questionnaire. (Adapted version of Pinto and Prescott's PIP). Pro test - 15 project management	1) Though there was a link between project success and the personnel factor, this factor does not have a significant impact	1) To improve the construct validity of the personnel variable by improving the psychometric properties of the questionnaires used in PM concept. 2) There is

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	resource management, International Journal of Project Management.	management plays a marginal role in PM with the "Personnel factor". H1) The personnel factor will have a significant role on the project success. H2) The relationship between the independent variables and project success will be affected by the project life cycle stages. H3) Project structure has moderating effect on the relationship between the IVs and project success. H4) Project sectors will have a moderating effect on the relationship between IVs & DV.	experts in more than ten Canadian companies. Final questionnaire sent to 212 respondents and 142 responses received. Questionnaire based on project life cycle with 7 point Likert scale (conception, planning, execution and completion). 1) Pearson correlation analysis. 2) Multiple regression analysis. 3) Degree of association between IVs. 4) Multi collinearity checking. 5) Regression analysis.	on project success. 2) Relationship between the independent variables and project success will vary according to life cycle stage. 3) Three different structures (functional, project based and matrix), top management's support and trouble - shooting variables were significantly related to project success. 4) There exists a moderation effect between independent variables and project success depending upon the sector studied. 5) HRM in project context is very rudimental.	multi collinearity problem in excess in the use of PIP. 3) Does HRM in project management context is different than traditional HRM?. 4) PIP instrument shortcoming need to be carefully removed and improved. 5) Project success should be measured from sponsor's view, project manager's view and sponsor as project manager's view.
10	Sodurlund, J. (2004). Building theories of project management: past research, questions for the future, International Journal of Project Management	Objectives: 1) To discuss on emerging perspectives within the project field. 2) To identify, why project organizations exist, how they behave and why they differ ?. Research Question: Basis of project management research - Too narrow and does not have middle range theories?. H1) The current research trends	No instrument used. 66 articles related to project management theories. Scholarly review of the journals. Research and analysis of project management concepts, existing line of research, critical analysis of current research and questions for future research.	Five basic questions were asked to and researched in details (they are: Why do project organizations exist?. Why do project organizations differ?. How do project organizations behave?. What is the function or value addition by the project management unit ?. What determines the success or failure of project organizations?.) Additional findings are,	1) To explore further on innovation and its impact to project management / project success. 2) To analyze further why projects and project organizations differ?. 3) Behavioral aspects of project organizations need to be researched further. 4) To study further on knowledge and technology value addition from projects to project organizations. 5) Social embeddedness dynamics need to be explored further.

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		on project management contributes to the body of knowledge on new and emerging trends on project management. H2) The project management research questions are adequate.		1) Innovation as a concept and its impact to project success has not studied so far. 2) Industry and corporate issues of project management not studied in details. 3) Limited knowledge on how do project organizations behave?. 4) Value addition by project on project organization due to technology and knowledge base is not researched in details. 5) CSF does not give real life knowledge on project success.	
11	Abdul, R. Z., Sambasivan, M., & Abdul, R. A. (2004). The influence of organizational culture on attitudes towards organizational change, Leadership & Organization development journal.	Objectives: 1) To investigate the influence of organizational culture on attitudes towards organizational change in Malaysian companies. H1) There is an association between organizational culture and attitudes toward change.	Questionnaire (Quantitative research). 258 companies listed in the Federation of Malaysian Manufacturing directory. (1,965 questionnaires sent and 281 responses received. 258 responses used for analysis). Self-administrated survey. SPSS software used to test 1) Descriptive statistics. 2) Pearson correlation. 3) Multivariate analysis of variance (MANOVA). 4)	1) There is an association between organizational culture and the cognitive, affective and behavioral tendency of attitudes toward organizational change. 2) Different type of organizational culture has different levels of acceptance of attitudes toward organizational change. 3) Cultural typology was related / associated with each type of attitudes toward change. Example: Mercenary culture has strong attitude towards change.	1) A longitudinal study of the relationships between various dimensions of attitudes toward organizational change, organizational culture and organizational strategy will help. 2) To study further on the relationship between organizational culture and attitudes toward organizational change and its impact on financial performance will be of help. 3) Impact of organizational size, type, industry / sector on the variables will be of further interest.

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			Reliability. 5) Regression ANOVA.		
12	Brady, T., Davies, A. (2004). Building project capabilities: From exploratory to exploitative learning, Organization studies.	Objectives: 1) To explore the organizational learning with 2 distinctive perspectives such as project led learning (learning from projects) and business led learning (strategic learning). H1) Project led learning (exploratory learning) has influence on organizational performance. H2) Business led learning (Exploitive learning) has influence on project performance.	No instrument used (Qualitative study). Companies studied are C & W, Ericcson Telecommunication Limited., Scholarly analysis of learning perspectives of projects and organizations from two selected companies. Cross case analysis (case study). Inductive study.	1) A new learning model named PCB (Project capability building model) was developed to explain the firm's learning processes such as project led learning and organization led learning. 2) The model explains organizations learn from project's experience (exploratory learning) and try to implement in other projects (exploitive learning). 3) The model can help to understand the position of a firm against their learning.	1) Model is studied on limited sampled companies and hence the study can be extended to other organizations, sectors, types to ascertain the outcome.
13	Turner, J. R., & Muller, R. (2005). The project manager's leadership style as a success factor on projects, a literature review, Project management institute.	Objectives: 1) To determine, whether the competence, including personality and leadership style of the project manager is a success factor for projects. 2) Different competence profiles are appropriate for different project types. H1) Leadership style and competence of PRMs influence project success. H2) PRMs competence profiles influence	No instrument used. 69 articles related to CSF and leadership. Scholarly review of related literature. Theoretical analysis of leadership, project success factors literature. Comparative analysis of various leadership styles and theories.	1) Previous studies on CSF for project success ignored the PRMs leadership role and its importance in project success. 2) The leadership style and competence of PRMs do not have significant impact on project success due to the unique, novel and temporary nature of the project.	1) This study is a theoretical study and do not support the proof that, PRMs leadership styles and competence do not have significant impact on project success. 2) Empirical studies should be conducted to evaluate this finding in real life projects in diverse conditions.

Appendix A – Literature review matrix

	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
		project outcomes.			
14	Hardness, C., Nilsson, M., & Urban Nulden. (2005). Experiencing a failing project for reflection and learning, Management Learning.	Objectives: 1) To facilitate experience sharing, discussion and reflection with the intention of improving project management practices both at the individual level and at the organizational level using PIER (Problem based learning, interactive multimedia, experiential learning and role playing) approach. H1) There exists a relationship between learning interventions and organizational development.	Questionnaire used with 19 open ended questions. One multinational corporation involved in project management business in Sweden. 84 members of the organization were sampled in this study. Empirical and interpretive case study and the overall research approach was action research. Descriptive statistics, Logical reasoning.	1) PIER supported organizational maintenance failed to promote organizational change. 2) Unsuccessful projects can be considered successful If the failed project provided opportunity for the organization to learn the mistakes and avoids risk of committing the same mistakes in the future projects. 3) Learning through reflection is significant, when we use PIER approach. 4) Perceptions about learning and it's outcomes to individual / organizational performance varies between individuals. 5) Learning interventions should be structured to promote learning organization culture and organizational performance. 6) Organizational changes are possible only with the support of structural changes by the top management and not by learning interventions alone.	1) Differences between individual learning and organizational learning could be an interesting area to study. 2) Role of top management and type of structural changes that reflect organizational learning and resulting in organizational performance could be further studied.

Appendix A – Literature review matrix

	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
15	Huang, C. J., & Liu, C. J. (2005). Exploration of the relationship between innovation, IT and performance, Journal of Intellectual Capital.	Objectives: 1) To explore the relationship between innovation, IT and performance. Research questions: 1) Do the investments of innovation capital and information technology (IT) capital have a non-linear relationship with firm performance?. 2) Does the interaction between innovation capital and IT capital have synergy effects on firm performance ?. H1) There exist a relationship between innovation capital and firm's performance. H2) There exist a relationship between IT capital and firm's performance. H3) There exists a positive relationship between innovation, IT and firm's performance.	Questionnaire. (Quantitative research). 1000 companies in Taiwan. Self-administrated survey. Multiple regression models to explore the nonlinear relationship between innovation, IT and firm performance.	1) Innovation capital has a non-linear relationship (inverted U shape) with firm performance. 2) IT capital has no significant impact on firm performance. 3) Innovation capital and IT capital has positive effect on firm's performance. 4) More investment in intellectual capital is not good.	1) To extend the study with more data (secondary) to explain the relationship between intellectual capital and firm's performance. 2) Future research to consider interaction effects of other perspectives of intellectual capital to understand further on firm's performance. 3) To study further on different types of IT investments and its impact on firm's performance.
16	Hyvari, I. (2006). Success of projects in different organizational conditions, Project Management Journal.	Objectives: To evaluate the critical success / failure factors in PM and to examine the relationship between CSF and organizational background variables.	Survey on members of the PMA – Finland. 78 company members and 368 individual members from various organizations. 54 Questions with 14 open ended questions. Correlation and	1) Results indicate the importance of communication related to the project size, organization type and project manager's work experience. 2) Communication is the most important factor in	1) Fewer attempts made to study the relationship of softer human elements of PM. 2) Relationship between CSF and measurement techniques and human elements could be studied in future research. 3) Organizational behavior and organizational factors of PM can be of interest for future research. 4)

Appendix A – Literature review matrix

	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
		H1) There is relationship between CSF and organizational variables.	reliability using SPSS & Karl Pearson Chi Square test. Utilized the results of previous qualitative & quantitative study results to compare results.	all the phases. 3) CSF ranking vary for different organizations in different sectors based on organizational conditions.	Only 25 responses analyzed and hence, larger response can have different results. 5) Study was conducted in Finland, can extend the study to other parts of the world. 6) Role of effective communication can be studied further. 7) Knowledge and information management in an organization for effective communication can be further studied.
17	Cicmil, S., & Hodgson, D. (2006). New possibilities for project management theory: A critical engagement, Project Management Journal.	Objectives: 1) Broader engagement with the conceptual considerations of project and project management. 2) To study deeply on concepts of project, project management, project performance, individual skills & competencies and social arrangements involved in projects. H1) Does alternative theoretical approaches and its implications influence project and project organizations.	No instrument used. 105 articles related to projects, project management, project success and so on. Scholarly review of the journals. Critical evaluation of intellectual foundations of project management for innovative research to create knowledge.	Six basic questions such as, 1) What projects are and how projects evolve. 2) Concepts of project, project management & project success. 3) Implications of the main stream definition of project, project management, project based organizing work and management. 4) Consequences of project organizing for project managers and workers. 5) Alternative perspectives beyond mainstream project management. 6) Whose interests are being served by the reproduction of the status quo in this field?. Based on the above questions, the following alternative assumptions were established. 1) Middle range theory on projects	1) To explore critically, the sensitivity to possible oppression and exploitation in projects due to pressurized environment. 2) To explore further critically performativity of the project body of knowledge (to consider other indicators such as health & safety, economy, ethics as measurement of success). 3) To consider studying the experiences of project actors (various practitioners involved in the project) rather than only on project managers.

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
				according to different selection criteria. 2) Human interactions in projects comparative case studies. 3) Project is a temporary organization with aggregate of individuals temporarily acting for a common cause.	
18	Henri, J. F. (2006). Organizational culture and performance measurement systems, Accounting, organizations and society.	Objectives: 1) To test the relationships between organizational culture and two attributes of performance measurement systems (PMS) namely diversity of measurement and nature of use. Research questions: 1) To what extent do control and flexibility values influence the measurement diversity. 2) To what extent do control and flexibility values influence the nature of use of the PMS by top managers?. 3) To what extent is the relationship between control and flexibility values and the measurement diversity mediated by the use of PMS?. H1) Top	Questionnaire (Quantitative research). 383 Canadian firms. Pilot study, instrument validation and final research. ANOVA, Structural equation modeling (SEM), validity, reliability, confirmatory factor analysis (CFA).	1) Organizational culture has a direct effect on PMS diversity of measurement and indirect effect through the use of PMS. 2) Flexibility value firms are associated with greater diversity of measurement than control value firms. 3) Organizational culture is an important factor in all the interactions of an organization. 4) Depending on the nature and intensity of use of PMS, the diversity of measurement will vary.	1) The study has limitations in terms of internal and external validity. 2) Study is primarily based on one dimension of organizational culture, that is PMS. Other dimensions of organizational culture should be studied for improved validity and reliability. 3) The study is static. That is, the study used PMS as such and did not use the evaluation of PMS. 4) Use of PMS for strategic decision making could be further studied. 5) Organizational values, diversity of measurement and use of PMS to improve organizational performance could be further studied.

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
		management teams of firms reflecting a control dominant type tend to use PMS for monitoring to a greater extent than firms reflecting a flexibility dominant type. H2) Top management teams of firms reflecting a flexibility dominant type tend to use PMS for attention focusing to a greater extent than firms reflecting a control dominant type. H3) Top management teams of firms reflecting a flexibility dominant type tend to use PMS for strategic decision making to a greater extent than firms reflecting a control dominant type. H4) Top management teams of firms reflecting a control dominant type tend to use PMS for legitimization to a greater extent than firms reflecting a flexibility dominant type.			
19	Kaliprasad, M. (2006). The human factor II: Creating a high	Objectives: 1) To explore the three major deterrents to	No instrument used. 15 articles related to organizational	1) Team work, global thinking, dynamic leadership and focus on	1) Cost of establishing high performance culture in an organization and the ROI can be an

Appendix A – Literature review matrix

	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
	performance culture in an organization, Cost Engineering.	sustain high performance culture in an organization. H1) Human factor has relationship to organizational performance. H2) Organizational culture has significant impact on high performance organizations.	performance. Scholarly review of organizational performance and high performance organizations. Critical review of literature and suggesting a new model for high performance in organizations.	solutions are some of the key factors for high performance culture in an organization. 2) Stronger the culture is, higher the resistance to change. 3) Organizational performance is influenced by leadership, organizational culture, structures and processes of the organization as well as external factors. 4) Sustaining high performance in an organization is it's competence to learning and to adopt to the learning organization concepts. 6) The three deterrents to organizational performance are senior management's lack of understanding on the market conditions, leadership issues of an organization and organizational systems and processes does not support organization's vision and goals.	area of study. 2) Factors influencing organizational performance could be another area for future studies. 3) Learning interventions, outcomes of learning interventions in organizational learning, influence of learning organization on high performance culture could be another interesting area for study.
20	Pounder, T. (2009). Using action learning to drive organizational learning and performance, Strategic HR Review.	Objectives: 1) To argue that action learning can contribute to organizational learning and increased organizational performance. H1)	No instrument used. Two UK companies who implemented action learning such as Alliance healthcare (formerly Unichem), Hiscox. Case study	1) The action learning approach can help create a dynamic culture of innovation and collaboration in which individuals and groups adopt a mindset of	1) Action learning and its impact on ROI (Return on investment) could be an interesting area of study. 2) Impact of action learning on learners of the organization as well as the facilitators and level of learning organization enhancement

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
		Action learning influences organizational performance.	(Qualitative research). Critical evaluation of action learning and its impact to organizational performance.	questioning and sharing the problem solving process. 2) Action learning helps to solve complex problems, which is difficult to solve using traditional methods. 3) Action learning is a powerful tool of organizational learning. 4) Real solutions for problems emerge from action learning. 5) Action learning improves organizational performance directly.	can be studied further.
21	Subramaniam, A., Othman, R., & Sambasivan, M. (2010). Implicit leadership theory among Malaysian managers: Impact of the leadership expectation gap on leader - member exchange quality, Leadership & Organization development Journal.	Objectives: 1) To examine the implicit leadership theory (ILT) among Malaysian managers and the impact of the gap between the ILT and actual behavior on leader member exchange (LMX) quality. H1) Individuals from various ethnic groups are associated with different ILT. H2) Differences in ethnic background have an effect on leadership expectation gap. H3) There is an impact of leadership expectation gap on LMX quality. H4) Duration of	Questionnaire (Quantitative research). Five Japanese companies operating in Malaysia and 137 Malaysian managers working under Japanese & Malaysian superiors. Self-administrated survey. SPSS software was used to test 1) Descriptive statistics. 2) One way ANOVA., 3) Factor analysis.	1) There is a distinct Malaysian ILT. 2) There are differences in ILT among different ethnic groups in Malaysia. 3) There is no significant difference in the leadership expectation gap among managers reporting to superiors from the same background, when compared to the superiors from different nationality and ethnic background. 4) Duration of manager's relationship have a moderating effect on the relationship between leadership expectation gap and LMX quality.	1) Future studies could be carried out to examine the differences in the level of leadership expectation among managers reporting to superiors from other nationalities. 2) GLOBE standard instrument is sued in this study, which has limitations on reflecting ILT related to local culture, this need to be noted and studied further using other instruments. 3) This is a cross sectional study, further research could be a longitudinal research to get finite assessments.

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
		manager's relationship have a moderating effect between the leadership expectation gap and LMX quality.			
22	De Valence, G. (2010). Innovation, procurement and construction industry development, Australian Journal of Construction economics and building.	Objectives: 1) To look at the R & D intensity and level of innovation that characterizes the construction industry, and relates these to the procurement systems and market structure in the industry. H1) What drives the R & D in construction industry ?.	No instrument used. 43 journal articles related to innovation & construction. Scholarly review of related literature. Theoretical review, analysis of available models etc.	1) Procurement methods used for building and construction projects are the determining factor for innovation in the construction industry. 2) Generic technologies such as IT and telecommunications have also impacted the building and construction process. 3) Innovation can be strategic option for complex projects. 4) Incentive systems can bring in many innovative ideas in construction projects execution. 5) Innovation at the tendering stage are not accepted by the clients so far and or the concepts are used by the clients to recall tenders.	1) To study further on the impact of procurement innovation in various sectors of construction and the value benefit analysis to the projects. 2) To extend this study empirically to prove that procurement innovation is the key factor for project innovation by and large in construction sector.
23	Anantamula, V. S. (2010). Project manager leadership role in improving project performance, Engineering management journal.	Objectives: 1) To identify a set of people-related project performance factors and to understand how these factors interact with one another. Research questions: How do the leadership	Questionnaire survey, personal interviews. 69 project management professionals representing senior management (SM), project managers (PRM), managers	1) A new project manager model and a project performance model developed. 2) Study concludes defining project processes and roles is the foremost thing for project success. 3) Project managers should	1) The study was conducted in a limited number of samples in a US setting. Further studies can be conducted in other parts of the world. 2) Different type of projects / industry can be tried with this new project manager, project performance model. 3) Study can be further extended to

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
		qualities of project managers impact project performance?. H1) There exist a relationship between leadership qualities of project managers (PRMs) and project performance. H2) There exists a relationship between people related factors and project performance.	(MGR) & consultants. Interpretive structural modeling (ISM) , Quantitative research. ISM results analysis. Relationship analysis between various people-related factors and its relationships.	establish trust with their teams for project success. 4) Defining and monitoring project outcomes is another important factor to achieve project success.	geographically dispersed project teams, cultural diversity, communication challenges etc.
24	De Oliveira, M. A., Luiz Veriano Oliveira, D. V., & Possamai, O. (2012). Forecasting project performance considering the influence of leadership style on organizational agility, International Journal of Productivity and Performance Management.	Objectives: 1) To analyze the influence of leadership style and factors associated with organization agility on project performance. H1) Leadership styles influence project performance. H2) Organizational agility influence organizational performance.	Questionnaire (35 questions) + interviews. Leading corporation involved in innovative projects. 96 respondents. Case study on a single organization. SPSS software for correlation, regression analysis, Bayesian Networks (BN) model is employed as a modeling tool to enable inferences and sensitivity analysis and also visualization and quantification of the propagation of effects between variables.	1) Combination of leadership style, agility and organizational factors lead to highest project performance. 2) Transactional leadership fails significantly in performance in innovative projects. 3) Transformational leadership has significant influence on performance of innovation projects. 4) Project performance is influenced by all agility factors such as continuous improvement, communication, continuous delivery, flexibility and team maturity. 5) Maximum project performance can be achieved when combining leadership factors and organizational	1) To extend this study with more number of participants to validate the perspective. 2) To extend this study to various types / sectors projects to see the relationships and impacts.

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
				factors.	
25	Nixon, P., Harrington, M., & Parker, D. (2012), Leadership performance is significant to project success or failure: A critical analysis, International Journal of Productivity and Performance Management.	Objectives: 1) To explore how performance of leadership in project management determines project success. H1) Leadership is crucial to a project success / failure.	No instrument used. 49 scholarly articles related to leadership and project success / failure. Scholarly review of articles and critical analysis of leadership and its impact on project success / failure. Critical evaluation of literature related to leadership, project success / failure and providing suggestions for better project performance.	1) No single leadership model is suitable throughout the life cycle of the project. 2) Leadership styles and models should be modified to suit the project performance requirements based on situations. 3) Project managers need to prioritize training in leadership skills for project success and must continuously improve to sustain project success. 4) Project failures are caused by two aspects: One is internal processes such as implementation of project itself, team's performance, meeting budgets, deadlines etc. and external processes such as measures of effectiveness made by the client and others. 5) Leadership performance management is crucial for project success through KPQ (Key performance questions) & KPI (Key performance indicators).	1) Performance management of project leadership is little researched so far and this could be one potential area for research. 2) This research was a theoretical analysis and an empirical study will further contribute validity to this study. 3) KPQ & KPI for project leadership and its impact on project performance (success / failure) could be another area of study.
26	Fernandes, C. I., Ferreira, J. J. M., & Raposo, M. (2013). Drivers to firm	Objectives: 1) To analyze the drivers to company innovation and their effects on the	Questionnaire (Quantitative research). Sample of 61 companies from	1) There were significant differences in terms of both drivers and inhibitors of innovation in	1) Innovation and its effect on financial performance of project organizations could be an extension to this research. 2)

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
	innovation and their effects on performance: An international comparison, International Entrepreneurship and Management Journal.	financial performance. H1) There exists a relationship between innovation and organizational financial performance.	Portugal & Spain. (Intentional convenience sampling). Self-administrated survey. Linear regression & univariate analysis was used to analyze the importance of innovation types between Portugal & Spain.	both Portugal and Spain. 2) Introduction of products to new markets proved significant in Spain. 3) Innovation in both products and processes are considered significant in both countries. 4) Innovative companies tend to record better financial performance. 4) Financial issues, difficulty in predicting market demand, unqualified employees, and difficulty in organizing innovation are the inhibitors to innovation. 5) Cooperation with suppliers, clients, universities, existence of business risk, innovation friendly climate and infrastructure are some of the drivers of innovation.	Factors of cooperation and existence of cooperative activities that promote innovation activities will be another area for future research. 3) The study is limited to only 61 companies in two countries in EU and studying the same in other countries with additional number of companies could benefit further in this body of research.
27	Hashi, I., & Stojčić, N. (2013). The impact of innovation activities on firm performance using a multi-stage model: Evidence from the Community Innovation Survey 4, Journal of case network studies & analysis.	Objectives: 1) To study the relationship between innovation and its impact on firm performance. 2) To compare the determinants of the innovation process in mature market economies and the transition economies. H1) The higher the innovation in an	Questionnaire (Quantitative research). 90,000 firms from 16 West and East European countries. Self-administrated survey. Four equation model of Crepon et al., is used to link innovation and firm's performance. SPSS software for correlation and	1) There is a positive relationship between innovation activities and productivity of the firm. 2) There is a relationship between size of the firm and its innovation activities. 3) Intensity of competition motivates firms to innovate. 4) Financial and knowledge factors hampers innovation. 5)	1) Impact of innovation on firm's KPIs could be an interesting area of research. 2) Relationship between business performance sustainability and innovation could be another area for future research.

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
		organization, the higher the performance.	regression analysis.	Productivity of the firm increases significantly with innovation. 5) Larger firms are likely to innovate more than smaller ones and innovation output decreases with firm size. 6) Regulatory and environmental issues contribute to higher level of innovation. 7) Product oriented innovations are mostly done in house in organizations.	
28	Saunila, M. (2014). Innovation capability for SME success: perspectives of financial and operational performance, Journal of Advances in Management Research.	Objectives: 1) To study the relationship between organizational innovation capability and firm performance. H1) Higher the firm's innovation capability, the greater the firm's financial performance. H2) Higher the firm's innovation capability, the greater the firm's operational performance.	Questionnaire (Quantitative research). 2,400 Finnish SME's. Random Sampling, Self-administered survey. SPSS software is used to analyze Descriptive statistics, ANOVA, validity, reliability, regression, factor analysis etc.	1) Three aspects of innovation capability namely ideation and organizing structures, participatory leadership culture, and know how development has some effect on different aspects of firm performance. 2) Innovation capability has more influence on financial performance than operational performance. 3) The paper suggests improving performance through development of innovation capability.	1) Relationship between a participatory leadership culture and financial performance was found to be negative in SME's. This needs further research to ascertain the results. 2) To what extent developing innovation capability leads to financial and operational performance, this need to be further studied. 3) It is worth to study the moderating effect of some of the aspects of innovation capability and firm's performance.
29	Koops, L., Coman, L., Rekveldt, M, b., Hertogh, M & Bakker, H. (2014). Public perspectives on project	Objectives: 1) To expose managerial view points on project success in different European countries. 2)	Qualitative study. 26 Dutch public project managers. Web based interviews. Q methodology.	Findings: 1) Language is a barrier to get the exact feedback from the participants. 2) The number of participants	1) To look for the outcome of the research and its viewpoints. 2) To conduct similar type of research in other parts of the world too.

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
	success - influenced by national culture?. Conf. paper, 28th IPMA worl congress, IPMA 2014.	Aims to indicate how cultural differences affect manager's perspectives on project success. H1) There exists a relationship between countries culture and viewpoints on project success.		who attended the interviews are smaller in number from each country. 3) Faced the problem of social bias during the research, when dealing with multinational respondents. 4) Outcome of the research is not concluded in this paper yet.	
30	Anderson, E. S. (2015). Do project managers have different perspectives on project management?. International journal of project management.	Objectives: 1) To find out if project managers have different perspectives on project management and their challenges differently. H1) Project managers have different perspectives on project management.	Quantitative research questionnaire. 180 project managers. Self-administered survey. SPSS statistical analysis for reliability, factor analysis, descriptive analysis etc.	Findings: 1) There exist two different perspectives on project management. One is organizational perspective and the other is task perspective. 2) Different project managers tend to have varied perspectives on project management. 3) Perspectives evolve during the project life cycle. 4) Radical changes on perspectives happen during the project. 5) People tend to shift their perspectives, when they move from one role to the other. 6) It is impossible to do planning. organizing, controlling of the project dominated by the organizational perspective the same way as task perspective of the project.	1) To extend the study to the project teams on their diverse perspectives on project management. 2) It would be interesting to study, why and what are the reasons for the different perspectives on project management.

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	Author / year / Title / Journal	Research objectives / Hypothesis	Methodology – Instrument, Sample, Design &/ Analysis techniques	Results	Directions for future research
31	Misic, S. & Radujkovic, M. (2015). Critical drivers of megaprojects success and failure, Procedia engineering (ORSDCE 2015).	Objectives: 1) To analyze and obtain critical factors that can affect megaprojects success or failure. H1) There exists critical factors, which determines the success and failure of megaprojects.	No instrument used. 41 literatures related to success and failure of mega projects + Real time data from practitioners. Scholarly review of related articles / data on megaprojects success / failure. Theoretical and practical analysis of data and literature related to megaprojects success / failure in research centers.	Findings: 1) Corruption, political influence and lack of experience and competence in project management act like failure factors. 2) Appropriate stakeholders management, respect for cultural differences and development of project management contribute to success in megaprojects. 3) Understanding of megaprojects success goes beyond iron triangle. 4) Main driver for each project is people and competent project manager is an important driver for megaproject success. 5) Megaprojects governance model developed.	1) Competence development and stakeholders management is a priority for the future research.
32	Stewart, M. B. (2015). Beyond the iron triangle: Evaluating aspects of success and failure using a project status model, Computing and information systems journal.	Objectives: 1) To establish a technique to visualize the key success criteria for important stages of the project. H1) There exists key success criteria for project success for important stages of the project.	No instrument used. 69 literatures related to success and failure of projects. Scholarly review of related articles on project success / failure criteria. Theoretical analysis of data and literature related to projects success / failure.	Findings: 1) The iron triangle provides a useful model to explore and clarify priorities, but does not demonstrate qualities or dynamics of project success. 2) A project status model (PSM) was developed to assess the project success criteria. 3) Findings suggest to go beyond time, cost and quality and to explore in areas such as benefits realization, risk management, stakeholder views, process implication and efficiency, team performance, methodology issues and lessons learnt.	1) To use the project status model (PSM) in real time projects to evaluate the success / failure of projects. 2) To analyze the applicability of the PSM in construction projects.
33	Diugwu, 1. A., Mohaamed, M. & Baba, D. L. (2015). Towards effective infrastructure development in	Objectives: 1) To identify factors that mitigate against successful completion of project. H1) There exists a positive	No instrument used. 45 literatures related to project management and success of projects in Nigeria. Scholarly review of related articles	Findings: 1) Good project conception and definition, project cost and budget management, adequate stakeholder management, appointment of competent project manager will address the problems	1) Factors which impede non adherence of project management principles in projects could be an interesting area to study.

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	Nigeria: Theoretical considerations from a project management perspective, American journal of industrial and business management.	relationship between project management principles and project success.	on project management principles and project success. Theoretical analysis of literature related to project success / failure in Nigeria.	associated with project success. 2) Study found the linkages of non-adherence of project management principles is the key reason for the failures of projects.	

Current research - project related factors and organizational related factors and its influence on project performance

1	Gopal, S. (2016). Impact of project and organizational factors on project performance of construction companies in Malaysia, Yet to be published.	Objectives: 1) To study the impact of project related factors on project performance. 2) To study the impact of organizational related factors on project performance. H1) Project related factors significantly impact project performance. H2) Organizational factors significantly impact project performance.	Questionnaire (Quantitative research). 360 respondents representing civil, building & infrastructure, marine, oil & gas and multi discipline construction projects in Malaysia. Self-administered survey. SPSS software for descriptive statistics, correlation, ANOVA, regression, validity, reliability etc.	Findings: 1) Organizational factors impact project performance significantly over project related factors. 2) Different project related factors and organizational related factors impact different sectors of construction such as C, B & I, marine, oil & gas and multidiscipline projects. 3) Other than iron triangle factors such as time, cost, quality, factors such as safety and financial are also equally important for project performance. 4) Relative importance index (RII) varies between and within project related factors and organizational factors for different sectors of construction.	1) Impact of skills, knowledge and competency of employees on project performance can be an interesting area of study. 2) Similar type of studies can be conducted in other parts of the world to ascertain the importance of organizational related factors on project performance.

Legend:

CSF	-	Critical success factors	GE	-	General electric company
PMT	-	Project management team	HP	-	Hewlett Packard
PM	-	Project management	KPQ	-	Key performance questions
HRM	-	Human resources management	KPI	-	Key performance indicators
PIP	-	Project implementation profile	SEM	-	Structural equation modeling
IV	-	Independent variable	RII	-	Relative importance index
DV	-	Dependent variable	ISM	-	Interpretive structural modeling

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AEC	-	Architectural, engineering and construction	SI	-	Severity index
ANOVA	-	Analysis of variance	IMP. I	-	Importance index
SPSS	-	Software packages for statistical analysis	PRM	-	Project manager
LMX	-	Leader member exchange	US	-	United States of America
PMS	-	Performance measurement systems	EU	-	European union
CFA	-	Confirmatory factor analysis	PMI	-	Project management institute
ROI	-	Return on investment	ILT	-	Implicit leadership theory
TCE	-	Transactional cost economics	TMO	-	Temporary multi organization
C, B & I	-	Civil, Building & Infrastructure	O & G	-	Oil and Gas
PSM	-	Project system model	H	-	Hypothesis
NPV	-	Net present value	CBA	-	Cost benefit analysis
SME	-	Small and medium enterprises	IT	-	Information technology
R&D	-	Research & Development	UK	-	United Kingdom
PMA	-	Project management association	HRD	-	Human resources development
MARA	-	Majlis Amanah Rakyat	CII	-	Concrete industry institute
MIS	-	Management information system	HR	-	Human resources
AEC	-	Asean economic community.			

Appendix B: Research Questionnaire

UNIVERSITI UTARA MALAYSIA

Dear Sir / Madam,

We realize that your time is valuable, as you are busy with your work. However, your participation in this survey, which will require about 15 - 20 minutes of your time, is vital for the success of this study.

I am Sekar Gopal, a research student of the Doctor of Business Administration (DBA) program of Universiti Utara Malaysia. As part of the program, I am conducting a survey regarding, **"Impact of project and organizational-related factors on project performance of construction companies in Malaysia"**. The objective of this study is to identify the project and organizational factors that impact the project performance of construction companies. Please be assured that all your responses will be kept strictly confidential and your identity will remain anonymous. All the data will be aggregated and will be strictly used for academic purposes only.

I look forward to receiving your response in this regard and thank you in advance for your cooperation. By participating in this research survey, you will be eligible to get a copy of the research report after the completion of the study. Please indicate your interest, if you wish to receive the research report, which will help you and your organization to understand the factors which impact project performance. Should you have any queries related to this study, please contact me through email at gopalsekarkrishna@yahoo.in or call me at 012 - 2069950.

Sincerely

Sekar Gopal
Matric No. 95596,
DBA – 8th Semester Student
Universiti Utara Malaysia.

PART 1: DEMOGRAPHIC FACTORS (ABOUT YOURSELF)

Please fill or tick (✓) the appropriate box that corresponds to your answer to each of the questions below.

1. Name (Optional) : _____
2. Position : _____
3. Division (Please specify) : _____
4. Department : _____
5. Age (Please specify) : _____ years
6. Gender

☐ Male
☐ Female

7. Race

☐ Malay
☐ Chinese
☐ Indian
☐ Others (Please specify): _____

8. Education Level

☐ Primary
☐ Secondary
☐ Diploma
☐ Graduate
☐ Post-Graduate
☐ Ph.D / DBA
☐ Others (Please Specify): _____

9. Number of years of experience in the construction industry (Please specify):

_____ years.

10. Total projects handled (number of projects):

☐	0 – 5	☐	6 – 10	☐	11 – 15
☐	16 – 20	☐	21 – 25	☐	Above 25

11. Specialized experience:

☐	Civil, Building & Infrastructure		
☐	Marine	☐	Oil & Gas
☐	Multi-discipline	☐	Others: _____

PART 2: ORGANIZATION DETAILS

---

1. Name of the organization :_____
2. Year of establishment :_____
3. Nature of business :_____
4. Annual turnover (RM in millions) :_____
5. Company status :

☐	Government	☐	Semi-Government
☐	Public listed	☐	Private
☐	Multinational		
☐	Others (Please specify):_____		

6. Total no. of employees :_____

7. Organization size : (In terms of number of employees)

☐	Small scale (1 to 50)	☐	Medium scale (51 to 200)
☐	Large scale (201 to 500)	☐	Very large scale (More than 500)

8. Specialized in construction :

☐	Civil, Building & Infrastructure		
☐	Marine	☐	Oil & Gas
☐	Multi-discipline	☐	Others: _____

9. Current Project :_____

PART 3: PROJECT RELATED FACTORS

Here are some statements that describe the factors which impact project performance in construction companies of Malaysia. Please indicate how strongly you agree or disagree with the following statements by circling the items below on a scale of 1 to 5.

……

CLIENT-RELATED FACTORS:

Factors		Strongly Disagree	Disagree	Neither Agree / Nor Disagree	Agree	Strongly Agree
1.	Lack of Finance and payments of completed works	1	2	3	4	5
2.	Owner interference	1	2	3	4	5
3.	Slow decision-making	1	2	3	4	5
4.	Unrealistic contract duration and requirement imposed	1	2	3	4	5

CONTRACTOR-RELATED FACTORS:

Factors		Strongly Disagree	Disagree	Neither Agree / Nor Disagree	Agree	Strongly Agree
1.	Contractor's poor performance	1	2	3	4	5
2.	Contractor's poor site management practices	1	2	3	4	5
3.	Poor construction methods used in projects	1	2	3	4	5
4.	Improper planning by contractor	1	2	3	4	5
5.	Mistakes during construction stage	1	2	3	4	5
6.	Contractor's Inadequate experience	1	2	3	4	5

CONSULTANT-RELATED FACTORS:

Factors	Strongly Disagree	Disagree	Neither Agree / Nor Disagree	Agree	Strongly Agree
1. Contractor management	1	2	3	4	5
2. Preparation and approval of drawings	1	2	3	4	5
3. Quality assurance control	1	2	3	4	5
4. Waiting time for approval of tests and inspection	1	2	3	4	5

MATERIAL-RELATED FACTORS:

Factors	Strongly Disagree	Disagree	Neither Agree / Nor Disagree	Agree	Strongly Agree
1. Availability of materials	1	2	3	4	5
2. Availability of quality materials	1	2	3	4	5
3. Shortage of materials	1	2	3	4	5
4. On-time material delivery	1	2	3	4	5

LABOR AND EQUIPMENT-RELATED FACTORS:

Factors	Strongly Disagree	Disagree	Neither Agree / Nor Disagree	Agree	Strongly Agree
1. Labor productivity	1	2	3	4	5
2. Lack of appropriate skills	1	2	3	4	5
3. Equipment availability	1	2	3	4	5
4. Adequacy of equipment	1	2	3	4	5

CONTRACT MANAGEMENT-RELATED FACTORS:

Factors	Strongly Disagree	Disagree	Neither Agree / Nor Disagree	Agree	Strongly Agree
1. Change orders	1	2	3	4	5
2. Mistakes and discrepancies in contract document	1	2	3	4	5
3. Major disputes and negotiations	1	2	3	4	5
4. Inappropriate overall organizational structure linked to the project	1	2	3	4	5
5. Lack of communication between the parties	1	2	3	4	5

EXTERNALLY-RELATED FACTORS:

Factors	Strongly Disagree	Disagree	Neither Agree / Nor Disagree	Agree	Strongly Agree
1. Weather conditions	1	2	3	4	5
2. Regulatory changes	1	2	3	4	5
3. Problem with neighbors	1	2	3	4	5
4. Unforeseen site conditions	1	2	3	4	5

PROJECT MANAGEMENT TOOLS/TECHNIQUES-RELATED FACTORS:

Factors	Strongly Disagree	Disagree	Neither Agree / Nor Disagree	Agree	Strongly Agree
1. My organization supports the use of project	1	2	3	4	5

	management tools/ techniques in managing the projects.					
2.	My organization uses adequate and appropriate project management tools/ techniques to improve project performance results in terms of time, cost, quality, safety and financial.	1	2	3	4	5
3.	My organization effectively uses project management tools/ techniques to detect the problems/issues of the projects at an early stage and mitigate them accordingly.	1	2	3	4	5
4.	The project management tools/techniques employed in my organization have no limitations and fit well for all types of projects	1	2	3	4	5

5. What are the most commonly used project management tools/techniques in your organization currently?

_____
_____
_____
_____

What would you recommend to improve the performance of the Malaysian construction industry?

……
……
……
……

PART 4: ORGANIZATIONAL-RELATED FACTORS

LEADERSHIP-RELATED FACTORS

Please indicate how strongly you agree or disagree with the following statements by circling the items below on a scale of 1 to 5.

	Factors	Strongly Disagree	Disagree	Neither Agree / Nor Disagree	Agree	Strongly Agree
1.	Employees need to be supervised closely, or they are not likely to do their work.	1	2	3	4	5
2.	Employees want to be part of the decision-making process.	1	2	3	4	5
3.	In complex situations, leaders should let subordinates work problems out on their own.	1	2	3	4	5
4.	It is fair to say that most employees in the general population are lazy.	1	2	3	4	5
5.	Providing guidance without pressure is the key to being a good leader.	1	2	3	4	5
6.	Leadership requires staying out of the way of subordinates as they do their work.	1	2	3	4	5
7.	As a rule, employees must be given rewards or punishments in order to motivate them to achieve organizational objectives.	1	2	3	4	5
8.	Most workers want frequent and supportive	1	2	3	4	5

	communication from their leaders.					
9.	As a rule, leaders should allow subordinates to appraise their own work.	1	2	3	4	5
10.	Most employees feel insecure about their work and need direction.	1	2	3	4	5
11.	Leaders need to help subordinates accept responsibility for completing their work.	1	2	3	4	5
12.	Leaders should give subordinates complete freedom to solve problems on their own.	1	2	3	4	5
13.	The leader is the chief judge of the achievements of the members in the group.	1	2	3	4	5
14.	It is the leader's job to help subordinates find their "passion".	1	2	3	4	5
15.	In most situations, workers prefer little input from the leader.	1	2	3	4	5
16.	Effective leaders give orders and clarify procedures.	1	2	3	4	5
17.	People are basically competent and if given a task, will do a good job.	1	2	3	4	5
18.	In general, it is best to leave subordinates alone.	1	2	3	4	5

ORGANIZATIONAL CULTURE-RELATED FACTORS

Strongly disagree (1)	Disagree (2)	Neither Agree / Nor Disagree (3)	Agree (4)	Strongly agree (5)

1.	The group I am assessing (organization, division, unit team) knows its business objectives clearly.	1	2	3	4	5
2.	People genuinely like one another.	1	2	3	4	5
3.	People follow clear guidelines and instructions about work.	1	2	3	4	5
4.	People get along very well and disputes are rare.	1	2	3	4	5
5.	Poor performance is dealt with quickly and firmly	1	2	3	4	5
6.	People often socialize outside of work.	1	2	3	4	5
7.	The group really wants to win.	1	2	3	4	5
8.	People do favors for each other because they like one another.	1	2	3	4	5
9.	When opportunities for competitive advantages arise, people move decisively to capitalize on them.	1	2	3	4	5
10.	People make friends for the sake of friendship; there is no other agenda.	1	2	3	4	5
11.	Strategic goals are shared.	1	2	3	4	5
12.	People often confide in one another about personal matters	1	2	3	4	5
13.	People build close long-term relationships. Someday, they may be of benefit.	1	2	3	4	5
14.	Reward and punishment are clear.	1	2	3	4	5
15.	People know a lot about each other's families.	1	2	3	4	5
16.	The group is determined to beat clearly defined enemies.	1	2	3	4	5
17.	People are always encouraged to work things out flexibly as they go along.	1	2	3	4	5
18.	Hitting targets is the most single important thing.	1	2	3	4	5
19.	To get something done, you can work around the system.	1	2	3	4	5
20.	Projects that are started are completed.	1	2	3	4	5
21.	When people leave, co-workers stay in contact to see how they are doing.	1	2	3	4	5
22.	It is clear where one person's job ends and another person's begins.	1	2	3	4	5
23.	People protect each other.	1	2	3	4	5

INNOVATION-RELATED FACTORS

Factors		Strongly Disagree	Disagree	Neither Agree / Nor Disagree	Agree	Strongly Agree
1.	The company does not value an effective network of contacts towards innovation.	1	2	3	4	5
2.	The company does not reward its employees for their creativity, for accepting risk and for being entrepreneurs.	1	2	3	4	5
3.	The company is more interested in preserving resources than in taking risks to capitalize an opportunity.	1	2	3	4	5
4.	Resource management has a greater influence in the company strategy than the pursuit of opportunity.	1	2	3	4	5
5.	The employees are evaluated for how well they follow the rules rather than for the value they add to the company.	1	2	3	4	5
6.	The company prefers to follow formal procedures instead of modifying usual practices.	1	2	3	4	5
7.	There is a hierarchy and formal description of tasks and functions.	1	2	3	4	5
8.	The company does not give autonomy to the employee and allows him to express his personality and judgment.	1	2	3	4	5
9.	The company does not have a formal process of	1	2	3	4	5

	innovation and R&D defined with the participation of top managers.					
10.	In general there is not a formal process of identification of new ideas and opportunities and these are accidental.	1	2	3	4	5
11.	There are no partnerships with universities or other organizations in order to do research.	1	2	3	4	5
12.	In general, the company communicates with customers in an informal way and on a face-to-face basis.	1	2	3	4	5

LEARNING ORGANIZATION-RELATED FACTORS

	Factors	Strongly Disagree	Disagree	Neither Agree / Nor Disagree	Agree	Strongly Agree
1.	My organization provides a conducive climate to help each other to learn.	1	2	3	4	5
2.	Employees in my organization are allowed to take time to support learning for themselves and others.	1	2	3	4	5
3.	Employees in my organization are rewarded for learning.	1	2	3	4	5
4.	Employees in my organization are allowed to provide open feedback to superiors.	1	2	3	4	5
5.	Superiors in my organization often ask, what others think on matters of interest related to the company and its performance.	1	2	3	4	5

6.	Employees and managers in my organization often spend time building trust among themselves.	1	2	3	4	5
7.	Employees in my organization are given freedom to adopt goals for their responsible areas.	1	2	3	4	5
8.	In my organization, employees are encouraged to revise their thinking with relevant information pertaining to their responsibilities.	1	2	3	4	5
9.	Managers in my organization listen and act on our recommendations.	1	2	3	4	5
10.	In my organization, managers create measurement system for learning and performance.	1	2	3	4	5
11.	In my organization, information from lessons learned is available to all the employees to learn and adopt.	1	2	3	4	5
12.	My organization recognizes employees for taking initiatives.	1	2	3	4	5
13.	My organization measures the results of training provided to employees.	1	2	3	4	5
14.	In my organization, management gives control over resources for better performance and learning.	1	2	3	4	5
15.	In my organization, management supports calculated risk-taking by	1	2	3	4	5

	employees to promote learning.					
16.	In my organization, employees are given opportunity to be aware of global perspectives.	1	2	3	4	5
17.	Employees in my organization are encouraged to have diverse perspectives.	1	2	3	4	5
18.	Leaders and managers in my organization provide coaching and mentoring to employees.	1	2	3	4	5
19.	My organization provides opportunities to learn.	1	2	3	4	5
20.	In my organization, employees are encouraged to ensure consistent actions.	1	2	3	4	5

PART 5: PROJECT PERFORMANCE-RELATED FACTORS

Please indicate how strongly you agree or disagree with the following statements by circling the items below on a scale of 1 to 5.

TIME-RELATED PERFORMANCE

	Factors	Strongly Disagree	Disagree	Neither Agree / Nor Disagree	Agree	Strongly Agree
1.	My organization completes the projects within the agreed contract schedule with the clients.	1	2	3	4	5
2.	My organization achieves the critical milestone dates always on time.	1	2	3	4	5
3.	My organization is effective in getting EOT (Extension of Time) for change orders initiated by the client, which has an impact on the schedule.	1	2	3	4	5
4.	My organization is efficient in identifying delays and deploying mitigation plans/catch-up plans to avoid project delay.	1	2	3	4	5
5.	My organization always submits the project turn-over documents on time to the client.	1	2	3	4	5

OTHERS (explain) _____

Remarks:

_____

_____

_____

COST-RELATED PERFORMANCE

Factors	Strongly Disagree	Disagree	Neither Agree / Nor Disagree	Agree	Strongly Agree
1. My organization completes the project within the cost/budget allocated to the project.	1	2	3	4	5
2. My organization is prompt in raising the cost claims for the works carried out in the project.	1	2	3	4	5
3. Our clients normally certify the claims on time and make timely payment.	1	2	3	4	5
4. My organization is prompt in documenting the change orders requested by the clients and raising cost claims on time to mitigate cost escalation.	1	2	3	4	5
5. My organization does not have disputes with the clients on project related costs/claims/retention sum.	1	2	3	4	5

OTHERS (explain) _____
Remarks:
_____
_____
_____

QUALITY-RELATED PERFORMANCE

Factors	Strongly Disagree	Disagree	Neither Agree / Nor Disagree	Agree	Strongly Agree
1. My organization pays attention to quality and does not compromise quality.	1	2	3	4	5
2. Mistakes and defects are identified through periodic quality inspections and resolved on time.	1	2	3	4	5
3. There were no major quality issues and no major non-conformance reports (NCR) were raised by the client.	1	2	3	4	5
4. There were no quality rejection and reworks in our projects.	1	2	3	4	5
5. There were no customer claims on quality-related works in our organization.	1	2	3	4	5

OTHERS (explain) _____
Remarks:
_____
_____
_____

SAFETY-RELATED PERFORMANCE

Factors	Strongly Disagree	Disagree	Neither Agree / Nor Disagree	Agree	Strongly Agree
1. In my organization, safety is given topmost priority.	1	2	3	4	5
2. Most of our projects are completed without accidents and LTAs.	1	2	3	4	5
3. Our company monitors safety statistics very closely and reports to authorities on safety statistics/incidents regularly.	1	2	3	4	5
4. Our company conducts safety-related training, education and campaigns regularly to promote safety awareness in projects.	1	2	3	4	5
5. In my company, safety inspections and audits are part of the system and employees are rewarded/ punished for safety performance.	1	2	3	4	5

OTHERS (explain) _____

Remarks:

_____

_____

_____

FINANCIAL-RELATED PERFORMANCE

Factors	Strongly Disagree	Disagree	Neither Agree / Nor Disagree	Agree	Strongly Agree
1. In my company, most of the projects are successfully completed and profits are earned.	1	2	3	4	5
2. Our company achieves good Return on Investment (ROI) from the projects it has undertaken.	1	2	3	4	5
3. Our company achieves good Return on Assets (ROA) & Return on Equity (ROE) from the projects undertaken.	1	2	3	4	5
4. Our company's financial performance is strongly related to the project's performance.	1	2	3	4	5

Appendix C: Open questions feedback:

Question no. 2 – Recommendations for improvement in project performance of construction companies in Malaysia.

Recommendations from respondents
Client-related recommendations
➢ Clients need to provide more realistic schedules to contractors. ➢ Clients need to monitor closely the contractor's works. ➢ Clients need to have competent or experienced supervision team. ➢ Clients need to have enough staff on site. Specifically for quality inspection and to attend to contractor requests, to facilitate joint inspection of completed works. ➢ Client or his representative to make immediate decisions on contractor requests. Specifically for technical and commercial issues. ➢ Client need to approve submittals, such as method statements, Inspection and test plans and materials on time. ➢ Clients need to award projects based on technical and financial capabilities of contractors rather than political and/or other relationships. ➢ Clients need to monitor the subcontractors, who carry out substandard works at the site, to avoid defects and problems during defect liability period (DLP). ➢ Clients need to reduce heavy documentation requirements from the contractors. ➢ Clients and contractors need to take serious action on final design before starting the construction activities at site. ➢ Potential success review of each project needs to be examined by the clients. ➢ Clients delay the TOC (Table of contents) approvals for final documentation of the projects, which delays the compilation of project reports and handover. ➢ Timely payment from client to contractors will help in all stages of the project, such as purchasing, construction, equipment mobilization and wages payment on time. ➢ Clients need to establish proper prequalification exercise first to avoid project failures. ➢ Clients need to avoid imposing biased contract documents creating problems to contractors in completing the projects on time within the budget.
Contractor-related recommendations
➢ Need to have healthy competition among the contractors in the market. ➢ Contractors must do realistic planning of site activities. ➢ Contractors need to have competent or experienced supervision team. ➢ Contractors need to understand their scope of works, before the bidding process. ➢ Contractors need to ensure that their personnel (Project manager, Construction manager, Engineer, Supervisor, Quality assurance and quality control, Safety) are experienced and able to manage their works efficiently. ➢ Contractors need to ensure that their plant and equipment are in good working conditions all the time and the operators are trained. ➢ Contractors need to embrace quality and should not compromise quality for cost benefits.

- Selection of contractors should be transparent and should be based on their past experience/strong financial background.
- Malaysian contractors need to implement new construction technologies, particularly in oil & gas construction sector.
- Contractors needs to study the details at the site regarding site conditions with method of working and compare the duration given in the contract for confirmation, to avoid time and cost issues later.
- Contractors need to monitor the subcontractor's works at the site, to avoid defects and problems.
- Construction industry needs to have more specialized main contractors and lesser subcontractors.
- Construction industry should have more experienced main contractors and they should not try to get cheaper sub-contractors. Instead, they should try to get quality and efficient sub-contractors.
- Workers incentives can play a big role in construction productivity improvement. This needs to be looked into by the contractors.
- Delay in the payment of subcontractors due to improper submission of documents is a common problem. Subcontractors need to be educated on the documentation preparation and submission methodology to avoid delays in payments.
- Effective payments to subcontractors will help to improve project performance.
- Contractors need to focus on meeting the customers' expectations in each and every project.
- Contractors to ensure every instruction given by the client and consultant shall be in written form officially. Every correspondence submission to the client must have received acknowledgement to avoid disputes and legal issues later.
- For documents or drawings which require client's or consultant's reply or approval, it must be followed up and reminded by the contractors.

Consultant-related recommendations

- Consultants need to improve technical efficiency in construction sector.
- Consultants need to have design standardization for standard infrastructure projects.
- Consultants in Malaysia need to improve design engineering skills.
- Consultants need to approve submittals, such as method statements, Inspection and test plans and materials on time.
- Selection of consultants shall be based on their experience and sufficient manpower.
- Better and cheaper consultants for all trades should be available for the construction industry.
- The design drawings for the project must be prepared by the consultants at an early stage to avoid delays and modifications.
- Consultants have to be better knowledgeable than others in their respective jobs.

Material-related recommendations

- Need to curb lack of material and their availability.
- Malaysia needs to adopt to change to high-tech techniques in construction from the conventional method and to adopt state-of-the-art materials, methods and tools in construction industries.
- Need to control fluctuation of material prices used for construction.
- Government to control building material prices to ensure that property prices are reasonable and the demand is high.
- Construction industry to consider standardization of construction materials for a variety of construction works to ensure availability on time at reasonable prices and quality.
- Government to consider withdrawal of GST on materials.

Labor & equipment-related recommendations

- Country must have a systematic blueprint or planning for development in stages. All of a sudden, lot of mega-projects should not appear, for which resources like manpower, machineries, logistics and quarry products are in shortage with a need to import resources from overseas.
- Need to apply mechanization and modern equipment in construction.
- Contractors should have competent workers in their company. Currently, most of the workers employed are not competent and have less knowledge in the business.
- Construction companies need to use skilled manpower for construction activities.
- Construction companies need to focus on mechanization to face labor shortage.
- Government needs to enforce regulations for the related parties involved in construction to bring in a good experienced workforce for the projects.
- Malaysia needs to explore relevant plant and equipment available in other countries that would minimize human error and improve productivity with less manpower.
- The labor law of Malaysia needs to be modified. It is more favorable to employees and especially "Medical Check" is the main problem which causes work disruption in construction projects. Also, before and after the long holidays, many of the construction employees do not come to work without any information and no actions can be taken on them.
- Construction companies need to use professional teams to the maximum for construction activities rather than non-professionals.
- Give more incentives and better salary for skilled workers so that they stay in the industry.
- To encourage and train local employees to be more competent to meet the demands of the construction industry.
- Employee's welfare in construction industry needs to be looked into.
- To increase the salary levels of workers in the construction industry to attract local workers. This will help to improve the skill levels of local workforce and reduce foreign labor.
- Every construction work must be carried out with right workers and tools to avoid mistakes and reworks.

- Extra hours worked at site by the employees must be adequately compensated.
- Malaysian government needs to support the construction industry to get skilled local workers as early as possible for reducing the dependency on foreign labor.

Contract-related recommendations

- Contractual issues need to be sorted out during the execution of the project itself. Contractor's Extension of Time (EOT) claims need to be evaluated once contractor submits the claim. Not to wait and negotiate till the end of the project, which is very common in Malaysia.
- All claims, particularly Variation Orders (VO), should be evaluated based on the contract terms and conditions as and when they are submitted rather than waiting till the completion of the project.
- Construction industry needs to have standard contract terms and conditions.
- All parties involved in construction projects need to improve their understanding of the contract before signing.
- Contract document to clearly define responsibility of clients and their representatives, number of days they need to respond to contractors' enquiry on technical matters and letters.
- Understanding the scope of works and responsibility clearly in executing the project at all levels is important.
- Improve contractual awareness among all parties in construction industry to minimize disputes.

Externally-related recommendations

- Malaysia needs to introduce/implement new/better technology in construction methods.
- Malaysia needs to curb bribery and political influence in awarding projects.
- All parties involved in construction should be well-versed with government's regulations.
- Most of the suppliers and contractors are having racism issues in the construction projects, but never show it up-front. This needs to be avoided.
- To have effective communication across the board to minimize queries/ discussions, which will save time and cost.

Project management tools/techniques-related recommendations

- Malaysia is lacking in using proper planning and management tools for management of projects, when compared to foreigners.
- Construction companies should apply Lean, Six Sigma, Kaizen techniques to improve labor productivity.
- Companies need to have proper planners with good planning tools, not schedulers.
- Need to have proper planning during the initial stage of the project, especially on the method of construction and availability of equipment to compliment the construction.
- Construction companies need to enhance the knowledge in application of project management tools/techniques.

- Construction companies need to use enterprise resource planning (ERP) software and electronic data management systems (EDMS) to reduce mistakes.
- Planning tools, such as daily, weekly reports should be taken seriously by the site personnel to fill up the report. Most of the times, the reports lack information.
- Contractors need to practice two to three weeks' look-ahead planning, which is very important to manage the project.
- Construction companies to follow exactly the project management life cycle and project management concepts.
- Site work implementation team should strictly follow the project management tools/techniques deployed.
- Construction industry needs to adopt international standards such as ISO 9001, PMP (project management professional) and BMS (Building management systems) to improve project performance.
- More detailed planning and adequate preparations, including resources need to be exercised to get better project results.
- Improve project management by using project risk management tools/techniques.
- To implement PMP as a mandatory tool for projects with a value of more than RM 50 million.
- Construction companies to use updated planning software for tracking project performance.
- To conduct extensive training on the tools that are used to monitor project performance in the construction industry for all the construction sectors to improve performance.
- Effective and logical planning by experienced project control planners with suitable project management tools will help to overcome the problems in construction projects.
- Construction companies need to establish project management procedures (Project management must be concerned about communication, job assignments, handling problems, identifying and assessing the risks, performance measurement and limit of authority in the project).

Leadership-related recommendations

- Create more effective and reliable management teams to manage projects.
- Lack of professionalism is there in most construction sites in managing contractors.
- Quick actions needed from the management of construction companies regarding welfare of workers and staff to retain them in the projects.
- Construction companies need to have skilled project managers, who can manage the projects successfully, by planning materials, resources and equipment on time.
- Construction companies need to employ appropriate human resources for the project and to have good labor management styles in the project.
- Project managers need to have professionalism and project management skills to ensure right quality products at right cost in the projects.

Organizational culture-related recommendations

- Construction companies need to ensure optimum capital utilization by best operational and management practices.
- Construction companies must improve communication within the organization as well to avoid issues in the projects.
- Construction companies to disseminate all staff responsibilities clearly before engaging them in the projects.
- The construction industry should look into the method on how to introduce new/ advanced technology with friendly working environment.
- Proper planning and execution will improve project performance.
- Construction companies need to identify at the early stage of planning, all the loop- holes and a person from the project needs to be engaged to address the loopholes based on the complications of the project.
- Engage social activities to improve the relationship between workers and management.
- Companies should encourage existing staff to upgrade their skills and to provide opportunities.
- Hire professionals regardless of race or ethnicity as they can impart valuable lessons to juniors in the construction industry.
- Construction companies need to give reward/bonus to the staff and employees for success in projects.
- Construction companies need to establish a good organizational structure in the first place for the success of the project.

Innovation-related recommendations

- The industry needs to source, adapt, and where applicable, technological advancements from abroad, to improve productivity and quality.
- When comparing the Malaysian construction technology with other developed countries, Malaysia needs a major improvement to achieve 2020 development. This needs to be looked into.
- Construction organizations should provide a work environment that allows innovation and continual improvement.
- Construction companies need to adapt to change, innovation and wider thinking.

Learning organization-related recommendations

- Need to create more skills-related training to the subcontractor's staff engaged in construction projects.
- Malaysian construction industry needs to think out of the box and learn the knowledge from other countries.
- Construction companies need to implement the best practices of construction management in construction projects.
- Construction companies need to provide training for effective operations for construction employees.
- Malaysian contractors need to have training and partnership with international contractors and technology transfer to improve skills and efficiency in the value chain.

- Construction companies need to update employees on technical knowledge and company resources and other related skills to be outstanding and to get better results.
- Courses and training are very important to improve the organization's performance. Hence, construction companies need to focus on training of employees.
- Construction companies need to conduct in-house training events regularly to improve the individual skills to meet the requirements of the international standards.
- Training on issues, like respect, behavior and responsibility needs to be provided to the staff related to their work in the construction industry to enhance performance.
- Construction companies need to get advice or consultation from experienced companies in the trade for better performance of their projects.
- Construction management team needs to attend courses and training regarding construction planning and project management.
- Education and training on the job, guidance/coaching are necessary to improve competency of employees to carry out their job well and be effective in the construction sector. This needs to be practiced.
- Construction companies should put more effort in knowledge management as part of learning organization to reduce repetitive mistakes.
- Construction companies need to consider continuous training for project managers to keep them abreast of the developments in the industry.
- Construction industry should have knowledge sharing sessions between major players in construction to benefit the industry.

Time performance-related recommendations

- By implementing project charter tool, the organization will get clear approach on execution, minimize the risk and improve the deliverables within the time frame given. Construction companies need to adopt this.
- Adequate manpower loading and planning to be followed. Immediate mitigation for any delay should be practiced at project sites.
- Root cause analysis needs to be done for any delay or mistakes done and to overcome the problem in the future.
- Construction companies need to improve the procurement strategy to avoid delays.
- Malaysian construction industry needs to find ways to utilize time saving systems to avoid delays.
- Construction companies need to have well-planned construction schedule with room for unforeseen circumstances that may arise in the project to avoid delays in the projects.
- When there are design changes in the projects, need faster approval from clients to expedite works and to avoid delays.
- Clients and contractors should adopt early start of work practice to avoid delays.
- To estimate resources and create a resource plan to arrange resources to meet

project schedules on time.

- Construction meetings should be carried out with substance and solutions to problems need to be decided efficiently without delay to ensure progress.
- Malaysia needs to increase the usage of IBS (Industrial building systems) to save time.
- Construction companies to analyze the entire construction process in detail and to determine the barriers for improving productivity.
- Construction companies to do better planning to mitigate the impact of work changes and to eliminate unnecessary waiting time.

Cost performance-related recommendations

- To enforce cost control system in place for timely and accurate control of cost in projects.
- Construction companies need to estimate the right costing for the project during bidding sessions accurately in consultation with all the departments, who have expertise, to avoid bursting of budget later in the project.
- It is important that the construction industry begins to look into evolving construction from the conventional method to improve productivity and progress and at the same time reduce cost. Example: Using system work forms instead of conventional work forms to reduce wastage.
- Cost control and project progress shall be balanced in a project. If too much control is exercised in the projects, it will affect the quality and lot of reworks will happen and will delay the progress of the projects.
- In terms of cost, it is better to compare the quotation provided by the suppliers and service providers. Nowadays, though this is stated in the purchasing procedures, none of the companies is following due to the urgency in the project.
- Create a preliminary budget and summarize the planned expenses and revenues. This will help to avoid cost escalation in construction projects.
- To implement cost control, efficient problem solving and potential for innovative cost saving mechanisms in construction projects.
- In cost management, cash flow is the utmost factor in construction. Try to maximize credit terms in order to meet payment terms by the client.
- Construction companies should manage the projects within the given budget and time to be more competitive.

Quality performance-related recommendations

- Construction companies should use the right tools or equipment rather than manual. i.e., more automation and reduce manual works to improve productivity and better quality.
- Many clients and client representatives are not implementing ISO 9001 Quality Management Systems (QMS) for the projects. Implementation of ISO QMS will lead to good quality of work and systematic documentation of work.
- Inspection and test plans need to be discussed, agreed and approved by all parties before execution of the works.
- Construction companies must always conduct site meetings to find out quality problems at the site and to rectify them immediately.

- Priority should not be only on the construction progress. Companies should push for quality assurances without compromising engineering practices and code of ethics.
- Top management interference in quality-related issues brings down the quality of the project. Hence, this should be avoided.
- No importance to quality is given, when the project is delayed. Construction companies should stop this practice.
- No proper planning affects quality in the projects. Normal construction behavior in Malaysian construction industry might not bring newcomers to the industry and the industry will be nowhere, when compared to the global scenario.
- Serious training and enforcement of quality control and assurance with priority over project progress need to be practiced.
- Deteriorating levels of quality of works produced by the contractors and sub-contractors needs to be identified and actions need to be taken accordingly.
- Construction companies to provide good margins to contractors to improve quality of construction.
- Malaysia needs to implement quality assessment system in construction (QLASSIC) as the mandatory quality management system for all construction projects to improve overall quality.
- Companies should have in-house subcontractors or their own workers. This is for better quality and not relying on sub-contractors, who tend to perform poorly.

Safety performance-related recommendations

- Regulatory bodies, such as CIDB and NIOSH need to play a proactive role in providing advice and education on safety to construction companies in Malaysia.
- The government authorities must enforce health, safety & environment (HSE) practices to ensure that projects are running safely and complying with legal requirements.
- All construction sectors must practice safety awareness and tool box meetings and should train every single worker depending on the activity and work sequences.
- Construction companies must issue warning letters and penalties for safety non-compliance by employees and subcontractors.
- Every staff must come out with UCUA (you see, you act) suggestions for any unsafe working condition at project site to improve the safety performance of the project.
- Malaysian government to follow, what the Government of Singapore is doing to its construction industry for better performance and safety.
- Malaysian construction industry needs to focus more on safety engagement. Malaysian construction companies engage foreign labor, since they are cheap and locals do not want to work in the construction industry. Many accidents happen as the foreign workers do not follow safety procedures.
- Construction companies need to educate the employees on their behavior. Many site accidents happened because of employee's behavior.

Financial performance-related recommendations

- Construction companies need to use local products and reduce imports to improve financial performance.
- The construction contractors of Malaysia must realize that they need to change and improve the way they operate to remain profitable and be competitive globally.
- Construction companies need to provide better remuneration, facilities, application of lean thinking training courses for the construction industry professionals for financial performance improvement.
- Construction companies need to train the new employees on what productivity means to all employees and to show them how increased productivity leads to fewer hassles and greater profits to employer and employees.

Other recommendations

- Government must set limits of jobs for certain construction companies, so that the market will have a healthy growth. Certain companies should not monopolize the construction projects in the country.
- Too many construction activities in a short span of time results in quality and safety issues, which affect all stakeholders.
- Regulators need to speed up their approval process.
- Construction industry needs to nurture better working relationship between client, consultant and contractor. All should work towards the same goal and should avoid policing culture.
- Need to improve communication among clients, consultants, contractors and subcontractors.
- Construction companies need to practice an honest business relationship between client and contractor.
- Malaysia needs to impose necessary laws for construction industries.
- Construction companies need to employ knowledgeable and competent people.
- Malaysian institutions of higher learning/universities to provide industrial skills-related education to students to cater to construction industry needs.
- Construction industry should give more exposure to fresh graduates and should train them to meet the talent requirements in the industry.
- Project housekeeping (cleanliness) is a direct factor in productivity improvement. Construction industry needs to focus on cleanliness-related issues.
- Malaysia needs to compare the competitiveness of the industry and needs to take necessary actions to improve the levels.
- Major changes and improvements are needed in many aspects of the construction industry to be a well-recognized country in the world.
- Malaysia needs to practice fair competition, no bribery and transparency in awarding contracts.
- Malaysia needs to focus on exporting construction services and technologies to other countries to learn and to be competitive in the global construction market.
- The relationship between the consultant, client and contractor should be ethical and completely professional. It is highly impossible to have happy ending in this triangular love story, but at least, maintain the professional decorum in the job to

smoothen the path towards the completion of the project.

- Knowledge and professionalism are the most important aspects in improving the performance of the Malaysian construction industry,
- Each and every party involved in the construction field should contribute equally to the industry,
- Malaysian government needs to establish a penalty system for construction organizations that does not follow the rules in the construction industry.
- The policy-makers and industry players need to work together to help drive changes in the construction sector.
- Construction industry needs to identify the root cause of the problem and to counter it with necessary corrective action.
- Malaysia needs to provide industrial training to schools and vocational training institute's students to expose them on real scenarios about the industry.
- Malaysia needs to establish a comprehensive database of available workers with joint effort between CIDB, Public Works Department and other stakeholders to help the construction industry.
- Government to come up with standard guidelines for contractors and their construction performance.
- Tax incentives from Government for contractors who improve performance may boost the industry culture.
- Malaysian construction companies do not have adequate skills and experience. Incentives to be given to foreign companies who induce transfer of knowledge and skills to local companies.
- Government should provide incentives to local construction companies, who compete with foreign companies and ventures in other countries.
- To standardize all the requirements, such as engineering, procurement, construction and commissioning for all types of projects to have a common platform for the industry.
- Malaysian government needs to give overseas education to intelligent students and staff to get experience in construction technologies and methodologies.
- Malaysia needs to establish special skills education colleges to conduct or to focus on the specialty of works needed in the construction industry.
- Malaysia needs to explore new construction technologies, which are used in China and Japan. China is using pre-fabricated condominium units to save time in projects. We need to learn this technology.
- Malaysian government needs to make sure the implementation of building law and its enforcement.
- Construction companies needs to have a good filing and documentation system from the beginning of the project till completion and handover.
- Malaysia requires effective enforcement authorities to ensure regulatory compliance not in a punitive way, but working together via friendly enforcement.
- Great initiative needed to create an interest for youth. Requires brainstorming from experienced personnel as motivators to attract the youth into the construction industry.
- Construction companies to analyze construction process in details before starting the construction works.

- Government needs to fund all small and medium construction companies to learn new technologies in construction.
- Malaysia needs to consider establishing regulations by the Board of Engineers to enforce timely payment by the clients to contractors.
- Malaysia needs to consider establishing an authority to supervise engineers and to prevent interference of project owners on technical matters related to the project.
- Malaysian government needs to limit the number of Chinese EPC (engineering, procurement and construction) companies coming into Malaysia. Because of their poor quality works, some projects are getting delayed and some are having quality and technical issues.
- Government policies need to be simple for property development projects to boost development projects.
- Construction industry needs to have more experienced engineers and architects to facilitate the construction industry's growth.
- Government to consider establishing an agency to accredit and qualify all building contractors for their performance.
- Government should enforce competency levels for contractors.
- CIDB should keep track of reliable sub-contractors and should propose to main contractors.
- Like in Singapore, each personnel in contractor's organization shall compulsorily attend one technical or skill course per year. Learning center to be controlled by Malaysian Government or CIDB.