DEVELOP THE [illegible] BUSINESS SUCCESS CHECKLIST IN THE CONSTRUCTION INDUSTRY

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ABSTRACT

Earlier conceptions of success in the construction industry placed a great emphasis on the project-based success criteria. Emphasising on this criterion has led to the vast efforts paid to grandiose the theory on project-based management practices to improve the efficiency of individual projects. Yet, success still proves to be elusive in many construction companies, which recorded the biggest percentage of failed businesses globally of 20.2%. In response to this issue, the objective of this study was to explore the success indicators for entrepreneurs in the construction industry from a different view, that is, from the perspectives of an entrepreneurship phenomenon. To guide the research effort, the overarching research question was formulated as: what are the success indicators for entrepreneurs in the construction industry? Following a review of existing knowledge in the entrepreneurship literature, a list of twenty three relevant indicators was proposed with a conceptual research model relies on four knowledge areas of an entrepreneurship phenomenon, namely entrepreneurial orientation, entrepreneurial organisation, entrepreneurial competency, and entrepreneurial environment. This research was conducted in two phases of research inquiry with the use of a mixed method research design. In the first phase, two rounds of the Delphi study was employed to identify the most important indicators to the success of construction enterprise. Then, the Decision Making and Trial Evaluation Laboratory (DEMATEL) was used to explore the interrelationships among those importance indicators in the second phase. The data was solicited from a panel of thirty nine construction industry experts comprising of contractor/developer, professional engineering consultant, government technical officer and academician, and was applicable for both phases. The Cronbach's alpha coefficient for the Delphi study and DEMATEL technique were 0.827 and 0.768, respectively, which implied high reliability of the instruments. The questionnaires were electronically transmitted to the expert panellists with the response rates of 100% in the first round and 92.3% in the second round of the Delphi study, and 55.6% in the DEMATEL technique. The overall research findings revealed that eighteen indicators were of importance with three indicators was the most critical and driving indicators to the success of the construction enterprise. In addition, a checklist named the Constructionpreneurial Business Success Checklist was developed and validated. The validation tests indicated that this checklist could be an appropriate tool for guiding the construction enterprise in monitoring their business toward an achievement of the long-term corporate success, and beneficial for the intended users. This research is expected to generate a new knowledge in the CEM literature as it highlights the benefits of the entrepreneurial activities brought to the successful business in the construction industry. Nevertheless, a list of practical implementation of success indicators forwarded by the research is expected to be applicable to a various stakeholders within the construction industry. From a research perspective, the study could stimulate further interest in the CEM and entrepreneurship research.

ABSTRAK

Konsep kejayaan yang terdahulu dalam industri pembinaan telah memberi penekanan yang besar terhadap kriteria kejayaan berasaskan projek. Penekanan terhadap kriteria ini telah membawa kepada banyak usaha dibuat untuk memertabatkan teori mengenai amalan pengurusan berasaskan projek bagi meningkatkan kecekapan projek. Namun, kejayaan masih sukar dibuktikan dalam kebanyakan syarikat pembinaan, dengan peratusan kegagalan perniagaan terbesar di peringkat global sebanyak 20.2 %. Sebagai tindak balas kepada isu ini, objektif kajian ini adalah untuk meneroka indikator kejayaan bagi usahawan dalam industri pembinaan daripada pandangan yang berbeza, iaitu daripada perspektif fenomena keusahawanan. Bagi membimbing usaha penyelidikan ini, soalan penyelidikan yang bersifat menyeluruh telah digubal sebagai: apakah indikator kejayaan bagi usahawan dalam industri pembinaan? Berikutan penelitian pengetahuan sedia ada dalam literatur keusahawanan, satu senarai yang mengandungi dua puluh tiga indikator berkaitan telah dicadangkan dengan model penyelidikan konsep bersandarkan kepada empat bidang pengetahuan fenomena keusahawanan, iaitu orientasi keusahawanan, organisasi keusahawanan, kecekapan keusahawanan, dan persekitaran keusahawanan. Kajian ini dijalankan dalam dua fasa siasatan penyelidikan dengan penggunaan kaedah penyelidikan bercampur. Dalam fasa pertama, dua pusingan kajian Delphi telah digunakan untuk mengenal pasti indikator-indikator yang paling penting bagi kejayaan syarikat pembinaan. Kemudian, teknik *Decision Making and Trial Evaluation Laboratory* (DEMATEL) telah digunakan dalam fasa kedua untuk meneroka hubungkait di antara indikator-indikator yang penting tersebut. Data penyelidikan telah dikumpul daripada satu panel mengandungi tiga puluh sembilan pakar industri pembinaan yang terdiri daripada kontraktor/pemaju, perunding kejuruteraan profesional, pegawai teknikal kerajaan dan ahli akademik, dan terpakai untuk kedua-dua fasa. Pekali alfa Cronbach untuk kajian Delphi dan teknik DEMATEL adalah masing-masing 0.827 dan 0.768, menunjukan kebolehpercayaan yang tinggi bagi instrumen tersebut. Borang soal selidik dihantar secara elektronik kepada ahli panel pakar dengan kadar respons sebanyak 100% pada pusingan pertama dan 92.3% pada pusingan kedua kajian Delphi, dan 55.6% bagi teknik DEMATEL. Hasil dapatan keseluruhan kajian menunjukkan bahawa lapan belas indikator mempunyai kepentingan dengan tiga darinya adalah indikator paling kritikal dan memandu kepada kejayaan syarikat pembinaan. Di samping itu, satu senarai semak yang dinamakan *Constructionpreneurial Business Success Checklist* telah dibangunkan dan disahkan. Ujian pengesahan menunjukkan bahawa senarai semak ini boleh menjadi alat yang sesuai untuk membimbing syarikat pembinaan memantau perniagaan mereka ke arah pencapaian kejayaan korporat jangka panjang, dan memberi manfaat kepada pengguna dimaksudkan. Kajian ini dijangka menjana pengetahuan baru dalam literatur pengurusan kejuruteraan pembinaan (PKP) kerana ia menonjolkan manfaat yang dibawa oleh aktiviti-aktiviti keusahawanan kepada kejayaan perniagaan dalam industri pembinaan. Walau bagaimanapun, senarai indikator kejayaan yang pelaksanaannya adalah praktikal hasil dari kajian ini dijangka terpakai kepada pelbagai pihak berkepentingan dalam industri pembinaan. Dari perspektif penyelidikan, kajian ini dapat merangsang lagi aktiviti penyelidikan dalam bidang PKP dan keusahawanan.

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AEC	Architecture, Engineering, and Construction
CBS	Constructionpreneurial Business Success
CC	Constructionpreneurial Competencies
CE	Constructionpreneurial Environment
CEM	Construction Engineering Management
CIDB	Construction Industry Development Board Malaysia
CIDC	Construction Industry Development Council India
CIMP	Construction Industry Master Plan
CITP	Construction Industry Transformation Programme
CO	Constructionpreneurial Orientation
COrg	Constructionpreneurial Organisation
CVA	Construction Value Added
DEMATEL	Decision Making Trial and Evaluation Laboratory
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
GEM	Global Entrepreneurship Monitor
IJV	International Joint Venture
MCDM	Multi-Criteria Decision Making
MENA	Middle East and North Africa
SME	Small and Medium Enterprise
SPSS	Statistical Package for the Social Sciences
UK	United of Kingdom
USA	United States of America

CHAPTER 1

INTRODUCTION

1.1 Preamble

Why should we care about the construction industry performance? Evidence has suggested that the construction industry activities, whether in public or private sectors, or even in developed or developing countries, have a positive significant contribution to the nation's economic development. It was estimated that the contribution of the industry to every nation's Gross Domestic Product (GDP) is around five to ten percent (Matijevic, 2014). Indeed, the gross output of the construction industry in the developing countries was estimated as much as fourteen percent (Well, 1984). It was also estimated that the construction industry accounts for around one-tenth of the world's GDP, seven percent of world employment, half of all world resource usage, and up to forty percent of the world energy usage (PricewaterhouseCoopers, 2015).

The construction industry is primarily a project-based industry. Basic amenities and infrastructure such as residential space, roads, bridges, harbours, railways, industrial building, and other utilities are just examples of the vital products of the industry. These products of the industry offer the citizens the chance to better their living standards. It also supports the operation of all other industries by producing the spaces and infrastructures that are necessary for business. Hence, the products of the construction industry are able to underpin the productivity advances that could hold the nation's future prosperity and wealth creation. In other words, the construction industry provides the necessary buildings and infrastructures that used to stimulate the nation's economic development.

The industry has extensively uses the manpower for its activities. Hence, the important of the construction industry to the economy can also be seen through its investment, and the multitude of workers employed. Moreover, the supply chain in the construction industry is complex and strongly interrelated, consisting manufacturing (materials, equipments), services (engineering, financial, transportations, legal), and traditional construction trades (hardware, plumbers), all of which depend on each other for survival. The industry has a 'two-times' multiplier effect, with more than one hundred and twenty other industries relying on the construction activities for their growth and sustainability. For instance, the industry consumes fifteen percent of the total manufacturing output (CIDB, 2015a). Nevertheless, the demand for construction activity is forced by the economic factors such as population growth, income growth, industry activity, technology change, commodity cycles, consumer sentiment, interest rates and inflation (AI Group Economics, 2015). For that reasons, the development of the construction industry has become the national agenda for every nations' government.

1.2 Research Background

The Construction Industry Development Board Malaysia (CIDB), a statutory body under the Ministry of Works, is the sole authority to develop the Malaysian construction industry to be one of the major contributing sectors to the national economy. The CIDB was established under the ACT 520 (Lembaga Pembangunan Industri Pembinaan Malaysia) on 24 July 1994 as the governing body entrusted with the responsibility to provide effective leadership and coordination among the construction industry players in Malaysia (CIDB, 2015b).

In line with the given mission, it has been made mandatory for all contractors to be registered with the CIDB in one of the seven grades before allowable undertaking business operations in Malaysia. The grades are based on the financial capability of a contractor. As shown in Table 1.1, the G1 is the smallest category with an allowable tendering capacity of not exceeding RM 200,000.00, whilst, G7 is the largest category with no limit tendering capacity.

Table 1.1 Contractor Registration Classification

Grade	Tendering capacity (RM)	Paid-up capital (RM)
G7	No Limit	750,000.00
G6	Not exceeding 10 million	500,000.00
G5	Not exceeding 5 million	250,000.00
G4	Not exceeding 3 million	150,000.00
G3	Not exceeding 1 million	50,000.00
G2	Not exceeding 500,000.00	25,000.00
G1	Not exceeding 200,000.00	5,000.00

Source: CIDB (2015b)

Table 1.2 indicated the total number of registered contractors from 2011 to 2014. It was obviously seen the tremendous increasing of the registered contractors from 63,850 in 2011 to 67,833 by the end of 2014. It also found that the highest number of registered contractors was 69,490 in 2012. However, the number has decreased to 66,672 in the year 2013.

Table 1.2 Total Number of Registered Contractors (2011 – 2014)

Grade	Registered contractors			
	2011	2012	2013	2014
G7	4,573	5,144	5,332	5,618
G6	1,398	1,692	1,594	1,528
G5	3,817	4,317	4,130	4,287
G4	2,686	2,922	3,038	3,093
G3	10,437	10,351	8,825	8,875
G2	8,287	8,665	9,268	10,441
G1	32,752	36,399	34,485	33,991
Total	63,850	69,490	66,672	67,833

Source: CIDB (2015b)

Although the reports did not provide justifications on the decreasing number of the registered contractors, nevertheless, the decrement may due to several factors. The most probable reason is that there existed a break in licensing time as the contractors fail to renew their license on time, especially for those expired end of the year. It might also due to some contractors have had upgraded their registration to the higher grade, resulting in increasing number of the higher grade and decreasing in the lower grade. Another possible reason is that the license renewal was not approved because it does not meet the requirements of the renewal registration, hence, it will take more time as to fulfilling the requirements. In the worst scenario, the declining might due to the contractors have been blacklisted for renewing their licensure or the license have been terminated by the authority for certain reasons such as unacceptable performance in handling projects or unethical issues in conducting the business. One final reason is that the contractors might have exited from the business either voluntary or bankruptcy.

Based on the estimated number of Malaysia's population (29,947,600) and the total registered contractors (66,672) in 2013, more than 0.2 percent of the Malaysia's population are contractors. It is a phenomenal number if one compares that to the total population. Thus, it has created a fragmented industry with a highly competitive environment.

CIDB (2015b) categorised the status of the registered contractors into three categories. First, active contractors are those who have projects during the period of their registration are in force. Second, semi active contractors are those who were not awarded any project during the duration of their registration but actively in bidding for tenders. Third, dormant contractors are contractors who were not awarded any project during the duration of their registration and did not bid for any tender.

As shown in Table 1.3, it is evident that, of 67,883 registered contractors as at 31 December 2014, only 80.4 percent (54,591) remain active. The balances 19.6 percent are either semi active (797) or dormant (6,451). Although the percentage is smaller, nonetheless, if one looks at the contribution of the construction industry to the nation's economy, 19.6 percent of either semi active or dormant contractors represent the significant effect to the industry and must be concerned about.

Table 1.3 Status of Registered Contractors as at 31 December 2014

Grade	Registered	Active	Semi Active	Dormant
G7	5,618	4,844	80	384
G6	1,528	1,317	31	101
G5	4,287	3,373	72	365
G4	3,093	2,545	42	227
G3	8,875	6,724	135	938
G2	10,441	7,742	130	985
G1	33,991	28,046	307	3,451
Total	67,883	54,591	797	6,451

Source: CIDB (2015b)

To face current and forthcoming challenges, the CIDB has forwarded eleven core strategies for the Malaysian construction industry strengthening its foundations (CIDB, 2015b), namely:

(i) Integrate the construction industry value chain to enhance productivity and efficiency,

(ii) Strengthen the construction industry image,

(iii) Strive for the highest quality standards and practices, and environmental standards and practices,

(iv) Develop human resource capabilities and capacities in the construction industry,

(v) Adopt new construction methods, and innovate through research and development,

(vi) Leverages on information and communication technology in the construction industry,

(vii) Benefit from globalization, including the export of construction products and services,

(viii) Strive to meet stakeholders' expectations,

(ix) Ensure efficient and effective delivery of services,

(x) Strengthen and invest in human capital requirement and development, and

(xi) Ensuring sustainable revenue and adopting good financial governance.

In 2007, the Government has introduced the Construction Industry Master Plan (CIMP), aimed to boost the domestic construction sector and develop local contractors to compete globally. The CIMP could be seen as a comprehensive plan charting the strategic status and future management of the Malaysian construction industry over the ten year period from 2006 to 2015. The program was to ensure the construction industry will able to support the nation's overall economic growth, and meets the challenges such as the need to raise productivity and quality along the entire construction industry value chain (CIDB, 2006). The CIMP consisted of seven strategic thrusts, namely:

(i) Integrate the construction industry value chain to enhance productivity and efficiency.

(ii) Strength the construction industry image.

(iii) Strive for the highest standard of quality, occupational safety and health, and environmental practices.

(iv) Develop human resource capabilities and capacities in the construction industry.

(v) Innovate through research and development and adopt new construction methods.

(vi) Leverage of information and communication technology in the construction industry.

(vii) Benefit from globalisation, including the export of construction products and services.

Recently in 2015, the Government has launched the Construction Industry Transformation Programme (CITP) to empower and strengthen the construction industry as espoused in the thrusts of the 11th Malaysia Plan. The CITP is a five year plan from 2016 to 2020 which is the continuity of the successes of the CIMP. It is aims to develop a highly productive construction industry that will be a major contributor towards the Malaysia's ambition of becoming a high-income nation by 2020 (CIDB, 2015a). The CITP is expected to transform the construction industry and change the way it is being perceived through four strategic thrusts, namely:

(i) Quality, safety and professionalism.

(ii) Environmental sustainability.

(iii) Productivity.

(iv) Internationalisation.

It is expected that the outcomes of the CITP are able to transform the industry and achieve the following objectives (CIDB, 2015a):

(i) Quality, safety and professionalism to be ingrained in the industry culture.

(ii) Malaysia's environmentally sustainable construction to be a model for the emerging world.

(iii) Productivity of the industry is more than doubled, matched by higher wages.

(iv) Malaysian champions to lead the charge locally and globally.

The Malaysian construction industry has acted as an important role in term of the economic, societal, and cultural growth, since the formation of the first national strategic economic development (1966 – 1970). It is the Malaysia's fourth largest industry, behind agriculture, mining, and manufacturing. As indicated in Table 1.4, the industry contributed to the national GDP at an average of 3.1 percent per annum within 2005 – 2012. The industry was also recorded an average growth of 6.8 percent per annum within 2005 to 2012, while, the national GDP grew at an average rate of 4.8 percent per annum over the same period. Although the national GDP growth has been shrunk to minus 1.5 percent in 2009, nevertheless, the construction industry still contributes higher at 3.1 percent for the particular year. It is expected that the construction industry could contribute at least 5.5 percent to the national GDP up to 2020 (Department of Statistics Malaysia, 2015).

Table 1.4 The Malaysian Construction Industry and the National Economy

Year	National		Construction Industry		
	GDP RM (million)	GDP Growth (%)	Output RM (million)	Contribution to GDP (%)	Growth (%)
2005	543,578	5.3	16,107	3.0	-1.5
2006	573,936	5.6	16,022	2.8	-0.5
2007	610,087	6.3	17,391	2.9	8.5
2008	639,565	4.8	18,151	2.8	4.4
2009	629,885	-1.5	19,270	3.1	6.2
2010	676,653	7.4	21,459	3.2	11.4
2011	711,351	5.1	22,464	3.2	4.7
2012	751,471	5.6	26,531	3.5	18.1
Avg.	642,066	4.8	19,674	3.1	6.8

Note: At constant 2005 prices

Source: Department of Statistics Malaysia (2015)

In comparison with other Asia's countries as listed in Table 1.5, Olanrewaju and Abdul-Aziz (2015) reported that the contribution of the Malaysian construction industry to the national GDP was the fifth largest at an average of 3.2 percent per annum within 2005 – 2013, behind Indonesia (6.3 percent), Philippines (5.1 percent), and South Korea (4.8 percent). Although Singapore has recorded an average of 3.8

percent, however, the data reported only for 2007 – 2013. It is also observed that, although the Malaysian construction industry was not the highest performer among the reported countries, nevertheless, its contribution has been consistent and stable between 2.8 percent to 3.5 percent.

Table 1.5 Percentage Share of GDP from the Construction Sector in Selected Countries

Country	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**Average**
South Korea	5.7	5.5	5.3	5.0	5.1	4.6	4.2	4.1	4.1	4.8
Hong Kong	3.4	2.9	2.7	2.9	2.7	2.9	3.3	3.5	3.5	3.1
Taiwan	2.8	2.7	2.6	2.4	2.3	2.3	2.3	2.2	2.2	2.4
Singapore	-	-	3.0	3.6	4.2	3.8	3.8	4.0	4.1	3.8
Thailand	2.4	2.4	2.4	2.2	2.2	2.2	2.1	2.1	2.1	2.2
Philippines	4.4	4.6	5.0	5.1	5.4	5.7	5.0	5.4	5.6	5.1
Indonesia	5.9	6.1	6.2	6.3	6.4	6.5	6.5	6.5	6.6	6.3
Malaysia	3.0	2.9	2.9	2.8	3.1	3.2	3.2	3.5	3.8	3.2

Source: Olanrewaju and Abdul-Aziz (2015)

In general, the Malaysian construction industry is classified into four sub-sectors, namely residential buildings, non-residential buildings, civil engineering, and special trades. The gross output of the sub-sectors remained consistent from 2012 to 2013 as shown in Table 1.6. The civil engineering sub-sector contributed the most to the gross output of the construction industry with a share of 28.9 percent (RM 28.0 billion) in 2013 as compared to 26.2 percent (RM 28.8 billion) in 2012. It was followed by the non-residential sub-sector, which recorded 27.0 percent (RM 35.4 billion) of gross output in 2013 as compared to 30.1 percent (RM 33.1 billion) in 2012.

Recently released report, shown in Table 1.7, indicated that in the third quarter of 2015, the highest percentage share was contributed by non-residential buildings sub-sector which recorded 34.5 percent. It was followed by civil engineering sub-sector (32.4 percent), residential buildings (28.5 percent), and special trades (4.6 percent). Thus, it can be concluded that civil engineering and non-residential sub-sectors were the main performers in the Malaysian construction industry.

Table 1.6 Contribution of Gross Output by the Construction Sub-sectors (2012 – 2013)

Sub-sector	Gross output			
	2012		2013	
	RM (billion)	%	RM (billion)	%
Residential	26.4	24.0	32.2	24.5
Non-residential	33.1	30.1	35.4	27.0
Civil engineering	28.8	26.2	38.0	28.9
Special trades	21.8	19.7	25.7	19.6
Total	110.1	100.0	131.3	100.0

Source: Department of Statistics Malaysia (2015)

Table 1.7 Value of the Construction Work Done by Sub-sectors (Q1 2014 – Q1 2015)

Quarter	Construction work done									
	Total		Residential		Non-residential		Civil engineering		Special trades	
	RM (million)	%	RM (million)	%	RM (million)	%	RM (million)	%	RM (million)	%
Q3/15	28,834	100.0	8,227	28.5	9,937	34.5	9,330	32.4	1,340	4.6
Q2/15	27,239	100.0	8,253	30.3	9,418	34.6	8,288	30.4	1,280	4.7
Q1/15	28,741	100.0	8,606	29.9	10,006	34.8	8,753	30.5	1,376	4.8
Q4/14	27,099	100.0	8,059	29.7	9,382	34.6	8,285	30.6	1,373	5.1
Q3/14	25,301	100.0	7,598	30.0	8,724	34.5	7,838	31.0	1,141	4.5

Source: Department of Statistics Malaysia (2015)

Furthermore, among the four major economic sectors, the construction industry was the third largest worker's employment behind the manufacturing industry and the agriculture industry. As shown in Table 1.8, the highest number of workers was employed by the manufacturing industry, which recorded 2,227,900 workers in 2012. It was followed by the agriculture industry (1,601,700), the construction industry (1,163,700), and the mining industry (80,600). While the other industries recorded fluctuates increment over the reported years, the contributions of the construction industry as a source of employment was constantly increased at an average of 3.4 percent per annum within 2005 – 2012.

Table 1.8 Labour Force by Various Industries (2005 – 2012)

Year	Labour force by industry							
	Agriculture ('000)	Growth (%)	Mining ('000)	Growth (%)	Manufacturing ('000)	Growth (%)	Construction ('000)	Growth (%)
2005	1,470.4	-1.2	36.1	4.0	1,989.3	-1.7	904.4	1.5
2006	1,503.5	2.2	42.0	16.3	2,082.8	4.7	908.9	0.5
2007	1,558.1	3.6	39.4	-6.2	1,977.3	-5.1	922.5	1.5
2008	1,487.7	-4.4	54.5	38.3	1,944.7	-1.6	998.0	8.2
2009	1,471.1	-1.1	62.7	15.0	1,807.1	-7.1	1,015.9	1.8
2010	1,614.9	9.8	57.2	-8.8	2,108.5	16.7	1,082.7	6.6
2011	1,410.0	-12.7	76.0	32.9	2,222.3	5.4	1,133.6	4.7
2012	1,601.7	13.6	80.6	6.0	2,227.9	0.2	1,163.7	2.7
Avg.	-	1.2	-	12.2	-	1.4	-	3.4

Source: Department of Statistics Malaysia (2015)

To this end, it is evidence that the construction industry has positively significant contribution to the nation's economic development, thus, the economic progress of every nation on the whole is linked heavily to the function of the construction industry. For that reason, the construction industry has becomes the key indicators and a driver of economic development of every nation. Consequently, the developments of the construction industry have become the national agenda of every nation's government which made the prospects of the construction industry are promising. Nevertheless, the construction industry still accounts for disproportionate business failure rate compared to other industries. Bear in mind that business failure in the construction industry is not only extremely destructive the industry, but may have caused significant rippling effects to the nation's economic development.

1.3 Problem Statement

It is evidence that the construction industry has a positive significant contribution to the Malaysian economic development. The Government of Malaysia through the roles of the CIDB has played the significant parts in developing the construction industry. It can be viewed through the introducing several major programs and policies such as the CIMP and CITP, aimed at strengthening the industry. It is appreciates the efforts initiated by the Government. However, those efforts are at the industry-level. In order to gainfully benefit from the industry, it is argued that strengthening the industry-wise must be parallel with reinforcing the construction enterprises organisational-wise because they are the key players of the industry. In other words, to give a maximum impact to the nation's economic growth, the construction industry must be performed in an effectively manner, both at the industry-level and organisation-level.

One means to accomplish this, which the current study means, is by providing a set of factors that could guide the construction enterprise in achieving successful business. Hofstrand (2010) asserted that successful entrepreneurs should have a detailed knowledge of the key factors needed for their success. These factors may represent themselves on a smaller scale within the organisational-wise. Nevertheless, on a large scale, they are affected the performance of the industry, and more importantly the overall national economic development. As a result, it is expected that the construction enterprises must consider those factors that might deliver a direct influence on their business objectives, and in turn affected the nation's economic growth as a whole.

Earlier conceptions of success in the construction industry had placed a great emphasis on the project-based success criteria because the fundamental elements of a construction business are dependent on the ability to deliver the project on schedule, within budget, and scope. Hence, the conception of success for a construction enterprise is typically framed by the successful achievement of the executed project from the viewpoint of the three fundamental elements, namely time, cost, and scope, and typically construed as project success. A construction enterprise is considered as a success if the executed project meets its completion date (time) or budget (budget) or if the end results conform to the original scope. These elements are critical to the success of construction enterprise since the outcomes of the capital projects typically have strategic implications on the success and profitability of the business (Farinde & Sillars, 2012; Jari & Bhangale, 2013).

However, in reality, depending solely on the project-based success criteria alone is seen insufficient to judge the overall success of the construction enterprise. These criteria only partially explain the actual success with only addresses the short-term goals of a business (Farinde & Sillars, 2012; Jari & Bhangale, 2013; Pankaj & Bangale, 2013; Nenni, Arnone, Boccardelli, & Napolitano, 2014). Yet, despite notable advances in the project-based management practices to improve the efficiency of individual projects, success still proves to be elusive in many construction companies (Mir & Pinnington, 2014), with business failures in the construction industry remaining consistently high compared to other industries (Raiz, 2014). It was reported that the construction enterprises represented the biggest percentage of failed businesses globally of 20.2 percent (Hirsh, 2015). Indeed, historically survival rates of companies in this industry are relatively low. As far back as the late 1980's, the United States Small Business Administration was reporting that whilst an average of 39.9 percent of new firms survived for 6 or more years, the highest survival rate was in the manufacturing industry (46.9 percent) and the lowest in the construction industry (35.3 percent) (Phillips & Kirchhoff, 1989). More recently, a study by Shane (2012) reported that of nine business sectors, the construction appeared to be the lowest survival rates with only 36.4 percent remain operating after five years started the business. The highest five year survival rates was the mining business (51.3 percent) with nearly 15.0 percent points higher than the construction business.

In the case of the Malaysian construction industry, it was reported that almost 17.3 percent of 417 government contract projects in Malaysia were classified as sick (more than three months of delay or abandoned) in 2005 (Sambasivan & Soon, 2007), of which the contractor factors being the major contribution problems (Othuman Mydin, Md. Sani, Agus Salim, & Mohamed Alias, 2014). Recently, the Housing Department of State, Malaysia (2015) reported that, as at 30 September 2015, a total of 155 housing projects were identified as abandoned (see Table 1.9). These projects are totalling of 26,934 units, comprising of 17,826 buyers. The majority of the abandoned projects occurred in Selangor (68 projects). It was followed by Perak (27 projects), Johor (16 projects), Kelantan (13 projects), Pahang (10 projects), Wilayah Persekutuan Kuala Lumpur (7 projects), Pulau Pinang (4 projects), Terengganu (3 projects), Negeri Sembilan (3 projects), and Kedah (3 projects). Melaka recorded three abandoned projects and none in Perlis.

Undoubtedly, these abandoned projects not only become a nightmare for the affected buyers or legal actions against the contractors which may face bankruptcy, but it also a burdensome social obligation for the Government to undertake. Thus, the Government has to take the responsible, and as a result, the public fund was utilised to rehabilitate the projects. As at 30 September 2015, a total of 24 abandoned projects have been rehabilitated by the Government consisting of 7,650 units and 5,444 of them have been sold (Housing Department of State Malaysia, 2015).

Table 1.9 Statistic of Abandoned Housing Projects in Peninsular Malaysia

State	Number of Projects	Number of Units	Number of Buyers
Johor	16	3,300	2,612
Kedah	3	1,031	752
Kelantan	13	1,009	689
Melaka	1	86	64
Negeri Sembilan	3	394	379
Pahang	10	961	601
Perak	27	2,784	2,158
Perlis	0	0	0
Pulau Pinang	4	589	287
Selangor	68	15,109	9,310
Terengganu	3	489	448
W.P. Kuala Lumpur	7	1,182	526
Total	155	26,934	17,826

Source: Housing Department of State Malaysia (2015)

The continuing high number of business failures in the construction industry, highlighted above, implies that the underlying success factors identified by previous research do not provide a full picture of the drivers of success (Garbharran, Govender, & Msani, 2012). It has led to the arguments that focus solely on project-based criteria to judge and drive the success of the construction enterprises only partially explains the success because they do not consider those company practices that influence success (Cooper & Kleinschmidt, 2007; Mir & Pinnington, 2014), and has reached the point of diminishing results (Chinowsky, Diekmann, & O'Brien, 2010).

To this end, it could be safe to conclude that earlier conceptions of success in the construction industry, both in academia and industry, placed a great emphasis on the project-based success criteria. Emphasising on this criterion has led to the vast efforts paid to grandiose the theory on project-based management practices to improve the efficiency of individual projects. Concurrent to this focus is a commensurate lack of emphasis being given to organisational and corporate issues, thereby limiting their effectiveness. As a result, the dominant attitude within the construction industry was that the long-term business planning related to the strategic management principles did not apply due to the transient nature of the industry (Kraft & Chinowsky, 2003). Contradictory, other industries have emphasised management practices for long time at a corporate level as an essential element of success (Boynton & Zmund, 1984). An exclusive focus on the project-based success criteria must be expanded to the corporate-based success criteria which related to the long-term success of the construction enterprises. As noted by de Waal (2012), short- and long-term focuses must be balanced to safeguard the long-term continuity of a business.

However, to be more effective, excellent management practices must be coupled with the adoption of the best business practices. Aniekwu and Igboanugo (2012) stressed the importance of adopting the best business practices that are conducive and combine with effectively used of available resources as a necessary condition to enhance business performance. In addition, businesses must also adopt practices which are adaptable and flexible that can differentiate from competitors (Li & Ling, 2012).

One facet of business behaviour adopted in most industry sectors outside construction sector that emphasises on the corporate issues to achieve success is that of entrepreneurship, with researchers highlighting the importance of entrepreneurial attitudes and behaviours for companies of all types and sizes in order to achieve long-term success and survival (Covin & Selvin, 1991; Lumpkin & Dess, 1996; Timmons, 1999; Wiklund & Shepherd, 2003; Antoncic & Hisrich, 2003; Kuratko, 2009; Kraus, 2013; Wong, 2014; Filser & Eggers, 2014). Indeed, Drucker (1985) warned that today's businesses whether small or large will not survive unless they acquire entrepreneurial mindsets. Thus, it is suggests that construction enterprises must adopted an entrepreneurial mindset as a vital requirement for the successful business.

Given the body of evidence, the current study presents an attempt to explore the success indicators for the construction enterprise by considering the gap in previous research. Ideally, identifying those indicators can help the construction enterprises achieve their intended goal with greater efficiency. Conceptually, exploring the success indicators must be aligned with the strategic management concept where exploration must be taking in place both short-term (project-level) and long-term (corporate-level) success objectives of the organisation. Theoretically, the current study focuses on the theoretical underpinnings the success indicators from the essential components of an entrepreneurship phenomenon. Entrepreneurship is considered as an important driving factor for the long-term business success and survival.

Therefore, the problem undertaken by the current study was that previously conducted research on the success factors in the construction industry have focused on the project-based success criteria without considering the long-term corporate objectives.

1.4 Research Questions

Developing a good research question is one of the first critical steps in conducting a research study. The research question, when suitably developed, will steer the research study and could assist in the generalisation of a logical argument. Therefore, the research question should be a clearly stated expression of interest and intent on the issue that the researcher aims to investigate (Salkind, 2009). As noted by Agee (2009), a clearly stated overarching question can give direction for the study purpose and assembling of information. It could also offer the potential for developing new, more specific questions during data collection and analysis.

Given the significance of the construction industry to the nation's economic growth and wealth creation, it is necessary to offer the construction enterprise with a set of reliable indicators that can help them to gain success and sustain competitive in their business. These indicators are expected to result in the success of their business. However, the success criteria need to be viewed as a multidimensional construct (Crook, Todd, Combs, Woehr, & Ketchen, 2011; Gorgievski, Ascalon, & Stephan, 2011; Islam, Khan, Obaidullah, & Alam, 2011), and therefore, must be assess using multiple indicators. The success indicators may also have resulted from the interrelationship among themselves. Thus, understanding how the indicators interact with one another and how the effectiveness of each indicator could have a profound effect on the understanding of the dynamic of the entrepreneurship phenomenon affecting the success of the construction business.

Identifying the indicators of success for the construction enterprise is the idea of the current research study. Grounded on this idea and to directed the data collection regarding the current issues under investigating, the following overarching research question was formulated:

What are the success indicators for entrepreneurs in the construction industry?

A broadly framed question can serve as a ground for initial and emerging sub-questions (Agee, 2009). To respond to this broad research question, four specific research questions (RQ) were developed to answer the overarching research question. Therefore, the specific research questions posed in the current study were:

RQ_1: What are the relevant indicators from the perspectives of an entrepreneurship phenomenon that can be employed to evaluate the success of the construction enterprise?

RQ_2: Which of the identified indicators is perceived to be important for the success of the construction enterprise?

RQ_3: How do the indicators impacted the success of the construction enterprise in term of causes and effects?

RQ_4: What checklist can be advocated to the success of the construction enterprise?

1.5 Research Significance

The body of knowledge that would be acquired in the current study is benefited in several ways:

(i) The study addressed an issue which has not been covered in the CEM literature that relates to the overall corporate success of the construction enterprise.

(ii) The study explored the success indicators for the construction enterprise that aligned with the strategic management concept where exploration taking in place both short-term (project-level) and long-term (corporate-level) success objectives of the organisation.

(iii) The study used the perspectives of an entrepreneurship phenomenon to address the overall corporate success of the construction enterprise which has not been explored in any previous studies.

(iv) The study is expected to provide new and significant research insights in which the success indicators for the construction enterprise could be assessed using the perspectives of an entrepreneurship phenomenon.

(v) From a research perspective, the study is expected to stimulate further interest in the CEM and entrepreneurship research.

1.6 Research Objectives

The primary objective of the current study was to explore the indicators of success for entrepreneurs in the construction industry from the perspectives of an entrepreneurship phenomenon. Specifically, to guide the research efforts, the following four research objectives (RO) were established:

RO_1: To identify the relevant indicators from the perspectives of an entrepreneurship phenomenon that can be employed to evaluate the success of the construction enterprise.

RO_2: To evaluate the identified indicators that perceived to be important for the success of the construction enterprise by using the modified Delphi method.

RO_3: To assess the impact of each important indicator to the success of the construction enterprise in term of causes and effects by using the DEMATEL technique.

RO_4: To develop a checklist that can be advocated to the success of the construction enterprise.

1.7 Nature of the Research

In addressing the overarching research question and the specified research questions, the current study adopted a mixed methods approach which typically associated with pragmatism paradigm. A pragmatic approach is problem-focused, rather than method-focused, and tends toward the real world, and practice-oriented research. The objective of the current study was to explore the indicators that could contribute to the success of the construction enterprises from the perspectives of an entrepreneurship phenomenon with practical implications. The utilised of these perspectives is a new aspect in the CEM literature and may result in a more complicated process that requiring advanced knowledge and experience of respondents. Then, the pragmatic paradigm through the applying of a mixed methods approach offered the best framework to explore the research questions. The pragmatic approach helps to provide grounding where the research avoids engaging in matters of insignificance rather than issues of truth and reality, as such in intuitively appealing (Creswell, 2009).

The current study involves two phases of research inquiry to generate a reliable list of the practical implications of the success indicators for the construction enterprises. Initially, a list of success indicators was compiled from an extensive literature review, in line with the stated problem statement, the research questions, and the research objectives. Then, the overall research design was developed. The modified Delphi method and the Decision Making Trial and Evaluation Laboratory (DEMATEL) technique found to be the best-suited research method to answer the research questions.

In the first phase, a qualitative inquiry was used to identify the indicators that are important for the success of the construction enterprises. In this stage, the construction industry practitioners were employed in an iterative consensus exercise known as a Delphi study to refine the list of indicators. This protocol lays out the methodology implemented in the consensus study. Then, the results of this stage were used in developing a comprehensive list of variables for the second phase of research inquiry. In this phase, a quantitative inquiry was established, aims to expand and validate the results of the first stage. It was managed through the use of the DEMATEL technique of which the results are analysed statistically to determine the interrelationships among those indicators.

Finally, based on the findings of the both phases, a checklist was developed and validated. It was aimed to guide the construction enterprise in monitoring their business toward an achievement of the long-term corporate success.

1.8 Operational Definitions

In order to provide clarity throughout the study, the operational definitions of terms are listed below. It was especially important for the terms with more than one meaning or that were vague in their application to the specified content.

(i) Business success – The ability of a commercial organisation to meet the overall corporate objectives (own thought).

(ii) Construction enterprise – All business entities involved in any aspect of the construction process within the Architecture, Engineering, and Construction (AEC) sectors including general contracting firms, specialist contractors, architectural and engineering design partnerships, cost consultancy practices, and development companies (Betts and Ofori, 1999).

(iii) Construction industry – Those comprising all new-build, refurbishment, repair, and maintenance activities, in both the public and private sectors (building, property development, infrastructure, civil engineering, *inter alia*), but excluding the materials supply industries (Thompson, Cox, & Anderson, 1998).

(iv) Constructionpreneur – An individual who organises and operates a construction business within the Architecture, Engineering, and Construction (AEC) sectors, with assuming risks in the business ventures (own thought).

(v) Constructionpreneurship – The processes by which construction enterprise involves in identifying risks, assemble management skills, organisational resources, technical capabilities, and strategies used to bear the risk and uncertainty, and to pursue opportunities within the construction industry (own thought).

(vi) Entrepreneur – An individual who takes initiative to bundle resources in innovative ways and is willing to bear the risk and/or uncertainty to act (Hisrich, Peters, & Shepherd, 2010).

(vii) Entrepreneurship – The creation of an innovative economic organisation (or network of organisations) for the purpose of gain or growth under conditions of risk and uncertainty (Dollinger, 2003).

1.9 Research Outline

Following this introductory chapter, Chapter 2 presents a literature review of the construction industry and entrepreneurship, and their relation to economic growth as well. It also discusses the current state of the success measures in the construction industry. It further demonstrates that a theoretical foundation exists for considering the success of the construction enterprise on the basis of the perspectives of an entrepreneurship phenomenon. It also includes the conceptual research framework, and discussion on research philosophical paradigms.

Chapter 3 details the overall research methodology used to conduct the current research study. It includes the justifications of research methodology adopted for the current study. Finally, discussions on the data inquiry techniques that consisted of the modified Delphi study and DEMATEL technique are presented.

Chapter 4 reports the overall findings of the current study associated with each phase of the data inquiry. It includes the analysis procedures and interpretations of the findings of both the modified Delphi study and DEMATEL technique.

Chapter 5 represents the discussions along the overall findings within the framework of the research questions underlying the study. Each of the findings is discussed, with comments on how builds on or deviates from the current literature and whether the findings appeared to be new contributions. The discussion is grounded in the findings of the modified Delphi study and DEMATEL technique.

Finally, Chapter 6 summarizes the findings of the research. It presents the general synthesis of the research study to address the status issues raised in the problem statement, and based on the research objectives. It also outlines the contribution of the current study, limitations, and recommendations for future research.

1.10 Chapter Summary

This chapter highlights the background of the problems encountered in the construction industry, which related to the construction business success. It also indicated that the project-based success criterion is seen insufficient to judge the overall success of construction business. The importance of shifting focus from short-term (project-level) to long-term (corporate-level) success objectives of the construction business has briefly discussed. The theoretical underpinnings success indicators from the perspectives of an entrepreneurship phenomenon that considered as driving factors for business success have also briefly stated. The problem statement has been outlined and justified by the significant of the research efforts. An overarching research question, research objective, the specific research questions, and research objectives had also stated. A brief methodology of the current study has been discussed. The operational definitions of terms used throughout the study have been provided. Finally, the outlined of the chapters included in this manuscript was also discussed.

CHAPTER 2

LITERATURE REVIEW

2.1 Preamble

This chapter will reviews the construction industry and entrepreneurship conceptualisations, and their relationship to the nation's economic growth. It will also demonstrates that a theoretical foundation exists for considering the indicators of success for entrepreneurs in the construction industry on the basis of four knowledge areas of an entrepreneurship phenomenon, namely entrepreneurial orientation, entrepreneurial organisation, entrepreneurial competency, and entrepreneurial environment. From a diversity of the perspectives, the success of construction entrepreneurs could be gauged from the perspectives of an entrepreneurship phenomenon.

2.2 Construction Industry

The construction industry is synonymous and has a profound impact on our daily lives. Apart from physical survival requirements, construction is one of the oldest, and most basic of human activities. It plays an important role in the design and creation of the world we live. The quality of our life relies in part of the products of the construction industry. Houses, office buildings, shops, factories, hospitals, schools and universities, roads and bridges, power plants, water and sewer lines, are among the examples of the vital products that provide shelter, water, power, and basic amenities for commerce, education, recreation, mobility, connectivity, and others.

Turk (2000) defined the term 'construction' as a series of 'works' with a proclaimed goal of resulting in a construction product. It encompasses the creation of physical infrastructure (roads, railways, harbours), other civil-engineering works (dams, irrigation projects, power plants), all building works (including housing and factory), and the maintenance and repair existing structures as well (Wells, 1984). Abdou (1996) offered a more comprehensive definition of construction. He viewed construction as a process governed by the complicated contracts and involving complex relationships in several tiers. The construction activities involved three functional entities such as the design, the development, and the construction of a project, all of which combined to make up a construction team. In this sense, first, there must be an owner or client with specific needs and resources to meet those needs. Second, a designer is required to articulate those needs in a technically competent way within the limits of the client's resources. Finally, there must be a constructor to articulate the project strategy with respects to time, cost, and budget, and to manage the construction life-cycles through to its successful completion.

The International Standard Industrial Classification of All Economic Activities provided definition of the construction industry based on the activities involves. It includes the construction of buildings, civil engineering, and specialized construction activities (United Nations, 2008). In the context of the Malaysian construction industry, the Malaysian Standard Industrial Classification adopted the above definition of the construction industry (Department of Statistics, 2008). However, for the purposes of the current study, the author follows the definition of Thompson, Cox, and Anderson (1998) as those comprising all new-build, refurbishment, repair, and maintenance activities, in both the public and private sectors (building, property development, infrastructure, civil engineering, *inter alia*), but excluding the materials supply industries.

2.3 Construction Industry and Economic Growth

The important of the construction activities have emerged since the beginning of civilisation. Humans constructed facilities to satisfy their demands of existence and to better service the needs of their community. The construction methods employed are based on the knowledge and experience of the daytime. Throughout the time, the construction methods and technologies have evolved rapidly. It could be traced from many different historical artefacts that remain intact until today.

The importance of the construction industry has significantly obvious, particularly during the Industrial Revolution. During this period, the industry has been associated with the process of industrialisation and urbanisation (Lopes, Nunes, & Baksa, 2011). For instance, the construction of railway systems and canals played a significant role in the connectedness of different parts of Europe, North America and in some regions of Latin America (Rostow, 1963). The construction industry has also likewise played an important role in the reconstruction of the war-ravaged Europe. It was claimed that during the Napoleonic Era in the early 1800s, Napoleon Bonaparte has successfully led more than fifty military campaigns, and hundreds of rebuilding efforts throughout Europe (Manas, 2006). The heavy programme of the construction activities in the rehabilitation of housing and social infrastructure was also a reflex of a better redistributive of the economic policy in Europe post World War II (Lopes, Nunes, & Baksa, 2011). The importance of the construction industry has also recognised in the context of the countries affected by natural hazards, for example, in the reconstruction of post-tsunami in Aceh and Sri Lanka (Kennedy, Ashmore, Babister, & Kelman, 2008).

It is incontestable that the construction activities comprise a critical component of any nation's economic (Tijhuis & Fellows, 2011). Ofori (2012) discussed several reasons concerning the importance of the construction industry as a key sector of every nation's economy. First, the national socio-economic development depends on the facilities for the production of all goods in the economy. It includes buildings, and other physical infrastructures which enabling goods and services distributed within and outside the country. The built items also offer social, and welfare benefits to the community. The housing, for instance, attempted to fulfil one of the most basic needs of citizens by providing protection and offers the chance to better their living standards. The industry is seen further to affect the ability of the country to attract foreign investment by providing all physical facilities required for business. Second, the construction industry constitutes a large part of the economy. The share of the industry in GDP, however, depends on the development level of the overall nation's economy. By looking at a sizeable proportion of most countries' GDP, the industry has potential to contribute directly to the growth of national economy. Third, the industry is considered as 'an economic regulator' or 'the balance wheel of the economy'. In this sense, governments normally handle a heavy portion of the investment in the construction industry. It includes schools, hospitals, airports and ports, roads and bridges, irrigation systems, water and power infrastructure and so on. Fourth, the construction industry has many complex linkages to other sectors of the economy such as manufacturing, materials supplier, transportations, financial services, professional services, and other related sectors, all of which are dependent on each other for survival. Fifth, the constructed built items are considered as the national's stock that represents a large proportion of its savings, and national wealth. Finally, the labour-intensive nature of the industry can also generate employment.

Wells (1985) described that all products of the construction industry regarded as 'investment goods' or a part of fixed capital formation, estimated between 40 to 60 percent of 'gross fixed capital formation' (GFCF) in every country. A higher rate of the investment (commonly more than 30 percent of GDP) is essential for rapid economic growth with the construction industry constitutes around 50 percent of the investment. However, whenever such growth occurs, it must accompany with a rapid expansion of activity in the construction sector (Wells, 1985).

Similar to other economic activities, the construction industry can contribute to the national economy by creating income or value-added. Ofori (1990) defined value-added as the sum of salaries and wages of employees, interest on borrowed capital, net rent, profit, and allowance for depreciation. The linkage between the value added by the construction industry as a part of GDP and per capita GDP has long been recognised. Among others, Turin (1969) and Strassman (1970) found a strong linear correlation between the logarithms of per capita value added by the construction industry and per capita GDP. Indeed, the share of value added by the construction industry as a percentage of GDP increased as per capita GDP increase.

In the developing countries, a study of Turin (1969) revealed that the share of the value added as a percentage of GDP was found to be around 3 to 5 percent of GDP for the period of 1955 to 1965. Meanwhile, in the developed countries, it was found to be around 5 to 8 percent of GDP for the same period. These results later were confirmed by many other studies such as those completed by Edmonds and Miles (1984), and Well (1984). However, according to Well (1984), it only explained a small part of the total construction process. Larger percentages of the total construction output consist of the intermediate outputs from other sectors of the economic systems, such as the building materials and service industries. It is estimated that from a variety of sources, the multiplier effect of the on-site construction activity was at two or two-and-a-half times the net of construction output. Hence, 'gross output' of the construction industry in the developing countries may as much as 14 percent of GDP.

The dynamic views of the construction industry in the national economy of the developing countries have been further examined by Lopes (1998). He established a model of interdependence between the construction sector in GDP and GDP per capita based on a long-term trend. Data on the construction and related economic sectors in the two economic series (1970 to 1980 and 1980 to most recent estimates), taken from 15 countries of Sub-Saharan Africa which represent the most recent development pattern of the regional group. By using the Construction Value Added (CVA) as the indicators for testing the model, he discovered a significant positive relationship between the share of the construction industry in GDP and the level of per capita national income.

Following the Catch-up Effect and Bon's Curve methodologies, Qifa (2013) analysed the relationship between GDP and the construction industry based on the data of United Kingdom (UK) and China. The results showed that the value and growth rate of the construction industry and GDP are highly interrelated. It was also found that the situation in China was similar to the UK, which dependent on the nature of the construction industry and its high investment multiplier.

In another study, Osei (2013) used the Engel-Granger Causality and Johansen Co-integration methodologies to estimate the econometric of the construction industry and its linkages to the economic growth in Ghana. The study found that the share of GDP of the construction sector was 9.1 percent, and 35.9 percent of the overall industrial output for the period of 1993 to 2011. These findings provided evidence that the construction activities promoted the economic growth in Ghana, and the relationship remains positive.

A recent study in Malaysia, Khan, Liew, and Ghazali (2014) examined the role and performance of the construction sector during the last two decades of 'Vision 2020' from year 1991 to year 2010. The results revealed a strong significant correlation between the construction sector and the economic growth of Malaysia. The study also found that the construction sector played a significant role in the aggregate economy of the country in term of its contribution to the revenue generation, capital formation, and employment creation. The study concluded that the construction industry ultimately supports the GDP and the socioeconomic development of Malaysia.

The nature of causal relationships between the construction industry and the national economic growth has also received considerable attention by many scholars. Sahoo and Dash (2009) investigated the role of physical infrastructure in the economic growth of India for the period 1970 to 2006. The overall results indicated that the infrastructure stocks, labour force, and total investment play a significant function in the economic growth in India. More importantly, they found that the infrastructure development in India has a more significant positive contribution to the economic growth than both the private and public investments. Further, the causality analysis showed a uni-directional causality from the infrastructure development to the output growth.

In Sri Lanka, Ramachandran, Rotimi, and Rameezdeen (2013) employed the Granger Causality test to investigate the direction of the causal relationship between the construction industry and the national economic growth. By using empirical information on the selected economic and the construction indicators for the period 1990 to 2009, the results revealed a uni-directional relationship, with the national economy inducing growth in the construction sector, and not *vice-versa*.

In the context of the Malaysian construction industry, Chia (2012) investigated the lead-lag relationships between the construction flow and the GDP. The study utilized data from the quarterly time series between 2000Q1 and 2009Q4, and the yearly time series between 1970 and 2009. By using Granger Causality methodology, the results found that the quarterly data showed a bi-directional relationship between the construction sector and the overall economy. On the other hand, the yearly data showed a uni-directional causality running from the construction sector to the aggregate economy.

In Indonesia, Wibowo (2013) developed a system model to examine the labour intensive and the equipment based construction methods. The results disclosed that the construction sector provides a positive significant contribution to the national and the local economy through the multiplier effects of job-generating ability for local people. Further results indicated that the contribution of the construction enterprises to the national economy can be classified as follows:

(i) A link from the contractor to the material supplier represents 40 percent of the total budget project for purchasing material.

(ii) A link from the contractor to the plant supplier constitutes 19 percent of the total budget project for equipment's renting.

(iii) A link from the contractor to the labour represents 33 percent of the total budget project for labour wages.

(iv) A link from the contractor to the government constitutes 10 percent of the total budget for paying government's tax.

From the above discussions, it could be drawn that there exists in literature a consensus on the investment in the construction industry impacted the growth of the nation's economy. However, the results of previous study on this topic provide contrasting views about the nature of the relationship. Some studies provided an evidence of the bi-directional relationship between the construction industry and the national economic growth. While other studies revealed the uni-directional relationship, with either the construction industry inducing growth in the national economy or the national economy inducing growth in the construction industry. Nevertheless, none of the studies reported negative relationship between the construction industry and the national economy. Indeed, the growth rate of the construction industry in the developing countries is more than GDP rate (Kargi, 2013). More importantly, these findings provided evidence of significant positive relationship between the construction industry and the national economy. The contrasting views about the nature of the relationship may be due to the differences in the economic policies and approaches among the reported countries.

In conclusion, the construction activities, whether in public or private sectors, appear to have either direct or indirect contribution to the nation's economic growth. The industry too has strong linkages with several other industries of the economy systems. Finally, the sizeable of the construction activities and it huge employments of labours are seen consistent with the classical approach in the growth theory where the physical capital formation is the main engine of the economic growth and development. Therefore, if the nation's economy to prosper, the construction industry must be developed in an effective manner. It must be able to confront the future challenges such as globalisation, high stakeholder's expectations, and the changing uncertainties in the construction technology (Ibrahim, Roy, Ahmed, & Imtiaz, 2010).

2.4 Entrepreneurship

Entrepreneurship is the most important aspect of the economic development in modern business history. The word entrepreneur is derived from the French 'entreprendre', meaning 'to undertake' (Kuratko & Hodgetts, 2004). Under this definition, an entrepreneur is one who undertakes to organise, manage, and assume risks of a business. In simplest term, entrepreneurship is a purposeful activity to initiate and develop a profit-oriented business.

Schumpeter (1934) was among the first to identify entrepreneur as an entity worthy of study, which distinct from the business owners and the managers. He described entrepreneurs as the individuals who carry out new combinations of means of production. For Schumpeter, this function was a mechanism for change and economic development. Kirzner (1973) depicted entrepreneurs as people who are alert enough to spot previously unseen profit opportunities and then act on it. However, in the recent years, entrepreneurs have been undertaking more activities, and therefore, broadened the definition.

Today, an entrepreneur is an innovator or a developer who recognizes and seizes opportunities into workable or marketable ideas. The opportunities could be derived from the value added through time, effort, money, or skills. It also includes assuming the risks of the competitive marketplace to put through these ideas and realizes rewards from the efforts (Stevenson & Gumpert, 1985). Timmons (1999) described entrepreneurship as an 'America's Secret Economic Weapon'. He observed that more than 95 percent of economic wealth in America today was made by the 'Entrepreneurial Generation' of revolutionaries since the 1980s. Further, he noted that one of every three household includes someone who has a primary role in a new emerging business.

However, there was no consensus among researchers about the descriptions and definitions of entrepreneurship, entrepreneurs, or their characteristics (Gartner, 1989), and concluded as remains elusive. The definitions have emphasized a broad range of activities including the creation of organisations, the exploration of opportunities, the bearing of uncertainty, and others. Entrepreneurship is seen further as a multi-faceted phenomenon that can view from different angle. Bolton and Thompson (2000) listed ten key action roles associated with entrepreneurs and entrepreneurship as follows:

(i) Entrepreneurs are individuals who make a significant difference.

(ii) Entrepreneurs are creative and innovative.

(iii) Entrepreneurs spot and exploit opportunities.

(iv) Entrepreneurs find the resources required to exploit opportunities.

(v) Entrepreneurs are good networkers.

(vi) Entrepreneurs are determined in the face of adversity.

(vii) Entrepreneurs are managing risk.

(viii) Entrepreneurs have control of the business.

(ix) Entrepreneurs put the customers first.

(x) Entrepreneurs create capital.

In other work, Wennekers and Thurik (1999) identified at least thirteen typological classifications of entrepreneur found in the economic literature as follows:

(i) The person who assumes the risk associated with uncertainty.

(ii) The supplier financial capital.

(iii) An innovator.

(iv) A decision maker.

(v) An industrial leader.

(vi) A manager or a superintendent.

(vii) An organiser and coordinator of economic resources.

(viii) The owner of an enterprise.

(ix) An employer of factors of production.

(x) A contractor.

(xi) An arbitrageur.

(xii) An allocator of resources among alternative uses.

(xiii) The person who realizes a start-up of a new business.

It is clear that previous literature underlying differences which lie in the views that are used to portray entrepreneurship. Moreover, there also exist some schools of thought that view the notion of entrepreneurship from fundamentally different perspectives. With such a variation in viewpoints, it is not surprising that a consensus has not reached about the definition of entrepreneurship.

2.5 Entrepreneurship and Economic Growth

The concept and significance of entrepreneurship to the economic growth have well studied previously. Literature has suggested that entrepreneurship plays a vital role in the modern economy. According to Wennekers and Thurik (1999), entrepreneurship is regarded as the ability and willingness of individuals, on their own, or in teams, to perceive and create the new economic opportunities.

Although entrepreneurship acts in pursuit of their profits, nevertheless, they may generate benefits to the broader society during the entrepreneurial processes. It can found through the introducing of technical ideas and innovations (Schumpeter, 1934; Baumol, 2002), and generating new employment (Biggs, 2002), all of which could generate the economic growth. In the recent work, Braumerhjelm, Acs, Audretsch, and Carlsson, (2010) introduced the knowledge spill-over theory of entrepreneurship that view entrepreneurship as one mechanism that links the knowledge to the commercialisation and the economic growth.

In reality, entrepreneurial activities do not only exist in the new small firms. It also existed in the largest organisations in the form of corporate entrepreneurship, where new ideas and responsibilities being implemented (Wennekers & Thurik, 1999). To be clearly understood, Wenneker and Thurik (1999) distinguished three different types of entrepreneurs that contribute to the economic growth, shown in Table 2.1.

Table 2.1 Three Types of Entrepreneurs

	Self-employed	Employee
Entrepreneurial	Schumpeterian entrepreneurs	Intrapreneurs
Managerial	Managerial business owners	Executive managers

Source: Wennekers and Thurik (1999)

As explained by Wennekers and Thurik (1999), Schumpeterian entrepreneurs are normally self-employed and can be found mostly in small firms. They own and direct independent firms that are innovative and creatively destroy existing market structures. Once identifying their goals, they often develop into managerial business owners, or they may again start new ventures or new firms. Intrapreneurs or sometimes called entrepreneurial managers are the persons who take commercial initiatives on behalf of their employer. They are risking their time, reputation and sometimes their job, and mostly they are embodiment of leadership resulting in entrepreneurial ventures in larger firms. Sometimes these entrepreneurial employees, either in teams or on their own, spin-off, start new enterprises and become Schumpeterian entrepreneurs. Thus, both Schumpeterian entrepreneurs and intrapreneurs belong to the core of real entrepreneurship and are viewed as the engine of innovation and 'creative destruction' (Schumpeter, 1996). Managerial business owners represent majority of self-employed. They are entrepreneurs in a formal sense and found in the large majority of small firms such as franchisees, shopkeepers, people in professional occupations, and others.

Most empirical studies on the link between entrepreneurship and economic development have similarly limited to the used by a neoclassical economic growth model where productivity and employment growth are the proxies for development. However, Gries and Naudé (2011) asserted that entrepreneurship can also view as multi-dimensional well-being by what people can attain through their capability. The central explanation lies in the fact that entrepreneurship represents a multifaceted phenomenon, being analysed as a process, a resource, or even as a state-of-being (Naudé, 2013).

Pšeničny (2002), cited in Pšeničny, Jakopin, Vukčević, and Čorić (2014), proposed three basic approaches in linking the essential of an interdisciplinary treatment of entrepreneurship to a socio-economic phenomenon of the twenty-first century as following:

(i) The economic aspect. From the macroeconomic and socioeconomic aspects, the contribution of entrepreneurship to the economic growth, employment, advanced stage of the nation's economy, and the prosperity of the society can be established, assess and measure. From the microeconomic point of view, the economic effects of individual entrepreneurial entities, their optimum size to achieve the expected return and the use of resources to achieve maximum effects, can be established:

(ii) The business-organisational aspect. The economic goals of an entrepreneurial organisation such as an enterprise or administer or manage the business functions are prerequisite for specialisation of entrepreneurship to achieve economic and socio-economic goals, can be assured.

(iii) The entrepreneurial management and entrepreneurial behaviour aspect. To a certain extent, what the entrepreneurial handling and conduct should able to apply the professional techniques and models, developed by the business and the organisational science. In this sense, the economic goals and non-economic goals are set by the entrepreneur and all other parties involve in the organisational relationship, can be clarified.

Previously conducted studies on the effect of entrepreneurship on the economic growth not limited to the urban areas or the developed countries only. Vázques-Rozas, Gómes, and Vieira (2010), for example, identified the importance of adding the local knowledge variables to the classical model of the economic growth of labour and capital in their study on the relationship between entrepreneurship and the economic development of regional level in Spanish and Portuguese. The results revealed a positive effect of entrepreneurship on the GDP growth for both per capita, and absolute value.

Baumgartner, Schulz, and Seidl (2013) developed a concept of entrepreneurship as the place-dependent local potential to examine its impact on the local economic performance of the rural territories in Switzerland. They applied three spatial random effects models (income tax per capita, share of employees, and welfare cases per inhabitant) in assessing short-to-medium-term impact of entrepreneurship on the economic performance of 1706 rural municipalities. In general, outcomes from both models revealed that the rural municipalities with the higher entrepreneurial potential correlate to the higher business tax revenues per capita and a lower share of the social welfare cases among the population. The overall results suggested a positive relationship between entrepreneurship and the local economic development, although the explanation of entrepreneurship was only moderate.

In the context of the developing countries, Warren (2011) expanded the neoclassical theory of the economic growth of labour and capital to include a measure of research and development. He then investigated the impact of entrepreneurship on economic growth by using secondary data collected from the Kenyan Business Registry covering over a 40 year period from 1968 to 2008. The correlation analysis revealed a very high correlation between the GDP and entrepreneurship ($r > 0.8$), indicated a strong positive linear relationship between the two. Further, the results of multiple regressions found a significant positive relationship between the GDP and entrepreneurship ($r^2 = 0.8974$), indicated that entrepreneurship was an important determinant of the economic growth.

Smith (2010) conducted an investigation of the position of entrepreneurship in the context of the economic growth. He employed a cross-sectional data set of 77 different countries for the year 2005. The regression analysis confirmed that entrepreneurship has a strong significant impact on the economic growth ($r^2 = 0.9167$), indicated by explanatory variables in the model explained 91.67% of the variation in the gross national income. In another study, Mrabet, Jebali, and Ellouze (2013) investigated the impact of entrepreneurship capital on economic performance at the macroeconomic level. They employed a secondary data on a sample of 16 countries of the Middle East and North Africa (MENA) region covering period from 1995 to 2009. The econometric results revealed that entrepreneurship capital, as assessed by start-up rate, positively affected and boosts the economic development.

The above discussions provided evidence on the roles and the importance of entrepreneurship to the nation's economic development. It was found that entrepreneurship and the economic development were intimately connected. Therefore, it can be concluded that entrepreneurship as a means to every nation's economic growth. For that reason, entrepreneurs are considered as the national assets that must be cultivated, motivated and remunerated to the greatest possible extent.

2.6 Construction Entrepreneurship

Entrepreneurship is a multifaceted phenomenon that cuts across many disciplinary boundaries (Low & MacMillan, 1988). Today, the boundaries of entrepreneurship have been expanded from 'individuals that creating a new venture' to a 'business concept to run an existing company and individual within that company' (Jennings & Lumpkin, 1989; Covin & Selvin, 1991; Lumpkin & Dess, 2001; Antoncic & Hisrich, 2003).

On the other hand, corporate entrepreneurship refers to the concept that focused on organisations, organisational culture, and processes rather than individuals (Cornwall & Perlman, 1990). It takes a holistic view of an organisation that infuses creative strategic processes throughout the organisation (Morris, Lewis, & Sexton, 1994). In the entrepreneurship literature, corporate entrepreneurship was characterised into three different types such as the creation of new businesses within an existing organisation, the transformation or renewal of existing organisations, and the changes of 'rules of competition' for its industry (Stopford & Baden-Fuller, 1994). However, each type has distinctive characteristics that need separate consideration. Therefore, it could be concluded that all business entities can be the entrepreneurial-driven corporations subjected to the corporate culture are guided and directed to create wealth (Kao, R.W.Y., Kao, R.R., & Jing, 2006).

Entrepreneurship literature assumes that an entrepreneur can anticipate and build a credible vision of his/her venture from the ability to recognise the business opportunity. In most cases, two series of parameters explain this ability, namely a willingness to bear uncertainty, and a specific cognitive abilities starting with alertness (Kirzner, 1973; Kao, R.W.Y., Kao, R.R., & Jing, 2006; Farmer, Yao, & Kung-

Mcintyre, 2011). In the context of the construction industry, the nature of the industry, which compounded with uncertainties are seen consistent with the entrepreneurship attributes. In other words, the nature of the industry demanded its entrepreneurs to be more willing to bear the uncertainty. They must also have more knowledgeable to overcome the difficulties resulted from the uncertainty than the non-construction entrepreneurs. Furthermore, alertness provides the construction entrepreneurs with the ability to detect and exploit early signs of changes in the marketplace, and then take necessary actions to suit the changes. Thus, they can take into account the potential impact of anticipated risks and problems, and then embedded into their business strategies.

In this view, the construction enterprise may require a host of entrepreneurial activities and competencies for the creating and capturing the economic value through the exploration and exploitation of the construction businesses. Hence, productivity and standards of achievement in the construction business can be improved through the entrepreneurial functions. Furthermore, the nature of the construction business that is very challenging has called for the business owner to work successfully in an environment that is frequently complex and compounded with uncertainties. This circumstance represents the activities of corporate entrepreneurship taking in place within the organisation (Setiawan, Erdogan, & Ogunlana, 2012).

However, the term 'entrepreneur' has different meanings in several ways in different contexts based on the business activities. Today, the terminology of entrepreneur has been widened up to more specific instead of the general term to includes terms such as technopreneur (Kamarudin & Sajilan, 2013), agropreneur (Halim, Alias, Hamid, & Zakaria, 2011), artrepreneur (Vijayshree & Hema, 2011), and others. Shane and Venkataraman (2004), for example, defined technopreneurship as processes by which entrepreneurs assemble the organisational resources and technical systems, and the strategies used by entrepreneurial firms to pursue opportunities. Halim, Alias, Hamid, and Zakaria (2011), on the other hand, referred agropreneurship as meaning of entrepreneurship that is practiced by farmers who desired to succeed in the farm business.

The uniqueness of the construction industry in sense that no two projects are exactly the same, has described the industry as an evolving the non-standardised nature of its end product. It against the steady state and standardised repetition processes in the manufacturing industry (Hillebrandt, 2000; Myers, 2013). Risk is another term that most frequently used to describe the characteristics of the construction industry. In this sense, the construction enterprise must deal not only with the uncertainties of the construction projects but may also deal with the uncertainties of the business environment. It may result in unfavourable effects such as cost overruns, schedule delays (Rahman, Memon, Karim, & Tarmizi, 2013; Subramani, Sruthi, & Kavitha, 2014), and fluctuation of the raw material price (Mao, Zhu, & Wang, 2013). Moreover, the construction industry is also characterised by highly competitive business environment where the players competing each other to secure the available projects in the marketplace. Thus, the construction industry has been plagued by all of these characteristics that have made differs from other industries.

To this end, it is evident that the construction enterprise can consider as an act of the corporate entrepreneurship. The author contends the need to more clearly differentiate between the challenges of corporate entrepreneurship within the construction enterprise compared to the non-construction enterprises. Thus, the author offers the term of 'constructionpreneur' and 'constructionpreneurship' for the first time to encapsulate the phenomenon of corporate entrepreneurship practising by entrepreneurs who desired success in the construction business.

The term of 'constructionpreneur' is a combination of the words of construction and entrepreneur. It refers to an individual who organises and operates a construction business within the Architecture, Engineering, and Construction (AEC) sectors, with assuming risks in the business ventures. On the other hand, the term of 'constructionpreneurship' is a combination of two words: construction, and preneur, which is a stand for entrepreneurship, to produce the term of 'constructionpreneurship'. It refers to the roles of entrepreneurial activities that can assist the constructionpreneur successful in the construction business both at the organisational-level and the project-level, specifically in the long-term corporate success. The term is aims to help both scholars and practitioners to distinguish the differences between corporate entrepreneurship in the construction industry than those in other industries. Thus, the author defines 'constructionpreneurship' as the processes by which construction enterprise involves in identifying risks, assemble management skills, organisational resources, technical capabilities, and strategies used to bear the risk and uncertainty, and to pursue opportunities within the construction industry. For remaining of this manuscript, this definition is used to define the construction entrepreneurship.

2.7 Entrepreneurship and Performance

Understanding the role of entrepreneurship on the business performance should begin with decomposition of the concept of entrepreneurship itself. There existed many definitions or concepts to describe entrepreneurship. Although those concepts have contributed greatly to the understanding of entrepreneurship, a universally accepted concept has not yet been established. Hence, previous studies have used different concepts of entrepreneurship, according to purpose of the study or the theory applied or/and the availability of the information needed for the study in hand. According to Naudé (2013), the evolution of scholarly views of entrepreneurship has evolved into three main categories. It refers to the behavioural definitions (Schumpeter, 1934, 1996; Kirzner, 1973), the occupational definitions (Evans & Jovanovic, 1989; Murphy, Schleifer, & Vishny, 1991), and the synthesis definitions (Gries & Naudé, 2011). Hence, entrepreneurship is regarded as a multi-dimensional constructs.

As earlier indicated, Pšeničny (2002), cited in Pšeničny, Jakopin, Vukčević, and Čorić (2014) suggested four basic approaches that could be used to measure the link between entrepreneurship and performance. It refers to the economic aspect, the business-organisational aspect, the entrepreneurial management aspect, and the entrepreneurial behaviour aspect. In light of these approaches, at least four knowledge areas of an entrepreneurship phenomenon have been identified from the entrepreneurship literature that could be used to justify the link between entrepreneurship and business performance. The identified knowledge areas are entrepreneurial orientation, entrepreneurial organisation, entrepreneurial competency, and entrepreneurial environment. Moreover, previous works have offered empirical evidence that justified the proposition that these areas lead to the superior organisational performance, and will discuss in the section below.

($r = 0.18$, $p < 0.001$). Furthermore, the study found that the constructive risk-taking rewarded with a higher average of performance. It also found that innovativeness increased the rewards to risk taking and that proactiveness often involved taking risks and therefore, indirectly affect the performance through its effect on risk taking. The study concluded that all the three dimensions of entrepreneurial orientation have a positive relation to performance, but for different reasons.

In a cross-sectoral study in various industries on 310 service firms in Austria, Kraus (2013) used the same three dimensions of entrepreneurial orientation, and revealed that entrepreneurial orientation is a highly significant predictor of the company performance ($\beta = 0.66$, $p < 0.001$). The effect of entrepreneurial orientation on performance during the economic downturn was also being studied. A study conducted within the UK service-sector by Chaston (2012), for example, provided empirical evidence of the advantages of adopting an entrepreneurial orientation to sustain business during the economic downtown. Indeed, it was reported that the effectiveness of relationship between entrepreneurial orientation and performance has increased over time (Wiklund, 1999; Madsen, 2007). Thus, it could be said that the effects of entrepreneurial orientation appear to be long-term and persistent.

2.7.2 Entrepreneurial Organisation

An entrepreneurial organisation is describes as a consciously coordinated social entity, with a relatively identifiable boundary, which functions on a relatively continuous basis to achieve a common goal or set of goals (Robbins & Mathew, 2009). It is seen as one that undertakes innovative activities to acquire distinguishing capabilities and abilities (Yeazdanshenas, 2014). Covin and Miles (1999) defined an entrepreneurial organisation as a strategic direction that includes renewing products, processes, services, strategies, or even the organisation as a whole. Thus, entrepreneurial organisation is considered as the most influential factor of firm's performance (Hunter, 2002).

In literature, amongst the most cited elements of entrepreneurial organisation are organisational structure and organisational culture (Ooshaksaraie, Asghari, Karajpur, & Teleghi, 2011; Janićijević, 2013; Mokua & Ngugi, 2013). According to

Janićijević (2013), organisational structure is an extrinsic factor that influences person's behaviour from outside through formal limitations set by division of labour, authority distribution, grouping of units, and coordination. On the other hand, organisational culture is an intrinsic factor of organisational behaviour. It could directed the way people behave in an organisation by determining assumptions, values, norms, and attitudes in which organizational members guide themselves in every action of the organisation. Furthermore, Janićijević (2013) hypothesised that organisational structure and organisational culture impact each other in the sense that there is a causal relationship between the two due to the agreement of the two components of the organisation leads to the better performance.

Bolman and Deal (2008) viewed that organisational structure acts as a blueprint for an organisation, which regards to officially sanctioned expectations and exchanges among internal players (such as executives, managers, and employees) and external constituencies (such as customers and clients). It is also regarded as 'anatomy of the organisation' (Dalton, Todor, Spendolini, Fielding, & Porter, 1980), and is considered as the formal framework within which work is divided, grouped, and coordinated (Coulter, 2003). An effective organisational structure is essential for any business organisation. The success of any strategy depends to a large extent on its fit with the organisational structure (Alam, 2011), because it is the only way that the formal roles and responsibilities are assigned and interconnected (McCabe, 2010). The assumption is that, if structure is appropriate, then all the processes and the relationships within the organisation will occur effectively.

Previous studies have provided some evidence on the link between organisational structure and entrepreneurship. An analysis of 133 respondents from 25 manufacturing companies in Iran, Ooshaksaraie, Asghari, Farajpur, and Teleghi (2011) revealed a significant positive relationship between organisational structure and organisational entrepreneurship (r = 0.654, p < 0.001). They also found a positive significant relationship between organic organisational structure (r = 0.441, p < 0.001), and mechanic organisational structure (r = 0.450, p < 0.001) with organisational entrepreneurship.

A study on 60 respondents of service industry in Kenya, Mokua and Ngugi (2013) found a significant positive correlation between organisational structure and corporate entrepreneurship (r = 0.5180, p < 0.05). The study concluded that an appropriate adoption of organisational structure could enhance the organisation's entrepreneurial activities which lead to the performance improvement. In another study, Csaszar (2012) tested a model of how organisational structure influences the organisational performance. Drawing upon the data from more than 150,000 stock-picking decisions made by 609 mutual funds, the results suggested that organisational structure has relevant and predictable effects on a wide range of the organisations.

In the context of the construction industry, Bresnen (1990) offered a scholarly discourse on the important of organising the construction organisation. He viewed that organisational structure as being interdependent upon combinations of external and internal variables, and plays a central role in the organisational structuring. The external factors such as resources, information, and specialisations are embodied in the terms and conditions of the contract. The internal factors combined with the external issues will guided the construction organisations operating in the competitive environments to tighten up the operational and administrative procedures. Firms operating in the hostile contractual environments may be seen to structure their project organisations to create buffers between the external environment and the projects.

A study by Shirazi, Langford, and Rowlinson, (1996) suggested that the complex environments of the construction project lead to the greater decentralisation of authority, mainly by the delegation. In the dimension of technology, for example, they found that complexity led to a wider use of liaison devices on the projects with a greater number of the functional technical specialists being used by the projects. As projects become more technically interdependent, then informality and flexibility are the principal mechanisms of the project control. Indeed, Chen and Lee (2007) denoted that organisational structure of a construction enterprise will affect the performance of specific projects.

Research in the construction industry has also shown the importance of the organisational structure in the context of the need for constantly deal with the changes in the operating environment. These changes and demands have induced a complex process of responses, requiring firms to manage their organisation flexibility to stay viable in the business environment. Indeed, a study by Shahu, Pundir, and Ganapathy (2012) in the construction projects found a high correlation between the project success and organisation flexibility. According to Lim, Ling, Ibbs, Raphael, and Ofori (2011), flexibility will improves the firms through the adaptive manoeuvring capacity that enables them to improvise and reconfigure their existing systems and processes promptly in response to the environmental changes. They viewed that construction organisational flexibility should be treated as a multidimensional concept, comprising operational flexibility, tactical flexibility, and strategic flexibility.

Culture is another aspect of entrepreneurial organisation. Hofstede (1994) defined organisational culture as collective programming of mind, which distinguishes members of one organisation from another. For entrepreneurial firm, culture is something that must be managed properly to allow firm to grow and innovate more effectively. It must be marketed internally to smooth the organisational development by sharing desired values and communicating a useful sense of leadership (Kao, 1991). In other words, organisational culture is about the image of an organisation and how it presents itself. The way how it perceived by its external environment and its internal members, commonly refer to as its 'corporate culture' (Deal & Kennedy, 1982). Having a good understanding of the company's persona as perceived by its members and the entities it deals with, is important to successfully manage a firm's organisational culture (Schein, 1984). The most important in managing the corporate culture is to allow entrepreneurial firm to grow and innovate more effectively (Kao, 1991).

An organisation's values, customs, traditions, and ways of doing things are largely due to past experienced and degree of success it has had with these, which reflects the beliefs, values, and vision of founders (Coulter, 2003). According to Tijhuis and Fellows (2012), the founders can develop the organisation's identity, both internally and externally, through influencing the staffs, and then shaping the values and behaviour of members of the organisation. Thus, organisational cultures should be developed through the necessity of maintaining effective and efficient working relationships amongst the organisational members and stakeholders.

The degree of corporate success enjoyed by an organisation can be viewed in term of the market and behavioural conditions (Porter, 1998). In this sense, it assumed that employees are entirely preoccupied with the group in the company that they belong, without distinguishing between their private and occupational lives (Kieser, 1995). They must have a clear sense of shared culture that enable to create social order, continuity, collective identity, commitment, and common vision while reducing the organisational uncertainties, resulting in the improvement of the organisational performance (Cameron & Quinn, 2006). Thus, organisational culture is judged by many as one of the key factors with regards to performance (Trice & Beyer, 1993; Cameron & Quinn, 1999), and was credited with the improvement of employee morale (Coolican & Jackson, 2002), linked to the long-term financial success and improved effectiveness of the organisations (Cameron & Ettingson, 1988; Denison, 1990), and created a competitive advantage (Bennis & Nanus, 1985). It was also seen as the caused for the merger and acquisition failure (Donahue, 2001).

The link between organisational culture and performance has also been explored in previous research. A survey in the UK, Ogbonna and Harris (2000) found that the innovative culture and the competitive culture positively linked to the operational performance with the total effects of 0.32 and 0.34, respectively. In a recent study, Turró, Urbano, and Peris-Ortiz, (2014) examined the moderating effect of cultural values on corporate entrepreneurship by using data from the Global Entrepreneurship Monitor database from year 2004 to 2008 of 62 different countries. There found that an entrepreneurial culture appeared to be positively significant and has a direct effect on corporate entrepreneurship ($\beta = 0.122, p < 0.001$).

In contrast, organisational culture is judged by many as one of the key factors of the construction industry performance. According to Oney-Yazic, Arditi, and Uwakweh, (2006), the dynamics of the construction business have become more dependent than ever on cultural characteristics of the construction companies. Sustained profitability and high financial returns were not enough for survival and successful in the highly competitive markets without an emphasising on the culture aspects because it is considerable evidence of conflicts and misunderstandings caused by cultural differences.

The effect of culture on conflicts which being one of the principal causes of poor project performance in construction has been pointed out by Ankrah and Langford (2005). They viewed that conflicts occurred at the interface level in one respect because participants have different objectives and different organisational cultures which define their approach to work and relationship with other project participants. Further, they asserted the importance of synergy and good 'project chemistry' with positive consequences for overall project performance.

Harinarian, Bornman, and Botha, (2013) employed the Organisational Culture Assessment Instrument (OCAI) developed by Cameron and Quinn (1999). They reported that market culture was the predominant organisational culture in the South Africa construction industry, follows by clan, hierarchy and adhocracy cultures. They concluded that understanding of their own and other firms' organisational culture could reduce the conflict and misunderstanding between stakeholders, and enable managers to reach business decisions that could improve competitiveness and create a more harmonious working environment.

In another study, Cheung, Wong, and Ana (2012) identified eight constructs of organisational culture identifiers and performance that have found in the literature. The constructs were goal clarity, coordination and integration, conflict resolution, employee participation, innovation orientation, performance emphasis, reward orientation, and team orientation. From the structural equation modelling the results confirmed that performance of the construction organisations is positively affected by their organisational cultures.

Among recent studies within the construction industry that link organisational culture with performance were related to international joint ventures (Yitmen, 2013), industry mentality (Cheung, Wong, & Wu, 2011), and trustworthiness and inter-project knowledge sharing (Wiewiora, Murphy, & Trigunarsyah, 2014).

2.7.3 Entrepreneurial Competency

In the dynamic capabilities approach, the competitive advantage of a firm lies with its management and organisational process, influenced by its specific asset position, and paths available to it (Shigang, 2012). The concept of competencies was first introduced in the late 1980s. Business strategists like Prahalad and Hamel (1990) advanced the idea of 'core competencies' as the design components of an organisation's competitive advantage based on the strategic operation viewpoint. They stressed that a company's competitiveness derived from its core competencies that constitute the collective learning in an organisation. Such core competencies are source of the competitive advantage that drives an organisation's ability to provide new products and services.

Capaldo, Iandoli, and Ponsiglione (2014) defined competency as the capability of an entrepreneurial organisation to acquire, use, and develop successful resources for its business purposes, in specific context in which the firm operates. It refers to the knowledge, skills, and attributes that differentiate the high performers from the average performers (Shippmann *et al.*, 2000). Many scholars believed that entrepreneurial competencies are important factors to the firm's performance and competitiveness (Man, Lau, & Chan, 2002; Shigang, 2012), and business success and growth (Mitchelmore & Rowley, 2010; Solesvik, 2012).

Research and practice linked to competencies are typically driven by the aspirations to achieve superior performance and potential for, in turn, economic gain or business success (Spencer, L.M. & Spencer, S.G., 1993). In other words, it involves behavioural aspects that contribute to the successful management and, ultimately, contribute to the business performance (Arditi, Gluch, & Holmdahl, 2013). According to Man, Lau, and Chan (2002), competent behaviour is a consequence of a variety factors such as personality traits, skills and knowledge. It can be viewed as the aggregate of the capabilities and abilities of entrepreneurs in performing the entrepreneurial role successfully, and mostly associated with birth, survival and growth of newly founded enterprises (Chandler & Hanks 1994; Chandler & Jansen 1992; Krueger, Reilly, & Carshud, 2000; Ma & Tan 2006; Wu, 2009). Jain (2011) hypothesised entrepreneurial competency as one of variables of entrepreneurial performance, and is viewed as a combination of entrepreneur's motives, and entrepreneur's attitude and personal characteristics, Some scholars suggested that entrepreneurial competency is needed to start a business (Wu, 2009), while managerial skills are needed to grow the business (Lerner & Almor, 2002), although competence in entrepreneurship requires competencies in the both areas. Contradictory, many previous studies have reported that majority of business failures are due to lack of management skills and competencies (Takim, Akintoye, & Kelly, 2004; Jena & Sahoo, 2014). Indeed, Bruno, Leidecker, & Harder, (1987) found lack of competencies in the areas of financial, marketing, and managerial were the three major reasons for unsuccessful business in the high-technology firms.

The ability to identify, obtain or create the marketplace along with the available opportunity and prerequisite of resources, is the basic assumption that entrepreneurial competency may have affected performance (Karra, Phillips, & Tracey, 2008). Many researchers have empirically explored the influence of entrepreneurial competency on business performance. Verle, Markič, Kodrič, and Zoran, (2014) viewed that competency can be measured from certain basic characteristics such as personal characteristics, motives, skills, knowledge, self-image, cognitive and social skill. However, previous research has shown that entrepreneurial competency vary in different contexts. In a meta-analysis of entrepreneurial competency, Man, Lau, and Chan (2002) identified six areas of competencies associated with firm's performance. These areas were opportunity competencies, relationship competencies, conceptual competencies, organising competencies, strategic competencies, and commitment competencies. In another study, Betonio (2014) found that time management skills, financial management skills, marketing management skills, and technical skills were the high competency areas that associated with firm's performance.

Drawing upon 450 respondents from Spanish entrepreneurs, Sánchez (2012) found that entrepreneurial competency appeared to have a direct impact on firm performance given that the chi-square for the relative performance, growth, and efficiency were 82.24, 107.43, and 99.47, respectively. Entrepreneurial competency of female entrepreneurs who committed to the growth of their business has also recently studied. Mitchelmore and Rowley, (2013) employed a principle factor analysis of data from 210 female entrepreneurs and revealed four primary clusters of competencies that related to the business growth. These include personal and relationship competencies, business and management competencies, entrepreneurial competencies, and human relations competencies.

In the context of the construction industry, Kivrak and Arslan (2008) examined the critical factors causing failure of the construction business through a survey among 40 small- to medium-sized Turkish construction companies. The study found that the most influential factors to the company failure are the lack of business skills and experience. These findings supported the view provided by Prahalad and Hamel (1990), and Swiercz and Spencer (1992) that entrepreneurs who have necessary competencies, such in area of operations, finance, marketing and human resources, and management skills that required for business, are more likely to be successful.

Shigang (2012) empirically investigated the link between core competency and performance of the Chinese construction SMEs. Drawing upon data from 121 construction enterprises, the results from a regression analysis revealed that entrepreneur capability ($\beta = 0.33, p < 0.01$), relationship marketing ($\beta = 0.31, p < 0.01$), and project management ($\beta = 0.26, p < 0.01$) were significantly positive relationship with the overall performance of the Chinese construction SMEs which measured by average sales and profit growth rates. Some other reported competency dimensions which link to the performance of the construction companies, include personal competencies (Othman & Jaafar, 2013), marketing competencies (Cristina, 2009), business and management competencies (Maes, Sels, & Roodhooft, 2005); and project management competencies (Omidvar, Samad, & Alias, 2012).

It is important to highlight that competency of an organisation can be categorised as either employee-level or organisation-level. According to Cardy and Selvarajan (2006), organisational-level competencies embedded in employee-level competencies. Employee-level competencies further divided into technical competencies and behavioural competencies. Technical competencies are such as job-related skills and knowledge, whereas behavioural competencies refer to personal attributes or characteristics. However, research on the role of entrepreneurial competency has recently moved from a focus on individuals to the teams and the firm as a whole. Rasmussen, Mosey, and Wright, (2011), for example, contributed to this strand of research by examining the development of entrepreneurial competencies of the teams in the high technology start-up firms.

In another study, Dimitratos, Liouka, and Young, (2014) empirically examined the firm-specific variables that constitute multinational enterprise subsidiary entrepreneurial competency. These studies contrast with prior research that focused on the individual-level. As such, the focus of the current study is on organisational-level competencies. As noted by Prahalad and Hamel (1990), core competencies are not the individual-level attributes, but at an organisational-level that drive an organisation's ability to change rapidly and innovate in response to the new and changing markets.

2.7.4 Entrepreneurial Environment

Entrepreneurship theory implies that the essence of entrepreneurship is ability to detect, and exploit opportunity in the marketplace (Kao, R.W.Y., Kao, R.R. and Jing, 2006; Kuratko, 2009). Entrepreneurial opportunities can be found from the environmental characteristics (Nikolina, 2008), regardless the industries the enterprise operates, despite the fact of offering products or services, whether it is profit or non-profit organisation, or a corporate or SMEs (Brakaj & Kume, 2013). An entrepreneurial environment or sometimes called as business environment is a combination of the external factors that play an important role in the entrepreneurship development, but beyond the influence and control of the organisation (Kaloo, 2010). Some examples of entrepreneurial environment dimensions highlighted in the literature are such as overall economic, political, financial, technological, and legal (Taormina & Lao, 2007; Voiculet, Belu, Parpandel, & Rizea, 2010).

The proportional importance of both entrepreneurial and success would appear to strongly influence by the environmental turbulence because it provides the foundation of the business activities such as processes, organisations, and strategies. The external circumstances that the organisations confront are likely to have important effects on the organisational outcomes (Donaldson, 2001). In this sense, the organisations must adapt to their environment if they are to remain survival. Thus, firm's external environment needs to be taken into account when considering the relationship between corporate entrepreneurship and firm performance (Covin & Slevin, 1991; Zahra, 1993).

Previous studies have suggested that the external environment influenced the entrepreneurial activity (Antoncic & Hisrich, 2001), and the entrepreneurial choice (Giannetti & Simonov, 2004). Environmental forces also being seen as the influence factors of the organisational structures and decision-making that influence success (Andrews & Johansen, 2012). It is considered as the key factor causing the difficulty to achieve the management goals (Drucker, 2009).

For purpose of the operationalisation and measurement, a distinction should be made between the internal and external environments. Duncan (1972) distinguished the two in which the internal environment is all those internal forces operating within the organisation. It includes the company's objectives and goals, the nature of organisation's products and services, the communication processes and networks within the organisation, and the educational background of employees. On the other hand, the external environment is those things outside the company such as customers, competitors, suppliers, governments, and trade unions, and others. In the case of the current study, the term of environment is referred to the external environment.

The link between entrepreneurial environment and performance has been previously studied in some details. A study by Taormina and Lao (2007) on 337 Chinese respondents found that the business environment was significant predictors for the successful entrepreneurs. Andrews and Johansen (2012) examined linear and nonlinear effects of different dimensions of the business environment of over 500 organisations using both objective and subjective measures of environment. They found strong evidence on the presence of the linear relationships between each environmental dimension, type of measurement, and performance, but no evidence of statistically significant nonlinear environmental effects.

Alkali and Isa (2012) conducted an empirical study to assess the influence of the external environment on business performance in Nigeria. Drawing upon 302 respondents from the manufacturing enterprises, they revealed that the external environment, measured by capital access ($\beta = 0.03$, $p < 0.05$), and government support

(β = 0.00, p < 0.05), were positively significant to the business performance. The moderating role of external environment on business performance was also tested in the previous study. For example, Jabeen and Mahmood (2014) investigated the moderating role of external environment on the relationship between entrepreneurial orientation and business performance of 220 SMEs in Pakistan. The results from hierarchical regression analysis revealed that the moderating effect of external environment on entrepreneurial orientation and business performance was positively significant ($\beta = 0.159$, $t = 2.437$, $p < 0.01$).

In addition, previous literature has also been reported the role of external environment that link to performance in the context of the prospects for success (Andrews & Johansen, 2012), motivation (Fereidouni, 2010), foreign direct investment inflows (Kuzmišin & Šišková, 2013), and growth and competitiveness (Kaloo, 2010).

In the context of the construction industry, each of the factors and components related to external environment must be treated as highly important due to the fact that the construction enterprises are critically exposed to its environment. The nature of the construction industry has made the construction enterprises facing more of an uncertain external environment. According to Mao, Zhu, & Wang, (2013), the vital effect of the external environment uncertainties on the construction enterprises was squeezing the profit due to several factors such as excessively low price bidding for the engineering projects, drastically fluctuation of the raw material price, low entry barrier and very high entry cost, and fierce entry of the foreign construction enterprise, all of which make the industry more competitive.

In a recent study, Akanni, Oke, and Akpomiemie, (2015) investigated the impact of environmental factors in the building project performance in the Delta State, Nigeria. They evaluated the project performance by time-overruns and cost-overruns, and environmental factors by clusters of political, legal, building technologies and resources, economic and financial, and socio-cultural and physical. Drawing upon data from a sample of 32 clients and 43 professionals, the Spearman Correlation analysis showed that clusters of economic and financial ($p = 0.004$) and political ($p = 0.11$) have a significant relationship with time overruns. Whereby, socio-cultural and physical has a significant relationship with cost-overruns ($p = 0.007$). These findings have offered evidence on the existence of positive relationship between the external environment and project performance. Within the Malaysian construction industry, Bakar, Tabassi, Razak, and Yusof (2012) conducted a study to investigate the link between environmental factors and firm's growth. The results revealed that forming joint ventures, availability of financial resources, open economic policy, government assistant, political stability and peaceful environment were amongst the key factors associated with the firm's growth (RII = 0.7976).

2.8 Defining Business Success

There existed different views about what constitutes a successful business since success is intangible and hardly agree upon. In the most basic way, success can be defined as the company's ability to survive (Lussier & Pfiefer, 2001; Stefanovic, Prokic, & Rankovic, 2010). In the organisational literature, the most consensus appears with regard to the concept of success is a goal achievement (Mahoney, 1967), which related to the profit maximisation (Keown, Martin, Petty, & and Scott, 2005). However, the changing roles of doing business have created a renewed conversation regarding what constitutes a successful business.

To define what constitutes as a successful business, one must first recognize what the business and the success are. Tennent (2014) referred a business as 'a commercial operation that provides products or services with aimed of making a profit for benefit of its owners'. This definition poses two questions: what is a commercial operation, and what is profit? Tennent (2014) further elaborated these two as follows:

(i) A commercial operation is an activity conducted for benefit of its owners.

(ii) A profit is a trading surplus whereby revenues earned the costs. This surplus belongs to the owners of business to use as they choose whether to take for themselves or to reinvest back in business, or a mixture of the two.

On the other hand, the Oxford English Dictionary (2006) defined the success as achieve an aim or purpose' and 'gain wealth or status'. Within these definitions, uccess can be judged by 'the ability to meet predetermined objectives of gaining wealth or status'. In the context of the business entities, success represents the ultimate goal of the business endeavours, and often emblematic of main objective of an organisation.

Thus, the business success can be defined as the ability of a commercial organisation to meet the overall corporate objectives. This concept of business success, while valid, merely recasts the search for the success criteria into a search for the organisational goals. It should be viewed from the different perspectives of the individuals and goals which related to the various elements (Gudienė, Ramelytė, & Banaitis, 2013). Padachi (2010), for example, categorised the main factors that contribute to the success or failure of a business as the internal and external factors. The internal factors are such as the managerial skills, workforce, accounting systems and financial management practices. The external factors are factors such as the availability of attractive financing, economic conditions, competition, government regulations, technology and others environmental factors. Islam, Khan, Obaidullah, and Alam (2011) viewed that at least two significant dimensions of success could be used in measuring the organisation performance, namely financial versus other success, and short-term versus long-term success. It includes the multiple criteria of financial and non-financial dimensions (Crook, Todd, Combs, Woehr, & Ketchen, 2011; Gorgievski, Ascalon, & Stephan, 2011). Hence, business success is a consequence of a complex process and is rarely dependent on a single factor. It could be seen as a multidimensional phenomenon that should be assessed using the multiple success indicators. Thus, the success measures must emphasize on the macro or holistic picture of a business, rather than the micro or metric focussed (Mbugua, Harris, Holt, & Olomolaiye, 1999).

2.9 Conceptions of Success in the Construction Industry

Achieving success has been the ultimate goal of every business endeavour. Hence, understanding the drivers of success is critical for any company to success and survival in today's competitive business environments (Gadekar & Pimplikar, 2013; Gudienė, Ramelytė, & Banaitis, 2013). However, in the construction industry, diversity and complexity of the industry itself makes it difficult to derive appropriate strategies to ensure the drivers are in place (Abraham, 2004).

The fundamental elements of a construction business are dependent on the ability to deliver the projects on schedule, within budget, and scope. Hence, the conceptions of success in the construction industry is typically framed by the successful achievement of the executed project from the viewpoint of three major goals of time, cost, and scope, and often construed as project success. A construction enterprise may consider as a success if the executed project meets the three predetermined goals of completion date (time), within budget (cost), and if the end results conform to the original specifications (scope) (Chan, Scott, & Lam, 2002). These factors are seen as being relatively easy to measure and within realm of an organisation (Abd-Hamid, 2011). Moreover, they are critical to the success of the construction enterprises since project performance typically have a strategic implication on the success and profitability of the business (Farinde & Sillars, 2012; Jari & Bhangale, 2013). Emphasizing on this evaluation concept has led to an intense focus to improve performance of the individual projects, resulted in many types of research have been conducted at project-level (Elwakil *et al.*, 2009). Those studies basically focused on outcomes of the construction projects from viewpoint of the traditional triple constraint of project management where cost, time, and scope play a major role in determining success.

Over the time, some researchers realised by considering the traditional triple constraint factors as solely indicators of success was not a real picture of success should be. Consequence, a number of studies have suggested the success factors beyond the triple constraint factors. Lim and Mohamed (1999), for example, looked at the project-based success criteria through the micro and macro viewpoints. The micro criteria included time, cost, quality, performance, and safety. Whereas, the macro criteria included those micro criteria together with the actual benefit that project's bring in the operation phase. Nguyen, Ogunlana, and Lan (2004) introduced the so-called four COMs of comfort, competence, commitment, and communication as factors for the successfully handling of the large construction projects in Vietnam. Yong and Mustaffa (2013) found significance of the human-related factors such as competence, commitment, communication and cooperation towards the successful construction projects in Malaysia.

As a time goes on, researchers have expanded the success factors and judged the performance of individual projects from the lenses such as health and safety (Al Haadir & Panuwatwanich, 2011), sustainability (Shen, Tam, V.W.Y., Tam, L. & Ji, 2010; Zhao, Z-Y., Zhao, X., Davidson, & Zuo, 2012), project's personnel competencies (Gunderson & Gloeckner, 2011; Gudienė, Banaitis, Podvecko, & Banaitienė, 2014), risk management (Zeynalian, Trigunarsyah, & Ronagh, 2013; Zhao, Hwang, & Low, 2013), compliance with rules and regulations (Tabish & Jha, 2011), managerial competencies (Arditi, Gluch, & Holmdahl, 2013), multi-firm satisfaction (Lehtiranta, Kärnä, Junnonen, & Julin, 2012), and others.

Although those studies have identified some significant and consistent results, nevertheless, depending on the project-based success criteria alone is seen insufficient to judge the overall success of the construction enterprise. These criteria only partially explain the actual success with only addresses short-term goals of a business (Farinde & Sillars, 2012; Jari & Bhangale, 2013; Pankaj & Bangale, 2013; Nenni, Arnone, Boccardelli, & Napolitano, 2014). Yet, despite notable advances in the project-related management practices to improve efficiency of the individual projects, success still proves to be elusive in many construction companies (Mir & Pinnington, 2014). It has led to the argument that research conducted at the project-level often fails to justify the actual success factors, since they do not include those company practices that influence success (Cooper & Kleinschmidt, 2007; Mir & Pinnington, 2014), and has reached the point of diminishing results (Chinowsky, Diekmann, & O'Brien, 2010). Thus, the questions arise, what are the actual factors for success in the construction business? What criteria are appropriate for assessing those factors?

Although it is hard to distinguish the project-based success criteria from the organisation success, however, in reality, survival of a construction business could not be achieved from the achievement of the individual project alone. The success of one project could not directly lead to the survival of another project or even the company as a whole. A simple explanation of this notation is that; if our children excellence in their education, what is the actual factors that contributed to their outstanding performance? Do their efforts are solely factors contributed to the success? How about the parent or teachers or school or even the overall education systems contribution factors? Logically, all these factors must have some contribution to the success of our children.

Thus, a successful landscape of a business could not build without the efficiency of the system as a whole. In practice, the question of success must be expanded beyond the confines of an individual project to include the capabilities of the construction organisation as a whole to deliver such projects successfully. Elwakil *et al.* (2009) stressed that achieving success should be based on many factors which have a direct effect on the performance of organisations as a whole.

It cannot be discounted that success of the construction business results from the integration of the management of the project and the management of the organisation itself, since the project and the organisation holds a mirror effect on the overall performance (Setiawan, Erdogan, & Ogunlana, 2012). Zavadskas, Vilutienė, & Šaparauskas, (2014) emphasised the need to balance the project-level and the organization-level in the construction business. They viewed that the success of a project as a temporary organisation is affected by the resources and effectiveness of the corporate organisation, or *vice-versa*. Thus, it must take into account both the short-term objectives (project-level) and the long-term objectives (corporate-level). It is clear that a successful landscape of the construction business could not build without the efficiency of a system as a whole. It could be safe to conclude that the success of the construction business is determined by its corporate effectiveness, and success criteria must be based on both the project- and organisational-based factors.

The introducing of the new methods of construction, new technologies, and new approaches to conducting business has increased the complexities of the construction industry, hence, created a renewed conversation regarding what constitutes a successful business. As noted by Chattopadhyay and Mo (2010), the construction enterprises are much more vulnerable to harsh business climate as of today and near future. These circumstances have resulted in the project-based success criteria are seen insufficient to judge the overall success of the construction business. Although projects have been acknowledged as vital to the success of any project-oriented organisation, however, it actually contributes partially to the overall success of organisation (Nenni, Arnone, Boccardelli, & Napolitano, 2014). Thus, the present measures of success in the construction industry must be extended from the project-based criteria to the long-term overall corporate objectives. It has called the need for the construction enterprise to learn how to better position by ensuring the organisation competitive in all its functions to achieve the long-term business success. Raiz (2014) highlighted the need to over-emphasise rather than under-emphasise importance of the business skills required to run a successful and sustainable construction business.

Moreover, the changing of the economic world has reflects a resurgence of interest on the importance of corporate management to the success of the construction enterprise as proven by others bodies of knowledge outside the CEM. Naoum (2001) stressed that the success or failure of any organisation depends on clarity of its operation and objective, quality of people employed, availability of resources, appropriateness of structure, and management system adopted. Thus, a better understanding of the organisation which refers to its key operations and the critical business function, are necessary to enhance the organisational performance (Sawalha, 2013). In a similar vein, Deng and Smyth (2013) considered that the organisational performance is a consequence of the fit between a set of contingencies, namely structure, people, technology, strategy, and culture. Therefore, the first step in evaluating the overall success is to understand the organisation itself, includes understanding of how it functions, how it structured, and what it emphasises (Heerwagen, Kampschroer, Kelly, & Powell, 2015).

However, the corporate issues have gained very limited interests in the construction industry. It is less surprising because of its project-based nature and such highly competitive environments typically overlook the opportunities to improve an industry's performance and give rise to the problems in project control (Dorée, 2004). Most of activities in the construction industry involve a large number of conflicting areas which hinder the management aspects as a whole (Jato-Espino, Castillo-Lopez, Rodriguez-Hernandez, & Canteras-Jordana, 2014). Moreover, the construction industry is plagued with prevailing attitude that related to the constantly changing nature of the business, resulted in the difficulty to apply the strategic business management concept and the long-term business planning to the industry (Kraft & Chinowsky, 2003; Abraham, 2004). Therefore, the construction enterprises must have to better positioning themselves by ensuring all facets of their business functions remain competitive in order to achieve the long-term business success without ignoring the short-term goals. The construction enterprise must also be willing to change and continuously improve its competitiveness in all its business functions. Thus, it is necessary to adopt the business practices that are conducive to, and combine with, the effective utilisation of all available resources (Aniekwu & Igboanugo, 2012).

Synthesising the above discourses, it is clear that the success in the construction industry is beyond the project-based criteria. A successful landscape of the construction business could not be built without efficiency of the organisation as a whole. An emphasis on the project-based success criteria should be extended to the overall corporate success in order for the construction enterprise to achieve the long-term continuity of the business. In this regards, the construction enterprises must focus on attainment of the long-term corporate objectives without ignoring the short-term objectives if they intend to remain success and survival in the current fiercely business environment. In addition, they must also consider the new roles of doing business which proven it effectiveness in achieving the long-term success objectives.

2.10 Success in the Construction Industry from an Entrepreneurship Perspective

Today's businesses are experiencing a new age of competition that emphasizes on the strategic thinking which related to the corporate strategy, systems and business processes (Mbugua, Harris, Holt, & Olomolaiye, 1999). It has called the need to adopt the best business practices that are adaptable and flexible which can differentiate from the competitors (Li & Ling, 2012). One facet of business behaviour adopted in most industry sectors outside the construction sector to achieve success is that of entrepreneurship, with researchers highlighting that entrepreneurship is an important driving factor to achieve the long-term business success and survival (Covin & Selvin, 1991; Lumpkin & Dess, 1996; Timmons, 1999; Wiklund & Shepherd, 2003; Antoncic & Hisrich, 2003; Kuratko, 2009; Kraus, 2013; Wong, 2014; Filser & Eggers, 2014). Many businesses outside the construction industry are increasingly attempting to foster entrepreneurship in order to explore and exploit the business opportunities (Kraus, 2013; Vecchiarini & Mussolino, 2013). Within this approach, it is argued that the construction enterprise must adopt entrepreneurial mindsets as a vital requirement for the successful business.

The need for all businesses to adapt entrepreneurship-type behaviours when formulating their strategies have become recognised in the academic literature (see, for examples, Dess & Lumpkin, 2005; Hitt, 2005; Kraus, 2013). In other words, it is necessary for every construction enterprise to continually developing, acquiring, and adapting new business methodologies that proven effective and efficient. The construction enterprise is in peril of collapse (Garzón & Pellicer, 2009), and will be out of business within a few years (Merrified, 1993), if they fail to embrace those changes. These circumstances highlighted the need for the entrepreneurial-oriented construction enterprise.

Drawing upon the existing theories on the link between entrepreneurship and performance, the author developed a theory by identifying four knowledge areas that could contribute to the constructionpreneurial business success. The four knowledge areas are entrepreneurial orientation, entrepreneurial organisation, entrepreneurial competency, and entrepreneurial environment. To clearly distinguish between corporate entrepreneurship within the construction business compared to the non-construction businesses, the term constructionpreneurial orientation, constructionpreneurial organisation, constructionpreneurial competency, and constructionpreneurial environment is utilised. It respectively substitutes the term entrepreneurial orientation, entrepreneurial organisation, entrepreneurial competency, and entrepreneurial environment. The important of these knowledge areas to the construction business can be viewed from the following perspectives.

First, the nature of the construction businesses with compounded with highly competitive and uncertainties have demanded the construction enterprise to focus on the constructionpreneurial orientation. In this focus, the success of the construction enterprise is influenced by the constructionpreneurial orientation because it will guide the operational basis of entrepreneurial decisions and actions. Furthermore, it refers to the entrepreneurial strategy-building processes that the construction enterprise must own to attain a competitive advantage (Vecchiarini & Mussolino, 2013).

Second, success cannot be achieved without an appropriate constructionpreneurial organisation. Organisation provides the fundamental for strategic direction to achieve a common goal or set of goals (Robbins & Mathew, 2009). In this sense, the construction enterprises must adapt appropriate organisational structure and culture because effectiveness of any strategy can only be achieved if it fit with these elements. The assumption is that, if the organisational structure and organisational culture are appropriate, then all processes and relationships within the organisation will occur effectively. Thus, the constructionpreneurial organisation could be seen as the factor that enables the successful of the construction enterprise.

Third, the constructionpreneurial competency is another aspect that the construction enterprises must consider. It is about the capability of the construction organisations to acquire, use, and develop successful resources for the business purposes (Capaldo, Iandoli, & Ponsiglione, 2014). For instance, project management competencies are very important in the implementation stage of a project's life-cycle. In this sense, the constructionpreneurial competency is considered as the driving factor of the successful construction enterprise.

Finally, the construction enterprises must aggressively scan their external environment to discover and exploit any opportunities available in the marketplace (Kuratko, 2009). Environmental turbulence is seen further to strongly influence the business activities include processes, systems, and strategies. In the context of the Malaysian construction industry, for example, the construction enterprise can take advantage of the availability of the new policies and development plans that introduced by the Government. For example, those included in recently launched 11th Malaysia Plan, and set a strategy to acquire the available opportunities. Therefore, the construction enterprises must suit their strategies accordingly to its external environment. In this regards, the constructionpreneurial environment is considered to have a significant contribution to the success in the construction business in such that the success of the construction enterprise is supported by the opportunities brought by the constructionpreneurial environment.

Granted the importance of these elements to the business performance, the author contended that the successful business in the construction can be achieve from the integration of the said theory as shown in Figure 2.1.

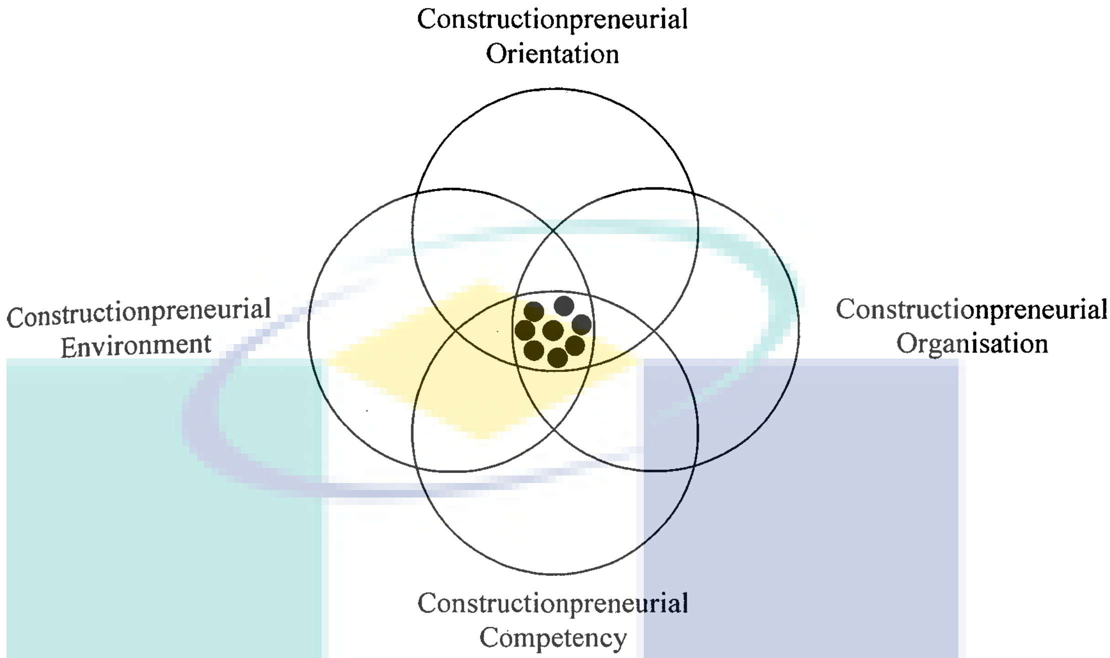

Figure 2.1 Relevant knowledge domains for the success of construction enterprise from the perspectives of an entrepreneurship phenomenon.

In synthesising the above discussions, and the evidence found in previous literature, the current study filled the gap in the construction engineering management (CEM) literature in several ways such as:

i) Against the earlier conceptions of success in the construction industry where focus have been given on project-based success criteria, this study explored the success factors for the construction enterprise that aligned with the concept of strategic management where exploration taking in place both short-term objectives at project-level and long-term objective at corporate-level. Thus, it could consider to fills the gap in the CEM literature.

ii) This study used different measures of success, that is, from the perspectives of an entrepreneurship phenomenon. No previous studies found in the CEM literature using the entrepreneurship perspectives to explore the success factors in the construction industry, thus, fillings the gap in the CEM and entrepreneurship literature.

(iii) Although the construction industry and entrepreneurship are considered as the fuel for economic growth, nevertheless the CEM and entrepreneurship literature have evolved separately with little cross-fertilization. Thus, this study could bridge the gap between the two bodies of knowledge.

2.11 Conceptual Research Framework

Cooper and Schindler (2009) defined a model as a representation of a system. It involves specifying relationships amongst variables (Zikmund, 2003). Drawing upon the existing theories found in the entrepreneurship literature as previously discussed in Section 2.10, a conceptual research model was developed to answer the overarching research questions underlying the current study.

The following Figure 2.2 illustrated the conceptual research model which shown the predictors of construction business success. It consists of four broad perspectives of an entrepreneurship phenomenon, namely entrepreneurial orientation, entrepreneurial organisation, entrepreneurial competency, and entrepreneurial environment. To iterate, the current study used the terms of constructionpreneurial orientation, constructionpreneurial organisation, constructionpreneurial competency, and constructionpreneurial environment. It aimed to distinguish the differences between corporate entrepreneurs that practice in the construction industry and those in other industries, as previously discussed in Section 2.6.

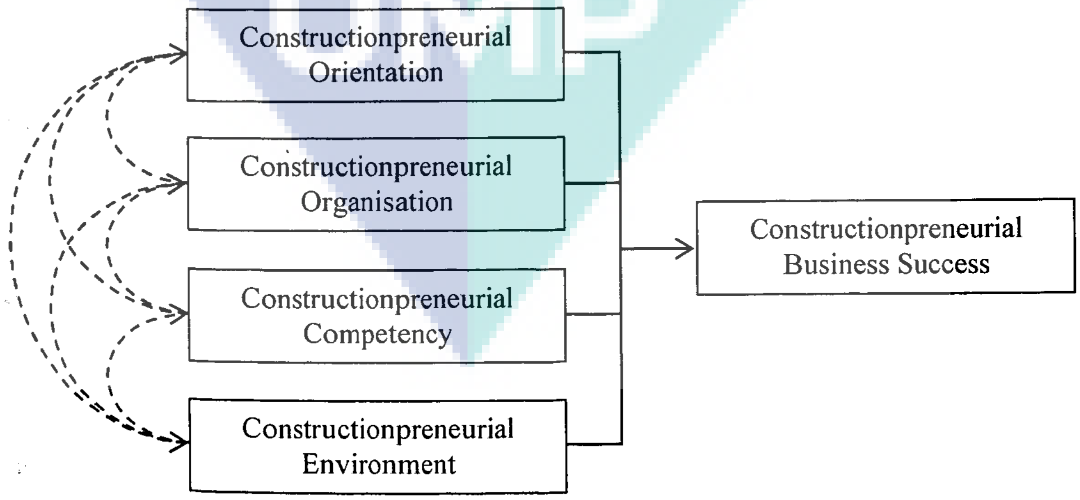

Figure 2.2 Conceptual research model

In reference to Figure 2.2, the long-term success of the construction business could be achieved from the results of the integration of constructionpreneurial orientation, constructionpreneurial organisation, constructionpreneurial competency, and constructionpreneurial environment. These elements considered as the predictors of success in the construction business because they linked to organisational performance and economic growth. They are as well representing the entrepreneurial activities implemented in the organisation. Thus, these four perspectives of an entrepreneurship phenomenon could be employed to answer the second research question.

The success of the construction business may also result from the interrelationships among the multiple success indicators. Understanding how these indicators interact with one another and how effective is each indicator could have a profound effect on the understanding of the dynamic of the entrepreneurship phenomenon to the successful of the construction business. Thus, the dotted lines represent the interrelationships amongst the four perspectives of entrepreneurship phenomenon and would likewise be studied to respond the third research question.

As previously discussed in Section 2.10, all of the four perspectives of the entrepreneurship phenomenon have been employed in many previous studies and may possess some validity in their effect on organisational performance. Therefore, this model is assumed to have some validity.

2.12 Selected Measures of the Constructionpreneurial Business Success

In measuring the research constructs, the measurement variables were designed by incorporating the conceptual research framework with relevant literature, particularly with respect to the entrepreneurship phenomenon.

2.12.1 Constructionpreneurial Orientation Measures

Entrepreneurial orientation is defined as a multidimensional construct that applied at the organisational-level, which characterised the firm's entrepreneurial behaviours. Previous literature has described that entrepreneurial orientation is an important determinant of the firm performance (Miller, 1983; Lumpkin & Dess, 2001;

Wiklund, 1999; Wiklund & Shepherd, 2005). A firm with a strong entrepreneurial organization is stated to possess the capacity to exploit market opportunities (Smart & Conant, 1994; Wiklund & Shepherd, 2003). They can also respond to the challenges of competition and the dynamics of the environment (Low & MacMillan, 1988; Lumpkin & Dess, 1996).

Previous studies have also demonstrated the existence of the direct effect between entrepreneurial orientation and the firm performance. According to Miller (1983), an organisation is an entrepreneurial orientation if they are simultaneously risk-taking, innovative, and proactive. Lumpkin and Dess (1996) have extended the construct by introducing two more dimensions, namely aggressiveness, and autonomy. Thus, the current study adapted all the five dimensions for the intent of measuring constructionpreneurial orientation. Table 2.2 summarised the brief description of the constructionpreneurial orientation dimensions.

Table 2.2 Description of the Constructionpreneurial Orientation Dimensions

Dimension	**Description**
Innovativeness	The predisposition to engage in creativity and experimentation through the introduction of new products/services as well as technological leadership via research and development in new processes (Miller, 1983).
Risk taking	Taking bold actions by venturing into the unknown, borrowing heavily, and/or committing significant resources to venture in uncertain environments (Miller, 1983).
Proactiveness	An opportunity-seeking, forward-looking perspective characterized by the introduction of new products and services ahead of the competition and acting in anticipation of future demand (Miller, 1983).
Competitive aggressiveness	The intensity of a firm's effort to outperform risks and characterized by a strong offensive posture or aggressive responses to competitive threats (Lumpkin & Dess, 1996).
Autonomy	Independent action undertaken by entrepreneurial leaders or teams directed at bringing about a new venture and seeing it fruition (Lumpkin & Dess, 1996).

2.12.2 Constructionpreneurial Organisation Measures

Previous studies have provided evidence that the entrepreneurial organisation as the basis for the organisational support activities, are important factors that stimulate the corporate entrepreneurship (Antoncic & Hisrich, 2001; Stevenson & Jarrillo, 1990). Stevenson and Jarillo (1990) hypothesised that an entrepreneurial organisation is means to pursue the opportunity, regardless of the resources currently available. Organisational structure and organisational culture are among the most researched concepts within the organisational discipline. They deliver an exceptionally strong influence on the behaviour and operation of both the organisation members and the organisation as a whole (Janićijević, 2013). In other words, it's concerned with how organisational structure and culture support the main business activities and provide an appropriate foundation on which to build effective organisations in the construction business. It can be said that both structure and culture are the behaviour of a firm that would influence success.

Mokaya (2012) insisted that firms with nurture organisational structures and cultures are conducive to entrepreneurial activities, and may results in enhancing performance. Indeed, several studies in the CEM domains have found significance positive relationship between these two dimensions and the performance (see, for examples, Zhang & Liu, 2006; Lim, Ling, Ibbs, Raphael, & Ofori, 2011; Cheung, Wong, & Ana, 2012; Ubani, 2012; Olanipekun, Aje, & Abida-Falemu, 2013). Therefore, for this study, the constructionpreneurial organisation is underpinned by two perspectives of the organisational studies, which are structure and culture. Table 2.3 summarised the brief description of the organisational structure and organisational culture.

Table 2.3 Description of the Constructionpreneurial Organisation Dimensions

Dimension	Description
Structure	The formal configuration between individuals and groups regarding the allocation of tasks, responsibilities, and authority within the organization (Greenberg, 2011).
Culture	The set of shared beliefs, values, and norms that influence the way organisation members think, feel and behave (Schein, 1985).

2.12.3 Constructionpreneurial Competency Measures

Entrepreneurial competency has been seen as important factors to the firm's performance and competitiveness (Man, Lau, & Chan, 2002) and business success and growth (Mitchelmore & Rowley, 2010; Solesvik, 2012). Entrepreneurial competency was identified as a specific group of competencies relevant to the exercise of successful entrepreneurship (Mitchelmore & Roley, 2010). It can be viewed from the competent behaviour results from a variety of factors, including an individual's motivation, personality traits, self-concept, and knowledge or skill (Hunt, 1998).

In the context of the construction industry, the existence of the construction business is mainly related to three primary functions. It includes the functions for getting the work/project, executing the work/project, and accounting for all the processes (Schleifer, 1990; Stevens, 2007). In other words, it involves the process of marketing to acquire the project, operating to execute the project, and administration to manage all of the processes. The most important of these primary functions should not be neglected as they recognised the multidimensional aspects of the organisational competency.

The existence of marketing competencies is essential for any business to gain success. Construction business recognizes the importance of marketing efforts to acquire the projects. Without the project, construction organisation does not exist. In this sense, marketing competencies are crucial to every construction enterprise. It includes the functions of estimating, pricing, bidding, networking, selling and so on. In the construction business, marketing activities are aimed to increase a target market, to build long-term relationships, to satisfy clients, and to ascertain the desired profitability (Naranjo, Pellicer, & Yepes, 2011). It also aimed to strengthen the competitive advantage (Arditi, Polat, & Makinde, 2008). Therefore, marketing in the construction business is not only a function but it is a tool that can be used to improve the performance of construction companies.

It also recognises the executing function of a construction project to build the projects successfully. Without project success, the construction organisation does not survive, since they have strategic implications on the success and profitability of the business (Pankaj & Bhangale, 2013). Technical competencies are considered essential to perform any job in the organisation within a defined technical or functional area of work (Valantinienė & Krikštaponytė, 2008). The nature of construction business that is project-based business has called for the need of technical competencies. For example, the important of project management competencies are to ensure that the project stays on schedule, within budget, and scope. Among the technical competencies that are crucial for the construction business includes cost estimating skills (Alroomi, Jeong, & Oberlender, 2012), project management skills (Assaf, Hassanain, & Al-Zahrani, 2015), construction skills, problem-solving skills, safety issues, and collaborative skills (Ahn, Pearce, & Kwon, 2012).

Technology has also plays a significant role in the construction business. According to Jasra, Khan, Hunjra, Ur Rehman, and Azam (2011), technology is regarded to the improvement of the production process. Indeed, the lack of new technology and equipment are reported as hindrances of much business development (Swierczek & Ha, 2007). It was said that an organisation's capacity to handle and take advantage of technology was the symbol of a core competence. New construction technologies affect working practices in the construction industry, constructing more component systems in manufacturing plants rather than on the building site. Thus, technological competencies are seemed to be important for the construction business and should not underrate.

The construction business is seen further emphasises the importance of the administrative aspects of managing all the operational processes within the organisation. In this sense, the effective business and management competencies are needed to manage well and control the overall business processes not only at the project-level but also at the organisational-level. Moreover, the complicated process of the construction business which involved extensive linkages to many upstream and downstream industries, has called for the need for superior skills and knowledge about the construction business to achieve success (Hamid, Yahya, & Han, 2010).

In the context of the construction industry, lack of business and management competencies have been seen as the causes of contractors' failure (Assaf, Hassanain, & Al-Zahrani, 2015). Some others business and management competencies that related to the performance of the construction business are such as strategic management (Lu, 2010; Bakar, Tabassi, Razak, & Yusof, 2011; Herazo, Lizarralde, & Paquin, 2012), risk management (Mbachu, 2011; Doloi, 2012; Zeynalian, Trigunarsyah, & Ronagh, 2013;), human resource management (Wilkinson, Johnstone, & Townsend, 2012; Siew, 2014), financial management (Alfan & Zakaria, 2013; Ding, Alessandra, & John, 2013), and others.

In addition, the important of background characteristics and psychological attributes of the founding entrepreneurs cannot be denied. The important of individual efforts to create wealth and add value to society are one of the factors that distinct an entrepreneurial driven corporation from others (Kao, R.W.Y., Kao, R.R., & Jing, 2006). Furthermore, the success of a business is due to many factors, but the greatest determinant is the entrepreneur him/herself (Driessen & Zwart, 2014). Evidence has suggested that entrepreneurs, as the owner-managers, play a prominent role in determining business success (Baum & Locke, 2004; Che Rose, Kumar, & Yen, 2006). Indeed, the lack of entrepreneurial competencies among the main founder-owner was the most significant reason for most enterprises failures (Kiggundu, 2002).

A study by Audretsch (2005), for example, examined the link between ownership, decision making, and employee deployment and performance, revealed that ownership profile was the key factors of the success of SMEs. In the context of the construction industry, founder's competencies have seen affected construction enterprises in term of profitability both directly and indirectly (Maes, Sels, & Roodhooft, 2005). It also found to have affected the business success (Jaafar, Ramayah, & Osman, 2004), and quality performance (Callistus, Anzagira, Ernest, Stephen, & Anzagira, 2014). Therefore, the personal competencies must also be considered as the important dimensions of competencies required by the construction enterprise.

The political competencies are the other aspect of the entrepreneurial competencies in the construction business. It is related to the use of the political connection by the construction enterprise to secure projects. Economies have long noted that firms that lobby or maintain other types of political connections receive a variety of economic benefits in returns (Blau, Brough, & Thomas, 2013). In the construction industry, lobbying efforts in attempted for securing contract can be considered as a part of managerial activities. In awarding contracts, besides the offered price, the criteria for selection were solely based on the contractor's financial and technical capabilities (Kangari, 1988). However, most of the scenario, selection of contractor could be related to the lobbying efforts; 'know who' rather than 'know how' (Abd-Hamid, 2011). Several other studies that explored the significant effects of the political connection on performance were the study of Boubakri, Cosset, and Saffar (2012), and Liming and Li (2013).

An increasing preoccupation in business is corporate social responsibility. It argued that a business's pursuit of success should benefit its shareholder in a way that respects and benefits the other stakeholders such as employees, suppliers, customers, and the wider community (Tennent, 2014). Ethical business entities must have a responsibility to the society (Pies, Beckmann, & Hielscher, 2010). The construction industry has a major effect on sustainable development, both direct and indirect effects. The direct effects are on water, resources, land use, and greenhouse gas emissions. On the other hand, the indirect effects are affected by transporting systems which also affects the communities, and even the public health (Pinkse & Domisse, 2008; Pitt, Tucker, & Longden, 2009).

Some other studies that addressed sustainable development issues in the construction industry were the study of du Plessis (2007), Warnock (2007), Holton, Glass, and Price (2008), Sev (2009), Presley and Meade (2010). A recent study conducted within the Malaysian construction industry by Papargyropoulou, Padfield, Harrison, and Preece (2012), found that the Malaysian built environment market offers a unique opportunity for businesses to invest and develop sustainability services. Therefore, construction enterprise must have necessary competencies to fulfil business's societal mandate.

In synthesising the above discussions, the following Table 2.4 summarised the dimensions of competencies that were used to measure the constructionpreneurial competency constructs.

Table 2.4 Description of the Constructionpreneurial Competency Dimensions

Dimension	Description
Founder's personal competencies	The capability of applying or using knowledge, skills, abilities, behaviours, and personal characteristics to successfully perform critical work tasks, specific functions, or operate in a given role or position (McClelland, 1973).
Business and management competencies	The observable characteristics such as knowledge, skills or behaviour patterns that contribute to the successful fulfilment of managerial and business tasks (Markman, 2007).
Marketing competencies	The ability to proactively identify and explore opportunities for acquiring new projects and retaining profitable customers through specific approaches such as networking, advertisement, etc. (own thought).
Technical competencies	The specific, measurable knowledge and skills required to apply technical principles and information in a job function (CCSA, 2014).
Technological competencies	The ability to create and use a particular field of technology effectively, which is gained through extensive experimentation and learning in its research, development and employment in production (Fai & von Tunzelmann, 2001).
Political competencies	The ability to understand political facts and processes and to influence these concerning the business interests such as the used of political connections in securing projects, etc. (own thought).
Social responsibility competencies	The adoption of business strategies and activities that are ethical, and society and environmental friendly (own thought).

2.12.4 Constructionpreneurial Environment Measures

Covin and Slevin (1991), and Zahra (1993) emphasized the needs of the firm's external environment to be taken into account when considering the relationship between corporate entrepreneurship and firm performance. Currently, the construction enterprises have been facing more than ever the uncertainties of external business environment. It includes excessively low price bidding for engineering projects among enterprises, the drastically fluctuation of raw material price, the low entry barrier, and very high entry cost, and the fierce entry of foreign construction enterprise (Mao, Zhu, & Wang, 2013). All of these factors have made construction a competitive industry that could squeeze the profit.

The conceptual framework employed by the Global Entrepreneurship Monitor (GEM) indicated the factors of entrepreneurial environments that influence opportunity recognition and entrepreneurial potential. It refers to financial availability, government policies, government programs, education and training, research and development transfer, commercial and professional infrastructure, entry regulation, physical infrastructure and services, and cultural and social norms (Reynolds, Hay, & Camp, 1999). For the current study, the items for environmental constructs will be development based on the guideline provided by the GEM, as shown in Table 2.5.

Table 2.5 Description of the Constructionpreneurial Environment Dimensions

Dimension	**Description**
Finance resources	The availability of financial resources such as equity and debt including grants and subsidies (Reynolds, Hay, & Camp, 1999).
Government policies	The extent to which taxes or regulations are encouraging construction enterprises (Reynolds, Hay, & Camp, 1999).
Government programs	The presence and quality of direct programs to assist new and growing firms at all levels of government (national, regional, municipal) (Reynolds, Hay, & Camp, 1999).
Entrepreneurial education and training	The extent to which training in creating or managing construction enterprises is incorporated within the education and training system at all levels (primary, secondary and post-school) (Reynolds, Hay, & Camp, 1999).
Research and development transfer	The extent to which national research and development will lead to new commercial opportunities and is available to construction enterprises (Reynolds, Hay, & Camp, 1999).
Commercial and professional infrastructure	The presence of property rights and commercial, accounting, and other legal services and institutions that support or promote construction enterprises (Reynolds, Hay, & Camp, 1999).
Internal market openness	Contains two components: (i) Market dynamics: the level of change in markets from year to year, and (ii) Market openness: the extent to which new firms are free to enter existing markets (Reynolds, Hay, & Camp, 1999).
Physical infrastructure and services	Ease of access to physical resources such as communication, utilities, transportation, land or space, at a price that does not discriminate against construction enterprises (Reynolds, Hay, & Camp, 1999).
Cultural and Social Norm	The extent to which social and cultural norms encourage or allow actions leading to new business methods or activities that can potentially increase personal wealth and income (Reynolds, Hay, & Camp, 1999).

2.13 Overview of the Research Philosophical Paradigms

Research is, among other things, an intense activity that based on the work of others in order to generate new ideas to pursue, and questions to answer (Salkind, 2009). Primarily, research is often based on the principles of the scientific methodology. The primary objective in selecting the specific approach in a research study is to determine the truth (Salkind, 2009). In other words, the use of an appropriate method may draw a valid and generalized conclusion. Thus, the foremost step in conducting research is to know the philosophical paradigm to be embraced.

According to Creswell (2009), research designs are the plans and the procedures for research that span the decisions from broad assumptions to detailed methods of data collection and analysis. The decision should be the worldwide assumptions that researcher brings to the study includes procedures of inquiry (often called as strategies), and specific methods of data collection, analysis, and interpretation (Creswell, 2009). It is also based on the nature of the research problem or issue being addressed, the researcher's personal experiences, and the audiences for the study. Saunders, Lewis, and Thornhill, (2014) explained these as research 'onion' and shown in Figure 2.3. The concept of the onion is that it has different layers depicting several issues to consider before reaching the central point.

However, Yin (2009) argued that the first and most important condition for differentiating among various strategies is to identify the type of research question being asked. Yin (2003) distinguished the research strategy based on three conditions. It linked to the type of research question posed, the extent of control an investigator has over actual behavioural events and the degree of focus on contemporary as opposed to historical events. Table 2.6 indicated these three conditions and its relation to the five major research strategies in the social sciences.

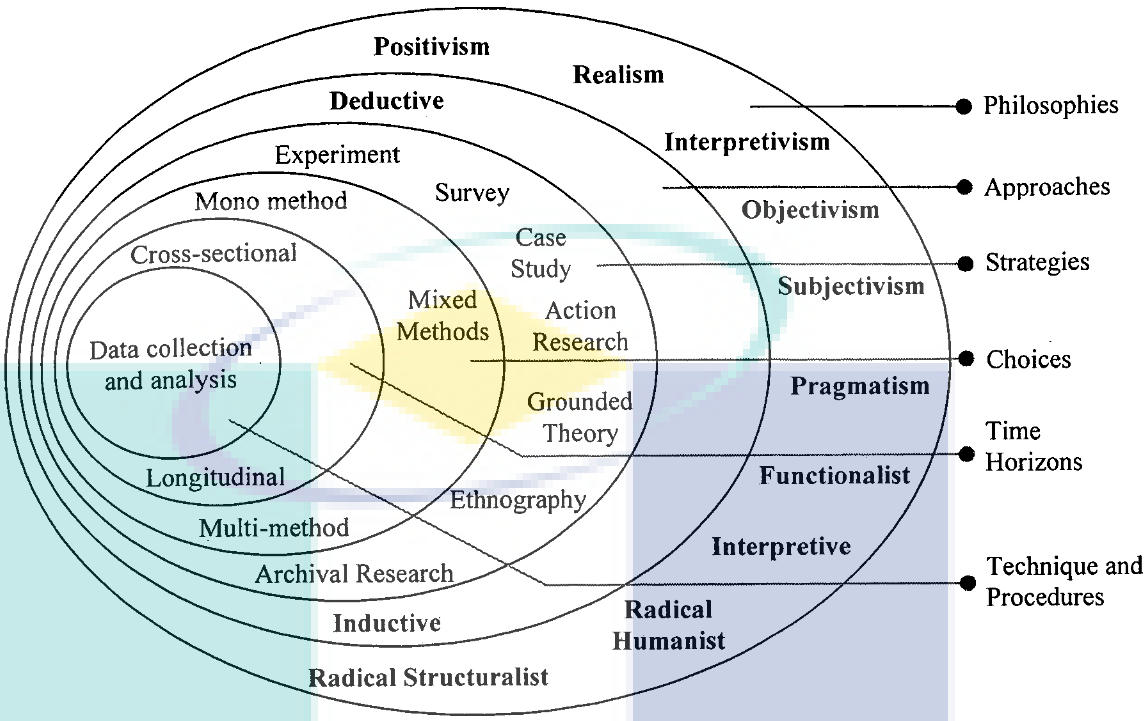

Figure 2.3 The research 'onion' (Source: Saunders, Lewis, and Thornhill, 2014)

Table 2.6 Relevant Situations for Different Research Methods

Method	Form of Research Question	Requires control over behavioural events?	Focus on contemporary events?
Experiment	How, why	Yes	Yes
Survey	Who, what, where, how many, how much	No	Yes
Archival Analysis	Who, what, where, how many, how much	No	Yes/No
History	How, why	No	No
Case Study	How, why	No	Yes

Source: Yin (2009)

In order to facilitate an evaluation of research strategies, it is useful to iterate the fundamental research question sets for the current study: What are the indicators of success for entrepreneurs in the construction industry? In referring the Yin's (2003) criterion, this type of question is likely to favour the survey and archival analysis strategies. Archival research used administrative records and documents as the principal source of data that are likely impossible for the current inquiry. As such, the research strategy appropriate for the current study is a survey research.

Salkind (2009) noted that survey research is the best application of sampling in theory and practice, and can found through quantitative or qualitative or mixed methods research. A quantitative research approach is an investigation into a social or human problem. It is based on proving a theory composed of variables, measured with numbers, and analysed with numerical procedures, to see whether the prognostic generalizations of the hypotheses hold true (Creswell, 2009). As a consequence, it is objective leading to positivist and deductive reasoning in a research study (Saunders, Lewis, & Thornhill, 2014; Yin, 2009).

A qualitative research approach, on the other hand, is an investigative process of a sympathetic study into a social or human problem. It focused on edifying a diverse, holistic depiction, fashioned with words, reporting comprehensive views of informants, and conducted in a normal setting (Creswell, 2009). Consequently, it is described as constructivist or naturalistic or interpretative and inductive techniques of a research subject area that try to explore a theme when the variables and the theory based unknown (Creswell, 2009). In this approve, the researcher tries to demonstrate the significance of a phenomenon from the perspectives of participants (Creswell, 2009). It refers to the used of exploratory techniques such as interviews, surveys, case studies, and other relatively personal techniques (Salkind, 2009).

The employment of both quantitative and qualitative approaches in a single research study is called a mixed methods research. Johnson, Onwuegbuzie, and Turner (2007) defined mixed methods research as a research inquiry that employs both quantitative and qualitative approaches in research work for the purpose of breadth and depth of understanding and partnership. According to Creswell and Plano-Clark (2011), a mixed methods research could provide a better understanding of the research problem rather than the use of single method alone. This research approach is argued to be one, if not, the most of the central premise of the pragmatic philosophical reasoning in research today (Tashakkori & Teddlie, 2003).

2.14 CURRENT METHODOLOGICAL APPROACHES IN THE CEM RESEARCH

The basis of the justification of the research methodology to be used in the current study is the appreciation of the selected approach, which best serves the research purpose and the most appropriate to the phenomenon under study. In the context of the CEM, Yates (2007) highlighted that the construction industry is suitable research subjects due to the nature of the business environment which is complex and constantly changing. However, the dynamic and transient nature of the construction industry has made conducting research in this field is a challenging task (Hallowell & Gambatese, 2010; Tran, Lester, & Sobin, 2014).

Basically, research in the construction industry examines real-world means and methods to improve effectiveness and efficiency of the industry (Lucko & Rojas, 2009). It can be categorized as at the intersection of natural science and social science (Love, Holt, & Li, 2002). Nevertheless, there has been considerable argument in the CEM literature as to which research methodology is the most appropriate for the industry's research problems (Voordijk, 2009). It too has been criticised for their anecdotal approach when interpreting the real-world phenomena (Amaratunga, Baldry, Sarshar, & Newton, 2002). Although numerous frameworks and concepts have been introduced, however, it has been concluded that no single theory well suited in the CEM field of research (Voordijk, 2009). Therefore, to avoid unwarranted categorical conclusions, it is worthwhile to consider all relevant views found in the CEM literature.

Seymour, Crook, and Rooke (1997) argued that the previous empirical investigation in the CEM, as a practice, has not taken place appropriately. The CEM, as a discipline, has simply accepted one particular theory without any judgment the meaning of the theory and method for arriving at that particular theory. In this sense, it is argued that the clear definition of a research strategy is a fundamental and necessary requirement for a sound empirical study in such a field. Love, Holt, and Li (2002) viewed that the problems in the construction industry can be effectively solved if a robust research methodology that able to better understand phenomena that influence performance at both the organisational-level and project-level is adopted.

Abowitz and Toole (2010) expressed the view that the construction industry is essentially a 'social' process. It could consider as the application by people of technology, developed by people to achieve goals, and established by people involving the erection or retrofitting of the infrastructure and buildings. The fact that people play the key roles in nearly all aspects of the construction activities, suggested that the effective CEM research requires the proper application of social science research methodologies in order to understand the human and social factors. In this perspective, it is suggested that the CEM research should be a multidisciplinary design between humanities and scientific disciplines. It aspires to produce multidisciplinary solution concepts used in resolving complex and relevant field problems in design, production and operation of the built environment.

A synthesis of AlSehaimi, Koskela, and Tzortzopoulos (2013) demonstrated that the majority of recommendations of the previous CEM studies are too general, and not devoted to solving the difficulties associated with particular problem statements. It against the research tends to explore, hence, resulting in inadequate for solving persistent managerial problems in the construction industry. They considered the use of alternative research approaches such as the innovative tools will better link research and practice thus, strengthen the relevance of academic in the CEM.

Zavadskas and Vilutienė (2013) expressed that the traditional optimisation, statistical and econometric analysis approaches used within the CEM context often based on the supposition that the considered problems are well formulated. In this sense, the researchers usually consider the existence of a single objective or evaluation criterion from the point of view that underlies the conducted analysis in which the solution of engineering problems is easy to obtain. Yet, in reality, the modelling of engineering problems is based on a different sort of logic that should take into consideration the conflicting aims of decision-makers, the complex, and the subjective and different nature of the evaluation process. For that reason, they suggested that the alternative research approaches such as the multiple criteria methods are useful techniques. This type of methods could contribute to the engineering context through the identification of the optimal alternatives with consideration of the conflicts between criteria and revealing the preferences.

Gibson and Whittington (2009) viewed that the construction industry typically used research methods such as surveys, sources document reviews, and structured interviews. However, they are suffering from barriers include low response rates, asynchronous communication, the time commitment of the researchers and respondents, access to project data, and travel costs, all of which could hamper results. They further suggested that the construction industry best practices research requires an interaction and feedback mechanism between the industry respondent and academician.

The above discussions have provided such fundamental underpinnings of various research philosophies and approaches to guide the choice of a particular paradigm for the current research study. It could be concluded that researchers in the CEM field must properly select the philosophy and approaches that aim to be used in their study. Therefore, the following factors must consider in the selection of the research design for the CEM research, namely:

(i) The research strategy being used must clearly specify,

(ii) The use of robust and rigour research methodologies,

(iii) The appropriate application of social science research methodologies,

(iv) The use of alternative and innovative research approaches, and

(v) The interaction and feedback mechanism between the industry respondent and academician.

2.15 CHAPTER SUMMARY

A literature review has provided evidence that both the construction industry and entrepreneurship activities are the key driver of the nation's economic growth. It also revealed that the corporate entrepreneurship is not confined to be a particular business or particular industries. The nature of the construction enterprise is seemed to be consistent with the entrepreneurial activities within the organisation. Thus, it can be considered as an entrepreneurial-driven corporation, as long as the corporate culture is guided and directed within the organisation. The author presents the term of 'constructionpreneurship' for the first time to define the process of corporate entrepreneurship within the construction industry.

To gain success and remain survival, the construction enterprise must continually improve their performance in both the project- and organisational-levels. One way for the construction enterprise sustains competing in this vital industry is by providing a set of reliable success indicators, not only in the short-term but also in the long-term that may have a direct impact on the success of their business. Rather than viewing the success from the project-based criteria, the current study hypothesised that the indicators of success for entrepreneurs in the construction industry could be derived from the entrepreneurial activities implemented within the organisation. In this sense, it is suggested that the entrepreneurially oriented construction enterprises can position themselves to take advantage of the market opportunities, and could be achieved through the corporate entrepreneurship activities.

The current study highlighted the vital elements of an entrepreneurship phenomenon, and suggested that entrepreneurial orientation, entrepreneurial organisation, entrepreneurial competency, and entrepreneurial environment were the keys elements to predict the success of construction business. It argued that no construction business success factors can comprehensively describe, nor can its complexity be adequately accounted for, unless all of these dimensions are investigated. Based on these dimensions, a conceptual research framework was established and discussed. Finally, this chapter discussed the findings on the methodological issues in the CEM research that are currently appearing to be more important than ever before. It is suggested that the researchers in the CEM field must properly selected the philosophies and approaches that aim to use in the study in hand.

This chapter sets the groundwork for the chapter to come. Chapter 3 discusses the methods of data collection and analysis chosen to answer each research question.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Preamble

This chapter describes the procedures undertaken to conduct the current study based on the literature reviewed, the theoretical framework, and the conceptual framework developed in the Chapter 2. This chapter firstly presents the selection of the research methodology and the justifications for the selected methodology. Then, this chapter discusses the methods and its application to the current research study. By considering the methodological, theoretical and contextual needs, two phases of sequential research inquiry is designed.

3.2 Selection of the Research Methodology

Upon considering all the suggestions found in the CEM literature, thus, the philosophical perspective of the current study is that of a pragmatic approach which draws heavily on the inductive and deductive reasoning. According to Ihuah and Eaton (2013), to fully analyse the phenomenon, it is necessary to support the inductive approach with deductive thinking. It enables to tackle a real-world problem such as in the case of the current effort. The inductive and deductive reasoning typically associated with the quantitative and qualitative research, respectively. Therefore, the current study adopted a mixed methods approach of the integration of the qualitative and quantitative research inquiries. The use of a mixed methods research is to take advantage of enabling the methodological triangulation by transformed the qualitative data into quantitative data. The move from the single-method approaches to the multi-methods approaches in the social and behavioural sciences over the past decade has called for a reinterpretation of the procedures for selecting the appropriate research approaches in the CEM study. The extensive academic literature could provide some theoretical discussion related to the pertinent factors for the research strategy to be employed. Previous studies have suggested the alternative approaches in the CEM research due to the transient nature of the construction industry itself. It has addressed the need for the CEM research to move from the traditional approach to the subjective methods that are more robust and rigorous, although sometimes compromise the academic rigour (Hallowell, 2009). A traditional survey could be conducted to gather input from members of the major stakeholder groups concerning the success indicators of the construction business. Nevertheless, the author judged that the mixed methods approach seemed to be the appropriate strategies of inquiry in the current study based on the nature of the study and the findings of research strategy in the CEM literature.

Furthermore, all these findings provided evidence that the subjective approaches such as the Delphi study and Multi-Criteria Decision Making (MCDM) methods are the appropriate current methodology application in the CEM research. Moreover, the interaction and feedback mechanism between the industry respondent and academician can be established using these methods. The value of these approaches to the CEM research is evident in its application. This fact could be derived from fifty five studies in the CEM fields performed from the year 2010 onwards in the different regions as listed in Appendix B, which interpret the current methodological approaches in the CEM research.

As presented in Appendix B, the studies covered many geographical regions include the USA, North America, the UK, Europe, Asia, Australasia, and Africa. Thirty four studies predominantly focused on the companies in Asia. The remaining twenty one written reports were from the countries outside Asia. Ten from the USA, six from Europe, two from Africa, and each one from North America, the UK, and Australasia. In the setting of country surveyed, the huge majority were from Iran with seventeen studies, follows by the USA with ten studies, China with five studies. Both three studies were from Greece, India, Malaysia, and Taiwan, and two studies were from

Africa. The remaining nine studies, of which each one was from Turkey, Lithuania, Germany, the UK, New Zealand, Canada, Hong Kong, Sri Lankan, and South Korea.

The studies tended to focus on three different methodologies as the tools for investigating the research problems. Twenty six studies employed the Delphi study, twenty seven studies used MCDM technique, and two used a combination of Delphi and MCDM technique. It also found that twelve of the MCDM studies tended to focus on hybrid methodologies, which involved two or more MCDM methods used simultaneously. The findings also revealed that the iterative rounds of Delphi study were ranging from two to a maximum of four rounds, although some studies did not report the employed rounds. Similarly, participants involved in the study are shown to be as low as two to the highest of one hundred and five experts. Furthermore, the chosen of experts' characteristics is seemed to be appropriate to the subject's understudies.

3.3 Rationale of the Selected Research Methodology

The research inquiries that related to the long-term corporate success of the construction enterprise from the perspectives of an entrepreneurship phenomenon indicate the current study will fill an important void in the CEM body of knowledge. It will also aid the industry practitioners to understand how the entrepreneurship phenomenon contributes to the successful business in the construction industry. The CEM is an emerging discipline, where scientific laws or best practices linked to the success factors have not so far developed. Thus, the purpose of the expert testimony as the method of data collection is acceptable in order to set up a grounding for research (Linstone &Turoff, 1975; Nworie, 2011).

In light of the current study, the used of an entrepreneurship phenomenon was a new aspect and rarely used in the CEM literature, therefore, may result in more complicated processes. The process of assessing the indicators is difficult, and requiring advanced knowledge and experience of the respondents. Thus, the Delphi method was the well suited approach for the current study since there was incomplete knowledge about the issue under study. As noted by Skulmoski, Hartman, & Krahn (2007), and Paliwoda (1983), a Delphi study is well suited as a research instrument when there is incomplete knowledge about a problem or phenomenon where there are no 'correct' answers. Moreover, the success indicators must be considered as a multidimensional construct. On the other hand, the success of the construction business may result from the interrelationships among the multiple success indicators. Understanding how these indicators interact with one another and how effective is each indicator could have a profound effect on the understanding of the dynamic of the entrepreneurship phenomenon to the successful of the construction business. The multiple regression or Pearson correlation analyses could be used to explore the interrelationships between the indicators but they can only make sense in the quantitative survey inquiry as in the traditional research approach. The nature of the current study which was a qualitative research approach implies that such analyses were impossible to employ. Moreover, a proper and effective evaluation requires the respondents to consider, assume, and analyse many factors, hence, would be difficult for the construction industry respondents to carry out. Thus, this process can be viewed as MCDM problems with many quantitative and qualitative attributes. Thus, the DEMATEL technique was considered as an appropriate tool in assessing the interrelationships between the indicators since no other techniques are able to assess such interrelationships for the MCDM problems.

Obtaining a more comprehensive view from the lenses of all the major stakeholders in the construction industry is necessary. It includes the perspectives of contractors/developers, professional engineering consultants, and government technical officers, as well as academicians engaged in the CEM research. It can easily gain through the used of the Delphi study and the DEMATEL technique. The mixed methods research of a combination of the Delphi study and the DEMATEL technique, therefore, is viewed as an appropriate strategy of inquiries for the current study. It involves in the developing new thoughts of the success indicators for the construction enterprise from the perspectives of an entrepreneurship phenomenon. The Delphi study and DEMATEL technique are the stronger methodologies for a rigorous query of experts and stakeholders, especially in the CEM fields as proven by many previous studies.

Hallowell (2009) highlighted that the inductive reasoning requires the synthesis of evidence and information from a variety of sources. On the other hand, utilising the interpretive reasoning which conclusions are drawn based on the recognition of patterns, spatial relationships, correlations, and causal relationships. In this context, the first is associated with the Delphi study, and the second can be achieved through the DEMATEL technique. The combination of these qualitative and quantitative methodologies in data collection and analysis will enable the findings to be more illustrative and exciting than those realised by practicing exclusively one type of method (Tapio, Paloniemi, Varho, & Vinnani, 2011). It is as well to bring advantage of enabling the methodological triangulation. According to Risjord, Dunbar, and Moloney (2002), triangulation yields completeness of the results because quantitative methods can further develop findings from qualitative research. Amongst other benefits of triangulation include increasing confidence in the research data, creating innovative ways of understanding a phenomenon, revealing unique findings, challenging or integrating theories, and providing a clearer understanding of the problems (Thurmond, 2001).

The Delphi method is a constructivist approach to knowledge, which straddles between qualitative and quantitative approach. The used of the Delphi method and DEMATEL technique in the CEM research have increasingly over the past decade. Appendix B and previous discussions provided evidence to this notation. In this approach, the outcomes of the Delphi study are used as the inputs for the DEMATEL technique. Specifically, the integration of Delphi study and DEMATEL technique was selected for the current research study for the following reasons:

(i) The complex issue which the current study undertaken could be considered as a multi-criteria decision-making problems that require knowledge from people who understand the theory, industry, economic, social, and political issues as well. Thus, the Delphi study and the DEMATEL technique could answer the research question more appropriately.

(ii) The research approaches based on the premise that the collective opinions of expert panellists are more quality than the limited view of an individual (Nworie, 2011). As the Delphi study is grounded on the rationale that, ‘two heads are better than one’ or ‘*n* heads are better that one’ (Dalkey & Rourke, 1972), thus, such approach desirable. Moreover, it does not require the participants to meet physically.

(iii) Although there may be a relatively limited number of experts with knowledge about the research problem, the expert's panel size requirements are modest.

(iv) The Delphi and the DEMATEL technique are flexible in its design and amenable to follow-up communicates. It permits the collection of richer data leading to a deeper understanding of the fundamental research question.

(v) The demanded of the effective application of research paradigm in the CEM due to the transient nature of the construction business environment has called for the alternative researcher approaches. Thus, the integration of Delphi study and the DEMATEL technique are the appropriate research approach to the CEM research because of their robustness.

(vi) The need for the interaction and feedback mechanism between the industry practitioners and academicians for the CEM research can easily found in the Delphi study and DEMATEL technique.

(vii) The Delphi study and the DEMATEL are highly formalised methods of communication that are designed to extract the maximum amount of unbiased information from a panel of experts.

(viii) To the best knowledge of the author, no previous studies found in the literature used the perspectives of an entrepreneurship phenomenon to explore the success indicators in the construction industry. Therefore, this study can be considered to be the first to do so.

The value of the Delphi study and the DEMATEL method in the CEM research is evident in its field application as previously discussed. The combination of the Delphi study and DEMATEL technique that employed in the current study is consistent with some previous studies within the CEM field. For examples, the work of Chen and Li (2009) in assessing the effectiveness factors of architectural design services in

China, the study of Wu, Xu, and Zhang (2009) in identifying the cause and effects factors of the traffic safety at the freeway work zone in China, and a recently conducted study in Iran by Poloie, Fazli, Alvandi, and Hasanlo, (2012) to identify the effective factors on the agility of supply chain in mass construction associations.

Therefore, this gap in the literature led to the choice of the combination of the Delphi study and DEMATEL technique, as appropriate research design to validate and refine the reliable indicators for the success of the construction enterprise.

3.4 Delphi Method Overview

The Delphi method is being increasingly used in many complex areas in which a consensus is to be reached, such as in the CEM research. The name 'Delphi' is derived from the ancient Greek temple, Oracle of Delphi. The original Delphi method was developed by the Rand Corporation in Santa Monica, California at the beginning of the Cold War in the 1950's, to forecast the impact of technology on warfare. It was the United States Air Force sponsored project aimed to solicit the expert opinions on the optimal of the USA industrial target system and to estimate the number of A-bombs required to reduce the munitions output by a prescribed amount, from the viewpoint of a Soviet strategic planner (Dalkey & Helmer, 1963).

According to Derian and Morize (1973), the Delphi concept is particularly useful for the highly controversial or multiple dimension subjects such as technological, economic, sociological or medical. In other words, the Delphi study is well suited as a research instrument when there is incomplete knowledge about a problem or phenomenon where there are no 'correct' answers (Skulmoski, Hartman, & Krahn, 2007; Paliwoda, 1983). Hanafin *et al.* (2007) believed that the method is especially well fitted to extremely complex problems such as:

(i) Ethical, political, legal, or social dilemmas dominate economic or technical ones.

(ii) Face-to-face contact is not possible or desirable due to prohibitive financial, geographical or temporal constraints and/or concern regarding democratic participation.

(iii) Precise analytical techniques and exact knowledge are absent and the gathering of subjective opinion, moderated through group consensus, is the only approach available.

(iv) Relevant experts are in different fields and/or occupations and not in direct communication.

The Delphi method uses an iterative feedback technique with a group of experts and concerning to a set of qualitative research methods. It relies on the opinions of individuals who are believed to be experts on the subject under consideration (Schmidt, 1997). The Delphi method is a highly formalised method of communication that is designed to extract the maximum amount of unbiased information from a panel of experts. As compared to the traditional surveys and interviews, the Delphi method requires participants to expert certification before the survey process begins. It lets the expert panel to interact anonymously to achieve consensus (Tran, Lester, & Sobin, 2014).

The research data, i.e. expert opinion, are typically collected using several rounds of intensive questionnaires, which bring forth a series of qualitative and quantitative information for analysis. The analysis findings will then determine the form and content of subsequent questionnaires, and so on until the group opinion is formed and stable (Gupta & Clarke, 1996). Rowe and Wright (1999) characterized the classical Delphi method into four key attributes:

(i) Anonymity – allows the panellists the opportunity to state their beliefs and judgments freely without undue social pressures from dominant or dogmatic others members in the group, and is accomplished through the use of questionnaires.

(ii) Iteration – allows the panellists the opportunity to refine their beliefs and judicial decisions without fear of losing face in the eyes of the (anonymous) others in the group, and are attained through a number of rounds of questionnaires.

(iii) Controlled feedback – informs the panellists the opinions of their anonymous colleagues, and is presented as a simple statistical summary in term of a mean or median value.

(iv) Group judgment – allows for statistical analysis and interpretation of data.

The Delphi method is useful for situations where individual judgement to be seized in order to address the lack of understanding along the incomplete state of knowledge (Delbecq, Gustafson, & de Ven, 1975; Skulmoski, Hartman, & Krahn, 2007). As such the method is particularly valued due to its ability to structure and organise group communication. The structure of the Delphi technique is intended to allow access to the positive attributes of interacting groups. It includes such as knowledge from a variety of sources and creative synthesis of literature while pre-empting their negative aspects attributable for example to social, personal and political conflicts. From a pragmatic view, the method allows input from a larger number of participations that could feasibly be included in a group or committee meeting (Rowe & Wright, 1999).

The ultimate goal of the Delphi method is not only to elicit a single answer or to arrive at consensus, but to obtain as many high quality responses and opinions as possible on a given issue from a panel of experts to enhance decision-making (Gupta & Clarke, 1996). This process enhanced the success, credibility and validity of the technique used (Clayton, 1997).

3.4.1 Advantages and Disadvantages of the Delphi Method

Although the Delphi has used successfully used for over 50 years, yet, several advantages and disadvantages have been identified in the literature. Among others, the advantages of the Delphi method include the following:

(i) Achievement of consensus in a given area of uncertainty or lack of empirical evidence (Murphy, Schleifer, & Vishny, 1998).

(ii) Allows experts to be anonymous which leads to more creative outcomes and adds richness to data (Okali & Pawlowski, 2004).

(iii) Issue inherent in face-to-face groups such as individual dominance, conflict of interest, and group pressures is almost wiped out (Murphy, Schleifer, & Vishny, 1998).

(iv) From strictly a practical standpoint, the Delphi technique is a relatively inexpensive method to organize and administer (Rowe & Wright, 1999).

(v) Use of modern technologies such as online surveys and e-mails significantly reduces the time needed to conduct the Delphi process (Donohoe, Stellefson, & Tennant, 2012).

In contradictory, the Delphi method is not excluded from having its constraints. Among others, the disadvantages of the Delphi method include the following:

(i) A typical three rounds can take at least four months to complete (Okoli & Pawlowski, 2004).

(ii) Participants' commitment may falter if the process takes too long, or they suffer some other commitment. The panellists are likely to suffer fatigue from completing more than two rounds questionnaires, leading to a low response rate (Adler & Ziglio, 1996). This issue leads to higher chances of a participant dropping out as the Delphi processes into the subsequent rounds.

(iii) The Delphi technique is not scientific (Sackman, 1975) when solely used the qualitative method of data collection and analysis. Nevertheless, when the combinations of qualitative and quantitative methods are utilised, and so it becomes scientific as was the case of the current field.

(iv) The quality of the research results is limited by the calibre of the participants (Martino, 1978).

(v) While two or more rounds are likely to result in some convergence of individual judgments, it is unclear whether this actually increases the accuracy of the group decision making (Murphy, Black, & Lamping, 1998).

(vi) In terms of application of the technique, the effects can be limited by sloppy execution, crudely designed questionnaires, poor selection of experts, unreliable result analysis, limited value of feedback and consensus, and instability of responses among consecutive rounds (Gupta & Clarke, 1996).

3.4.2 Delphi Process

Theoretically, the Delphi study can be continuously iterated until reaching a predetermined level of consensus, or gained no new information from further rounds of the Delphi processes (Linstone & Turoff, 1975). According to Christie and Barela (2005), and Mullen (2003), a minimum of two rounds is required to allow feedback and revision of responses. However, to be benefited from the Delphi's purported advantages, a clear understanding is demanded to enable methodological application and adaptation (Ayton, Ferrel, & Stewart, 1999). Figure 3.1 provide guidelines for the basic steps of typical three round Delphi process as outlined by Skulmoski, Hartman, & Krahn (2007).

In the context of its application in the CEM fields, Hallowell and Gambatese (2010) outlined the general structure of a process which they suggest to be applied for all Delphi studies in the CEM fields. As illustrated in Figure 3.2, the flowchart represents the typical order of events of the Delphi process that illustrates the role of multiple rounds. However, in this model, the pilot study was not included. Hence, contradicted with the suggestion of Skulmoski, Hartman, and Krahn (2007), and Clibbens, Walters, and Baird (2012), who emphasised the importance of a pilot study in Delphi process.

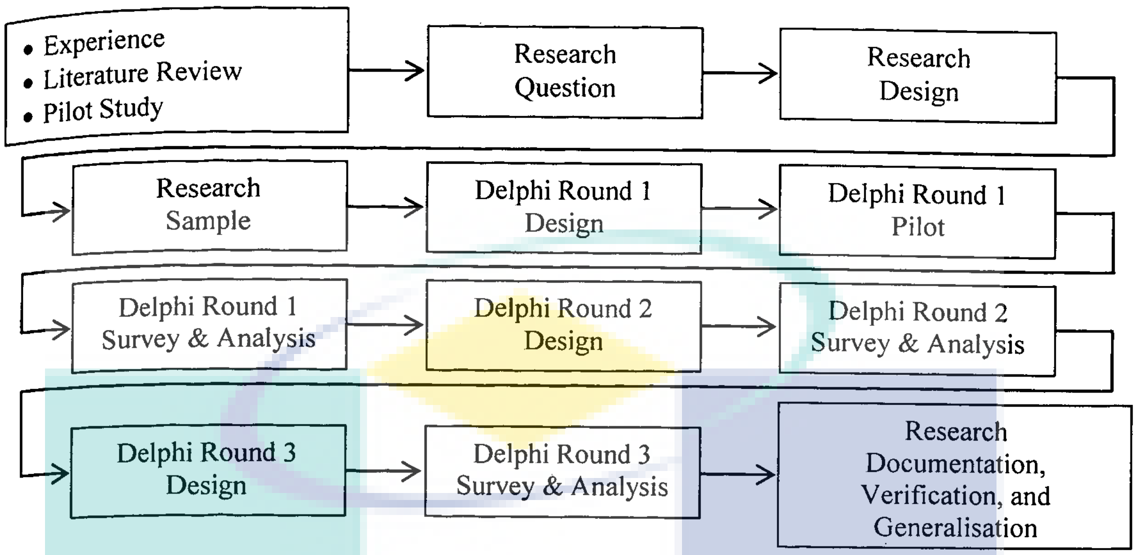

Figure 3.1 Typical three rounds Delphi process (Source: Skulmoski, Hartman, and Krahn, 2007)

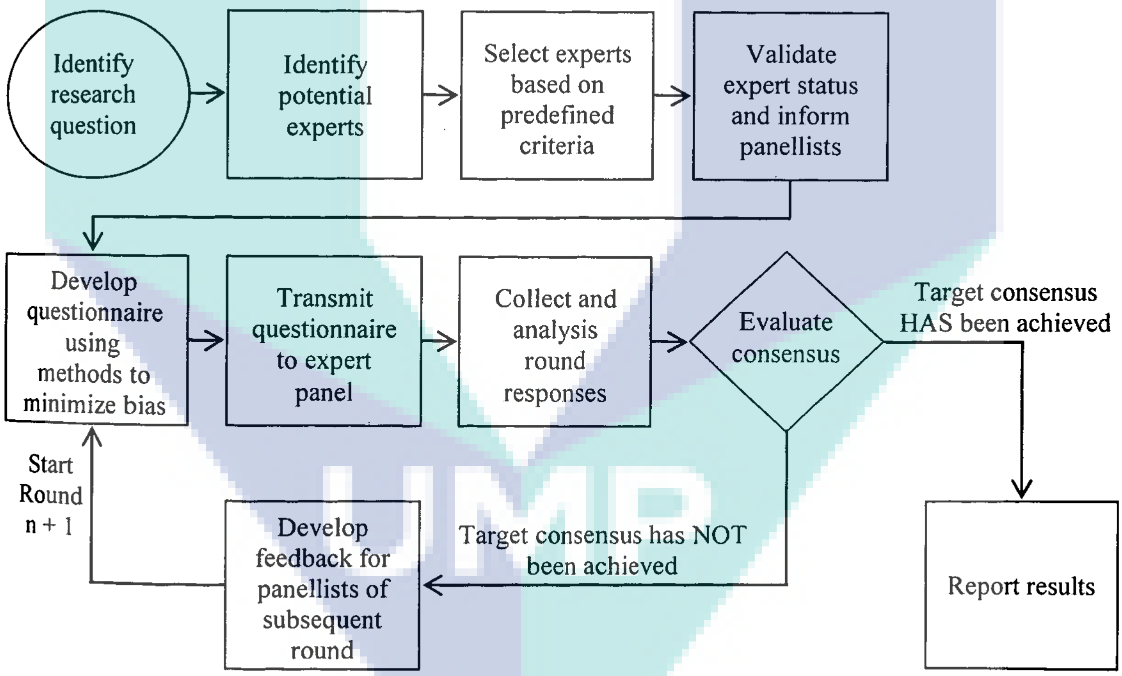

Figure 3.2 Delphi procedures for the CEM research (Source: Hallowell and Gambatese, 2010)

3.4.3 Delphi Questionnaire

In the initial round of the Delphi study, researchers have the choice to apply either an open-ended questionnaire as in the traditional Delphi process or a structured questionnaire or both structured and open-ended questionnaires as in the modified Delphi process. Open-ended questions are recognised as beneficial for increasing the richness of information collected (Powell, 2003; Okoli & Pawlowski, 2004). However, it could lead to a high attrition of experts (Hsu & Sandford, 2007). The questions could also result from issues identified during the literature reviewed as the case for a structured questionnaire (Nworie, 2011).

It should be noted that the utilised of an open-ended questionnaire or a structured questionnaire or combination of a structured and an open-ended questionnaire, is an acceptable and a common practice that often found in the academic research (Hsu & Sandford, 2007; Kalaian & Kasim, 2012). However, the use of a modified Delphi process will make sense under two conditions. First, the basic information concerning the target issue is available and usable (Kerlinger, 1973). Second, an extensive literature review has been conducted prior to the exercise of a modified Delphi (Tsu & Sandford, 2007). For the current study, a modified Delphi process consisting of a structured and open-ended questionnaire is used in the initial round as advocated by Smith, Miller, Christofferson, and Hutchings (2011), Vatalis, Manoliadis, and Charalampides (2011), Afshari and Yusuff (2012), and Zou and Moon (2014).

The modified Delphi study is similar to the traditional Delphi process in terms of its procedures. The major modification involves a set of carefully selected items structured in the initial questionnaire rather than the open-ended questionnaire. These pre-selected items may be drawn from various sources including related literature reviews, competency profiles, or interviews with experts. According to Custer, Scarcella, and Stewart (1999), the primary advantages of the modification to the Delphi process is to improve the initial round response rate, and to provide a solid grounding in previously developed work. The use of the modified Delphi study may also reduce the effects of bias due to group interaction, assuring anonymity, and providing controlled feedback to participants (Dalkey, 1972a, 1972b).

The current study is aimed to explore the indicators for the success of construction enterprise from the perspective of an entrepreneurship phenomenon. The use of such perspectives in the construction industry is rare and new. It may incur difficulties for the participants to understand the concepts, principles or terminologies used in the entrepreneurship phenomenon. Participants may provide inappropriate answers if they do not understand well the concepts of entrepreneurship and may leasing to the meaningless of the whole research effort. For that reasons and to steer the participants toward the research objectives, the author decided to use a modified Delphi process with the adoption of a structured questionnaire in the initial round. However, the open-ended questions are also provided at the end of each perspective asked.

The initial round of the Delphi questionnaire was developed from an extensive literature review and the prior experience of the author in the construction industry. This instrument consisted of demographic information, experience, qualifications and other information that would able to confirm the invited participants are experts in this field of study. Twenty three items under four different perspectives of an entrepreneurship phenomenon included in the questionnaire. Five questions about the entrepreneurial orientation, two questions on the entrepreneurial organisation, seven questions on the entrepreneurial competency, and the remaining nine questions related to the entrepreneurial environment. The questions posed were:

A. To access the success of the construction enterprise with regard to the entrepreneurial orientation dimensions, which of the following indicators do you think are important?

(i) Autonomy

(ii) Innovativeness

(iii) Risk-taking

(iv) Proactiveness

(v) Competitive aggressiveness

B. To access the success of the construction enterprise with regard to the entrepreneurial organisation dimensions, which of the following indicators do you think are important?

(i) Organisational structure

(ii) Organisational culture

C. To access the success of the construction enterprise with regard to the entrepreneurial competency dimensions, which of the following indicators do you think are important?

(i) Founder's personal competencies

(ii) Business and management competencies

(iii) Marketing competencies

(iv) Technical competencies

(v) Technological competencies

(vi) Political competencies

(vii) Social responsibility competencies

D. To access the success of the construction enterprise with regard to the entrepreneurial environment dimensions, which of the following indicators do you think are important?

(i) Finance resources

(ii) Government policies

(iii) Government programs

(iv) Entrepreneurial education and training

(v) Research and development transfer

(vi) Commercial and professional infrastructure

(vii) Internal market openness

(viii) Physical infrastructure and services

(ix) Cultural and social norms

The content of each section of the questionnaire was explained clearly including the brief description of each item asked. The participants were instructed to rate the importance of the indicators to the construction business success using the importance scale based on a five-point Likert-scale: 1 = no judgment, 2 = very unimportant, 3 = unimportant, 4 = important, and 5 = very important. Participants were also asked to list and describe any other additional indicators that they think are important and should consider in the evaluation of success indicators in the provided column at the end of every success perspective.

3.4.4 Pilot Study

A pilot study is a small-scale methodological test conducted to prepare for a main study, and is intended to ensure that methods or ideas would work in practice (Salkind, 2009). In other words, it is refers to a feasibility study that comprises small-scale versions of the planned study, trial runs of planned methods, or miniature versions of the anticipated research in order to answer a methodological question(s) and to guide the development of the research plan (Prescott & Soeken, 1989).

The Delphi study typically consists of several rounds of a questionnaire sent to a panel of pre-selected experts. The rounds of the questionnaires are structured to answer a specific research question. According to Leedy and Ormrod (2010), a pilot testing of the initial questionnaire is optional, but noted that it may help to identify ambiguities and improve the feasibility of administration of the main survey. Skulmoski, Hartman, and Krahn (2007) highlighted the need to pilot a Delphi questionnaire as to improve its comprehension, and to rectify any procedural problems. In similar veins, Moseley and Mead (2001) noted that pilot studies could offer a means to ensure greater rigour, particularly in light of criticisms about the design of the initial round questions. However, only a few Delphi studies reported undertaking the pilot studies.

Simon (2011) viewed that conducting a pilot study is a part of the research strategy, aims to resolve some logistical issues prior to the actual study such as:

(i) Check the instructions are comprehensible.

(ii) Check that investigators and technicians are sufficiently skilled in the procedures.

(iii) Check the wording of the survey.

(iv) Check the reliability and validity of results.

(v) Check the statistical and analytical processes to determine if they are efficacious.

However, a literature search revealed no clear guidelines whether to pilot the whole process, each round, or just the initial round. It has led to individual variations and lack of reporting of the pilot processes used. To increase the validity of the questions, Quinn and Sulivan (2000), and Meskell, Murphy, Shaw, and Casey (2014), for examples, piloted all the five and three rounds of their Delphi questionnaires, respectively. In another study, Cramer, Klasser, Epstein, and Sheps (2008), Hung, Altschuld, and Lee (2008), and Valdez (2009) piloted only the initial round of their Delphi studies. It is important to note that the participants of a pilot study should meet the pre-determined selection criteria but must not involve in the actual study (Linstone & Turoff, 1975).

To establish the 'best' approach for conducting a Delphi's pilot study, Clibbens, Walters, Baird (2012) reviewed twenty five Delphi research papers on health care published between 2000 and 2011. They found two approaches used by the researchers to piloting the Delphi research. First, the most common approach was to pilot the initial round of the Delphi study to increase the validity of its questions because the process of designing the questionnaire is difficult, and the initial round questions are the basis for the subsequent rounds. However, they argued that by limiting the pilot study to the initial round only would lead to the failure to test the complex processes of analysis and to measure if any shortfall occurring later in the subsequent rounds. The second approach was piloted all stages of the Delphi process to ensure the phrasing of the questions, instructions and information clearly understood.

In light of the second approach, Clibbens, Walters, and Baird (2012) considered and tested two options. First, piloted each round of the Delphi process immediately before conducting each round of the full study, and second, piloted all the rounds of the Delphi process in advance of recruiting for the full Delphi study. It is obviously seen that piloting the whole rounds of the Delphi study prior to the full study bring more advantages rather than piloted round by round as shown in Table 3.1.

Following the suggestion and a recommendation by Clibbens, Walters, and Baird (2012), the current study employed a pilot study of all rounds of the Delphi study. It was carried out in advance of recruiting for the full Delphi study. Nevertheless, for the DEMATEL technique, the pilot study was executed after the completion of the entire process of the actual Delphi survey, as shown in the following Figure 3.3.

Table 3.1 Different Approaches to Piloting the Delphi Surveys

	Pilot of the whole study	**Pilot round by round**
Benefits	▪ Full review of all aspects of the study gives a stronger sense of the whole. ▪ Review of all complex processes, improves rigour. ▪ Avoid complexity of managing two samples at the same time. ▪ Avoid unnecessary delays between rounds.	▪ Full study begins sooner. ▪ Gives contemporaneous and round-specific feedback.
Disadvantages	▪ Significantly delays the start of the full study.	▪ Cause delays between rounds, potentially increasing sample attrition. ▪ Causes added complexity by managing two samples. ▪ Danger of finding methodological problems in Round 2 or three that should have been dealt with earlier.

Source: Clibbens, Walters, and Baird (2012)

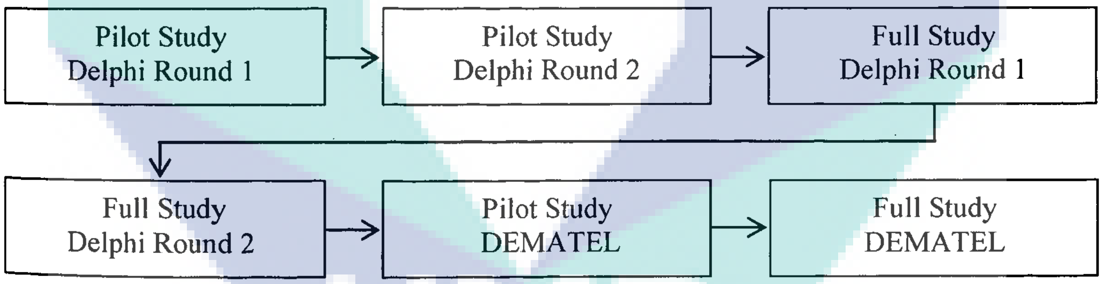

Figure 3.3 Flowchart of the pilot study process

3.4.5 Reliability and Validity

Failure to measure the worth of a study in term of the soundness of its method, the accuracy of its findings, and the integrity of assumptions made or conclusion could have awful consequences which may result in wasted time and effort (Long & Johnson, 2000). In the worst scenario, such wrong findings could result in the acceptance of dangerous or harmful practices. For that reason, the evaluation of studies is an essential pre-requisite for the application of findings. Traditionally, such evaluation has centred on assessment of reliability and validity.

3.4.5.1 Reliability

Reliability refers the extent to which data collection technique(s) yielded consistent findings. Thus, similar observations would make or conclusions reached by other researchers or there is transparency in how sense was made from the raw data (Saunders, Lewis, & Thornhill, 2014). In simple words, reliability measures the consistency and stability of the questions. However, there was no evidence in the literature indicated the reliability of the Delphi study. Hasson, Keeney, and McKenna (2000), for example, suggested that criteria for the qualitative method could be used in the Delphi study to produce the credible interpretations of the findings. The criteria based on four major issues, namely credibility (truthfulness), fittingness (applicability), auditability (consistency), and confirmability.

The attributes of the traditional Delphi make it impossible to conduct the reliability test as in the quantitative research. It is true because the questionnaire in the initial round of the traditional Delphi study typically in the form of open-ended questions where the reliability test could not possible to apply. However, the question arose, how if the initial round of the Delphi study uses a structured questionnaire as the case of the current study, can reliability measure?

To this end, the author argued that the reliability test is possible to apply to the modified Delphi study where the structured questionnaire is used especially with the use of Likert scales such as in the current study. Therefore, the current study used Cronbach's alpha coefficient analysis to test the reliability and internal consistency of each item asked in the questionnaire with the used of the Statistical Package for the Social Sciences Version 20.0 (SPSS 20.0) statistical software packages. The Cronbach's alpha correlation coefficient is the most widely accepted and commonly used statistical tools to assess the internal reliability, and, therefore, is appropriate to gauge the instrument reliability.

3.4.5.2 Validity

Hasson, Keeney, and McKenna (2000) pointed out that the basis of the Delphi process is the assumption of safety in numbers in the sense that several people are less likely to arrive at a wrong decision than a single individual. Then, the decisions will strengthen by a reasoned argument that challenged the assumptions, thus help in enhancing validity. Goodman (1987) added that the use of participants who have the knowledge and interest on the topic may help to increase the content validity of Delphi questionnaire. In addition, the use of successive rounds of the questionnaire may also help to increase the concurrent validity (Hasson, Keeney, & McKenna, 2000).

In the current study, the construction industry experts were examined based on the pre-determined criteria and only those who are qualified were selected and invited to be the expert panellists. Furthermore, the Delphi study was conducted in two subsequent rounds, thus complied with the validation criteria proposed by Goodman (1987) and Hasson, Keeney, and McKenna (2000).

In addition to the above, three more measures of validity were applied. First, the supervisors were consulted to validate the readability, content, ease of answering and the rating scale used. Second, the expert validation of the content was used to address validity issues of the questionnaire. A group of two experts from the academician's group, each one from the Universiti Malaya and the Universiti Teknologi Malaysia, were selected to review the initial round questionnaire. It aimed to ensure that all statements were valid, understandable and practical. All of them have proven research expertise in the Delphi methodology and the construction industry. These experts did not participate in any aspect of the study except in this content validity exercise. Third, a pilot study of eight construction industry experts who comply with the pre-determined criteria was conducted to test the effectiveness of the survey instrument. All of which has established the face validity of the developed instrument, therefore, the instrument is considered to be achieved the content validity.

Moreover, the Delphi survey data were statistically calculated using SPSS 20.0 statistical software packages. As the data was not large, it was controlled by the researcher's supervisor for accurate feedback in successive rounds of the Delphi process to increase validity. In case of missing data, the respondents were informed accordingly to ensure the validity of the rated measures. The used of importance scales for consensus building is to ensure that the measures achieved internal consistency.

3.4.6 Panel Composition

The success of the Delphi study clearly rests on the combined expertise of the participants in the relevant field that make up the expert panel (Powell, 2003). According to Nworie (2011), expert panellists must be experienced professionals who can provide an expert opinion on issues in their given field. They are selected because of their knowledge of their field or the issue being investigated. In other words, knowledge in a field, or subject matter area, or expertise on the issue being investigated is an essential requirement for participation of an expert panel.

To understand the expert panel, one must first recognise what an expert is. Merriam-Webster (2005) defined an expert as ‘a person with a high level of knowledge or skill in a field’. From this definition, it could be understood that an expert is restricted to those who have a high level of knowledge through a specialised training such as an engineer, scientist or medical doctor. However, this definition has excluded an individual who derives expertise from the real field experience. Cantrill, Sibbald, Buetow (1996) opposed such definition, arguing that the definition should include an individual who gains knowledge and experience of a particular field through hands-on job experience.

Needham and de Loë (1990) introduced the concept of ‘closeness’ to give more recognition to a variety of experts as shown in Figure 3.4. According to this concept, experts can be identified in terms of their ‘closeness’ to a problem or issue, and that exists along a ‘closeness’ continuum. As explained by Needham and de Loë (1990), within the ‘closeness’ continuum, an expert population comprises of individuals with subjective, mandated, and objective ‘closeness’. It can be found through individuals’ profession, occupation, training, education, experience, and other explanatory variables. Individuals (such as industry practitioners) who possess deep experiential knowledge or hands-on experience in the particular fields are classified as subjective ‘closeness’ and refer to subjective experts. On the other hand, individuals (such as academic researchers) who did research in the particular fields are classified as objective 'closeness' and refer as objective experts. Individuals (such as professional) who possess job responsibility in the particular fields are categorized as mandated 'closeness' and refer to mandated experts. 'Closeness', therefore, ensures that the participants bring a wide range of direct knowledge and experience to the decision-making process (Powell, 2003).

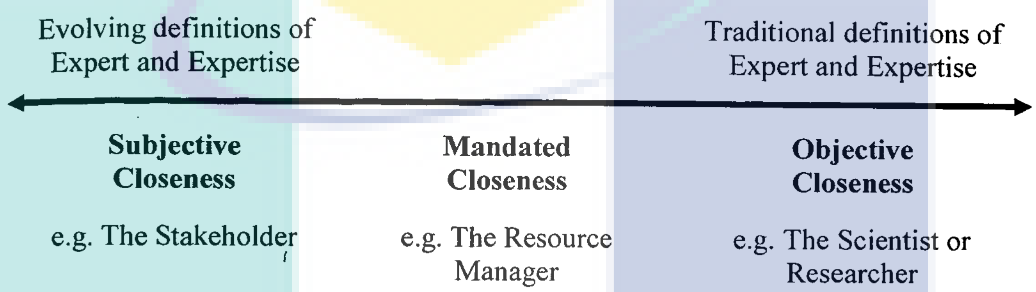

Figure 3.4 The 'closeness' continuum (Source: Needham and de Loë, 1990)

Accordingly, Delbecq, Gustafson, and de Ven (1975), and Rowe and Wright (1999) asserted that to achieve meaningful, legitimate and quality Delphi results, the research problem and survey questions must be congruent with the interests, knowledge, and skills of participant experts. Moreover, experts should represent different perspectives on the issue (Kaynak, Bloom, & Leibold, 1994), all of which represent to the 'closeness' to the subject under study.

3.4.6.1 Panel Size

The optimal size of participants in the Delphi study has not been established in previous research. As a consequence, there was a varied opinion on the prerequisite panel size. The impact of the panel size on the accuracy and effectiveness of the Delphi process has been studied by Brockhoff (1975), and Boje, Fedor, and Rowland (1982). However, none of the studies found a significant correlation between the panel size and effectiveness of the Delphi process. In a summary of Rowe and Wright (1999), the size of a Delphi panel in peer-reviewed studies ranged from a low of three members to a high of eighty. Likewise, the number of the Delphi panels as reported in previous studies within the CEM (refer to Appendix B), ranged from one to four panel with the vast majority of the Delphi studies limited to single panel only.

Some researchers have related the panel size with the group characteristics. Skulmoski, Hartman, and Krahn (2007), for example, noted that in the homogenous group, small panels of ten experts to fifteen experts are sufficient to obtain reasonable results. Paliwoda (1983), on the other hand, asserted that if the group is heterogeneous, it would be practical to solicit up to four panels from ten to eighteen members. Powell (2003) clarified that representativeness in the Delphi study is assessed on the qualities of the expert panel rather than its size because the method does not need a representative sample for statistical purposes. However, Needham and de Loë (1990) warned that larger populations may result in cost-inefficiencies that related to time, product, and iteration process. While, smaller populations may result in idea-generation paucity. In a similar vein, Skulmoski, Hartman, and Krahn (2007) noted that larger populations may greatly increase the complexity and difficulty in collecting data, reaching consensus, conducting analysis, and verifying results as well. In contrast, the larger the populations, the more convincingly the results can be said to be verified.

A scan of the fifty five studies from the year 2010 onwards found in the CEM literature as appended in Appendix B, showed that the panel members of those Delphi studies ranged from as lower as nine to a high of one hundred and five. Specifically, the panel sizes were in the following ranges: less than ten – three studies, ten to twenty – sixteen studies, twenty one to thirty – five studies, thirty one to forty – one study, eighty to ninety – one study, and more than one hundred – two studies.

It is obviously seen a significant variation in the number of participants in each Delphi panel in the CEM research. The majority of the studies reported the expert panellists within ten to twenty, represents by sixteen studies. Therefore, the researcher must appropriately design the panel size as it may affect the results quality. Nevertheless, the decisions made must be base of several factors suggested in the literature. Among the considerable factors are the purpose of the study (Cantrill, Sibbald, Buetow, 1996), the scope of the problem, the availability of resources, and the desired balance of expertise (Powell, 2003), heterogeneous or homogeneous sample, decision quality or Delphi manageability trade-off, and internal and external verification (Skulmoski, Hartman, & Krahn, 2007).

The Delphi study traditionally has been identified as best suited for objective 'closeness' (Donohoe & Needham, 2009). Nevertheless, Delbecq, Gustafson, and de Ven (1975) contended that to produce higher quality results, heterogeneous groups which characterised by experts with varied 'closeness' and different perspectives on the problem at hand, are much better than homogeneous groups. Based on the evidence from the literature and personal judgment, the author decided to form a heterogeneous group of four independent panels of five to fifteen members each. The basis of this decision is that the panel size is congruent with established methodological norms, and to allow for potential drop-out (Briedenhann & Butts, 2006). It is also small enough to ensure the respondents are all experts in their fields. The four independent panels are as follows:

(i) Contractors/developers.

(ii) Professional engineering consultants (architects, engineers, and quantity surveyors).

(iii) Government technical officers.

(iv) Academicians.

Also, the selection of the panel size is based on purposive sampling on the basis of 'closeness' to the topic under study (Donohoe & Needham, 2009). According to Polit and Hungler (2013), purposive sampling is a non-probability sampling technique where participants are not randomly selected, but instead are deliberately selected to capture a range of group characteristics. This form of sampling based on the assumption that the researcher's knowledge of the population can be used to select individuals carefully to include in the sample. Therefore, this size was deemed to be sufficient for the composition of highly qualified expert panellists.

3.4.6.2 Panel Member Qualification

A Delphi study does not depend on a statistical sample that attempts to be representative of any population. It is a group decision mechanism requiring qualified experts who have deep understanding of the issues. Therefore, one of the most critical requirements is the selection of qualified experts. As previously indicated, the characteristics required to define an individual as an expert is equivocal.

Needham and de Loë (1990) provided one of the interesting insights on the expert selection found in the literature. They asserted that two fundamental principles should guide the expert selection. First, experts must be representative of the industry or sectoral experience that relates to the subject of research. This criterion is measured in terms of demonstrated education and training (natural, social, and engineering sciences), profession and occupation (commerce, education, government, industry), and regional and sectoral affiliation (professional licensure, committee member of related associations). Second, the experts must also exhibit recognised authority or sufficient expertise. It is measured in terms of standing within the discipline of the subject under study (construction industry practitioners), standing within profession sensitive to the subject under study (contractors, developers, and professional engineering consultants), and experience with applied management and research (government technical officers, and academicians). In addition, Delbecq, Gustafson and de Ven (1975) listed another four basic criteria that should meet for the potential experts to qualify as panellists, such as:

(i) Feel personally involved in the problem of concern to the decision makers,

(ii) Have pertinent information to share,

(iii) Motivated to include the Delphi task in their schedule of competing tasks, and

(iv) Feel that the aggregation of judgments of a respondent panel will include information that they too value and to which they would not otherwise have access.

In similar veins, Alder and Ziglio (1996) asserted that the Delphi participants should meet four expertise requirements such as:

(i) Knowledge and experience with the issues under investigation,

(ii) Capacity and willingness to participate,

(iii) Sufficient time to participate in the Delphi, and

(iv) Effective communication skills.

Needham and de Loë (1990) emphasised the importance of procedural openness in the expert selection process. Literature related to the CEM research is rife with examples of expert opinion being consulted and used as an expert panel. Nevertheless, the same literature fails to demonstrate the procedural openness for selection of the most appropriate experts. Most of them only mentioned the criteria that the potential participants must have to meet. For example, a study by Agumba (2013) to identify the leading indicators of the construction health and safety performance improvement, indicated that for persons to qualify as experts, they should meet at least three of the eight pre-determined requirements (equivalent to 37.5%).

Hallowell and Gambatese (2010) provided one of the few examples of procedural openness. They offered a relative point system that allows one to select specific expert qualities more appropriate. The point system based on the relative time commitment required to complete successfully each of the achievements or experiences. It refers to the best judgment of the writers and practices of professional licensing agencies. To meet a minimum level of qualification, the panellists' score should at least one point in four different achievement or experience categories and a minimum of eleven total points is requires to qualify for participation.

In the case of the published Delphi studies in the CEM research, experts were identified exist along the 'closeness' continuum, and various combinations of expert group have been consulted. For example, in a study to identify the competencies needed for working environment of the construction projects, Sabet, Ansari, Fard, Aadal, and Raad (2014) established a homogeneous panel of mandated experts as represented by the site engineers, project managers, construction managers, and site supervisors. The external validation of their expertise was who had over seven years of experiences in the construction projects.

In their assessment on the effectiveness of risk management of the road construction project, Parera, Rameezdeen, Chileshe, and Hosseini (2014) established a heterogeneous panel comprises of mandated experts (consultants, project managers), and subjective experts (client, contractors). Zou and Moon (2014) in their development of an evaluation framework for measuring the environmental performance of a construction operation, also established a heterogeneous panel. But, in addition to mandated and subjective experts as represented by government officers, owners, and contractors, they also include objective experts as represented by academicians. However, according to Donohoe and Needham (2009), the measure of expert 'closeness' and the balance of expertise in the Delphi study is dictated by research purpose and objectives.

On the basis of the expert continuum and the participant requirements for a successful Delphi study, a description of the selection criteria for each expert panel must be clearly defined (Briedenhann & Butts, 2006). It should be based on purposively for their strong interest and knowledge in areas under study (Wright, 2006). In addition, Hollowell (2010) noted that the method of selecting expert panel should be strategic and unbiased. The following sections provide explicit guidance for qualifying individuals as experts in the CEM research.

In a study to identify the leading indicators of the construction health and safety performance improvement, Agumba (2013) indicated that for persons to qualify as experts they should meet at least three of the following eight requirements:

(i) Minimum five years of work experience in either academia or industry;

(ii) At least one professional qualification;

(iii) An editor, book, and book chapter authorship;

(iv) Minimum qualification for industry practitioners is diploma and bachelor degree for academia;

(v) Five or more publications in conference and journals;

(vi) Member or committee chair of faculty;

(vii) Safety association member, and

(viii) Offers workshop or training in health and safety.

In their assessment of selection criteria for operational variations of the design-build system, Xia and Chan (2012) adopted three of five selection criteria in order to identify eligible expert panel members, namely:

(i) Having extensive working experience in the design-build projects in the People Republic of China,

(ii) Having a direct involvement in the management of design-build projects, and

(iii) Having sound knowledge of the design-build operational variations.

In addition to the above three criteria, and to obtain the most valuable opinion, the authors added two more specific criteria, such as:

(i) For practitioners, they must have more than five years hands-on working experience in the design-build field, and

(ii) For Academicians, they should have publications related to design-build.

In a study to identify the factors affecting the choice of dispute resolution methods in the international construction research, Gad and Shane (2012) generated five criteria in selecting the expert panel, namely:

(i) At least ten years of experience in resolving international construction disputes,

(ii) Experienced in working with parties from English-speaking, Middle Eastern, and Asian countries,

(iii) Published books or articles and gave presentation/lectures on dispute resolution methods,

(iv) Experienced with various dispute resolution methods, and

(v) An engineering background (desired, but not mandatory).

In the development of a framework for evaluating the building information modelling competencies of the building owners, Giel and Issa (2014) suggested that all expert members should meet at least four criteria outlined by Hallowell and Gambatese (2010). In addition to those criteria, the expert members must also satisfy one of the following requirements:

(i) At least five years of building information modelling experience working with architectural, construction management, engineering or specialty consulting firm, and have personally worked on at least five projects in which building information modelling deliverables were exchanged at critical life-cycle phases with requirements by owners,

(ii) Employed by an owner organization which had required building information modelling for a period of six months or more and have had direct experience working with building information modelling deliverables on a minimum of five projects, and

(iii) Researcher in the building information modelling maturity or facility management domain.

In the context of the current study, the fundamental objective was to identify the indicators of success for entrepreneurs in the construction industry. It focused on the perspective of an entrepreneurship phenomenon, all of which gleaned from the advanced knowledge and experiences of the construction industry practitioners. Participants should be selected to reflect a wide range of opinions. According to Meskell, Murphy, Shaw, and Casey (2014), the panellists are experts, assumed to have some special insights that allow them to predict the future better than lay people. In addition, the findings of Vick (2002), and Simonton (2014) on the development of engineering expertise, indicated that engineering experts reach the height of their expertise between career ages of 10 and 33, corresponds to chronological ages of thirty five and fifty three.

Synthesising of the available guidelines found in the literature has provided guidelines on the criteria for expert selection for the current study. Firstly, the experts must be representative of the Malaysian construction industry. To make the study more interesting and to obtain the most valuable opinion, the author has set up different requirements for each panel as indicated in Table 3.2.

Table 3.2 Requirements for the Selection of Qualified Expert

Panel	Criteria/Requirement	Requirement
Contractors/Developers	i. At least ten years of professional experience in the construction industry. ii. A minimum of a bachelor degree in the fields directly related to the construction industry, from an accredited institution of higher learning. iii. At least five years registered as certified professional engineer, professional architect, professional quantity surveyor, or project management professional. iv. Committee member of a construction or developer associations.	Minimum two requirements.
Professional Engineering Consultants	i. At least ten years of professional experience in the construction industry. ii. A minimum of bachelor degree in the fields directly related to the construction industry, from an accredited institution of higher learning.	All three requirements.

Table 3.2 Continued

Panel	Criteria/Requirement	Requirement
	iii. At least five years registered as certified professional engineer, professional architect, professional quantity surveyor, or project management professional.	
Government Technical Officers	i. At least ten years of experience as a government officer in technical department. ii. A minimum of bachelor degree in the engineering fields, from an accredited institution of higher learning. iii. At least five years registered as certified professional engineer, professional architect, professional quantity surveyor, or project management professional. iv. Invited to present at a conference focused on the topic of the CEM.	Minimum two requirements.
Academicians	i. At least ten years of experience as the faculty member at an accredited institution of higher learning with research or teaching focus on the CEM, or other subjects related to construction industry. ii. A minimum of a master degree in the engineering or other fields related to the construction industry, from an accredited institution of higher learning. iii. Primary or secondary author of at least three peer-reviewed journal articles on the topic of the CEM. iv. Invited to present at a conference focused on the topic of CEM. v. Author and editor of a book or book chapter on the topic of the CEM, or infrastructure management. vi. At least five years registered as certified professional engineer, professional architect, professional quantity surveyor, or project management professional.	Minimum four requirements.

To qualify as an expert of the contractors/developers panel, an individual must meet at least two of the listed four requirements. It considers that register as a certified professional or a committee member of the construction association is not the mandatory requirement to become a contractor or developer. Holding an advanced degree is also not the mandatory requirement to become a contractor or developer. However, due to the nature of the current study that investigates a new aspect in the CEM literature that requires advanced knowledge and experience, hence, this requirement was also included for the the contractors/developers panel selection.

In the professional engineering consultants' panel, the individual must meet all the mandatory three requirements. In the government technical officers' panel, an individual must meet at least two of the listed four requirements. It takes into account that not all of the government technical officers have registered as professional or presenting paper in the conference.

Finally, in the academicians' panel, an individual must meet at least four of the listed six requirements. It includes a minimum of a master degree in the fields directly related to the construction industry, considering that a master holder is a minimum requirement to become a lecturer.

3.4.7 Delphi Round

Of the first priorities in conducting a Delphi study is to decide upon the questionnaire structure and the appropriate rounds (Giannarou & Zervas, 2014). The questionnaire structure such as the Likert scales choice depends on the study purpose. For example, if the researcher intention is to identify between three situations, a 3-point Likert scale should be used (Christie & Barela, 2005). The objective of rounds in the Delphi study is to reach consensus by reducing variance in responses as to improve precision. It is achieved through the use of the controlled feedback and iteration (Hallowell & Gambatese, 2010). However, the literature provides very little guidance for the acceptable number of iteration rounds.

According to Mullen (2003), Delphi is a repeated process of feedback until a consensus reach. However, if the sample is small, in most cases, no more than one round may be needed. However, to allow feedback and revision of responses, a minimum of two rounds are required (Mullen, 2003; Christie & Barela, 2005). Dietz

(1987) contended that most changes in the Delphi response would occur in the first two rounds. Nevertheless, based on the scope of study, for example, when the goal is to understand the nuances, and the sample is homogeneity, a smaller number of rounds, i.e. less than three rounds is accepted (Skulmoski, Hartman, & Krahn, 2007).

The most interesting suggestion was come from Giannarou and Zervas (2014). They suggested that the Delphi rounds are open to the choices of the researcher. The researcher may prefer to sacrifice rounds to guarantee panel participation and continuity (Landeta, 2006). Indeed, the number of rounds needs to be as few as possible as to eliminate fatigue and time pressure that result in high panel attrition (Mitchell, 1991). In fact, a highly suggestive was from the outcome of experiment by Dalkey, Rourke, Lewis, and Synder (1972) that the answers were most accurate in Round 2 and became less accurate in the subsequent rounds.

A summary of peer-reviewed Delphi studies in the CEM field, as shown in Appendix B, indicated that the number of round range from two to four. Of twenty eight Delphi studies reported, fourteen studies found the acceptable convergence after two iterations. Eight studies reached the acceptable convergence after three iterations. Five studies achieved the acceptable convergence after four iterations, and one study did not mention the iteration rounds.

Based on the above discussions, the current research study was designed to limit to two rounds of the Delphi process only. In addition, it would allowed the feedback and revision of responses as suggested by Mullen (2003), and Christie and Barela (2005). It could also eliminated the fatigue and time pressure that result in high panel attrition (Mitchell, 1991). More importantly, it was consistent with the majority of the studies found in CEM literature (see Appendix B).

3.4.8 Criteria for Attaining Consensus

One of the aims of using the Delphi method is to achieve greater consensus amongst panellists. Consensus simply means the general agreement on the subjects under investigating (Gunhan & Arditi, 2005), and is determined by measuring the variance in responses of panellists over rounds (Rowe & Wright, 1999). A greater consensus achieved when reduction in variance occurs. Although the principal aim of the Delphi study is to reach consensus among the experts, nevertheless, there is no general agreement in the literature that defines specific criteria used to determine when consensus have achieved or when to stop the Delphi process. Hence, many studies have used different measurement to measure consensus. For example, in a study to identify potential drivers of change in context of the sustainable construction in Greece, Manoliadis, Tsolas, and Nakou (2006) defined consensus as no change in the ranking of factors and a slight difference in mean.

Normally, two methods have been used to determine when to stop a Delphi process, namely stability and consensus. Stability refers to the percentage of change of variables between two subsequent rounds. Whereby, the consensus is measured by averaging the chosen percentage values of each factor (von der Gracht, 2012), and can be decided if a certain percentage of votes fall within a prescribed range (Miller, 2006).

Therefore, for the current study, the author has pre-determined the criterions to reach a consensus as shown in Table 3.3. These criterions were adopted for the Delphi process and, therefore, the indicators that achieved these criterions are considered to have reached the desire consensus. The criterions were: median 4 to 5, and 80% or more of respondents rating the indicators within 4 to 5 on the importance scale. These criterions were consistent with the studies conducted by Smith, Miller, Christofferson, and Hutchings (2011) and Hollander *et al.* (2013).

Table 3.3 Criterions to Reach Consensus

	% Response on 4 and 5 of the importance scale	**Importance median**
Consensus	80% response and above	4.00 – 5.00

3.5 DEMATEL Technique Overview

The Decision Making Trial and Evaluation Laboratory (DEMATEL) technique was developed by A. Duval, E. Fontela, and A. Gabus in 1974 at the Battelle Memorial

Institute in the Geneva Research Center (Tzeng & Huang, 2011). It was initially created for the world problem structure or 'world problematique' by analysing scientific, political, and economic problems that influenced by a complex system of different factors and involve many stakeholders. It is one of the powerful decision-making methods. In the recent years, it was adopted successfully to analyse multi-criteria problems such as in the CEM field.

The main purpose of the DEMATEL method is to analyse different factors affecting a complex system. It uses expert knowledge to better understanding the correlation between the factors, in terms of the relationships and influences between the different factors. It enables decision makers to convert the complex criteria of a system (or subsystem) into cause and effect groups to simplify the process of decision making. It also enables them to recognize the direct and indirect influences of the complex factors. Thus, this method will able to improve the understanding of the specific problematique, the cluster of intertwined problems, and contribute to the identification of workable solution by the hierarchical structure (Tzeng, Chiang, & Li, 2007; Tsai & Chou, 2009).

In the DEMATEL technique, each factor or element in the system may exert on and obtain from other higher or lower level elements, resulting in the establishment of worth importance of elements instead of considering specific elements (Fontela & Gabus, 1976). The method is considered as one of the structural modelling techniques that can identify the interdependence among the factors of a system through a causal diagram (Wu & Lee, 2007; Mavi, Kazemi, Najafabadi, & Mousaabadi, 2013). The causal diagram uses diagraphs rather than directionless graphs to portray the basic concept of the contextual relationships among the element of a system and the value represent the strength of influences (Wu, 2008; Mavi, Kazemi, Najafabadi, & Mousaabadi, 2013). Hence, the method can convert the relationships between cause and effect elements into an intelligible structural model of the system, and also can propose the most important elements that affect other elements (Fontela & Gabus, 1976).

The DEMATEL technique has widely accepted and considered as one of the best tools to solve the cause and effect relationship among the evaluation criteria. Some reported studies within the CEM that used the DEMATEL method were related to sustainable building (Hiete, Kühlen, & Schultmann, 2011), project team (Jeng, 2011), supply chain (Poloie, Fazli, Alvandi, & Hasanlo, 2012), project risk assessment (Samani & Shahbodaghlou, 2012), project complexity (Sedaghat-Seresht, Fazli, & Mozaffari, 2012), procurement (Hoseilalipour, Mohammadhasanzadeh, & Hafezi, 2013), project interface management (Tian, 2013), and selection of contractors (Taheri & Iranban, 2015).

3.5.1 Advantages and Disadvantages of DEMATEL Technique

Although the DEMATEL technique has successfully used in its applications of solving complex problems, nevertheless, several advantages and disadvantages have been reported in the literature. Teng (2002) summarised the advantages of group decision making as such in the DEMATEL technique includes, among other things, the following:

(i) Draw on the collective wisdom and absorb all useful ideas.

(ii) Increasing creativity.

(iii) Facilitating participant, and understanding.

(iv) Minimising personal subjectivity.

(v) Minimising differences and ensuring relatively equal participation (Brahm & Kleiner, 1996).

In contradictory, the DEMATEL technique might have its constraints. Among others, the disadvantages of the DEMATEL technique as summarised by Teng (2002) include the following:

(i) Risk-avoidance phenomena.

(ii) Controlled by a minor group of people.

(iii) Uncertainty in responsibilities.

(iv) Emphasis on trivial things.

(v) Time consuming and higher costs.

(vi) Lacks of flexibility by only being able to deal with one problem at a time.

3.5.2 DEMATEL Process

Although the identified indicators emerged from the Delphi study could be used as the success indicators for the construction enterprise, nevertheless, it is unrealistic to improve all these factors simultaneously with limited resources. Moreover, it cannot be discounted that the success of the construction business may also result from the interrelationships among these indicators. The interdependent relationships between the indicators must be confirmed. Therefore, in order to improve the indicators more effectively, the DEMATEL technique was used. For example, if the availability of financial resources is amongst the success indicators, it would relate to the business and management competencies, risk taking, national economic growth, government policies and political stability as well. Similarly, if the marketing competencies are amongst the success indicators, it would relate to the competitive aggressiveness, risk-taking, national economic growth, government policies and political stability. Likewise, if the success indicators are organisational culture, business and management competencies, innovativeness, technical competencies, and technological competencies, it would work if the companies have an appropriate organisational structure. Consequently, there is a network structure among the indicators. The DEMATEL method is a suitable mechanism for verifying the relationships.

Therefore, this current study applied the DEMATEL method to determine the relationships of a network structure and its degree of independence. Based on the work of Wu and Lee (2007), Shieh, Wu, and Huang (2010), Liu, Tzeng, and Lee (2012), Wang, Lin, Lin, Chung, and Lee (2012), and Tsai, Lin, Lee, Chang, and Hsu (2013), the following Figure 3.5 diagrammed the procedure of the DEMATEL technique.

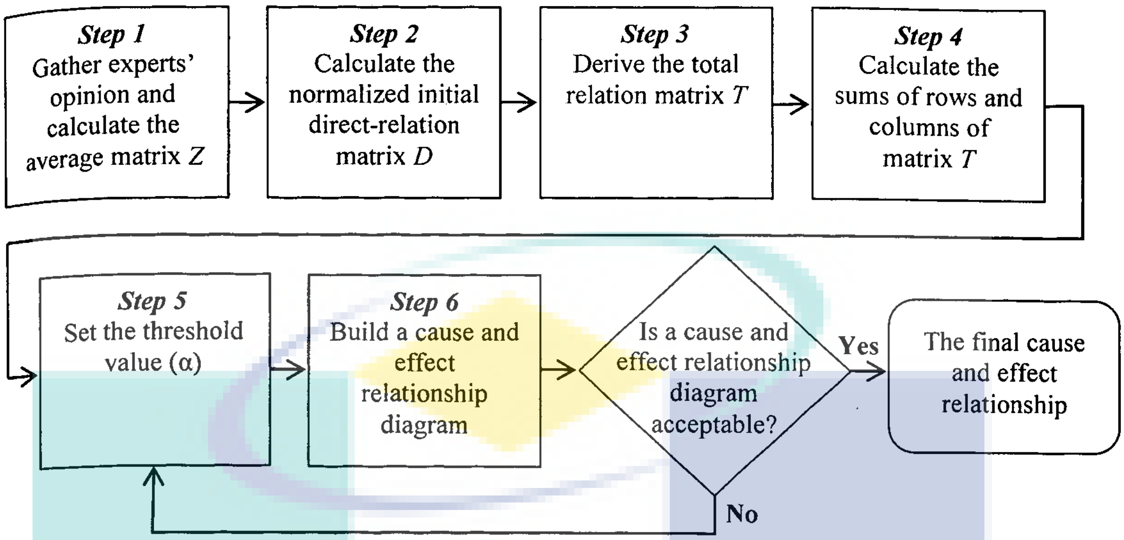

Figure 3.5 Steps of the DEMATEL technique

For clarification, the following Section 3.5.2.1 to 3.5.2.6 discussed the primary DEMATEL procedures.

3.5.2.1 Step 1: Generating the Initial Direct-relation Matrix *Z*

In the first step of DEMATEL technique, a group of experts is asked to indicate the level to which they believe that any of the factors influence each other. In the current study, the integer score of 0 (no influence), 1 (weak direct influence), 2 (moderate direct influence), and 3 (strong direct influence), were used for measuring the relationship between different factors. Let consider a group of m experts and n factors. Each expert is asked to view the degree of direct influence between two factors based on the pairwise comparison. The degree to which the expert perceived factor i affects on factor j is denoted as x_{ij}. For each expert, a n x n non-negative matrix is constructed as $X^k = [x^k_{ij}]$, where k is the expert number of participating in the evaluation process with $1 \leq k \leq m$. The mathematical notation can be formulated as below:

$$\boldsymbol{X} = \begin{bmatrix} 0 & x_{12} & \cdots & x_{1n} \\ x_{21} & 0 & \cdots & x_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ x_{n1} & x_{n2} & \cdots & 0 \end{bmatrix}$$

Thus, we have X^1, X^2, X^3,..., X^m matrices from m experts, and each element of X^k is an integer in the range of the influence scale, representing the degree of factor i influencing factor j, and denoted by x_{ij}. The main diagonal elements of each answer matrix x_{ii} are set to zero because DEMATEL does not evaluate the self-influence of the factors.

To aggregate all judgements from m experts, an average matrix $\boldsymbol{Z} = [z_{ij}]$ is constructed by calculating the average influence quantification as below:

$$z_{ij} = \frac{1}{m}\sum_{i=1}^{m} x_{ij}^{k} \tag{3.1}$$

This matrix $\boldsymbol{Z}$ is also called the initial direct relation matrix. It shows the initial direct effects that a factor exerts on and receives from other factors. This direct relation matrix can also depict in an influence map.

3.5.2.2 Step 2: Normalising the Initial Direct-relation Matrix *D*

The second step is to calculate the normalized direct relation matrix D from the average matrix $\boldsymbol{Z}$. It can be done by dividing each element by the largest row sum of the average matrix, as in the original DEMATEL method. Some recent applications of the method also used the largest row or column sum as the standard for normalization. Factor $max_{1 \le i \le n} \sum_{j=1}^{n} z_{ij}$ represents the total direct influence on the influence scale of the factor with the most direct influence on the other factors.

This normalisation step is for the preparation for the following steps of DEMATEL where indirect influences are calculated and provides an aligned scale for all factors for these calculations. The normalised initial direct-relation matrix $D = [d_{ij}]$, where the value of each element in matrix D is ranged between [0,1]. The calculation is shown below:

$$D = \frac{Z}{s} \tag{3.2}$$

$$\text{Where,} \qquad s = \max_{1 \le i \le n} \sum_{j=1}^{n} z_{ij} \tag{3.3}$$

3.5.2.3 Step 3: Obtaining the Total-relation Matrix *T*

In this step, the direct/indirect or total-relation matrix is calculated. However, in the research study, the experts have estimated the effects only. It assumed that the indirect effects of the influence factors (factor *a* influences factor *b and* factor *b* influences factor *c*, thus factor *a* also indirectly influences factor *c*) are lower than the direct effects. The increasing indirections the indirect influence matrix converges to the null matrix as shown below:

$$\lim_{k \to \infty} D^k = 0$$

Where 0 is the null matrix, and with *I* is an *n* x *n* identity matrix, the following hold true:

$$\lim_{k \to \infty} \left(I + D + D^2 + \ldots + D^k \right) = (I - D)^{-1}$$

The total relation matrix T is, therefore, defined as:

$$T = D(I - D)^{-1} \tag{3.4}$$

3.5.2.4 Step 4: Computing the sums of rows and columns of matrix *T*

In the total-relation matrix *T*, the sum of rows and the sum of columns are represented by vector *R* and *D*, respectively. Let *R* and *D* be *n* x 1 and 1 x *n* vectors representing the sum of rows and the sum of columns in the total-relation matrix *T*. Now, if D_i is the sum of the *i*th row of the matrix *T*, then:

$$(D_1 \cdots D_n) \quad \text{with} \quad D_j = \sum_{i=1}^{n} t_{ij} \quad \text{where } (j = 1, 2, \ldots, n) \tag{3.5}$$

It summarises both the direct and indirect effects that factor i exerts on the other factors. Similarly, if R_j is the sum of the jth column in the matrix T, then:

$$\begin{bmatrix} D_1 \\ \vdots \\ D_n \end{bmatrix} \quad \text{with} \quad D_i = \sum_{j=1}^{n} t_{ij} \quad \text{where } (i = 1, 2, \ldots, n) \tag{3.6}$$

It summarises the direct and indirect effects that factor j receive from the other factors. When $i = j$, the sum $(D_i + R_i)$ shows the total effects given and received by factor i, thus:

$$(D_i + R_i) = \sum_{j=1}^{n} t_{ij} + \sum_{k=1}^{n} t_{ik} \tag{3.7}$$

It represents the degree of importance of factor i in the entire system. The difference indicates the net effects that factor i contributes to the system and is shown below:

$$(D_i - R_i) = \sum_{j=1}^{n} t_{ij} - \sum_{k=1}^{n} t_{ik} \tag{3.8}$$

Specifically, if $(D_i - R_i)$ is positive, the influence factor i is a net cause, while if $(D_i - R_i)$ is negative, factor i is a net receiver.

3.5.2.5 Step 5: Setting the Threshold Value, α

The threshold value, α was computed by the average of the elements in matrix T. This calculation aimed to eliminate some minor effects elements in matrix T and is shown below:

$$\alpha = \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} [t_{ij}]}{N} \quad \text{where } N \text{ is the total number of elements in matrix } T \tag{3.9}$$

3.5.2.6 Step 6: Building the Cause and Effect Relationship Diagram

The cause and effect diagram is constructed by mapping all coordinate sets of $(D_l + R_l, D_l - R_l)$ to visualize the complex interrelationship. It provides information to judge which the most important factors are and how influence affected factors (Shieh, Wu, & Huang, 2010). The factors that t_{ij} is greater than α are selected and shown in cause and effect diagram (Yang, Shieh, Leu, & Tzeng, 2008).

Based on the coordinate positions of $(D_k + R_k)$ and $(D_k - R_k)$, the factors can be divided into the following four types (Tsai *et al.*, 2015):

(i) $(D_k - R_k)$ is positive and $(D_k + R_k)$ is large: This indicates that the factors are causes, which are also driving factors for solving problems.

(ii) $(D_k - R_k)$ is positive and $(D_k + R_k)$ is small: This indicates that the factors are independent and can only influence a few other factors.

(iii) $(D_k - R_k)$ is negative and $(D_k + R_k)$ is large: This indicates that the factors are the core problems that must be solve, however, these are effect-type attributes which cannot be directly improved.

(iv) $(D_k - R_k)$ is negative and $(D_k + R_k)$ is small: This indicates that the factors are independent and can be influenced by only a few other factors.

For the management implications of each type of the causal relationship diagram, Han, Hsu, and Yeh (2015) simplified the four types of factors into four quadrants as shown in the following Figure 3.6.

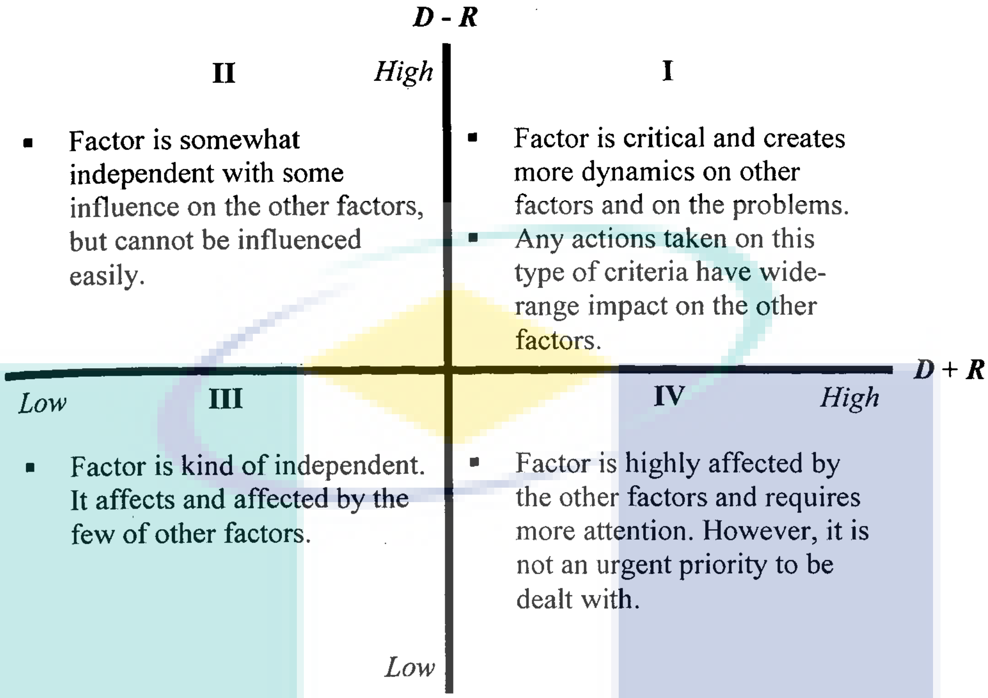

Figure 3.6 Interpretation of the causal diagram (Source: Han, Hsu, and Yeh, 2015)

3.6 Delphi-DEMATEL Process

A list of reliable success indicators was abstracted from an extensive entrepreneurship literature review. These indicators were the basis for the development of the structured questionnaire in the initial round of the Delphi study. The questionnaire was sent to the supervisors to validate the readability, content, ease of answering and the rating scale used. At the same time, the questionnaire was sent to the two experts from academician's group who have proven research expertise in the Delphi methodology and the construction to ensure that all statements were valid, understandable and practical. The questionnaire was refined to accommodate the suggestions and comments received. The questionnaire was then piloted to eight participants to improve its comprehension, and to rectify any procedural problems. Again, the questionnaire was refined based on the suggestions and feedbacks received. The final questionnaire was then electronically sent via email in two rounds of the Delphi procedure to a panel of thirty nine purposely selected construction industry experts from October 2014 to January 2015.

With regards to the experts' selection, in the initial stage, the potential respondents were contacted via telephone call asking their willingness to participate in the study. During this stage, the details of the study, including the purpose of the study and a brief description of the commitment needed from them were briefly explained. Following their verbal agreement, the official invitations letter was delivered electronically to the prospective Delphi experts. The prospective Delphi experts were invited officially to form the experts' panel for the study. The official invitations letter consisted of introductory questionnaires that provide the introduction to the study include an explanation of the theory underpinning the study. It also explained the responsibilities of the respondent in participating in the study. At the end of the introductory questionnaire, the 'Participation Consent Form' was also included. Together with this letter, the 'Research Confirmation Letter from UMP', and the 'Professional Profile' were also attached. In the 'Participation Consent Form', the brief description of the study, responsibility of participation such as voluntary, withdrawing the participation at any time during the project without any comment or penalty, and involvement to answer the questionnaires were clearly stated. Prospective experts were also informed about the risks of being participate, and confidentiality of their comment and responses. In addition, they were given opportunity to ask any question or information regarding the study. Finally, they were required to return signed copies of the consent forms to record their agreement and willingness to take part in the survey. Those who returned signed the consent forms will select officially as the expert panel of the study. In compliance with research ethics policy, the survey did not start until all participants returned the concerned forms. The sample of the introductory questionnaire is appended in Appendix C.

The current work was carried out in two phases, simultaneously. The analysis of participants' input was done at the end of each phase to assess for themes and to look for consensus and disagreements among participant responses. In Phase 1, a modified Delphi study offering participants four major perspectives of an entrepreneurship phenomenon consisted of twenty three questions in the format of structured and open-ended for feedback was applied. The Delphi study was limited to two rounds of the iteration process. The content of each section of the questionnaire clearly explained the indicators include the brief description of each indicator. The participants were instructed to rate the importance of the indicators to the construction business success and survival. It used the importance scale based on a five-point Likert-scale: 1 = no judgment, 2 = very unimportant, 3 = unimportant, 4 = important, and 5 = very important. The sample of the initial round questionnaire is appended in Appendix D. In addition, participants were also asked to list and describe additional indicators that they think are important and should consider in the evaluation of success dimensions in the provided column. The questionnaire was sent electronically to the qualified expert panellists. After receiving subjects' responses, the data was analysed in term of group mean and median.

In the second round and the final round of the Delphi process, each panellist received a second questionnaire including the additional indicators suggested by participants in the initial round, if any. The results of the previous round in term of group mean and median of each construct were included in the questionnaire. Also, the individuals' response to the previous round was also stated. In this round, panellists were asked to revise his/her judgments provided in the previous round. This round gives the Delphi panellists an opportunity to make further clarifications of both the information and their judgments of the relative importance of the items. After receiving subjects' responses, the data was analysed to determine the consensus. The aim of this Phase 1 was to abstract a set of reliable success indicators for the construction enterprise by gathering the expert's opinions. Appendix E appended the sample of the second round questionnaire.

Upon completing the two rounds of Delphi iterations in Phase 1, Phase 2 of the study was carried out using the DEMATEL technique, subsequently. The DEMATEL technique is applied to confirm quantitatively the interdependent relationships between the abstracted indicators, which had achieved consensus in the previous stage. The questionnaire was designed in the matrix format. It included a pairwise scale and designated into three levels. The scores of 0, 1, 2, and 3 represent no influence, weak direct influence, moderate direct influence, and strong direct influence.

A pilot study of eight participants was then conducted prior to the full DEMATEL study. Participants were asked to indicate the direct influence (or dominance) that they believe an indicator exerts on each of the other indicators based on the provided influence scale. After receiving subjects' responses, the data was analysed by procedures as previously said.

3.7 Developing the Constructionpreneurial Business Success Checklist

3.7.1 Phase 1: Designing the Constructionpreneurial Business Success Checklist

This phase entailed the design and development of the constructionpreneurial business success (CBS) checklist. The list of initial items for the checklist was based on the results of two iterations round of the Delphi study. Specifically, all indicators that achieved consensus in the Delphi study were admitted as the initial items for the CBS checklist.

3.7.2 Phase 2: Refining the Constructionpreneurial Business Success Checklist

The initial items of the CBS checklist was then refined based on the results of the DEMATEL technique. The items that have shown the interrelations among each other in term of causes and effects were retained, and those did not have any relationship with other variables were deleted from the checklist.

3.7.3 Phase 3: Validating the Constructionpreneurial Business Success Checklist

Validity is defined as the extent to which data collection method or methods accurately measure what they were intended to measure (Saunders, Lewis, & Thornhill, 2011). In simplest words, validity is about the test or instrument that is used actually measures what suppose to be measured. However, Salkind (2009) stressed that the validity of an instrument must be defined within the context of how the test is being used, and is classified in three aspects such as:

(i) Validity refers to the results of a test, not to the test itself.

(ii) Validity is about valid or invalid, and occurs in degrees from low validity to high validity.

(iii) Validity must be interpreted within the context in which the test occurs.

The aim of the validity process is to generate a body of evidence on the ability of the instrument to measure what intended to measure, hence, increasing the confidence level of the potential users. Thus, the validation process requires accumulating evidence from different sources. The main sources of validity evidence are content validity, construct validity, and criterion-related validity or predictive validity (Saunders, Lewis, & Thornhill, 2011).

It is important to highlights that emphasising have been given to the criterion-related validity. An assumption was that the criterion with which the test is being compared has some intrinsic value as a measure of some trait or characteristic (Salkind, 2009), often undertaken using statistical analysis such as correlation (Saunders, Lewis, & Thornhill, 2011). To accomplish this, a field study was conducted to measures the criterion-validity of the CBS checklist. It was conducted using face to face interviews protocol. The selected construction enterprises were asked to use the CBS checklist as a self-assessment tool to evaluate their performance. In this regards, the owner or director of the construction enterprise were appointed as the participants. It was then followed by the interview to get feedback about the benefits of using the CBS checklist, and potential improvements to it were also included. In this way, the field study provided data to examine the psychometric properties of the CBS checklist, evaluated from the intended users' perspective (i.e. constructionpreneurs).

The respondents were asked to rate each item on the CBS checklist based on their perception of the current situation in their organisations. In addition, they were invited to provide feedback, in the form of narrative data, about the utility of the CBS checklist in determining their performance, and its potential benefits guiding their performance toward achievement of the overall corporate success. The demographic questions to explore the characteristics of the construction enterprises were also included.

The data gathered from this phase of the validation process included both quantitative and qualitative procedures. Descriptive statistics, including mean score and standard deviation for each item and each component of the CBS checklist are provided. Correlations between components, inter-item correlations by component, and correlations between all the items on the CBS checklist were estimated using Pearson product-moment correlation coefficient. The correlation coefficients were interpreted based on the guidelines provided by Pallant (2010), such as: r = ±.10 to ±.29 = low; r = ±.30 to ±.49 = moderate; r = ±.50 to ±1.0 = high.

In addition, Cronbach's alpha coefficient was estimated to determine the internal consistency coefficient is appropriate when there is no right or wrong answer to each item and when items contain a range of possible answers. The guidelines provided by George and Mallery (2010) were used in interpretation of Cronbach's alpha coefficient, such as: $\alpha \geq .9$ = excellent; $\alpha \geq .9$ = excellent; $\alpha \geq .8$ = good; $\alpha \geq .7$ = accepted; $\alpha \geq .6$ = questionable; $\alpha \geq .5$ = poor; and $\alpha < .5$ = unacceptable.

The qualitative analytic procedures involve the transcription and examination of the responses from all questions asked in the interview phase. The coding of the data by question was conducted independently by author with the guided of the supervisors. Percentage of agreement was estimated as [agreement/(agreement + disagreement) x 100%].

3.8 Chapter Summary

This chapter elaborated the procedures adopted for conducting this research effort, including the selection of methodology and its justifications. A mixed methods approach was selected as the most appropriate methodology in the context of this research. Based on the evidence provided by the CEM literature, an integration of the Delphi study and DEMATEL technique were selected to solicit data for the study. The processes of the Delphi study and the DEMATEL technique were elaborated, including how it used as a constructivist approach that straddled between qualitative and quantitative approach. The strength and weakness of both methods were also discussed.

The procedures in the selection of the expert panellists including the panel size were also discussed. The quality of the research in term of reliability and validity has also been outlined. The discussion on the Delphi-DEMATEL process was also provided. Finally, this chapter ended with the discussions on the development and validation of the CBS checklist. The conceptual research model and the methodologies described above set the cornerstone for the chapter to come. Chapter 4 presents the findings of the research and discussions on the results, before conclusions and recommendations presented in the subsequent chapter.

CHAPTER 4

ANALYSIS AND FINDINGS

4.1 Preamble

This chapter presents the procedures used to analysis the data and summarizes the main themes discovered from the research effort. The themes were associated with the areas of inquiry described in Chapter 1. The research questions that guided the current study include: RQ_1 – What are the relevant indicators from the perspectives of an entrepreneurship phenomenon that can be employed to evaluate the success of the construction enterprise? RQ_2 – Which of the identified indicators is perceived to be important for the success of the construction enterprise? RQ_3 – How do the indicators impacted the success of the construction enterprise in term of causes and effects? RQ_4 – What checklist can be advocated to the success of the construction enterprise? These specific questions enabled the answer to the overarching research question: What are the success indicators for entrepreneurs in the construction industry?

As indicated earlier, the current study adopted a mixed methods approach of the combination of the modified Delphi study and the DEMATEL technique. The data collection utilized three rounds of sequential questionnaires to gather feedback from the panel of the construction industry experts. The first two rounds were the Delphi study, and the third and final round utilized the DEMATEL technique. The survey was conducted electronically via an Internet-delivered survey. Prior to the execution of the full study, a pilot study was undertaken to assure the quality and the delivery mechanism of the questionnaire viability.

Through the networking of the construction industry practitioners and the academicians, suitable participants matching the intent of the study emerged. The participants were currently involved in the Malaysian construction industry either as the contractors or developers or professional engineering consultants (architect, engineer, and quantity surveyor) or government technical officers or academicians. Each participant was qualified as an expert based on the pre-determined criteria as previously described in Chapter 3.

4.2 Research Question 1

To answer the first research question, an extensive literature review was conducted. Drawing upon the findings from the entrepreneurship literature as discussed in Section 2.7 and Section 2.10 of Chapter 2, twenty three variables were abstracted to form a list of relevant indicators that can be used in evaluating the success of the construction enterprise. As presented in Table 4.1, the variables were categorised under four perspectives of an entrepreneurship phenomenon.

Five variables, namely autonomy, innovativeness, risk-taking, proactiveness, and competitive aggressiveness listed under the entrepreneurial orientation dimension. Two variables listed under the entrepreneurial organisation dimension were organisational structure and organisational culture. Seven variables namely, founder's personal competencies, business and management competencies, marketing competencies, technical competencies, technological competencies, political competencies, and social responsibility competencies found to be the dimension of the entrepreneurial competency. Another nine variables, namely financial resources, government policies, government programs, entrepreneurial education and training, research and development transfer, commercial and professional infrastructure, internal market openness, physical infrastructure and services, and cultural and social norms included in the entrepreneurial environment dimension.

All of these variables have sufficiently explored and used in many previous studies and may have validity on their effect to the organisational performance.

Table 4.1 Variables Abstracted from the Entrepreneurship Literature

Item	Dimension	Variable
1.	Entrepreneurial Orientation	i. Autonomy ii. Innovativeness iii. Risk-taking iv. Proactiveness v. Competitive aggressiveness
2.	Entrepreneurial Organisation	i. Organisational structure ii. Organisational culture
3.	Entrepreneurial Competency	i. Founder's personal competencies ii. Business and management competencies iii. Marketing competencies iv. Technical competencies v. Technological competencies vi. Political competencies vii. Social responsibility competencies
4.	Entrepreneurial Environment	i. Financial resources ii. Government policies iii. Government programs iv. Entrepreneurial education and training v. Research and development transfer vi. Commercial and professional infrastructure vii. Internal market openness viii. Physical infrastructure and services ix. Cultural and social norms

4.3 Research Question 2

The second research question was answered through the employment of a modified Delphi study. A list of reliable indicators emerged from analysis data of the two iterations round of a Delphi study. The following sections provide the details of the data analysis and findings.

4.3.1 Panel Composition

Individuals who are currently involved in the Malaysian construction industry were contacted and asked for their willingness to participate. The potential individuals were from four heterogeneous groups of the construction industry stakeholders, namely contractor/developer, professional engineering consultant, government technical officer, and academician. The lists of the potential experts were abstracted from the official website, includes:

(i) Construction Industry Development Board, Malaysia.

(ii) Board of Engineers, Malaysia.

(iii) Board of Architects, Malaysia.

(iv) Board of Quantity Surveyors, Malaysia.

(v) Public Works Department of Malaysia.

(vi) Drain and Drainage Department of Malaysia.

(vii) Universiti Malaya.

(viii) Universiti Sains Malaysia.

(ix) Universiti Teknologi Malaysia.

(x) Universiti Malaysia Pahang.

In total, forty two potential experts were identified and contacted via telephone call asking their willingness to participate in the current study. During this stage, the details of the study, including the purpose of the study and a brief description of the commitment needed from the experts were briefly explained. Following their verbal agreement, the official invitation letter and the 'Participation Consent Form' were sent out via email (see Appendix C). In compliance with research ethics policy, the survey did not start until all participants returned the concerned forms.

Thirty nine experts officially agreed to take part in the current study. The list of expert panellists and qualification is appended in Appendix D. However, to maintain the confidential addressed by research ethics policy, the name of the expert panellists were coded individually. For example, E1 represented expert number one, and this coded was applicable for all other expert panellists. In addition, any published data were not identifying individuals, the institution, or organisations. It was consistent with others electronically transmitted Delphi studies such as in the doctoral researches of Hallowell (2008), and Agumba (2013).

The composition of the experts consisted of eleven for the contractor's and developer's panel, ten for the professional consultant's panel, eleven for the government technical officer's panel, and seven for the academician's panel. The academician's panel were from five leadings Malaysian public universities, each two from the Universiti Malaya, the Universiti Teknologi Malaysia, and the Universiti Malaysia Pahang, and one from the Universiti Sains Malaysia. This size was deemed to be sufficient with the composition of highly qualified expert panellists.

4.3.2 Demographic Characteristics of the Expert Panel

A list of thirty nine construction industry experts consisted of contractors/developers, professional engineering consultants, government technical officers, and faculty members have been placed. The same panel experts were employed for both the Delphi study and DEMATEL technique. All thirty nine experts returned the Round 1 questionnaire, represents 100% response rate. Table 4.2 illustrated the profile of the experts' panellists and confirms that the experts were experienced professional who can provide an opinion on the issues under study, as a result from the Round 1 of the Delphi Study.

Table 4.2 Profile of the Expert Panellists

Characteristic	**Classify**	**N**	**%**
Group	Contractor/Developer	11	28.2
	Professional Engineering Consultant	10	25.6
	Government Technical Officer	11	28.2
	Academician	7	18.0
	Total	*39*	*100.0*
Gender	Male	34	87.2
	Female	5	12.8
	Total	*39*	*100.0*

Table 4.2 Continued

Characteristic	Classify	N	%
Age	31-40	6	15.4
	41-50	10	25.6
	51-60	18	46.2
	Over 60	5	12.8
	Total	*39*	*100.0*
Current Designation	Owner/Director	11	28.2
	Principal	10	25.6
	Senior Engineer	11	28.2
	Lecturer	2	5.1
	Senior Lecturer	1	2.6
	Associate Professor	2	5.1
	Professor	2	5.1
	Total	*39*	*100.0*
Education Background	Bachelor degree	24	61.5
	Master degree	11	28.2
	PhD degree	4	10.3
	Total	*39*	*100.0*
	Average (Journal, Book, Book's Chapter, and Conference)	*8.4 journals/expert*	
Industrial and Academic Experience	Contractor/Developer	296 years	36.5
	Professional Engineering Consultant	208 years	25.7
	Government Technical Officer	306 years	37.8
	Total (Industrial Experience)	*810 years*	*100.0*
	Academia	127 years	100.0
	Total (Academic Experience)	*127 years*	*100.0*
	Total Industrial and Academic Experience	*937 years*	
	Average Industrial Experience	*20.8 years/expert*	
	Average Academic Experience	*3.3 years/expert*	
	Average Industrial and Academic Experience	*24.0 years/expert*	
Professional Licensure	0-4	-	-
	5-10	19 years	70.3
	11-20	5 years	18.6
	Over 20	3 years	11.1
	Total	*27 years*	*100.0*
Committee Member of NGO's Association	The Malay Contractors Association	2	8.7
	The Real Estate and Housing Developers' Association, Malaysia	1	4.3
	The Institution of Engineers, Malaysia	18	78.3
	The Institute of Value Management, Malaysia	1	4.3
	Others	1	4.3
	Total	*23*	*100.0*

Thirty nine construction industry practitioners have been recruited as the experts in this survey. Of those experts, 11 or 28.2% were contractors/developers, 10 or 25.6% were professional engineering consultants, 11 or 28.2% were government technical officers, and 7 or 18.0% were academicians. The combination of experts from various disciplines of the construction industry includes practitioners and academicians from different public universities makes this study unique and interesting. The uniqueness of this expert's composition should alleviate any biases that might occur in the findings of this study.

The experts were predominately male (N = 34, 87.2%), which indicates that the majority of the construction industry experts were male, which coincides with the study of Agumba (2013). Of the thirty nine participants, 15.4% (N = 6) of the experts were between 31 to 40 years old of age, 25.6% (N = 10) were between 41 to 50 years old, 46.2% (N = 18) were between 51 to 60 years old, and another 12.8% (N = 5) were over 60 years old. This output indicates that all of the experts have a vast experience in the construction industry.

The current designation held by the experts from contractors/developers' panel was the manager/owner (N =11, 28.2%), and professional consultants' panel was the principal (N = 10, 25.6%). For government technical officers' panel, the current designation held by all of the experts was senior engineers (N = 11, 28.2%). For academicians' panel, the current designation held by the experts was lecturers (N = 2, 5.1%), senior lecturer (N = 1, 2.6%), Associate Professors (N = 2, 5.1%), and Professor (N = 2, 5.1%). This outcome concurs with the studies within the construction industry of Afshari, Yusuff, and Derayatifar (2012), and Wu and Wang (2013) who used a mixture of experts to eliminate biases of response.

In related to the education background, 61.5% (N = 24) of the experts held bachelor degree, 28.2% (N = 11) held master degree, and the balance 10.3% (N = 4) held doctorate degree. These outcomes were consistent with the previous findings of Wu and Wang (2013) and also parallel to the work of Hallowell and Gambatese (2007) who asserted that the experts' level of education qualification is one of the important attributes when selecting experts in the Delphi study.

The experts had extensively contributed to the body of knowledge in the construction industry through the academic publications at an average of 8.4 journals and conference papers per expert. 36.2% (N = 119) were published in peer-reviewed journals, 7.6% (N = 25) were book or book's chapter, and another 56.2% (N = 185) were conference presentation.

The accumulated years of industrial experience of the experts was 810 years at an average of 20.8 years per expert and the accumulated years of academic experience was 127 years at an average of 3.3 years per expert. The accumulated experience of the experts for both industrial and academic was 937 years at an average of 25.0 years per expert. In previous studies, Hallowell and Gambatese (2007), and Rajendran and Gambatese (2009) indicated that experts should have sufficient experience. Indeed, in the studies within the construction industry conducted by Rajendran and Gambatese (2009), and Agumba (2013) reported that experts average experience was 15.5 years per expert and 14.9 years per expert, respectively, which is lesser than the current findings.

69.2% (N = 27) of the experts were professionally registered to practice with professional bodies. 37.0% (N = 10) of the experts were registered less than 5 years, 33.3% (N = 9) registered between 6 to 10 years, 18.6% (N = 5) registered between 11 to 20 years, and 11.1% (N = 3) have accredited as professional for more than 20 years.

59.0% (N = 23) of the experts were found to be the committee members of the NGO's Association, of which 8.7% (N = 2) of them were committee members of the Malay Contractors Association, Malaysia, 4.3% (N = 1) was committee member of the Real Estate and Housing Developers' Association, Malaysia, 78.3% (N = 7) were committee members of the Institution of Engineers, Malaysia, 4.3% (N = 1) was committee member of the Institute of Value Management, Malaysia, and the remaining 4.3% (N = 1) was the expert panel of the Malaysia Qualifications Agency.

The most significant aspect of the findings from these demographic characteristics of the experts is the existence of cumulative experience of the panel in the construction industry because the outcomes of the survey represent the consensus beliefs of these people. These findings had added the author's assurance that the data gathered from the current survey were of sound quality, which would enable to get a valid and generalised conclusion. In synthesising the above findings, the collective qualifications of the experts for the current study to be found at the following:

(i) A large various disciplines of the construction industry are represented.

(ii) Four individuals possess a PhD., eleven possess a Master, and twenty four possess a Bachelor as their terminal degree in a related field of study within the construction industry.

(iii) The panel has produced a total of one hundred nineteen peer-reviewed publications on the topics related to the construction industry.

(iv) The panel has produced twenty five books or book chapters on the topics related to the construction industry.

(v) The panel has presented one hundred eighty five conference presentations on the topics related to the construction industry.

(vi) The panel has over eight hundred years of field experience in the construction industry.

(vii) The panel has over one hundred years of academic experience in the construction industry.

(viii) The panellists have also obtained twenty four Professional Engineering licenses, two Professional Architect licenses, and both one Professional Building Surveyor and Professional Quantity Surveyor licenses.

These characteristics confirmed that all the selected individuals have been matched the pre-qualification of experts as previously discussed in Section 3.6.5 in Chapter 3. Therefore, they were qualified and certified as the experts for the current study according to the literature.

4.3.3 Pilot Study

Following the recommendation of Clibbens, Walters, and Baird (2012), a pilot study of all two rounds of the Delphi study was carried out in advance of recruiting to the full Delphi study. For the DEMATEL technique, the pilot study was done after completing the full process of the Delphi study. A group of eight experts who involved in the construction industry was selected in the pilot study. The used of fewer respondents for the pilot study is common and accepted in the Delphi study. For example, in the education research of Simon (2011), a panel consisting of six special education experts was employed to pilot the Delphi instrument. In recent study, Agumba (2013) piloted the Delphi's instrument using three respondents of a statistician, a member of expert panel involved in Delphi, and his supervisor in a study to identify the leading health and safety indicator metrics to improve a construction health and safety performance at project level. If one looks at the small number of experts required in a consensus study such in the current study (N = 39), eight experts participated in the pilot study deemed to be sufficient. The same group of experts was used for piloting both the instruments of the Delphi study and DEMATEL technique.

The goal of a pilot study was to overcome any potential shortcomings of the data-gathering instrument in order to ensure the quality of the instrument. In addition, the pilot study was also used to test the effectiveness of the delivery mechanism as well as to ensure that the questions were free from any bias as possible. All the participants in the pilot study did not involve in the actual study. Although the pilot group of the participant was small, it did give an interesting result. Hence, the data were considered important and incorporated in the administration of the actual study with the larger panel of experts. This effort could add more confident to the author that the information gathered from the survey was of sound quality. Thus, the pilot study was taken from September 2014 to October 2014, and the recommendations were as below:

(i) The wording of the questionnaire was to be improved, especially reducing the lengthy statements.

(ii) Corrected the grammatical mistakes.

(iii) Improved the format or layout of the questionnaire.

(iv) Provided a brief description of each success indicator.

All the comments and feedback received from the pilot participants were considered, and advances were prepared for the actual Delphi and DEMATEL studies. Additionally, changes were made in the phrasing of certain questions for clarity as to accommodate the feedbacks received.

4.3.4 Instrument Reliability

Although, there was no evidence in the literature indicated the reliability of the Delphi study, nevertheless, an attempt has been made to determine the reliability of the tool being used. The author contends that the measurement of the instrument reliability could be possible if the initial round of the Delphi study used the structured questionnaire as in this current work. Reliability was evaluated using Cronbach's alpha coefficient that measures the internal consistency of the indicators in the index.

The variables were tested using the reliability analysis function of the SPSS 20.0 from the data of the pilot study. The guidelines provided by George and Mallery (2010) were used in interpretation of Cronbach's alpha coefficient, such as: $\alpha \geq .9$ = excellent; $\alpha \geq .9$ = excellent; $\alpha \geq .8$ = good; $\alpha \geq .7$ = accepted; $\alpha \geq .6$ = questionable; $\alpha \geq .5$ = poor; and $\alpha < .5$ = unacceptable.

Upon analysis, the Cronbach's alpha for the instrument was found as $\alpha = .83$ which indicated good reliability (George & Mallery, 2010). The results of item-total statistics revealed that just a little alteration in the Cronbach's alpha if any of the variables was deleted. Due to these minor changes in Cronbach's alpha, the author decided to continue using the identified variables without any of the items asked being deleted.

In summary, the result revealed that the Cronbach's alpha for all business success indicators was between .7 and .8 which high enough to justify that combining all of the items were of acceptable and good reliability (George & Mallery, 2010). These findings have added confident to the author that the information gathered from the survey was of sound quality that would enable this work to make a valid and generalised conclusion. The following Table 4.3 summarised of the reliability analysis of the evaluation scale for the Delphi study.

Table 4.3 Reliability Analysis of the Evaluation Scale for the Delphi Study

Item	Variables	Cronbach's alpha	Cronbach's alpha if item deleted
	Overall	*.83*	
1.	Autonomy		.81
2.	Innovativeness		.83
3.	Risk-taking		.83
4.	Proactiveness		.82
5.	Competitive aggressiveness		.82
6.	Organisational structure		.82
7.	Organisational culture		.84
8.	Founder's personal competencies		.82
9.	Business and management competencies		.81
10.	Marketing competencies		.81
11.	Technical competencies		.84
12.	Technological competencies		.81
13.	Political competencies		.88
14.	Social responsibility competencies		.81
15.	Financial resources		.81
16.	Government policies		.80
17.	Government programs		.81
18.	Entrepreneurial education and training		.82
19.	Research and development transfer		.80
20.	Commercial and professional infrastructure		.81
21.	Internal market openness		.80
22.	Physical infrastructure and services		.82
23.	Cultural and social norms		.80

4.3.5 Findings of the Delphi Study Round 1

In Round 1 of Delphi study, questionnaires were sent electronically to the thirty nine respondents who have formally agreed to take part in this survey. All the thirty nine experts returned the Round 1 questionnaire, represents 100% response rate. The respondents were asked to evaluate and rate each indicator under five perspectives of an entrepreneurship phenomenon on the five-point Likert scales (1 = no judgment, 2 = very unimportant, 3 = unimportant, 4 = important, and 5 = very important). They rated them based on their experience and expertise that they have with respect to the important of the listed success indicators to the construction business. A brief description of each indicator was also provided in the format of the table at the end of the questionnaires. The respondents were also asked to list and describe additional indicators that they believe are significant and should be taken in evaluating the success indicators for the construction business (see Appendix E).

Within each round, measures of central of the tendency were calculated in term of the mean and median response of the respondents. To reiterate, the current study defined consensus as being reached when measures attracted final scores of median 4 to 5, and more than 80% of respondents rating the indicators between 4 to 5 on the importance scale. The proposed consensus criteria were similar to those indicated by Hasson, Keeney, and McKenna (2000) and Hollander *et al.* (2013). From Table 4.4, it is evident that sixteen success indicators categorised in four leading perspectives of an entrepreneurship phenomenon deemed to achieve the needed consensus in the Delphi Round 1.

Table 4.4 Importance Indicators Emerged from the Delphi Round 1

Indicator	**% Response (Score 4 and 5)**	**Importance Mean**	**Importance Median**
Constructionpreneurial Orientation:			
Autonomy*	66.7	3.85	4.00
Innovativeness	87.2	4.23	4.00
Risk-taking*	79.5	4.00	4.00
Proactiveness	94.9	4.49	5.00
Competitive aggressiveness	82.1	4.08	4.00
Constructionpreneurial Organisation:			
Organisational structure	92.3	4.33	4.00
Organisational culture	87.1	4.46	5.00
Constructionpreneurial Competency:			
Founder's personal competencies	82.1	4.10	4.00
Business and management competencies	94.9	4.36	4.00
Marketing competencies	92.3	4.44	5.00
Technical competencies	89.8	4.31	4.00
Technological competencies	84.6	4.03	4.00
Political competencies*	53.9	3.54	4.00
Social responsibility competencies*	59.0	3.54	4.00
Constructionpreneurial Environment:			
Financial resources	97.5	4.72	5.00
Government policies	92.3	4.31	4.00
Government programs	82.1	4.00	4.00
Entrepreneurial education and training	84.6	4.03	4.00
Research and development transfer*	66.7	3.67	4.00
Commercial and professional infrastructure	82.0	4.08	4.00
Internal market openness*	71.8	3.92	4.00
Physical infrastructure and services*	66.6	3.77	4.00
Cultural and social norms*	69.2	4.00	4.00

*Did not reach consensus. Consensus was defined as median 4 to 5, and 80% or more of respondents rating the indicators within 4 to 5 on the importance scale.

The following section provides the discussions on the indicators that achieved consensus in the Delphi Round 1, with respect to each perspective of an entrepreneurship phenomenon.

4.3.5.1 Constructionpreneurial Orientation

The success indicators with regard to the constructionpreneurial orientation dimensions were measured using five indicators, namely 'Autonomy', 'Innovativeness', 'Risk-taking', 'Proactiveness', and 'Competitive Aggressiveness'. All of the indicators indicated the importance median 4 to 5. However, two indicators were rated less than 80% of the panel experts as being strongly important or important. Thus, three indicators were achieved consensus, namely 'Innovativeness', 'Proactiveness', and 'Competitive Aggressiveness'.

In addition, one expert suggested and described one additional indicator that he/she believed as an important indicator in evaluating the constructionpreneurial orientation (see Appendix F). The suggestion was as follows:

> Religious beliefs and religions such as honesty were an important indicator of the success of construction business as they could minimise the danger of unethical practices within the industry (E33, 2016).

4.3.5.2 Constructionpreneurial Organisation

The success indicators concerning the constructionpreneurial organisation dimensions were assessed using two indicators, namely 'Organisational Structure' and 'Organisational Culture'. More than 80% of the panel experts rated the indicators as both being strongly important or important. The importance median for the indicators fell between 4.0 and 5.0, hence, all of the indicators achieved consensus.

4.3.5.3 Constructionpreneurial Competency

The success indicators concerning the constructionpreneurial competency dimensions were measured using seven indicators, namely 'Founder's Personal Competencies', 'Business and Management Competencies', 'Marketing Competencies', 'Technical Competencies', 'Technological Competencies', 'Political Competencies', and 'Social Responsibility Competencies'. All of the indicators indicated the importance median 4 to 5. However, two indicators were rated less than 80% of the panel experts as being strongly important or important. Therefore, five indicators were seemed to achieve consensus, namely 'Founder's Personal Competencies', 'Business and Management Competencies', 'Marketing Competencies', 'Technical Competencies', and 'Technological Competencies'.

4.3.5.4 Constructionpreneurial Environment

The success indicators with regard to the constructionpreneurial environment dimensions were assessed through nine indicators, namely 'Financial Resources', 'Government Policies', 'Government Programs', 'Entrepreneurial Education and Training', 'Research and Development Transfer', 'Commercial and Professional Infrastructure', 'Internal Market Openness', 'Physical Infrastructure and Services', and 'Culture and Social Norms'. All of the indicators indicated the importance median of 4 to 5. However, four indicators were rated less than 80% of the panel experts as being strongly important or important, namely 'Research and Development Transfer', 'Internal Market Openness', 'Physical Infrastructure and Services', and 'Culture and Social Norms'. The remaining five indicators that achieved consensus were 'Financial Resources', 'Government Policies', 'Government Programs', 'Entrepreneurial Education and Training', and 'Commercial and Professional Infrastructure'.

In addition, one expert has been indicated and described two additional indicators that he/she believed as significant indicators for evaluation the constructionpreneurial environment (see Appendix G), as follows:

The progress of the national economy is very important to the survival of construction enterprise in which the growth of the nation's economy resulting in increases the demand for construction projects not only by government but also by the private sector. Customers will have purchasing power, the market value of the projects and services will also increase as a result of the economic progress over time (E8, 2016).

The political stability of the government is also important to the success of construction business. The stable government normally has the policies in the development of national economies, infrastructures, and societies, as well as lesser risks in doing businesses (E8, 2016).

The level of consensus was also calculated using the Kendall's Coefficient of Concordance, *W* with the assist of SPSS 20.0. The results revealed that the Kendall's Coefficient of Concordance, *W* was positively significant ($W = .492$, $p < .05$). However, the finding indicated that the low level of consensus reached by the panellists was not the good results of sharp agreements. Therefore, the Delphi process continued to the Round 2.

4.3.6 Findings of the Delphi Study Round 2

In Round 2 of Delphi process, questionnaires were sent electronically to thirty nine respondents who responded the Round 1 survey. Of thirty nine respondents, thirty six experts returned the questionnaire, representing 92.3% response rate. The three experts who did not respond in Round 2 provided no reasons for doing so.

In this Round 2, experts were granted an opportunity to review their rating based on the group mean and median achieved in Round 1. Three new indicators that have been proposed by the expert in Round 1 were carefully reviewed base on the reasons provided by the experts and the literature review.

The influence of religion within the field of entrepreneurship has received scholarly attention. Balog, Baker, and Walker posited that entrepreneurs often place a deep level of personal meaning on their entrepreneurial pursuits, such as religion and spirituality. A study of Tahir and Abdul (2013), for example, found that religious orientation was associated with business performance of the Malaysian SMEs.

There exists in literature a consensus on impacted of the nation's economy growth to the investment in the construction industry as previously discussed in Chapter 2. In Sri Lanka, a study of Ramachandran, Rotimi, and Rameezdeen (2013), for example, revealed a uni-directional relationship, with the national economy inducing growth in the construction sector, and not *vice-versa*.

In addition, the national economy growth and political stability were deeply interconnected. In this sense, the relationship between economic growth and stability refers to the manner in which the political stability of a nation can lead to its economic growth which in turn providing safely and stable business environment (Voiculet, Belu, Parpandel, & Rizea, 2010). Contradictory, a study of Aisen and Veiga (2013) revealed that political instability are highly associated with low growth rates of GDP per capita of which political instability adversely affects growth by lowering the rates of productivity growth.

Upon considering the reasons provided by the participants, and the available evident in literature, the author decided to accept all the three new indicators and was named them as 'Religiosity', 'National Economy Growth' and 'National Political Stability'. 'Religiosity' was added as the fifth indicator of the constructionpreneurial orientation. 'National Economy Growth' and 'National Political Stability' were added as the tenth and eleventh indicators of the constructionpreneurial environment. As a result, the Round 2 of the Delphi study consisted of twenty six questions (see Appendix H).

As shown in Table 4.5, it was evident that eighteen success indicators categorised under four leading perspectives of an entrepreneurship phenomenon achieved the required consensus in the Delphi Round 2.

Table 4.5 Importance Indicators Emerged from the Delphi Round 2

Indicator	% Response (Score 4 and 5)	Importance Mean	Importance Median
Constructionpreneurial Orientation:			
Autonomy*	72.2	3.94	4.00
Innovativeness	94.4	4.39	4.00
Risk-taking	94.4	4.28	4.00
Proactiveness	97.2	4.58	5.00
Competitive aggressiveness	89.9	4.19	4.00
Religiosity†*	72.2	4.11	4.50
Constructionpreneurial Organisation:			
Organisational structure	97.2	4.50	4.00
Organisational culture	91.7	4.58	5.00
Constructionpreneurial Competency:			
Founder's personal competencies	88.8	4.31	4.00
Business and management competencies	94.4	4.44	4.00
Marketing competencies	91.7	4.50	5.00
Technical competencies	94.5	4.47	4.00
Technological competencies	91.7	4.19	4.00
Political competencies*	58.3	3.58	4.00
Social responsibility competencies*	58.4	3.56	4.00
Constructionpreneurial Environment:			
Financial resources	97.2	4.75	5.00
Government policies	91.7	4.28	4.00
Government programs	86.1	4.06	4.00
Entrepreneurial education and training	91.7	4.14	4.00
Research and development transfer*	72.2	3.81	4.00
Commercial and professional infrastructure	83.4	4.14	4.00
Internal market openness*	75.0	3.94	4.00
Physical infrastructure and services*	78.4	3.94	4.00
Cultural and social norms*	75.0	3.87	4.00
National economy growth†	100.0	4.42	4.00
National political stability†	97.2	4.56	5.00

†New indicator. *Did not reach consensus. Consensus was defined as median 4 to 5, and 80% or more of respondents rating the indicators within 4 to 5 on the importance scale.

The following section provides the discussions on the indicators that achieved consensus in the Delphi Round 2, with respect to each perspective of an entrepreneurship phenomenon.

4.3.6.1 Constructionpreneurial Orientation

The success indicators concerning the constructionpreneurial orientation dimensions were measured using six indicators. All of the indicators indicated the importance median 4 to 5. 'Risk-taking' which did not attain consensus in Round 1, has reached consensus in this round. Two indicators, namely 'Autonomy', and 'Religiosity' were rated less than 80% of the panel experts as being strongly important or important. Thus, four indicators were achieved consensus, namely 'Innovativeness', 'Risk-taking', 'Proactiveness', and 'Competitive Aggressiveness'.

4.3.6.2 Constructionpreneurial Organisation

The success indicators concerning the constructionpreneurial organisation dimensions were assessed using two indicators. Both indicators were placed as being strongly important or important by more than 80% of the panel experts. The importance median for both indicators fell between 4.0 and 5.0. This result was consistent with the previous finding of Round 1. Thus, 'Organisational Structure' and 'Organisational Culture' were deemed to be achieved consensus.

4.3.6.3 Constructionpreneurial Competency

The success indicators concerning the constructionpreneurial competency dimensions were assessed using seven indicators. All of the indicators indicated the importance median 4 to 5. Nevertheless, five indicators, namely 'Founder's Personal Competencies', 'Business and Management Competencies', 'Marketing Competencies', 'Technical Competencies', and 'Technological Competencies' were rated as being strongly important or important by more than 80% of the panel experts, and therefore, attained consensus. Again, this result was consistent with the Round 1 result.

4.3.6.4 Constructionpreneurial Environment

The success indicators concerning the constructionpreneurial environment dimension were measured using eleven indicators. Two additional indicators, namely 'National Economy Growth' and 'National Political Stability' were added. All of the indicators indicated the importance median of 4 to 5. However, three indicators were rated less than 80% of the panel experts as being strongly important or important, namely 'Research and Development Transfer', 'Physical Infrastructure and Services', and 'Culture and Social Norms'. The remaining seven indicators, namely 'Financial Resources', 'Government Policies', 'Government Programs', 'Entrepreneurial Education and Training', 'Commercial and Professional Infrastructure', 'National Economy Growth', and 'National Political Stability' attained the required consensus.

Table 4.6 summarised the most important indicators of construction business success emerging from the Delphi Round 2 questionnaire. The ranking based on the mean, and if any of the indicators have the same mean, then the percentage of experts' agreement on that particular indicator was used. For instance, 'Proactiveness' and 'Organisational Culture' revealed the same mean of 4.58 but the percentage of agreement with the experts favoured to 'Proactiveness' which indicated 97.2% compared to 91.7% for 'Organisational Culture'. Hence, 'Proactiveness' will be the higher ranking than 'Organisational Culture'.

Table 4.6 Most Important Success Indicators for the Construction Business

Rank	**Indicators**	**Mean**	**% of Agreement**	**Entrepreneurship Perspectives**
1	Financial resources	4.75	97.2	Environment
2	Proactiveness	4.58	97.2	Orientation
3	Organizational culture	4.58	91.7	Organisation
4	National political stability	4.56	97.2	Environment
5	Organizational structure	4.50	97.2	Organisation
6	Marketing competencies	4.50	91.7	Competency
7	Technical competencies	4.47	94.5	Competency
8	Business and management competencies	4.44	94.4	Competency
9	National economic growth	4.42	100.0	Environment
10	Innovativeness	4.39	94.4	Orientation
11	Founder's personal competencies	4.31	88.8	Competency
12	Risk-taking	4.28	94.4	Orientation
13	Government policies	4.28	91.7	Environment
14	Competitive aggressiveness	4.19	91.7	Orientation
15	Technological competencies	4.19	89.9	Competency
16	Entrepreneurial education and training	4.14	91.7	Environment
17	Commercial and professional infrastructure	4.14	83.4	Environment
18	Government programs	4.06	86.1	Environment

Ten most significant indicators of the constructionpreneurial business success were 'Financial Resources', 'Proactiveness', 'Organizational Culture', 'National Political Stability', 'Organizational Structure', 'Marketing Competencies', 'Technical

Competencies', 'Business and Management Competencies', 'National Economy Growth', and 'Innovativeness', respectively. One of the most interesting insights that emerged from these findings was the relative importance of not just the individual ranked indicators, but that of the indicators perspectives themselves. Of the four success perspectives, constructionpreneurial competency and constructionpreneurial environment were the most domain perspectives. Each three indicators of these perspectives included in the top ten of the most important indicators of construction business success, followed by each two indicators of constructionpreneurial organisation, and constructionpreneurial orientation.

4.3.7 Consensus for the Delphi Rounds

According to von der Gracht (2012), the determination of agreement by level of agreement is particularly meaningful if ordinal data, such as the used of Likert scales for the degree of agreement, as adopted in the current study. The consensus was deemed to have reached when the level of agreement on a practice becomes a majority, that is, greater than 50% (Olawale & Sun, 2015). Table 4.7 showed the improvement of consensus between Delphi Round 1 and Delphi Round 2.

Table 4.7 Improvement of Consensus between the Delphi Rounds

Level of Agreement Amongst Experts	Number of Indicators	
	Delphi Round 1	**Delphi Round 2**
< 50%	-	-
50% - 60%	2	2
60% - 70%	4	-
70% - 80%	2	6 (included 1†)
80% - 90%	9	4
> 90%	6	14 (included 2†)
Total number of indicators	$N = 23$	$N = 26$ (included 3†)
Kendall's Coefficient of Concordance	$W = .49$	$W = .63$

†New indicator(s). The Kendall's Coefficient of Concordance was calculated base on $N = 23$ for both rounds.

As one can see from Table 4.7, in the first round of the Delphi process, the analysis of responses showed that all of the twenty three indicators were agreed for more than 50% of importance (important or very important). 50% – 60% of the experts agreed on the importance of two indicators, and 60% – 70% of the experts agreed on the importance of four indicators. Two indicators were agreed as important by 70% – 80% of the experts, while 80% – 90% of the experts agreed on the importance of nine indicators. Furthermore, more than 90% of the experts agreed on the importance of six indicators during this round. The analysis also demonstrated the majority views on the indicators are of which four indicators were deemed very important by the experts, and nineteen were deemed important. None of the twenty three indicators were rated as unimportant, very unimportant, and no judgment by majority of the experts. This round of the Delphi study was obviously revealed that all of the twenty three indicators were deemed important or very important of which nineteen indicators deemed important and four indicators deemed very important.

Although all of the twenty three indicators were seemed to be important or very important to the construction business success as they ranked more than 50% by the experts, but it was deemed that a second round of the Delphi study would be needed since consensus for the indicators in this current study was defined as being reached when measures attracted final scores of median 4 to 5, and more than 80% of respondents rating the indicators between 4 to 5 on the importance scale. Furthermore, the purpose of the Delphi process is to see if the majority of the experts can agree on as many indicators as possible. Moreover, three additional new indicators proposed in this round yet to be valued by the experts.

In the second round of the Delphi process, the analysis of responses showed that all of the twenty three indicators were agreed for more than 50% of importance (important or very important) as in the first round. Two indicators were still counted as important by 50% – 60%. A shifted of consensus was occurring when the level of agreement 60% – 70% has now dropped from four indicators to zero. It is apparent that some experts have changed their minds in this round. 70% – 80% of experts now have the same opinion on five indicators from two indicators in the previous round. Although 80% – 90% of the experts now agree on four indicators in this round which was dropped from six indicators in the previous round, however, twelve indicators have increased level of importance as they were agreed by more than 90%. This indicates a massive turnaround of 100% from six indicators in the previous round. The shifted of consensus in this round deemed that consensus had been reached on the level of importance of the indicators put forward by the expert panel. In relation to the three new indicators, one indicator was agreed as important by 70% – 80% of the experts, while 80% – 90% of the experts agreed on the importance of the other two indicators.

The reaching consensus as recommended by experts after only two rounds of Delphi process is a good indication that all the chosen success indicators were relevant in addressing the problem that stated in this study. Therefore, the iteration was stopped after the second round as there would be no further benefit derived from more Delphi rounds due to consensus have achieved. Moreover, the Kendall's coefficient of concordance, W was positively significant ($p < .05$) and increased from .49 in the first round to .63 in the second round. The interpretation of the Kendall's coefficient of concordance, W is based on the guidelines of Schmidt (1997) as indicated in Table 4.8. This outcome indicates that the importance of the selected indicators was not especially controversial.

Table 4.8 Interpretation of the Kendall's Coefficient of Concordance, W

W	Interpretation	Confidence in Ranks
0.1	Very weak agreement	None
0.3	Weak agreement	Low
0.5	Moderate agreement	Fair
0.7	Strong agreement	High
0.9	Unusually strong agreement	Very high

Source: Schmidt (1997)

Although the result indicates the moderate-to-strong level of consensus ($W = .632$, $p < .05$) reached by the Delphi panellists, nevertheless, it was not the result of sharp disagreements over the ranking of the indicators. Indeed, to achieve the Kendall's coefficient of concordance, W more than .9 is rarely in consensus study (Schmidt, 1997). To iterate, the current study was designed to limit to two rounds of the Delphi process only, as earlier discussed in Section 3.4.7 of Chapter 3. Thus, the achieved by moderate-to-strong level of consensus has provided a reasonable level of confidence in the results of the current study. It was consistent with the works of Pierre, Cassivi, and Chalabi (2012) who also found the moderate-to-strong level of consensus

(W = .615, $p < .05$) in their Delphi study to identify the most important IT project management resources and capabilities.

4.4 Research Question 3

The DEMATEL technique was used to answer the third research question. This technique will able to assess the relationships between the indicators in term of causes and effects, and convert into an intelligible structural model. Hence, the most important factors for the solving of the problems under study could emerge. The following sections provide the details of the findings.

4.4.1 Instrument Reliability

The pilot study of eight experts who comply with the pre-described criteria was conducted after completed the full process of the Delphi study. The DEMATEL questionnaire consisted of eighteen items that have been reached the degree of consensus as defined in the current study. The reliability analysis procedures were similar to that was used in the Delphi study as described above.

Upon analysis, the Cronbach's alpha for the instrument was found as .77 which represented acceptable reliability (George & Mallery, 2010). The results of item-total statistics revealed that only a small change in the Cronbach's alpha if any of the variables was deleted, as shown in the following Table 4.9.

Table 4.9 Reliability Analysis of the Evaluation Scale for the DEMATEL Technique

Item	Variables	Cronbach's alpha	Cronbach's alpha if item deleted
	Overall	*.77*	
1.	Innovativeness		.76
2.	Risk-taking		.77
3.	Proactiveness		.76
4.	Competitive aggressiveness		.77
5.	Organisational structure		.76
6.	Organisational culture		.76
7.	Founder's personal competencies		.77
8.	Business and management competencies		.76

Table 4.9 Continued

Item	Variables	Cronbach's alpha	Cronbach's alpha if item deleted
9.	Marketing competencies		.73
10.	Technical competencies		.77
11.	Technological competencies		.75
12.	Financial resources		.75
13.	Government policies		.75
14.	Government programs		.75
15.	Entrepreneurial education and training		.74
16.	Commercial and professional infrastructure		.75
17.	National economy growth		.77
18.	National political stability		.78

Due to these small changes in Cronbach's alpha, the author decided to continue using the identified variables without any of the items asked being deleted. Again, this finding have added confidently to the author that the data collected from the survey were of sound quality that would enable this study to draw a valid and generalised conclusion.

4.4.2 Findings of the DEMATEL Technique

The questionnaires were sent electronically to the thirty six respondents who responded the Round 2 of the Delphi study. For the matrix calculation, the indicators were numbered accordingly, as shown in Table 4.10.

Respondents were asked to indicate the level to which they believe that any of the indicators influence each other using the integer score 0 (no influence), 1 (weak direct influence), 2 (moderate direct influence), and 3 (strong direct influence). Based on the influence scale, a higher score represents stronger direct influence. They ranked them based on their experience and expertise that they hold with regard to the importance of indicators to the success of the construction business. A brief description of each indicator was also offered in the format of the table at the end of the questionnaires (see Appendix I).

Table 4.10 Numbered Influence Indicators for the Matrix Calculation

No.	Perspective/Indicator
A	Constructionpreneurial Orientation
A1	Proactiveness
A2	Innovativeness
A3	Risk-taking
A4	Competitive aggressiveness
B	Constructionpreneurial Organisation
B1	Organisational culture
B2	Organisational structure
C	Constructionpreneurial Competency
C1	Marketing competencies
C2	Technical competencies
C3	Business and management competencies
C4	Founder's personal competencies
C5	Technological competencies
D	Constructionpreneurial Environment
D1	Financial resources
D2	National political stability
D3	National economic growth
D4	Government policies
D5	Entrepreneurial education and training
D6	Commercial and professional infrastructure
D7	Government programs

Of the thirty six respondents, twenty responded the questionnaires representing 55.6% response rate. One of the expert noted that the time restriction and the difficulty in developing the relationship of variables as the causes for not participate in the DEMATEL round. While the other experts who did not respond provided no grounds for behaving so. According to Teng (2002), and Skulmoski, Hartman, and Krahn (2007), within 5 to 15 experts are sufficient for a group decision-making to be appropriate. In a DEMATEL study in China, Tian (2013) solicited data from fifteen respondents to analyse the impact factors of the project interface management. Meanwhile, Nilashi *et al.* (2014) engaged twelve Malaysian construction industry practitioners to identify the critical success factors of a construction project. Similar, in a recent DEMATEL study, Taheri and Iranban (2015) also employed twelve experts to develop a framework for evaluation and selection of contractors. Hence, the data generated from twenty respondents for this DEMATEL round were considered of sound quality that would enable to draw a valid and generalised conclusion.

Twenty sets of 18 x 18 non-negative matrices were obtained from the twenty respondents. Data analysis was done by the aided of Microsoft Excel 2007. All judgments of the twenty experts were aggregated. An initial direct-relation matrix Z was constructed by calculating the arithmetic mean of the same elements in the collected matrices of the respondents. The computation was performed according to Equation (3.1). It demonstrated the initial direct effects that an indicator exerts on and receives from other indicators as shown in Table 4.11.

The initial direct-relation matrix Z was then normalised to create the normalised initial direct-relation matrix X, and was calculated according to Equation (3.2) and used for the computation according to Equation (3.3). In this study, the normalization indicator was determined as the largest value of row sum or column sum. As shown in Table 4.11, the normalisation indicator (s) was the largest column sum, stems from column 7 (Indicator C1), and has a value of 43.35. The normalisation was done by dividing each element of the initial direct-relation matrix Z with 43.35. The resultant matrix X is shown in Table 4.12.

To examine the direct effects of the indicators between each other, the total relation matrix T was created. This was done based on the normalised initial direct-relation matrix D and was calculated according to Equation (3.4). First, the identity matrix I was developed of which the main diagonal elements are equal to 1, and the remaining elements are 0. Then, the $(I - X)$ matrix was constructed by subtracting each element of the matrix X from the corresponding element of the matrix I before constructing the inverse matrix $(I - X)^{-1}$. Further, the resulting matrix T was calculated by multiplying the normalised initial direct-relation matrix X with the inverse matrix $(I - X)^{-1}$ as shown in Table 4.13. The sum of rows and the sum of columns in the total-relation matrix T was calculated according to Equation (3.5) and Equation (3.6). In Table 4.13 the sum of rows and the sum of columns were presented by D and R, respectively.

Table 4.11 Initial Direct-relation Matrix Z

	A1	A2	A3	A4	B1	B2	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5	D6	D7	$\sum Z_i$
A1	0.00	2.60	2.45	2.40	2.60	2.20	2.85	2.65	2.40	2.30	2.50	2.45	1.60	1.80	2.00	2.15	1.95	1.65	38.55
A2	2.50	0.00	2.20	2.35	2.30	2.10	2.70	2.90	2.45	2.50	2.70	2.45	1.60	2.30	2.35	2.25	2.25	1.70	39.65
A3	2.65	2.40	0.00	2.65	2.05	2.30	2.40	2.45	2.30	2.30	2.20	2.20	1.85	2.20	2.05	2.10	2.05	1.50	37.75
A4	2.50	2.40	2.55	0.00	2.10	2.25	2.60	2.45	2.55	2.50	2.05	2.40	1.80	2.20	2.05	2.15	2.10	1.65	38.40
B1	2.55	2.25	2.10	2.20	0.00	2.60	2.50	2.20	2.35	2.30	2.10	2.25	1.70	1.60	1.45	2.25	1.80	1.40	35.65
B2	2.40	2.15	2.45	2.35	2.50	0.00	2.60	2.35	2.55	2.40	2.10	2.15	1.65	1.65	1.70	2.30	1.90	1.35	36.60
C1	2.80	2.60	2.40	2.65	2.55	2.70	0.00	2.60	2.65	2.70	2.45	2.75	1.80	2.25	2.00	2.25	2.45	1.85	41.45
C2	2.65	2.90	2.80	2.55	2.25	2.65	2.80	0.00	2.55	2.40	2.75	2.60	1.45	1.85	1.90	2.70	2.30	1.80	40.95
C3	2.55	2.35	2.60	2.70	2.40	2.60	2.90	2.75	0.00	2.65	2.45	2.65	1.85	1.95	2.15	2.60	2.45	1.85	41.45
C4	2.50	2.60	2.40	2.45	2.40	2.55	2.70	2.60	2.75	0.00	2.60	2.60	1.20	1.60	1.90	2.55	1.85	1.45	38.75
C5	2.65	2.70	2.25	2.25	2.15	2.35	2.60	2.80	2.50	2.60	0.00	2.50	1.50	2.10	2.05	2.30	2.35	1.95	39.65
D1	2.70	2.40	2.30	2.50	2.05	2.40	2.70	2.45	2.65	2.65	2.50	0.00	2.40	2.70	2.30	2.30	2.20	2.15	41.40
D2	1.70	1.70	1.90	1.80	1.75	1.55	1.90	1.45	1.80	1.45	1.45	2.35	0.00	2.75	2.80	1.60	1.90	2.45	32.35
D3	2.00	2.35	2.40	2.15	1.70	1.80	2.20	1.95	2.15	2.35	2.25	2.90	2.60	0.00	2.85	2.10	2.15	2.65	38.60
D4	2.05	1.90	2.15	2.20	1.55	1.60	2.00	1.85	2.05	1.90	2.10	2.50	2.60	2.70	0.00	2.20	2.15	2.75	36.30
D5	2.30	2.45	1.95	2.05	2.15	2.25	2.40	2.65	2.50	2.50	2.45	2.25	1.50	2.00	2.15	0.00	2.40	2.30	38.25
D6	2.20	2.35	1.90	2.30	1.95	2.05	2.60	2.35	2.60	1.90	2.45	2.25	1.95	2.15	2.15	2.35	0.00	2.40	37.95
D7	1.90	1.95	1.70	1.75	1.50	1.80	2.20	2.00	2.10	1.75	2.00	2.30	2.70	2.80	2.75	2.65	2.40	0.00	36.30
$\sum Z_j$	40.60	40.05	38.50	39.30	35.95	37.75	43.35	40.45	40.90	39.25	39.10	41.55	31.75	36.60	36.60	38.80	36.65	32.85	

Table 4.12 Normalised Initial Direct-relation Matrix X

	A1	A2	A3	A4	B1	B2	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5	D6	D7
A1	0.000	0.060	0.057	0.055	0.060	0.051	0.066	0.061	0.055	0.053	0.058	0.057	0.037	0.042	0.046	0.050	0.045	0.038
A2	0.058	0.000	0.051	0.054	0.053	0.048	0.063	0.067	0.057	0.058	0.062	0.057	0.037	0.053	0.054	0.052	0.052	0.039
A3	0.061	0.055	0.000	0.061	0.047	0.053	0.057	0.057	0.053	0.054	0.051	0.051	0.043	0.051	0.047	0.048	0.047	0.035
A4	0.058	0.055	0.059	0.000	0.048	0.052	0.061	0.057	0.059	0.059	0.047	0.055	0.042	0.051	0.047	0.050	0.048	0.038
B1	0.059	0.052	0.048	0.051	0.000	0.060	0.059	0.051	0.054	0.053	0.048	0.052	0.039	0.037	0.033	0.052	0.042	0.032
B2	0.055	0.050	0.057	0.054	0.058	0.000	0.061	0.054	0.059	0.055	0.048	0.050	0.038	0.038	0.039	0.053	0.044	0.031
C1	0.065	0.060	0.055	0.061	0.059	0.062	0.000	0.060	0.061	0.062	0.057	0.063	0.042	0.052	0.046	0.052	0.057	0.043
C2	0.061	0.067	0.065	0.059	0.052	0.061	0.066	0.000	0.059	0.055	0.063	0.060	0.033	0.043	0.044	0.062	0.053	0.042
C3	0.059	0.054	0.060	0.062	0.055	0.060	0.067	0.063	0.000	0.061	0.057	0.061	0.043	0.045	0.050	0.060	0.057	0.043
C4	0.058	0.060	0.055	0.057	0.055	0.059	0.063	0.060	0.063	0.000	0.060	0.060	0.028	0.037	0.440	0.059	0.043	0.033
C5	0.061	0.062	0.052	0.052	0.050	0.054	0.061	0.065	0.058	0.060	0.000	0.058	0.035	0.048	0.047	0.053	0.054	0.045
D1	0.062	0.055	0.053	0.058	0.047	0.055	0.063	0.057	0.061	0.061	0.058	0.000	0.055	0.062	0.053	0.053	0.051	0.050
D2	0.039	0.039	0.044	0.042	0.040	0.036	0.045	0.033	0.042	0.033	0.033	0.054	0.000	0.063	0.065	0.037	0.044	0.057
D3	0.046	0.054	0.055	0.050	0.039	0.042	0.052	0.045	0.050	0.054	0.052	0.067	0.060	0.000	0.066	0.048	0.050	0.061
D4	0.047	0.044	0.050	0.051	0.036	0.037	0.047	0.043	0.047	0.044	0.048	0.058	0.060	0.062	0.000	0.051	0.050	0.063
D5	0.053	0.057	0.045	0.047	0.050	0.052	0.055	0.061	0.058	0.058	0.057	0.052	0.035	0.046	0.050	0.000	0.055	0.053
D6	0.051	0.054	0.044	0.053	0.045	0.047	0.061	0.054	0.060	0.044	0.057	0.052	0.045	0.050	0.050	0.054	0.000	0.055
D7	0.044	0.045	0.039	0.040	0.035	0.042	0.052	0.046	0.048	0.040	0.046	0.053	0.062	0.065	0.063	0.061	0.055	0.000

Table 4.11 Total Relation Matrix T

	A1	A2	A3	A4	B1	B2	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5	D6	D7	*D*
A1	0.418	**0.469**	**0.450**	**0.457**	0.429	**0.439**	0.506	**0.475**	**0.472**	**0.456**	**0.458**	**0.478**	0.361	0.413	0.417	**0.445**	0.420	0.373	7.936
A2	**0.484**	0.424	**0.456**	**0.467**	0.433	**0.447**	**0.515**	**0.491**	**0.485**	**0.471**	**0.473**	**0.490**	0.370	0.434	0.435	**0.458**	0.436	0.384	8.152
A3	**0.467**	**0.456**	0.388	**0.454**	0.410	0.432	**0.488**	**0.461**	0.461	0.448	**0.443**	**0.464**	0.359	0.414	0.410	0.436	0.414	0.363	7.766
A4	**0.470**	**0.463**	**0.450**	0.403	0.417	0.438	**0.499**	**0.468**	0.473	0.459	**0.446**	**0.475**	0.364	0.420	0.417	**0.443**	0.421	0.372	7.899
B1	**0.443**	0.432	0.414	0.424	0.346	0.419	**0.467**	0.435	0.441	0.427	0.420	**0.443**	0.339	0.382	0.378	0.419	0.389	0.343	7.361
B2	**0.450**	**0.439**	0.431	0.437	0.409	0.372	**0.480**	**0.448**	0.455	0.438	0.430	**0.451**	0.346	0.392	0.392	0.429	0.400	0.350	7.548
C1	**0.508**	**0.497**	**0.477**	**0.491**	**0.454**	**0.476**	0.475	**0.503**	0.507	0.492	**0.485**	**0.514**	0.388	**0.449**	**0.443**	**0.475**	**0.456**	0.401	8.489
C2	**0.501**	**0.500**	**0.481**	**0.485**	**0.444**	**0.471**	**0.532**	0.442	0.501	0.482	**0.487**	**0.506**	0.377	0.436	0.437	**0.481**	**0.450**	0.396	8.409
C3	**0.503**	**0.492**	**0.481**	**0.492**	**0.451**	**0.474**	**0.537**	**0.506**	0.449	0.491	**0.485**	**0.512**	0.389	**0.442**	**0.446**	**0.482**	**0.457**	0.401	8.490
C4	**0.476**	**0.472**	**0.452**	**0.462**	0.428	**0.449**	**0.507**	**0.477**	0.483	0.409	**0.463**	**0.484**	0.354	0.411	0.417	**0.457**	0.421	0.371	7.993
C5	**0.487**	**0.482**	**0.457**	**0.465**	0.430	**0.453**	**0.514**	**0.489**	0.486	0.473	0.414	**0.491**	0.368	0.430	0.428	**0.460**	**0.439**	0.389	8.154
D1	**0.504**	**0.492**	**0.473**	**0.486**	**0.442**	**0.468**	**0.533**	**0.498**	0.505	0.489	**0.484**	0.453	0.400	**0.457**	**0.449**	**0.475**	**0.450**	0.406	8.464
D2	0.388	0.383	0.374	0.379	0.350	0.361	0.414	0.381	0.391	0.372	0.370	0.408	0.275	0.375	0.375	0.370	0.358	0.337	6.662
D3	**0.459**	**0.461**	**0.446**	**0.449**	0.407	0.427	**0.490**	**0.457**	0.464	0.454	**0.450**	**0.485**	0.382	0.373	0.434	**0.442**	0.422	0.394	7.897
D4	0.436	0.428	0.419	0.427	0.383	0.401	**0.460**	0.431	0.438	0.421	0.423	**0.453**	0.363	0.410	0.351	0.421	0.401	0.377	7.443
D5	**0.465**	**0.462**	0.436	**0.446**	0.416	0.436	0.492	**0.471**	**0.471**	**0.456**	**0.453**	0.470	0.356	0.414	0.417	0.395	0.426	0.384	7.869
D6	**0.459**	**0.456**	0.432	**0.448**	0.409	0.428	0.493	**0.461**	**0.469**	**0.440**	**0.449**	0.467	0.363	0.415	0.415	**0.443**	0.371	0.384	7.801
D7	0.433	0.429	0.409	0.418	0.382	0.405	**0.464**	0.434	**0.439**	0.418	0.421	**0.448**	0.365	0.412	0.411	0.431	0.406	0.317	7.441
R	8.350	8.236	7.927	8.089	7.442	7.797	8.868	8.329	8.391	8.054	8.054	8.491	6.516	7.478	7.473	7.961	7.537	6.740	141.775

Boldfaces represent values greater than the threshold value (α = 0.438)

The total effects given and received by each indicator were also calculated according to Equation (3.7) and Equation (3.8). The determinants of the sum of the row (D) and the sum of column (R) were added together to obtain the centrality ($D + R$). The higher the centrality ($D + R$), the higher was the importance of the indicator. The determinants of the sum of the row were subtracted from the sum of column to obtain the degree of cause and effect ($D - R$). The higher the positive degree of cause and effect ($D - R$), the easier item directly influencing the other indicators, whereas the higher the negative degree of cause and effect, the easier was the indicator to be influenced by other indicators. Table 4.14 summarised the total effects given and received by each indicator.

The threshold value (α) was computed by the average of the elements in the total relation matrix T in order to eliminate some minor effects elements. It was calculated according to Equation (3.9) and revealed that the threshold value (α) was 0.438, i.e. 141.775 divided by 324. The boldfaced elements in the total relation matrix T, shown in Table 4.13, represent values greater than the threshold value (α).

Table 4.14 Total Effects of the Overall Influence of Indicators

Indicator	**Rate of the effect on other indicator (*D*)**	**Rate of the effect from other indicator (*R*)**	**Total effects rate (*D* + *R*)**	**Net effect rate (*D* – *R*)**
A1	7.936	8.350	16.285	-0.414
A2	8.152	8.236	16.388	-0.083
A3	7.766	7.927	15.693	-0.161
A4	7.899	8.089	15.988	-0.191
B1	7.361	7.442	14.803	-0.081
B2	7.548	7.797	15.345	-0.249
C1	8.489	8.868	17.357	-0.378
C2	8.409	8.329	16.738	0.080
C3	8.490	8.391	16.882	0.099
C4	7.993	8.096	16.090	-0.103
C5	8.154	8.054	16.208	0.101
D1	8.464	8.491	16.955	-0.027
D2	6.662	6.516	13.178	0.146
D3	7.897	7.479	15.375	0.418
D4	7.443	7.473	14.916	-0.031
D5	7.897	7.961	15.830	-0.091
D6	7.801	7.537	15.339	0.264
D7	7.441	6.740	14.181	0.702

Finally, the cause and effect diagram was constructed by mapping all coordinate sets of $(D + R, D - R)$ to visualize the complex interrelationship. It offers information to judge which the most significant indicators are and how they influence or affected other indicators. Only the interrelationships with the influence levels higher than that of the threshold value in the total relation matrix T were selected and presented in the cause and effect diagram as illustrated in the following Figure 4.1.

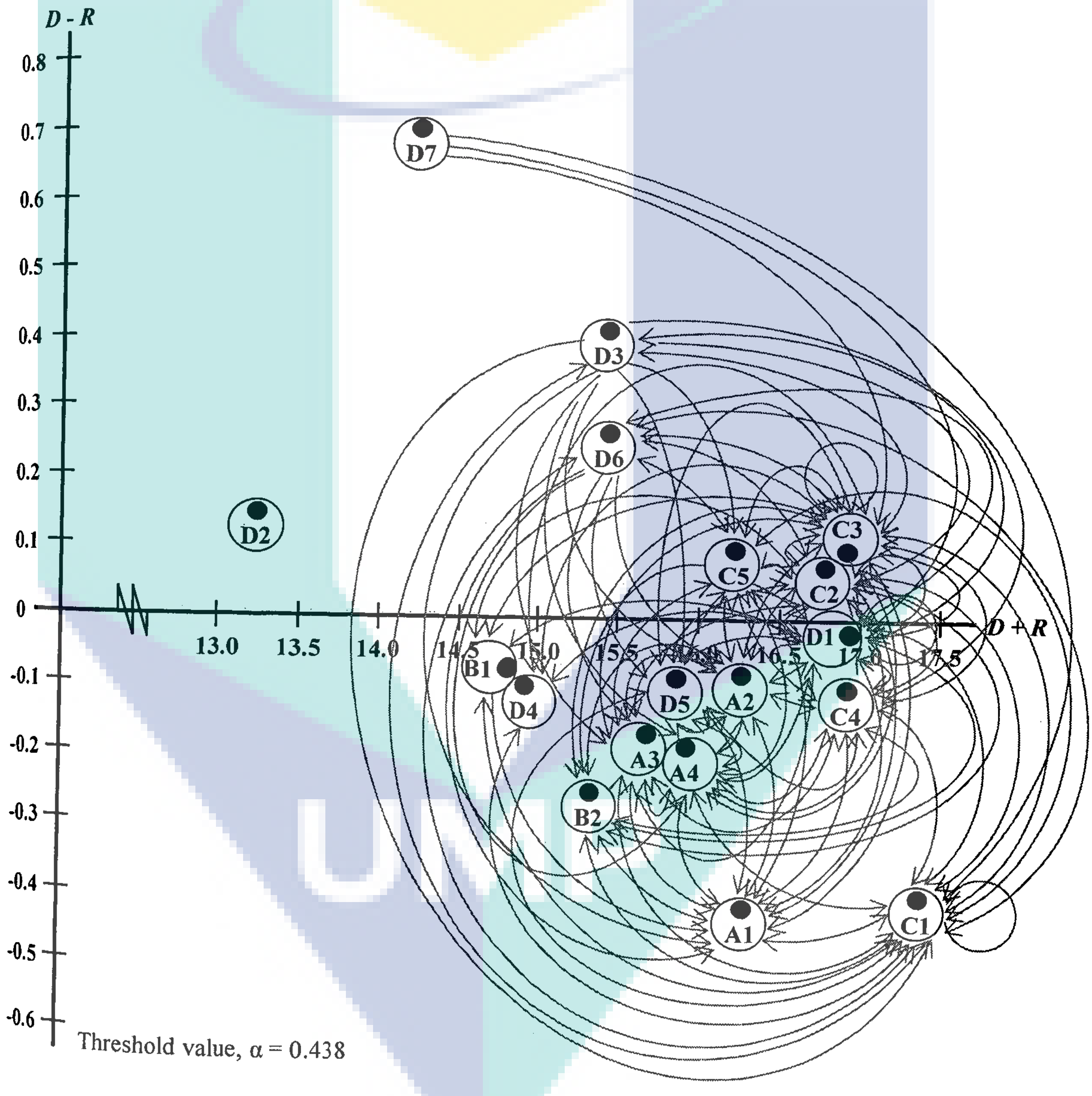

Figure 4.1 Overall cause and effect diagram

In addition, an attempt has been established to determine the significant indicators under each perspective by using the same procedures as described above. Table 4.15 to Table 4.18 presented the total-relation matrix T for the indicators from each perspective. Table 4.19 summarised the total effects given and received by the indicators from each perspective. Finally, the cause and effect diagram among the indicators under each perspective were constructed and shown in Figure 4.2 to Figure 4.5.

Table 4.15 Total Relation Matrix *T* for the Constructionpreneurial Orientation

	A1	**A2**	**A3**	**A4**	***D***
A1	6.406	**6.504**	6.362	**6.483**	25.755
A2	6.388	5.996	6.092	6.223	24.699
A3	**6.831**	**6.655**	6.283	**6.667**	26.435
A4	**6.658**	**6.496**	6.376	6.252	25.783
R	26.284	25.650	25.113	25.625	102.672

Boldfaces represent values greater than the threshold value (α = 6.417)

Table 4.16 Total Relation Matrix *T* for the Constructionpreneurial Organisation

	B1	**B2**	***D***
B1	25.000	**26.000**	51.000
B2	25.000	25.000	50.000
R	50.000	51.000	101.000

Boldfaces represent values greater than the threshold value (α = 25.250)

Table 4.17 Total Relation Matrix *T* for the Constructionpreneurial Competency

	C1	**C2**	**C3**	**C4**	**C5**	***D***
C1	3.714	**3.794**	3.717	3.693	3.649	18.567
C2	**3.959**	3.644	3.750	3.714	3.705	18.772
C3	**4.020**	**3.899**	3.619	**3.783**	3.742	19.064
C4	**3.998**	**3.877**	**3.804**	3.579	3.738	18.997
C5	**3.948**	**3.846**	3.748	3.726	3.509	18.777
R	19.640	19.060	18.638	18.344	18.344	94.176

Boldfaces represent values greater than the threshold value (α = 3.767)

Table 4.18 Total Relation Matrix *T* for the Constructionpreneurial Environment

	D1	D2	D3	D4	D5	D6	D7	*D*
D1	1.413	**1.483**	**1.607**	**1.579**	1.423	1.417	**1.545**	10.466
D2	**1.538**	1.347	**1.605**	**1.598**	1.383	1.396	**1.553**	10.420
D3	**1.679**	**1.599**	**1.574**	**1.718**	**1.513**	**1.514**	**1.678**	11.274
D4	**1.629**	**1.569**	**1.690**	**1.532**	1.490	1.486	**1.653**	11.050
D5	1.408	1.315	1.439	1.437	1.177	1.309	1.421	9.505
D6	1.466	1.392	1.506	1.497	1.360	1.228	1.484	9.933
D7	**1.675**	**1.626**	**1.751**	**1.739**	**1.563**	**1.549**	**1.559**	11.461
R	10.807	10.331	11.170	11.100	9.910	9.898	10.892	74.109

Boldfaces represent values greater than the threshold value ($\alpha = 1.512$)

Table 4.19 Total Effects of Influence of the Indicators under Each Dimension

Item	Perspective/Indicator	*D*	*R*	(*D* + *R*)	(*D* – *R*)
A	Constructionpreneurial Orientation				
A1	Proactiveness	25.756	26.284	52.040	-0.528
A2	Innovativeness	24.699	26.650	50.349	-0.951
A3	Risk-taking	26.435	25.113	51.548	1.322
A4	Competitive aggressiveness	25.783	25.625	51.408	0.158
B	Constructionpreneurial Organisation				
B1	Organisational culture	51.000	50.000	101.000	1.000
B2	Organisational structure	50.000	51.000	101.000	-1.000
C	Constructionpreneurial Competency				
C1	Marketing competencies	18.567	19.640	38.207	-1.073
C2	Technical competencies	18.772	19.060	37.832	-0.288
C3	Business and management competencies	19.064	18.638	37.702	0.426
C4	Founder's personal competencies	18.997	18.494	37.491	0.503
C5	Technological competencies	18.777	18.344	37.121	0.433
D	Constructionpreneurial Environment				
D1	Financial resources	10.466	10.807	21.273	-0.341
D2	National political stability	10.420	10.331	20.751	0.089
D3	National economic growth	11.274	11.170	22.444	0.104
D4	Government policies	11.050	11.100	22.150	-0.050
D5	Entrepreneurial education and training	9.505	9.910	19.415	-0.405
D6	Commercial and professional infrastructure	9.933	9.898	19.831	0.035
D7	Government programs	11.461	10.892	22.353	0.569

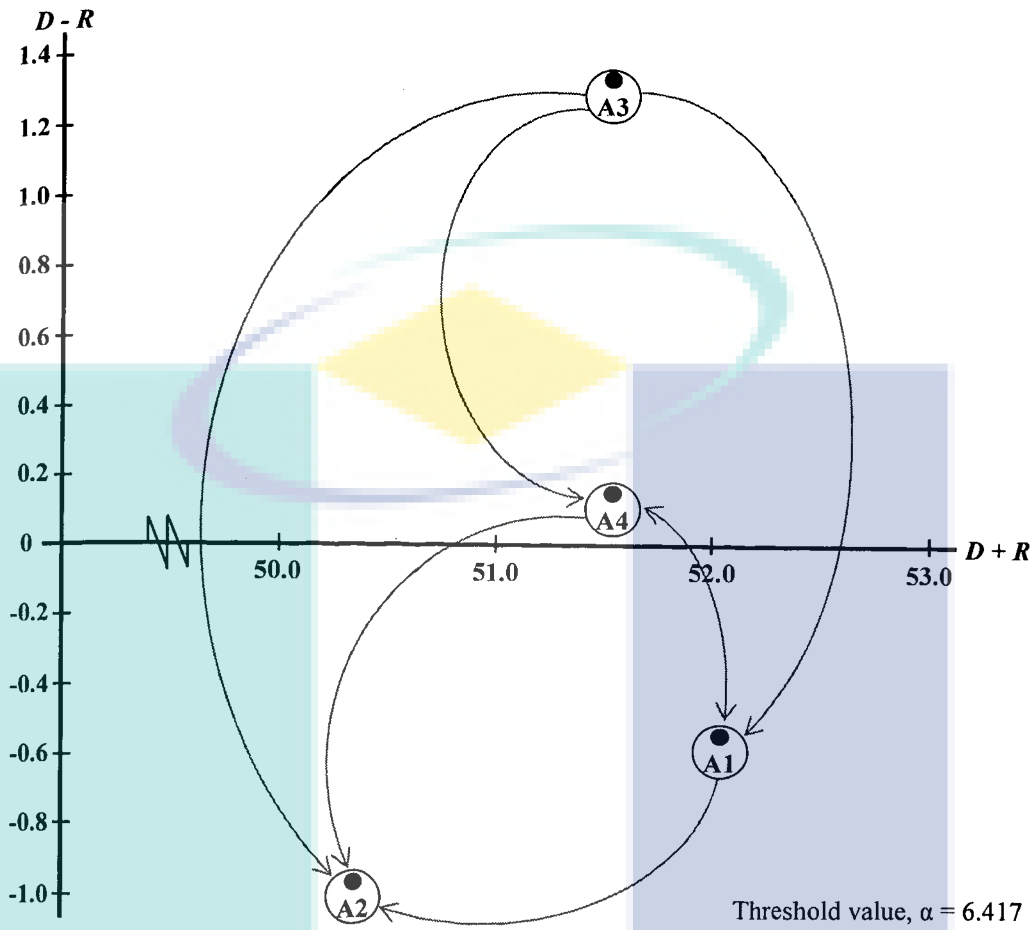

Figure 4.2 Cause and effect diagram for the constructionpreneurial orientation

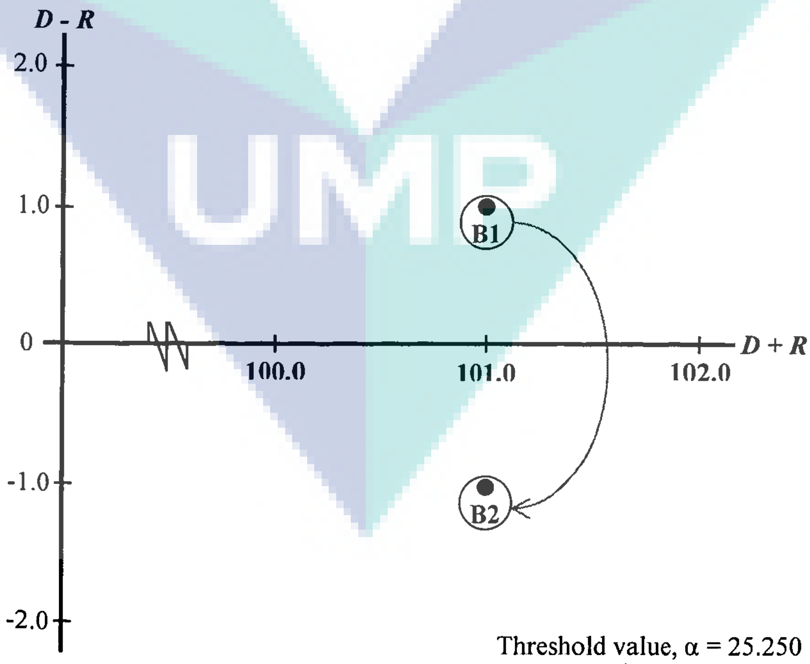

Figure 4.3 Cause and effect diagram for the constructionpreneurial organisation

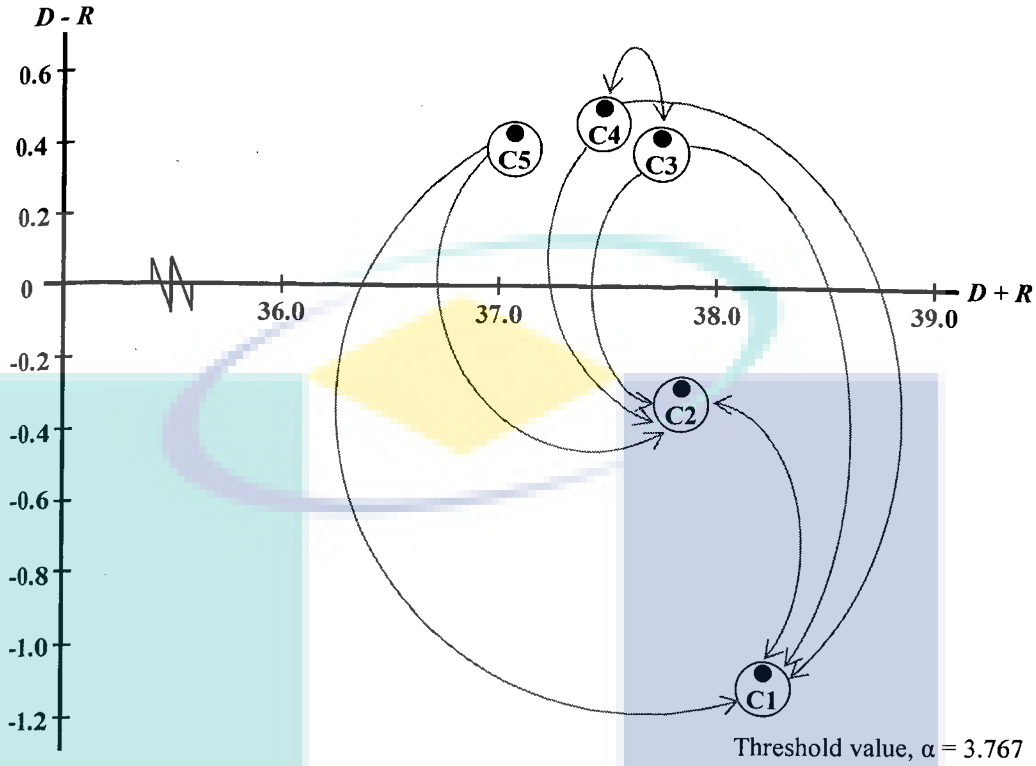

Figure 4.4 Cause and effect diagram for the constructionpreneurial competency

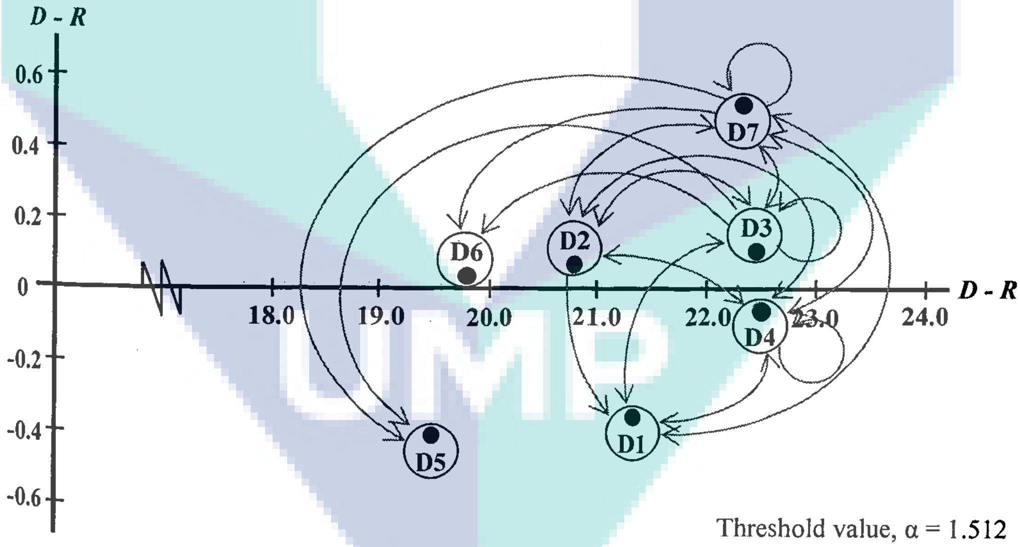

Figure 4.5 Cause and effect diagram for the constructionpreneurial environment

4.4.3 Interpreting the Findings

The importance of the evaluation indicator was determined by $(D + R)$ values. Greater centrality $(D + R)$ value represents that the success indicator is relatively important. Based on Table 4.15, it is obviously shown that ten indicators were above the average in overall centrality (15.753). In the descending order, the most important indicators were 'Marketing Competencies' (C1), 'Financial Resources' (D1), 'Business and Management Competencies' (C3), 'Technical Competencies' (C2), 'Innovativeness' (A2), 'Proactiveness' (A1), 'Technological Competencies' (C5), 'Founder's Personal Competencies' (C4), 'Competitive Aggressiveness' (A4), and 'Entrepreneurial Education and Training' (D5), which representing the $(D + R)$ values of 17.357, 16.955, 16.882, 16.738, 16.388, 16.285, 16.208, 16.090, 15.988, and 15.830, respectively.

The symbol of causality $(D - R)$ represents whether the success indicator affects or is affected by others. Based on $(D - R)$ values, the indicators were classified into two groups such as cause group and effect group. If the value of $(D - R)$ was positive or net cause, such indicators were classified in the cause group, and directly affected the others. In addition, the indicators which have the highest value of $(D - R)$ had the greatest direct impact on the others. In contradictory, if the value of $(D - R)$ was negative or net receive, such indicators were classified in the effect group, and largely influenced by the others.

From column $(D - R)$ in Table 4.14, it was found that seven indicators, namely 'Government Programs' (D7), 'National Economic Growth' (D3), 'Commercial and Professional Infrastructure' (D6), 'National Political Stability' (D2), 'Technological Competencies' (C5), 'Business and Management Competencies' (C3), and 'Technical Competencies' (C2) which have positive $(D - R)$ values of 0.702, 0.418, 0.264, 0.146, 0.101, 0.099, and 0.080, respectively, were classified in the cause group.

The other eleven indicators, namely 'Financial Resources' (D1), 'Government Policies' (D4), 'Organizational Culture' (B1), 'Innovativeness' (A2), 'Entrepreneurial Education and Training' (D5), 'Founder's Personal Competencies' (C4), 'Risk-taking' (A3), 'Competitive Aggressiveness' (A4), 'Organizational Structure' (B2), 'Marketing Competencies' (C1), and 'Proactiveness' (A1), which have negative $(D - R)$ values of -0.027, -0.031 -0.081, -0.083, -0.091, -0.103, -0.161, -0.191, -0.249, -0.378, -0.414, respectively, were classified in the effect group.

From the cause and effect diagram as illustrated in Figure 4.1, it was clearly seen that 174 out of 324 causal interrelationships were established among eighteen indicators undertaken in the current study that have values greater than the threshold value (α) of 0.438. The 'National Economic Growth' (D3) has directly influenced on seven other indicators, namely 'Proactiveness' (A1), 'Innovativeness' (A2), 'Risk-taking' (A3), 'Competitive Aggressiveness' (A4), 'Technical Competencies' (C2), 'Founder's Personal Competencies' (C4), and 'Entrepreneurial Education and Training' (D5). It also has a mutual interaction on 'Marketing Competencies' (C1), 'Business and Management Competencies' (C3), 'Technological Competencies' (C5), and 'Financial Resources' (D1).

The 'Commercial and Professional Infrastructure' (D6), and 'Technological Competencies' (C5) have directly influenced four other indicators. 'Commercial and Professional Infrastructure' (D6) have directly influenced 'Proactiveness' (A1), 'Innovativeness' (A2), 'Competitive Aggressiveness' (A4), and 'Entrepreneurial Education and Training' (D5). Whereas, 'Technological Competencies' (C5) have directly influenced 'Organisational Culture' (B1), 'Organisational Structure' (B2), 'Founder's Personal Competencies' (C4), and 'Government Policies' (D4).

'Entrepreneurial Education and Training' (D5) has a mutual interaction on 'Marketing Competencies' (C1), 'Technical Competencies' (C2), 'Business and Management Competencies' (C3), 'Founder's Personal Competencies' (C4), 'Technological Competencies' (C5), and 'Financial Resources' (D1). On the other hand, 'Technological Competencies' (C5) has a mutual interaction on 'Proactiveness' (A1), 'Innovativeness' (A2), 'Risk-taking' (A3), 'Competitive Aggressiveness' (A4), 'Marketing Competencies' (C1), 'Technical Competencies' (C2), 'Business and Management Competencies' (C3), 'Financial Resources' (D1), 'National Economic Growth' (D3), 'Entrepreneurial Education and Training' (D5), and 'Commercial and Professional Infrastructure' (D6).

The 'Government Programs' (D7) has directly influenced three other indicators, namely 'Marketing Competencies' (C1), 'Business and Management Competencies' (C3), and 'Financial Resources' (D1). However, the 'National Political Stability' (D2) stands on its own, neither affecting nor effected by other indicators.

In summarising the aforementioned analyses, the importance of the evaluation indicator was determined by $(D + R)$ and $(D - R)$ values. According to the prominence $(D + R)$ and relation $(D - R)$, shown in Table 4.14 and Figure 4.1, the eighteen indicators can be group under four categories to understand the degrees and directions of the interative influence (Tsai *et al.*, 2015; Han *et al.*, 2015) as follows:

(i) Indicators with high relation and high prominence representing by positive $(D - R)$ value, and higher $(D + R)$ value. This category comprised 'Business and Management Competencies' (C3), 'Technical Competencies' (C2), and 'Technological Competencies' (C5).

(ii) Indicator with high relation and low prominence representing by negative $(D - R)$ value, higher $(D + R)$ value. This category consisted 'Marketing Competencies' (C1), 'Financial Resources' (D1), 'Innovativeness' (A2), 'Proactiveness' (A1), and 'Founder's Personal Competencies' (C4).

(iii) Indicator with low relation and high prominence representing by positive $(D - R)$ value, and lower $(D + R)$ value. This category included 'National Economic Growth' (D3), 'Commercial and Professional Infrastructure' (D6), 'Government Program' (D7), and 'National Political Stability' (D2).

(iv) Indicator with low relation and low prominence representing by negative $(D - R)$ value, and lower $(D + R)$ value. This category consisted 'Competitive Aggressiveness' (A4), 'Entrepreneurial Education and Training' (D5), 'Risk-taking' (A3), 'Organizational Structure' (B2), 'Government Policies' (D4), and 'Organizational Culture' (B1).

To be more clearer, based on the coordinate position of $(D + R)$ and $(D - R)$, the indicators can be divided into four quadrants as shown in the following Figure 4.6.

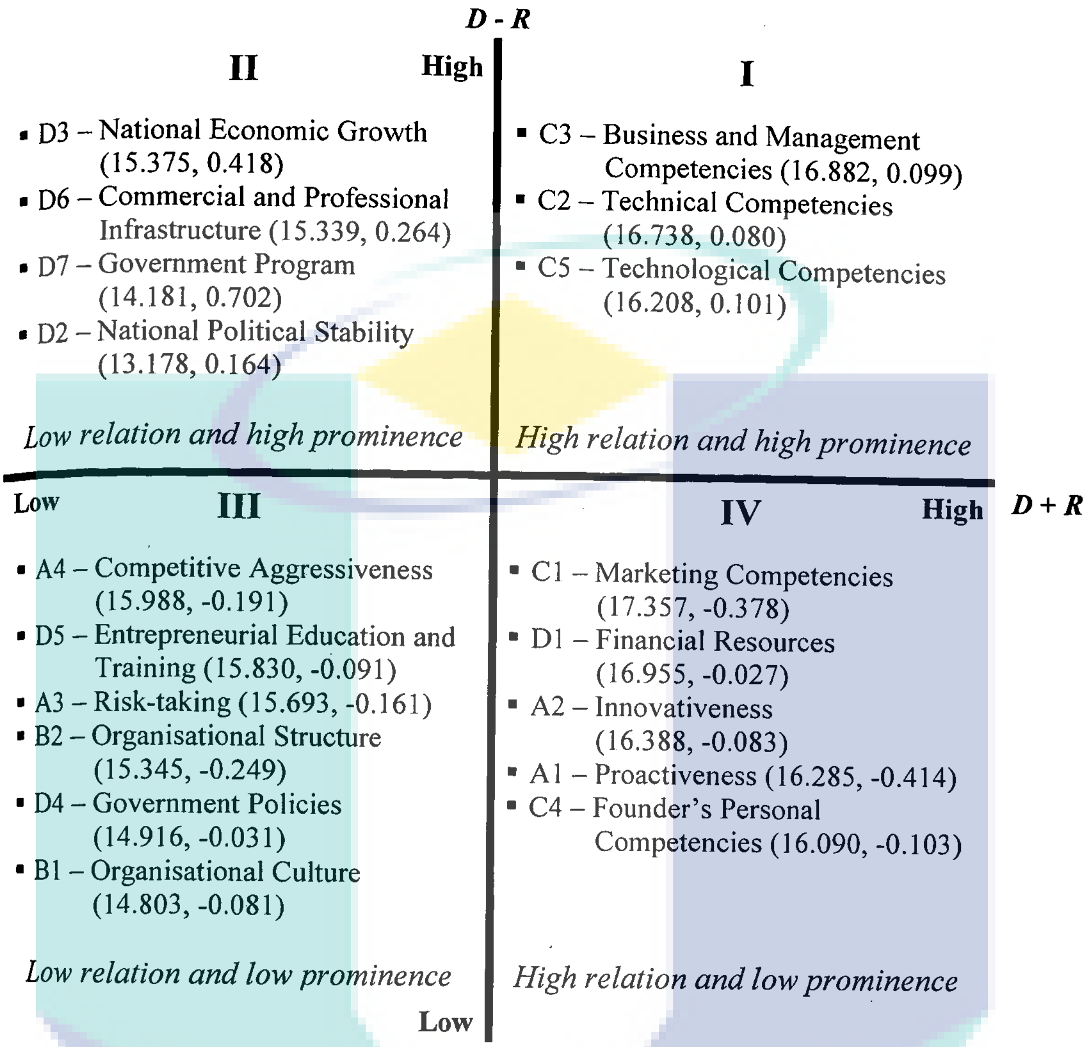

Figure 4.6 Degrees and directions of the interative influence

In referring the Quadrant I, it is obviously seen that three success indicators, namely 'Technical Competencies' (C2), 'Business and Management Competencies' (C3), and 'Technological Competencies' (C5) were the critical and core indicators influencing other indicators. They are the driving indicators of the problem solving. Any actions taken on these indicators will have wide-ranging impact on other indicators.

From the Quadrant II, 'National Economic Growth' (D3), 'Commercial and Professional Infrastructure' (D6), 'Government Program' (D7), and 'National Political Stability' (D2), were independent and can only influence a few other indicators. These indicators are somewhat independent with some influence on the other factors, but cannot be influenced easily.

Quadrant III indicated that 'Competitive Aggressiveness' (A4), 'Entrepreneurial Education and Training' (D5), 'Risk-taking' (A3), 'Organisational Structure' (B2), 'Government Policies' (D4), and 'Organisational Culture' (B1) were independent indicators and can only be influenced by a few other indicators.

In Quadrant IV, 'Marketing Competencies' (C1), 'Financial Resources' (D1), 'Innovativeness' (A2), 'Proactiveness' (A1), and 'Founder's Personal Competencies' (C4) were the core problems that must be solved, however, these are effect-type attributes which cannot be directly improved. They are highly affected by the other indicators and require more attention. Nevertheless, they are not an urgent priority to be dealt with.

In the context of the four leading perspectives of an entrepreneurship phenomenon as indicated in Table 4.19, under the constructionpreneurial orientation dimensions, it was found that 'Risk-taking' (A3), representing by higher positive ($D - R$) value of 1.322, and higher ($D + R$) value of 51.548, was the most critical and core indicator influencing other indicators, and the driver for problem solving. 'Competitive aggressiveness' with positive ($D - R$) value of 0.158, and lower ($D + R$) value of 51.408 was the independent indicators and can only influence a few other factors. 'Proactiveness' with negative ($D - R$) value of -0.528, and higher ($D + R$) value of 52.040, was the core indicators that must be solved, however, it cannot be directly improved because of an effect-type attribute. 'Innovativeness' with negative ($D - R$) value of -0.951, and lower ($D + R$) value of 50.349 was the independent indicator and can be influenced by only a few other indicators.

From the cause and effect diagram as shown in Figure 4.2, 'Risk-taking' (A3) have directly influenced on three other indicators, namely 'Proactiveness' (A1), 'Innovativeness' (A2), and 'Competitive Aggressiveness' (A4). 'Competitive Aggressiveness' (A4) has a direct impact on 'Innovativeness' (A2) and a mutual interaction on 'Proactiveness' (A1). It also found that 'Proactiveness' (A1) have a direct impact on 'Innovativeness' (A2).

For the indicators of constructionpreneurial organisational perspective, it was found that 'Organisational Culture' (B1), representing by higher positive $(D - R)$ value of 1.000, and higher $(D + R)$ value of 101.000, was the most critical and core indicator influencing other indicators, and the driver for problem solving. 'Organisational Structure' with negative $(D - R)$ value of -1.000, and higher $(D + R)$ value of 101.000, was the core indicators that must solve, however, it cannot be directly improved because of an effect-type attribute. As diagrammed in Figure 4.3, Organisational Culture' (B1) was a net cause and largely impacted 'Organisational Structure' (B2).

Under the constructionpreneurial competency dimensions, it was found that 'Business and Management Competencies' (C3), 'Founder's Personal Competencies' (C4), and 'Technological Competencies' (C5) with the positive $(D - R)$ value of 0.426, 0.503, and 0.433, 1.322, respectively, and higher $(D + R)$ value of 37.702, 37.491, and 37.121, respectively, were the most critical and core indicators influencing other indicators, and the drivers for problem solving. 'Marketing Competencies' (C1) with negative $(D - R)$ value of -1.073, and higher $(D + R)$ value of 38.207, was the core indicators that must be solved, however, it cannot be directly improved because of an effect-type attribute. 'Technical Competencies' (C2) with negative $(D - R)$ value of -0.288, and lower $(D + R)$ value of 37.832 was the independent indicator and can be influenced by only a few other indicators.

From the cause and effect diagram as shown in Figure 4.4, 'Business and Management Competencies' (C3) and 'Founder's Personal Competencies' (C4) have directly influenced the two other indicators, namely, 'Marketing Competencies' (C1) and 'Technical Competencies' (C2). Moreover, they also had a mutual interaction with each other. 'Technological Competencies' (C5) was also found to have a direct impact on 'Marketing Competencies' (C1) and 'Technical Competencies' (C2). In addition, a mutual interaction was existed between 'Marketing Competencies' (C1) and 'Technical Competencies' (C2).

Under the constructionpreneurial environment dimensions, 'National Economic Growth' (D3) and 'Government Programs' (D7) represented by positive $(D - R)$ values of 0.104 and 0.569, respectively, and higher $(D + R)$ values of 22.444 and 22.353, were the most critical and core indicator influencing other indicators, and the driver for problem solving. 'National Political Stability' (D2) and 'Commercial and Professional Infrastructure' (D6), with positive $(D-R)$ values of 0.089 and 0.035, respectively, and lower $(D+R)$ values of 20.751 and 19.831, respectively were the independent indicators and can only influence a few other factors. 'Government Policies' (D4) and 'Financial Resources' (D1), with negative $(D-R)$ value of -0.050 and -0.341, respectively, and higher $(D+R)$ value of 22.150 and 21.273, respectively, were the core indicators that must be solved, however, it cannot be directly improved because of an effect-type attribute. 'Entrepreneurial Education and Training' (D5) 'Innovativeness' with negative $(D-R)$ value of -0.405, and lower $(D+R)$ value of 19.415 was the independent indicator and can be influenced by only a few other indicators.

From the cause and effect diagram as shown in Figure 4.5, 'National Economic Growth' (D3) and 'Government Programs' (D7) had directly influenced two other indicators, namely, 'Entrepreneurial Education and Training' (D5) and 'Commercial and Professional Infrastructure' (D6). Both of them were also found to have directly influenced by themselves, and have a mutual interaction with each other. 'National Political Stability' (D2) has directly influenced 'Financial Resources' (D1), and a mutual interaction on 'National Economic Growth' (D3), 'Government Policies' (D4), and 'Government Programs' (D7).

4.5 Research Question 4

4.5.1 Phase 1: Designing the Constructionpreneurial Business Success Checklist

The initial constructionpreneurial business success (CBS) checklist was designed consisting of eighteen items from four perspectives of an entrepreneurship phenomenon. These items were the importance indicators to the successful of construction enterprise as perceived by a panel of the construction industry expert. In addition, these items had achieved the desire consensus in the Delphi study. The dimensions and amount of items in each dimension were: 'Contructionpreneurial Orientation', four items; 'Contructionpreneurial Organisation', two items, 'Contructionpreneurial Competency', five items, and 'Contructionpreneurial Environment', seven items.

4.5.2 Phase 2: Refining the Constructionpreneurial Business Success Checklist

The initial CBS checklist was then refined by exploring the interrelationship between the items based on the results of the DEMATEL technique. From the cause and effect diagram as illustrated in Figure 4.1, it was obviously seen that seventeen indicators have interrelated between each other. One indicator, namely the 'National Political Stability' (D2) stands on its own, neither affecting nor effected by other indicators. Thus, this indicator was deleted from the CBS checklist. Table 4.20 listed the refined items the CBS checklist consisted of seventeen items. The introduction, directions, and statements of each item of the initial CBS checklist were also developed as shown in Appendix J. A four-point rating scale (1 = not at all, 2 = to a small extent, 3 = to some extent, 4 = to a great extent) was used to rate each items of the CBS checklist.

Table 4.20 Refined Items for the CBS Checklist

Item	Dimension and Variable	Statement
A	Constructionpreneurial Orientation:	
1	Proactiveness	Your company emphasises on opportunity-seeking and forward-looking perspective to offer services ahead of the competition and acting in anticipation of future demand.
2	Innovativeness	Your company able to takes opportunities to use and adopt the availability of new technologies related to construction innovative.
3	Risk-taking	Your company anticipates uncertain environment of construction business such as economic climate, fluctuation of material price, and others, and committing significant resources to venture in uncertain environments.
4	Competitive Aggressiveness	Your company adopts an effective competitive strategy, in the long-term, to acquire opportunities in the marketplace and to outperform competitors.
B	Constructionpreneurial Organisation:	
5	Organisational Culture	Your company has its own set of shared beliefs, values, and norms that influence the way organisation members think, feel, and behave.

Table 4.20 Continued

Item	Dimension and Variable	Statement
6	Organisational Structure	Your company was structured appropriately such that all processes and relationships within the organisation occurred effectively.
C	Constructionpreneurial Competency:	
7	Marketing Competencies	Your company is proactively identify and explore opportunities for acquiring new projects and retaining profitable customers through specific approaches such as networking, advertisement, and others.
8	Technical Competencies	Your company has specific knowledge and skills required to apply technical principles and information in a job function, such as contract management, project management, and others.
9	Business and Management Competencies	Your company has the observable characteristics such as knowledge, skills or behaviour patterns that contribute to the successful fulfilment of managerial and business tasks, such as strategic management, financial management, HRM, risks management, and others
10	Founder's Personal Competencies	You have the capability of applying or using knowledge, skills, abilities, behaviours, and personal characteristics to successfully perform critical work tasks, specific functions, or operate in a given role or position.
11	Technological Competencies	Your company has the ability to create and use effectively a particular field of technology that related to the construction business, such as information technology, technological construction methods, and others
D	Constructionpreneurial Environment:	
12	National Economic Growth	Your company frequently monitors the nation's economy climate to identify the market demand of the construction projects, and set strategies to acquire the available opportunities.
13	Financial Resources	Your company has sufficient capital resources and can easily funding from financing institutions, private individuals, and others.
14	Government Policy	Your company is aware and take advantage on the availability of government policies such as public procurements, regulations, licensing requirements, and others which favour to the construction business.

Table 4.20 Continued

Item	Dimension and Variable	Statement
15	Entrepreneurial Education and Training	Your company is frequently participating in the continuing professional development programs such as technical, and business and management trainings.
16	Commercial and Professional Infrastructure	Your company has actively used and take advantage on the availability of subcontractors, suppliers, consultants, professional legal and accounting services, and banking services.
17	Government Program	Your company has participates government's programs that supporting your company growth.

4.5.3 Phase 3: Validating the Constructionpreneurial Business Success Checklist

The current study depicted early efforts to evaluate the reliable indicators for the checklist prior to encouraging its use. The content validity was first established by the author, including the identification of domain of content through a review of relevant literature, generating the pool items accordingly, and developing the constructionpreneurial business success checklist. Second, as earlier discussed in Section 3.4.5.2 of Chapter 3, the content validity was achieved through two measures. First, the supervisors were consulted to validate the readability of the content, easy to answer, and the rating scale used. Second, a group of two experts from academician group who have proven research expertise in the Delphi study and DEMATEL technique were employed to validate the statements, understandable, and practicality of the items asked. Thus, the instrument was considered to have the reasonable validity.

Then, the validation process of the CBS checklist involved a field study which comprising the quantitative and qualitative data gathered from the construction enterprises. The quantitative data analysis consisted of an examination of the psychometric properties of the CBS checklist using SPSS 20. The qualitative data included an analysis of the open-ended questions. The field study was performed by using face to face interview protocol.

The case organisations were selected with the assumption that they are the intended user of the CBS checklist. In this sense, the construction enterprises were purposely selected as the participants. According to Betts and Ofori (1999), the construction enterprises are those business entities involved in any aspect of the construction process within the Architecture, Engineering, and Construction (AEC) sectors including general contracting firms, specialist contractors, architectural and engineering design partnerships, cost consultancy practices, and development companies.

Twelve construction enterprises were purposely selected as the case organisations in this validation procedure. The optimal size of firms to be selected for the validation case study has not been established in previous research. As a consequence, there was a varied number of the case organisations employed in previous research. Cheng and Wang (2010) purposed a dual-sided business data integrity policy framework for the SMEs in Taiwan with the use of a hybrid Delphi-Bayesian method. They employed a field study of four case organisations to validate the framework. In another study, Vimal and Vinodh (2013) developed a checklist for evaluating sustainability characteristics of manufacturing processes. They used five case organisations in the validation process. Thus, the twelve construction enterprises used as the case organisations in the validation process of the CBS checklist was deemed to be sufficient and would enable to draw a valid and generalised conclusion. Table 4.21 showed the demographical of the selected case construction enterprises.

Of the twelve case organisations, five were contractors, four were engineering consultants, two were specialised contractor, and another one was developer. They were also located in various regions with four in Pahang, and both four in Kuala Lumpur and Selangor. The most significant aspect of the demographical characteristics of the case construction enterprises was that, they representing the small companies with RM 1 million to RM 10 million annual turnovers to bigger companies of more than RM 100 million annual turnovers, if one looks at the size of the companies based on annual turnover. This composition of case organisations has added the author's assurance that the data for the CBS checklist validation process were of sound quality because they could be considered represent the Malaysian construction industry.

Table 4.21 Demographical Characteristics of the Selected Case Construction Enterprise

No.	Organisation	Position of Respondent	Number of Permanent Employee	Annual Turnover (RM'000,000)	Location
1	Contractor	Owner-Director	Less than 25	10 – 50	Kuala Lumpur
2	Engineering Consultant	Owner-Director	Less than 25	1 – 10	Selangor
3	Specialised Contractor	Owner-Director	Less than 25	1 – 10	Pahang
4	Engineering Consultant	Owner	Less than 25	1 – 10	Selangor
5	Engineering Consultant	Owner	Less than 25	1 – 10	Pahang
6	Developer	Director	Less than 25	< 100	Kuala Lumpur
7	Contractor	Director	Less than 25	< 100	Pahang
8	Contractor	Director	Less than 25	10 – 50	Kuala Lumpur
9	Specialised Contractor	Director	Less than 25	10 – 50	Selangor
10	Contractor	Owner-Director	Less than 25	10 – 50	Pahang
11	Contractor	Director	Less than 25	10 – 50	Kuala Lumpur
12	Engineering Consultant	Director	Less than 25	1 – 10	Selangor

The field study was conducted from 5 September 2016 to 9 September 2016. The refined version of the CBS (see Appendix J) was used to solicit data from the ten case construction enterprises that participated in this validation process. The field study was conducted in form of semi-structured interview.

The twelve case organisations were contacted via telephone call asking their willingness to participate in the validation process. Luckily, all of them agreed to participate and appointments were set. The field study interview protocol was conducted between 30 to 45 minutes, and scheduled as the following Table 4.22.

Table 4.22 Schedule of the Field Study Interview Protocol

Case	Location	Date	Time
1	Pahang	5 September 2016	9.30 am
2	Pahang	5 September 2016	2.30 pm
3	Pahang	5 September 2016	5.00 am
4	Pahang	6 September 2016	9.00 pm
5	Kuala Lumpur	6 September 2016	3.30 pm
6	Kuala Lumpur	7 September 2016	10.30 am
7	Kuala Lumpur	7 September 2016	3.00 pm
8	Kuala Lumpur	8 September 2016	10.00 am
9	Selangor	8 September 2016	3.00 pm
10	Selangor	9 September 2016	9.00 pm
11	Selangor	9 September 2016	2.30 pm
12	Selangor	9 September 2016	4.30 pm

4.5.3.1: Descriptive Statistics and Internal Consistency

The data were screened through an examination of skewness and kurtosis for each component. The results showed skewness and kurtosis for each component were between -.87 to .81 which yielded adequate results (Salkind, 2009). The mean, standard deviation, item-to-total correlation, and Cronbach's alpha if item is deleted, for all the items in the CBS checklist are presented in Table 4.23.

Table 4.23 Psychometric Properties of the CBS Checklist Items

Component	*M*	*SD*	Cronbach's alpha	Corrected item-total correlation	Cronbach's alpha if item deleted
Constructionpreneurial Orientation:			.73		
1. Proactiveness	3.25	0.75		.62	.62
2. Innovativeness	3.08	0.90		.69	.56
3. Risk-taking	3.00	0.74		.00	.91
4. Competitive Aggressiveness	3.00	0.85		.92	.39
Constructionpreneurial Organisation:			.79		
5. Organisational Culture	2.92	1.16		.70	-
6. Organisational Structure	3.08	0.79		.70	-

Table 4.23 Continued

Component	*M*	*SD*	Cronbach's alpha	Corrected item-total correlation	Cronbach's alpha if item deleted
Constructionpreneurial Competency:			.73		
7. Marketing Competencies	3.17	0.72		.29	.77
8. Technical Competencies	3.33	0.49		.75	.62
9. Business and Management Competencies	3.17	0.72		.80	.54
10. Founder's Personal Competencies	3.33	0.65		.25	.77
11. Technological Competencies	3.42	0.67		.51	.68
Constructionpreneurial Environment:			.76		
12. National Economic Growth	2.75	0.75		.33	.77
13. Financial Resources	3.08	0.90		.61	.70
14. Government Policy	3.42	0.67		.82	.66
15. Entrepreneurial Education and Training	2.75	0.75		.69	.69
16. Commercial and Professional Infrastructure	3.00	0.85		.34	.77
17. Government Program	2.67	1.15		.41	.77

The Constructionpreneurial Orientation showed a high item-to-total correlation (.62 to .92) which Item 3 (Risk-taking) was the weakest of the group (.00). The Constructionpreneurial Organisation showed a high item-to-total correlation for both items (.70). The item-to-total correlation for the Constructionpreneurial Competency was low to high (.25 to .80). Item 10 (Founder's Personal Competencies) and Item 7 (Marketing Competencies) were the weakest of the group with the item-to-total correlations of .25 and .29, respectively.

Lastly, the item-to-total correlation of the Constructionpreneurial Environment was moderate to high (.33 to .82). The overall Cronbach's alpha coefficient for the CBS checklist was found to be .90 which implies good reliability (George & Mallery, 2010). Only small changes in the Cronbach's alpha were traced if any items in the CBS checklist are deleted except Item 3 (Risk-taking). Since, majority of the items showed only small changes in the Cronbach's alpha if any item deleted, all the items were remained. However, an exploration of the content of all the weakest items was conducted.

4.5.3.2: Correlations

Correlations between components of the CBS checklist were examined using the Pearson correction analysis, shown in Table 4.24. The results appeared that the correlations ranged from .35 to .75. Two correlations were significant at 1 percent level of significance, and the other two were at 5 percent level of significance. In addition, the correlations were positive with all of them were high. The highest correlation found was between Constructionpreneurial Competency and Constructionpreneurial Organisation (r = .75, $p < .01$), followed by Constructionpreneurial Environment and Constructionpreneurial Competencies (r = .73, p < .01), Constructionpreneurial Environment and Constructionpreneurial Orientation (r = .66, p < .05), and Constructionpreneurial Competency and Constructionpreneurial Orientation (r = .63, p < .05). The correlation between Constructionpreneurial Environment and Constructionpreneurial Organisation (r = .52), and between Constructionpreneurial Organisation and Constructionpreneurial Orientation (r = .48), even though were high in magnitude, are non-significant.

Table 4.24 Correlations of the CBS Checklist Components

Component	CO	COrg	CC	CE
CO	---			
COrg	.35	---		
CC	.63*	.75**	---	
CE	.66*	.52	.73**	---

N = 10, CO = Constructionpreneurial Orientation, COrg = Constructionpreneurial Organisation, CC = Constructionpreneurial Competency, CE = Constructionpreneurial Environment, $*p < .05$, $**p < .01$

Table 4.25 and Table 4.26 summarised the inter-item correlations by component according to their magnitude. The inter-item correlations by components were all positive and ranged from r = .03 to r = .86. For the Constructionpreneurial Orientation component, the inter-item correlations ranged from low (r = .14) to high (r = .83). Two correlations between Item 4 (Competitive Aggressiveness) and Item 2 (Innovativeness) (r = .83), and between Item 2 (Innovativeness) and Item 1 (Proactiveness) (r = .77) were highly significant at the $p < .01$ level. Another one correlation between Item 4 (Competitive Aggressiveness) and Item 1 (Innovativeness)

(r = .71) was highly significant at the $p < .05$ level. The remainder items in this component had low correlation. For the Entrepreneurial Organisation component, the inter-item correlation between the two items was significant (r = .70), at the 0.05 level. In Constructionpreneurial Competency component, the inter-item correlations ranged from low (r = .03) to high (r = .86). The correlation between Item 9 (Business and Management Competencies) and Item 8 (Technical Competencies) was highly correlated (r = .86) at the $p < .01$ level. Two correlations between Item 11 (Technological Competencies) and Item 8 (Technical Competencies) (r = .64), and between Item 11(Technological Competencies) and Item 9 (Business and Management Competencies) (r = .6) were highly correlated at .05 level of significance. Although inter-correlations between Item 9 (Business and Management Competencies) and Item 7 (Marketing Competencies) (r = .47), and between Item 8 (Technical Competencies) and Item 7 (Marketing Competencies) (r = .34) were highly correlated but they were non-significant. The remainder items in this component were non-significant and low in magnitude. Similarly, in the Constructionpreneurial Environment component, three correlations between Item 16 (Commercial and Professional Infrastructure) and Item 15 (Entrepreneurial Education and Training) (r = .71), between Item 14 (Government Policy) and Item 13 (Financial Resources) (r = .69), and between Item 15 (Entrepreneurial Education and Training) and Item 14 (Government Policy) (r = .59) were significant at the $p < .05$ level and high in magnitude. The correlations between Item 15 (Entrepreneurial Education and Training) and Item 13 (Financial Resources) (r = .57), and between Item 17 (Government Program) and Item 13 (Financial Resources) (r = .55), and between Item 17 (Government Program) and Item 14 (Government Policy) (r = .55) were non-significant, and high in magnitude. The correlations between Item 16 (Commercial and Professional Infrastructure) and Item 14 (Government Policy) (r = .49), between Item 14 (Government Policy) and Item 12 (National Economic Growth) (r = .41), between Item 15 (Entrepreneurial Education and Training) and Item 12 (National Economic Growth) (r = .36), and between Item 17 (Government Program) and Item 12 (National Economic Growth) (r = .31) were non-significant and moderate in magnitude. The remaining items were non-significant and low in magnitude.

Table 4.25 Amount of Correlations by Components According to Their Magnitude

Component	N	Low +1.0 to .29	Moderate +.30 to .49	High > +.50
Constructionpreneurial Orientation	4		1[a]	3[b]
Constructionpreneurial Organisation	2			1[b]
Constructionpreneurial Competency	5	2;[a]	2[a]	3[b]
Constructionpreneurial Environment	6	3[a]	4[a]	3[a],3[b]

[a]Amount of non-significant correlations, [b]Amount of significant correlations

The inter-item correlations between all items on the CBS checklist (see Table 4.26) ranged from a minimum of -.01 to a maximum of .89. These correlations were mostly positive, and more than half were moderate to high correlated (r = .32 to .89). The highest correlations (r =.89) within the different components was between Item 7 (Marketing Competencies) and Item 4 (Competitive Aggressiveness) at the p < .01 level.

The second highest correlation was between Item 11 (Technological Competencies) and Item 5 (r = .87, p < .01). It was followed by the inter-item correlations between Item 7 (Marketing Competencies) and Item 2 (Innovativeness) (r = .82, p < .01), between Item 14 (Government Policy) and Item 4 (Competitive Aggressiveness) (r = .80, p < .01), between Item 11 (Technological Competencies) and Item 6 (Organisational Structure) (r = .79, p < .01), between Item 14 (Government Policy) and Item 9 (Business and Management Competencies) (r = .79, p < .01), between Item 9 (Business and Management Competencies) and Item 5 (Organisational Culture) (r = .78, p < .01), between Item 7 (Marketing Competencies) and Item 1 (Proactiveness) (r = .76, p < .01), between Item 8 (Technical Competencies) and Item 5 (Organisational Culture) (r = .69, p < .05), between Item 9 (Business and Management Competencies) and Item 3 (Risk-taking) (r = .69, p < .05),), between Item 17 (Government Program) and Item 4 (Competitive Aggressiveness) (r = .65, p < .05), between Item 14 (Government Policy) and Item 8 (r = .64, p < .05), between Item 5 (Organisational Culture) and Item 3 (Risk-taking) (r = .63, p < .05), between Item 8 (Technical Competencies) and Item 6 (Organisational Structure) (r = .62, p < .05), between Item 9 (Business and Management Competencies) and Item 6 (Organisational Structure) (r = .61, p < .05), between Item 14 (Government Policy) and Item 7

(Marketing Competencies) (r = .60, $p < .05$), between Item 9 (Business and Management Competencies) and Item 4 (Competitive Aggressiveness) (r = .59, $p < .05$), between Item 15 (Entrepreneurial Education and Training) and Item 9 (Business and Management Competencies) (r = .59, $p < .05$), between Item 15 (Entrepreneurial Education and Training) and Item 11 (Technological Competencies) (r = .59, $p < .05$), and between Item 16 (Commercial and Professional Infrastructure) and Item 9 (Business and Management Competencies) (r = .59, $p < .05$).

Although few negative inter-item correlations (r = -.04 to -.14) were found, nevertheless, the magnitude almost of them was close to zero, and none of them were significant.

Table 4.26 Correlations of the CHS Checklist Items

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
CO																	
1	---																
2	.77**	---															
3	.16	.14	---														
4	.71*	.83**	.29	---													
COrg																	
5	.23	.09	.63*	.37	---												
6	.27	-.14	.31	.13	.70*	---											
CC																	
7	.76**	.82**	.00	.89**	.13	.13	---										
8	.24	.14	.50	.43	.69*	.62*	.34	---									
9	.42	.26	.69*	.59*	.78**	.61*	.47	.86**	---								
10	.00	-.05	.19	.00	.16	.12	.06	.19	.26	---							
11	.13	-.06	.37	.12	.87**	.79**	.03	.64*	.60*	.28	---						
CE																	
12	.28	.43	.16	.42	.18	-.11	.25	-.24	.08	.37	.04	---					
13	.10	-.01	.41	.35	.18	.37	.26	.55	.54	.10	.24	.03	---				
14	.50	.54	.55	.80**	.52	.27	.60*	.64*	.79**	.28	.39	.41	.69*	---			
15	-.04	.03	.49	.28	.49	.49	.25	.49	.59*	.55	.59*	.36	.57	.59*	---		
16	.14	.24	.29	.25	.46	.27	.30	.43	.59*	.34	.48	.14	.24	.49	.71*	---	
17	.52	.38	.32	.65*	.32	.43	.51	.37	.51	.20	.08	.31	.55	.55	.21	.09	---

N = 10, CO = Constructionpreneurial Orientation, COrg = Constructionpreneurial Organisation, CC = Constructionpreneurial Competency, CE = Constructionpreneurial Environment, $*p < .05$, $**p < .01$

4.5.3.3 Appropriateness of the CBS Checklist for the Intended Uses

The open-ended questions in the Field Study Interview Protocol (see Appendix K) asked the participants to provide their opinion about the CBS checklist in three main areas, namely usefulness of the CBS checklist to determine the business success of the construction enterprise, helpfulness of the CBS checklist to guide the construction enterprise achieving business success, and changes to improve the CBS checklist. A set of codes were developed based on the questions and participants' responses, such as 'useful', 'somewhat useful', 'helpful', 'somewhat helpful', 'not helpful at all', and 'modify wording'.

Information from participants about the usefulness of the CBS checklist to determine the success of their business was coded as 'useful' if participants expressed how the CBS checklist was beneficial for monitoring successful business. The majority of the responses to this question were classified within this code. Some examples are: "It seems that the checklist will able to be a great tool in monitoring successful business not only for the construction industry but for other industries as well", "Very useful", and "The checklist is very useful as it provides new dimensions in monitoring successful business". There were few instances in which participants indicated that the CBS checklist was 'to some extent useful' for the organisation and were also coded. Responses include, "To some extent useful, it requires advanced knowledge to understand the concept introduced", "Useful but need sufficient resources to support it", and "Useful but seemed too academic".

Feedback about the helpfulness of the CBS checklist guiding the organisation toward achieving successful business was coded as 'helpful' when responses were completely positive about it. All of the responses to this question were classified within this code. Some examples are: "Very helpful in guiding our company", "It provides almost all dimensions needed for successful business", and "It is helpful since no such checklist introduced for the industry at present".

Participants' responses to the question about to improve the CBS checklist were for the most part, straightforward answers, either 'yes' or 'no'. Responses coded as 'yes' when the participants indicated that the items were clear, the response scale was appropriate, and the length of the CBS checklist was appropriate. Majority of the respondents indicated as 'yes'. For example, "Yes, it seems clear with good examples but need to modify some words", "Yes, the response scale is sufficient", and "Yes, it seems the right length". One respondent indicated that "the checklist was not clear since it was too lengthy and I suggest you should revise the wording as to be more focus".

In regards with the question whether any suggestion items to be added or deleted from the CBS checklist, the majority of the respondents indicated as 'no'. Only one respondent indicated that "Customer relationship is important to the success of construction business". Finally, regarding to the question about any suggestion to improve the CBS checklist, almost all the respondents indicated that they did not have any additional suggestions. Indeed, some of them expressed that the CBS checklist was "Very good and well done". One participant suggested that "It is good enough if could provide a column/row at the end of every component to summarise the score of that particular component, and the total score at the end of the checklist as well".

Table 4.27 summarised the findings from the Field Study Interview Protocol. It is obviously seen that the percentage agreement of appropriateness of the CBS checklist was 98.3 percent [(59/60) x 100%]. Overall, participant responses showed for the most part, positive responses, indicating that the CBS checklist could be an appropriate tool for the determine success, and beneficial for the intended uses.

Table 4.27 Summary of Findings from the Field Study Interview Protocol

No.	Question	Responses Yes	Responses No
1.	How useful was the checklist in determining the successful of construction business?	12	
2.	How helpful do you think the checklist will be to guide your company in achieving successful business?	12	
3.	What changes, if any, do you consider necessary to improve the checklist?		
	a. Were the items clear?	11	1
	b. Were the response options appropriate?	12	
	c. Was the length of the checklist appropriate	12	
	Total Score	**59**	**1**

The final adjustments of the CBS checklist were made taking into consideration the results from the analysis of the psychometric properties and the feedback from participants. These were about retaining items without changes, and modifying the wording of the items. It is important to note that as a result of the field study, change to the introduction of the CBS checklist was not required, thus, all the wording was retained. However, changes were made to the directions to include the words: After completing the checklist, review the statements marked as 'to a small extent' and 'not at all'. These are the areas of improvement that need to be prioritised in order to achieve the desire success in the business.

Regarding to the rating scale, the names of the response options were retained but the numerical values were removed. Estimating the score by each component or the total score for the overall CBS checklist as suggested by participant will not provide the construction enterprises the information necessary to determine their strengths and the specific areas that need to be prioritised. For example, does 80% as in the 'rule of thumb', could be considered representing excellent performance of the construction enterprise? However, it could be possible if an additional exploration done to determine what constitutes the score or percentage of performance for the CBS checklist which beyond the scope of the current study. It could be done by an empirical survey with wider population within the construction industry. Thus, it will be necessary to examine the items individually giving the preference to those marked as to 'a small extent' and 'not at all' in order to increase the company's performance toward achieving successful business.

Finally, an exploration of the content of Item 1 (Proactiveness), Item 2 (Innovativeness), Item 10 (Founder's Personal Competencies), and Item 12 (National Economic Growth) which found to be the weakest in their groups in term of item-to-total correlation was necessary. Therefore, the content of these items were examined to determine its relevancy and consider the possibility of removal. However, Item 1 and Item 2 represent an important dimension of the Constructionpreneurial Orientation. Similarly, Item 10 (Founder's Personal Competencies), and Item 12 (National Economic Growth) represent an important dimension of the Constructionpreneurial Competency and Constructionpreneurial Environment, respectively. It seemed that all of these items could not be removed from the components, and as a result, they were retained and reworded. It is important to note that the name of Item 10 was changed from Founder's Personal Competencies to Personal Competencies. The final version of the CBS checklist was then confirmed as appended in Appendix L.

4.6 Chapter Summary

Chapter 4 presents the results of the data analyses and findings. The conceptual research model developed in Section 2.11, Chapter 2 was applied to identify the indicators of success for entrepreneurs in the construction industry. The current study employed two phases of data inquiry. The two iteration rounds of Delphi study were used in the first phase and the DEMATEL technique employed in the second phase.

Data sources were from the replies given by the construction industry experts from four panels, namely contractors/developers, professional engineering consultants (architect, engineer, and quantity surveyor), government technical officers, and academicians. The participants were currently involved in the Malaysian construction industry. Each participant was also qualified as an expert based on the pre-determined criteria. The questionnaires were delivered electronically via the internet, and therefore, each participant must have an Internet access in order to participate. A pilot study of eight experts who involved in the construction industry was conducted in advance of recruiting to the full Delphi study and DEMATEL technique. The results revealed satisfactory. The Cronbach's alpha for the Delphi and DEMATEL instruments were .83 and .77, respectively. Hence, the data collected from the survey were of sound quality which would enable this study to draw a valid and generalised conclusion.

Thirty nine experts officially agreed to participate in the current study. All of them complied with the pre-described criteria and confirm as qualified experts. All thirty nine experts returned the Delphi Round 1 questionnaire, represents 100% response rate. In the Delphi Round 2, of thirty nine respondents, thirty six experts returned the questionnaire, representing 92.3% response rate. In the DEMATEL study, of thirty six experts, twenty experts responded the questionnaire, representing 55.6% response rate. The findings from the Delphi study revealed that eighteen indicators achieved the required consensus as suggested by the experts. All these indicators were used as variables in DEMATEL questionnaire. Results from the DEMATEL technique found that three indicators were the most critical and driving indicators affected others. Five other indicators were the critical indicators of the effect group.

The eighteen indicators emerged from the Delphi study was admitted as the initial components of the CBS checklist. Seventeen indicators were confirmed as the final components of the checklist as a result of DEMATEL findings. A field study of ten case organisations was conducted to validate the checklist. The validation results indicated that the CBS checklist could be an appropriate tool for determine the constructionpreneurial business success and beneficial for the intended uses.

The following Table 4.28 summarised the findings of the current study which respect to each research question.

Table 4.28 Summary of Findings from the Current Study

No.	Research Question	Finding
RQ_1	What are the relevant indicators from the perspectives of an entrepreneurship phenomenon that can be employed to evaluate the success of the construction enterprise?	Twenty three relevant indicators were abstracted from the entrepreneurship literature.
RQ_2	Which of the identified indicators is perceived to be important for the success of the construction enterprise?	Eighteen indicators were perceived to be important for the success of the construction enterprise.
RQ_3	How do the indicators impacted the success of the construction enterprise in term of causes and effects?	Three indicators were the most critical and driving indicators affected others, and five indicators were the critical indicators of the effect group.
RQ_4	What checklist can be advocated to the success of the construction enterprise?	A checklist named the Constructionpreneurial Business Success Checklist was developed and validated.

The findings presented in this chapter set the groundwork for the chapter to come. Chapter 5 presents the discussion of the findings. The discussion includes the overall findings within the framework of the research questions underlying the study. Each of the findings is discussed, with comments on how builds on or deviates from current literature and whether the findings appeared to be a new contribution.

CHAPTER 5

DISCUSSION OF THE FINDINGS

5.3 Preamble

The primary objective of the current study was to explore the indicators of success for entrepreneurs in the construction industry from the perspectives of an entrepreneurship phenomenon. This chapter discussed the overall findings within the framework of the research questions underlying the study. Each of the findings is discussed, with comments on how builds on or deviates from current literature and whether the findings appeared to be new contributions.

The current study was developed from a theoretical foundation and should provide a deeper insight into the theories and bodies of knowledge on both the construction engineering management (CEM) and the entrepreneurship.

5.2 Research Question 1

The first research question addressed the relevant indicators from the perspectives of an entrepreneurship phenomenon that can be employed to evaluate the success of the construction enterprise. In addressing the first research question, an extensive literature reviews have been carried on to compile the relevant success indicators from the entrepreneurship literature. Twenty three indicators from four perspectives of an entrepreneurship phenomenon have been identified. All of these indicators have sufficiently explored and used in many previous studies, and may have a significant positive effect on firm's profitability and growth.

The findings are considered to have offered a significant contribution to the literature, since this study is the first to use the perspectives of the entrepreneurship phenomenon in searching the success indicators for the construction enterprise. Table 5.1 presented the relevant success indicators from the four perspectives of an entrepreneurship phenomenon.

Table 5.1 Relevant Success Indicators from the Entrepreneurship Phenomenon

No.	Entrepreneurship Phenomenon and Indicator
A	Entrepreneurial Orientation
1.	Autonomy
2.	Innovativeness
3.	Risk-taking
4.	Proactiveness
5.	Competitive aggressiveness
B	Entrepreneurial Organisation
1.	Organisational structure
2.	Organisational culture
C	Entrepreneurial Competency
1.	Founder's personal competencies
2.	Business and management competencies
3.	Marketing competencies
4.	Technical competencies
5.	Technological competencies
6.	Political competencies
7.	Social responsibility competencies
D	Entrepreneurial Environment
1.	Financial resources
2.	Government policies
3.	Government programs
4.	Entrepreneurial education and training
5.	Research and development transfer
6.	Commercial and professional infrastructure
7.	Internal market openness
8.	Physical infrastructure and services
9.	Cultural and social norms

5.3 Research Question 2

The second research question aimed to identify the indicators that are perceived to be significant for the success of the construction enterprise. The Delphi process in two iterative rounds was applied to answer the research question.

The significant results revealed from the Delphi study was that the expert panellists have perceived eighteen indicators as the important indicators for the success of the construction enterprises. The following Table 5.2 indicated the eighteen indicators that achieved consensus according to the importance rank, and entrepreneurship perspectives.

Table 5.2 Importance Rank of the Success Indicators

Rank	Indicator	Perspective
1	Financial resources	Entrepreneurial environment
2	Proactiveness	Entrepreneurial orientation
3	Organisational culture	Entrepreneurial organisation
4	National political stability	Entrepreneurial environment
5	Organisational structure	Entrepreneurial organisation
6	Marketing competencies	Entrepreneurial competency
7	Technical competencies	Entrepreneurial competency
8	Business and management competencies	Entrepreneurial competency
9	National economic growth	Entrepreneurial environment
10	Innovativeness	Entrepreneurial orientation
11	Founder's personal competencies	Entrepreneurial competency
12	Risk-taking	Entrepreneurial orientation
13	Government policies	Entrepreneurial environment
14	Competitive aggressiveness	Entrepreneurial orientation
15	Technological competencies	Entrepreneurial competency
16	Entrepreneurial education and training	Entrepreneurial environment
17	Commercial and professional infrastructure	Entrepreneurial environment
18	Government programs	Entrepreneurial environment

The findings provided evidence that an entrepreneurship phenomenon could be used and developed in other disciplines such as in the CEM. Hence, it is considered to have offered a significant contribution to the CEM and entrepreneurship literature.

5.3.1 Constructionpreneurial Orientation

Entrepreneurial orientation has been posited by many scholars as associated positively with firm profitability and growth (Hitt, 2005; Rauch, Wiklund, Lumpkin, & Frese, 2009; Kraus, 2013). The constructionpreneurial orientation was assessed using six indicators, namely 'Innovativeness', 'Risk-taking', 'Proactiveness', 'Competitive Aggressiveness', 'Autonomy', and 'Religiosity'. The findings of the Delphi study revealed that four indicators, namely 'Innovativeness', 'Risk-taking', 'Proactiveness', and 'Competitive Aggressiveness' were deemed to achieve consensus. Two other indicators, namely 'Autonomy' and 'Religiosity' have been rated below the consensus cut-off level.

The existence consensus of findings was consistent with the majority of previous studies that reported a positive relationship between 'Innovativeness', 'Risk-taking', 'Proactiveness', and 'Competitive Aggressiveness' and business performance (Putniņš & Sauka, 2013; Shehu & Mahmood, 2014; Arshad, S., Rasli, Arshad, A.A. & Zain, 2014). The results provided evidence of synergies relating to constructionpreneurial orientation and business performance. Constructionpreneurial orientation is not only strategy-making processes of construction business, but also an ongoing process to achieve a competitive advantage in the hostile business environment such as the construction business is (Zain & Hassan, 2007; Vecchiarini & Mussolino, 2013).

It was surprising to notice that 'Autonomy' did not achieve the consensus. Thus, in a situation where the owners or founders of construction enterprise lose their autonomy over their business decisions, an effect on performance would be expected. However, it is possible that the owners or founders believe the importance for all business decisions undertaken as the collective decisions by them and their managers. Another reason on this issue could be due to the fact that people play key roles in nearly aspects of all construction process and management (Abowitz & Toole, 2010). It has implied the need for collaboration among people in the construction organisation, especially in the decisions making process. The finding has consistence with the study of Zain and Hassan (2007) within the Malaysian construction industry which revealed that autonomy was negatively associated with the growth of construction companies. It also supported evidence offered by Arshad, S., Rasli, Arshad, A.A. & Zain, 2014) that no correlation found between autonomy and business performance in the Malaysian technology-based SMEs.

Nevertheless, the absence of consensus on 'Religiosity' orientation was not surprising since there were strong disagreements in the literature on the relationships between the 'Religiosity' and performance. For examples, the studies by Osman-Gani, Hashim, and Ismail (2013), and Wahab and Rafiki (2014) found a significant relationship between religiosity and business performance. Contradictory, the study of Wening and Choerudin (2015) revealed no influence of religiosity on performance. However, this finding could be considered to have offered a significant contribution to the CEM literature.

5.3.2 Constructionpreneurial Organisation

The entrepreneurial organisation has been considered by many scholars as a strategic direction that includes renewing products, processes, services, strategies, or even the organisation as a whole (Colvin & Miles, 1999). It is the most influence indicators on firm's productivity (Hunter, 2002). Two indicators evaluated the constructionpreneurial organisation, namely 'Organisational Structure' and 'Organisational Culture'. The findings of the Delphi study indicated that both of them achieved consensus.

In relation to 'Organisational Structure', the finding supported the views forwarded by Mokua and Ngugi (2013) where the right organisational structure could enhance organisation's entrepreneurial activities that contribute to performance improvement. It also supported the evidence offered by Chen and Lee (2007) that the organisational structure of a construction enterprise was affecting the performance of specific projects. Indeed, a high correlation was found between the project success and organisational flexibility (Shahu, Pundir, & Ganapathy, 2012).

In relation to the 'Organisational Culture', the result supported the findings of Turró, Urbano, and Peris-Ortiz (2014) where organisation culture appeared to be positively significant and has a direct effect on corporate entrepreneurship. Indeed, Ogbonna and Harris (2000) found that that innovative culture and competitive culture positively linked to the business performance. It also supported the evidence that organisational culture is one the key indicators of construction industry performance, in term of trustworthiness and inter-project knowledge sharing (Wiewiora, Murphy, & Trigunarsyah, 2014), international strategic alliances (Yitmen, 2013), industry mentality (Cheung, Wong, & Ana, 2012), and conflict amongst stakeholders (Harinarian, Bornman, & Botha, 2013).

5.3.3 Constructionpreneurial Competency

The entrepreneurial competency has been considered by many scholars as important ingredients to the firm's performance and competitiveness (Man, Lau, & Chan, 2002), and business success and growth (Mitchelmore & Rowley, 2010; Solesvik, 2012). Seven indicators evaluated the constructionpreneurial competency. It refers to 'Founder's Personal Competencies', 'Business and Management Competencies', 'Marketing Competencies', 'Technical Competencies', 'Technological Competencies', 'Political Competencies' and 'Social Responsibility Competencies'.

The findings of the Delphi study revealed that five indicators achieved consensus. It includes 'Marketing Competencies', 'Technical Competencies', 'Business and Management Competencies', 'Founder's Personal Competencies', and 'Technological Competencies'. These indicators are seen associated with the fundamental functions of the existence of the construction business. It involves the processes of marketing to acquire or sell the project or product, operational to execute the project, and management to manage all the processes involved (Schleifer, 1989; Stevens, 2007).

'Marketing Competencies' is crucial to every construction enterprise, and may include the functions of estimating, pricing, bidding, networking, and so on. It implies the importance of marketing efforts to acquire the projects. The project is the 'commodity' of the construction business, and without the project, construction business does not survive. Further, the operational functions that involve the execution of the project is very important to the construction business. It aims to ensure the project is built accordingly and successfully since they have strategic implications for the success and effectiveness of the business (Jari & Bhangale, 2013). In this regard, 'Technical Competencies' and 'Technological Competencies' are the elements that played the vital roles in the project's execution phases. It may include the elements such as construction knowledge, project management practices, information technology or the utilization of new methods of construction and so on.

The construction business is seen further emphasises the importance of management aspects to managing all the operational processes within the organisation. In this horizon, 'Business and Management Competencies' is the significant aspects of entrepreneurial competency that have significance to the organisation performance. Among the important areas of 'Business and Management Competencies' that have significant to the construction business are strategic management, risk management, human resource management, financial management, and others.

The 'Founder's Personal Competencies' which highlighted the importance of background characteristics and psychological attributes of the founding entrepreneurs are also the important aspects of the construction business. This finding supports the view forwarded by Driessen and Zwart (2014) that the greatest determinant of business success is the entrepreneur him/herself. It also supported evidence offered by Baum and Locke (2004) and Che Rose, Kumar, & Yen (2006) that entrepreneurs, as the owner-managers, play a prominent role in determining business success. Indeed, the lack of entrepreneurial competency among the main founder-owner was the most significant reason for most enterprises failures (Kiggundu, 2002).

All of these findings are corroborated by the findings of Mitchelmore and Rowley (2013) who found that personal competencies and, business and management competencies associated with business growth. In the context of construction business, these findings confirmed the evidence offered by Shigang (2011). He revealed that entrepreneurial capability, marketing, and project management competencies were significantly positive relationship with the overall performance of Chinese construction enterprises. It also confirmed the findings of studies that discovered some others competency dimensions that relate to a performance of construction firms. It includes personal competencies (Othman & Jaafar, 2013), marketing competencies (Cristina, 2008), business and management competencies (Maes, Sels, & Roodhooft, 2005), project management competencies (Omidvar, Samad, & Alias, 2012), and human resource competencies (Wilkinson, Johnstone, & Townsend, 2012).

The absence of consensus on two other indicators, namely 'Political Competency', and 'Social Responsibility Competency' was seen to be associated with the external indicators that outside the fundamental elements of the construction business. Nevertheless, the determinations are regarded to have offered a substantial contribution to the literature since there were strong disagreements in the literature on the effects of 'Political Competencies' and 'Social Responsibility Competencies' on performance. Some researchers had found the positive relationship while others contradictory.

Economies have long noted that firms maintain any political connections receive a variety of economic benefits in returns (Blau, Brough, & Thomas, 2013). In this context, the 'Political Competencies' which represents the used of political connections in securing projects was ignored by most of the experts. However, it is possible that the experts considered that the lobbying efforts were one of the activities of 'Marketing Competencies'.

The absence of consensus on 'Corporate Social Responsibility Competencies' supported the viewed of Nasieku, Tagun, and Olubunmi (2014). They viewed that corporate social responsibility has become very complicated and multifaceted of which its relationships to the performance was unclear. It is likewise coherent with the grounds offered by Iqbal, Ahmad, Basheer, & Nadeem (2012) that corporate social responsibility has no effect on organisational performance. Indeed, corporate social responsibility activities significantly decrease short-term profitability in certain industries (Inoue & Lee, 2011). Furthermore, the gains expected from corporate social responsibility practices are more in the form of intangible benefits such as image/reputation, recognition, and loyalty benefits, all of which may result in turn of profits.

However, these intangible benefits may less necessary for the construction business because they did not guarantee for securing future projects. It could be true in the manufacturing industry where image or reputation and recognition of the company were able to gain loyal benefits and results in gaining superior income. As previously indicated, the criteria for selection of the contractor were solely based on previous performance records, financial status, and technical capabilities.

5.3.4 Constructionpreneurial Environment

According to Covin and Slevin (1991), and Zahra (1993), the firm's external environment needs to be taken into account when considering the relationship between corporate entrepreneurship and firm performance. Eleven indicators judged the constructionpreneurial environment, namely 'Finance Resources', 'Government Policies', 'Government Programs', 'Entrepreneurial Education and Training', 'Research and Development Transfer', 'Commercial and Professional Infrastructure', 'Internal Market Openness', 'Physical Infrastructure and Services', 'Cultural and Social Norms', 'National Economic Growth' and 'National Political Stability'. The findings of the Delphi study revealed that seven indicators have achieved consensus, namely 'Financial Resources', 'National Political Stability', 'National Economy Growth', 'Government Policies', 'Entrepreneurial Education and Training', 'Commercial and Professional Infrastructure', and 'Government Programs'. Four other indicators, namely 'Research and Development Transfer', 'Internal Market Openness', 'Physical Infrastructure and Services', and 'Cultural and Social Norms' have rated below the consensus cutoff level.

The existence consensus on 'Financial Resources', 'Government Policies', 'Government Programs', 'Entrepreneurial Education and Training', and 'Commercial and Professional Infrastructure' could be expected. It collaborates with the evidence forwarded by Ahmad and Xavier (2012) that discovered these indicators were among the major aspect of success indicators for entrepreneurial development in Malaysia.

With regard to these indicators, the accessibility of financial support was viewed as the highest consensus among the expert panellists. This finding confirmed the evidence offered by Alkali and Isa (2012), and Shamsuddin, Othman, Shahadan, and Zakaria (2012) that availability of monetary resource is significantly linked with business performance. Indeed, lack of financial support have been widely described as the primary problem facing the entrepreneurs in Malaysia and was apparent in research done in both developed and developing countries (Ahmad & Xavier, 2012). This finding highlights that the availability of 'Financial Resources' is of paramount importance to the construction business. In this sense, construction enterprise may need capital to execute the projects, and it could acquire through internal funds or loans, mortgages, and others from financial institutions.

The needs of consistencies of 'Government Policies' and 'Government Programs' to support entrepreneurial activities are also crucial for the construction business. It can be managed by improving 'Entrepreneurial Education and Training' with special stress on the four perspectives of an entrepreneurship phenomenon which employed in the current work, namely constructionpreneurial orientation, constructionpreneurial organisation, constructionpreneurial competency, and constructionpreneurial environment. Moreover, 'Government Policies' and 'Government Programs' could also support entrepreneurial development by providing the 'Commercial and Professional Infrastructure' which accessible to the constructionpreneurs.

'National Economy Growth' and 'National Political Stability' were other indicators that have achieved consensus. 'National Economy Growth' and 'National Political Stability' were deeply interconnected. In this sense, the relationship between economic growth and stability refers to the manner in which the political stability of a nation can lead to its economic growth which in turn providing safely and stable business environment. These findings confirmed the evidence forwarded by Bazza and Daneji (2013) that the performance of business organisation depends to a great extent on the stability of government. In the context of the construction industry, stable government and economic prosperous will provide more development projects and resulting in more chances to the construction business.

The absence of consensus on 'Research and Development Transfer', and 'Cultural and Social Norms' was surprising. These results against some of the studies found in the literature where research and development transfer, and cultural and social norms are among the important factors of organisational performance (Ahmad and Xavier, 2012; Harinarian *et al.*, 2013; Wiewiora *et al.*, 2014). Nevertheless, these findings should provide a better understanding of the nature and attributes of the

Malaysian construction industry. It could be taken to have offered a significant contribution to the construction engineering management literature.

It was least surprised when the findings revealed that 'Internal Market Openness' and 'Physical Infrastructure and Services' did not reach the desired consensus. The construction enterprises are likely disagreeing on the internal market opened due to the facts the market openness will increase competition which could affected their interest. If the new firms are freely permitted to get into the existing marketplace, then a tougher competition could be expected. The absence of consensus on 'Physical Infrastructure and Services' may due to the construction enterprises satisfied with the current availability of infrastructures provided by the Government. In other words, the physical resources such as communication, utilities, and transportation are easy to access, and the availability of space is at a reasonable price that does not discriminate them.

5.4 Research Question 3

The third research question examined the impact of the indicators impacted the success of the construction enterprise in term of causes and effects. In directing the third research question the DEMATEL technique was used.

Eighteen indicators that achieved consensus in the Delphi study were used as variables in the DEMATEL questionnaire. Although these indicators could be used as the success indicators for the construction enterprise, nevertheless, it is unrealistic to improve all these factors simultaneously with limited resources. Moreover, it cannot be discounted that the success of the construction business may also result from the interrelationships among these elements. Therefore, in order to improve the factors more effectively, the DEMATEL technique was employed to first prioritise the importance of these factors and then construct the causal relations among them. Hence, the key success factors for the construction business success can be identified and improvement can be made by observing the causal relationships of the key success indicators.

From the cause and effect diagram (see Figure 4.1), it was noticed that 'National Political Stability' stands on its own, neither affecting nor effected by other indicators. It could expected that the uncertainty political environment resulted from unstable national political may affect the pace of economic development. However, it was least surprised since previous study on the interconnected of political stability and economic growth showed inconclusive findings. Haber and Razo (1998) viewed that national political stability could acts as a double edged sword in such that the peaceful environment brought by political stability may offer is a desideratum, but it could easily become a breeding ground for abuse of power and corruption. A study by Ahmed and Pulok (2013) indicated that political stability has negative effect on economic performance in long-term while the short-run effect is positive. Thus, it seemed that entrepreneurs have much lesser sensitive to political instability, meaning that they will continue their investment as long as rights to business are not abrogated. However, this finding could be considered to have offered a significant contribution to the CEM literature.

The overall results of the DEMATEL study revealed that three success indicators were the most critical indicators influencing the other indicators, namely 'Business and Management Competencies', 'Technical Competencies', and 'Technological Competencies'. The results highlighted the importance of competencies in the construction business due to the facts that the construction business is the project-related business. It suggests that these three indicators are of great importance and the drivers for the success of the construction business.

These indicators are classified in the cause group. The cause group criteria imply the meaning of the influencing criteria and the effect group criteria denote the meaning of influence criteria (Fontela & Gabus, 1976). Thus, all these three indicators can directly influence the other indicators. The outcomes indicate that the construction enterprises should pay more attention to improve these indicators because they are the driving indicators for problem resolving. Any actions taken on these indicators will have wide-ranging impact on other indicators.

It also found that five other indicators, namely 'Marketing Competencies', 'Financial Resources', 'Innovativeness', 'Proactiveness', and 'Founder's Personal

Competencies' were the critical indicators of the effect group. Although they are also considered as the core problems that must be solved, however, they are effected-type attributes which cannot be directly improved. The results suggest that the construction enterprises should also give more attention to improve these indicators because they are highly affected by the other indicators. Nevertheless, they are not an urgent priority to be dealt with.

The most significant of all of these indicators for the construction business are evident and have been discussed in the previous section. Although some of the indicators, namely 'Government Programs', 'National Economic Growth', 'Commercial and Professional Infrastructure', and 'National Political Stability' are less important and beyond the controlled of construction enterprise, nevertheless, they must alert and closely monitored these indicators. Alertness is one of the abilities that entrepreneurs must have (Thérin, 2007; Farmer, Yao, & Kung-Mcintyre, 2011). In this sense, alertness will provide them with the ability to detect and exploit early signs of change, and then take necessary action to grab the opportunities. If the Government brings in a new policy, for example the emphasising on the use of Industrialized Building Systems (IBS) in the construction projects, construction enterprise must have to take advantage of this program by improving their 'Technological Competencies' and 'Technical Competencies' so that they have specialised in constructing such method. They too should improve their 'Business and Management Competencies' by setting out collaboration with the IBS manufacturers or suppliers, and then could offer their service as a specialized contractor in the IBS to the clients.

The other ten indicators, namely 'National Economic Growth', 'Commercial and Professional Infrastructure', 'Government Program', 'National Political Stability', 'Competitive Aggressiveness', 'Entrepreneurial Education and Training', 'Risk-taking', 'Organisational Structure', 'Government Policies', and 'Organisational Culture' were independent and can only influence a few other indicators.

It is advised that if the construction enterprises desire to obtain high potential in business success, they should firstly, focus to the cause group indicators, and then pay attention to the effect group indicators. Therefore, an effective way for the construction enterprise to gain success is by managing all these causes and effects indicators, namely 'Business and Management Competencies', 'Technical Competencies', 'Technological Competencies', 'Marketing Competencies', 'Financial Resources', 'Innovativeness', 'Proactiveness', and 'Founder's Personal Competencies'. These indicators are regarded as the most critical indicators for the construction enterprise to consider in order achieving success.

For instance, 'Technological Competencies' and 'Proactiveness' were among the important causal and effect indicators, respectively. In other words, 'Proactiveness' was the effect indicator attempted to increase the cause indicator of 'Technological Competency' for construction business to achieve success. In this sense, the constructionpreneurs must have a proactive behaviour involves acting in anticipation of future demand rather than just 'wait and see'. They must look forward to seek an opportunity by taking advantages of the new introduced technologies in the construction industry, and then offer their expertise in those particular technologies to the market ahead of their competitors.

5.4.1 Constructionpreneurial Orientation

The results revealed that 'Risk-taking' was the most critical and core indicator influencing other indicators, and the driver for problem solving. Risk is synonymous with the construction industry. Shahu, Pundir, and Ganapathy (2012) viewed that the unique nature of the construction industry where most of the process taking place in a turbulent and temporary environment that is vulnerable to environmental conditions, has resulted in occurring frequent changes during the whole construction process creating a risk for managing tasks such as design, contracts, suppliers, resource, and so on. However, it needs to address in a different approach, unlike other industries. These circumstances have demanded the constructionpreneur to be capable to oversee all the occurred risks if they desire to reach success.

'Proactiveness' was also found as the core indicators of the effect group that must be solved. Proactive behaviour relates to the an opportunity-seeking, forward-looking perspective characterised by the introduction of new products and services ahead of the competition and acting in anticipation of future demand (Miller, 1983). Therefore, the constructionpreneurs must act in advance of a future situation, rather than just reacting. In other words, the constructionpreneurs must able to control and making things occur rather than simply adapting to a situation or waiting something to occur.

The results suggested that the constructionpreneurs must give focus on 'Risk-taking' because it is the driving indicator of the problem solving related to constructionpreneurial orientation. Any actions taken on this indicator will have wide-ranging impact on other indicators. Furthermore, the constructionpreneurs must also give priority to improving their 'Proactive' behaviour. This indicator was the most important effect indicator.

5.4.2 Constructionpreneurial Organisation

In the context of the constructionpreneurial organisation, it was found that 'Organisational Culture' was the most critical indicators that affected 'Organisational Structure'. It implies that constructionpreneurs must give priority to improving both 'Organisational Culture' and 'Organisational Structure'. The findings supported the hypothesis developed by Janićijević (2013) that organisational structure and organisational culture impacted each other in the sense that there is a causal relationship among them due to which the agreement of the two components of the organisation leads to better performance.

5.4.3 Constructionpreneurial Competency

Under the constructionpreneurial competency perspective, it was found that 'Business and Management Competencies', 'Founder's Personal Competencies', and 'Technological Competencies' were the most critical and core indicators influencing other indicators, and the drivers for problem solving related to the constructionpreneurial organization. In this respect, these indicators could be regarded as the fundamental competency needed for the construction business. These indicators present the mandatory competency needed in every business venture that would apply in the construction business.

With regard to the 'Business and Management Competencies', the finding supported evidence offered by Hamid, Yahya, and Han (2010) that those business skills and knowledge in the construction business were mandatory in order to achieve success. It also confirmed the findings forwarded by Assaf, Hassanain, and Al-Zahrani (2015) that lack of business and management competencies were the causes of contractors' failure. In relation to the 'Technological Competencies', the finding has consistence with the views forwarded by Swierczek and Ha (2007) that the lack of new technology and equipment could hindrances business development in the construction industry.

The existence of 'Founder's Personal Competencies' as the most critical indicator of the constructionpreneurial competency was consistent with the previous findings. Jaafar, Ramayah, and Osman (2004) revealed that founder's competency affected the construction enterprises in term of business success. It also supported evidence offered by Maes, Sels, and Roodhooft (2005) that founder's competency could affect construction enterprise in term of profitability both directly and indirectly.

The results also revealed that 'Marketing Competencies' was the core indicator that must be solved. This finding highlights the critical marketing efforts in the construction industry. Hence, the constructionpreneurs must give attention to increase their marketing performance. The finding supported evidence provided by Shigang (2012) that marketing efforts were among the core competency of a construction business that link to the superior performance.

5.4.4 Constructionpreneurial Environment

In the context of the constructionpreneurial environment, it was found that 'National Economic Growth' and 'Government Programs' were the most critical and core indicator influencing other indicators, and the driver for problem solving. National economic growth is important if businesses are to arise and thrive. It relates to growth in the output of the economy as a whole, which refers to an increase in the value of the national expenditure. Thus, money can be spent on physical development that would provide an opportunity for the construction business. It implies that the constructionpreneurs must have to consider economic growth while setting their objectives and strategy for the future.

With respect to the 'Government Programs', the finding highlighted the importance of the national-level programs in supporting the construction industry activities. As noted by Hillebrandt (2000), governments must use the construction industry to help regulate the economy in striving for growth and reasonable stability as consistent with their macroeconomic management. It is important to ascertain the strength of the industry as it can energize the nation's economic development. It implies that the Governments must constantly create the specify programs to assist the construction enterprises at all levels, such as national, regional or municipal. Developing the constructionpreneurs will improve the overall performance of the construction industry, hence could contribute to the excellence national economic development. Furthermore, the Government must take necessary actions to include construction activities in their national development plans. In the context of the Malaysian construction industry, for instance, the solid performance of construction activities was reported to have been forced by the Government macroeconomic stimulus packages, and the execution of assorted construction projects by both public and private sectors (CIDB, 2014). The finding supported evidence offered by Alkali and Isa (2012) that those government support was found to be positively significant to business performance.

It also found that 'Government Policies' and 'Financial Resources' were the core effect indicators that must be solved. In the context of the 'Government Policies', the finding implies the need for consistencies policies to support the constructionpreneurial activities. Indeed, recently the Government has launched the Construction Industry Transformation Programme (CITP). This five year program from 2016 – 2020 is aimed to ramp up the Malaysian construction industry to be a major contribution towards Malaysia's ambition of getting a high-income nation by 2020. The CITP highlighted the policies on quality, safety and professionalism, environmental sustainability, productivity, and internationalization, to guide the transformation and continued development the construction industry (CIDB, 2015).

With regard to the 'Financial Resources', the finding supported the evidence offered by Alkali and Isa (2012) and Shamsuddin, Othman, Shahadan, and Zakaria (2012) that availability of monetary resource is significantly linked to business performance. Indeed, lack of financial support have been widely reported as the main problem facing entrepreneurs in Malaysia and was apparent in research done in both developed and developing countries (Ahmad & Xavier, 2012). This finding highlights that the availability of 'Financial Resources' is of paramount importance to the construction business.

5.5 Research Question 4

The forth research question addressed the relevant checklist that could be provided to guide the construction enterprise toward achieving success. In addressing the fourth research question, a checklist called the Constructionpreneurial Business Success (CBS) was developed based on the findings of the Delphi study and the DEMATEL technique. Seventeen success indicators that achieved consensus in the Delphi study, and had relationships with other indicators as shown in the DEMATEL results, were admitted in the checklist. The CBS checklist was then validated in term of content validity, construct validity, and criterion-related validity (Saunders, Lewis, & Thornhill, 2011).

The current study depicted early efforts to evaluate the reliable indicators for the checklist prior to encouraging its use. The internal validity was first established by the author, including the identification of domain of content through a review relevant literature, generating the pool items accordingly, and developing the constructionpreneurial business success checklist. Content and construct validity evidences were collected during the initial phases of the current study, and were discussed in Section 3.4.5.2 of Chapter 3. Moreover, the list of the indicators was drawn from an extensive literature review on the link between entrepreneurship and performance. All the indicators have sufficiently studied in many previous works and may have validity on the effect to business performance, hence, the content validity was complied.

The final phase of the validation process was criterion-related validity. It was addressed through the field study. Accordingly, data were gathered from the intended users through face-to-face interviews. The information collected from participants suggests that the CBS checklist will be beneficial for the construction enterprises to monitoring performance toward successful business. For the most part, participants indicated that the content of the CBS checklist was relevant and very useful.

Cronbach's alpha coefficient was estimated to determine the internal consistency reliability of the CBS components. The overall Cronbach's alpha coefficient for the components of the CBS checklist, presented in Table 4.23, was acceptable (.73 to .79), suggesting that the items are measuring aspects of their corresponding component.

Regarding to the item-to-total correlation, in the Constructionpreneurial Orientation component, Item 3 (Risk-taking) showed an item-to-total correlation of .00. This value was considered low indicating the need to revise or remove. Removing this item from the component would substantially increase the internal consistency reliability from .73 to .91, making the Cronbach's alpha coefficient an excellent value. Thus, the content of this item was examined to determine its relevancy or considerable removal. It was found that the item is relevant for the evaluation of the constructionpreneurial business success since Risk-taking was among the major component of an entrepreneurial orientation. Moreover, the transient nature of the construction industry implies that the construction enterprise more expose to risks and uncertainties. As a result, this item was retained but with rewording. As a result, this item was retained but with rewording.

In the Constructionpreneurial Organisation, both items indicated the item-to-total correlations of .70. Thus, these items were retained. In the Constructionpreneurial Competency, Item 7 (Marketing Competencies) and Item 10 (Founder's Personal Competencies) showed the item-to-total correlation of .29 and .25, respectively. If these items are removed, the Cronbach's alpha coefficient will increase from .73 to .77. This represents a small increase of the alpha if the items deleted, meaning that these items are contributing in some way with information. Therefore, an exploration of the content of these items was conducted. It was determined that the content of these items may not have been totally apparent to participants. As a result, the items were reworded and retained in the CBS checklist.

The item-to-total correlation of the Constructionpreneurial Environment indicated moderate to high correlations (.33 to .82), indicating that they contribute rich information to the CBS checklist. Since, only small change in the alpha if any of the item deleted from this component, thus, all the items were retained.

The Pearson product moment correlation coefficient was employed to estimate the correlations between components, inter-item correlations by component, and correlations between all the items in the CBS checklist. All the correlations between the components of the CBS checklist appeared to be positive as expected, almost all of them were significant, except two (see Table 4.24). The correlation between Contructionpreneurial Environment and Contructionpreneurial Organisation (r = .52), even though was high in magnitude, however, it was non-significant. Similar, the correlation between Contructionpreneurial Organisation and Contructionpreneurial Orientation (r = .32) was moderate but it also non-significant. These values could be influenced by the sample size (N = 12). In addition, of six correlations between components, five of them were high, and the remainder one was moderate, indicating substantial relationship between the components of the CBS checklist. This suggests that the components are measuring various aspects of the same construct.

Similarly, all the inter-item correlations by component were positive as expected. The majority of these correlations were high, and few of them were moderate and low (see Table 4.26). This suggests that most of the items are measuring aspects of their corresponding component. Specifically, in the Constructionpreneurial Orientation component, it was found that the correlations between Item 3 (Risk-taking) and Item 1 (Proactiveness), between Item 3 (Risk-taking) and Item 2 (Innovativeness), and between Item 4 (Competitive Aggressiveness) and Item 3 (Risk-taking) were low. In the Constructionpreneurial Organisation, the correlation between Item 6 (Organisational Structure) and Item 5 (Organisational Culture) was found to be significantly interrelated.

For the Constructionpreneurial Competency, it was found that Item 10 (Founder's Personal Competencies) had low correlations with Item 7 (Marketing Competencies), Item 8 (Technical Competencies), and Item 9 (Business and Management Competencies). Other items with low correlations were Item 11 (Technological Competencies) with Item 7 (Marketing Competencies), and Item 10 (Founder's Personal Competencies). Even though these items indicated low correlations, they actually are indicating a minimal interrelationship between the items. The moderate correlations were found between Item 8 (Technical Competencies) and Item 7 (Marketing Competencies), and between Item 9 and Item 7 (Marketing Competencies). Although, the correlations were non-significant, they actually measuring a unique aspect of this component.

In the Constructionpreneurial Environment, the low correlations were found between Item 13 (Financial Resources) with Item 12 (National Economic Growth), between Item 16 (Commercial and Professional Infrastructure) with Item 12 (National Economic Growth), and Item 13 (Financial Resources), and between Item 17 (Government Program) with Item 15 (Entrepreneurial Education and Training), and Item 16 (Commercial and Professional Infrastructure), indicating a minimal relationships. The moderate correlations were found between Item 14 (Government Policy) with Item 12 (National Economic Growth), Item 15 (Entrepreneurial Education and Training) with Item 12 (National Economic Growth), Item 16 (Commercial and Professional Infrastructure) with Item 14 (Government Policy), and Item 17 (Government Program) with Item 12 (National Economic Growth) and Item 13 (Financial Resources). However, all of these correlations were non-significant, and they measuring a unique aspect of this component. The non-significant high correlations were also found between Item 15 (Entrepreneurial Education and Training) with Item 13 (Financial Resources), and Item 17 (Government Program) with Item 13 (Financial Resources), and 14 (Government Policy). These correlations indicate the unique aspects of this component. As previously discussed in this chapter, all the items with low correlations were reworded.

Likewise, the inter-item correlations between all items on the CBS checklist were also examined. Most of the correlations were positive and more than half indicated moderate and high associations. In overall, the results suggest that the items of the CBS checklist are measuring different dimensions of the same construct. Only six negative inter-item correlations, ranging from -.04 to -.24, were found. These correlations were non-significant and most of them were among the lowest correlations yielded between all items. In contrast, the highest correlation (r =.89) found within the different components was between Item 7 (Marketing Competencies) and Item 4 (Competitive Aggressiveness), followed by the correlation (r = .87) between Item 11 (Technological Competencies) and Item 5 (Organisational Culture), the correlation (r = .82) between Item 7 (Marketing Competencies) and Item 2 (Innovativeness), and the correlation (r = .80) between Item 14 (Government Policy) and Item 4 (Competitive Aggressiveness). The results suggest that the content of four components of the CBS checklist covers aspects of evaluation of the constructionpreneurial business success, explaining somehow the strength of the correlations. Thus, the CBS checklist can be consider as an appropriate tool for evaluating the constructionpreneurial business success, and beneficial for the intended uses.

To this end, the final version of the CBS checklist was developed (see Appendix L). The purpose of the CBS checklist was to guide the construction enterprise in monitoring their business toward an achievement of the long-term corporate success. The CBS checklist could be served the construction enterprise as a tool to:

(i) Identify the current situation to support the achievement of successful business.

(ii) Guide in recognising which areas may be need of improvement, and

(iii) Determine the progress toward the achievement of the successful business by revisiting the checklist when necessary.

The CBS checklist was designed as a self-assessment tool to be completed by personnel of the construction enterprise, preferable by the owner or founder itself. It was also designed as a step-wise management process. A four-point rating scale (1 = not at all, 2 = to a small extent, 3 = to some extent, 4 = to a great extent) was used to rate each items of the CBS checklist. It believed that if the CBS checklist properly managed, then the overall corporate success could be expected.

5.6 Chapter Summary

Drawing upon the existing theories found in the entrepreneurship literature, twenty three indicators from four leading perspectives of the entrepreneurship phenomenon have been identified. Outcomes from the Delphi study revealed that the experts have perceived eighteen indicators that achieved the required consensus as the indicators of success for entrepreneurs in the construction industry. All these indicators were used as variables in DEMATEL questionnaire. Results from the DEMATEL study showed a variation in attitudes of the indicators. Three indicators were regarded as the most important and the driving indicators for the successes in the construction business. These indicators directly influenced the other indicators. Five other indicators were the critical indicators of the effect group. The remaining ten indicators were independent and can only influence or influenced by a few other indicators.

Finally, the CBS checklist was designed and validated. The CBS checklist can be consider as an appropriate tool for evaluating the constructionpreneurial business success, and beneficial for the intended uses. It was designed as a self-assessment tool and a step-wise management process to guide the construction enterprise in monitoring their business toward an achievement of the long-term corporate success.

The final Chapter 6 discusses the summary of the key findings, including the recommendation for future study and conclusions.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 Preamble

A critique of the literature indicates that the dynamic leading to the success in the construction industry remain largely undisclosed. It is against the existing theories found in the CEM literature, this study is designed to meet four research objectives: RO_1 – To identify the relevant indicators from the perspectives of an entrepreneurship phenomenon that can be employed to evaluate the success of the construction enterprise, RO_2 – To evaluate the identified indicators that perceived to be important for the success of the construction enterprise by using the modified Delphi method, RO_3 – To assess the impact of each important indicator to the success of the construction enterprise in term of causes and effects by using the DEMATEL technique, and RO_4 – To develop a checklist that can be advocated to the success of the construction enterprise. These specific objectives enabled to fulfil the primary research objective which was to explore the indicators of success for entrepreneurs in the construction industry from the perspectives of an entrepreneurship phenomenon.

The current study hypothesised that the indicators of success for entrepreneurs in the construction industry can be determined from the four perspectives of an entrepreneurship phenomenon, namely entrepreneurial orientation, entrepreneurial organisation, entrepreneurial competency, and entrepreneurial environment. A theoretical framework based on these perspectives was built up and applied to fulfil the research objectives.

In addition, this study forwarded the term of 'constructionpreneurship' for the first time, to differentiate the entrepreneurial activities in the construction industry from other industries. Moreover, the construction industry and entrepreneurial activities are the most important drivers of economic growth and corporate success, regardless of size, age, or industry. Nevertheless, only a few studies, if any, have so far adopted the role of entrepreneurship in searching success indicators for the construction enterprise, although both of them are significant to the nation's economic growth.

This chapter summarises the key findings of the study objectives and their implications for the success improvement of the construction enterprises. Several conclusions are drawn from these findings. The contributions and limitations of the current study are discussed, and recommendations for future research are suggested as well.

6.2 Research Objective 1

The first research objective was to identify the relevant indicators from the perspectives of the entrepreneurship phenomenon that can be employed to evaluate the success of the construction enterprise. Drawing upon the existing theories on the link between an entrepreneurship phenomenon and performance, discussed in Section 2.7 and Section 2.10 of Chapter 2, twenty three success indicators from four perspectives of an entrepreneurship phenomenon were identified. These constructs have been explored in many previous studies, and have significant positive effects on business performance.

Five indicators were identified under the entrepreneurial orientation, namely 'Autonomy', 'Innovativeness', 'Risk-taking', 'Proactiveness', and 'Competitive Aggressiveness'. Two indicators, namely 'Organisational Structure', and 'Organisational Culture' were included under the entrepreneurial organisation. Seven indicators were identified under entrepreneurial competency, namely 'Founder's Personal Competencies', 'Business and Management Competencies', 'Marketing Competencies', 'Technical Competencies', 'Technological Competencies', 'Political Competencies', and 'Social Responsibility Competencies'. Finally, under the entrepreneurial environment, nine indicators, namely 'Financial Resources', ‘Government Policies’, ‘Government Programs’, ‘Entrepreneurial Education and Training’, ‘Research and Development Transfer’, ‘Commercial and Professional Infrastructure’, ‘Internal Market Openness’, ‘Physical Infrastructure and Services’, and ‘Cultural and Social Norms’ were identified.

With respect to the first research objective and based on the findings from the literature reviews, it could be safely concluded that the nature of business in the contruction idustry which plagued with highly competitive and uncertainties, represents the activities of corporate entrepreneurship taking place in the organisation. Hence, the perspectives of an entrepreneurship phenomenon could be used in searching the indicators for success of the construction business. To the best of the author’s knowledge, no previous studies used the perspectives of an entrepreneurial phenomenon to explore the predictors of success for the construction business. This work can be thought to be the first to do so, therefore, should contribute a new insight to the construction engineering management (CEM) literature.

6.3 Research Objective 2

The second research objective was to evaluate the identified indicators that perceived to be important for the success of the construction enterprise by using the modified Delphi method. Grounded on the construction industry experts’ opinions through two iterative rounds of a modified Delphi study, the results revealed that eighteen indicators were perceived to be important to the constructionpreneurial success.

These indicators have achieved the desire pre-determined consensus as median 4 to 5, and 80% or more respondents rating the indicators within 4 to 5 on the important scale, as perceived by the construction industry’s experts. Under the constructionpreneurial orientation, four indicators have achieved consensus, namely ‘Innovativeness’, ‘Risk-taking’, ‘Proactiveness’, and ‘Competitive Aggressiveness’. All two indicators under the constructionpreneurial organisation, namely ‘Organisational Structure’, and ‘Organisational Culture’ have achieved consensus. Under the constructionpreneurial competency, five indicators, namely ‘Founder’s Personal Competencies’, ‘Business and Management Competencies’, ‘Marketing

Competencies', 'Technical Competencies', and 'Technological Competencies' have achieved desire consesnsus. Finally, seven indicators under the constructionpreneurial environment, namely 'Financial Resources', 'Government Policies', 'Government Programs', 'Entrepreneurial Education and Training', 'Commercial and Professional Infrastructure', 'National Economy Growth', and 'National Political Stability' have also achieved consensus.

'Financial Resources' were deemed to be the highest ranking indicator with the mean of 4.75 and 97.2% of agreement among the expert panelists. This was followed by 'Proactiveness' (4.58, 97.2%), 'Organisational Culture' (4.58, 91.7%), 'National Political Stability' (4.56, 97.2%), 'Organisational Structure' (4.50, 97.2%), 'Marketing Competencies' (4.50, 91.7%, 'Technical Competencies' (4.47, 94.5%), 'Business and Management Competencies' (4.44, 94.4%), 'National Economic Growth' (4.42, 100.0%), 'Innovativeness' (4.39, 94.4%), 'Founder's Personal Competencies' (4.31, 88.8%), 'Risk-taking' (4.28, 94.4%), 'Government Policies' (4.28, 91.7%), 'Competitive Aggressiveness' (4.19, 91.7%), 'Technological Competencies' (4.19, 89.9%), 'Entrepreneurial Education and Training' (4.14, 91.7%), 'Commercial and Professional Infrastructure' (4.14, 83.4%), and 'Government Programs' (4.06, 86.1%), respectively.

In fulfilling the second research objective, this research study forwarded eighteen success indicators that could enhance the success of the construction business. This conclusion is drawn from the evidence that these success indicators have attained the require consensus as perceived by the construction industry experts.

6.4 Research Objective 3

The third research objective was to assess the impact of each identified indicators in term of causes and effects to the success of the construction enterprise by using the DEMATEL technique. It is aimed to identify the key indicators that influence the business success of construction enterprise. As earlier indicated, eighteen indicators that achieved consensus in the modified Delphi process were used in developing the DEMATEL questionnaire.

The results of the DEMATEL study revealed that three indicators, namely 'Business and Management Competencies' (16.882, 0.099), 'Technical Competencies' (16.738, 0.080), and 'Technological Competencies' (16.208, 0.101) were the most critical indicators for the success of construction enterprise as their influencing other indicators. These indicators have the highest relation and highest prominence representing by positive ($D - R$) value, and higher ($D + R$) value, and are classified in the cause group. Thus, they are consider as the driving indicators for the constructionpreneurial business success because any actions taken on these indicators will have wide-range impact on other indicators. The results suggested that the construction enterprises should give more attention to improving these three success indicators.

The findings also indicated that five other indicators, namely 'Marketing Competencies' (17.357, -0.378), 'Financial Resources' (16.955, -0.027), 'Innovativeness' (16.388, -0.083), 'Proactiveness' (16.285, -0.414), and 'Founder's Personal Competencies' (16.090, -0.103) were the core indicators that highly affected by the other indicators. These indicators were the high relation and low prominence representing by negative ($D - R$) value, and higher ($D + R$) value, and classified in the effect group. They are consider as the core indicators that require more attention.

Another five indicators with the low relation and high prominence representing by positive ($D - R$) value, and lower ($D + R$) value, namely 'National Economic Growth' (15.375, 0.418), 'Commercial and Professional Infrastructure' (15.339, 0.264), 'Government Program' (14.181, 0.702), and 'National Political Stability' (13.178, 0.164), were independent and can only influence a few other indicators, but cannot be influenced easily.

The remaining five indicators with the low relation and low prominence representing by negative ($D - R$) value, and lower ($D + R$) value, namely 'Competitive Aggressiveness' (15.988, -0.191), 'Entrepreneurial Education and Training' (15.830, -0.091), 'Risk-taking' (15.693, -0.161), 'Organisational Structure' (15.345, -0.249), 'Government Policies' (14.916, -0.031), and 'Organisational Culture' (14.803, -0.081) were of the independent indicators that can only be influenced by a few other indicators.

In the context of each perspective of an entrepreneurship phenomenon, under the constructionpreneurial orientation, the findings suggested that 'Risk-taking' (A3), representing by the higher positive ($D - R$) value, and higher ($D + R$) value, was the most critical cause indicator that influencing others, and the driver for problem solving. 'Competitive aggressiveness' with positive ($D - R$) value, and lower ($D + R$) value, was the independent indicators and can only influence a few other factors. 'Proactiveness' with negative ($D - R$) value, and higher ($D + R$) value, was the core effect indicators that must be solve, however, it cannot be directly improved because of a effect-type attribute. 'Innovativeness' with negative ($D - R$) value, and lower ($D + R$) value, was the independent indicator and can be influenced by only a few other indicators.

In relation with the constructionpreneurial organisational, it was found that 'Organisational culture' (B1), representing by higher positive ($D - R$) value, and higher ($D + R$) value, was the most critical and core indicator influencing other indicators, and the driver for problem solving. 'Organisational structure' with negative ($D_k - R_k$) value, and higher ($D_k + R_k$) value, was the core indicators that must be solve, however, it cannot be directly improved because of a effect-type attribute.

Under the constructionpreneurial competency, it was found that 'Business and Management Competencies' (C3), 'Founder's Personal Competencies' (C4), and 'Technological Competencies' (C5) with the positive ($D - R$) value, and higher ($D_k + R_k$) value were the most critical and core indicators influencing other indicators, and the drivers for problem solving. 'Marketing Competencies' (C1) with negative ($D - R$) value, and higher ($D + R$) value, was the core indicators that must be solve, however, it cannot be directly improved because of a effect-type attribute. 'Technical Competencies' (C2) with negative ($D - R_k$) value, and lower ($D + R$) value, the independent indicator and can be influenced by only a few other indicators.

For the constructionpreneurial environment, 'National Economic Growth' (D3) and 'Government Programs' (D7) representing by positive ($D - R$) values, and higher ($D + R$) values, were the most critical and core indicator influencing other indicators, and the driver for problem solving. 'National Political Stability' (D2) and 'Commercial and Professional Infrastructure' (D6), with positive ($D - R$) values, and lower ($D + R$) values, were the independent indicators that can only influence a few other factors.

'Government Policies' (D4) and 'Financial Resources' (D1), with negative $(D-R)$ values, and higher $(D+R)$ values, were the core indicators that must be solve, however, it cannot be directly improved because of a effect-type attribute. 'Entrepreneurial Education and Training' (D5) 'Innovativeness' with negative $(D-R)$ value, and lower $(D+R)$ value, was the independent indicator and can be influenced by only a few other indicators.

With respect to the third research objective, this research study forwarded evidence of the critical success indicators for the construction business as shown from the results of DEMATEL technique. It could be safely concluded that the construction enterprises should give more attention to improving the three indicators, namely 'Technical Competencies' (C2), 'Business and Management Competencies' (C3), and 'Technological Competencies' (C5) because they are the driving indicators for the constructionpreneurial business success. In addition, five others indicators, namely 'Marketing Competencies' (C1), 'Financial Resources' (D1), 'Innovativeness' (A2), 'Proactiveness' (A1), and 'Founder's Personal Competencies' (C4) were the core indicators of the effect group. Although they are difficult to change, the construction enterprises should manage all these causal indicators in order to gains success.

6.5 Research Objective 4

The forth and the final research objective was to develop a checklist that can be advocated to the construction enterprise that links the perspectives of the entrepreneurship phenomenon with the business success. In fulfilling this objective, a checklist called the Constructionpreneurial Business Success (CBS) checklist was developed. Eighteen success indicators that achieved consensus in the Delphi study were admitted as the initial items of the CBS checklist. The initial CBS checklist was refined by the use of DEMATEL technique, resulting seventeen items retained in the checklist.

The CBS checklist was then validated to confirm its appropriateness and beneficial for the intended uses. A field study of twelve case construction enterprises was used in the validation process, and was conducted through face to face interview protocol of twelve directors/owners of the case construction enterprise. It was done by using a semi-structured questionnaire. The psychometric properties of the CBS checklist were estimated using the Cronbach's alpha coefficient and Pearson product moment correlation coefficient. The data for this process was solicited from the interview using the structured questionnaire. Few items of the CBS checklist were reworded base on the outcomes from the psychometric properties test. The overall results suggest that the items are measuring aspects of the same construct. Finally, the information from participants about the usefulness, helpfulness, and improvement needed of the CBS checklist were collected using the open-ended questionnaire. Overall, participants' responses indicated that the CBS checklist was appropriate for the intended uses. The final adjustments of the CBS checklist (see Appendix L) were made taking into consideration the results of the psychometric properties analysis and the feedback from participants.

The CBS checklist was designed as a user friendly, such that constructionpreneur could easily respond to the items included in the checklist. It could be use as a self-assessment tool for the construction enterprises to assess the level of their business performance toward the achievement of the successful business. It was also a step-wise management processes should enable constructionpreneurs to improve all the seventeen enablers included in the CBS checklist. It is believed that should all the seventeen enablers been properly managed, the constructionpreneurial business success could be expected.

6.6 Contribution of the Study

The contribution of the current study can be seen from two important aspects: academic and industry, and is discussed in the section below.

6.6.1 Academic Contributions

The research effort identifies the critical indicators of success for the construction business from the viewpoint of an entrepreneurship phenomenon. The study contributes to the existing bodies of knowledge and research in the field of the CEM and entrepreneurship in several ways, such as:

(i) The current study conceptually and empirically examined the indicators of success for the construction enterprise, a multi-dimensional construct of consolidating four perspectives of an entrepreneurship phenomenon that reflect the business performance. It is important to the existing literature since none of prior research had addressed these dimensions into an integrated model to explore the success factors in the construction industry. Thus, this study is considered to be the first known in the CEM research to do so, hence, could bridge the gap between the CEM and entrepreneurship bodies of knowledge.

(ii) The current study recognised the key elements for the construction business success from the viewpoint of an entrepreneurship phenomenon. The construction industry and entrepreneurship are regarded as the fuel to the economic growth, creating employment, and prosperity. Both of them constitute a critical component of every nation's economic development. However, little is known about the entrepreneurial activities in the construction industry. Merely a few studies, if any, have so far taken the role of an entrepreneurship in searching success factors for the construction business. In most regards, the construction management and entrepreneurship literature have evolved separately, with little cross-fertilisation.

(iii) The current study presented the term of 'constructionpreneurship' for the first time to define the process of corporate entrepreneurship within the construction industry. This term is aimed to help both scholars and practitioners to distinguish the differences between corporate entrepreneurs that operate in the construction industry and those in other industries. It is argued that constructionpreneurs face unique challenges that have made them differ than corporate entrepreneurs in other businesses.

(iv) The current study is expected to provide a new and significant research insights by identifying the long-term objectives related to the overall corporate success of the construction enterprise which against the previous conceptions of success in the construction industry.

(v) The current study used the perspectives of entrepreneurship phenomenon in searching the success indicators in the construction industry. Entrepreneurship is the new style of business approach that have successfully adopted by many other businesses. From the research perspective, it is expected that the implications of this approach will stimulate further interest in the CEM and entrepreneurship research.

(vi) The current study provided evidence that the entrepreneurship phenomenon could be apply to every business venture, specifically in the hostile business environment such as the construction business is.

6.6.2 Industry Contributions

Some industrial implications can be concluded from the study. The practitioners in the construction industry should have benefited from the current study in several ways, such as:

(i) The current study provided a new and significant research insight by providing the success indicators for the construction enterprise from the lens of an entrepreneurship phenomenon.

(ii) The current study provided a framework for policy-makers in the construction industry to consider an entrepreneurship phenomenon when formulating policy and development programmes that adhere to the construction industry way forward.

(iii) The current study highlighted the benefits of entrepreneurial activities bring to the success of the construction enterprise. The constructionpreneurs who emphasise the entrepreneurial activities within their organization are likely to achieve superior performance outcomes.

(iv) The study provided the constructionpreneurs with a detailed understanding of the pre-conditions that facilitate and drive the overall business success. Specifically, the establishment effective of both the enterprise organisation and the temporary project organisation will result in the superior performance. Hence, strengthening the company's long-term objective related to the overall corporate success, based on the identified indicators should be a priority for the entrepreneurs who engaged in the construction business.

(v) The current study implied that the constructionpreneurs should expand the project-based success criteria to the corporate-based success in managing their business if they seek to enjoy benefits from their business.

(vi) The CBS checklist developed out of this work shows a great potential as a self-assessment tool to guide construction enterprise in monitoring their business toward an achievement of the long-term corporate success. The CBS checklist provides the construction enterprise with a capability to identifying the current practices that supporting toward the achievement of successful business. It also guiding the construction enterprise in recognising which areas may be need of improvement. Finally, the CBS checklist could assists the construction enterprise in determining progress toward the achievement of the successful business by revisiting the checklist when necessary.

(vii) The Malaysian construction industry should utilise the findings from the current study. It could be done by including the four perspectives of the entrepreneurship phenomenon as the guidelines or syllabus in the training and consultations for the development of the constructionpreneurship. The constructionpreneurs should use the success indicators as the strategic functions for both the short-term and the long-term strategic planning for them to achieve successful construction business. It is believed that the outcomes might lead to better industry's reputation and hence better competitive edge for construction enterprises to survive in the current fiercely business environment.

6.7 Limitations of the Study

It is important to highlight that the current effort allude to the fact that there are some limitations of the data and methodologies presented in this study. Most of these limitations result from the specific structure of the research and the assumptions made during the course of the study. The current study presented empirical evidence that contributes to the body of knowledge based on the entrepreneurial activities within the construction industry. The research findings and conclusions need to be interpreted within the limitations which are exploratory in nature, especially because most of measurement factors of the respective constructs were borrowed from cross-disciplinary studies and then re-contextualized in the CEM field. Therefore, it is acknowledged that the research findings are indicative but not conclusive.

The static nature of the current study and the fact that the study was conducted within the Malaysian construction industry has implied that the results might generally be limited and cannot be universal generalised. However, the issue does not diminish the contribution of the study. It is due to the general measurement variables under investigation used in this study had been adequately identified and validated in other studies across the broad geographical regions and various industries as well.

The fact that the data and responses provided by respondents were subjected to the degree of their experience, knowledge on the construction business, and knowledge on the entrepreneurship principles, as well as their willingness to participate. Moreover, this study relies on self-reported information. It entails that the survey was limited by participants' experience, cognition, perception, and the honesty in their answers. However, these issues have been minimised by the carefully selection of the construction industry experts' base on the predetermined criteria.

The respondents might have a difficulty in interpreting terminologies in the questionnaires because of rarely used in the CEM contexts. As an effort to alleviate this possibility, the pilot study was conducted, and elements of difficulty should have eliminated. Moreover, brief descriptions have been provided for every factor being asked.

The facts that the current study focused on limited measures of the construction organisation practices that represent the entrepreneurial activities in the organisation were as a result of the Delphi process and the literature review. Despite the use of Delphi method, other constructive methods like observation or interviews with the construction industry practitioners could further assist in highlighting more significant results.

The current study involved in the used convenience sampling technique. This technique advocates only for respondents who are willing and available to participate, and therefore not easy to generalise the findings.

The current work focused on the criteria for judging the success of the construction business determined by a selected panel of the Malaysian construction industry practitioners. It was an investigative process with the primary concern of accurately determining these criteria. However, the study limitations reflect the restrictions on the study over which the researcher had no control. The current study remained limited to the asynchronous feedback gathered from a selected group of panels.

The CBS checklist developed out of this work is a new instrument introduced in the construction industry. Indeed, the validation process employed by this work is based on the data analyses from twelve directors/owners of the construction enterprises which may also become the limitation of the study. Thus, the CBS checklist still requires more testing and applications in the field to validate it in a comprehensive way.

One final limitation remained the fact that it is likely that no individual is capable for identifying and quantifying all business success indicators regardless of expertise.

6.8 Recommendations for Future Research

The results of this study make a significant contribution to the existing bodies of knowledge in the CEM and entrepreneurship, even though various limitations encountered. It is practical to suggest possibilities for future research reflected from the limitations indicated in the above section. As noted by Jenkins and Smith (1994), results from any Delphi study should be viewed as a beginning statement and not as a definitive work. Therefore, using this research as a platform, future research efforts should able to support or refute the findings revealed from this study.

It is recommended to extend the findings of the current study by conducting an empirical survey of the wider population of the constructionpreneurial organisations. Nevertheless, it is important to insure that the respondents well understand the concept of entrepreneurship.

It is suggested to replicate the study in cooperating data from wider geographical regions to improve the external validity of the instruments and to substantiate results reported by the Malaysian construction industry. It also suggested replicating the study with a different panel of experts to determine if effects and recommendations expressed are supported or refuted. For example, to include the construction material suppliers, legal practitioners or the bankers, as the expert panellists should make the study more interesting.

New business success indicators could be designed, depending on what have been agreed to be termed as the entrepreneurship phenomenon to improve the model. For example, it could use the perspectives of entrepreneurial schools of thought consisted of the micro view and macro view of entrepreneurship.

Regarding the CBS checklist, it is likewise interesting to recognise if the checklist is universally and could apply in other industries. The future direction of this study could be a longitudinal study in other industries to determine whether the CBS checklist is useful and effective as in the construction industry. It is also interesting to explore the utility of the CBS checklist according to the size of the organisations.

6.9 Concluding Remarks

A nation can only benefited from the stimulus brought by the construction business to its economic if it has an efficient and effective construction industry. One means to accomplish this, which the current study means, is by providing a set of reliable indicators that have a direct impact on the success of the construction enterprise. Although these indicators may represent themselves on a smaller scale within the organisational-wise, nevertheless, on a large scale, they are affected the larger components of the nation's economic activities, and more importantly the overall national economic development.

Against, the previous conceptions of success in the construction industry, the current study evolve a model for exploring the indicators of success in the construction industry from different view, that is, from an entrepreneurship perspective. The model relies on four knowledge areas of an entrepreneurship phenomenon, namely entrepreneurial orientation, entrepreneurial organisation, entrepreneurial competency, and entrepreneurial environment.

Rather than viewing the success elements in the construction industry from the project-based criteria, the current study hypothesised that the indicators of success for entrepreneurs in the construction industry could be derived from the corporate entrepreneurship activities implemented within the organisation. The current study suggests that the entrepreneurial-oriented construction enterprise would able to effectively explore and exploit the opportunities available in the marketplace.

With responded to the overarching research question, this study forwarded eighteen valid indicators of which three indicators are the most critical and driving indicators for the successful entrepreneurs in the construction industry. The findings could be said to have shed light on a symbiotic relationship between the entrepreneurial activities and business success in the construction industry.

To ensure the successful business, the construction enterprises must cherish the influence of the entrepreneurial orientation, entrepreneurial organisation, entrepreneurial competency, and entrepreneurial environment. Furthermore, this study suggests that these leading indicators are valid and reliable measures of the success in the construction business within the Malaysian construction industry. The findings posit that, these success indicators will constitute the construction enterprises achieve superior performance and the potential for, in turn, business success, and enhance the overall national economic performance.

It is contended that a construction enterprise must consider entrepreneurial mindsets if they desire for success in their business. In this sense, they should focus on constructionpreneurial orientation, enabled by an appropriate constructionpreneurial organisation, driven by constructionpreneurial competency, and foundation by capability to absorb constructionpreneurial environment. Figure 6.1 illustrated theoretical framework for the success of construction enterprise from the perspectives of an entrepreneurship phenomenon.

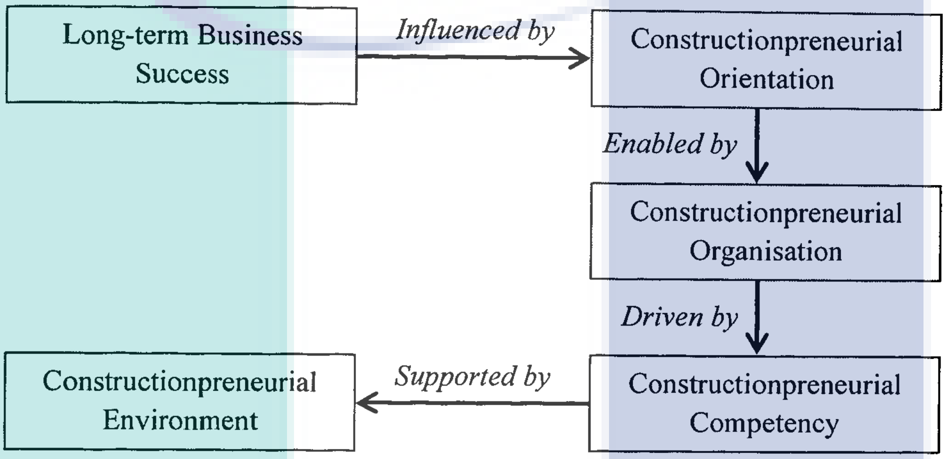

Figure 6.1 Theoretical framework for the success of construction enterprise from the perspectives of an entrepreneurship phenomenon

Nevertheless, when cumulative evidence is considered as previously discussed, there is some agreement, at least at a broad conceptual level, that the constructionpreneurial orientation, constructionpreneurial organisation, constructionpreneurial competency, and constructionpreneurial environment could have impacted the business success of the construction enterprise. These elements are expressed as the following formulation:

$$CBS = f[CO, COrg, CC, CE] \tag{6.1}$$

Where: CBS represents the construction business success; CO refers to the constructionpreneurial orientation that related to the strategic postures, which construction enterprise must focus. COrg is the constructionpreneurial organisation, which acts as the foundation for the constructionpreneurial activities. CC refers to the constructionpreneurial competency, which are drivers for the constructionpreneurial success. CE represents the constructionpreneurial environment, which is a source of the constructionpreneurial opportunities.

This framework is the first to combine the four knowledge areas of an entrepreneurship phenomenon, to seek the success indicators for the construction business. The basic assumption of this formulation is that the success indicators of the construction business cannot be studied exclusively from a single frame of reference, such as the organisation or the individual project. Instead, it must adopt a more holistic approach. In this sense, no construction business success factors can comprehensively describe, nor can it complexity be adequately accounted for, unless investigated all of these four knowledge areas of an entrepreneurship phenomenon. An attempt should also be made to discover how variables from each dimension interact with variables from other dimensions.

Moreover, previous studies have proven that the business success must consider as a multidimensional construct. In this view, the construction business success may result from the interrelationship of the four knowledge areas of entrepreneurship phenomenon. More importantly, though, the specified relationships are directly concerned with the current issues that relate to the short-term and the long-term objectives of a construction business. Few, if any, empirical studies focus upon all of these perspectives and attempt to investigate how they jointly influence the success of construction business. Therefore, the principle thrust of this research is an attempt to answer the overarching research question: What are the indicators of success for entrepreneurs in the construction industry?

As earlier discussed in Section 2.7, all of these factors have been explored in many previous studies and may have some validity in their effect on the organisational performance. Furthermore, the findings of the Delphi study and DEMATEL technique have confirmed that these factors are important to the successful of constructionpreneurial success. Thus, these factors are considered as the appropriate grounded theories for evaluating the success factors of the construction enterprise.

The findings reported in the current study are relatively comprehensive compared to the findings from some other studies found in the CEM literature. Comparison of the findings from this study to the findings raised in the literature should provide the construction industry practitioners and researchers with a better understanding on the impact of the entrepreneurship phenomenon to the business performance, specifically in the construction industry.

The CBS checklist is considers as appropriate tool for determine the constructionpreneurial business success and beneficial for the intended uses. However, the CBS checklist might be used in others industries outside the construction sector. Thus, future direction of this research could be a longitudinal study in other industries with more number of populations.

Finally, the author acknowledges that, owing to the exploratory nature of the current study, the results are not definitive, they are indicative of a perceived trend. Hence, the current study has offered numerous limitations, recommendations, and suggestions for future research for generalising the findings.

REFERENCES

Abd-Hamid, Z. (2011). *The effects of ISO 9000 quality management systems on project management performance in construction industry*. Eng.D. Thesis. Universiti Teknologi Malaysia, Malaysia.

Abdou, O. (1996). Managing construction risks. *Journal of Architectural Engineering, 2*(1), 3-10.

Abowitz, D. and Toole, T. (2010). Mixed method research: Fundamental issues of design, validity, and reliability in construction research. *Journal of Construction Engineering and Management*, *136*(1), 108-116.

Abraham, G.L. (2004). Critical success factors for the construction industry. *Proceedings of the Construction Research Congress 2004: Wind of Change: Integration and Innovation, ASCE*, pp. 1-9.

Adler, M. and Ziglio, E (1996). *Gazing into the oracle: the Delphi method and its application to social policy and public health.* London: Jessica Kingsley.

Afshari, A.R. and Yusuff, R.M. (2012). Developing a structural method for eliciting criteria in project manager selection. *Proceedings of the 2012 International Conference on Industrial Engineering and Operations Management*, pp. 150-158.

Afshari, A.R., Yusuff, R.M. and Derayatifar, A.R. (2012). An application of Delphi method for eliciting criteria in personnel selection problem. *Scientific Research and Essays*, *7*(33), 2927-2935.

Agee, J. (2009). Developing qualitative research questions: a reflective process. *International Journal of Qualitative Studies in Education*, *22*, 431-447.

Agumba, J.N. (2013). *A construction health and safety performance improvement model for South African small and medium enterprises*. Ph.D. Thesis. University of Johannesburg, South Africa.

Agumba, J.N. and Haupt, T.C. (2012). Identification of health and safety performance improvement indicators for small and medium construction enterprises: a Delphi consensus study. *Mediterranean Journal of Social Sciences*, *3*(3), 545-557.

Ahmad, S.Z. and Xavier, S.R. (2012). Entrepreneurial environments and growth: Evidence from Malaysia GEM data. *Journal of Chinese Entrepreneurship, 4*(1), 50-69.

Ahmed, M.U. and Pulok, M.H. (2013). The Role of Political Stability on Economic Performance: the Case of Bangladesh. *Journal of Economic Cooperation and Development, 34*(3), 61-100.

Ahn, Y.H., Pearce, A.R. and Kwon, H. (2012). Key competencies for U.S. construction graduate: Industry perspective. *Journal of Professional Issues in Engineetring Education and Practice*, *138*(2), 123-130.

AI Group Economics Research. (2015). Australia's construction industry: profile and outlook (online). Retrieved from http://www.aigroup.com.au/ on 16 November 2015.

Aisen, A. and Veiga, F.J. (2013). How does political instability affect economic growth? *European Journal of Political Economy*, *29*, 151-167.

Akanni, P.O., Oke, A.E. and Akpomiemie, O.A. (2015). Impact of environmental factors on building project performance in Delta State, Nigeria. *HBRC Journal*, *11*(1), 91-97.

Alam, S.S. 2011. Entrepreneur's traits and firm innovation capability: an empirical study in Malaysia. *Asian Journal of Technology Innovation*, *19*(1), 53-66.

Adler, M., and Ziglio, E. (1996). *Gazing into the oracle*. Bristol: Jessica Kingsley Publishers.

Alfan, E. and Zakaria, Z. (2013). Review of financial performance and distress: a case of Malaysian construction companies. *British Journal of Arts and Social Sciences*, *12*(II), 143-157.

Al Haadir, S. and Panuwatwanich, K. (2011). CSFs for safety program implementation among construction companies in Saudi Arabia. *Procedia Engineering*, *14*, 148-155.

Alkali, M. and Isa, A.H.M. (2012). Assessing the influence of external environmental factors on the performance of small business manufacturing enterprises in Bauchi State, Nigeria. *Interdisplinary Journal of Contemporary Research in Business*, *4*(7), 621-628.

Alroomi, A., Jeong, D.H.S. and Oberlender, G.D. (2012). Analysis of cost-estimating competencies using criticality matrix and factor analysis. *Journal of Construction Engineering and Management*, *138*(11), 1270-1280.

AlSehaimi, A., Koskela, L. and Tzortzopoulos, P. (2013). Need for alternative research approaches in construction management: case of delay studies. *Journal of Management in Engineering*, *29*(4), 407-413.

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

Andrews, R. and Johansen, M. (2012). Organizational environments and performance: A linear or nonlinear relationship? *Public Organization Review*, *12*(2), 175-189.

Aniekwu, N.A. and Igboanugo, A.C. (2012). Barriers to the uptake of concurrent engineering in the Nigerian construction industry. *International Journal of Engineering Business Management*, *4*(43), 1-8.

Ankrah, N.A. and Langford, D.A. (2005). Architects and contractors: A comparative study of organizational cultures. *Construction, Management and Economics*, *23*(5), 595-697.

Antoncic, B. and Hisrich, R.D. (2001). Intrapreneurship: Construct refinement and cross-cultural validation. *Journal of Business Venturing*, *16*(5), 495-527.

Antoncic, B. and Hisrich, R.D. (2003). Clarifying the intrapreneurship concept. *Journal of Small Business and Enterprise Development*, *10*(1), 7-24.

Antoncic, B. and Scarlat, C. (2005). Corporate entrepreneurship and organizational performance: A comparison between Slovenia and Romania. Managing the process of globalization in new and upcoming EU members. *Proceedings of the 6th International Conference of the Faculty of Management Koper, Congress Centre Bernardin, Slovenia*, pp. 1-11.

Arditi, D., Polat, G. and Makinde, S. (2008). Marketing practices of U.S. contractors. *Journal of Management in Engineering*, *24*(4), 255-264.

Arditi, D., Gluch, P. and Holmdahl, M. (2013). Managerial competencies of female and male managers in the Swedish construction industry. *Construction, Management and Economics*, *31*(9), 979-990

Arshad, A.S., Rasli, A., Arshad, A.A. and Zain, Z.M. (2014). The impact of entrepreneurial orientation on business performance: a study of technology-based SMEs in Malaysia. *Procedia - Social and Behavioral Sciences*, *130*, 46-53.

Assaf, S., Hassanain, M.A. and Al-Zahrani, S. (2015). Causes of contractors' failure in industrial projects in Saudi Arabia. *Research Journal of Applied Sciences, Engineering and Technology*, *9*(3), 158-164.

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

Audretsch, D.B. 2005. *The knowledge spillover theory of entrepreneurship and economic growth*. G.T. Vinig and R.C.W. Van Der Voort (Eds.). USA: Emerald Group Publishing.

Ayton, P., Ferrel, W.R. and Stewart, T.R. (1999). Commentaries on 'The Delphi technique as a forecasting tool: issues and analysis' by Rowe and Wright. *International Journal of Forecasting*, *15*, 377-381.

Bakar, A.H.A., Tufail, M.A., Yusof, M.N. and Virgiyanti, W. (2011). Implementation of strategic management practices in the Malaysian construction industry. *Pakistan Journal of Commerce and Social Sciences*, *5*(1), 140-154.

Bakar, A.H.A., Tabassi, A.A., Razak, A.A. and Yusof, M.N. (2012). Key factors contributing to growth of construction companies: a Malaysia experience. *World Applied Sciences Journal*, *19*(9), 1295-1307.

Bakhshi, M. and Bioki, T.A. (2013). The new integrated approach for contractor selection criteria through A2 method. *Reef Resources Assessment and Management Technical Paper*, *38*(5), 582-596.

Balali, V., Zahraie, B. and Roozbahani, A. (2014). A comparison of AHP and PROMETHEE family decision making methods for selection of building structural system. *American Journal of Civil Engineering and Architecture*, *2*(5), 149-159.

Balog, A.M., Baker, L.T., and Walker, A.G. (2013). Religiosity and spirituality in entrepreneurship: a review and research agenda. *Journal of Management, Spirituality and Religions*. 1-27 (online). Retrieved from http://dx.doi.org/10.1080/14766086.2013.836127 on 20 September 2016.

Baum, J.R. and Locke, E.A. (2004). The relationship of entrepreneurial traits, skill, and motivation to subsequent venture growth. *Journal of Applied Psychology*, *89*(4), 587-598.

Baumgartner, D., Schulz, T. and Seidl, I. (2013). Quantifying entrepreneurship and its impact on local economic performance: a spatial assessment in rural Switzerland. *Entrepreneurship and Regional Development: An International Journal*, *25*(3-4), 222-250.

Baumol, W. (2002). *The free market innovation machine: analyzing the growth miracle of capitalism*. Princeton: Princeton University Press.

Bazza, M.I. and Daneji, B.A. (2013). Political instability and organizational performance: a case study of Afribank PLC (Mainstreet Bank) Maiduguri Branch. *Asian Journal of Business and Management*, *1*(5), 249-259.

Beatham, S., Anumba, C., Thorpe, T. and Hedges, I. (2004). KPIs: a critical appraisal of their use in construction. *Benchmarking: An International Journal*, *11*(1), 93-117.

Bennis, W. and Nanus, B. (1985). *Leadership: the strategies for taking charge*. New York: Harper and Row.

Betonio, J. (2014). Entrepreneurial competencies of the small and medium enterprise business operators of Ozamiz City Public Mall Philippines: Basis for community extension programs. IAMURE International Journal of Multidisciplinary Research. *8*(1) (online). Retrieved from http://dx.doi.org/10.7718/iamure.v8i1.790 on 5 November 2014.

Betts, M. and Ofori, G. (1999). *Strategic management in construction*. M. Betts (ed.). Oxford: Blackwell Science.

Biggs, T. (2002). *Is small beautiful and worthy of subsidy? Literature review*. Washington: International Finance Corporation.

Blau, B.M., Brough, T.J. and Thomas, D.W. (2013). Corporate lobbying, political connections, and the bailout of banks. *Journal of Banking and Finance*, *37*(8), 3007–3017.

Boje, D.M., Fedor, D.B. and Rowland, K.M. (1982). Myth making: a qualitative step in OD interventions. *Journal of Applied Behavioral Science*, *18*, 17-28.

Bolman, L.G. and Deal, T.E. (2008). *Reframing organizations: artistry, choice, and leadership*. 4th ed. San Fransisco: Jossey-Bass.

Bolton, B. and Thompson, J. (2000). *Entrepreneurs: talent, temperament, technique*. Oxford: Butterworth-Heinemann.

Boubakri, N., Cosset, J-C. and Saffar, W. (2012). The impact of political connections on firms' operating performance and financial decisions. *Journal of Financial Research*, *35*(3), 397-423.

Boynton, A.C. and Zmund, R.W. (1984). An assessment of CSFs. *Sloan Management Review*, *25*(4), 17-27.

Brakaj, E.P. and Kume, V. (2013). How the Albanian external environment affect the construction industry. *Annales Universitatis Apulensis Series Oeconomica*, *15*(1), 295-309.

Braumerhjelm, P., Acs, Z.L., Audretsch, D.B. and Carlsson, D.B. (2010). The missing link: Knowledge diffusion and entrepreneurship in endogenous growth. *Small Business Economics*, *34*(2), 104-125.

Bresnen, M. (1990). *Organizing construction: project organization and matrix management*. New York: Routledge.

Briedenhann, J. and Butts, S. (2006). The application of the Delphi technique to rural tourism project evaluation. *Current Issues in Tourism*, *9*(2), 171-190.

Brockhoff, K. (1975). *The performance of forecasting groups in computer dialogue and face to face discussions*. H. Linstone and M. Turoff (Eds). London: Addison-Wesley.

Brockhaus, W.L. and Mickelsen, J.F. (1977). An analysis of prior Delphi applications and some observations on its future applicability. *Technological Forecasting and Social Change*, *10*, 103-110.

Bruno, A.V., Leidecker, J.K. and Harder, J.W. (1987). Why firms fail. *Journal of Management*, *7*(27), 50-58.

Calhoun, M.E. and Hallowell, M.R. (2010). Interrelationships among construction injury prevention strategies: a cross-impact analysis. *Proceedings of the Proceedings of the Construction Research Congress 2010: Innovation for Reshaping Construction Practice, ASCE*, pp. 1264-1273.

Callistus, T., Anzagira, L.F., Ernest, K., Stephen, B. and Anzagira, C.A. (2014). Factors affecting quality performance of construction firms in Ghana: evidence from small-scale contractors. *Civil and Environmental Research*, *6*(5), 18-25.

Cameron, K.S. and Ettington, D.R. (1988). *The conceptual foundations of organizational culture*. J. Smart (ed.). New York: Agathon.

Cameron, K.S., and Quinn, R.E. (1999). *Diagnosing and changing organizational culture*. Reading: Addison-Wesley Longman.

Cameron, K.S. and Quinn, R.E. (2006). Diagnosing and changing organizational culture: based on the competing values framework. San Francisco: John Wiley and Sons.

Cantrill, J.A., Sibbald, B. and Buetow, S. (1996). The Delphi and nominal group techniques in health sciences research. *International Journal of Pharmacy Practice*, *4*(2), 67-74.

Capaldo, G., Iandoli, L. and Ponsiglione, C. (2014). Value creation in small firms: a competence-based approach (online). Retrieved from http://www.kmu.unisg.ch/rencontres/RENC2004/Topics/Capal on 5 Julai 2014.

Cardy, R.L. and Selvarajan, T.T. (2006). Competencies: alternative frameworks for competitive advantage. *Business Horizons*, *49*(3), 235-245.

CCSA. (2014). *Competencies for Canada's substance abuse workforce*. Ottawa: Canadian Centre on Substance Abuse.

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

Chan, A.P.C., Lam, P.T.I., Wen, Y., Ameyaw, E.E., Wand, S. and Ke, Y. (2015). Cross-sectional analysis of critical risk factors for PPP water projects in China. *Journal of Infrastructure Systems*, *21*, 1-10.

Chandler, G.N. and Hanks, S.H. (1994). Market attractiveness, resource-based capabilities, venture strategies and venture performance. *Journal of Small Business Management*, *12*(1), 27-35.

Chandler, G.N. and Jansen, E.J. (1992). Founder's self-assessed competence and venture performance. *Journal of Business Venturing*, *7*(3), 223-236.

Chaphalkar, N.B. and Shirke, P.P. (2013). Application of multi-criteria decision making techniques for bridge construction. *International Journal of Innovative Research in Science, Engineering and Technology*, *2*(8), 3617-3626.

Chaston, I. (2012). Entrepreneurship and knowledge management in small service-sector firms. *The Service Industries Journal*, *32*(6), 845-860.

Chattopadhyay, S. and Mo, J.P.T. (2010). Modelling a global EPCM (engineering, procurement and construction management enterprise). *International Journal of Engineering Business Management*, *2*(1), 1-8.

Che Ibrahim, C.K.I., Costello, S.B. and Wilkinson, S. (2014). Establishment of quantitative measures for team integration assessment in alliance projects. *Journal of Management in Engineering*. 31(5) (online). Retrieved from http://dx.doi.org/10.1061/(ASCE)ME.1943-5479.0000318 on 10 March 2015.

Che Rose, R., Kumar, N. and Yen, L.L. (2006). The dynamics of entrepreneurs' success factors in influencing venture growth. *Journal of Asia Entrepreneurship and Sustainability*. II(3) (online). Retrieved from http://www.asiaentrepreneurshipjournal.com/AJESII3Kumar.pdf on 24 July 2013.

Chen, S. and Li, J. (2009). Assessing the architectural design services by using DEMATEL approach. *Proceedings of the 2009 International Conference on Computational Intelligence and Natural Computing*, pp. 463-466.

Chen, S.H. and Lee, H.T. (2007). Performance evaluation model for project managers using managerial practices. *International Journal of Project Management*, *25*(6), 543-551.

Cheung, S.O., Wong, P.S.W. and Wu, A.W.Y. (2011). Towards an organizational culture framework in construction. *International Journal of Project Management*, *29*(1), 33-34.

Cheung, S.O., Wong, P.S.P. and Ana, L.L. (2012). An investigation of the relationship between organizational culture and the performance of construction organizations. *Journal of Business Economics and Management*, *13*(4), 688-704.

Chia, F.C. (2012). Construction and economic development: the case of Malaysia. *International Journal of Construction Management*, *12*(1), 23-35.

Chinowsky, P., Diekmann, J. and Galotti, V. (2008). Social network model of construction. *Journal of Construction Engineering and Management*, *134*(10), 804-812.

Chinowsky, P.S., Diekmann, J. and O'Brien, J. (2010). Project organizations as social networks. *Journal of Construction Engineering and Management*, *136*, 452-458.

Christie, C.A. and Barela, E. (2005). The Delphi technique as a method for increasing inclusion in the evaluation process. *The Canadian Journal of Program Evaluation*, *20*(1), 105-122.

CIDB. (2006). *Construction industry master plan 2006 – 2015*. Kuala Lumpur: Construction Industry Development Board Malaysia.

CIDB. (2015a). *Construction industry transformation programme 2016 – 2020: driving construction excellence together*. Kuala Lumpur: Construction Industry Development Board Malaysia.

CIDB. (2015b). *Official portal* (online). Retrieved from http://www.cidb.gov.my/ on 28 November 2015.

Clayton, M.J. (1997). Delphi: a technique to harness expert opinion for critical decision-making tasks in education. *Educational Psychology: an International Journal of Experimental Educational Psychology*, *17*(4), 373-386.

Clibbens, N., Walters, S. and Baird, W. (2012). Delphi research: issues raised by a pilot study. *Nurse Researcher*, *19*(2), 37-44.

Coolican, M. and Jackson, J. (2002). Integrating culture with strategy (online). Retrieved from http//www.leadervalues.com on 12 April 204.

Cooper, D.R. and Schindler, P.S. (2009). *Business research methods*. 6th ed. New York: Irwin/McGraw-Hill.

Cooper, R.G. and Kleinschmidt, E.J. (2007). Winning businesses in product development: the critical success factors. *Research Technology Management*, May-June, 2007 (online). Retrieved from http//www.stage-gate.com on 17 April 2014.

Cornwall, J.R. and Perlman, B. (1990). *Organizational entrepreneurship*. Homewood: Irwin.

Coulter, M. (2003). *Entrepreneurship in action*. 2nd ed. New Jersey: Prentice Hall.

Covin, J.G. and Miles, M.P. (2007). Strategic use of corporate venturing. *Entrepreneurship Theory and Practice*, *31*(2), 183-207.

Covin, J.G. and Miles, M.P. (1999). Corporate entrepreneurship and the pursuit of competitive advantage. *Entrepreneurship Theory and Practice*, *23*(3), 47-64.

Covin, J.G. and Slevin, D.P. (1988). The influence of organizational structure on the utility of an entrepreneurial to management style. *Journal of Management Studies*, *25*(3), 217-234.

Covin, J.G., and Slevin, D.P. (1991). A conceptual model of entrepreneurship as firm behaviour. *Entrepreneurship Theory and Practice*, *16*(1), 7-25.

Cramer, C.K., Klasser, K.D., Epstein, J.B. and Sheps, S.B. (2008). The Delphi process in dental research. *The Journal of Evidence-Based Dental Practice*, *8*, 211-220.

Creswell, J.W. (2009). *Research design: qualitative, quantitative, and mixed methods approaches*. 3rd ed. Thousand Oaks: Sage Publication.

Creswell, J.W. and Plano Clark, V. L. (2011). *Designing and conducting mixed methods research*. 2nd ed. Thousand Oaks: Sage Publications.

Cristina, D. (2009). Marketing on the construction market in a economic crisis. *Annales Universitatis Apulensis Series Oeconomica*, *11*(2), 1055-1059.

Crook, T.R., Todd, S.Y., Combs, J.G. Woehr, D.J. and Ketchen, D.J.Jr. (2011). Does human capital matter? A meta-analysis of the relationship between human capital and firm performance. *Journal of Applied Psychology*, *96*(3), 443-456.

Csaszar, F.A. (2012). Organizational structure as a determinant of performance: Evidence from mutual funds. *Strategic Management Journal*, *33*, 611-632.

Custer, R.L., Scarcella, J.A. and Stewart, B.R. (1999). The modified Delphi technique - A rotational modification. *Journal of Career and Technical Education*. 15(2) (online). Retrieved from https://ejournals.lib.vt.edu/index.php/JCTE/article/view/643/688 on 19 March 2016.

Dalkey, N.C. (1972a). *Occupational analysis: techniques & procedures*. New York: The Bruce Publishing Co.

Dalkey, N.C. (1972b). *The Delphi method: an experimental application of group opinion*. N.C. Dalkey, D.L. Rourke, R. Lewis, and D. Snyder (Eds.). Lexington: Lexington Books.

Dalkey, N.C. and Helmer, O. (1963). An experimental application of the Delphi method to the use of experts. *Management Science*, *9*(3), 458-467.

Dalkey, N.C. and Rourke, D.L. (1972). *Experimental assessment of Delphi procedures with group value judgments*. N.C. Dalkey, D.L. Rourke, R. Lewis and D. Synder (Eds.). Lexington: Lexington Books.

Dalkey, N.C., Rourke, D.L., Lewis, R. and Synder, D. (1972). *Studies in the quality of life: Delphi and decision making*. Lexington: Lexington Books.

Dalton, D.R., Todor, H.D., Spendolini, M.J., Fielding, G.J. and Porter, L.W. (1980). Organization structure and performance: a critical review. *The Academy of Management Review*, *5*(1), 49-64.

Damigos, D. and Anyfantis, F. (2011). The value of view through the eyes of real estate experts: a fuzzy Delphi Approach. *Landscape and Urban Planning*, *101*, 171-178.

Deal, T.E. and Kennedy, A.A. (1982). *Corporate cultures: the rites and rituals of corporate life*. Reading: Addison-Wesley.

Delbecq, A.L., Gustafson, D.H. and de Ven, V. (1975). *Group techniques for program planning: a guide to nominal group and Delphi processes*. Glenview: Scott, Foresman and Company.

Deng, F. and Smyth, H. (2013). Contingency-based approach to firm performance in construction: Critical review of empirical research. *Journal of Construction Engineering and Management*. 139(10), 04013004. Retrieved from http://dx.doi.org/10.1061/(ASCE)CO.1943-7862.0000738 on 4 April 2014.

Denison, D.R. (1990). What is the difference between organizational culture and organizational climate? a native's point of view on a decade of paradigm wars. *The Academy of Management Review*, *21*(3), 619-654.

Department of Statistics Malaysia. (2008). *Malaysian standard industrial classification (MSIC) 2008, version 1.0*. Putrajaya: Department of Statistics, Malaysia.

Department of Statistics Malaysia. (2015). *Official portal* (online). Retrieved from https://www.statistics.gov.my/ on 27 November 2015.

Derian, J-C., and Morize, F. (1973). Delphi in the assessment of research and development projects. *Futures*, *5*(5), 469–483.

Dess, G.G. and Lumpkin, G.T. (2005). The role of entrepreneurial orientation in stimulating effective corporate entrepreneurship. *Academy of Management Executive*, *19*(1), 147-156.

de Waal, A. (2012). Characteristics of high performance organizations. *Journal of Management Research*, *4*(4), 39-71.

Dikmen, I., Birgonul, M.T. and Ozcenk, I. (2005). Marketing orientation in construction firms: Evidence from Turkish contractors. *Building and Environment*, *40*, 257-265.

Dimitratos, P., Liouka, I. and Young, S. (2014). A missing operationalization: entrepreneurial competencies in multinational enterprise subsidiaries. *Long Range Planning*, 47(1-2), 64-75.

Ding, S., Alessandra, G. and John, K. (2013). Investment and financing constraints in China: Does working capital make a difference? *Journal of Banking and Finance*, *37*, 1490-1507.

Dollinger, M.J. (2003). *Entrepreneurship: strategies and resources*. 3rd ed. New Jersey: Prentice Hall.

Doloi, H. (2012). Understanding impacts of time and cost related construction risks on operational performance of PPP projects. *International Journal of Strategic Property Management*, *16*(3), 316–337.

Donahue, K.B. (2001). How to ruin a merger: Five people management pitfalls to avoid. *Harvard Management Update*, *6*(9), 1-4.

Donohoe, H.M. and Needham, R.D. (2009). Moving best practice forward: Delphi characteristics, advantages, potential problems, and solutions. *International Journal of Tourism Research*, *11*, 415–437.

Donohoe, H., Stellefson, M. and Tennant, B. (2012). Advantages and limitations of the e-Delphi technique: implications for health education researchers. *American Journal of Health Education*, *43*(1), 38-46.

Donaldson, L. (2001). *The contingency theory of organizations*. Thousand Oaks: Sage.

Dorée, A.G. (2004). Collusion in the Dutch construction industry: an industrial organization perspective. *Building Research and Information*, *32*(2), 146-156.

Driessen, M.P. and Zwart, P.S. (2014). The role of the entrepreneur in small business success: the entrepreneurship scan (online). Retrieved from http://www.ondernemerstest.nl/wp-content/ uploads/2010/03/ICSBv5.pdf on 18 June 2014.

Drucker, P. (1985). *Entrepreneurship and innovation: practice and principles*. London: William Heinemann.

Drucker, P.F. (2009). *The effective executive*. New York: HarperCollins.

du Plessis, C.D. (2007). A strategic framework for sustainable construction in developing countries. *Construction Management and Economics*, *25*(1), 67-76.

Duncan, R.B. (1972). Characteristics of organizational environments and perceived environmental uncertainty. Administrative Science Quarterly, *7*(3), 313-327.

Edmonds, G. and Miles, D. (1984). *Foundation of change, aspects of the construction industry in developing countries*. London: Intermediate Technology Publication.

Edum-Fotwe, F., Andrew, P. and Thorpe, A. (1996). A review of financial ratio tools for predicting contractor insolvency. *Construction Management and Economics*, *14*, 189-198.

Elattar, S.M.S. (2009). Towards developing an improved methodology for evaluating performance and achieving success in construction projects. *Scientific Research and Essay*, *4*(6), 549-554.

Elwakil, M., Ammar, M., Zayed, T., Mahmoud, M., Eweda, A. and Mashhour, I. (2009). Investigating and modeling of critical success factors in construction organizations. *Proceedings of the Construction Research Congress 2009: Building Sustainable Future, ASCE*, pp. 350-359.

Evans, D.S. and Jovanovic, B. (1989). As estimated model of entrepreneurial choice under liquidity constraints. *Journal of Political Economy*, *97*(4), 808-827.

Fai, F. and von Tunzelmann, N. (2001). Industry-specific competencies and converging technological systems: Evidence from patents. *Structural Change and Economic Dynamics*, *12*(2), 141-170.

Farinde, O. and Sillars, D. (2012). A holistic success model for the construction industry. *Proceeding of the 2012 Engineering Project Organizations Conference – Global Collaboration*, pp. 1-21.

Farmer, S.M., Yao, X, and Kung-Mcintyre, K. (2011). The behavioral impact of entrepreneur identity aspiration and prior entrepreneurial experience. *Entrepreneurship Theory and Practice*, *35*(2), 245-273.

Fereidouni ,H.G., Masron, T.A., Nikbin, D. and Amiri R.E. (2010). Consequences of external environment on entrepreneurial motivation in Iran. *Asian Academy of Management Journal*, *15*(2), 175-196.

Filser, M. and Eggers, F. (2014). Entrepreneurial orientation and firm performance: a comparative study of Austria, Liechtenstein and Switzerland. *South African Journal of Business Management*, *45*(1), 55-65.

Fontela, E. and Gabus, A. (1976). *The DEMATEL observer*. Geneva: Battelle Memorial Institute Geneva Research Centre, Switzerland.

George, D. and Mallery, P. (2010). *SPSS for Windows: step by step.* 10th ed. Boston: Allyn and Bacon.

Gorgievski, M.J., Ascalon, M.E. and Stephan, U. (2011). Small business owners' success criteria, a values approach to personal differences. *Journal of Small Business Management*, *49*, 207-232.

Greenberg, J. (2011). *Behavior in organizations.* global ed. Essex: Pearson Education Limited.

Gries, T. and Naudé, W. (2011). Entrepreneurship and human Development: a capability approach. *Journal of Public Economics*, *3*(1), 216-224.

Gudienė, N., Ramelytė, L. and Banaitis, A. (2013). An evaluation of critical success factors for construction projects using expert judgment. *Proceedings of the 1st International Virtual Scientific Conference*, pp. 384-389.

Gudienė, N., Banaitis, A., Podvecko, V. and Banaitienė, N. (2014). Identification and evaluation of the critical success factors for construction projects in Lithuania: AHP approach. *Journal of Civil Engineering and Management*, *20*(3), 350-359.

Gunderson, D.E. and Gloeckner, G.W. (2011). Superintendent competencies and attributes required for success: A national study comparing construction professionals' opinions. *International Journal of Construction Education and Research*, *7*, 294-311.

Gunhan, S. and Arditi, D. (2005). Factors affecting international construction. *Journal of Construction Engineering and Management*, *131*(3), 273-282.

Gupta, U.G. and Clarke, R.E. (1996). Theory and applications of the Delphi Technique: a bibliography (1975-1994). *Technological Forecasting and Social Change*, *53*(2), 185-211.

Haber, S. and Razo, A. (1998). Political instability and economic performance: evidence from revolutionary Mexico. *World Politics*. 51(1), 99-143 (online). Retrieved from http://www.jstor.org/stable/25054067 on 2 September 2016.

Habibi, A., Sarafrazi, A. and Izadyar, S. (2014). Delphi technique theoretical framework in qualitative research. *International Journal of Engineering and Science*, *3*(4), 8-13.

Halim, M.A.S.A., Alias, M., Hamid, A.C. and Zakaria, Z. (2011). An inter-relationship of entrepreneurial personality, commitment and self-independent in a Terengganu agriculture industry. *International Journal of Business and Social Science*, *2*(23), 274-281.

Hallowell, M.R. (2008). A formal model for construction safety and health risk management. Ph.D Thesis. Oregon State University, USA.

Hallowell, M. (2009). Techniques to minimize bias when using the Delphi method to quantify construction safety and health risks. *Proceedings of the Construction Research Congress 2009: Building a Sustainable Future, ASCE*, pp. 1489-1498.

Hallowell, M. and Gambatese, J. (2007). A formal model for construction safety risk management. *Proceedings of the Construction and Building Research Conference of Royal Institute of Chartered Surveyors (COBRA 2007)*, pp. 1-15.

Hallowell, M. and Gambatese, J. (2010). Qualitative research: Application of the Delphi method to CEM research. *Journal of Construction Engineering and Management. Special Issue: Research Methodologies in Construction Engineering and Management*, *136*, 99-107.

Hallowell, M., Esmaeli, B. and Chinowsky, P. (2011). Safety risk interactions among highway construction work tasks. *Construction Management and Economics*, *29*(4), 417-429.

Hallowell, M.R. and Calhoun, M.E. (2011). Interrelationship among highly effective construction injury prevention strategies. *Journal of Construction Engineering and Management*, *137*(11), 985-993.

Hamid, A.R.A., Yahya, K. and Han, L.W. (2010). Management competencies for preventing and reducing stress at construction site. *Built Environment Journal*, *7*(2), 32-37.

Han, W-M., Hsu, C-H. and Yeh, C-Y. (2015). *Using DEMATEL to analyze the quality characteristics of mobile applications*. D. Zheng (Ed). London: Taylor and Francis Group.

Hanafin, S., Brooks, A-M., Carroll, E., Fitzgerald, E., Gabhainn, S.N. and Sixsmith, J. (2007). Achieving consensus in developing a national set of child well-being indicators. *Social Indicators Research*, *80*, 79-104.

Hardison, D., Behm, M. Hallowell, M.R. and Fonooni, H. (2014). Identifying construction supervisor competencies for effective site safety. *Safety Science*, *65*, 45-53.

Harinarian, N. and Haupt, T.C. (2014). Drivers for the effective management of HIV and AIDS in the South African construction industry – a Delphi study. *African Journal of AIDS Research*, *13*(3), 291-303.

Harinarian, N., Bornman, C-L. and Botha, M. (2013). Organisational culture of the South African construction industry. *Acta Structilia*, *20*(1), 22-43.

Hasson, F., Keeney, S. and McKenna, H. (2000). Research guidelines for the Delphi survey technique. *Journal of Advanced Nursing*, *33*(4), 1008-1015.

Heerwagen, J., Kampschroer, K., Kelly, K. and Powell, K. (2015). Designing for organizational effectiveness (online). Retrieved from http://www.wbdg.org/resources/design_orgeff.php on 5 August 2015.

Heravi, G. and Charkhakan, M.H. (2014). Predicting and tracing change-formation scenarios in construction projects using the DEMATEL technique. *Journal of Management in Engineering*, *30*, 1-8.

Herazo, B., Lizarralde, G. and Paquin, R. (2012). Sustainable development in the building sector: A Canadian case study on the alignment of strategic and tactical management. *Project Management Journal*, *43*(2), 84-100.

Hiete, M., Kühlen, A. and Schultmann, F. (2011). Analyzing the interdependencies between the criteria of vsustainable building rating systems. *Construction Management and Economics*, *29*(4), 323-328.

Hillebrandt, P.M. (2000). *Economic theory and the construction industry*. 3rd ed. London: MacMillan Press.

Hirsh, L. (2015). Businesses that have high failure rates. *Houston Chronicle* (online). Retrieved from http://smallbusiness.chron.com/businesses-high-failure-rates-61640.html on 4 April, 2016.

Hisrich, R.D., Peters, M.P. and Shepherd, D.A. (2010). *Entrepreneurship*. New York: McGraw-Hill

Hitt, M.A. (2005). Spotlight on strategic management. *Business Horizons*, *48*, 371-377.

Hofstede, G.H. (1994). *Cultures and organizations: software of mind*. London: HarperCollins.

Hofstrand, D. (2010). What is an entrepreneur? *Ag Decision Maker, File C5-07* (online). Retrieved from http://www.Extension.iastate.edu/agdm on 3 July 2014.

Hollander, M.C., Sage, J.M., Greenler, A.J., Pendl, J., Avcin, T., Espada, G., Beresford, M.W., Henrickson, M., Lee, T-L., Punaro, M., Huggins, J., Stevens, A.M., Klein-Gitelman, M.S. and Brunner, H.I. (2013). International consensus for provisions of quality-driven care in childhood-onset systemic lupus erythematosus. *Arthritis Care and Research*, *65*(9), 1416-1423.

Holton, I., Glass, J. and Price, A. (2008). Developing a successful sector sustainability strategy: Six lessons from the UK construction products industry. *Corporate Social Responsibility and Environmental Management*, *15*(1), 29-42.

Horta, I.M., Camanho, A.S. and de Costa, M. (2012). Performance assessment of construction companies: A study of factors promoting financial soundness and innovation in the industry. *International Journal of Production Economics*, *137*(1), 84-93.

Hoseilalipour, M., Mohammadhasanzadeh, S. and Hafezi, M. (2013). Assessing the applicability of collaborative procurement in Iranian construction industry. *Journal of Applied Environmental and Biological Sciences*, *3*(10), 8-23.

Housing Department of State Malaysia. (2015). *Official portal* (online). Retrieved from http://ehome.kpkt.gov.my/index.php/pages/view/244 on 28 November 2015.

Hsu, C-C. and Sandford, A.B. (2007). Minimizing non-response in the Delphi process: How to respond to non-response. *Practical Assessment, Research and Evaluation*, *12*(17), 62-78.

Hu, Y., Chan, A.P.C. and Le, Y. (2014). Understanding the determinants of program organization for construction megaproject success: case study of the Shanghai expo construction. *Journal of Management in Engineering*. 31(5), 05014019 (online). Retrieved from http://dx.doi.org/10.1061/(ASCE)ME.1943-5479.0000310.

Hung, H-L., Altschuld, J.W. and Lee, Y-F. (2008). Methodological and conceptual issues confronting a cross-country Delphi study of education program evaluation. *Evaluation and Program Planning*, *31*, 191-198.

Hunt, J.M. (1998). Toward the development of a competency model of family firm leadership. *Proceedings of the 12th Annual National Conference, United States Association for Small Business and Entrepreneurship*, pp. 15-18.

Hunter, J. (2002). Improving organizational performance through the use of effective elements of organizational structure. *Leadership in Health Services*, *15*(3), 12-21.

Ibrahim, A.B., Roy, M.H., Ahmed, Z. and Imtiaz, G. (2010). An investigation of the status of the Malaysian construction industry. *Benchmarking: An International Journal*, *17*(2), 294-308.

Ihuah, P.W. and Eaton, D. (2013). The pragmatic approach: A framework for sustainable management of housing estates in Nigeria. *Journal of US-China Public Administration*, *10*(10), 933-944.

Inoue, Y. and Lee, S. (2011). Effects of different dimensions of corporate social responsibility on corporate financial performance in tourism-related industries. *Tourism Management*, *32*, 790-804.

Islam, M.A., Khan, M.A. Obaidullah, A.Z.M. and Alam, M.S. (2011). Effect of entrepreneur and firm characteristics on the business success of small and medium enterprises (SMEs) in Bangladesh. *International Journal of Business and Management*, *6*(3), 289-299.

Iqbal, N., Ahmad, N., Basheer, N.A. and Nadeem, M. (2012). Impact of corporate social responsibility on financial performance: evidence from Pakistan. *International Journal of Learning and Development*, *2*(6), 107-118.

Jaafar, M., Ramayah, T. and Osman, M. (2004). Owner/manager characteristics and business success: A study among Malaysian contractors. *Proceedings of the 18th Annual Conference of the Australian and New Zealand Academy of Management*, pp. 8-11.

Jabeen, R. and Mahmood, R. (2014). Effect of external environmental on entrepreneurial orientation and business performance relationship. *Social and Basic Sciences Research Review*, *2*(9), 394-403.

Jain, R.K. (2011). Entrepreneurial competencies a meta-analysis and comprehensive conceptualization for future research. *Vision: The Journal of Business Perspective*, 15(2), 127-152.

Janićijević, N. (2013). The mutual impact of organizational culture and structure. *Economic Annals*, *58*(198), 35-60.

Jari, A.J. and Bhangale, P.P. (2013). To study critical factors necessary for a successful construction projects. *International Journal of Innovative Technology and Exploring Engineering*, *2*(5), 331-335.

Jasra, J.M., Khan, M.A., Hunjra, A.I., Ur Rehman, R.A. and Azam, R.I. (2011). Determinants of business success of small and medium enterprises. *International Journal of Business and Social Science*, *2*(2), 274-280.

Jato-Espino, D., Castillo-Lopez, E., Rodriguez-Hernandez, J. and Canteras-Jordana, J.C. (2014). A review of application of multi-criteria decision making methods in construction. *Automation in Construction*, *45*, 151-162.

Jayasuriya, C.S. (2014). Measuring project success in the construction industry (online). Retrieved from http://www.slqsuae.org/wp-content/uploads/2012/11/Measuring-project-Success.pdf on 23 October 2014.

Jena, S. and Sahoo, C.K. (2014). Improving managerial performance: A study on entrepreneurial and leadership competencies. *Industrial and Commercial Training*, *46*(3), 143-149.

Jeng, D.J-F. (2011). Evaluating intertwined effects of team internal factors on project success: A hybrid method combining exploratory factor analysis and the DEMATEL technique. *International Journal of Innovative Computing, Information and Control*, *8*(10), 7451-7465.

Jenkins, D.A. and Smith, T.E. (1994). Applying Delphi methodology in family therapy research. *Contemporary Family Therapy*, *16*, 114-130.

Jennings, D.F. and Lumpkin, J.L. (1989). Functionally modeling corporate entrepreneurship: an empirical integrative analysis. *Journal of Management*, *15*(3), 485-503.

Johnson, R.B., Onwuegbuzie, A.J. and Turner, L.A. (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research*, *1*(2), 122-133.

Jozi, S.A., Shoshtary, M.T. and Zadeh, A.R.K. (2015). Environmental risk assessment of dams in construction phase using a multi-criteria decision-making (MCDM) method. *Human and Ecological Risk Assessment*, *21*, 1-16.

Kalaian, S.A. and Kasim, R.M. (2012). Terminating sequential Delphi survey data collection. *Practical Assessment, Research and Evaluation*, *17*(5), 1-9.

Kaloo, U. (2010). *Managing small enterprises: models for developing the competitive performance of small enterprises*. Petaling Jaya: Golden Books Centre.

Kamarudin, H.S. and Sajilan, S. (2013). Critical success factors of technopreneurship in the creative industries: a study of animation ventures. *Review of Integrative Business and Economics Research*, *2*(1), 1-37.

Kaminsky, J. and Javernick-Will, A. (2013). Contested factors for sustainability: Construction and management of household on-site wastewater treatment systems. *Journal of Construction Engineering and Management*, *139*, 1-9.

Kangari, R. (1988). Business failure in construction industry. *Journal of Construction Engineering and Management*, *114*(2), 172-190.

Kao, J.J. (1991). *The entrepreneurial organization*. New Jersey: Prentice Hall.

Kao, R.W.Y., Kao, R.R. and Jing, Y. (2006). *An entrepreneurial approach to corporate management*. 2nd ed. Singapore: Pearson Education.

Kargi, B. (2013). Interaction between the economic growth and the construction industry: a time series analysis on Turkey (2000-2012). *Emerging Market Journal*, *3*, 20-34.

KarimiAzari, A.R., Mousavi, N., Mousavi, S.F. and Hosseini, SB. (2011). Risk assessment model selection in construction industry. *Expert Systems with Applications*, *38*, 9105-9111.

Karra, N., Phillips, N. and Tracey, P. (2008). Building the born global firm: Developing entrepreneurial capabilities for international new venture success. *Long Range Planning*, *41*(4), 440-458.

Kaynak, E., Bloom, J. and Leibold, M. (1994). Using the Delphi technique to predict future tourism potential. *Marketing Intelligence and Planning*, *12*(7), 18-29.

Kennedy, J., Ashmore, J., Babister, E. and Kelman, I. (2008). The meaning of 'build back better': evidence from post-tsunami Aceh and Sri Lanka. *Journal of Contingencies and Crisis Management*, *16*(1), 24-36.

Keown, A.J., Martin, J.D., Petty, J.W. and Scott, D.F.Jr. (2005). *Financial management: principles and applications*. 10th ed. New Jersey: Pearson Prentice Hall.

Kerlinger, F.N. (1973). *Foundations of behavioral research*. New York: Holt, Reinhart, and Winston.

Khan, R.A., Liew, M.S. and Ghazali, Z. (2014). Malaysian construction sector and Malaysia Vision 2020: developed nation status. *Procedia - Social and Behavioral Sciences*, *109*(8), 507-513.

Kieser, A. (1995). *Management theory and taylorism*. Stuttgart: Kolhammer.

Kiggundu, M.N. (2002). Entrepreneurs and entrepreneurship in Africa: what is known and what needs to be done. *Journal of Developmental Entrepreneurship*, 7(3), 239-258.

Kirzner, I.M. (1973). *Competition and entrepreneurship*. Chicago: University of Chicago Press.

Kivrak, S. and Arslan, G. (2008). *Factors causing construction company failure*. G. Lizarralde, C. Davidson, A. Pukteris and M. de Blois (Eds). Montreal: Groupe de recherche if - grif, Université de Montréal, Canada.

Kraft, E. and Chinowsky, P.S. (2003). The effect of construction organization management practices on project success. *Proceedings of the Construction Research Congress 2003: Wind of Change: Integration and Innovation, ASCE*, pp. 1-8.

Kraus, S. (2013). The role of entrepreneurial orientation in service firms: Empirical evidence from Austria. *The Service Industries Journal*, *33*(5), 427-444.

Krueger, N.F., Reilly, M.D. and Carshud, A.L. (2000). Competing models of entrepreneurial intensions. *Journal of Business Venturing*, *15*(5), 411-432.

Kumar, R., Jagadish and Ray, A. (2014). Selection of material for optimal decision using multi-criteria decision making. *Procedia Materials Science*, *6*, 590-596.

Kuratko, D.F. (2009). *Entrepreneurship: theory, process, practice*. 8th ed. Mason: South-Western Cengage Learning.

Kuratko, D.F. and Hodgetts, R.M. (2004). *Entrepreneurship: theory, process, practice*. Ohio: Thomson South Western.

Kuzmišin, P. and Šišková, A. (2013). The quality of entrepreneurial environment as a factor of foreign direct investments inflows. *Quality Innovation Prosperity/Kvalita Inovácia Prosperita*, *XVII*(2), 22-35.

Landeta, J. (2006). Current validity of the Delphi method in social sciences. *Technological Forecasting and Social Change*, *73*, 467-482.

Leedy, D.P. and Ormrod, E.J. (2010). *Practical research: planning and designing*. 9th ed. New Jersey: Pearson Education.

Lehtiranta, L., Kärnä, S., Junnonen, J-M. and Julin, D. (2012). The role of multi-firm satisfaction in construction project success. *Construction Management and Economics*, *30*, 463-475.

Lerner, M. and Almor, T. (2002). Relationship among strategic capabilities and the performance of women-owned small ventures. *Journal of Small Business Management*, *40*(2), 109-125.

Li, H., Jin, Z., Li, V., Liu, G. and Skitmore, R.M. (2013). An entry mode decision-making model for the international expansion of construction enterprises. *Engineering, Construction and Architectural Management*, *20*(2), 160-180.

Li, S. and Ling, F.Y.Y. (2012). Critical strategies for Chinese architectural, engineering and construction firms to achieve profitability. *Engineering, Construction and Architectural Management*, *19*(5), 495-511.

Lim, B.T.H., Ling, F.Y.Y., Ibbs, C.W., Raphael, B. and Ofori, G. (2011). Empirical analysis of the determinants of organizational flexibility in the construction business. *Journal of Construction Engineering and Management*, *137*(3), 225-237.

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

Liming, Z. and Li, J. (2013). In an exploratory research on corporate expenditure on networking with government officials China. *South East Asia Journal of Contemporary Business, Economics and Low*, *2*(1), 71-85.

Linstone, H.A. (2002). *Eight basic pitfalls: a checklist*. M. Turoff and H.A. Linstone, (Eds.). Reading: Addison-Wesley.

Linstone, H.A. and Turoff, M. (1975). *The Delphi method: techniques and applications*. London: Addison-Wesley.

Liu, B., Wang, X., Chen, Y. and Shen, Y. 2013. Market structure of China's construction industry based on the Panzar–Rosse model. *Construction Management and Economics*. 31(7): 731-745.

Liu, C-H., Tzeng, G-H. and Lee, M-H. (2012). Improving tourism policy implementation – the use of hybrid MCDM models. *Tourism Management*, *33*, 413-426.

Long, T. and Johnson, M. (2000). Rigour, reliability and validity research. *Clinical Effectiveness in Nursing*, *4*(1), 30-37.

Lopes, J., Nunes, A. and Baksa, C. (2011). The long-run relationship between the construction sector and the national economy in Cape Verde. *International Journal of Strategic Property Management*, *15*(1), 48-59.

Lopes, J. (1998). The construction industry and macroeconomy in Sub-Saharan Africa post 1970. *Construction Management and Economics*, *16*(6), 637-649.

Love, P.E.D., Holt, G.D. and Li, H. (2002). Triangulation in construction management research. *Engineering, Construction and Architectural Management*, *9*(4), 294-303.

Low, M.B. and MacMillan, I.C. (1988). Entrepreneurship: past research and future challenges. *Journal of Management*, *14*, 139-161.

Lu, W. (2010). Improved SWOT approach for conducting strategic planning in the construction industry. *Journal of Construction Engineering and Management*, *136*(12), 1317-1328.

Lucko, G. and Rojas, E.M. (2009). Research validity: challenges and opportunities in the construction domain. *Journal of Construction Engineering and Management*, *136*(1), 127-135.

Lumpkin, G.T. and Dess, G.G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review*, *21*(1), 135-172.

Lumpkin, G.T. and Dess, G.G. (2001). Linking two dimensions of entrepreneurial orientation to firm performance: the moderating role of environment and industry life cycle. *Journal of Business Venturing*, *16*, 429-451.

Lussier, R.N. and Pfeifer, S. (2001). A crossnational prediction model for business success. *Journal of Small Business Management*, *39*(3), 228-239.

Ma, H. and Tan, J. (2006). Key components and implications of entrepreneurship: a 4-P framework. *Journal of Business Venturing*, *21*(5): 704-725.

Madsen, E.L. (2007). The significance of sustained entrepreneurial orientation on performance of firms – a longitudinal analysis. *Entrepreneurship and Regional Development: An International Journal*, *19*(2), 185-204.

Maes, J., Sels, L. and Roodhooft, F. (2005). Modelling the link between management practices and financial performance: evidence from small construction companies. *Small Business Economics*, *25*, 17-34.

Mahoney, T.A. (1967). Managerial perceptions of organizational effectiveness. *Management Science*, *14*(2), B76-B91.

Makwana, A.H. and Pitroda, J. (2013). An approach for ready mixed concrete selection for construction companies through technique for order preference by similarity to ideal solution (TOPSIS) technique. *International Journal of Innovative Technology and Exploring Engineering*, *3*(5), 92-96.

Man, T.W.Y., Lau, T. and Chan, K.F. (2002). The competitiveness of small and medium enterprises: A conceptualization with focus on entrepreneurial competencies. *Journal of Business Venturing*, *17*(2), 123-142.

Manas, J. (2006). *Napoleon on project management: timeless lessons in planning, execution, and leadership*. Tennesse: Thomas Nelson.

Manoliadis, O., Tsolas, I. and Nakou, A. (2006). Sustainable construction and drivers of change in Greece: A Delphi study. *Construction Management and Economics*, *24*, 113-120.

Mao, H., Zhu, B. and Wang, T. (2013). The effect of organizational environment on engineering project cost management: a field study on CREC 2nd Bureau Co. Ltd. *Nankai Business Review International*, *4*(1), 25-48.

Markman, G.D. (2007). *Entrepreneur's competencies*. Baum, J. R., Frese, M. and Baron, R., A., Mahwah (Eds.). London: Lawrence Erlbaum Association.

Martino, J.P. (1978). *Technology forecasting for decision making*. New York: Elsevier.

Matijevic, I. (2014). Construction industry and mediation. *International Finance Corporation, World Bank Group* (online). Retrieved from http://www.ifc.org/pepse on 14 October 2015.

Mavi, R.K., Kazemi, S., Najafabadi, A.F. and Mousaabadi, H.B. (2013). Identification and assessment of logistical factors to evaluate a green supplier using the fuzzy logic DEMATEL method. *Polish Journal of Environmental Studies*, *22*(2), 445-455.

Mbachu, J. (2011). Sources of contractor's payment risks and cash flow problems in the New Zealand construction industry: project team's perceptions of the risks and mitigation measures. *Construction Management and Economics*, *29*(10), 1027-1041.

Mbugua, L.M., Harris, P., Holt, G.D. and Olomolaiye, P.O. (1999). A framework for determining critical success factors influencing construction business performance. *Proceedings of the 15th Annual ARCOM Conference*, pp. 255-264.

McCabe, D. (2010). Taking the long view: A cultural analysis of memory as resisting and facilitating organizational change. *Journal of Organizational Change Management*, *23*(3), 230-250.

McClelland, D. (1973). Testing for competence rather than for "intelligence". *American Psychologist*, *28*, 1-14.

Merriam-Webster (2005). *The Merriam-Webster Thesaurus*. Springfield: Merriam-Webster.

Merrified, D.B. (1993). Intrapreneurial corporate renewal. *Journal of Business Venturing*, *8*(5), 383-389.

Meskell, P., Murphy, K., Shaw, D.G. and Casey, D. (2014). Insights into the used and complexities of the policy Delphi technique. *Nurse Researcher*, *21*(3), 32-39.

Miller, D. (1983). The correlaters of entrepreneurship in three types of firms. *Management Science*, *29*(7), 770-791.

Miller, L.E. (2006). Determining what could/should be: the Delphi technique and its application. *Working Paper. The 2006 Annual Meeting of the Mid-Western Educational Research Association*. Columbus, Ohio, U.S.A.

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

Mitchell, V.W. (1991). The Delphi technique: an exposition and application. *Technology Analysis and Strategic Management*, *3*(4), 333-358.

Mitchelmore, S. and Rowley, J. (2010). Entrepreneurial competencies: a literature review and development agenda. *International Journal of Entrepreneurial Behaviour and Research*, *16*(2), 92-111.

Mitchelmore, S. and Rowley, J. (2013). Entrepreneurial competencies of women entrepreneurs pursuing business growth. *Journal of Small Business and Enterprise Development*, *20*(1), 125-142.

Mokaya, S.O. (2012). Corporate entrepreneurship and organizational performance: Theoretical perspectives, approaches and outcomes. *International Journal of Arts and Commerce*, *1*(4), 133-143.

Mokua, L.O. and Ngugi, P.K. (2013). Determinants of effective corporate entrepreneurship in the banking industry in Kenya: a case of Equity Bank Limited. *International Journal of Arts and Entrepreneurship*, *1*(5), 1-16.

Morris, M.H. and Kuratko, D.F. (2002). *Corporate entrepreneurship: entrepreneurial development within organizations*. Orlando: Harcourt.

Morris, M.H. and Sexton, D.L. (1996). The concept of entrepreneurial intensity: Implications for company performance. *Journal of Business Research*, *36*, 5-13.

Morris, M.H., Lewis, P.S. and Sexton, P.L. (1994). Reconceptualizing entrepreneurship: an input-output perspective. *SAM Advanced Management Journal*, *59*(1), 21-31.

Mrabet, A., Jebali, L. and Ellouze, A. (2013). Entrepreneurship capital and economic performance in MENA Region: dynamic panel approach. *Journal of Emerging Trends in Economics and Management Sciences*, *4*(1), 71-79.

Mullen, P.M. (2003). Delphi myths and reality. *Journal of Health Organization and Management*, *17*(1), 37-52.

Murphy, K., Schleifer, A. and Vishny, R. (1991). The allocation of talent: Implications for growth. *Quarterly Journal of Economics*, *106*(2), 503-530.

Murphy, M., Black, N. and Lamping, D. (1998). Consensus development methods and their used in clinical guideline development. *Health Technology Assessment*, *2*(3), i-iv.

Myers, D. (2013). *Construction economics: a new approach*. 3rd ed. London: Routledge.

Naoum, S. (2001). *People and organizational management in construction*. London: Telford.

Naranjo, G., Pellicer, E. and Yepes, V. (2011). Marketing in the construction industry: state of knowledge and current trends. *Dyna*, *78*(170), 245-253.

Nasieku, T., Tagun, O.R. and Olubunmi, E.M. (2014). Corporate social responsibility and organizational performance. *International Journal of Humanities Social Sciences and Education*, *1*(12), 106-114.

Naudé, W. (2013). *Entrepreneurship and economic development: theory, evidence and policy*. Bonn: The Institute for the Study of Labor (IZA).

Needham, R.D. and de Loë, R. (1990). The policy Delphi: purpose, structure, and application. *The Canadian Geographer*, *34*(2), 133-142.

Nenni, M.E., Arnone, V., Boccardelli, P. and Napolitano, I. (2014). How to increase the value of project management maturity model as a business-oriented framework. *International Journal of Engineering Business Management*, *6*(8), 1-7.

Nguyen, L.D., Ogunlana, S.O., and Lan, D.T.X. (2004). A study on project success factors in large construction projects in Vietnam. *Engineering, Construction and Architectural Management*, *11*(6), 404-413.

Nikolina, F. (2008). *The sources of entrepreneurial opportunities: perspectives on individuals and institutions*. Aalborg: Institut for Samfundsudvikling og Planlægning, Aalborg Universitet.

Nilashi, M., Zakaria, R., Ibrahim, O., Majid, M.Z.A., Zin, R.M. and Farahmand, M. (2014). MCPCM: a DEMATEL-ANP-based multi-criteria decision-making approach to evaluate the critical success factors in construction projects. *Arabian Journal for Science and Engineering*. 40(343) (online). Retrieved from http://dx.doi.org/10.1007/s13369-014-1529-1 on 5 May 2015.

Nworie, J. (2011). Using the Delphi technique in educational technology research. *TechTrends: Linking Research and Practice to Improve Learning*, *55*(5), 24-30.

Ofori, G. (1990). *The construction industry: aspects of its management and economics*. Singapore: Singapore University Press.

Ofori, G. (2012). Developing the construction industry in Ghana: the case for a central agency (online). Retrieved from http://www.buildingcontractorsgh.com/Developing%20the%20Construction%20Industry%20in%20Ghana.pdf on 30 July 2015.

Ogbonna, E. and Harris, L.C. (2000). Leadership style, organizational culture and performance: Empirical evidence from UK companies. *International Journal of Human Resource Management*, *11*(4), 766-788.

Okali, C. and Pawlowski, S.D. (2004). The Delphi method as a research tool: An example, design considerations and applications. *Information and Management*, *42*(1), 15-29.

Olanipekun, A.O., Aje, I.O. and Abida-Falemu, J.O. (2013). Effects of organisational culture on the performance of quantity surveying firms in Nigeria. *International Journal of Humanities and Social Science*, *3*(5), 206-215.

Olanrewaju, A.L. and Abdul-Aziz, A-R. (2015). *Building maintenance and processes: the case of a fast developing country*. Singapore: Springer-Verlag.

Olawale, Y. and Sun, M. (2015). Construction project control in the UK: current practice, existing problems and recommendations for future improvement. International Journal of Project Management, *33*(3), 623-637.

Omidvar, G., Samad, Z.A. and Alias, A. (2012). Project management competency elements: Valued by project managers in construction industry. *International Journal of Research in Management and Technology*, *2*(6), 593-602.

Oney-Yazic, E., Arditi, D. and Uwakweh, B.O. (2006). Organizational culture in US construction companies. *Proceedings of the Joint International Conference on Construction, Culture, Innovation and Management (CCIM)*, pp. 219-228.

Ooshaksaraie, M., Asghari, M. H., Farajpur, Z. and Teleghi, M. (2011). Relation between organizational structure and organizational entrepreneurship (Case study: manufacturing companies in the west of Mazandaran province). *Kuwait Chapter of Arabian Journal of Business and Management Review*, *1*(4), 150-159.

Osei, V. (2013). The construction industry and its linkages to the Ghanaian economy-policies to improve the sector's performance. *International Journal of Development and Economic Sustainability*, *1*(1), 56-72.

Osman-Gani, A.M., Hashim, J. and Ismail, Y. (2013). Establishing linkages between religiosity and spirituality on employee performance. *Employee Relations*, *35*(4), 360-367.

Othman, N.L. and Jaafar, M. (2013). Personal competency of selected women construction project managers in Malaysia. *Journal of Engineering, Design and Technology*, *11*(3), 276-287.

Othuman Mydin, M.A., Md. Sani, N., Agus Salim, N.A. and Mohamed Alias, N. (2014). Assessment of influential causes of construction projects delay in Malaysian private housing from developer's viewpoint. *E3S Web of Conferences*. 3(01027): 1-8. Retrieved from http://dx.doi.org/10.1051/e3sconf/20140301027 on 18 May 2015.

Oxford English Dictionary. (2006). *Little Oxford English dictionary*. 9th ed. New York: Oxford University Press.

Padachi, K. (2010). Trends in working capital management and its impact on firm's performance: An analysis of Mauritian small manufacturing firms. *International Review of Business Research Papers*, *2*(2), 45-58.

Pallant, J. (2010). *SPSS survival manual: a step by step guide to data analysis using the SPSS program*. 4th ed. Chicago: Open University Press.

Paliwoda, S.J. (1983). Predicting the future using Delphi. *Management Decision*, *21*(1), 31-38.

Pankaj, A.J.J. and Bhangale, P.P. (2013). To study critical factors necessary for a successful construction projects. *International Journal of Innovative Technology and Exploring Engineering*, *2*(5), 331-335.

Papargyropoulou, E., Padfield, R., Harrison, O. and Preece, C. (2012). The rise of sustainability services for the built environment in Malaysia. *Sustainable Cities and Society*, *5*, 44-51.

Parera, B.A.K.S., Rameezdeen, R., Chileshe, N. and Hosseini, M.R. (2014). Enhancing the effectiveness of risk management practices in Sri Lankan road construction projects: a Delphi approach. *International Journal of Construction Management*, *14*(1), 1-14.

Philips, B.B. and Kirchhoff, B.A. (1989). Formation, growth and survival: small firm dynamics in the US economy. *Small Business Economics*, *1*, 65-74.

Pies, I., Beckmann, M. and Hielscher, S. (2010). Value creation, management competencies, and global corporate citizenship: an ordonomic approach to business ethics in the age of globalization. *Journal of Business Ethics*, *94*, 265-278.

Pinkse, J. and Domisse, M. (2008). Overcoming barriers to sustainability: An explanation of residential builders' reluctance to adopt clean technologies. *Business Strategy and the Environment*, *18*(8), 515-527.

Pitt, M., Tucker, M., Riley, M. and Longden, J. (2009). Towards sustainable construction: Promotion and best practices. *Construction Innovation*, *9*(2), 201-224.

Polat, G. and Donmez, U. (2010). ANP-based marketing activity selection model for construction companies. *Construction Innovation*, *10*(1), 89-111.

Polit, D.F. and Hungler, B.P. (2013). *Essentials of nursing research: methods, appraisal and utilisation*. New York: Lippincott Williams and Wilkins.

Poloie, K., Fazli, S., Alvandi, M. and Hasanlo, S. (2012). A framework for measuring the supply chain's agility of mass construction industry in Iran. *Management Science Letter*, *2*, 2317-2334.

Porter, M.E. (1998). *Competitive strategy: techniques for analyzing industries and competitors*. New York: Free Press.

Powell, C. (2003). The Delphi technique: myths and realities. *Journal of Advanced Nursing*, *41*(4), 376-382.

Prahalad, C.K., and Hamel, G. (1990). The core competence of the corporation. *Harvard Business Review*, *68*(3), 79-91.

PricewaterhouseCoopers (2015). Engineering & construction industry sector (online). Retrieved from http://www.pwc.com/extweb/industry.nsf/docid/707e1d1bdd3b2e0785256df800185c8c on 18 May 2015.

Prescott, P.A. and Soeken, K.L. (1989). The potential uses of pilot work. *Nursing Research*, *38*(1), 60-62.

Presley, A. and Meade, L. (2010). Benchmarking for sustainability: an application to the sustainable construction industry. *Benchmarking: An International Journal*. *17*(3), 435-451.

Pšeničny, V., Jakopin, E., Vukčević, Z. and Čorić, G. (2014). Dynamic entrepreneurship – generator of sustainable economic growth and competitiveness. *Management: Journal of Contemporary Management Issues*, *19*(1), 61-92.

Putniņš, T.J. and Sauka, A. (2013). Why does entrepreneurial orientation affect company performance? Discussion Paper, 4: 1-36 (online). Retrieved from http://venta.lv/wp-content/uploads/DISCUSSION-PAPER-No4.pdf on 6 April 2015.

Qifa, J. (2013). Analysis on the relationship between GDP and construction based on the data of UK and China. *Proceedings of the International Conference on Education Technology and Management Science (ICETMS 2013)*, pp. 1296-1299.

Quinn, B. and Sulivan, S.J. (2000). The identification by physiotherapists of the physical problems resulting from a mild traumatic brain injury. *Brain Injury*, *14*(12), 1063-1076.

Rahman, I.A., Memon, A.H., Karim, A. and Tarmizi, A. (2013). Significant factors causing cost overruns in large construction projects in Malaysia. *Journal of Applied Science*, *13*(2), 286-293.

Rajendran, S. and Gambatese, A.J. (2009). Development and initial validation of sustainable construction safety and health rating system. *Journal of Construction Engineering and Management*, *135*(10), 1067-1075.

Ramachandran, T., Rotimi, J.O.B. and Rameezdeen, R. (2013). Direction of the causal relationship between construction and the national economy of Sri Lanka. *Journal of Construction in Developing Countries*, *18*(2), 49-63.

Ramezaniyan, M.R., Kazemi, M., Jafari, H. and Elahi, S.M. (2012). Application of integrated fuzzy VIKOR & AHP methodology to contractor ranking. *Management Science Letters*, *2*, 1511-1526.

Raiz, A. (2014). Building a construction company takes more skill than constructing a building (online). Retrieved from http://www.unleasingideas.org/global-entrepreneurshiplibrary/sites/grl/files/building_a_construction_company_takes_more_skill_than_constructing_a_building.pdf on 24 August 2014.

Rashvand, P., Majid, M.Z.A. and Pinto, J.K. (2015). Contractor management performance evaluation model at prequalification stage. *Expert Systems with Applications*, *42*, 5087-5101.

Rasmussen, E., Mosey, S. and Wright, M. (2011). The evolution of entrepreneurial competencies: A longitudinal study of university spin-off venture emergence. *Journal of Management Studies*, *48*(6), 1314-1345.

Rauch, A., Wiklund, J., Lumpkin, G.T. and Frese, M. (2009). Entrepreneurial orientation and business performance: An assessment of past research and suggestions for future. *Entrepreneurship Theory and Practice*, *33*, 761-787.

Reynolds, P.D., Hay, M. and Camp, S.M. (1999). *GEM Global 1999 Executive Report*. Kansas City: Kaufman Center.

Risjord, M.W., Dunbar, S.B. and Moloney, M.F. (2001). A new foundation for methodological triangulation. *Journal of Nursing Scholarship*, *34*(3), 269-275.

Robbins, S.P. and Mathew, M. (2009). *Organization theory: structure, design and applications*. New Delhi: Prentice-Hall.

Rogoff, E.G., Lee M.S. and Suh, D.G. (2004). Who done it? Attributions by entrepreneurs and experts of the factors that cause and impede small business success. *Journal of Small Business Management*, *42*(3), 364-376.

Rostow, W.W. (1963). The leading sectors and the take-off: pr*oceedings of conference held by the International Economic Association*. London: Macmillan.

Rowe, G. and Wright, G. (1999). The Delphi technique as a forecasting tool: issues and analysis. *International Journal of Forecasting*, *15(*4), 353-375.

Sabet, P.G.P., Ansari, R., Fard, A.B. Aadal, H. and Raad, K.G. (2014). Necessary competencies of construction managers in Iran as a developing country. *Research Journal of Applied Sciences, Engineering and Technology*, *7*(10), 2161-2171.

Sackman, H. (1975). *Delphi critique*. Lexington: Lexington Books.

Sahoo, P. and Dash, R.K. (2009). Infrastructure development and economic growth in India. *Journal of the Asia Pacific Economy*, *14*(4), 351-365.

Salkind, N.J. (2009). *Exploring research*. 7th ed. New Jersey: Pearson Education.

Samani, B.A. and Shahbodaghlou, F. (2012). A fuzzy systematic approach to construction risk analysis. *Journal of Risk Analysis and Crisis Response*, *2*(4), 275-284.

Sambasivan, M. and Soon, Y.W. (2007). Causes and effects of delays in Malaysian construction industry. *International Journal of Project Management*, *25*, 517-526.

Sánchez, J. (2012). The influence of entrepreneurial competencies on small firm performance. *Revista Latinoamericana de Pcicología*. 44(2): 165-177 (online). Retrieved from http://www.scielo.org.co/pdf/rlps/v44n2/v44n2a14.pdf on 24 December 2014.

Saunders, M., Lewis, P. and Thornhill, A. (2014). *Research methods for business students*. 5th ed. New Delhi: Dorling Kindersley.

Sawalha, I.H.S. (2013). Organisational performance and business continuity management: A theoretical perspective and a case study. *Journal of Business Continuity and Emergency Planning*, *6*(4), 360-373.

Schein, E.H. (1984). Coming to an awareness of organisational culture. *Sloan Management Review*, *25*(1), 3-16.

Schein, E. (1985). *Organizational culture and leadership*. San Francisco: Jossey-Bass.

Schleifer, T.C. (1990). *Construction contractors' survival guide*. New York: John Willey and Sons.

Schmidt, R.C. (1997). Managing Delphi surveys using nonparametric statistical techniques. *Decision Sciences*, *28*(3), 763-774.

Schumpeter, J.A. (1934). *The theory of economic development*. Cambridge: Harvard University Press.

Schumpeter, A.J. (1996). *Capitalism, socialism and democracy*. London: Routledge.

Setiawan, H., Erdogan, B. and Ogunlana, O. (2012). Corporate entrepreneurship for contracting companies: the current issues. *Proceedings of the 28th Annual ARCOM Conference*, pp. 817-827.

Seymour, D., Crook, D. and Rooke, J. (1997). The role of theory in construction management: a call for debate. *Construction Management and Economics*, *15*, 117-119.

Shahu, R., Pundir, A.K. and Ganapathy, L. (2012). Measuring flexibility degree of building construction projects. *International Journal of Social Science and Interdisciplinary Research*, *1*(8), 191-197.

Shane, S. (2012). Small business failure rates by industry: the real numbers (online). Retrieved from http://smallbiztrends.com/2012/09/failure-rates-by-sector-the-real-numbers.html on 5 June 2016.

Shane, S. and Venkataraman, S. (2004). 'Guest editors' introduction to the special issue on technology entrepreneurship. *Research Policy*, *32*, 181-184.

Shamsuddin, S., Othman, J., Shahadan, M.A. and Zakaria, Z. (2012). The dimensions of corporate entrepreneurship and the performance of established organization. *ACRN Journal of Entrepreneurship Perspectives*, *1*(2), 111-131.

Shehu, A. M. and Mahmood, R. (2014). Influence of entrepreneurial orientation and business environment on small and medium firm performance: a PLS approach. *Advances in Management and Applied Economics*, *4*(4), 101-114.

Shen, L., Tam, V.W.Y., Tam, L. and Ji, Y. (2010). Project feasibility study: the key to successful implementation of sustainable and socially responsible construction management practice. *Journal of Cleaner Production*, *18*(3), 254-259.

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

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

Shieh, J-I., Wu, H-H. and Huang, K-K. (2010). A DEMATEL method in identifying key success factors for hospital service quality. *Knowledge-Based Systems*, *23*, 277-282.

Shigang, Y. (2011). Core competence and performance of construction SMEs in China. *Advances in Intelligent and Soft Computing*, *111*, 309-314.

Shippmann, J.S., Ash, R.A., Battista, M., Carr, L., Eyde, L.D., Hesketh, B., Kehoe, J., Pearlman, K. and Prien, E.P. (2000). The practice of competency modeling. *Personnel Psychology*, *53*, 703-740.

Shirazi, B., Langford, D.A. and Rowlinson, S.M. (1996). Organizational structures in the construction industry. *Construction Management and Economics*, *14*(3), 199-212.

Siew, R.Y.J. (2014). Human resource management in the construction industry – Sustainability competencies. *Australasian Journal of Construction Economics and Building*, *14*(2), 87-103.

Simon, M.K. (2011). *Dissertation and scholarly research: recipes for success*. Seattle: Dissertation Success, LLC.

Simonton, D.K. (2014). *Creative expertise: a lifespan developmental perspective*. K.A. Ericsson (Ed.). East Sussex: Psychology Press.

Skulmoski, J.G., Hartman, T.F. and Krahn, J. (2007). The Delphi method for graduate research. *Journal of Information Technology Education*, *6*, 1-21.

Smart, D.T. and Conant, J.S. (1994). Entrepreneurial orientation, distinctive marketing competencies and organizational performance. *Journal of Applied Business Research*, *10*(3), 28-38.

Smith, D. (2010). The role of entrepreneurship in economic growth. *Undergraduate Economic Review*, *6*(1), 1-17.

Smith, J.P., Miller, K., Christofferson, J. and Hutchings, M. (2011). Best practices for dealing with price volatility in Utah's residential construction market. *International Journal of Construction Education and Research*, *7*(3), 210-225.

Solesvik, M.Z. (2012). Entrepreneurial competencies in emerging economy context. *Proceedings of the 17th Nordic Conference on Small Business Research*, pp. 1-17.

Spencer, L.M. and Spencer, S.G. (1993). *Competent at work: models for superior performance*. New York: John Wiley and Sons.

Stefanovic, I., Prokic, S., and Rankovic, L. (2010). Motivational and success factors of entrepreneurs: The evidence from a developing country. *Journal of Economics and Business*, *28*(2), 251-269.

Stevens, M. (2007). *Managing a construction firm on just 24 hours a day*. New York: McGraw-Hill.

Stevenson, H.H. and Gumbert, D. (1985).The heart of entrepreneurship. *Harvard Business Review*, *85*(2), 85-95.

Stevenson, H.H. and Jarillo, J.C. (1990). A paradigm of entrepreneurship: entrepreneurial management. *Strategic Management Journal*, *11*, 17-27. 1990.

Stopford J.M. and Baden-Fuller C.W.F. (1994). Creating corporate entrepreneurship. *Strategic Management Journal*, *15*, 521-536.

Strassmann, W.P. (1970). The construction sector in economic development. *Scottish Journal of Political Economy*, *17*(3), 391-409.

Strischek, D., and McIntyre, M. (2008). Red flags & warning signs of contractor failure. *The RMA Journal*. March: 73-77. Retrieved from https://suretyinfo.org/pdf/RedFlagsMarch2008.pdf on 7 August 2015.

Subramani, T., Sruthi, P.S. and Kavitha, M. (2014). Causes of cost overrun in construction. *IOSR Journal of Engineering*, *4*(6), 1-7.

Swierczek, F.W. and Ha, T.T. (2007). Entrepreneurial orientation uncertainty avoidance and firm performance: an analysis of Thai and Vietnamese SMEs. *International Journal of Entrepreneurship and Innovation*, *4*(1), 46-58.

Swiercz, P. and Spencer, B.A. (1992). HRM and sustainable competitive advantage: Lessons from Delta Air Lines. *Human Resource Planning*, *15*(2), 35-46.

Tabish, S.Z.S. and Jha, K.N. (2011). Identification and evaluation of success factors for public construction projects. *Construction Management and Economics*, *29*, 809-823.

Taheri, E. and Iranban, S.J. (2015). The evaluation and selection of contractors by combined ANP method and DEMATEL (Case study: gas refinery company of Parsian). *Management Research Report*, 3(3), 478-485.

Takim, R., Akintoye, A., and Kelly, J. (2004). Analysis of measures of construction project success in Malaysia. *Proceedings of the 20th Annual ARCOM Conference*, pp. 1123-1133.

Tan, D.J-Z. and Ghazali, F.E.M. (2011). Critical success factors for Malaysian contractors in international construction projects using analytical hierarchy process. *Proceedings of the 2011 International Conference on Engineering, Project, and Production Management (EPPM 2011)*, pp. 127-137.

Taormina, R.J. and Lao, S.K-M. (2006). Measuring Chinese entrepreneurial motivation – personality and environmental influences. *International Journal of Entrepreneurial Behaviour and Research*, *13*(4), 200-221.

Tapio, P., Paloniemi, R., Varho, V. and Vinnani, M. (2011). The unhold marriage? Integrating qualitative and quantitative information in Delphi processes. *Technological Forecasting and Social Change*, *78*, 1616-1628.

Tashakkori, A. and Teddlie, C. (2003). *Handbook of mixed methods in social and behavioural research*. London: SAGE Publication.

Teng, J.Y. (2002). *Project evaluation: methods and applications*. Keelung: National Taiwan Ocean University, Logistics Planning and Management Research Center.

Tennent, J. (2014). *The economist: guide to financial management*. 2nd ed. New York: Economist Books.

Thérin, F. (2007). *Handbook of research of technopreneurship*. Cheltenham: Edward Elgar Publishing.

Thompson, I., Cox, A., and Anderson, L. (1998). Contracting strategies for the project environment. *European Journal of Purchasing and Supply Management*, *4*, 31-41.

Thurmond, V. (2001). The point of triangulation. *Journal of Nursing Scholarship*, *33*(3), 245-256

Tian, X. (2013). Influencing factors for project interface management. *Proceedings of the 2013 International Conference on Construction and Real Estate Management (ICCREM 2013)*, pp. 448-456.

Tijhuis, W. and Fellows, R. (2011). *Culture in international construction*. London: Spon Press.

Timmons, J.A. (1999). *New venture creation: entrepreneurship for the 21st century*. Singapore: Irwin/McGraw-Hill.

Torfi, F. and Rashidi, A. (2011). Selection of project managers in construction firms using analytic hierarchy process (AHP) and fuzzy TOPSIS: a case study. *Journal of Construction in Developing Countries*, *16*(1), 69-89.

Tran, D., Lester, H. and Sobin, N. (2014). Toward statistics on construction engineering and management research. *Proceedings of the Construction Research Congress 2014: Construction in a Global Network, ASCE*, pp. 1139-1148.

Trice, H.M. and Beyer, J.M. (1993). *The cultures of work organizations*. New Jersey: Prentice Hall.

Tsai, W-H., Lin, S-J., Lee, Y-F., Chang, Y-C. and Hsu, J-L. (2013). Construction method selection for green building projects to improve environmental sustainability by using an MCDM approach. *Journal of Environmental Planning and Management*, *56*(10), 1487-1510.

Tsai, S-B., Chien, M-F., Xue, Y., Li, L. Jiang, X., Chen, Q., Zhou, J. and Wang, L. (2015). Using the fuzzy DEMATEL to determine environmental performance: a case of printed circuit board industry in Taiwan. *PLoS ONE*. 10(6): e0129153 (online). Retrieved from http://dx.doi.org/10.1371/journal.pone.0129153 on 15 September 2014.

Tsai, W.H. and Chou, W.C. (2009). Selecting management systems for sustainable development in SMEs: a novel hybrid model based on DEMATEL, ANP, and ZOGP. *Expert Systems with Applications*, *36*, 1444-1458.

Tsai, W-H., Lin, S-J., Lee, Y-F., Chang, Y-C. and Hsu, J-L. (2013). Construction method selection for green building projects to improve environmental sustainability by using an MCDM approach. *Journal of Environmental Planning and Management*, *56*(10), 1487-1510.

Turk, Ž. (2000). Construction IT: definition, framework and research issues. *Faculty of Civil and Geodetic Engineering on the doorstep of the millennium: on the occasion of its 80th anniversary.* 17-32 (online). Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.85.4215&rep=rep1&type=pdf on 15 January 2014.

Turin, D.A. (1969). *Construction and development*. London: Built Environment Research Unit, University College London.

Turró, A., Urbano, D. and Peris-Ortiz, M. (2014). Culture and innovation: The moderating effect of cultural values on corporate entrepreneurship. *Technological Forecasting and Social Change*, *88*, 360-369.

Tzeng, G.H. and Huang, J.J. (2011). *Multiple attribute decision making: methods and applications*. Boca Raton: CRC Press.

Tzeng, G.H., Chiang, C.H. and Li, C.W. (2007). Evaluating intertwined effects in e-learning programs: A novel hybrid MCDM model based on factor analysis and DEMATEL. *Expert Systems with Applications*, *32*(4), 1028-1044.

Ubani, E.C. (2012). Evaluating the effects of organizational structure on the effective delivery of civil engineering projects. *Interdisciplinary Journal of Contemporary Research in Business*, *4*(6), 1284-1296.

United Nations. (2008). *International standard industrial classification of all economic activities*. Rev. 4. New York: United Nations.

Valantinienė, I. and Krikštaponytė, I. (2008). Winning challenge in the era of glabalization: The mastery of business management and development. *Management Theory and Studies for Rural Business and Infrastructure Development*, *12*(1), 167-175.

Valdez, A.M. 2009. So much to learn, so little time: Educational priorities for the future of emergency nursing. *Advanced Emergency Nursing Journal*, *31*(4), 337-353.

Vatalis, K.I., Manoliadis, O.G. and Charalampides, G. (2011). Assessment of the economic benefits from sustainable construction in Greece. *International Journal of Sustainable Development and World Ecology*, *18*(5), 377-383.

Vatalis, K.I., Manoliadis, O.G. and Mavridis, D.G. (2012). Project performance indicators as an innovative tool for identifying sustainability perspectives in green public procurement. *Procedia Economics and Finance*, *1*, 401-410.

Vatalis, K.I., Manoliadis, O.G. and Mavridis, D.G. (2012). Using DEMATEL method to modeling project complexity dimensions. *Journal of Basic and Applied Scientific Research*, *2*(11), 1121-11217.

Vázques-Rozas, E.E., Gómes, S. and Vieira, E. (2010). Entrepreneurship and economic growth in Spanish and Portuguese regions (online). Retrieved from http://www.usc.es/economet/reviews/eers1028.pdf on 20 October 2014.

Vecchiarini, M., and Mussolino, D. (2013). Determinants of entrepreneurial orientation in family-owned healthcare organizations. *International Journal of Healthcare Management*, *6*(4), 237-251.

Venkatraman, N. (1989). Strategic orientation of business enterprises: The construct, dimensionality and measurement. *Management Science*, *35*(8), 941-962.

Verle, K., Markič, M., Kodrič, B. and Zoran, A.G. (2014). Managerial competencies and organizational structures. *Industrial Management and Data Systems*, *114*(6), 922-935.

Vick, S.G. (2002). *Degrees of belief – subjective probability and engineering judgement*. Danvers: ASCE Press.

Vijayshree, P.T. and Hema, B. (2011). The raising era of entrepreneurship – A case study on SAIPA. *Annamalai International Journal of Business Studies and Research*, *3*(1), 24-29.

Voiculet, A., Belu, N., Parpandel, E.D. and Rizea, I.C. (2010). The impact of external environment on organizational development strategy. *Munich Personal RePEc Archive*. Paper No. 26303: 1-5 (online). Retrieved from http://mpra.ub.uni-muenchen.de/26303/ on 17 August 2014.

von der Gracht, H. (2012). Consensus measurement in Delphi studies: re-opinion and implications for future quality assurance. *Technological Forecasting and Social Change*, *79*, 1525-1536.

Voordijk, H. (2009). Construction management and economics: The epistemology of a multidisciplinary design science. *Construction Management and Economics*, *27*(8), 713-720.

Wahab, K.A., and Rafiki, A. (2014). Measuring small firm entrepreneur's performance based on Al-Falah. *World Applied Sciences Journal*, *29*(12), 1532-1539.

Wai, S.H., Yusof, A.M., Ismail, S. and Ng, C.A. (2013). Exploring success factors of social infrastructure projects in Malaysia. *International Journal of Engineering Business Management*, *5*(2), 1-9.

Wang, W-C., Lin, Y-H., Lin, C-L., Chung, C-H. and Lee, M-T. (2012). DEMATEL-based model to improve the performance in a matrix organization. *Expert Systems with Applications*, *39*, 4978-4986.

Warnock, A.C. (2007). An overview of integrating instruments to achieve sustainable construction and buildings. *Management of Environmental Quality: An International Journal*, *18*(4), 427-441.

Warren, M. (2011). Econometric analysis of the impact of entrepreneurship on economic growth – case of the Kenyan economy. *Journal of Economics and Sustainable Development*, *2*(7), 71-88.

Weidman, J.E., Miller, K.R., Christofferson, J.P. and Newitt, J.S. (2011). Best practices for dealing with price volatility in commercial construction. *International Journal of Construction Education and Research*, *7*(4), 276-293.

Wening, N. and Choerudin, A. (2015). The influence of religiosity towards organizational commitment, job satisfaction and personal performance. *Polish Journal of Management Studies*, *11*(2), 187-191.

Wennekers, S. and Thurik, R. (1999). Linking entrepreneurship and economic growth. *Small Business Economics*, *13*, 27-55.

Wells, J. (1984). The construction industry in the context of development: a new perspective. *Habitat International*, *8*(3-4), 9-28.

Wells, J. (1985). The role of construction in economic growth and development. *Habitat International*, *9*(1), 55-70.

Wibowo, M.A. (2013). The contribution of the construction industry to the economy of Indonesia: a systemic approach (online). Retrieed from http://eprints.undip.ac.id/387/1/Agung_Wibowo.pdf on 18 May 2013.

Wiewiora, A., Murphy, G. and Trigunarsyah, B. (2014). Interactions between organizational culture, trustworthiness, and mechanisms for inter-project knowledge sharing. *Project Management Journal*, *45*(2), 48-65.

Wiklund, J. (1999). The sustainability of the entrepreneurial orientation-performance relationship. *Entrepreneurship Theory and Practice*, *4*(2), 37-38.

Wiklund, J. and Shepherd, D. (2003). Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses. *Strategic Management Journal*, *24*, 1307-1314.

Wiklund, J. and Shepherd, D. (2005). Entrepreneurial orientation and small business performance: a configurational approach. *Journal of Business Venturing*, *20*, 71-91.

Wilkinson, A., Johnstone, S. and Townsend, K. (2012). Changing patterns of human resource management in construction. *Construction Management and Economics, Special Issue: Human Resource Management in Construction*. *30*(7), 507-512.

Wong, S.K-S, (2014). Impacts of environmental turbulence on entrepreneurial orientation and new product success. *European Journal of Innovation Management*, *17*(2), 229-249.

Wright, T.S.A. (2006). Giving “teeth” to an environmental policy: a Delphi Study at Dalhousie University. *Journal of Cleaner Production*, *14*(9), 761-768.

Wu, B., Xu, H. and Zhang, W. (2009). Identifying the cause and effect factors of traffic safety zone at freeway work zone based on DEMATEL model. *Proceedings of the International Conference on Transportation Engineering 2009 (ICTE 2009)*, pp. 2183-2188.

Wu, W.W. (2008). Choosing knowledge management strategies by using a combined ANP and DEMATEL approach. *Expert Systems with Applications*, *35*, 828-835.

Wu, W-W. (2009). A competency-based model for the success of an entrepreneurial start-up. *WSEAS Transactions on Business and Economics*, *6*(6), 279-289.

Xia, B. and Chan, A.P.C. (2012). Measuring complexity for building projects: A Delphi study. *Engineering, Construction and Architectural Management*, *19*(1), 7-24.

Xia, B. and Chan, A.P.C. (2012). Identification of selection criteria for operational variations of the design-build system: a Delphi study in China. *Journal of Civil Engineering and Management*, *18*(2), 173-183.

Xia, B., Molenaar, K., Chan, A. Skitmore, M. and Zuo, J. (2013). Determining optimal proportion of design in design-build request for proposals. *Journal of Construction Engineering and Management*, *139*(6), 620-627.

Xu, Y., Yeung, J.F.Y., Chan, A.P.C., Chan, D.W.M., Wang, S.Q. and Ke, Y. (2010). Developing a risk assessment model for PPP projects in China – a fuzzy synthetic evaluation approach. *Automation in Construction*, *19*, 929-943.

Yang, Y-P.O, Shieh, H-M., Leu, J-D. and Tzeng, G-H. (2008). A novel hybrid MCDM model combined with DEMATEL and ANP with applications. *International Journal of Operations Research*, *5*(3), 160-168.

Yates, J. K. (2007). *Global engineering and construction*. New York: John Wiley and Sons.

Yeazdanshenas, M. (2014). Designing a conceptual framework for organizational entrepreneurship in the public sector in Iran. *Iranian Journal of Management Studies*, *7*(2), 365-390.

Yin, R.K. (2009). *Case study research: design and methods*. 4th ed. Los Angeles: SAGE Inc.

Yitmen, I. (2013). Organizational cultural intelligence: A competitive capability for strategic alliances in the international construction industry. *Project Management Journal*, *44*(4), 5-25.

Yong, Y.C. and Mustaffa, N.E. (2013). Critical success factors of Malaysian construction projects: An empirical assessment. *Construction Management and Economics*, *31*(9), 959-978.

Yusof, N.A., Kamal, E.M., Kong-Seng, L. and Iranmanesh, M. (2014). Are innovations being created or adopted in the construction industry? Exploring innovation in the construction industry. *SAGE Open*. 4: 1-9 (online).Retrieved from http://dx.doi.org/10.1177/2158244014552424 on 14 November 2015.

Zahedi-Seresht, M., Akbarijokar, M., Khosravi, S. and Afshari, H. (2014). Construction project success ranking through the data envelopment analysis. *Journal of Data Envelopment Analysis and Decision Science*, *2014*, 1-13.

Zahra, S.A. (1993). Environment, corporate entrepreneurship, and financial performance: A taxonomic approach. *Journal of Business Venturing*, *8*(4), 319-340.

Zain, M. and Hassan, A.E. (2007). The impact of corporate entrepreneurship on company growth in a hostile business environment. *Proceedings of the 7th Global Conference on Business and Economics*, pp. 1-32.

Zavadskas, E.K., Turskis, Z. and Tamosaitiene, J. (2010). Multi-criteria decision making of management effectiveness of construction enterprises based on SWOT and MCDM. *Proceedings of the 6th International Scientific Conference "Business and Management 2010"*, pp. 1127-1132.

Zavadskas, E.K. and Vilutiené, T. (2013). Operations research in areas of civil engineering and sustainable development: EURO working group activities. *Organization, Technology and Management in Construction: An International Journal*, *5*(1), 650-653.

Zavadskas, E.K., Vilutienė, T., and Šaparauskas, J. (2014). Multi-criteria analysis of projects' performance in construction. *Archives of Civil and Mechanical Engineering*, *14*, 114-121.

Zeynalian, M., Trigunarsyah, B. and Ronagh, H.R. (2013). Modification of advanced programmatic risk analysis and management model for the whole project life cycle's risks. *Journal of Construction Engineering and Management*, *139*(1), 51-59.

Zhang, S.B. and Liu, A.M. (2006). Organisational culture profiles of construction enterprises in China. *Construction Management and Economics*, *24*(8), 817-828.

Zhao, Z-Y., Zhao, X., Davidson, K. and Zuo, J. (2012). A corporate social responsibility indicator system for construction enterprises. *Journal of Cleaner Production*, *29-30*, 277-289.

Zhao, X., Hwang, B-G., and Low, S. (2013). Developing fuzzy enterprise risk management maturity model for construction firms. *Journal of Construction Engineering and Management*, *139*, 1179-1189.

Zikmund, W.G. (2003). *Business research methods*. 7th ed. Mason: South Western Thompson.

Zou, X. and Moon, S. (2014). Hierarchical evaluation of on-site environmental performance to enhance a green construction operation. *Civil Engineering and Environmental Systems*, *31*(1), 5-23.

APPENDIX A

DISSEMINATION OF THE KNOWLEDGE OF THE CURRENT STUDY

A part of this research study has been published in several journals and presented in conferences as stipulated herein:

1.0 Peer-reviewed Journals

Abd-Hamid, Z., Azizan, N.A., and Sorooshian, S. (2015). Constructionpreneurship: Entrepreneurship Activity within Construction Industry. *Australian Journal of Basic and Applied Science*. **9**(9)(Special): 51-55.

Abd-Hamid, Z., Azizan, N.A., and Sorooshian, S. (2015). Predictors for Success and Survival of Entrepreneurs in Construction Industry. *International Journal of Engineering Business Management*. **7**(12): 1-11.

2.0 Peer-reviewed Conferences

Abd-Hamid, Z., Azizan, N.A. and Sorooshian, S. (2015). A Conceptual Framework for Construction Entrepreneurial Success. *Proceedings of the National Conference for Postgraduate Research 2015, 24th – 25th January 2015, Universiti Malaysia Pahang, Kuantan, Pahang.*

Abd-Hamid, Z., Azizan, N.A. and Sorooshian, S. (2015). Constructionpreneurship: Entrepreneurship Activity within Construction Industry. *Proceedings of the International Conference on Accounting, Business and Economics 2015, 6th – 7th March 2015, Bandung, Indonesia.*

Abd-Hamid, Z., Azizan, N.A. and Sorooshian, S. (2015). Acquisition of Expert's Opinions to Explore the Drivers of Business Success in the Construction Industry. *Proceedings of the 12th Annual World Congress 2015 of Academy for Global Business Advancement, 16th – 17th November 2015, Universiti Malaysia Pahang, Kuantan, Pahang* (Best Paper Award).

APPENDIX B

ALTERNATIVE METHODOLOGY APPROACHES IN THE CEM RESEARCH (YEAR 2010 ONWARDS)

Author(s)	Country	Scope of Study	Methodology Used	Experts Panelist	Number of Experts	Delphi's Round
1. Calhoun and Hallowell (2010)	USA	Cross-impact analysis on the effectiveness of various safety program elements.	Delphi	• Authors • Chair or members of construction S&H committee	13	4
2. Polat and Donmez (2010)	Turkey	Developing an analytic model to assist in prioritizing and selecting marketing activities of construction companies.	MCDM (ANP)	• Marketing manager of general contractor firm • Marketing manager of developer firm	2	Not applicable
3. Xu, Yeung, Chan, A.P.C., Chan, D.W.M., Wang, and Ke (2010)	China	Developing an evaluation model for assessing the risk level associated with PPP projects.	Delphi + Factor Analysis	• Public sector • Private sector • Academic sector	105	2
4. Zavadskas, Turskis, and Tamosaitiene (2010)	Lithuania	Developing a methodology for formulating management strategies in construction enterprises.	SWOT + MCDM	Not mentioned	Not mentioned	Not applicable
5. Damigos and Anyfantis (2011)	Greece	Identifying the effect of pleasant and unpleasant views on property prices.	Fuzzy Delphi	• Realtors • Economists	10	2
6. Gohar, Khanzadi, and Jalal (2011)	Iran	Identifying risk factors of construction projects.	MCDM (Fuzzy AHP)	• Project managers	15	Not applicable
7. Hallowell and Calhoun (2011)	USA	Quantifying the interrelationships of highly effective and commonly implemented construction injury prevention strategies.	Delphi	• H&S professionals • Academicians	13	3

ALTERNATIVE METHODOLOGY APPROACHES IN CEM RESEARCH (YEAR 2010 ONWARDS) – CONTINUED

Author(s)	Country	Scope of Study	Methodology Used	Experts Panelist	Number of Experts	Delphi's Round
8. Hallowell, Esmaeli, and Chinowsky (2011)	USA	Quantifying the impact of pair-wise spatial and temporal interactions on the base-level risk of common highway construction work tasks.	Delphi	• Safety managers • Project managers • Safety officers • OSHA representatives • S & H researchers • Insurance representatives	28	4
9. Hiete, Kühlen, and Schultmann (2011)	German	Analyzing the interdependencies between the criteria of sustainable building rating systems.	MCDM (DEMATEL)	• Researchers	3	Not applicable
10. Jeng (2011)	Taiwan	Investigating the intertwined effects of project team internal soft factors.	Quantitative survey + MCDM (Fuzzy DEMATEL)	• Project managers • Senior team members	50	Not applicable
11. KarimiAzari, Mousavi, A., Mousavi, S., and Hosseini (2011)	Iran	Developing risk assessment model selection in construction industry.	MCDM (Fuzzy TOPSIS) + case study	Not mentioned	Not mentioned	Not applicable
12. Smith, Miller, Christofferson, and Hutchings (2011)	USA	Identifying the best practices for dealing with the problem of price fluctuation in construction market.	Delphi	• General contractors • Subcontractors • Suppliers	19	2
13. Tan and Ghazali (2011)	Malaysia	Assessing the critical success factors for contractors to penetrate internationally.	Interviews + MCDM (AHP)	• Directors • Project managers • Executives	Not mentioned	Not applicable
14. Torfi and Rashidi (2011)	Iran	Developing the model for selection of project managers in construction firms.	MCDM (AHP + Fuzzy TOPSIS)	• Senior managers	Not mentioned	Not applicable

ALTERNATIVE METHODOLOGY APPROACHES IN CEM RESEARCH (YEAR 2010 ONWARDS) – CONTINUED

Author(s)	Country	Scope of Study	Methodology Used	Experts Panelist	Number of Experts	Delphi's Round
15. Vatalis, Manoliadis, and Charalampides (2011)	Greece	Assessing the economic benefits of sustainable construction projects.	Delphi + quantitative survey	• Academicians • Architects • Construction engineers • Contractors-developers • Economists	19	2
16. Weidman, Miller, Christofferson, and Newitt (2011)	USA	Identifying the best practices for dealing with the risks of price volatility in construction projects.	Delphi	• Contractors • Sub-contractors • Owners • Suppliers	24	2
17. Afshari and Yusuff (2012)	Iran	Identifying the criteria for project manager selection.	Delphi	Not mentioned	10	3
18. Agumba and Haupt (2012)	South Africa	Identifying leading indicator metrics of health and safety for small and medium construction enterprises.	Delphi	• Industry practitioners • Academicians	20	4
19. Gad and Shane (2012)	USA	Identifying the factors that have an effect on the choice of dispute resolution methods in international construction contracts.	Delphi + case study	• Experienced in resolving international construction disputes • Engineering background • Academicians	11	4
20. Poloie, Fazli, Alvandi, and Hasanlo (2012)	Iran	Identifying the intervening factors of agility of supply chain of mass construction associations.	Delphi + MCDM (DEMATEL)	• Academicians • Housing industry experts	9	Not mentioned
21. Ramezaniyan, Kazemi, Jafari, and Elahi (2012)	Iran	Developing a framework in selection of contractors in construction projects.	MCDM (Fuzzy VIKOR + Fuzzy AHP)	Not mentioned	Not mentioned	Not applicable

ALTERNATIVE METHODOLOGY APPROACHES IN CEM RESEARCH (YEAR 2010 ONWARDS) – CONTINUED

Author(s)	Country	Scope of Study	Methodology Used	Experts Panelist	Number of Experts	Delphi's Round
22. Samani and Shahbodaghlou (2012)	Iran	Developing a hierarchical systematic structure of risk assessment of bridge construction project.	MCDM (Fuzzy DEMATEL)	Not mentioned	Not mentioned	Not applicable
23. Vatalis, Manoliadis, and Mavridis (2012)	Iran	Exploring the relationships among the most important project complexity dimensions.	MCDM (DEMATEL)	Not mentioned	9	Not applicable
24. Vatalis, Manoliadis, and Mavridis (2012)	Greece	Developing a methodology to diagnose, evaluate and improve the green procurement process for construction projects.	Delphi	• Engineers • Industrial administration • Sail persons • Journalists	9	2
25. Wang, Lin, Lin, Chung, and Lee (2012)	Taiwan	Identifying the project divisions within the organisation that related to the poor performance of design project.	MCDM (SIA + DEMATEL)	• Engineers • Division managers	35	Not applicable
26. Xia and Chan (2012)	China	Identifying the selection criteria for operational variations of design-build system.	Delphi	• Real estate developers • Government officers • Consultants • Project managers • Contractors • Academicians	20	3
27. Bakhshi and Bioki (2013)	Iran	Identifying the criteria for selection of contractors.	MCDM (AHP + ANN)	• Clients • Project managers • Consultants • Contractors	Not mentioned	Not applicable
28. Chaphalkar and Shirke (2013)	India	Comparing the methodology for the selection of type of bridge.	MCDM (Fuzzy AHP and Fuzzy TOPSIS)	• Bridge construction experts	6	Not applicable

ALTERNATIVE METHODOLOGY APPROACHES IN CEM RESEARCH (YEAR 2010 ONWARDS) – CONTINUED

Author(s)	Country	Scope of Study	Methodology Used	Experts Panelist	Number of Experts	Delphi's Round
29. Li, Jin, Li, Liu, and Skitmore (2013)	China	Developing a model of entry mode decision-making model for construction enterprises involved in international business.	MCDM (AHP + PROMETHEE)	• Senior practitioners • Academicians	50	Not applicable
30. Hoseinalipour, Mohammadhasanzadeh, and Hafezi (2013)	Iran	Identifying main barriers in implementing collaboration procurement in construction industry.	MCDM (Fuzzy DEMATEL + Fuzzy AHP)	• Partnering experts	20	Not applicable
31. Kaminsky and Javernick-Will (2013)	USA	Identifying factors for sustainability of household of on-site wastewater treatment systems.	Delphi	• Regulators • International development practitioners • O & M providers • Manufacturers • Academicians	14	4
32. Makwana and Pitroda (2013)	India	Evaluating the ready mixed concrete selection for construction companies.	MCDM (TOPSIS)	Not mentioned	Not mentioned	Not applicable
33. Tian (2013)	China	Analyzing the impact factors of the project interface management.	MCDM (DEMATEL)	• Government officers • Engineering designers • Project supervisors • Project managers • Engineering and technical personnel	15	Not applicable
34. Tsai, Lin, Lee, Chang, and Hsu (2013)	Taiwan	Developing the methodology for selection construction method for green building projects to improve environmental sustainability.	MCDM (DEMATEL + ANP + ZOGP)	• Architects	9	Not applicable

ALTERNATIVE METHODOLOGY APPROACHES IN CEM RESEARCH (YEAR 2010 ONWARDS) – CONTINUED

Author(s)	Country	Scope of Study	Methodology Used	Experts Panelist	Number of Experts	Delphi's Round
35. Xia, Molenaar, Chan, Skitmore, and Zuo (2013)	USA	Identifying the factors influencing owners' decisions in determining the proportion of design to include in design-build request for proposals.	Delphi	• DB experts	82	2
36. Balali, Zahraie, and Roozbahani (2014)	Iran	Comparing the methodology for selection of building structural system.	MCDM (AHP + PROMETHEE)	• Contractors • Consultants • Owners	20	Not applicable
37. Che Ibrahim, Costello, and Wilkinson (2014)	New Zealand	Identifying the key indicators of alliance team integration performance index of alliance projects.	Delphi	• Project alliance board members • Alliance managers • Alliance management teams • Alliance teams	17	2
38. Gharaibeh (2014)	Canada	Identifying the problems of controlling project cost of mega projects.	Delphi	• Project personnel	27	3
39. Gholipour, Jandaghi, and Rajaei (2014)	Iran	Developing a framework for selection of contractor.	MCDM (Fuzzy AHP)	Not mentioned	Not mentioned	Not applicable
40. Giel and Issa (2014)	USA	Identifying the building information modeling of building owners.	Delphi	• Architects/engineers • Contractors • Owners • Consultants • Academicians	21	3
41. Hardison, Behm, Hallowell, and Fonooni (2014)	USA	Identifying construction supervisor competencies for effective site safety.	Delphi	• Industry practitioners • Academicians	14	2

ALTERNATIVE METHODOLOGY APPROACHES IN CEM RESEARCH (YEAR 2010 ONWARDS) – CONTINUED

Author(s)	Country	Scope of Study	Methodology Used	Experts Panelist	Number of Experts	Delphi's Round
42. Harinarian and Haupt (2014)	South Africa	Identifying the drivers needed for the effective management of HIV and AIDS and to understand their impact on the construction industry.	Delphi	• Industry practitioners • Academicians	12	3
43. Heravi and Charkhakan (2014)	Iran	Developing a framework for predicting and tracing change-formation scenarios in construction projects.	MCDM (DEMATEL) + case study	• Project manager • Technical manager • Project-control manager • Contract manager	Not mentioned	Not Applicable
44. Hu, Chan, and Le (2014)	Hong Kong	Identifying the principal program organization factors to manage megaprojects.	Delphi	• Clients • Consultants	10	2
45. Kumar, Jagadish, and Ray (2014)	India	Developing the methodology to evaluate optimum material for engineering design.	MCDM (TOPSIS)	Not applicable	Not applicable	Not applicable
46. Nilashi, Zakaria, Ibrahim, Majid, Zin, and Farahmand (2014)	Malaysia	Identifying the critical success factors of a construction project.	MCDM (GRA + DEMATEL + AHP)	• Industry practitioners	12	Not Applicable
47. Parera, Rameezdeen, Chileshe, and Hosseini (2014)	Sri Lankan	Identifying the effectiveness of risk management of road construction projects.	Delphi	• Client • Consultant • Project manager • Contractor	33	3
48. Sabet, Ansari, Fard, Aadal, and Raad (2014)	Iran	Identifying the importance of the competencies regarding the dominant challenges at working environment of construction projects.	Delphi	• Site engineers • Project managers • Construction managers • Supervisors	25	2

ALTERNATIVE METHODOLOGY APPROACHES IN CEM RESEARCH (YEAR 2010 ONWARDS) – CONTINUED

Author(s)	Country	Scope of Study	Methodology Used	Experts Panelist	Number of Experts	Delphi's Round
49. Zahedi-Seresht, Akbarijokar, Khosravi, and Afshari (2014)	Iran	Developing construction projects' success factors in a post-delivery phase.	Delphi + MCDM (DEA)	• Middle managers • Project managers	20	2
50. Zou and Moon (2014)	South Korea	Developing an evaluation framework for measuring the environmental performance of a construction operation.	Delphi + case study	• Contractors • Owners • Government officers • Academicians	15	3
51. Chan, Lam, Wen, Ameyaw, Wand, and Ke (2015)	China	Evaluating typical risks associated with the public-private partnership in water supply sector.	Delphi	• Government • Industrial sector • Academic sector	105	2
52. Jozi, Shoshtary, and Zadeh (2015)	Iran	Identifying the environmental and human health risks of dams in construction phase.	MCDM (AHP + TOPSIS)	Not applicable	Not Applicable	Not Applicable
53. Olawale and Sun (2015)	UK	Identifying the main deficiencies with the prevailing project cost and time control practices for construction projects.	Empirical Survey + Interviews + Delphi	• Main contractors • Consortiums • Contractors • Consultants	8	2
54. Rashvand, Majid, and Pinto (2015)	Malaysia	Developing the contractor evaluation model related to contractor management capabilities and practices at the prequalification stage.	MCDM (ANP)	• Director of construction companies • Professional engineers	40	Not applicable
55. Taheri and Iranban (2015)	Iran	Developing a framework for evaluation and selection of contractors.	MCDM (DEMATEL + ANP)	• Managers of gas refinery firm	12	Not applicable

APPENDIX C

INVITATION TO PARTICIPATE IN THE DELPHI-DEMATEL STUDY

Dear Sir/Madam/Dr./Prof.,

My name is Ir. ZAHIDY ABD HAMID from Faculty of Industrial Management, Universiti Malaysia Pahang. I am currently working on a Doctor of Philosophy research entitled 'Predictors for Success and Survival of Entrepreneurs in Construction Industry'. The purpose of this research is to explore the various factors of business success required for construction entrepreneurs from the perspectives of the entrepreneurship theory. The Delphi-DEMATEL research method will be employ for this project.

To do so, I would like to invite you to participate in this research asan expert panel of the Delphi study. Your expertise in construction industry is very helpful in order to complete this research effort. This will hopefully help in developing new strategies and the way forward for the construction industry.

For your reference, enclosed are the related documents:

i. Confirmation Letter from UMP
ii. Professional Profile
iii. Participant Information for Research Project

Kind Regards,

Ir. ZAHIDY ABD HAMID
Phone : +609 513 7799
Mobile : +6019 989 2741
Email : ir.zahidy@gmail.com

PARTICIPANT INFORMATION FOR THE DELPHI-DEMATEL STUDY

Indicators of Success for Entrepreneurs in the Construction Industry

Research Team Contacts:

Researcher : Ir. ZAHIDY ABD HAMID
Phone : +609 513 7799
Mobile : +6019 989 2741
Email : ir.zahidy@gmail.com

Description:

This research is being undertaken as part of PhD research project. The primary objective of this research is to explore the factors for business success required for construction entrepreneurs to succeed and survival from the entrepreneurship perspectives. Entrepreneurship has been considered as an important driving factor of business success (Covin and Selvin, 1991; Lumpkin and Dess, 1996; Wiklund and Shepherd, 2003). However, very few studies, if any, have explored the entrepreneurship theory in searching the success factors for construction businesses. In most regard, the construction management and entrepreneurship literature have evolved separately, with little cross-fertilization.

Hofstrand (2010) suggested that successful entrepreneurs should have a detailed knowledge of the keys factors needed for success. Discovering which factors or practices lead to business success and which lead to failure is a primary, and as yet unfulfilled, purpose of business research (Rogoff et al., 2004). Therefore, this study is attempted to fill the gap in construction management literature by identify the success factors of construction businesses from different dimensions of success factors, that is, from the perspective of the theory of entrepreneurship.

Participation:

Your participation in this project is voluntary. If you do agree to participate, you can withdraw your participation at any time during the project without any comment or penalty. Your decision to participate will in no way impact upon your current or future relation with UMP.

Your participation will involve three rounds of questionnaires. The questionnaires will be distributed to participants via email. The researcher intends to employ the

Delphi-DEMATEL research method. The participants are request to answer the questionnaire and then save the file before send it back to researcher via email.

It is expected that the questionnaire rounds will 4 to 6 weeks to complete, including data analysis, if participants can response to the questionnaires within 7 days of receipt.

Risks:

There are no risks to participants beyond those encountered in everyday life.

Confidentiality:

All comments and responses are anonymous and will be treated confidentially and data from this research will be reported only in the aggregate.

Consent to participate:

Please fill the details in last section as a written consent to confirm your agreement to participate in this project.

Questions about the project:

Please contact the researcher if you have any questions or further information needed about this project.

Statement of consent:

I agree to participate in this research, and my details are as the following:

Name : ______________________________

Current Employer : ______________________________

Position : ______________________________

Email : ______________________________

[Please save this file and return it back to researcher via email at ir.zahidy@gmail.com]

APPENDIX D

List of Expert Panellists and Qualifications

Code	Designation	Organisation/ Location	Age	Academic			Industry Experience (Year)	Professional Licensure (Year)	NGO's Involvement
				Degree	Experience (Year)	Publication (Nos.)			
E1	Director: Owner/Founder	ASSB Contractor Kuala Lumpur	60+	Bachelor	-	-	29	29	-
E2	Director: Associate	SMSB Contractor Pahang	60+	Master	-	-	34	11	-
E3	Director: Associate	IKCSB Developer Perlis	51-60	Master	-	-	25	10	-
E4	Director: Managing Owner/Founder	I-SSB Contractor Terengganu	51-60	Bachelor	-	-	32	-	-
E5	Director: Managing Owner/Founder	ARGM Contractor Selangor	51-60	Master	-	-	25	-	-
E6	Director: Managing Owner/Founder	TRDSB Developer Selangor	41-50	Bachelor	-	-	22	-	-

List of Expert Panellists and Qualifications (Continued)

Code	Designation	Organisation/ Location	Age	Academic			Industry Experience (Year)	Professional Licensure (Year)	NGO's Involvement
				Degree	Experience (Year)	Publication (Nos.)			
E7	Director: Associate	JPSB Contractor Kuala Lumpur	41-50	Master	-	-	22	-	-
E8	Director: Associate	AMSB Contractor Pahang	60+	Bachelor	-	-	35	5	-
E9	Director: Associate	SSMASB Contractor Kuala Lumpur	51-60	Bachelor	-	-	24	2	-
E10	Director: Managing Owner/Founder	GISB Contractor Johor	51-60	Bachelor	-	-	25	-	-
E11	Director: Managing Owner/Founder	CSB Contractor Pahang	41-50	Bachelor	-	-	23	-	Yes
E12	Director: Principal Owner/Founder	ABHJPSB Eng. Consult. Pahang	51-60	Bachelor	-	-	25	16	Yes
E13	Principal Owner	H & A Arch. Consult. Selangor	31-40	Bachelor	-	-	10	5	-

List of Expert Panellists and Qualifications (Continued)

Code	Designation	Organisation/ Location	Age	Academic			Industry Experience (Year)	Professional Licensure (Year)	NGO's Involvement
				Degree	Experience (Year)	Publication (Nos.)			
E14	Principal Owner/Founder	PRJA Eng. Consult. Pahang	60+	Bachelor	-	-	36	30	Yes
E15	Principal Owner/Founder	YYA Arch. Consult. Pahang	31-40	Bachelor	2	7	10	6	-
E16	Principal Owner/Founder	ASAC Eng. Consult. Pahang	51-60	Bachelor	-	-	25	8	-
E17	Director: Principal Owner/Founder	PZKSB Eng. Consult. Selangor	51-60	Master	5	-	28	20	-
E18	Director: Principal Owner	ACSJPSB Eng. Consult. Kuala Lumpur	41-50	Bachelor	-	-	25	20	-
E19	Director: Principal	PNJSB Eng. Consult. Pahang	31-40	Master	-	-	12	1	-
E20	Principal Owner	PRJA Eng. Consult. Pahang	31-40	Bachelor	-	-	12	3	Yes
E21	Principal Owner/Founder	NZRTC Eng. Consult. Selangor	41-50	Bachelor	-	-	25	7	-

List of Expert Panellists and Qualifications (Continued)

Code	Designation	Organisation/ Location	Age	Academic			Industry Experience (Year)	Professional Licensure (Year)	NGO's Involvement
				Degree	Experience (Year)	Publication (Nos.)			
E22	Senior Engineer District Engineer	JPS Pahang	51-60	Bachelor	-	-	30	6	-
E23	Senior Engineer Principal Assistant Director	JKR Kuala Lumpur	51-60	Bachelor	-	3	30	10	-
E24	Senior Engineer Director Technical Division	MPK Pahang	60+	Bachelor	-	-	37	25	-
E25	Senior Engineer Principal Assistant Director	JKR Kuala Lumpur	51-60	Master	-	41	31	-	-
E26	Senior Engineer Project Director	JKR Pahang	51-60	Bachelor	-	-	35	4	-
E27	Senior Engineer Project Director	JKR Pahang	41-50	Master	-	-	28	5	-
E28	Senior Engineer Principal Assistant Director	JKR Kuala Lumpur	41-50	Bachelor	-	-	19	2	-
E29	Senior Engineer Principal Assistant Director	KKLW Putrajaya	51-60	Bachelor	-	-	30	6	-
E30	Senior Engineer Principal Assistant Director	JKR Pahang	51-60	Bachelor	-	-	19	6	-
E31	Senior Engineer District Manager	PAIP Pahang	41-50	Bachelor	-	-	17	-	-
E32	Senior Engineer Director	JKR Selangor	51-60	Bachelor	-	-	30	-	-

List of Expert Panellists and Qualifications (Continued)

Code	Designation	Organisation/ Location	Age	Academic Degree	Academic Experience (Year)	Academic Publication (Nos.)	Industry Experience (Year)	Professional Licensure (Year)	NGO's Involvement
E33	Professor Senior Lecturer	USM Pulau Pinang	41-50	PhD SM/PM	20	160	20	4	-
E34	Lecturer	UMP Pahang	31-40	Master CM	10	-	10	5	-
E35	Senior Lecturer	UM Kuala Lumpur	31-40	PhD CE	5	11	5	-	-
E36	Professor Senior Lecturer	UTM Johor	60+	PhD CM	32	19	32	-	Yes
E37	Associate Professor Senior Lecturer	UMP Pahang	51-60	Master CEng	13	37	16	15	Yes
E38	Associate Professor Senior Lecturer	UTM Johor	51-60	PhD CM	24	39	30	-	-
E39	Lecturer	UM Kuala Lumpur	41-50	Master BM	10	10	14	-	Yes

Note: SM = Strategic Management, PM = Project Management, CM = Construction Management, CE = Civil Engineering, CEng = Construction Engineering, BM = Building/Value Management.

APPENDIX E

DELPHI-DEMATEL QUESTIONNAIRES

INTRODUCTORY

Indicators of Success for Entrepreneurs in the Construction Industry

Preamble

While the importance of construction industry to the nation's economic growth and to our daily lives is significant, it also facing an experience of poor performance. The rate of business failures in the construction industry are a real possibility and have been increased tremendously. Consequently, construction business failure is not only extremely disruptive to the industry but may also cause significant rippling effects to the nation's economy.

Entrepreneurship has been considered as an important driving factor of business success (Covin and Selvin, 1991; Lumpkin and Dess, 1996; Wiklund and Shepherd, 2003). However, very few studies, if any, have explored the entrepreneurship perspectives in searching the success factors for construction businesses. In most regard, the construction engineering management and entrepreneurship literature have evolved separately, with little cross-fertilization.

In previous studies, researchers have been attempted to measure success factors that contributed to construction businesses from the outcomes of the project executed since they have strategic implications on the success and profitability of the business. Emphasized on this evaluation concept resulted in intensive focus on project management techniques to improve the efficiency and success of individual projects. However, in spite of advancement in project management processes, tools, and systems, project success has not significantly improved (Mir and Finnington, 2014).

It could be argued that too much research attention has been paid to grandiose theory on project related success factors and not enough research has been conducted on corporate issues to determine the overall success of construction businesses. Yet those researches have been evaluated success factors at the project level which is short-term approach. An emphasize of short-term success objectives on the outcomes of the project implemented should be shifted to long-term objectives related to corporate business success in order for construction enterprises to sustain survival and to compete in today's fiercely competition business environment.

ROUND 1: The first round of the study will involve identification of factors that are feasible and important to the construction enterprise business success, and which should be considered in the selection of the most appropriate factors. This first round in not expected to take you more than an hour.

ROUND 2: The second Delphi-DEMATEL round will involve approving first round's results by reviewing you and other participants (anonymously) first's round results. This could not take more than 30 minutes.

ROUND 3: In the third round, you will receive a series of questions asking to indicate the direct influence (or dominance) that you believe a factor exerts on each of the other factors based of an integer scale provided. This round is quite intensive and it will take you about one to two hours, but enough time will be ensured for you to complete it.

Participating in the Study

You have been selected as a member of the Delphi-DEMATEL expect panel. Over the next few weeks, you will be asked to complete four rounds of questionnaires. At the end of this period, the results of the questionnaires will be made available to you as token of gratitude for your contribution.

Your participation is on a voluntary basis. Below are the conditions of voluntary participation:

- Confidentiality
- Anonymity
- Not asked to divulge any business sensitive information

The first round Delphi-DEMATEL questionnaire can be found overleaf. The questionnaire should take no more than one hour to complete. Kindly return the completed questionnaire within 7 days of receiving the questionnaire.

Many thanks in advance for your time and contribution. If you have any questions about the research, please do not hesitate to contact the undersigned.

Kind Regards,

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Engineering • Technology • Creativity

DELPHI-DEMATEL QUESTIONNAIRES

ROUND ONE

Indicators of Success for Entrepreneurs in the Construction Industry

Thank you once again for serving on the Delphi-DEMATEL panel for this research. Your participation is greatly appreciated. The objective of this Delphi-DEMATEL survey is to explore various aspects of construction entrepreneurial business success.

To iterate, this first round of Delphi-DEMATEL research is to identify factors that are feasible and important to the construction enterprise business success, and which should be considered in the selection of the most appropriate factors. Kindly complete the questionnaire within **7 days** of receipt, and please return your completed response via email, in Word format, to **zahidy.ump@gmail.com**. This survey is intended to be completed in less than an hour.

SECTION A : EXPERT'S BACKGROUND INFORMATION

The following questions are intended to confirm your position as an expert. Once validated, the Delphi-DEMATEL responses will be anonymous and all members will be treated equally.

PERSONAL INFORMATION

Name : ______________________________

Current Employer : ______________________________

Position : ______________________________

Age : ☐ 20-30 ☐ 31-40 ☐ 41-50 ☐ 51-60 ☐ 60+

City : ______________________________

State : ______________________________

Country : ______________________________

ACADEMIC INFORMATION

Please indicate the degrees that you have earned from accredited institutions of higher learning:

Degree	Major/Field of Concentration
☐ Diplomas	______
☐ Bachelors	______
☐ Masters	______
☐ Doctorate	______
☐ Other (please specify)	______

Please indicate your experience in academia:

Position	Approximate Number of Years
☐ None	______
☐ Lecturer	______
☐ Senior Lecturer	______
☐ Assistant Professor	______
☐ Associate Professor	______
☐ Professor	______
☐ Other (please specify)	______

PUBLICATIONS AND CONFERENCE PERTICIPATIONS

Please indicate your publishing and conference activity in the areas of construction industry:

Activity	Approximate Number
☐ Publication in peer-reviewed journals	______
☐ Books or books chapters	______
☐ Conference presentations	______
☐ Trade publications	______
☐ Other (please specify)	______

PROFESSIONAL EXPERIENCE

Please indicate your experience in the construction industry:

Position	Approximate Number of Years
☐ Business owner of construction enterprise	______
☐ Founder of construction enterprise	______
☐ Professional Engineer	______
☐ Professional Architect	______
☐ Professional Quantity Surveyor	______
☐ Government Officer (Technical Department)	______
☐ Academician	______
☐ Other (please specify)	______

Please indicate your professional licensure/certification:

Licensure or Certification	Approximate Number of Years
☐ Professional Engineer	______
☐ Professional Architect	______
☐ Professional Quantity Surveyor	______
☐ Project Management Professional	______
☐ Other (please specify)	______

NGO's INVOLVEMENT

Please indicate if you are or have been the chairman or committee of any particular association that related to construction industry:

Association	Position
☐ The Malay Contractors Association (PKMM)	______
☐ The Real Estate and Housing Developers' Association Malaysia (REHDA)	______
☐ Other (please specify)	______

SECTION B : BUSINESS SUCCESS FACTORS

1.0 Entrepreneurial Orientation

Entrepreneurial orientation refers to the processes, actions, method practices and decision making styles within the firm.

To access the success of the construction enterprise with regard to the entrepreneurial orientation dimensions, which of the following indicators do you think are important?

Note: 1 = No judgment 2 = Very unimportant 3 = Unimportant 4 = Important 5 = Very important

Business Success Factor	1	2	3	4	5
1. Autonomy	☐	☐	☐	☐	☐
2. Innovativeness	☐	☐	☐	☐	☐
3. Risk-taking	☐	☐	☐	☐	☐
4. Proactiveness	☐	☐	☐	☐	☐
5. Competitive aggressiveness	☐	☐	☐	☐	☐

Note: Refer Table 1 (page 8) for a brief description of each business success factor.

Please list and describe additional factors that you think are important and should be considered in evaluation of entrepreneurial orientation.

2.0 Entrepreneurial Organisation

Entrepreneurial organisation promotes entrepreneurial activity adapting structure, management, and processes accordingly in order to gain the required agility, speed, creativity, and drive to act profitably upon specific opportunities.

To access the success of the construction enterprise with regard to the entrepreneurial organisation dimensions, which of the following indicators do you think are important?

Note: 1 = No judgment 2 = Very unimportant 3 = Unimportant 4 = Important 5 = Very Important

Business Success Factor	1	2	3	4	5
1. Organisational structure	☐	☐	☐	☐	☐
2. Organisational culture	☐	☐	☐	☐	☐

Note: Refer Table 1 (page 8) for a brief description of each business success factor.

Please list and describe additional factors that you think are important and should be considered in evaluation of entrepreneurial organisation.

3.0 Entrepreneurial Competency

Entrepreneurial competency refers to the underlying characteristics, skills and knowledge of an organization as a whole with results in survival and/or growth in business venture.

To access the success of the construction enterprise with regard to the entrepreneurial competency dimensions, which of the following indicators do you think are important?

Note: 1 = No judgment 2 = Very unimportant 3 = Unimportant 4 = Important 5 = Very Important

Business Success Factor	1	2	3	4	5
1. Founder's personal competencies	☐	☐	☐	☐	☐
2. Business and management competencies	☐	☐	☐	☐	☐
3. Marketing competencies	☐	☐	☐	☐	☐
4. Technical competencies	☐	☐	☐	☐	☐
5. Technological competencies	☐	☐	☐	☐	☐
6. Political competencies	☐	☐	☐	☐	☐
7. Social responsibility competencies	☐	☐	☐	☐	☐

Note: Refer Table 1 (page 8) for a brief description of each business success factor.

Please list and describe additional factors that you think are important and should be considered in evaluation of entrepreneurial competencies.

4.0 Entrepreneurial Environment

Entrepreneurial environment refers to a combination of external factors that play a role in the development of entrepreneurship.

To access the success of the construction enterprise with regard to the entrepreneurial environment dimensions, which of the following indicators do you think are important?

Note: 1 = No judgment 2 = Very unimportant 3 = Unimportant 4 = Important 5 = Very Important

Business Success Factor	1	2	3	4	5
1. Finance resources	☐	☐	☐	☐	☐
2. Government policies	☐	☐	☐	☐	☐
3. Government programs	☐	☐	☐	☐	☐
4. Entrepreneurial education and training	☐	☐	☐	☐	☐
5. R&D transfer	☐	☐	☐	☐	☐
6. Commercial and professional infrastructure	☐	☐	☐	☐	☐
7. Internal market openness	☐	☐	☐	☐	☐
8. Physical infrastructure and services	☐	☐	☐	☐	☐
9. Cultural and social norms	☐	☐	☐	☐	☐

Note: Refer Table 1 (page 8) for a brief description of each business success factor.

Please list and describe additional factors that you think are important and should be considered in evaluation of entrepreneurial environmental.

Table 1: Description of selection factors in describing construction entrepreneurial business success

Dimension	Description
Entrepreneurial Orientation:	
Innovativeness	The predisposition to engage in creativity and experimentation through the introduction of new products/services as well as technological leadership via research and development in new processes (Miller, 1983).
Risk taking	Taking bold actions by venturing into the unknown, borrowing heavily, and/or committing significant resources to venture in uncertain environments (Miller, 1983).
Proactiveness	An opportunity-seeking, forward-looking perspective characterized by the introduction of new products and services ahead of the competition and acting in anticipation of future demand (Miller, 1983).
Competitive aggressiveness	The intensity of a firm's effort to outperform risks and characterized by a strong offensive posture or aggressive responses to competitive threats (Lumpkin and Dess, 1996).
Autonomy	Independent action undertaken by entrepreneurial leaders or teams directed at bringing about a new venture and seeing it fruition (Lumpkin and Dess, 1996).
Entrepreneurial Organisation:	
Structure	The formal configuration between individuals and groups regarding the allocation of tasks, responsibilities, and authority within the organization (Greenberg, 2011).
Culture	The set of shared beliefs, values, and norms that influence the way organisation members think, feel and behave (Schein, 1985).
Entrepreneurial Competency:	
Founder's personal competencies	The capability of applying or using knowledge, skills, abilities, behaviours, and personal characteristics to successfully perform critical work tasks, specific functions, or operate in a given role or position (McClelland, 1973).
Business and management competencies	The observable characteristics such as knowledge, skills or behaviour patterns that contribute to the successful fulfilment of managerial and business tasks (Markman, 2007).
Marketing competencies	The ability to proactively identify and explore opportunities for acquiring new projects and retaining profitable customers through specific approaches such as networking, advertisement, etc. (own thought).
Technical competencies	The specific, measurable knowledge and skills required to apply technical principles and information in a job function (CCSA, 2014).
Technological competencies	The ability to create and use a particular field of technology effectively, which is gained through extensive experimentation and learning in its research, development and employment in production (Fai and von Tunzelmann, 2001).

Table 1: Continued

Dimension	Description
Political competencies	The ability to understand political facts and processes and to influence these concerning the business interests such as the used of political connections in securing projects, etc. (own thought).
Social responsibility competencies	The adoption of business strategies and activities that are ethical, and society and environmental friendly (own thought).
Entrepreneurial Environment:	
Finance resources	The availability of financial resources such as equity and debt including grants and subsidies (Reynolds *et al.*, 1999).
Government policies	The extent to which taxes or regulations are encouraging construction enterprises (Reynolds *et al.*, 1999).
Government programs	The presence and quality of direct programs to assist new and growing firms at all levels of government (national, regional, municipal) (Reynolds *et al.*, 1999).
Entrepreneurial education and training	The extent to which training in creating or managing construction enterprises is incorporated within the education and training system at all levels (primary, secondary and post-school) (Reynolds *et al.*, 1999).
Research and development transfer	The extent to which national research and development will lead to new commercial opportunities and is available to construction enterprises (Reynolds *et al.*, 1999).
Commercial and professional infrastructure	The presence of property rights and commercial, accounting, and other legal services and institutions that support or promote construction enterprises (Reynolds *et al.*, 1999).
Internal market openness	Contains two components: (i) Market dynamics: the level of change in markets from year to year, and (ii) Market openness: the extent to which new firms are free to enter existing markets (Reynolds *et al.*, 1999).
Physical infrastructure and services	Ease of access to physical resources such as communication, utilities, transportation, land or space, at a price that does not discriminate against construction enterprises (Reynolds *et al.*, 1999).
Cultural and Social Norm	The extent to which social and cultural norms encourage or allow actions leading to new business methods or activities that can potentially increase personal wealth and income (Reynolds *et al.*, 1999).

APPENDIX F

Sample of Expert's Opinions 1

DELPHI-DEMATEL QUESTIONNAIRES

ROUND ONE

Indicators of Success for Entrepreneurs in the Construction Industry

Thank you once again for serving on the Delphi-DEMATEL panel for this research. Your participation is greatly appreciated. The objective of this Delphi-DEMATEL survey is to explore various aspects of construction entrepreneurial business success.

To iterate, this first round of Delphi-DEMATEL research is to identify factors that are feasible and important to the construction enterprise business success, and which should be considered in the selection of the most appropriate factors. Kindly complete the questionnaire within **7 days** of receipt, and please return your completed response via email, in Word format, to zahidy.ump@gmail.com. This survey is intended to be completed in less than an hour.

SECTION A : EXPERT'S BACKGROUND INFORMATION

The following questions are intended to confirm your position as an expert. Once validated, the Delphi-DEMATEL responses will be anonymous and all members will be treated equally.

PERSONAL INFORMATION

Name : [redacted]

Current Employer : [redacted]

Position : [redacted]

Age : ☐ 20-30 ☐ 31-40 [/] 41-50 ☐ 51-60 ☐ 60+

City : [redacted]

State : [redacted]

Country : Malaysia

ACADEMIC INFORMATION

Please indicate the degrees that you have earned from accredited institutions of higher learning:

Degree	Major/Field of Concentration
☐ Diplomas	
☐ Bachelors	
☐ Masters	
☑ Doctorate	Strategic/project management
☐ Other (please specify)	

Please indicate your experience in academia:

Position	Approximate Number of Years
☐ None	
☑ Lecturer	10 years
☑ Senior Lecturer	5 years
☐ Assistant Professor	
☑ Associate Professor	5 years
☐ Professor	
☐ Other (please specify)	

PUBLICATIONS AND CONFERENCE PERTICIPATIONS

Please indicate your publishing and conference activity in the areas of construction industry:

Activity	Approximate Number
☑ Publication in peer-reviewed journals	60
☑ Books or books chapters	10
☑ Conference presentations	90
☐ Trade publications	
☐ Other (please specify)	

PROFESSIONAL EXPERIENCE

Please indicate your experience in the construction industry:

Position	Approximate Number of Years
☐ Business owner of construction enterprise	
☐ Founder of construction enterprise	
☐ Professional Engineer	
☐ Professional Architect	
☐ Professional Quantity Surveyor	
☐ Government Officer (Technical Department)	
☐ Academician	
☑ Other (please specify)	QS/PM-8 years

Please indicate your professional licensure/certification:

Licensure or Certification	Approximate Number of Years
☐ Professional Engineer	
☐ Professional Architect	
☐ Professional Quantity Surveyor	
☐ Project Management Professional	
☑ Other (please specify)	BS-4 years

NGO's INVOLVEMENT

Please indicate if you are or have been the chairman or committee of any particular association that related to construction industry:

Association	Position
☐ The Malay Contractors Association (PKMM)	
☐ The Real Estate and Housing Developers' Association Malaysia (REHDA)	
☐ Other (please specify)	

SECTION B : BUSINESS SUCCESS FACTORS

1.0 Entrepreneurial Orientation

Entrepreneurial orientation refers to the processes, actions, method practices and decision making styles within the firm.

To access business success factors of construction enterprise with regard to entrepreneurial orientation dimensions, which factors do you think are important?

Note: 1 = No Judgment 2 = Very Unimportant 3 = Unimportant 4 = Important 5 = Very Important

Business Success Factor	1	2	3	4	5
1. Autonomy					/
2. Innovativeness				/	
3. Risk-taking				/	
4. Proactiveness					/
5. Competitive aggressiveness					/

Note: Refer Table 1 (page 8) for a brief description of each business success factor.

Please list and describe additional factors that you think are important and should be considered in evaluation of entrepreneurial orientation.
Honesty and the adopting of Islamic work value in construction industry is very important, will minimize the risk of corruption.

2.0 Entrepreneurial Organisation

Entrepreneurial organisation promotes entrepreneurial activity adapting structure, management, and processes accordingly in order to gain the required agility, speed, creativity, and drive to act profitably upon specific opportunities.

To access business success factors of construction enterprise with regard to entrepreneurial organisation dimensions, which factors do you think are important?

Note: 1 = No Judgment 2 = Very Unimportant 3 = Unimportant 4 = Important 5 = Very Important

Business Success Factor	1	2	3	4	5
1. Organisational structure				/	
2. Organisational culture					/

Note: Refer Table 1 (page 8) for a brief description of each business success factor.

Please list and describe additional factors that you think are important and should be considered in evaluation of entrepreneurial organisation.
Staffs needs to be given and directed towards the achievement of vision and mission of the company. Close supervision and monitoring on staff performance and reward them according to their performance. Creating a good working environment.

2.1 Entrepreneurial Competency

Entrepreneurial competency refers to the underlying characteristics, skills and knowledge of an organization as a whole with results in survival and/or growth in business venture.

To access business success factors of construction enterprise with regard to entrepreneurial competencies dimensions, which factors do you think are important?

Note: 1 = No Judgment 2 = Very Unimportant 3 = Unimportant 4 = Important 5 = Very Important

Business Success Factor	1	2	3	4	5
1. Founder's personal competencies					/
2. Business and management competencies					/
3. Marketing competencies					/
4. Technical competencies				/	
5. Technological competencies				/	
6. Political competencies				/	
7. Social responsibility competencies					/

Note: Refer Table 1 (page 8) for a brief description of each business success factor.

Please list and describe additional factors that you think are important and should be considered in evaluation of entrepreneurial competencies.
Managing relationship with stakeholders and employees. Managing finance and project. Founder's entrepreneurial skills.

4.0 Entrepreneurial Environmental

Entrepreneurial environment refers to a combination of external factors that play a role in the development of entrepreneurship.

To access business success factors of construction enterprise with regard to entrepreneurial environment dimensions, which factors do you think are important?

Note: 1 = No Judgment 2 = Very Unimportant 3 = Unimportant 4 = Important 5 = Very Important

Business Success Factor	1	2	3	4	5
1. Finance resources					/
2. Government policies					/
3. Government programs					/
4. Entrepreneurial education and training					/
5. R&D transfer				/	
6. Commercial and professional infrastructure				/	
7. Internal market openness					
8. Physical infrastructure and services				/	/
9. Cultural and social norms					/

Note: Refer Table 1 (page 8) for a brief description of each business success factor.

Please list and describe additional factors that you think are important and should be considered in evaluation of entrepreneurial environmental.

APPENDIX G

Sample of Expert's Opinions 2

DELPHI-DEMATEL QUESTIONNAIRES

ROUND ONE

Indicators of Success for Entrepreneurs in the Construction Industry

Thank you once again for serving on the Delphi-DEMATEL panel for this research. Your participation is greatly appreciated. The objective of this Delphi-DEMATEL survey is to explore various aspects of construction entrepreneurial business success.

To iterate, this first round of Delphi-DEMATEL researchis to identifyfactors that are feasible and important to the construction enterprise business success, and which should be considered in the selection of the most appropriate factors.Kindly complete the questionnaire within **7 days** of receipt, and please return your completed response via email, in Word format, to zahidy.ump@gmail.com. This survey is intended to be completed in less than an hour.

SECTION A : EXPERT'S BACKGROUND INFORMATION

The following questions are intended to confirm your position as an expert. Once validated, the Delphi-DEMATEL responses will be anonymous and all members will be treated equally.

PERSONAL INFORMATION

Name : [redacted]

Current Employer : [redacted]

Position : [redacted]

Age : ☐ 20-30 ☐ 31-40 ☐ 41-50 ☐ 51-60 ☑ 60+

City : [redacted]

State : [redacted]

Country : Malaysia

CADEMIC INFORMATION

Please indicate the degrees that you have earned from accredited institutions of higher learning:

Degree	Major/Field of Concentration
☐ Diplomas	
☑ Bachelors	B.Eng. Civil (Hons)
☐ Masters	
☐ Doctorate	
☐ Other (please specify)	

Please indicate your experience in academia:

Position	Approximate Number of Years
☐ None	
☐ Lecturer	
☐ Senior Lecturer	
☐ Assistant Professor	
☐ Associate Professor	
☐ Professor	
☐ Other (please specify)	

PUBLICATIONS AND CONFERENCE PERTICIPATIONS

Please indicate your publishing and conference activity in the areas of construction industry:

Activity	Approximate Number
☐ Publication in peer-reviewed journals	
☐ Books or books chapters	
☐ Conference presentations	
☐ Trade publications	
☐ Other (please specify)	

PROFESSIONAL EXPERIENCE

Please indicate your experience in the construction industry:

Position	Approximate Number of Years
[/] Business owner of construction enterprise	35 years
[ ] Founder of construction enterprise	
[ ] Professional Engineering Consultant	
[ ] Professional Architect	
[ ] Professional Quantity Surveyor	
[ ] Government Officer (Technical Department)	
[ ] Academician	
[ ] Other (please specify)	

Please indicate your professional licensure/certification:

Licensure or Certification	Approximate Number of Years
[/] Professional Engineer	5 years
[ ] Professional Architect	
[ ] Professional Quantity Surveyor	
[ ] Project Management Professional	
[ ] Other (please specify)	

NGO's INVOLVEMENT

Please indicate if you are or have been the chairman or committee of any particular association that related to construction industry:

Association	Position
[ ] The Malay Contractors Association (PKMM)	
[ ] The Real Estate and Housing Developers' Association Malaysia (REHDA)	
[ ] Other (please specify)	

SECTION B : BUSINESS SUCCESS FACTORS

1.0 Entrepreneurial Orientation

Entrepreneurial orientation refers to the processes, actions, method practices and decision making styles within the firm.

To access business success factors of construction enterprise with regard to entrepreneurial orientation dimensions, which factors do you think are important?

Note: 1 = No Judgment 2 = Very Unimportant 3 = Unimportant 4 = Important 5 = Very Important

Business Success Factor	1	2	3	4	5
1. Autonomy			/		
2. Innovativeness					/
3. Risk-taking				/	
4. Proactiveness					/
5. Competitive aggressiveness					/

Note: Refer Table 1 (page 8) for a brief description of each business success factor.

Please list and describe additional factors that you think are important and should be considered in evaluation of entrepreneurial orientation.

3.0 Entrepreneurial Organisation

Entrepreneurial organisation promotes entrepreneurial activity adapting structure, management, and processes accordingly in order to gain the required agility, speed, creativity, and drive to act profitably upon specific opportunities.

To access business success factors of construction enterprise with regard to entrepreneurial organisation dimensions, which factors do you think are important?

Note: 1 = No Judgment 2 = Very Unimportant 3 = Unimportant 4 = Important 5 = Very Important

Business Success Factor	1	2	3	4	5
1. Organisational structure				/	
2. Organisational culture					/

Note: Refer Table 1 (page 8) for a brief description of each business success factor.

Please list and describe additional factors that you think are important and should be considered in evaluation of entrepreneurial organisation.

4.0 Entrepreneurial Competency

Entrepreneurial competency refers to the underlying characteristics, skills and knowledge of an organization as a whole with results in survival and/or growth in business venture.

To access business success factors of construction enterprise with regard to entrepreneurial competencies dimensions, which factors do you think are important?

Note: 1 = No Judgment 2 = Very Unimportant 3 = Unimportant 4 = Important 5 = Very Important

Business Success Factor	1	2	3	4	5
1. Founder's personal competencies				/	
2. Business and management competencies				/	
3. Marketing competencies					/
4. Technical competencies				/	
5. Technological competencies				/	
6. Political competencies			/		
7. Social responsibility competencies			/		

Note: Refer Table 1 (page 8) for a brief description of each business success factor.

Please list and describe additional factors that you think are important and should be considered in evaluation of entrepreneurial competencies.

5.0 Entrepreneurial Environmental

Entrepreneurial environment refers to a combination of external factors that play a role in the development of entrepreneurship.

To access business success factors of construction enterprise with regard to entrepreneurial environment dimensions, which factors do you think are important?

Note: 1 = No Judgment 2 = Very Unimportant 3 = Unimportant 4 = Important 5 = Very Important

Business Success Factor	1	2	3	4	5
1. Finance resources					/
2. Government policies				/	
3. Government programs				/	
4. Entrepreneurial education and training				/	
5. R&D transfer				/	
6. Commercial and professional infrastructure				/	
7. Internal market openness				/	
8. Physical infrastructure and services				/	
9. Cultural and social norms				/	

Note: Refer Table 1 (page 8) for a brief description of each business success factor.

Please list and describe additional factors that you think are important and should be considered in evaluation of entrepreneurial environmental.
1. Economy factor - Economy progress will leads to more budget allocated for development projects. This will creates more changes for construction companies. 2. Political factor - Stable government will creates good environment for doing business, i.e. economic policies, regulations, etc. that support the contractors.

APPENDIX H

DELPHI-DEMATEL QUESTIONNAIRES

ROUND TWO

Indicators of Success for Entrepreneurs in the Construction Industry

Thank you for completing the Delphi-DEMATEL Round One survey. We recognize that the survey required a significant time investment to complete thoughtfully and we are very appreciating of your time and effort. This Round Two survey continues the Delphi-DEMATEL process for this study. In previous Round One survey, you have identified and ranked the important factors for construction entrepreneurs' success and survival.

The purpose of Round Two survey is to provide you with the opportunity to change your response, if desired. It is intended to be completed in approximately 10-15 minutes as you are only being asked to review your previous responses. The collective group response in term of median and mean is given for each factor for your reference. Kindly complete the questionnaire within __7 days__ of receipt, and please return your completed response via email, in Word format, to **zahidy.ump@gmail.com**.

INSTRUCTION

In the previous Round One survey, you had ranked and indicated the importance factors to construction entrepreneurs' success and survival. In this Round Two survey, for each business success factors you will guild with 3 values: (i) the group median; (ii) the group mean; and (iii) your response of the previous Round One survey (indicated with highlighted field).

A. Please take __**one**__ of the following three actions:
   1. Accept the group median and mean response by leaving the entire field completely unchanged, or
   2. Maintain your original response by ticking the highlighted field, or
   3. Indicate your new response in the provided field.

B. Please rank the new factors (marked as *)

Note: 1 = Not important 2 = Somewhat important 3 = Important 4 = Very important 5 = Extremely important

Business Success Factor	Collective group response		Your current ranking	Your review ranking
	Median	Mean		
Entrepreneurial Orientation:				
1. Autonomy			☐	☐
2. Innovativeness			☐	☐
3. Risk-taking			☐	☐
4. Proactiveness			☐	☐
5. Competitive aggressiveness			☐	☐
6. Religiosity*				☐
Entrepreneurial Organizational:				
1. Organizational structure			☐	☐
2. Organizational culture			☐	☐
Entrepreneurial Competencies:				
1. Founder's personal competencies			☐	☐
2. Business and management competencies			☐	☐
3. Marketing competencies			☐	☐
4. Technical competencies			☐	☐
5. Technological competencies			☐	☐
6. Political competencies			☐	☐
7. Social responsibility competencies			☐	☐

Refer Table 1 (page 4) for a brief description of each business success factor.

Note: 1 = Not important 2 = Somewhat important 3 = Important 4 = Very important 5 = Extremely important

Business Success Factor	Collective Group Response		Your current ranking	Your review ranking
	Median	Mean		
Entrepreneurial Environmental:				
1. Finance resources			☐	☐
2. Government policies			☐	☐
3. Government programs			☐	☐
4. Entrepreneurial education and training			☐	☐
5. R&D transfer			☐	☐
6. Commercial and professional infrastructure			☐	☐
7. Internal market openness			☐	☐
8. Physical infrastructure and services			☐	☐
9. Cultural and social norms			☐	☐
10. National economic growth*				☐
11. National political stability*				☐

* New factor

Refer Table 1 (page 4) for a brief description of each business success factor.

Name : ______________________

Organization : ______________________

Email : ______________________

Table 1: Description of selection factors in describing construction entrepreneurial business success

Dimension	Description
Entrepreneurial Orientation:	
Innovativeness	The predisposition to engage in creativity and experimentation through the introduction of new products/services as well as technological leadership via research and development in new processes (Miller, 1983).
Risk taking	Taking bold actions by venturing into the unknown, borrowing heavily, and/or committing significant resources to venture in uncertain environments (Miller, 1983).
Proactiveness	An opportunity-seeking, forward-looking perspective characterized by the introduction of new products and services ahead of the competition and acting in anticipation of future demand (Miller, 1983).
Competitive aggressiveness	The intensity of a firm's effort to outperform risks and characterized by a strong offensive posture or aggressive responses to competitive threats (Lumpkin and Dess, 1996).
Autonomy	Independent action undertaken by entrepreneurial leaders or teams directed at bringing about a new venture and seeing it fruition (Lumpkin and Dess, 1996).
Entrepreneurial Organisation:	
Structure	The formal configuration between individuals and groups regarding the allocation of tasks, responsibilities, and authority within the organization (Greenberg, 2011).
Culture	The set of shared beliefs, values, and norms that influence the way organisation members think, feel and behave (Schein, 1985).
Entrepreneurial Competency:	
Founder's personal competencies	The capability of applying or using knowledge, skills, abilities, behaviours, and personal characteristics to successfully perform critical work tasks, specific functions, or operate in a given role or position (McClelland, 1973).
Business and management competencies	The observable characteristics such as knowledge, skills or behaviour patterns that contribute to the successful fulfilment of managerial and business tasks (Markman, 2007).
Marketing competencies	The ability to proactively identify and explore opportunities for acquiring new projects and retaining profitable customers through specific approaches such as networking, advertisement, etc. (own thought).
Technical competencies	The specific, measurable knowledge and skills required to apply technical principles and information in a job function (CCSA, 2014).
Technological competencies	The ability to create and use a particular field of technology effectively, which is gained through extensive experimentation and learning in its research, development and employment in production (Fai and von Tunzelmann, 2001).

Table 1: Continued

Dimension	Description
Political competencies	The ability to understand political facts and processes and to influence these concerning the business interests such as the used of political connections in securing projects, etc. (own thought).
Social responsibility competencies	The adoption of business strategies and activities that are ethical, and society and environmental friendly (own thought).
Entrepreneurial Environment:	
Finance resources	The availability of financial resources such as equity and debt including grants and subsidies (Reynolds *et al.*, 1999).
Government policies	The extent to which taxes or regulations are encouraging construction enterprises (Reynolds *et al.*, 1999).
Government programs	The presence and quality of direct programs to assist new and growing firms at all levels of government (national, regional, municipal) (Reynolds *et al.*, 1999).
Entrepreneurial education and training	The extent to which training in creating or managing construction enterprises is incorporated within the education and training system at all levels (primary, secondary and post-school) (Reynolds *et al.*, 1999).
Research and development transfer	The extent to which national research and development will lead to new commercial opportunities and is available to construction enterprises (Reynolds *et al.*, 1999).
Commercial and professional infrastructure	The presence of property rights and commercial, accounting, and other legal services and institutions that support or promote construction enterprises (Reynolds *et al.*, 1999).
Internal market openness	Contains two components: (i) Market dynamics: the level of change in markets from year to year, and (ii) Market openness: the extent to which new firms are free to enter existing markets (Reynolds *et al.*, 1999).
Physical infrastructure and services	Ease of access to physical resources such as communication, utilities, transportation, land or space, at a price that does not discriminate against construction enterprises (Reynolds *et al.*, 1999).
Cultural and Social Norm	The extent to which social and cultural norms encourage or allow actions leading to new business methods or activities that can potentially increase personal wealth and income (Reynolds *et al.*, 1999).

APPENDIX I

DELPHI-DEMATEL QUESTIONNAIRES

ROUND THREE

Indicators of Success for Entrepreneurs in the Construction Industry

Thank you for completing the Delphi-DEMATEL Round Two questionnaire. We appreciate your time and effort. This Round Three is the **final round** and will conclude the Delphi-DEMATEL process for this study.

The purpose of this Round Three survey is to examine the direct influence amongst factors which were identified from previous round. This round is quite intensive and it will take you not more than 45 minutes.

Kindly complete the questionnaire within **7 days** of receipt, and please return your completed response via email, in Word format, to ir.zahidy@gmail.com.

INSTRUCTION

In previous Round Two survey, you had identified and confirmed the important factors for construction entrepreneurs' success and survival. A brief description of the factors is shown in Table 1.

In this Round Three survey you are asking to indicate the direct influence (or dominance) that you believe a factor exerts on each of the other factors based of an influence scale provided. This round is quite intensive and it will take you not more than 45 minutes.

Please give your rating base on the influence symbols as described below. For example, if you feel that organizational culture may have a strong direct influence on marketing competencies, please indicate '3' in the appropriate column of the direct relation matrix table.

0 = No influence
1 = Weak direct influence
2 = Moderate direct influence
3 = Strong direct influence

The Direct Relation Matrix

Influence scale:

Symbol	Meaning
0	No influence
1	Weak direct influence
2	Moderate direct influence
3	Strong direct influence

		1 Financial resources	2 Proactiveness	3 Organizational culture	4 National political stability	5 Organizational structure	6 Marketing competencies	7 Technical competencies	8 Business and management competencies	9 National economic growth	10 Innovativeness	11 Founder's personal competencies	12 Risk-taking	13 Government policies	14 Competitive aggressiveness	15 Technological competencies	16 Entrepreneurial education and training	17 Commercial and professional infrastructure	18 Government programs
1	Financial resources																		
2	Proactiveness																		
3	Organisational culture																		
4	National political stability																		
5	Organisational structure																		
6	Marketing competencies																		
7	Technical competencies																		
8	Business and management competencies																		
9	National economic growth																		
10	Innovativeness																		
11	Founder's personal competencies																		
12	Risk-taking																		
13	Government policies																		
14	Competitive aggressiveness																		
15	Technological competencies																		
16	Entrepreneurial education and training																		
17	Commercial and professional infrastructure																		
18	Government programs																		

Table 1: Description of selection factors in describing construction entrepreneurial business success

Dimension	Description
Entrepreneurial Orientation:	
Innovativeness	The predisposition to engage in creativity and experimentation through the introduction of new products/services as well as technological leadership via research and development in new processes (Miller, 1983).
Risk taking	Taking bold actions by venturing into the unknown, borrowing heavily, and/or committing significant resources to venture in uncertain environments (Miller, 1983).
Proactiveness	An opportunity-seeking, forward-looking perspective characterized by the introduction of new products and services ahead of the competition and acting in anticipation of future demand (Miller, 1983).
Competitive aggressiveness	The intensity of a firm's effort to outperform risks and characterized by a strong offensive posture or aggressive responses to competitive threats (Lumpkin and Dess, 1996).
Autonomy	Independent action undertaken by entrepreneurial leaders or teams directed at bringing about a new venture and seeing it fruition (Lumpkin and Dess, 1996).
Entrepreneurial Organisation:	
Structure	The formal configuration between individuals and groups regarding the allocation of tasks, responsibilities, and authority within the organization (Greenberg, 2011).
Culture	The set of shared beliefs, values, and norms that influence the way organisation members think, feel and behave (Schein, 1985).
Entrepreneurial Competency:	
Founder's personal competencies	The capability of applying or using knowledge, skills, abilities, behaviours, and personal characteristics to successfully perform critical work tasks, specific functions, or operate in a given role or position (McClelland, 1973).
Business and management competencies	The observable characteristics such as knowledge, skills or behaviour patterns that contribute to the successful fulfilment of managerial and business tasks (Markman, 2007).
Marketing competencies	The ability to proactively identify and explore opportunities for acquiring new projects and retaining profitable customers through specific approaches such as networking, advertisement, etc. (own thought).
Technical competencies	The specific, measurable knowledge and skills required to apply technical principles and information in a job function (CCSA, 2014).
Technological competencies	The ability to create and use a particular field of technology effectively, which is gained through extensive experimentation and learning in its research, development and employment in production (Fai and von Tunzelmann, 2001).

Table 1: Continued

Dimension	Description
Political competencies	The ability to understand political facts and processes and to influence these concerning the business interests such as the used of political connections in securing projects, etc. (own thought).
Social responsibility competencies	The adoption of business strategies and activities that are ethical, and society and environmental friendly (own thought).
Entrepreneurial Environment:	
Finance resources	The availability of financial resources such as equity and debt including grants and subsidies (Reynolds *et al.*, 1999).
Government policies	The extent to which taxes or regulations are encouraging construction enterprises (Reynolds *et al.*, 1999).
Government programs	The presence and quality of direct programs to assist new and growing firms at all levels of government (national, regional, municipal) (Reynolds *et al.*, 1999).
Entrepreneurial education and training	The extent to which training in creating or managing construction enterprises is incorporated within the education and training system at all levels (primary, secondary and post-school) (Reynolds *et al.*, 1999).
Research and development transfer	The extent to which national research and development will lead to new commercial opportunities and is available to construction enterprises (Reynolds *et al.*, 1999).
Commercial and professional infrastructure	The presence of property rights and commercial, accounting, and other legal services and institutions that support or promote construction enterprises (Reynolds *et al.*, 1999).
Internal market openness	Contains two components: (i) Market dynamics: the level of change in markets from year to year, and (ii) Market openness: the extent to which new firms are free to enter existing markets (Reynolds *et al.*, 1999).
Physical infrastructure and services	Ease of access to physical resources such as communication, utilities, transportation, land or space, at a price that does not discriminate against construction enterprises (Reynolds *et al.*, 1999).
Cultural and Social Norm	The extent to which social and cultural norms encourage or allow actions leading to new business methods or activities that can potentially increase personal wealth and income (Reynolds *et al.*, 1999).

APPENDIX J

FIELD STUDY QUESTIONNAIRE

Validation of Construction Enterprise Business Success Checklist

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SECTION A: THE COMPANY BACKGROUND

1. Name of Respondent: ______________________________
2. Position: ______________________________
3. Company Name: ______________________________
4. No. of Permanent Employee:

- [ ] Less than 25
- [ ] 26 – 50
- [ ] 51 – 100
- [ ] 101 – 200
- [ ] 201 – 400
- [ ] More than 400

5. Annual turnover:

- [ ] Less than RM 1million
- [ ] RM 1 million – RM 10 million
- [ ] RM10 million – RM50 million
- [ ] RM50 million – RM100 million
- [ ] More than RM100 million

SECTION B: VALIDATION OF CHECKLIST

Construction Enterprise Business Success Checklist

Zahidy Abd Hamid
2016

This checklist is based on the perceptions of the construction industry experts regarding the important factors for the success of construction enterprise from the entrepreneurship perspectives. The purpose of this checklist is to guide construction enterprise in monitoring their business toward an achievement of the long-term corporate success. The checklist serves organisation by: (a) identifying the current situation to support the achievement of successful business, (b) guiding in recognising which areas may be need of improvement, and (c) determining progress toward the achievement of the successful business by revisiting the checklist when necessary.

Directions: For each of the following factors, please **bold** the response that best describes the current situation of your organisation, indicating the extent to which it presents within the organisation.	**To a Great Extent**	**To Some Extent**	**To a Small Extent**	**Not at All**
A. Entrepreneurial Orientation				
1. Proactiveness *Your company emphasises on opportunity-seeking and forward-looking perspective to offer services ahead of the competition and acting in anticipation of future demand.*	4	3	2	1
2. Innovativeness *Your company able to takes opportunities to use and adopt the availability of new technologies related to construction innovative.*	4	3	2	1
3. Risk-taking *Your company anticipates uncertain environment of construction business such as economic climate, fluctuation of material price, and others, and committing significant resources to venture in uncertain environments.*	4	3	2	1
4. Competitive Aggressiveness *Your company adopts an effective competitive strategy, in the long-term, to acquire opportunities in the marketplace and to outperform competitors.*	4	3	2	1

	To a Great Extent	To Some Extent	To a Small Extent	Not at All
B. Entrepreneurial Organisation				
5. Organisational Culture *Your company has its own set of shared beliefs, values, and norms that influence the way organisation members think, feel, and behave.*	4	3	2	1
6. Organisational Structure *Your company was structured appropriately such that all processes and relationships within the organisation occurred effectively.*	4	3	2	1
C. Entrepreneurial Competency				
7. Marketing Competencies *Your company is proactively identify and explore opportunities for acquiring new projects and retaining profitable customers through specific approaches such as networking, advertisement, and others.*	4	3	2	1
8. Technical Competencies *Your company has the specific knowledge and skills required to apply technical principles and information in a job function, such as contract management, project management, and others.*	4	3	2	1
9. Business and Management Competencies *Your company has the observable characteristics such as knowledge, skills or behaviour patterns that contribute to the successful fulfilment of managerial and business tasks, such as strategic management, financial management, HRM, risks management, and others.*	4	3	2	1
10. Founder's Personal Competencies *Your company's owners have the capability of applying or using knowledge, skills, abilities, behaviours, and personal characteristics to successfully perform critical work tasks, specific functions, or operate in a given role or position.*	4	3	2	1

	To a Great Extent	To Some Extent	To a Small Extent	Not at All
D. Entrepreneurial Environment				
11. Technological Competencies *Your company has the ability to create and use effectively a particular field of technology that related to the construction business, such as information technology, technological construction methods, and others.*	4	3	2	1
12. National Economic Growth *Your company frequently monitors the nation's economy climate to identify the market demand of the construction projects, and set strategies to secure the available opportunities.*	4	3	2	1
13. Financial Resources *Your company has sufficient capital resources and can easily funding from financing institutions, private individuals, and others.*	4	3	2	1
14. Government Policy *Your company is aware and take advantage on the availability of government policies such as public procurements, regulations, licensing requirements, and others which favour to the construction business.*	4	3	2	1
15. Entrepreneurial Education and Training *Your company is frequently participating in the continuing professional development programs such as technical, and business and management trainings.*	4	3	2	1
16. Commercial and Professional Infrastructure *Your company has actively used and take advantage on the availability of subcontractors, suppliers, consultants, professional legal and accounting services, and banking services (checking accounts, foreign exchange transactions, letters of credit, and others).*	4	3	2	1
17. Government Program *Your company has received adequate support from the government through it programs that supporting the company growth.*	4	3	2	1

APPENDIX K

Questions for the Field Study Interview Protocol

1. How useful was the checklist in determining the successful of construction business?

2. How helpful do you think the checklist will be to guide your company in achieving successful business?

3. What changes, if any, do you consider necessary to improve the checklist?

   a. Were the items clear?

   b. Were the response options appropriate?

   c. Was the length of the checklist appropriate? If not, is it too short or too long?

   d. Are there any items that should be added to the checklist? If yes, please explain.

   e. Are there any items that should be deleted from the checklist? If yes, please explain.

APPENDIX L

Final Version of the CBS Checklist

Construction Enterprise Business Success Checklist

Zahidy Abd Hamid
2016

This checklist is based on the perceptions of the construction industry experts regarding the important factors for the success of construction enterprise from the entrepreneurship perspectives. The purpose of this checklist is to guide construction enterprise in monitoring their business toward an achievement of the long-term corporate success. The checklist serves organisation by: (a) identifying the current situation to support the achievement of successful business, (b) guiding in recognising which areas may be need of improvement, and (c) determining progress toward the achievement of the successful business by revisiting the checklist when necessary.

Directions: For each of the following factors, please thick the response that best describes the current situation of your organisation, indicating the extent to which it presents within the organisation. After completing the checklist, review the statements marked as "to a small extent" and "not at all". These are the areas of improvement that need to be prioritised in order to achieve the desire success in the business	**To a Great Extent**	**To Some Extent**	**To a Small Extent**	**Not at All**
A. Entrepreneurial Orientation				
1. Proactiveness Your company emphasises on opportunity-seeking and forward-looking perspective to offer services ahead of the competition and acting in anticipation of future demand.	○	○	○	○
2. Innovativeness Your company always takes opportunities to use and adopt the available of new technologies related to the construction innovation.	○	○	○	○
3. Risk-taking Your company committed to venture in uncertain business environment, and anticipates uncertain environment such as economic climate, fluctuation of material price, and others.	○	○	○	○
4. Competitive Aggressiveness Your company adopts an effective competitive strategy, in the long-term, to acquire opportunities in the marketplace and to outperform competitors.	○	○	○	○

	To a Great Extent	To Some Extent	To a Small Extent	Not at All
B. Entrepreneurial Organisation				
5. Organisational Culture Your company has its own set of shared beliefs, values, and norms that influence the way organisation members think, feel, and behave.	○	○	○	○
6. Organisational Structure Your company is structured appropriately such that all processes and relationships within the organisation occurred effectively.	○	○	○	○
C. Entrepreneurial Competency				
7. Marketing Competencies Your company proactively identify and explore any opportunities in the marketplace, and has a good relationship with customers through specific approaches such as communication, networking, advertisement, and others.	○	○	○	○
8. Technical Competencies Your company has the specific knowledge and skills required to apply technical principles and information in a job function, such as contract management, project management, quality management, and others.	○	○	○	○
9. Business and Management Competencies Your company has adequate knowledge and skills that contribute to the successful fulfilment of managerial and business tasks, such as strategic management, financial management, HRM, risks management, and others.	○	○	○	○
10. Personal Competencies Your company's key persons have the characteristics to perform entrepreneurial functions effectively such as independence and self-confidence, opportunity-seeking, initiative persistence, fulfilling of commitments, demand for quality and efficiency, calculated risk-taking, goal-setting, information-seeking, systematic planning and monitoring, and persuasion and networking.	○	○	○	○
11. Technological Competencies Your company has the ability to create or to use effectively a particular field of technology that has significant contribution to the customer benefits such as information technology, and technological construction methods and tools, which are better functionality, attractive features or design, lowest price, time saving, and others.	○	○	○	○

	To a Great Extent	To Some Extent	To a Small Extent	Not at All
D. Entrepreneurial Environment				
12. National Economic Growth Your company has frequently monitors the nation's economy climate to identify the market demand of the construction projects, and set strategies to secure the available opportunities.	○	○	○	○
13. Financial Resources Your company has sufficient capital resources to execute any secure projects, and can easily funding from financing institutions, private individuals, and others.	○	○	○	○
14. Government Policy Your company has aware and take advantage on the availability of government policies such as public procurements, regulations, licensing requirements, and others, which favour to the construction business.	○	○	○	○
15. Entrepreneurial Education and Training Your company has frequently participated in the continuing professional development programs such as technical, and business and management trainings.	○	○	○	○
16. Commercial and Professional Infrastructure Your company has actively used and take advantage on the availability of commercial and professional infrastructure such as the availability of subcontractors, suppliers, consultants, professional legal and accounting services, and banking services (checking accounts, foreign exchange transactions, letters of credit, and others).	○	○	○	○
17. Government Program Your company has aware and take granted on the provided support by the government through it programs that supporting the company growth.	○	○	○	○