

Engineering Consultancy Practice (ECP) Business Model in Malaysia: A Structural Equation Modeling (SEM) Approach

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Abstract

The implementation of liberalization in Malaysia has offered opportunities to the Malaysian to expand business. The salient point of liberalization of Engineering Consultancy Practices (ECP) is the opening of the flood gate for non-professionals (including foreigners) to register and operates consultancy practices. This would create an excessive competitive environment to the Malaysian ECP. The aim of this study is to identify the successful business model to be adopted by Engineering Consultancy Practice (ECP) for building its capacity and competitiveness. This study is important in the sense that it serves as one of the pioneer studies, focusing on the engineering consultancy practices, from the perspective of business model. Principal Component Analysis (PCA) is employed to analyze data from a quantitative survey. Three components are extracted through PCA approach: (1) Profit Structure factor, (2) Management Capability factor and (3) Stakeholder Relationship factor. Consequently, Structural Equation Modeling (SEM) is utilized to perform analysis on the data extracted from PCA. Two (2) Business Model Indices are formed to examine the business performance in terms of business model criteria and business performance. Through the data validation, it is found that ECP Business Performance Index is best to evaluate the business performance. Understanding the core values related to the Engineering Consultancy Practices could help the local stakeholders to have better preparation and planning to face a greater challenge lies as a result of the liberalization.

Keywords: Malaysian engineering consultancy practice (ECP), business model, structural equation modeling (SEM)

1. Introduction

Liberalization is first introduced in October 2011 in Malaysian Budget 2012, to be enforced in seventeen (17) sectors, including construction services, i.e. engineering consultancy practices. Engineering Consultancy Practices (ECP) are referring to architectural, civil and structural, mechanical and electrical consultancy and others professional engineer.

The nature of the services sector has changed radically as a result of Malaysia's commitment to the General Agreement on Trade in Services (GATS). The salient point of the changes is that the ownership of the ECP has now opened to the foreign service provider accordingly. Lim (2005) suggested that Malaysian services industries will have to adapt to a more open market environment, where the sector needs to build up efficiency, productivity, and thus competitiveness, through essential market means as it becomes increasingly open to foreign participation and global best practice standards, including transparency of rules and regulations.

The liberalization of the ECP has posed great deal of challenges. While the flood gate of ECP ownership has inevitably opened to the foreign service provider, the huge competitiveness of the environment is foreseeable in the sense that only the winner can survive. Consequently, the liberalization of the ECP has inspired the motive of this study to establish a successful business model to be adopted by ECP for building its capacity and competitiveness. At the meantime, this study serves as the pioneer study in Malaysian ECP in examining their business performance.

The significant of this study can be seen from both the theoretical and practical aspects. From the theoretical aspect, it covers mainly the field of academics and educations. The result of this study is able to enrich the context of the business management in academia and management philosophy. In addition, despite the fact that

this study only focuses on the Malaysian ECP, it can be served as a solid basis upon conducting an international comparative study of the business performance in Southeast Asia or even Asia. This could further broaden the horizon on how to manage a business performance in different geographical locations.

From the practical aspect, the outcome of this study, a causal relationship framework is developed to draw attention of the ECP practitioners, thereby improving the general understanding business management in ECP. Meanwhile understanding the ECP success criteria could help to evaluate the success of a business. Managing business criteria is complex in nature and multifaceted. Also, it is impossible to focus on every aspects of a business performance criteria. Therefore, understanding ECP business success factors and criteria could help to focus the restrained resources on certain aspect of the business (input), thereby enhancing the output of the business.

2. Literature

2.1 *Engineering Consultancy Practice (ECP)*

The Board of Engineers Malaysia (BEM), with the aim of facilitating the registration of engineers and regulating the professional conduct and practice of registered engineers in order to safeguard the safety and interest of the public, was only formed in 23rd August 1972. The BEM is fall in the ambit responsibility of the Minister of Works, where the Board Member and the Registrar is appointed by the Minister. More specifically, for the interest of the public, especially those who come from the background of engineering, it is uncommon that the primary role of BEM is a statutory body enabling the registration of Profession Engineers. With the registration of Profession Engineers, one can legally endorse drawings from their respective discipline, where this act is generally associated with maximizing profit. However, the role of BEM is not limited to registration of Profession Engineers, but also promoting Engineering Consultancy Practices (ECP), which serves as the main subject of this study.

In Malaysia, those either sole proprietorship, partnership or body corporate desirous of practicing as consulting engineers shall register with BEM. As such, the definition of ECP mostly adapted from the rule and regulations of BEM. BEM first defines 'Professional engineering services' as engineering services and advice in connection with any feasibility study, planning, survey, design, construction, commissioning, operation, maintenance and management of engineering works or projects and includes any other engineering services approved by the Board.

Meanwhile, ECP encompass the independent performance of engineering related study, preparation of reports, making design, supervision of construction and similar advisory activities in the engineering disciplines in conformity with generally accepted professional techniques and sound management practices. Also, the requirements and procedure of the ECP has stressed that, regardless of single discipline or multi discipline, the ownership of the ECP must comprise of Professional Engineers, Professional Architects and registered Quantity Surveyors. The ownership of ECP is not open to the public in accordance with the requirements and procedure of the Board as per stated in Engineering Act (7) (A) (1); (2); (3).

The amendment of Engineering Act (2013) due to liberalization has allowed (i) the owner from a sole proprietorship, partners and in case of body corporate, 2/3s of the board of directors and 70% of the equity shall be or with Professional Engineers (local or foreign) with a Practicing Certificate; (ii) ensure that all the decisions of a body corporate shall be made by a Professional Engineer with a Practicing Certificate; and (iii) equity to be stated in these acts is for the ease of future amendments.

The liberalization of the ECP has posed great deal of challenges. While the flood gate of ECP ownership has inevitably opened to the foreign service provider, the huge competitiveness of the environment is foreseeable in the sense that only the winner can survive. Consequently, the liberalization of the ECP has inspired the motive of this study to establish a suitable business model to be adopted by ECP in Malaysia to build its competitiveness.

2.2 *Business Model*

Southeast Asia countries are potentially high growth regions in both local and internationally. This positioning in Southeast Asia countries encourage further development in both public and private partnership, adapting business models for expansion and moving with greater agility. These imperatives will be critical not only for global businesses seeking to expand into Southeast Asia, but also for large domestic businesses that are aiming to assert a leadership position in the region or in Asia more broadly (Accenture, 2011).

Business model remains essential to every successful organization, whether it is a new venture or an established player. It is referring to the organization production and managerial system. It shows a highly simplifies and aggregate form which resources play an important role in the organization. A good business model facilitates the

internal process to transform goods and services into marketable information and products. In addition, the architecture of value creation, strategic as well as customer and market components are considered in order to realize the overriding objective of generating and preserving a competitive advantage. As such, business model enables a firm to have sustainable competitive advantage to perform better than its rival in the long run (Wirtz, 2011; Afuah & Tucci, 2003; Magretta, 2002).

Traditional model is the most common business model in Southeast Asia. Traditional business model creates either service or product to the customers and distributors. The greatest challenge rely on the traditional business model is dependent on the right channel to promote their services or products. The risk is trimmed by a combination of regulation and ethics both aimed at muting competition. The ECP practitioners are realistically aspire to a safe upper middle class, but hardly to be wealthy. This is mainly due to the expansion of the traditional business model is limited (Holger et al., 2009).

Business Excellence Model (BEM) is normally implemented in small and medium enterprise (SME). The model is used to access the business performance core values and concepts embedded in an organization. It helps organization to access their strength and provide guidance to the management. This business model serves as internal business consultant for the ECP in Malaysia (Jha et al., 2003; Robin et al., 2013).

Canvas Business Model is an innovative product, compilation of the existing business models in the market, analyzed and modified to outfit the current scenario in the business management arena. This model has proven its success through Microsoft, Apple, Google, Lego, Facebook, and many others (Osterwalder, 2010). The advantages of the Canvas Business Model are its ability to explore an organization's functions, activities and process interrelated to the business. The renovation of Canvas Business Model in Southeast Asia helps to increase the business performance in this region. The business model core criteria are presented in the Figure 1.

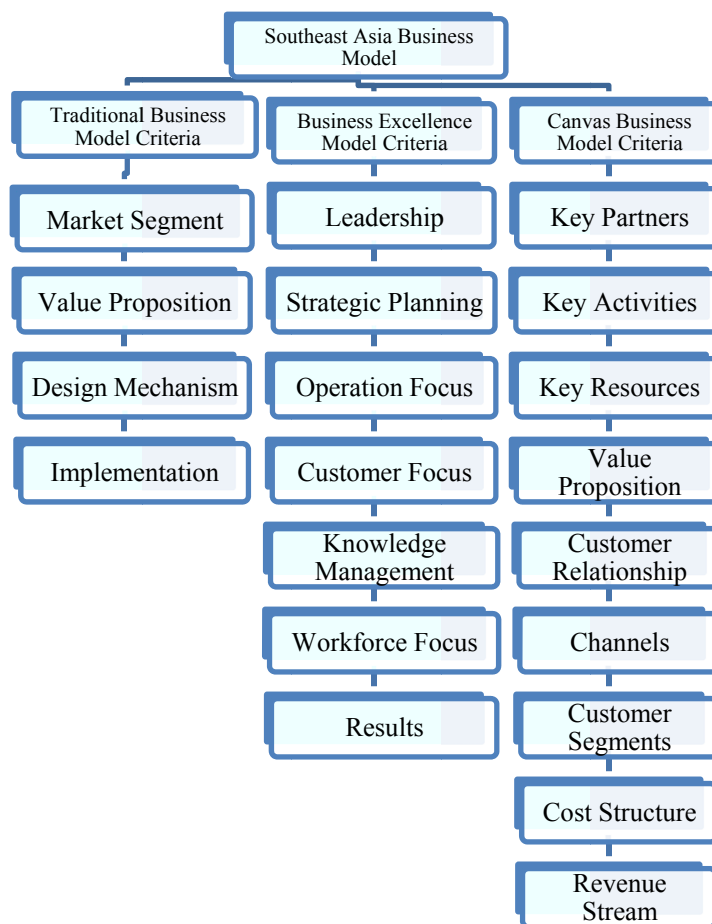


Figure 1. Common business model in Southeast Asia

In general, there are numerous types of business model in business academic studies. The selection of the

business model is based on the suitability and types of the business conducted. A competitive business model articulates the logic and provides that demonstrates how a business creates and delivers value to customers. It is greatly rely on the strategy and innovative renovation in the model to suit the business. The recent stage in business model development is very much depended on structure of an organization, cultural behavior and the potential customers in determining a business model. Taking into consideration of Engineering Consultancy Practice (ECP) business development in Malaysia, the liberalization has brought direct impact to the ECP development, creating competitiveness and flexibility to the ECP service providers. Moreover, the ECP business model development is still considered young in its business performance resulting in the Malaysian ECP today is facing greater challenges in sustaining their business.

The adoption of suitable business model is able to help ECP in managing the firm in a systematic way to ensure revenue stream. As the selection and suitability of the business model is relied on the eleven business core values, hence formation of best ECP business model could be generated by review the core values and criteria to suit the Malaysian consultancy industry.

3. Research Methodology

The review on business model is intended to examine the existing business performance in Malaysian's civil and structure engineer in order to justify their competitiveness in overcoming the challenges due to liberalization. Based on binomial distribution, 95% confidence level of 3500 population size (civil and structure engineers only), 346 sets questionnaire were distributed. 125 sets questionnaire were collected, 84 sets valid questionnaire were received, representing 24.3% of response rate. According to Fellow et al. (1997), the normal expected responses rate is ranging from 25%-35%. Thus, the response rate for this study is considered acceptable.

The questionnaire is designed in 5 points Likert Scale. "5" represent strongly agree, "1" representing strongly disagree meanwhile "3" representing less agree. This is to prevent neutral opinion given by the respondents.

Principal Component Analysis (PCA) and Structural Equation Modeling (SEM) were utilized to examine the causal relationship of ECP business model in Malaysia. One of the main reasons this study employs Structural Equation Modeling (SEM) lies with its capability of modeling the relationship among multiple independent and dependent constructs simultaneously (Zainudin, 2012).

4. Analysis and Discussion

Principal Component Analysis (PCA) is conducted through Statistical Package for Social Sciences (SPSS). The results of PCA are utilized to compute ECP Business Model through Analysis of Moment Structure (AMOS). The analysis is discussed in following sections.

4.1 Principal Component Analysis

Principal Component Analysis is greatly relying on the reliability and sampling adequacy test (Field, 2005). Cronbach's alpha is commonly used to measure of the internal consistency of the factors which correlated to each other. The higher Cronbach's Alpha represent the higher reliability of the variable set. It is suggested that the threshold value for the Cronbach's Alpha is set at 0.7 (Nunnally & Bernstein, 1994). The Cronbach's Alpha recorded in this study is 0.895, suggesting a high internal consistency as well as high level of reliability of the survey instrument. Meanwhile, Kaiser-Meyer-Olkin (KMO) and Bartlett's measure are normally used to measure the sampling adequacy in factor analysis. The threshold value of KMO should be greater than 0.5 if the sample size is adequate (Child, 1990). The test result of KMO is 0.600 suggesting that the sample size is adequate for factor analysis.

As this study involves 69-factors (refer Appendix), for the sake of interpretability, the coefficient display format was set to suppress absolute values of less than 0.7. Meanwhile, the extraction method was set to principal component while the rotation method was set to varimax. As Meyers et al. (2006) suggests the threshold value for the cumulative of total variance explained is 50 per cent total variance explained, the number of groups account for 50 per cent is three as shown in Table 1.

Table 1. Total variance explained of ECP success factors

Component	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	Variance (%)	Cumulative (%)	Total	Variance (%)	Cumulative (%)
1	24.525	35.544	35.544	17.612	25.524	25.524
2	7.181	10.408	45.951	10.285	14.906	40.430
3	5.790	8.391	54.342	9.599	13.912	54.342

The result of PCA is shown in Appendix. There are 20 business model factors extracted from 69 factors, categorized into 3 components, which are profit structure, management capacity and stakeholder relationship. The naming of the components are based on the fundamental consideration relied on the factors extracted in each category. The final result is shown in Figure 2.

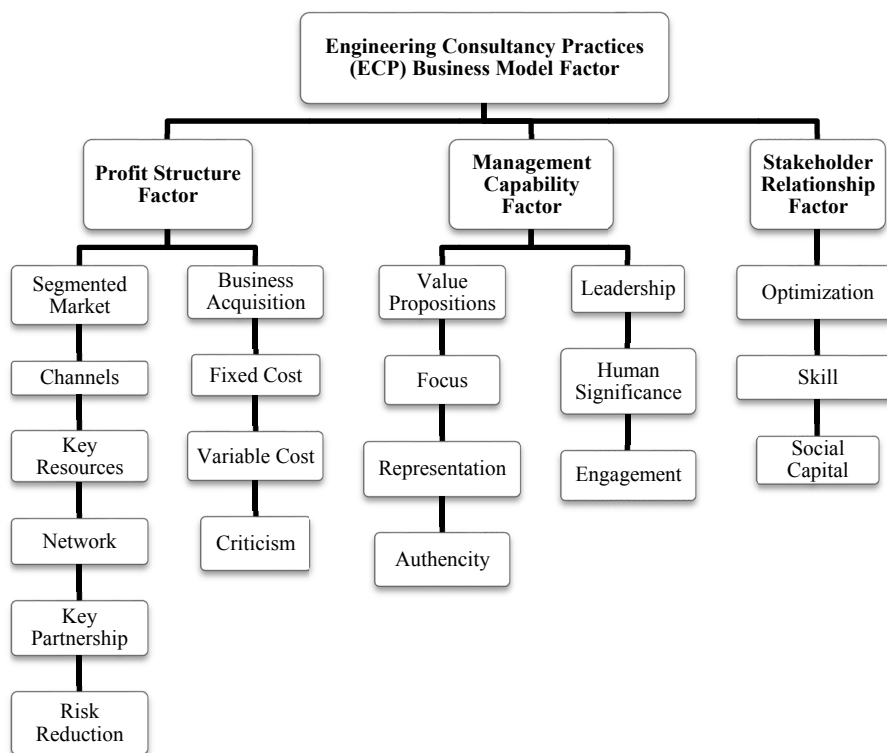


Figure 2. Engineering consultancy practice (ECP) business model factor

4.2 Structural Equation Modeling (SEM)

Before the generation of the ECP Model, the validity of the data should be justified. The justification of the Composite Reliability (CR) and Average Variance Extracted (AVE) is shown in Table 2.

Table 2. Construct composite reliability and average variance extracted

Construct	Composite Reliability (CR)	Average Variance Extracted (AVE)
Profit Structure	0.794	0.556
Management Capability	0.890	0.541
Stakeholder Relationship	0.695	0.440

The threshold requirement for the Composite Reliability (CR) is above 0.60 (Bagozi & Yi, 1988) and the Average Variance Extracted (AVE) is suggested to be above 0.5 (Diamantopoulous & Siguaw, 2000). Table 2

indicated that the AVE for construct Business Model and Management Capability are above 0.5; meanwhile Stakeholder Relationship has recorded 0.440. According to Fornell and Larcker (1981), the construct is considered valid if the CR is above 0.6 although the AVE has recorded less than 0.5. As such, the result in Table 2 indicates that the reliability and validity of SEM data have been testified by achieving the minimum threshold requirements.

Based and the steps and theories in developing SEM model, an ECP model has been generated as shown in following figure.

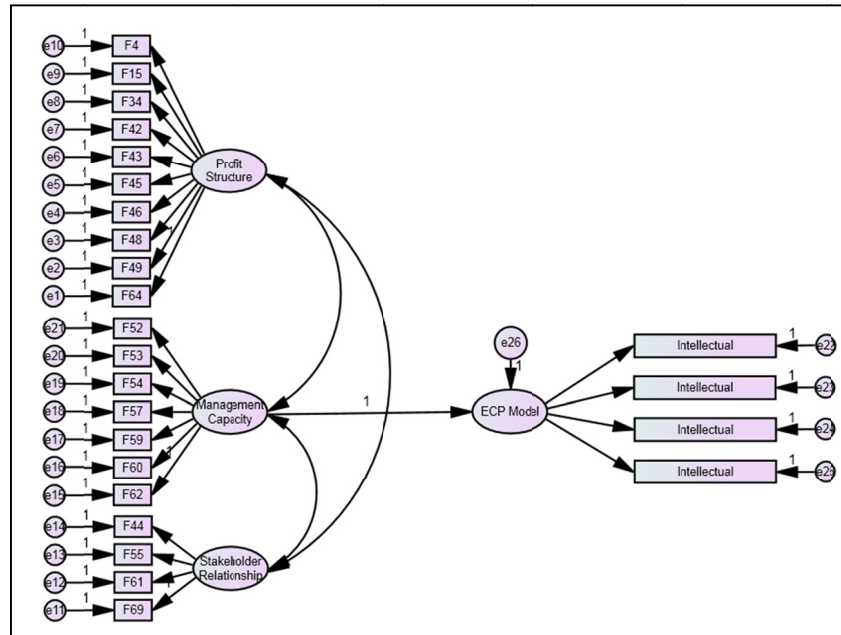


Figure 3. ECP Business model

After the generation of the ECP Model, the Goodness of Fit Measures is conducted to verify the model fitness. The result is shown in Table 3.

Table 3. Goodness of fit measures for model 3

Category	Index	Threshold	ECP Model
Absolute Fit	Chisq (CMIN)	> 0.05	620.689
	Root Mean Square of Error Approximation (RMSEA)	< 0.100	0.145
	Goodness of Fit Index (GFI)	> 0.800	0.601
		0 (no fit), 1 (perfect fit)	
Incremental Fit	Adjusted Goodness of Fit Index (AGFI)	> 0.800	0.521
	Comparative Fit Index (CFI)	> 0.800	0.722
	Tucker Lewis Index (TLI)	> 0.800	0.692
	Normal Fit Index (NFI)	> 0.800	0.601
		0 (no fit), 1 (perfect fit)	
Parsimonious Fit	Chisq/degree of freedom (CMIN/DF)	< 5.0 Or 1-2	2.290

The model is considered fit if either one of the index has met the minimum requirement in a particular category. The most common index to justify absolute fit is Root Mean Square of Error Approximation (RMSEA) and (Goodness of Fit Index). For the Incremental Fit category, Comparative Fit Index (CFI) is best to describe the model fitness meanwhile Parsimonious Fit category is represented by Chisq/degree of freedom (CMIN/DF). The following section will be discussing the development of ECP Model.

It is noted that the model fitness at the first model testing do not achieved the Goodness of Fit. However, the results are considered reasonably accepted. This is due to some of the index has met the minimum requirement of the Goodness of Fit in SEM ECP Model. In conjunction to this, Modification Indices (MI) will be implemented to improve the model fitness. The MI is conducted by covariant the similar characteristic variances in the model. The covariance of similar characteristic variances can be conducted to the variances fall into the same construct only. It is found that F64 has the similar characteristic variance in SEM modification restructuring. Therefore, F64 is covaried to F15, F34, F42 and F46. The detail relationship in covariance the variances can be seen in Figure 4.

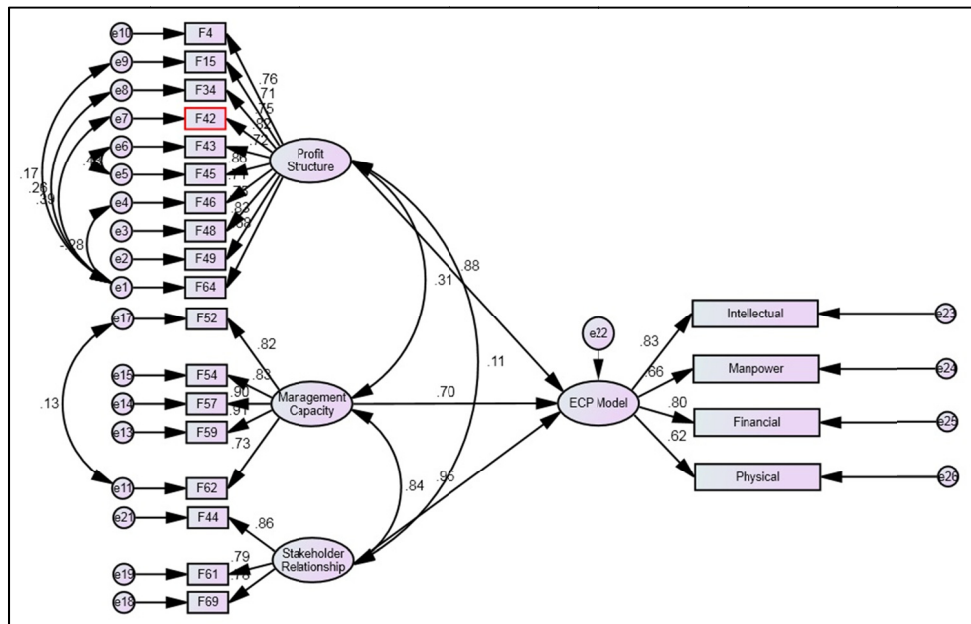


Figure 4. ECP business model

After the MI procedure, the next logical step is to examine the improvement of MI to the ECP Model. A new test is conducted to the ECP model. The results are tabulated in Table 4.

Table 4. Modification indices for ECP business model

Category	Index	Threshold	ECP Model	ECP Model MI
Absolute Fit	CMIN	> 0.050	620.689	229.755
	RMSEA	< 0.100	0.145	0.092
	GFI	> 0.800	0.601	0.741
Incremental Fit	AGFI	> 0.800	0.521	0.667
	CFI	> 0.800	0.722	0.896
	TLI	> 0.800	0.692	0.878
	NFI	> 0.800	0.601	0.755
Parsimonious Fit	CMIN/DF	1-2	2.290	1.522

It is found that the ECP Model MI has an improvement in Goodness of Fit. Based on the data, the model has met the optimum Goodness of Fit in which the model is considered valid from its theory, technical and practical assessment. The final ECP model is shown in Figure 5.

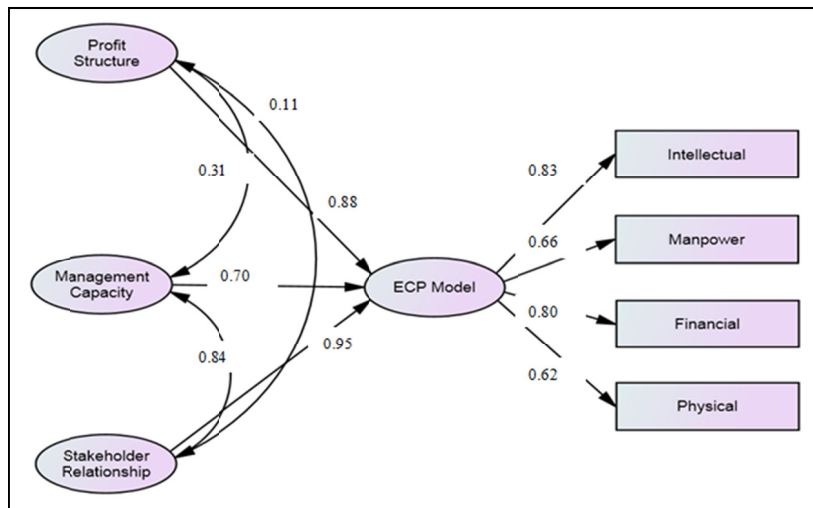


Figure 5. Final ECP business model

4.3 Develop ECP Business Model Index

The development of ECP business model index is essential to provide a preliminary review of a particular ECP business performance. Based on the core values in the ECP business model index, one can predict the most likelihood of the business performance and proper adjustment could be made to improve their business efficiency.

The development of ECP business model index utilizes the standard regression weights as stated in Figure 5. Moreover, the ECP factor in the figure is classified into Profit Structure factors, Management Capability factors and Stakeholder Relationship factors. Therefore, a robust approach has been adapted in this study to formulate the ECP business model index. The relationships between ECP factors are shown in Table 5.0.

Table 5. ECP and its core values relationships

Relationships	Standardized Weight
ECP --> Classifications -->Profit Structure (PS)	.31*.88 = .27
ECP --> Classifications -->Management Capability (MC)	.84*.70 = .58
ECP--> Classifications -->Stakeholder Relationship (SR)	.11*.95 = .11
ECP --> Intellectual (IN)	.83
ECP --> Manpower (MP)	.66
ECP --> Financial (FI)	.80
ECP --> Physical (PH)	.62

Based on the results shown in SEM model, it can be concluded that ECP is a function of summation in business model core values and business resources. The housing delivery performance index formula is shown as follows:

$$\text{ECP Business Model Index} = f(PS, MC, SR) \tag{1}$$

$$\text{ECP Business Performance Index} = f(IN, MP, FI, PH) \tag{2}$$

Two ECP Business Model Index is developed from the SEM. ECP Business Model Index is computed from the business model factors in which the factors are categorized into Profit Structure factors, management capability factors and stakeholder relationship factors. This index explained the theoretical formation of a business. It justified a particular business performance from the theoretical point of view. Meanwhile, ECP Business performance Index is generated from the core values of the factors, grouped into intellectual, manpower, financial and physical. It explained the business performance from the fundamental of a business, the resources needed to set up a business. This index examine the business performance by identifying the strength of a business organization through the knowledge of the top management, human resources in an organization, financial power and equipment and facilities to perform the business.

The next step after the formation of the formula is to introduce a measurement method for the ECP Business Model Index. This could be obtained by referring to the standardized weight in Table 5. Based on the standardized weight tabulated from the SEM model, the equation can be reformed as:

$$\text{From (1), ECP Business Model Index} = 0.27PS + 0.58MC + 0.11SR \quad (3)$$

$$\text{From (2), ECP Business Performance Index} = 0.83IN + 0.66MP + 0.80FI + 0.62PH \quad (4)$$

The equations are then converted to a common value system, in order to evaluate the level of delay in the project by following the rating scale created. This can be achieved through mathematical approach by dividing the standardized weigh with the total standardized weight in the particular equation. The final equations are shown as follows:

$$\text{From (3), ECP Business Model Index} = 0.28PS + 0.60MC + 0.12SR \quad (5)$$

$$\text{From (4), ECP Business Performance Index} = 0.29IN + 0.23MP + 0.27FI + 0.21PH \quad (6)$$

After computing the ECP indexes, a measurement scale is created to measure the business performance. A rating scale from -5 to 5 is created as shown in Figure 6.

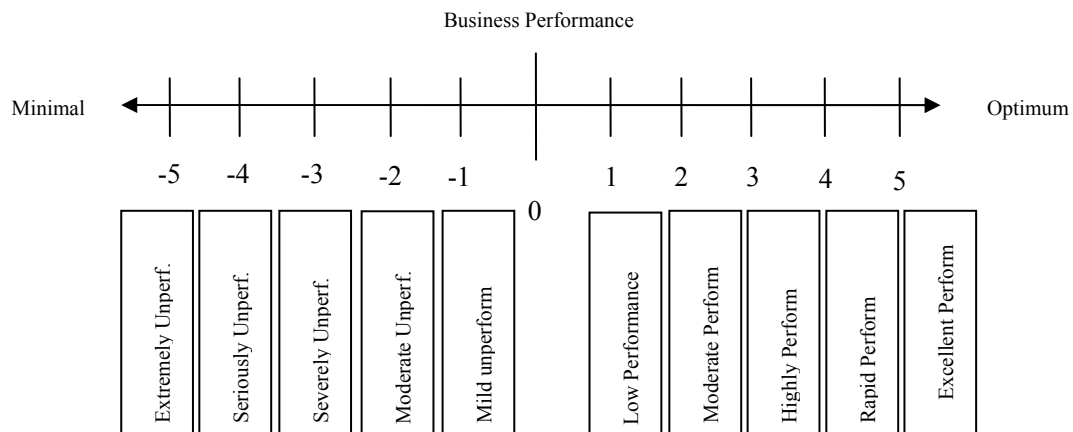


Figure 6. Business performance rating scale

The practitioners are able to examine their business performance by utilizing the rating scale as shown in Figure 6. A minimum of -5 and maximum of 5 is used to measure their business performance according to intellectual, manpower, financial and physical. The final calculation of the business performance index will be rated based on the rating system created in Figure 6.0.

4.4 Data Validation

Five experts are selected to validate the research output, whereby the respondents are currently: (1) Senior Lecturer, Faculty of Management, Universiti Teknologi Malaysia; (2) Immediate Past Chairman, The Institution of Engineers Malaysia (Southern Branch); (3) Vice Chairman, The Institution of Engineers Malaysia (Southern Branch); (4) Honorary Secretary, The Institution of Engineers Malaysia (Southern Branch); (5) Local Authority Officer.

The selection of an academicians in validating the business model is essential to identify the functionality of the business model in terms of theoretical perspective. Justification of the formation of ECP business performance index from the selection of business model core values, categorization and developing performance index is important to validate the methodology framework. The opinions of practitioners such as consultants are undeniable essential.

From the data validation, it is found that ECP Business Performance Index is best to describe a business organization due to its ability to identify the business performance through the strength in business resources.

5. Conclusion

The concept of Engineering Consultancy Practices (ECP) in Malaysia is explored. Understanding of ECP would result in the building its capacity and competitiveness to face the great challenges due to the liberalization. As this study serves as the pioneer study that focuses on the ECP in Malaysia from the aspects of business model

factor and a structural model that depicts the relationships between ECP factors and criteria.

Investigation into the ECP success factors reveals three main components namely Profit Structure factor, management capability factor and stakeholder relationship factor. The three components, together with four criteria namely intellectual (knowledge, patents, copyrights), human (manpower), financial (cash, stocks) and physical (facilities, building) form the input data and output data for an ECP model. More specifically, ECP success factors provide input into the ECP model, which is evaluated by four ECP criteria as mentioned. The development of the ECP model is important in the sense that it provides insight into: (1) the depiction of relationships between the ECP success factors and ECP success criteria, (2) the formulation of an ECP business performance index ($0.29IN+0.23MP+0.27FI+0.21PH$).

The model proved its practicality through case studies validation. The practitioners are able to identify their business performance through the ECP Business Performance Index which examining their business intellectual property, financial, manpower and physical assts. These four criteria highlighted the essence of a business model. Therefore, the ECP Business Performance Index is considered comprehensive in terms of practicality and reliability.

There are few considerations have been taken while carrying this study. Due to the resources and time constraint, the study is limited to, Civil & Structure Engineering Consulting firms in Malaysia; the study is conducted to large, medium and small consulting firms and the social desirability bias is omitted. Meanwhile, data collection is carried out through questionnaire survey in Malaysia, therefore the social desirability bias is omitted.

Apart from that, there is limitation lies with the methodology such as the method employed in this study, Structural Equation Modeling. Given the dataset of this study consist of 84 sets returned valid questionnaire, future studies may require more set of questionnaire. Also, more case studies are needed to validate the findings of this study. Both quantitative and qualitative approach is needed to investigate into the issues regarding the Engineering Consultancy Practices (ECP) in Malaysia.

In addition, as this study serves as one of the pioneer studies into the Engineering Consultancy Practices (ECP), the focus of this study (success factors) is rather broad and more specific case studies are needed to comprehensively look into the issues related to ECP. Finally, as a result of globalization, more comparative study across countries should be encouraged to compare the issues related to ECP across geographical location.

References

- Accenture. (2011). *The Time for Regional Expansion is Now Why Businesses are Gravitating towards Southeast Asia as a New Growth Destination*. Retrieved From <http://www.accenture.com/Microsites/accenture-innovation-center-asia-pacific/Documents/pdf/Accenture-The-Time-for-Regional-Expansion-is-Now.pdf>
- Alexander, O., & Yves, P. (2010). *Business model Generation*. New Jersey: John Wiley & Sons, Inc., Hoboken.
- Allan, N. A., & Christopher, T. (2003). *Internet Business Models and Strategies: Text and cases*. New York: McGraw-Hill.
- Bagozzi, R. P., & Yi, Y. (1988). On the Evaluation of Structural Equation Models. *Journal of the Academy of Marketing Science*, 16, 74-94. <http://dx.doi.org/10.1177/027753024002008>
- Bernd, W. W. (2011). *Business Model Management, Design, Instrument, Success Factors*. University of Speyer Freiherr-vom-Stein-Strape.
- Diamantopoulous, A., & Sigaw, J. (2000). *Introducing LISREL*. London: Sage Publication.
- Fellows, R., & Liu, A. (1997). *Research Methods for Construction*. Oxford: Blackwell Science Limited.
- Field, A. (2005). *Discovering Statistic using SPSS for Windows*. London: Sage Publications.
- Fornell, C. (1983). Issues in the Application of Covariance Structure Analysis: A Comment. *Journal of Consumer Research*, 9(4), 443-448. <http://dx.doi.org/10.1086/208938>
- Holger, K., Konrad, V., Gregor, S., & Jorge, C. (2009). Service Engineering in Business Ecosystems. *German Federal Ministry of Economy and Technology*.
- Jha, V. S., & Sreedhara, T. N. (2003). Strategic Issues in Business Excellence and Benchmarking for competing in the 21st Century-An Indian Context. *Quality Management Forum Journal*, 29(3). <http://dx.doi.org/10.1.1.307.9409>
- Lim, C. S., & Mohammad, M. Z. (1999). Criteria of Project Success: An Exploratory Re-examination.

International Journal of Project Management, 17(4), 243-248.
[http://dx.doi.org/10.1016/S0263-7863\(98\)00040-4](http://dx.doi.org/10.1016/S0263-7863(98)00040-4)

Magretta, J. (2002). Why business models matter. *Harvard Business Review*, 80(5), 86-92.

Meyers, L. S., Gamst, G., & Guarino, A. J. (2006). *Applied Multivariate Research: Design and Interpretation*. Thousand Oaks: Sage Publications.

Zainudin, A. (2012). *Structural Equation Modeling Using Amos Graphic*. UiTM Press.

Appendix

Rotated Component Matrix ^a	Component		
	1	2	3
Fac1-Customer Segments			
Fac2-Mass Market			
Fac3-Niche Market			
Fac4-Segmented Market	.743		
Fac5-Value Propositions		.731	
Fac6-Newness			
Fac7-Performance			
Fac8-Customization			
Fac9-Getting the Job Done			
Fac10-Price			
Fac11-Cost Reduction			
Fac12-Risk Reduction			
Fac13-Accessibility			
Fac14-Convenience			
Fac15-Channels	.705		
Fac16-Awareness			
Fac17-Evaluation			
Fac18-Purchase			
Fac19-Delivery			
Fac20-After Sale			
Fac21-Customer Relationships			
Fac22-Personal Assistance			
Fac23-Self Service			
Fac24-Automated Service			
Fac25-Communitie			
Fac26-Revenue Streams			
Fac27-Asset Sale			
Fac28-Usage Fee			
Fac29-Subscription Fees			
Fac30-Renting			
Fac31-Licensing			
Fac32-Advertising			
Fac33-Pricing			
Fac34-Key Resources	.736		
Fac35-Intellectual			
Fac36-Human			
Fac37-Financial			
Fac38-Physical			
Fac39-Key Activities			
Fac40-Production			
Fac41-Problem Solving			
Fac42-Network	.800		
Fac43-Key Partnership	.775		

Fac44 -Optimization		.749
Fac45 -Reduction	.855	
Fac46 -Acquisition	.716	
Fac47 -Cost Structure		
Fac48 -Fixed Cost	.768	
Fac49 -Variable Cost	.779	
Fac50 -Economies of Scale		
Fac51 -Economies of Scope		
Fac52 -Leadership		.763
Fac53 -Intent		
Fac54 -Focus		.793
Fac55 -Skill		.707
Fac56 -Form		
Fac57 -Representation		.864
Fac58 -Imagination		
Fac59 -Authenticity		.844
Fac60 -Engagement		.872
Fac61 -Pleasure		.802
Fac62 -Human Significance		.821
Fac63 -Context		
Fac64 -Criticism	.728	
Fac65 -Innovation		
Fac66 -Value		
Fac67 -Pro-activity		
Fac68 -New Plan		
Fac69 -Social Capital		.785

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