

Grooming of Malaysian Sustainable Engineering Consultancy Firms

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Abstract. The capacity of large engineering consultancy firms in Malaysia has generally been stagnant for the last 25 years. One of the top five consulting firms in ACEM in 1990s is now no longer in the ACEM's list. We have little chance to compete regionally without capacity. Consequently many local mega projects are led by foreign engineering firms. Malaysian engineering consultancy firms lack capacity for big or mega projects although we may have the capabilities individually in small specialist firms. Our largest consultancy firm is about 1% of the largest engineering consultancy firm in the world. The largest engineering consultancy firm in the world has a staff-strength of 52,000 with annual revenue of about US\$6.5 billion or about US\$10,000 per man-month. In comparison, Malaysia's largest engineering consultancy firm has only about 500 staff with much lower annual revenue. Our engineering consultancy firms face numerous challenges for sustainability and growth. Ownership structure which does not promote sustainability is the main challenge. In fact it encourages fragmentation of engineering consultancy firms. This paper outlines a solution for growth and sustainability with government facilitation but without extra cost to our government. The government only needs to refine and realign the procurement system that promotes growth and sustainability. Our consultancy firms could grow with a few of them double their size and capacity within about five years. This proposal could groom Malaysian engineering consultancy firms for growth and competitiveness, and even to export our services overseas.

Keywords: Sustainable consultant, capacity of consultant, export of services.

1.0 Introduction

The capacity of large engineering consultancy firms (ECF) in Malaysia has generally been stagnant for the last 25 years. Consultancy firms regardless of their sizes have been confronted with sustainability problems; one of the top five consulting firms in Association of Consulting Engineers Malaysia (ACEM) in 1990s is now no longer in the ACEM's list and many firms are no more active or had closed down after the founders had retired. Malaysia's engineering consulting firms have little chance to compete regionally mainly because we lack capacity (size) although we may have the capabilities individually. Consequently many local mega projects are led by foreign engineering firms despite most of these projects are of similar engineering/technical nature to the projects previously carried out in this country for the last fifty years i.e. since independence. In summary, the government, government linked companies (GLC), private sectors and also local engineering consulting firms themselves had failed or unable to allow our engineering consultancy firms to grow.

No.	Name of Firm	Total No. of Staff		
		1990	2000	2010
1	Sepakat Setia Perunding (M) Sdn Bhd	400	373	503
2	Minconsult Sdn Bhd	509	473	450
3	Ranhill Bersekutu Sdn Bhd	290	450**	450**
4	HSS Integrated Sdn Bhd	-	330	370
5	SMHB Sdn Bhd	-	304	300
6	G&P Professional Sdn Bhd	-	20	212
7	Kumarasivan Tan & Ariffin Sdn Bhd	193	341*	205*
8	Jurutera Konsultant (SEA) Sdn Bhd	262	-	-

Note :

1. Numbers mainly obtained from ACEM Directory.
 - * Name changed to KTA Tenaga Sdn Bhd
 - ** Number provided by personal correspondences

Many factors are discouraging our local consultants to grow. The main challenges are:

- i) Mismatch in appointment of consultancy firms to projects by our government
- ii) Capacity or size of consultancy firms.

The size of our largest consultancy firm is only about 1% of the largest engineering consultancy firm in the world. The largest engineering consultancy firm (ECF) in the world has a staff-strength of over 50,000 and Malaysia's largest ECF has only about 500. Malaysia's ECF faces numerous challenges for sustainability and growth. One of the main stumbling blocks is the mentality of the owner of the local ECF on sustainability as reflected in their ownership structure. In fact most of the existing ownership structures of consultancy firms indirectly encourage fragmentation of ECF.

Furthermore, excessive professional fees competition results in low salary for engineers. This further aggravates the situation leading to a brain drain of our engineers to neighbouring countries.

This paper outlines a solution for growth and sustainability with government facilitation and this could be done without extra cost to our government. The government only needs to refine and realign the procurement system that promotes growth and sustainability. Our ECF could grow with a few of them able to double their size and capacity within three to five years. This proposal could groom Malaysian engineering consultancy firms for growth and competitiveness, and to even export our services overseas for better income generation.

2.0 Challenges Faced by Engineering Consultancy Firms

If we were to look at the historical trend of salary of engineers working in engineering consultancy services sector in Malaysia, a sad picture will prevail. The starting salaries of engineers have not increased much over the past 20 years. In fact, the actual net value of income (buying power taking into consideration of inflation) has been reducing. This is against our government's aspiration to be a high income economy by year 2020. This trend of reducing net value of income is reflected in the stagnant growth of local ECF and limitation of ECF to largely operate within local markets only. They lack capacity to export their services overseas. These two problems are inter-related and should be addressed in tandem.

There are many reasons that limit the growth of our local ECF which can be summarised as follows:

- 1) Most of the Malaysian engineering consultants only carry out local (Malaysia) projects and do not have the capacity or ambitions to expand their consultancy services overseas. With less opportunity, this would mean less income and also less flexibility to deal with the local economic cycle resulting in downsizing or retrenchment during economic downturns such as those in the late 1980s and 1990s.
- 2) Local ECF mostly work as sub-consultant to foreign consultants for mega projects implemented even in our own country by the government or government linked companies (GLC) or private companies. The project proponents frequently have a subconscious colonial perception that foreign firms are more technically superior than local firms, thus not giving chance to local firms to be the lead engineer. The perception of foreign engineering consultants being better than local consultants has to be changed as this perception will lead to relying on foreign experts instead of grooming local experts for nation building.
- 3) The Malaysian Government sometimes award contracts for engineering consulting works without due consideration of the full evaluation procedures with regard to the capacity and capability of the ECF. This leads to many large projects being awarded to Consulting firms which are incompatible to the size and complexities of the project. As a consequence, many of these projects were plagued with problems of design not being up to standard, failures affecting public safety with some involving fatalities, cost overruns and significant delay in completion of projects. According to Gue & Tan (2006), 60% of failures of slopes in projects are linked to inadequacy in design. This clearly reflects the importance of engaging an ECF with good capacity and capability.
- 4) Stiff competitions among consultants for limited projects available in Malaysia results in unsustainable lowering of professional fees. Such practices with the hope to be more competitive caused these ECF to have difficulty in giving a reasonable salary to engineers and other supporting staff. The ECF are also not able to provide sufficient resources to work on the project resulting in over-work and poor quality of the deliverables. In the long term, this will encourage emigration of our best engineers to high income economy who are able to offer much better remunerations.

- 5) Limited capital investment into ECF other than from professional engineers as the current Act prevents non professionals from owning shares in consultancy firms. This environment restricts the industry from getting capital for expansion which indirectly affects employment and salary of engineers working in this industry. It would also affect firms from exploring overseas market which require substantial financial investment.
- 6) It has also been a trend for many engineering consulting firms in Malaysia to lose their key senior engineers for the following reasons :
 - Little prospect of significant ownership in consulting firms as the equity is largely controlled by a few owners, mostly founders of the firms. Thus some of Malaysia's ECF is more like family-owned firm.
 - Migration of engineers to other countries for better prospects causing Malaysia to lose "trained brains" and professionals to other countries.
- 7) Consulting firms in Malaysia have become fragmented and unable to grow in size with sufficient capacity and capability to compete in the international markets. The top few consulting firms have about 500 staff each compared to more than 10,000 staff for each of the top 10 engineering consulting firms in the world. For example, Arcadis Global from Netherlands which has about 15,000 staff is third (3rd) largest in Europe and the eighth (8th) largest consulting firm in the world despite the Netherlands having a population of only 16.5 million which is even smaller than Malaysia.
- 8) Some of the Malaysian engineering consulting firms may have impressive project CV in their company brochures for a specialised field, but without the key senior engineers in that field as most of them have left or retired, they lack the real capability and capacity to deliver.
- 9) Many top engineering consulting firms in Malaysia also have difficulties in retaining knowledge and experience as a result of the equity structure which does not nurture commitment from senior staff and does not encourage future investments in the knowledge management system. Very often substantial knowledge and experience are lost once key senior engineers retire or resign from the firm. There is little long-term planning or succession plans to continually nurture future leaders. This hinders the development of sustainable consulting firms for Malaysia.

Understanding our problems, we have to make the right changes to correct the wrong. Some of the recommendations are:

- 1) Ownership structure of engineering consulting firms (ECF) in Malaysia shall be revamped through encouragement by the Government or GLC to groom sustainable ownership model for ECF.
- 2) Proper merit based and structured procurement system to ensure quality and value-added services. Government and GLC should give opportunity for local firms to lead mega projects. Local engineering consultants can import foreign expertise in the field that they are not familiar with or lack expertise. This will achieve the technology transfer that will help nation building and growth of technical know-how. Nevertheless, any sub-consultancy shall be limited to not

more than 25% to ensure significant participation of local ECF. Joint Venture partnerships should encourage partnering firms to merge in the long-term.

- 3) Government should encourage and groom ECF that has ownership system to retain key experienced engineers, who consistently provide high quality of service and has a structured and systematic knowledge management system. The sustained growth of this type of ECF will benefit the nation as a whole in terms of improved quality of engineering works in Malaysia as well as exporting Malaysian expertise abroad to increase our national earnings. It will also provide reliability for our own mega projects. What is important is that all these can be carried out without extra cost or burden to the Government.

3.0 Concept to Groom Local Engineering Consultancy Firms

The Malaysian Government to date still do not have a comprehensive and systematic plan to groom local engineering consulting firms (ECF) based on capacity and capability although it was discussed for some 25 years. Therefore it is time to implement a comprehensive roadmap and plan to achieve the following objectives:

- 1) Introduce a comprehensive list of Malaysian sustainable ECF with specialisations. Groom a list of local sustainable consulting firms into world class specialist consulting firms in each field that can compete with international firms overseas.
- 2) The model consulting firms must be technically superior in their particular field of engineering, with sufficient capacity (e.g. staff of relevant qualifications and experiences) and to possess a sustainable ownership structure for long-term growth and not short-lived by the retirement or decease of the directors.
- 3) Government policy of grooming bumiputra participation in ECF could be incorporated into the programme.
- 4) Facilitate participating ECF to achieve Malaysia's own group/list of sustainable consulting firms that could compete in international market.

4.0 Macro Implementation Plan

The following stages in sequence are needed to achieve the objective of grooming local consulting firms so that they would be able to grow sustainably and to compete internationally:

Stage I : Comprehensive listing of Sustainable ECF

Stage II : Grooming of participating Sustainable ECF

Stage III : Export of Services by Sustainable ECF

The Government should identify a one-stop agency to implement the plan. The organisation that should be able to carry out this plan is the Ministry of Works.

5.0 Stage I : Comprehensive listing of Sustainable ECF

The Government shall first carry out an evaluation of all Engineering Consulting Firms (ECF) in Malaysia that wish to participate (on a voluntary basis) in the “Sustainable ECF Programme”. This listing can be split into two parts. The ECFs will first have to qualify themselves as a sustainable engineering company through looking at their ownership structure, systems, training and knowledge management. The second part is to categorise the ECF by their technical capability and staff capacity into each field of engineering. The Government needs to groom ECF that have enough specialists in different field of engineering to compete with international consultants. This can be administered by a one-stop government agency. Each participating ECF will be rated (e.g. using points system) and awarded Sustainability Points under a Company Level and an Individual Level assessment. Further elaborations of the criteria and points system are presented below.

5.1 Part 1 – Company Level Assessment to be classified as a Sustainable ECF

In order to qualify for participation in the programme, the ECF will first need to obtain a certain minimum points awarded according to its ownership structure, quality assurance system, training and knowledge management. A total of 100 points shall be allocated according to the different categories below.

5.1.1 Sustainable Ownership Programme (60 points)

In order to encourage long-term sustainability of the ECF in terms of ownership for engineers, points are given to ECF that encourage and practice sharing or grooming of engineers to be partners in the company with the following criteria:

- 1) Identify engineers that have potential for long term growth of company to be shareholders or to have profit sharing through dividend or equivalent like any other shareholders.
- 2) Profit sharing should not be monopolised by a few owners/shareholders only and to be shared with key and senior staff.
- 3) Non-executive shareholders who are not practicing or not involved in daily operation of the company will have less points.

Profit sharing here excludes bonus to staff. Profit sharing is part of profit that the company issues to shareholders as dividend or other incentives. In addition, a sustainable ECF must have a certain size or capacity in order for it to compete and work effectively. As it is part of the Government objectives to groom ECF who possess both capability and capacity and to eventually compete in the global market, the sustainable ECF shall have a minimum core size of professional staff of not less than 20.

The points to be allocated for different ownership structure to promote sustainable ECF programme are as follows:

Table 2 – Points Allocated for Sustainable Ownership Programme	
Percentage of Profit Share	Points
Profit sharing to be shared by <10% of total professional staff strength of each company.	0
Profit sharing to be shared by 10% to <15% of total professional staff strength of each company.	10
Profit sharing to be shared by 15% to <20% of total professional staff strength of each company.	20
Profit sharing to be shared by 20% to <25% of total professional staff strength of each company.	30
Profit sharing to be shared by 25% to <30% of total professional staff strength of each company.	40
Profit sharing to be shared by 30% to <35% of total professional staff strength of each company.	50
Profit sharing to be shared by >35% of total professional staff strength of each company.	60
Note :	
1. The company shall have a professional staff strength of at least 20 people.	

5.1.2 Quality Assurance and Quality Control (QA/QC) System (15 points)

Quality Assurance and Quality Control (QA/QC) involves very wide coverage in ECF. In the most basic term, a ECF must have a structured system of check and review to ensure that the design works are carried out effectively with quality output. However, one of the easiest ways of allocating points is to base on ISO9001:2000 certification by government recognised certification body (e.g. SIRIM, etc).

Table 3 - Points Allocated for Quality Assurance and Control System	
Description	Points
ECF without ISO9001:2000 Certification	up to 10
ECF that maintain certification of ISO9001:2000	15
Note :	
1. For companies without ISO9001, the points are to be based on the quality of the existing system.	

5.1.3 Training and Knowledge Management (25 points)

A comprehensive training programme and knowledge management system are essential for the ECF to be competitive in terms of technical knowledge. Dissemination of knowledge and experience from senior staff to junior staff and also lessons learned from each project are essential parts of successful ECF. Since the main objectives of such training programme is to improve and disseminate TECHNICAL knowledge and experience, only ENGINEERING based structured training is taken into account.

The points to be allocated for structured training and knowledge management are as follows:

Number of Technical Training	Points
Company arranged less than 12 events of <i><u>technical</u></i> training a year	0
Company arranged 12 to 24 events of <i><u>technical</u></i> training a year	10
Company arranged 25 to 36 events of <i><u>technical</u></i> training a year	15
Company arranged 37 to 48 events of <i><u>technical</u></i> training a year	20
Company arranged more than 49 events of <i><u>technical</u></i> training a year	25
Notes: <ol style="list-style-type: none">1. <i>Technical Training</i> includes in-house or external engineering talks, presentation, colloquium, conference, seminar on engineering aspects of works. It is recommended that each training event to be at least 1hour duration and that the in-house training should be limited to not more than 80% of the total technical training.2. Each event shall be on different topics. The engineer who attended the training event shall provide a one page summary stating the topic, name of presenter, organiser, date, duration, venue and a brief account of the presentation.	

It is recommended that only ECF that achieves a **minimum point of 60** and committed to increase the score based on the total of Part 1 assessment is allowed to participate in the Sustainable ECF Programme.

5.2 Part 2 – Individual Level Assessment for Listing of Professional Staff in Each Field of Engineering

The second part is required for grooming of local engineering consulting firm (ECF) that are able to compete in international market in both capacity and technical capability. A comprehensive evaluation system of each ECF should be categorised into different fields of engineering. A few simple categories are given as follows:

- High-rise Structures (e.g. pre-stressed, shear wall, load bearing wall, etc.)
- Bridges (e.g. various type of bridges, box girder, cable-stayed, suspension bridges, etc.)
- Highway and Transportation (e.g. alignment design, infrastructures, etc.)
- Geotechnical (e.g. ground treatment, foundation, slopes and landslides, basement excavation, coastal geotechnics, etc.)
- Water Treatment Plant and Water Supply (e.g. dam, water supply piping, water treatment plant process, etc.)
- Water Resources (e.g. catchment study, flood mitigation, hydraulics and hydrology analysis, dam break study etc.)
- Waste Treatment (e.g. sanitary, industrial, etc.)
- Coastal and Marine Structures
- Mass Housing Development
- Oil & Gas
- Processes and System (e.g. factories, plants, etc.)
- Green Technology (e.g. environmental friendly technology, etc.)

Senior Engineers and above with at least 5 years of working experience will need to declare one major specialist skill set under which they operate. They will then be given an individual point based on the criteria below.

Table 5 – Points Allocated for Professional Staff in the Design Office (registered with the Board of Engineers, Malaysia)	
Points (N)	1 point for every full year of work experience up to a maximum of 15 points
Notes:	
<ol style="list-style-type: none"> 1. Only for full-time professional staff (with evidence of EPF contribution) shall be given full points (N). The total professional staff shall include all engineering graduates as well as graduates in related specialist skills area such as geologist and hydrologist. 2. Part-time staff should be based on ratio of actual time spent on the ECF which needs to be justified with evidence of time input records. If no evidence, maximum allowable points (N) are limited to 10% of the individual point only. 	

Table 6 – Multiplying Factors for Engineers based on Professional Recognition	
Basic Professional Recognition	Multiplying Factor (M)
Engineer without P. Eng. and other professional staff	1.0
Engineer with P. Eng (with “Ir.”)	2.0
Note: 1. Professional staff who are non-engineers but hold a degree in the relevant fields such as geologist, hydrologist, environmental scientist may be considered for the above points system.	

Table 7 – Value Added to Multiplying Factors	
Additional Professional Recognition & Bumiputra Participation	Value Added (V) to Multiplying Factor
Engineer registered with the Board of Engineers Malaysia (BEM) as Accredited Checkers (AC)	0.2
Engineer recognised and professionally registered with regional or international engineering organisations	0.1 each up to a maximum of 0.2
Recognition in the specific field of specialisation by peers (exclude in-house) such as to give presentation, lecture or publish technical papers in seminar, workshop, forum, conference: <ul style="list-style-type: none"> • If nos. >5 but (\leq) 10 • If nos. >10 but (\leq)15 • If nos. >15 	0.1 0.2 0.3
Bumiputra staff	0.1
Note : 1. The regional and international organisations shall include the Asean Chartered Professional Engineer (ACPE) and the APEC Engineer and International Engineer (EMF)	

6.0 Stage II : Grooming of participating Sustainable ECF

The Government should allocate certain portion of engineering consulting jobs for the participating Consultants (ECF). The Government agency in charge of this plan can use these projects to groom the ECF in “*Sustainable ECF Programme*” and also use these projects to evaluate the performance of the ECF.

To groom a consultant firm with 500 to 1000 staff, the Government only needs to provide projects with fees of about RM40m, which is about 3.5% of the yearly allocation. If we align less than 20% of the government projects to the sustainable firms with capability, we could grow about five large firms to double their size. However, growth has to be manageable, it should not grow too fast unless it is a merging by specialist firms. A reasonable growth will be to double in size in 3 to 5 years.

Only ECF that fulfil the requirements of the Part 1 – Company Level Sustainability Points of 60 and above will be included. This is to encourage and ensure dedicated participation of ECF in the programme. These government consulting jobs will be used by the Agency to motivate Malaysian ECF to improve and grow. With this incentive, these ECF will not have the worry of not able to survive due to lack of projects when they have to spend extra effort to “upgrade” to fulfil the Government’s aspiration to be world class ECF. Yearly or half-yearly evaluation of participating ECF shall be carried out to ensure compliance to the requirements in the programme.

6.1 How the Sustainability Points System Works?

A central agency shall keep a list of participating ECF with their Company and Individual Level points and it is expected that the list will be updated on a yearly or half-yearly basis. Subsequently, for new projects by the government or government-linked companies, the project proponent can then select from the list and invite say three to five of the ECF who are suitable in terms of capability and size to bid for the project.

One key requirement will be that the project proponent needs to issue the anticipated man-power requirements for each different field of engineering required. It is also important that the ECF have sufficient capacity to handle the project. As a control measure, the total number of existing professional staff of the ECF shall be at least **1.5 times** the number of staff required for the project. The reason for this is that the ECF is likely to be involved in other engineering projects and hence will need to divert resources to serve its other obligations in existing projects.

The ECF will then be assessed based on the Total Sustainability Points obtained for the company and individual level assessments as follows:

$$\text{Total Sustainability Points} = \frac{\text{Company Points}}{100} \times \sum \text{Individual Points}$$

where the Individual Points are based on the points attributable to the number of professional staff as specified by the project proponent for the area of practice; and who will be committed to work on the project if the ECF is subsequently awarded the consultancy agreement.

The above Sustainability Points assessment is carried out to ensure that the participating ECF are sustainable in terms of ownership structure, Quality Assurance system, training and knowledge management as well as possessing the required technical capability to carry out the works.

In order to illustrate the Sustainability Points System, a typical government project with 4 interested ECF participating in the evaluation process is presented below. The project involves Construction of a 10-km two-lane dual carriageway through hilly terrain. Details of the project are shown below:

Table 8 – Example of Project where the Sustainability Points System is applied	
Project Proponent	Jabatan Kerja Raya, Cawangan Jalan
Project Brief	Construct a 10-km two-lane dual carriageway through hilly terrain
Project Stage	Detailed Design
Estimated Man-power Required from Designer	<p>1 no. Project Director or Team Leader with minimum 10 years of experience in Road Construction</p> <p><u>Team of Designers, each to be led by a Senior Engineer with at least 5 years of relevant experience supported by two Engineers or relevant specialists as follows:</u></p> <ul style="list-style-type: none"> • 2 teams of Road Works and Drainage Designer • 2 teams of Geotechnical Designer • 1 team of Bridge Designer <p>Hence total number of professional staff required is $1 + (5 \times 3) = \mathbf{16}$.</p>

There are 4 ECF who are interested to bid for this project under the Sustainable ECF Programme. A brief bio-data of these companies are as shown below:

Company A

- large multi-disciplinary design consultant with 100 professional staff
- Profit shared by 15% to <20% of total professional staff strength
- ISO 9001 certified
- Company arranged more than 49 events of technical training a year

Company B

- medium-sized specialist firm dealing with road works with 30 professional staff
- Profit shared by 25% to <30% of total professional staff strength
- ISO 9001 certified
- Company arranged 25 to 36 events of technical training a year

Company C

- large multi-disciplinary design consultant with 100 professional staff

- Profit shared by <10% of total professional staff strength
- ISO 9001 certified
- Company arranged more than 49 events of technical training a year

Company D

- small to medium-sized specialist firm dealing with road works with 20 professional staff
- Profit shared by 30% to <35% of total professional staff strength
- ISO 9001 certified
- Company arranged 12 to 24 events of technical training a year

Out of the 4 companies, only Company A, B and C are able to qualify to bid for the project in terms of capacity. Company D does not qualify since its total professional staff strength is less than 1.5 times the required man-power of 16 persons.

The points allocated to the remaining companies under the Part 1 - Company Level assessment is presented below:

Table 9 – Comparison of Points for Part 1 : Company Level Assessment			
Criteria	Company Points Allocated		
	Company A	Company B	Company C
Sustainable Ownership Programme	20	40	0
QA/QC System	15	15	15
Training and Knowledge Management	25	15	25
Total	60	70	40

Based on the above Company Points, Company C does not qualify as its points are less than the minimum 60 points required. The Part 2 – Individual Level Assessment for Company A and B is then carried out and presented below:

Table 10 – Part 2: Individual Level Assessment for Company A

Staff Detail	Individual Points Allocated							M+V	Sub-total
	Years of Experience	Multiplying Factor, M	Value added to Multiplying Factor, V						
			Accredited Checker	Recognition	Papers	Bumiputra			
Project Director	20*	2	-	0.1	0.1	0.1	2.3	34.5	
<u>Road Works 1</u>									
Senior Engineer	13	2	-	0.2	0.2	0.1	2.5	32.5	
Engineer	6	2	-	-	0.1	-	2.1	12.6	
Engineer	1	1	-	-	-	-	1.0	1.0	
<u>Road Works 2</u>									
Senior Engineer	8	2	-	0.1	0.1	-	2.2	17.6	
Engineer	5	2	-	-	-	0.1	2.1	10.5	
Engineer	3	1	-	-	-	-	1.0	3.0	
<u>Geotechnics 1</u>									
Senior Engineer	15	2	0.2	0.2	0.3	-	2.7	40.5	
Engineer	7	1	-	-	0.1	-	1.1	7.7	
Engineer	4	1	-	-	-	0.1	1.1	4.4	
<u>Geotechnics 2</u>									
Senior Engineer	12	2	-	-	0.2	0.1	2.3	27.6	
Engineer	8	2	-	-	0.2	0.1	2.3	18.4	
Senior Geologist	6	1	-	-	0.1	0.1	1.2	7.2	
<u>Bridge</u>									
Senior Engineer	15	2	0.2	0.2	0.2	0.1	2.7	40.5	
Engineer	5	2	-	-	0.1	-	2.1	10.5	
Engineer	3	1	-	-	-	-	1.0	3.0	
Total								271.5	

Note :

* The maximum point based on years of experience is capped at 15.

Table 11 – Part 2: Individual Assessment for Company B

Staff Detail	Individual Points Allocated							
	Years of Experience	Multiplying Factor, M	Value added to Multiplying Factor, V				M+V	Sub-total
			Accredited Checker	Recognition	Papers	Bumiputra		
Project Director	20*	2	-	0.1	0.1	0.1	2.3	34.5
<u>Road Works 1</u>								
Senior Engineer	13	2	-	0.2	0.2	0.1	2.5	32.5
Engineer	6	2	-	-	0.1	-	2.1	12.6
Engineer	1	1	-	-	-	-	1.0	1.0
<u>Road Works 2</u>								
Senior Engineer	8	2	-	0.1	0.1	-	2.2	17.6
Engineer	5	2	-	-	-	0.1	2.1	10.5
Engineer	3	1	-	-	-	-	1.0	3.0
<u>Geotechnics 1</u>								
Senior Engineer	15	2	0.2	0.2	0.3	-	2.7	40.5
Engineer	7	1	-	-	0.1	-	1.1	7.7
Engineer	4	1	-	-	-	0.1	1.1	4.4
<u>Geotechnics 2</u>								
Senior Engineer	12	2	-	-	0.2	0.1	2.3	27.6
Engineer	8	2	-	-	0.2	0.1	2.3	18.4
Senior Geologist	6	1	-	-	0.1	0.1	1.2	7.2
<u>Bridge (from sub-consultant)</u>								
Senior Engineer	10	2	-	0.1	0.1	0.1	2.3	23.0
Engineer	5	2	-	-	0.1	-	2.1	10.5
Engineer	3	1	-	-	-	-	1.0	3.0
Total								254

Note :

* The maximum point based on years of experience is capped at 15.

For the position of Senior Engineer and above, it is expected that the individual must have more than 5 years of relevant experience. He or she must also be operating in his declared field of engineering expertise as pre-listed by the central agency. The only difference between the two companies is that Company B does not have a Bridge Design section and has thus appointed Company X as its sub-consultant who is providing a team of Bridge Designers. Since the total number of professional staff from the Bridge team is less than 20% of the total professional staff required, this is allowed. The final Sustainability Points for both Company A and B are presented below:

Criteria	Company Points Allocated	
	Company A	Company B
Part 1 – Company Level Points	60	70
Part 2 – Individual Level Points	271.5	254
Final Sustainability Points	$\frac{60}{100} \times 271.5 = \mathbf{162.9}$	$\frac{70}{100} \times 254 = \mathbf{177.8}$

Based on the above assessment, Company B will be awarded the project based on the Sustainability ECF Programme. The Design Team members once submitted and approved by the Project Proponent cannot be changed. Any staff replacement shall be subject to meeting the minimum overall points as assessed above.

7.0 Stage III: Export of Services by Sustainable ECF

The next stage after listing and grooming of Sustainable ECF is to export the services by these ECF to overseas market. Exporting of services is beneficial in terms of building up the expertise and experience of local ECF and to improve the earning potential of these companies as part of the contribution to the national economy. By exporting their services, our ECF will be better able to navigate through the regional economic cycles by shifting resources from regions which are facing economic crisis to regions which are experiencing rapid growth.

The export of services for Malaysian Engineering Consulting Firms (ECF) can be developed in 2 stages:

- Stage 1: The implementation Agency assists to secure “Government to Government” (G to G) project internationally. This acts as the introduction of Malaysian ECF to international market.
- Stage 2: Once Malaysian ECF have matured through this “Sustainable ECF programme”, they will be able to competitively export the engineering consulting service to earn foreign exchange for the country.

The implementation agency should continue to monitor and provide assistance to all the Malaysian ECF that have matured through the Programme and propose further improvements to stay competitive.

This can be done through organising business and technical forums for the ECF to learn and share their experience.

8.0 Conclusion

The growth of large engineering consultancy firms in Malaysia has generally been stagnant for the last 25 years and one of the top five consulting firms in the 1990s has now disappeared from the ACEM directory. In contrast, Netherlands with a smaller population than Malaysia has the third largest engineering firm in Europe with staff strength of 15,000. There is a need for the government to groom quality engineering consultancy firms with capability and capacity so that we do not need to rely on foreign consultants for our own projects and to export our services to other countries.

It is possible to groom and double the size of a few engineering consultant firms in 3 to 5 years time without any extra budget to the government. This can be done by aligning part of the government projects to sustainable firms which are characterised by their ownership structure, quality assurance and quality control systems as well as their training programme and knowledge management system. Only firms that continue to follow and implement the “Sustainable ECF programme” will be awarded projects through the implementation agency. Smaller firms should be given opportunity in the grooming programme by encouraging them to merge. The programme will groom Malaysian Sustainable Engineering Consultancy Firms and ensure success and safety of projects in Malaysia.

Reference

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