

THE IMPACT OF PROJECT MANAGEMENT SKILLS ON THE PERFORMANCE OF RENEWABLE ENERGY PROJECTS

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ABSTRACT

Project management skills are critical in ensuring the success of energy management project. Amongst project management skills, three were identified important in managing renewable energy projects. They were managing human resources, transformational leadership and knowledge sharing. These constructs were influential factors that capable of affecting energy project performance. Such impact could be by increasing motivation in projects' employees. Previous studies recorded 11 variables that had been considered for those 3 project management skills constructs. Palm and oil mills projects had been selected for the data collection. Eighty-six (86) data from palm and oil mills located in Peninsular have been collected through questionnaire and respondents involved majority were the project managers. This study employed quantitative research design. Pearson Correlation Coefficient test was used to establish relationships between three project management constructs towards renewable energy project success. The results showed that all three constructs were significantly correlated with energy project performance. For HRM practices, the maximum impact was for training and the minimum impact was variable related to staffing. Among variables for transformational leadership, vision recorded the strongest relationship on energy project success. In addition, both variables for knowledge sharing have significant positive impact on energy project performance. It could be concluded that all three project management skills are important for palm and oils mill projects in improving energy project performance.

Key words: *Skills, Project Performance, Energy Management*

INTRODUCTION

In order to professionally manage a project in the best way possible, the project manager should have the needed knowledge and skills. According to the rapid changing global context of industry with some issues including fast information advancement, shortage of skills and the technologies for communication as well as enhancing prioritization of challenges like environmental protection, sustainability and the changes of climate so the project manager's role should be adapted. Through increasing global concern regarding negative effects of human activities on environment in current years, a lot of industries are looking for sustainable developments as well as implementation of green measurements. As the changes in industry occur, the project managers face with new problems and should take the responsibilities which have not been part of their tasks traditionally (Edum-Fotwe and McCaffer, 2000).

The project managers in these days will not only meet the project management roles but also should manage the projects in most effective and efficient ways possible with considering sustainability as well. By growing the phenomena of renewable energy and the increasing level of its popularity, there should be better realization about those pivotal attributes that all of the project managers need to have in order to manage these types of

projects. Even though there are so many studies about competency of project managers, a few of them have examined the crucial skills and knowledge specifically, which are needed for project managers to conduct a sustainable project successfully.

In order to manage a project successfully the competency of the project manager is essential, and certain skills have been mentioned and emphasized in numerous studies (Sayles and Chandler, 1971) as Frank asserted (2002) success of a project is strongly depended on project managers ability and knowledge, this has over 34-37 % influence. Successful organizations are concentrating that project manager acknowledge core competencies needed for being successful in their tasks. According to Frank (2002), project managers have critical impact in defining the project success.

In case of using renewable energy for sustainable development, it is clear that new concepts and new technologies should be employed. Using such technologies requires training the employees, planning and innovation (Yusoff, 2006). However, many factors on increasing success of project have been identified such as knowledge management (Fedor et al., 2003; Ajmal et al., 2010; Yang et al., 2012), Information Technology tools (Chan et al., 2004; Yang et al., 2010), and also managerial skills.

Because of the fact that each of influential factors has different dimensions, this study attempted to focus on management skills in order to use it in line with increasing project success of renewable energy. On the other hand, since a lot of decision makings require high management skills, this study put it as priority of its investigations. Thus, this paper attempts to discuss how human resource management practices, transformational leadership and knowledge sharing give an impact to the renewable energy project success.

RENEWABLE ENERGY

Energy can be considered as one of the necessary factors for having sustainable development and also well-being of countries in this modern age. Malaysia's overall primary energy supply was equal to 65,692 kilo tones of the oil equivalent in year 2009 that grew up to 72,951 kilo tones of the oil equivalent in year 2010 (Energy Commission Malaysia; 2010). Regarding the final use of all of the primary available energy, the electricity' share was equal to 22% in year 2010. Demand for electricity in Malaysia dramatically has been increased during the past years because of impressive growth in economy and also development in social context (Tang and Tan, 2013; Chen et al. 2007).

Between years 1998 to 2009, the growth in economy which was measured by GDP had the average growth rate of 6.6% and the consumption of electricity was 4.5% each year. Although growth rate of GDP has been understood as being medium (Hannesson, 2009), this country can be considered as one of the biggest consumers of electricity compared to other members of Association of Southeast Asian Nations (Tang and Tan, 2013).

It can be estimated that for year 2004 to 2030 the growth of GDP will be 4.6% as a result (Gan & Li, 2008) and the highest demand for the electricity will be equal to 23,099 MW in year 2020 (Oh et al., 2010). It can also be assumed that Malaysia will need 151 TWh by year 2022 (Akhwanzada & Tahar, 2010) and by year 2030 this demand will rise up to 216 TWh as well (IEA, 2010). It can be expected that demand for electricity can be more owing to social development objectives and goal oriented economic which are established by government.

This will put the policy makers in country in a highly overwhelming position for making sure about a steady electricity supply. By referring to oil crises in year 1973, government of

Malaysia capped gas and oil production through following National Depletion Policy of 1980. Then in year 1981, strategy of Four-Fuel presented natural gas in order to produce electricity (Jafar et al., 2008). By considering the fact that reserves of fossil fuel are few and limited the government of Malaysia offered those renewable sources based on Diversification Strategy of Five-Fuel in year 2000 then (Chua and Oh, 2010).

According to this policy, renewable capacity by year 2011 was below 1% of overall capacity which was installed (Muis et al., 2012). By comparison of such underachievement of this country with those countries which are hoping for 100% renewable resources like Ireland (Connolly et al., 2011) and Denmark (Lund & Mathiesen, 2009), it can be revealed that technology of Malaysia is locking into the fossil fuel according to system of generation.

KNOWLEDGE AREAS AND MANAGEMENT SKILLS

Project management institute (PMI) at first documented its core nine areas of knowledge (Integration, Cost, Time, Quality, Procurement, Human Resource, Communication, Risk and Scope) in (PMBOK Guide), Project Management Body of Knowledge, in year 1987 in order to standardize and document those general accepted practices and information of project management (PMI, 2008). Any of these nine areas of knowledge includes processes that have to be done with discipline for achieving an efficient program regarding project management. In addition, project risk management is a progress which is focused on defining, reviewing and reacting to the project risk. These activities contain identification of risk, quantification of risk, development of response and control.

Competency of project management will be attained through achieved knowledge combination in training, developed skills by experience, and also applying the obtained knowledge. The areas of knowledge required by the manager of project in practice, by the way, will transcend covered scope by accrediting bodies and will probably more diverse and complex compared to other industries (Ahadzie et al. 2008). The manager of the project should at first get the knowledge regarding technical dimensions of industry in such a level that she or he recognizes the service and product being developed and delivered. Based on statements of Edum-Fotwe and McCaffer (2000), most of the knowledge which should manage the construction project is considered as unique for project management including forecasting project cash flow and critical path analysis. These types of demands need a much wider context compared to defined boundaries of subject by means of certification requirements. Therefore, modern practice of project management requires other management and general knowledge as well along with those skills that goes beyond technical dimensions of traditional areas of engineering (Edum-Fotwe & McCaffer, 2000).

Among all of the identified management skills that required by the project manager, human resource management practices (HRM), transformational leadership and knowledge sharing were considered in this study. These three management skills will be analyzed to identify their impact on the renewable energy project success.

Human Resources Management Practices

Human resource management practices is understood as the engaging organizational activities for handling human resources team and also making sure that these resources are used for having successful achievements of objectives and goals of the company and organization (Wright & Snell, 1991). Based on the statements of Wright and Snell (1991) and Schuler and Jackson (1987), human resource management practices are known as the

organizational activities for managing human resources pool and to make sure that they are utilized to meet organizational objectives. They explain that there is a positive relationship between organizational performance and HRM practices. Delery and Doty (1996) and Mac Duffie (1995) discussed about innovative practices of HRM and made comparison between them for choosing the best one among them.

In addition, many theories support the relationship between performance and human resource management practice including Resource Based View or RBV. According to RBV (Barney, 1992), human resource can be employed for increasing performance and also having sustainable competitive advantage. Moreover, some of the researches (Kooji et al, 2010) regarding the relationship between human resource management practice and job satisfaction through which we can see the impact of this relationship on innovation and performance (Cheng et al., 2010).

Transformational Leadership

Transformational leadership is defined as a leadership approach that causes change in individuals and social systems. Burns (1978) was the first person who made difference between transactional and transforming leadership. Based on his statements transactional leadership is a mutual relationship that can be found between leaders and followers in such a way that the followers will achieve both wages and prestige for collaborating in reaching objectives and expectations of leaders. While transactional leadership contains contingent rewards which are as some certain and specific rewards to be used for giving reward to those followers who have the capability of satisfying organization and management goals along with the exception that managers will intervene only in those time that employees do not meet organizational objectives or those times that something is wrong.

Transformational leaders attempt to impact morale of the followers positively. They encourage followers for showing better performance that is beyond expectations, also they alter the attitudes, beliefs and also values of the followers against just getting compliance as mentioned by Bass (1985) and Yuki (1999). Additionally, Bass presented a lot of sub dimensions regarding transformational leadership for example "Charisma" which later has been renamed as the "Idealized Influence" that was defined as a compelling talent for inducing encouragement and motivation from other staffs, "Inspirational Motivation" which comes from approach of the leader for providing substance or meaning in work that has been given to followers, in addition there is "Intellectual Stimulation" that tries to grow the minds through mental tasks and also "Individual Consideration" by which the leader is able to pay attention to needs of followers appropriately.

Knowledge Sharing

Knowledge sharing occurs when an individual is going to assist and learn from the other individuals in order to develop new type of competency (Yang, 2007). Knowledge sharing can be defined as an activity by which the knowledge will be exchanged between individuals, families, friends, communities and also organizations and firms (Manafi et al, 2013). It can be considered as the dissemination voluntary from achieved skills and also the experience to members of the organization (Asgharian et al., 2013). It is important since the knowledge of a person does not efficiently impact the organization unless it will be available for all of the employees (Nonaka & Takeuchi, 1995).

Knowledge sharing demonstrates a social task that occurs within a system in which

knowledge defines the value of a source (Fulk et al., 2004). Through sharing the knowledge among members, the competitive capabilities would be generated and it will contribute to organizational performance (Zohoori et al., 2013). Additionally, firms share the knowledge since they think that this effort will result in performance stimulation, effectiveness and productivity, reduction of costs, improved quality and improved efficiency as well as reduction of available resources.

Hence, knowledge sharing can increase the level of inert organizational performance and also the projects. The impact of increasing the innovation is clear in renewable energy project because it requires using the new technologies in high levels. It is clear that increase of knowledge sharing can highlight the issues of project and through utilizing other people's experiences, the decision making will be improved.

RESEARCH METHODOLOGY

The mixed methods approach was implemented in this research, which was carried out in two phases. The first phase was the literature review which covered on knowledge management in project practised in Malaysia. In addition, literature review on 3 related research areas namely resource management practices (HRM), transformational leadership and knowledge sharing were carried out in this phase. The identification of importance skills for a project managers were carried out through extensive literature, both by local and international researchers in line with the research focus. Essential information and data were gathered from various published materials. The discussion on mixed methods approach as a methodology for the study was also been carried out in the literature review exercise.

The second phase was the main data collection using questionnaire survey. Eighty-six (86) surveyed data from palm and oil mills located in Peninsular have been collected to investigate on how those three areas of skills could affect energy project success. The variables were shortlisted to the most influential factors that influence the renewal energy project success. Information and data to identify the factors and the influence of the energy project success were gathered through questionnaire survey. This would enable quantitative data collected for further analysis, followed by semi-structured interview for qualitative part.

In general, the questionnaire survey and semi-structured interview were implemented for primary data collection for the study. Before the survey questionnaires were sent out to the respondents, a pilot of the questionnaire was performed on five potential respondents to avoid any unclear or ambiguous sentences and terminologies used in the questionnaire. Some of the suggestions and comments received from the pilot survey exercise were taken into account and used to improve the questionnaire where necessary before the actual dissemination of the questionnaires was made. The details regarding the questionnaire survey administration as shows in Table 1 below.

Table 1: Questionnaire Administration

Description	Number	Percentage
Total questionnaire sent out	100	
Total returned questionnaires	86	
Questionnaire without answers	0	
Questionnaires answered, but were excluded	14	
Valid questionnaires	86	
Overall percentage returned		100%
Valid percentage returned		~86%

For data analysis, Bi-variate analysis that refers to the associative test of two variables in the present study was employed. A parametric correlation test namely Pearson Product Moment Correlation Coefficient was used. The Pearson correlation coefficient is one of the correlation coefficients that express a relationship between two variables (Lind et al., 2003). It is a parametric method of correlation coefficient and it normally measures data on at least an interval scale such as a Likert's scale. For some cases, it would be also use to measure a relationship between two continuous variables when the data is normally distributed. For instance, this coefficient was used to check significant relationships between HRM practices (key factor) and energy project success (project performance).

The following conceptual framework had been developed based on previous studies to define and explain the relationship between independent and dependent variables of the research. There are 11 independent variables categorized into three constructs. Based on literature reviewed, those constructs could affect the energy project success construct. The framework becomes a basis for the data analysis.

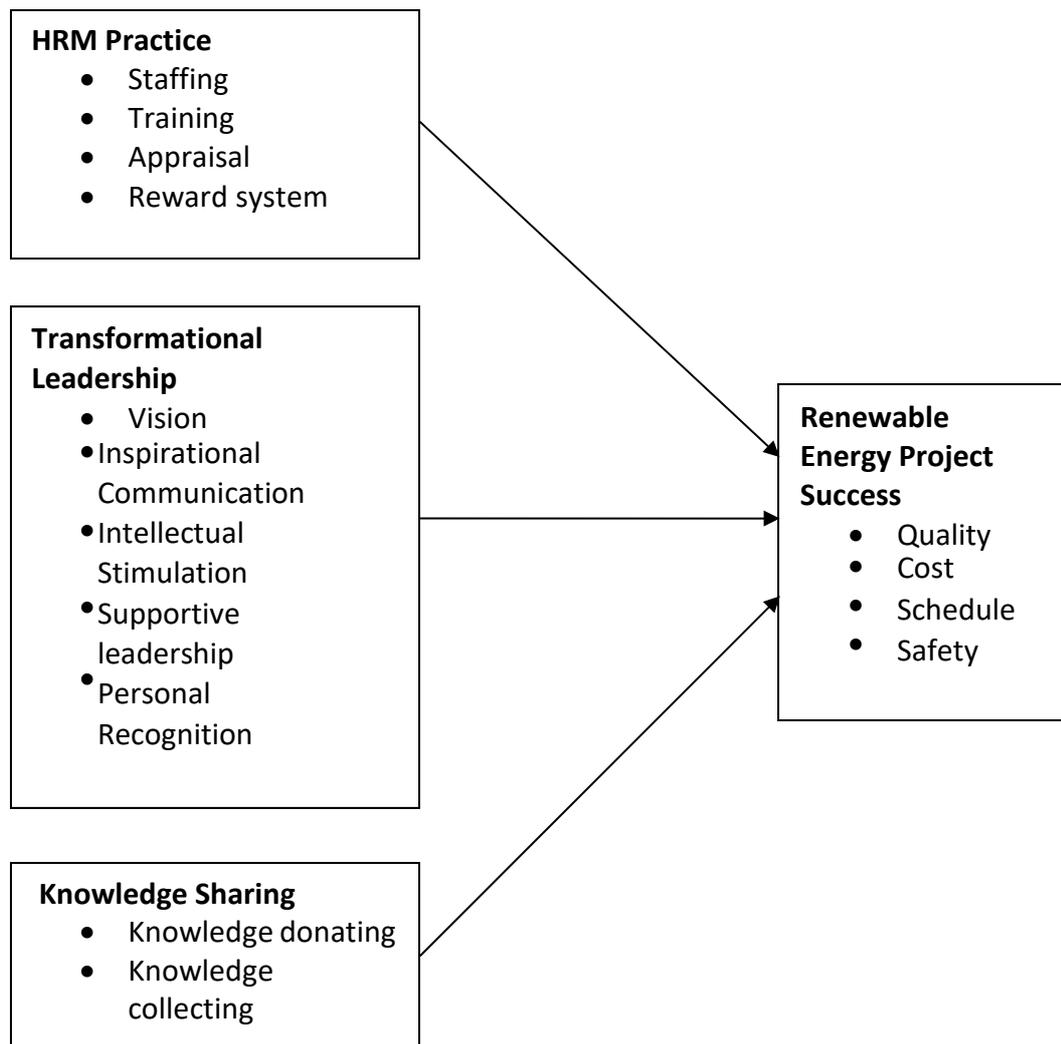


Figure 1: Proposed Conceptual Framework

RESULT AND DISCUSSION

Associate test was employed to establish relationship between independent and dependent variables. Based on the Pearson correlation test as shown in Table 2, all variables had significant relationship with energy project success. In addition, the results of the analysis are also shown that training has a significant impact on project success. This result is consistent and in line with study by Wright et al. (2003). In addition, the impact of staffing and reward system could also significantly affect energy project success with the correlation coefficient of 0.52 and 0.680 respectively. The result is consistent with previous research conducted by Hueslid (1995), Wright et al. (2003), and Cho et al. (2006). Therefore, HRM practice could improve project success related to renewable energy.

Table 2: Correlation between Independent and Dependent Variables

Independent Variable	Energy Project Success
Training	.701**
Staffing	.520**
Reward System	.680**
Performance Appraisal	.681**
Vision	.778**
Inspirational Communication	.656**
Intellectual Stimulation	.498**
Supportive Leadership	.337**
Personal Recognition	.773**
Knowledge Donating	.707**
Knowledge Collecting	.700**

** . Correlation is significant at the 0.01 level (2-tailed).

Results in Table 2 also show significant relationship between transformational leadership variables and energy project performance. Variables Vision, Inspirational Communication, Intellectual Simulation, Supportive Leadership and Personal Recognition significantly correlated with energy project success. The correlation coefficient ranging from 0.337 to 0.778 with variable Vision recorded the highest score. The obtained results are in line with previous study by Turner and Muller (2005), and Anantatmula (2010).

The results of Pearson correlation test in Table 2 also confirmed that knowledge sharing has significant positive relationship with energy project performance. The variable correlated with coefficient of 0.707. The result supported previous study by Reid and McAdam (2000) who discussed on knowledge sharing affect the project performance.

Table 3: Correlation between Independent and dependent constructs

Construct	Energy Project Success
HRM practice	.842**
Transformation al leadership	.814**
Knowledge sharing	.707**

** . Correlation is significant at the 0.01 level (2-tailed).

Associative test also employed to check is there any relationship amongst the constructs. The Pearson correlation shows in Table 3 concludes that Knowledge sharing, HRM practices and transformational leadership could significantly affect the energy project performance. HRM practice recorded strongest relationship with the score of 0.842, 1 percent significant level. This consistent with study result by Yang et al. (2012) who emphasized on the role of those three constructs in improving energy project performance.

CONCLUSION

In order to professionally manage a project in the best way possible, the project manager should have the needed knowledge and skills. Project management skills are critical in ensuring the success of project. This study highlights the impact of project management skills focusing in management skills on how it performs in renewable energy project. They were managing human resources, transformational leadership and knowledge sharing. The mixed methods approach was implemented in this research, which are literature review and questionnaire survey. Eighty-six (86) data from palm and oil mills located in Peninsular have been collected through questionnaire and respondents involved majority were the project managers. Results shows, all variables had significant relationship which could significantly affect the energy project performance.

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