# Sustainable Development through Knowledge Management and Human Resource Management A Thai Case Study

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Abstract-This study is aimed at understanding the influence of knowledge and human resource management on sustainable development, covering three dimensions: economics, social, and environmental. For the study, questionnaires were used to collect data from the respondents, who were employees of a Thai electricity generating firm, with 393 responses being received through stratified random sampling. Multiple regression analysis was deployed to test the effect of knowledge and human resource management on sustainable development. The results show that knowledge management has an influence on sustainable development at the 0.05 significance level. The findings also revealed that human resource management has a positive impact on sustainable development at the 0.05 significance level. The evidence leads to the recommendation that organizations should enhance their knowledge and human resource management abilities so as foster their sustainable development.<sup>1</sup>

# *Index Terms*—human resource management; knowledge management; sustainable development; sustainability

## I. INTRODUCTION

Globalization has led to a change in the business environment, in particular, there has been a rapid growth in competition. Hence, organizations need to adapt to these changes, if they are to survive in the future. That is, each organization has to devise a way for dealing with this critical issue and set out guidelines aimed at the development of sustainable competitiveness [1]. Regarding sustainable development, knowledge management has been acknowledged as a valuable asset of the organization in it can help deliver competitive advantage [2].

A firm requires knowledge for innovation so as to contribute to economic and societal development [3]. Knowledge management is a process that can improve efficiency and productivity, foster innovation and thus, make a reality the vision of modern organizations to acquire the competence of sustainability [4-5]. In addition, human capital, covering knowledge, skill, and capability of the employee provides value to the organization [6]. Human resource management can facilitate employees using their abilities effectively towards achieving an organization's goals. In particular, organizations can develop employees through human resource management, resulting in strong leadership and expertise for fostering competitiveness and sustainable development [4, 7-9].

In this paper, the contribution of knowledge and human resource management to the sustainable development of the organization is recognized. The findings contained within based on research, are aimed at providing guidelines for the management teams towards the sustainable development of the organization. The structure of this paper is as follows: a literature review is provided in Section II: whilst the research methodology is explained in Section III. The results are presented in Section IV and finally, there is a conclusion in Section V.

#### II. LITERATURE REVIEW

Knowledge has been referred to as the result of cognitive processing generated by the inflow of new stimuli and a process of applying expertise. Whilst knowledge management pertains to knowledge flows and the process of creation, sharing, and distributing knowledge [10]. Tiwanna and Williams [11] highlighted that knowledge management creates value for businesses, whilst also helping them to acquire and maintain competitive advantage through communication and application based on firms' knowledge. Knowledge management processes include storing, transforming, and communicating the knowledge throughout the organization [12]. Effective knowledge management is associated with competitive advantage and also with stimulating innovative creation [13].

North et al. [14] investigated the influence of knowledge management on organizational development in Germany. The results revealed that it improved the efficiency of the organization, reduced costs of management and risk, whilst also delivering higher customer satisfaction. Robinson [5] found that knowledge management was linked with the sustainable development of UK construction firms. Gloet [4] contended that knowledge management was a means of developing leadership and management capabilities to support sustainability. Shahzad et al. [15] elicited that knowledge management has a significantly positive effect on creativity and efficiency of organization listed on the Lahore Stock Exchange. In light of the reviewed literature, this leads to following hypotheses:

Manuscript received February 10, 2018; revised April 10, 2018.

 $H1_{a,b,c}$ : Knowledge management has a positive influence on sustainable development of the organization (economic, social, and environment dimensions).

Human resource management refers to utilizing the human resources of the organization effectively so as to achieve the organization's objectives [16-17]. Gary [18] explained how human resource management, covers policy and practices with regards to personnel, including staffing, training, evaluation, reward, safety, and ethics. From a slightly different perspective, it has been contended that it covers recruitment and selection, training and development [19]. In general, human resource management can be described as a strategy geared towards the development of a firm's employees [20].

Vickers et al. [21] showed that human resource management is an important element of an organization's drive towards sustainable development. Khandekar and Sharma [9] determined that human resource management had a positive relationship with organizational efficiency in India. In addition, it could lead to significant sustainable competitive advantage. Gloet [4] argued that human resource management promotes sustainability across the business, environment and social justice contexts. Ferguson and Reio [22] found through implementation of an effective human resources management strategy that supports organizational contexts, that this has a positive influence on firm performance. Freitas et al. [23] found that human resource management has a positive impact on the efficiency of an organization as well as supporting sustainable development. Hence, for this study it is proposed that:

 $H2_{a,b,c}$ : Human resource management has a positive influence on the sustainable development of the organization (economic, social, and environment dimensions).

Based on the hypotheses development discussed above, a research framework, as shown in Fig. 1, is constructed.



Figure 1. Research Framework

#### **III. RESEARCH METHODOLOGY**

For the study, a structured questionnaire was deployed to collect data from respondents working at a Thai electricity generating firm. Specifically, stratified random sampling of 11 departments of the organization were surveyed with a total of 393 questionnaires being distributed, the breakdown of which is shown in Table I.

Department	Population	Sample
1. Management Board	153	3
2. Policy and Planning	372	7
3. Accounting and	1,155	20
Finance		
4. Administration	1,883	33
<ol><li>Social Enterprise</li></ol>	452	8
<ol><li>Electrical Plant</li></ol>	1,873	33
Development		
7. Transmission System	1,331	24
Development		
8. Electricity Production	7,607	134
9. Business	2,192	39
Development		
10. Fuel	1,783	31
11. Transmission System	3,435	61
Total	22,236	393

TABLE I. THE STRATIFIED RANDOM SAMPLING

The questionnaire contained four parts, with the first being aimed at gathering information about the respondents' profiles. Next, the levels of knowledge management and human resource management were probed in the second and third part, respectively. Finally, the fourth part pertained to the perceived level of sustainable development of the organization. Closed questions with multiple-choice answers were applied for the survey, whilst the second to the fourth parts required responses to statements on a seven-point Likert scale, where 1 indicated the least agreement and 7 the most.

Regarding the questionnaire contents, for the context of knowledge management there were five dimensions, the nature and of which are provided in Table II. Whilst the human resource management perspective involved three dimensions, as shown in Table III, along with their sources. Finally, sustainable development included the three of economic, social, and the environment, as presented with the sources in Table IV.

TABLE II. CONSTRUCT OF KNOWLEDGE MANAGEMENT

Knowledge Management	Number of Items	Source
Knowledge Acquisition	2	Turban and Frenzel [24];
Knowledge Creation	3	Marquardt [25]; Trapp
Knowledge Storatge and	3	[26]; Probst et al. [27];
Retrieval		Yahya and Goh [28] ;
Knowledge Sharing	4	Robinson et al. [5]; Chang
Knowledge Utilization	5	and Lin [29]

TABLE III. CONSTRUCT OF HUMAN RESOURCE MANAGEMENT

Human Resource Management	Number of Items	Source
Staffing	5	Kaplan and Norton [16];
		Mondy [17]; Ferguson
Training and	5	and Reio et al. [22];
Development		Chang and Lin [29];
-		Aladwan et al. [30]; Toh
Compensation	6	et al. [31]

TABLE IV. CONSTRUCT OF SUSTAINABLE DEVELOPMENT

Sustainable Development	Number of Items	source
Economics Dimension	5	Pearce et al. [32]; CEPAL
Social Dimension	5	[33]; Eurostat [34]; Pask
Environment	5	et al. [35]; Iddrisu and
Dimension		Bhattacharyya [36]

We pre-tested the draft version of the questionnaire with academics expert in order to check content validity and correct any ambiguity. A reliability test of the questionnaire was undertaken to ascertain Cronbach's alpha coefficient for 30 questionnaires, which equaled 0.970. For this research, the surveys were carried out in person and a total of 393 completed questionnaires were collected which over the minimum calculated sample 89 questionnaires with the effect size of 0.15, the test power level of 0.95, and the maximum allowed error of 5% [37], i.e. the full identified sample, as illustrated in Table I. Subsequently, descriptive statistics including frequency, percentage, mean, and standard deviation (S.D) were applied to present respondents' profiles. In addition, the average scores for knowledge management, human resource management, and sustainable development were calculated. Finally, multiple regression analysis was deployed to investigate the influence of knowledge and human resource management on the sustainable development of the organization, in accordance with the research framework.

### IV. RESULTS

#### A. Respondents' Profiles and Descritive Statistics

Most respondents (53.9%) from the sample of Thai electricity generating firm were male and the majority (60.8%) were between 18 and 30 years old. The vast majority of them (85.5%) had an education to at least bachelor degree level. Regarding work experience, 75.8 percent of the respondents had been employed in the industry for 1 to 10 years.

The descriptive statistics provided in Table V were measured according to the average scores for each dimension of knowledge management, human resource management, and sustainable development. These were divided into seven categories: 1) Very low [1.00–1.857] 2) Low [1.858–2.714] 3) Quite low [2.715–3.571] 4) Moderate [3.572-4.428] 5) Quite good [4.429-5.285] 6) Good [5.286-6.142] 7) Very good [6.143-7.000]. The results show that the overall average score for knowledge management is 5.35, thus being situated in the good category. The findings reveal that the Thai electricity generating firm performs knowledge creation (5.50) as part of knowledge management better than the other four dimensions, with knowledge sharing (5.38) and knowledge storage and retrieval (5.34) coming second and third, respectively.

The overall average score of human resource management is 5.09, which is positioned at quite a good level. The average for training and development dimension is the highest (5.18), followed by compensation (5.05), and staffing (5.03), respectively. The results regarding the sustainable development of this Thai electrical generating firm demonstrate that the overall average score equals 5.48, which is in the good category. Regarding the different elements of sustainable development, the environment dimension was said to be at a very good level (6.16), followed by the social (5.63), and economic dimensions (4.64), respectively.

TABLE V.	THE DESCRIPTIVE STATISTICS OF KNOWLEDGE
MANAGEMENT, H	UMAN RESOURCE MANAGEMENT, AND SUSTAINABLE
	DEVELOPMENT

	Dimension	Mean	S.D
	1. Knowledge Acquisition	5.18	1.028
	2. Knowledge Creation	5.50	0.918
Knowledge Management	3. Knowledge Storage and Retrieval	5.34	0.981
	4. Knowledge Sharing	5.38	0.949
	5. Knowledge Utilization	5.28	0.952
	Total	5.35	0.860
	1. Staffing	5.03	1.135
Human Resource Management	2. Training and Development	5.18	1.064
	3. Compensation	5.05	1.093
	Total	5.09	0.996
	1. Economic	4.64	1.168
Sustainable Development	2. Social	5.63	0.889
	3. Environment	6.16	0.786
	Total	5.48	0.764

#### B. Hypotheses Testing

Multiple regression was deployed for hypotheses testing based on the research framework. In accordance with classical regression models, the normality test was evaluated in terms of value of the skewness and kurtosis of the independent and dependent variables, which ranged from -0.855 to -0.243, and -0.502 to 0.594, respectively. This indicates that they were normal distribution, because the absolute values were less than 2 for each measure [38].

The influence of knowledge management on sustainable development was then tested for the economic, social, and environmental dimensions, respectively (H1<sub>a.b.c</sub>). A test for multicollinearity was carried out in the form of the variance inflation factor (VIF). The results showed that the value of VIF ranged from 2.518 to 4.060 (less than 10), thus indicating there was no multicollinearity. The plots of the standardized residual by the regression standardized predicted value showed that error terms along the regression lines had a constant variance, thus implying that there was homoscedasticity. The results of hypotheses testing in relation to whether there is an association between knowledge management and sustainable development are shown in Table VI. The first line indicates the *p*-value for each item of knowledge management, whilst the second displays the standardized coefficients in brackets. These items are followed by the results of the F-test, the coefficient of determination  $(R^2)$ , and the adjusted  $R^2$ , respectively, in the last three rows. The results reveal that the knowledge acquisition and knowledge utilization dimensions impact positively both the economic and social dimensions regarding sustainable development (significantly at the 0.05 level), whereas the knowledge sharing dimension has a negative effect on economic dimension. The findings also indicate that the knowledge creation aspect has a positive influence on the social and environment dimensions, at the 0.05 significance level.

Knowladge	Sustainable Development		
Management	Economics Dimension	Social Dimension	Environment Dimension
Knowledge	$0.008^{*}$	0.012*	0.204
Acquisition	(0.187)	(0.163)	(0.090)
Knowledge	0.169	$0.000^{*}$	$0.000^{*}$
Creation	(0.115)	(0.311)	(0.323)
Knowledge	0.260	0.887	0.911
Storage and	(0.087)	(0.010)	(-0.009)
Retrieval			
Knowledge	$0.022^{*}$	0.782	0.343
Sharing	(-0.203)	(-0.023)	(0.86)
Knowledge	$0.000^{*}$	0.009*	0.780
Utilization	(0.350)	(0.192)	(0.022)
F	26.524	42.502	22.813
$R^2$	0.255	0.354	0.228
Adjusted R <sup>2</sup>	0.246	0.346	0.218

TABLE VI. THE INFLUENCE OF KNOWLEDGE MANAGEMENT ON SUSTAINABLE DEVELOPMENT

Statistically significant at p < 0.05 level

Subsequently, multiple regression analysis was deployed to test the influence of human resource management on sustainable development for the same three dimensions (H2<sub>a,b,c</sub>). Multicollinearity testing through the variance inflation factor (VIF) regarding these models was undertaken. The results showed values of VIF ranging from 2.430 to 3.296 (less than 10), thus indicating there was no multicollinearity. The plots of the standardized residual by the regression standardized predicted value also showed that error terms along the regression lines had a constant variance, thus indicating that there was homoscedasticity.

The results of the hypotheses testing for a link between human resource management and sustainable development are provided in Table VII. The findings reveal that the staffing and compensation dimensions have a positive impact on both the economic and social context. Moreover, training and development has a positive effect on the environment dimension regarding sustainable development at the 0.05 significance level.

 TABLE VII.
 THE INFLUENCE OF HUMAN RESOURCE

 MANAGEMENT ON SUSTAINABLE DEVELOPMENT

Human	Sustainable Development		
Resource	Economics Social Envir		Environment
Management	Dimension	Dimension	Dimension
Staffing	$0.000^{*}$	$0.000^{*}$	0.587
	(0.284)	(0.317)	(0.040)
Training and	0.799	0.110	$0.000^{*}$
Development	(-0.020)	(0.111)	(.359)
Compensation	$0.000^{*}$	$0.000^{*}$	0.145
	(0.324)	(0.297)	(0.102)
F	53.735	99.148	37.324
$R^2$	0.293	0.433	0.224
Adjusted R <sup>2</sup>	0.288	0.429	0.218

Statistically significant at p < 0.05 level

#### V. CONCLUSION

Having investigated the influence of knowledge management and human resource management on the sustainable development of an electricity generating firm in Thailand, the findings provide evidence of an association between these forms of management and such development. The research framework developed and tested in this study explains that: (i) knowledge acquisition, knowledge utilization, staffing and compensation lead to sustainable development regarding the economics dimension; (ii), knowledge acquisition, knowledge creation, knowledge utilization, staffing, and compensation positively influence sustainable development in terms of the social dimension; (iii) the environment dimension pertaining to sustainable development could be improved through knowledge creation, and training as well as development based on knowledge management and human resource management, respectively.

Practitioners can benefit from the results delivered through this study in that they provide evidence that knowledge and human resource management can help to improve sustainable development, in relation to its economic, social, and environment dimensions. Moreover, policy makers from the government and private industries can support and should consider promoting campaigns to bolster these aspects of management so as to reap the rewards of sustainable development regarding these three dimensions. The main limitation of this study is that the sample based on only one electricity generating firm in Thailand. Hence, further studies need to be carried out gather data through surveys from various sectors. Confirmatory factor analysis and structural equation modeling could be deployed to construct the structural measurement and to investigate the hypotheses testing in these future studies. Finally, future research should consider other aspects not investigated in this study that could impact sustainable development.

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