

Full Length Research Paper

Work values, work attitude and job performance of green energy industry employees in Taiwan

Chin-Wen Liao^{1*}, Chien-Yu Lu¹, Chuan-Kuei Huang¹ and Ta-Lung Chiang²

¹Department of Industrial Education and Technology, National Changhua University of Education, No.166, Sinyi Street, East District, Taichung City, 401, Taiwan (Republic of China).

²Lions Clubs International No.166, Sinyi Street, East District, Taichung City, 401, Taiwan (Republic of China).

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This research aimed to explore the relations among work values, work attitude (including job involvement and organizational commitment) and job performance, and explore how the director's leadership may be a moderator between the work values and work attitude of green industry employees in Taiwan. Data was collected through convenience sampling. The samples in this study were employees and directors in the green energy industry in Taiwan, A total of 650 questionnaires were sent to employees and 120 questionnaires to directors. Of these, 485 valid questionnaires from the employees were received as well as 92 questionnaires from the directors. The research results found a positive correlation between work values and job attitude (including job involvement and organizational commitment). A mediated effect was shown in work attitude and job involvement toward work value and job performance. Directors with a supportive and directive leadership style had a moderate effect on the relations between work values and work attitude (including job involvement and organizational commitment).

Key words: Work value, work attitude, leadership style, job performance, green energy industry.

INTRODUCTION

Governments around the world are going green in an attempt to combat climate change with energy efficiency and carbon reductions. After the global financial crisis, the US, Japan, China, the UK, Germany and Korea invested an aggregation of US\$184.9 billion in clean energies. Among these investments, approximately US\$65.7 billion have gone to energy efficiency, US\$35.3 billion to renewable energy, US\$48.6 billion to smart grids, US\$22.1 billion to R&D, US\$4.8 billion to transportation and US\$8.4 billion to others. In the US, President Obama's decision to spend US\$209 billion in clean energy projects has spurred a wave of renewable energy technologies and start-ups. Germany intends to spend US\$3.7 billion on cleantech, as part of its economic stimulus and green energy campaign. Among these investments, US\$675 million will go towards energy

efficiency improvements, US\$170 million toward energy technology R&D, and US\$112 million towards energy efficiency for buildings. Japan is planning to invest US\$11.3 billion in cleantech, including US\$3.7 billion on subsidies for environmentally-friendly vehicles and US\$470 million on solar installations, as part of its economic stimulus packages. The Korean government has launched the Green New Deal by investing US\$7.7 billion in cleantech, including LED technology, green transportation systems and green cities (defined as an IT industry that resolves economic and social issues), as well as US\$6 billion on eco-buildings and US\$1.8 billion on renewable energy and clean vehicles (Bureau of Energy, 2011). According to the 2010 data from Marketbuzz, WWEA and Strategic Unlimited, the global demand for green energies is continuing to rise, prompting the growth of relevant industries. Taking the solar industry as an example, solar installations in 2010 totaled approximately 12 GW, with a production value of US\$26.3 billion. The accumulative installations are expected to reach 65 GW by 2015, with a production

*Corresponding author. E-mail: tcwliao@cc.ncue.edu.tw. Tel: +886-4-7232105/7260. Fax: +886-4-7211287.

value of over \$100 billion. In 2010, accumulative wind installations totaled approximately 120 GW, with a production value of approximately US\$58.8 billion. This number is expected to reach 600 GW by 2015, with a production value exceeding US\$200 billion. The production value of the LED illumination industry was about US\$4.2 billion in 2010 and is expected to reach US\$40 billion by 2015.

Lacking natural resources, Taiwan relies on imported energies for almost all of its needs. However, Taiwan is known for excellent technology R&D and manufacturing capabilities. If Taiwan can leverage its window of opportunity when global technologies and industries reshuffle, it will be possible for Taiwan to become a leader in the energy industry during the next decade. Taiwan has to repeat its success by transforming itself from an OEM manufacturing hub to ODM, and become an innovative centre of production. This can bring Taiwanese society into an era of low carbon and high value added products. Dr. Hsin-sen Chu, Executive Vice President of the Industrial Technology Research Institute, suggested that the production value of the green energy industry in Taiwan would exceed NT\$350 billion in 2008, with the total number of employees surpassing 18,000. Employees play a pivotal role in the competitive environment of the green energy industry, because they have to confront various challenges and establish loyal customer relationships (Karatepe and Sokmen, 2006). They also have to provide high quality services and improve organizational performance (Tsai, 2008). Only with the dedication of its employees can a company survive and thrive (Dai et al., 2007). Therefore, employees are the most important assets of the green energy industry (Karatepe et al., 2006). The author of this research hoped its findings could prompt management teams in the green energy industry to pay more attention to human resource management, as this will benefit the development of the industry. This was the first research motivation.

In a service-oriented business environment, the professionalism and work attitude of employees has an influence on how customers evaluate service quality, and it can make or break the image of an organization (Huang, 2004). Work values dictate work behavior, set the goals for individuals, and calibrate choices over work hours (Chung et al., 2008). In the green energy industry, employee values are critical because they can affect the assessment of green energy products by the customers. Huang (2005) suggested that in a service-oriented organization and work environment, the alignment of the members' work values and attitude with an organization can better internalize those values and generate a higher emotional commitment to the organization. Meanwhile, the alignment of the values of individuals and the values of the organization can help individuals identify with the organization. It encourages dedication to the organization and organizational behavior (Dutton et al., 1994). Therefore, to improve organizational commitment and job

satisfaction, it is necessary to enable members to integrate the values of the organization with their own via interactions at the workplace. This paper suggests that management in the green energy industry should be aware that they must first understand the work values of their employees in order to enhance their dedication and commitment to the organization. The second research motivation of this study was to investigate the work values of employees that can enhance job involvement, organizational commitment and job performance in the green energy industry.

The quality of an organization largely depends on its leadership (Kao, 2006). In fact, leadership is an important issue throughout all kinds of community activities and group interactions, as it constantly affects behavior and interdependency relationships (Wu, 2004). This is why leaders are important in any given organization. Wang (2005) argued that management is increasingly essential to the green energy industry due to its rapid growth. Leadership styles also have profound effects on organizational performance. Leadership behavior can reinforce the roles of employees and affect the performance of organizational behavior (Huang, 2004; Tracey and Hinkin, 1994). Meanwhile, the vision and conviction of a leader can influence the thoughts and values of employees, and hence, create solidarity within the organization (Yang et al., 2005). In sum, leadership styles have an effect on the work attitude and behavior of employees. The third research motivation was to investigate if leadership styles can enhance the work involvement and organizational commitment of employees.

This study hoped to make contributions to theoretic concepts and provide analysis results about green energy as a reference for the recruitment and management of employees. Therefore, this research set out to explore: (1) the correlation between the work values and work attitude of employees; (2) the correlation between the work attitude and job performance of employees; (3) the correlation between the work values and job performance of employees; (4) whether work attitude has a mediating effect on work values and job performance; and (5) whether the intervention of leadership styles affects the relationship between work values and work attitude.

LITERATURE REVIEW

Chung et al. (2008) suggested that work values are a set of durable beliefs in work. They reflect personal needs, job types or the environmental preferences of individuals. They also guide the work behavior of individuals and can dictate their goals and job choices. Work values have an influence on hiring and retention rates and can affect the willingness of individuals to work diligently (Boyatzis and Skelly, 1991). Chiu (2002) suggested that most individuals consider whether the image and values of an

organization match their own in their job selections. If they match, it is an enhancer to the development of the individual and the organization; If not, it becomes an obstacle. It is imperative for companies to gain a deep understanding of the work values of their employees and ensure that the ownership of desirable work values is factored into the recruitment process (Chung et al., 2008).

Most of the papers dealing with the issues associated with work attitude in the context of organizational behavior have investigated work involvement, job satisfaction and organizational commitment (Robbins, 2001). However, this research considered work attitude to be a set of attitude and thoughts toward work, and such attitudes and thoughts are reflected in the form of work involvement and organizational commitment. Therefore, it examined work involvement and organizational commitment in terms of work attitude. Diefendorff et al. (2002) indicated that work involvement is an indication of the level of job identification, emphasis and concern that employees have toward their jobs. Employees work hard because they expect rewards. Rewards can include monetary benefits such as salary raises and promotions, as well as psychological satisfaction, such as feeling valuable, making contributions to the organization and expressing their talents (Huang and Huang, 1997). A high degree of work involvement means a high degree of self-growth, satisfaction and job performance in employees. As a result, the organization becomes more competitive (Liao and Wu, 2003). Mulki et al. (2008) argued that organizational commitment is a psychological solidarity that gives employees a sense of belonging. It creates employees that are loyal to the organization and encourages them to maximize their efforts to the organization. It is manifested in the form of positive internalized concern and externalized behavior to the organization (Chen, 2007). By understanding the organizational commitment of employees, an organization can identify ways to retain employees and enhance their performance (Lin, 2006). Employees who are highly committed to an organization identify with the goals and values of the organization, and devote to and feel loyal toward the organization (Chen and Chen, 2006).

Job performance is the benchmark for promotions, redundancy, rewards, punishments, reviews and salary adjustments. It also satisfies the needs for employees to realize themselves. Therefore, job performance is one of the most important research variables in organizational behavior (Chung et al., 2007). Lin et al. (2008) suggested that job performance refers to all of the actions taken by employees in order to make contributions to the organizational goals. These actions can be measured and assessed. The evaluation and application of performance reviews are the foundation for managers in allocating manpower, designing training programs, promotions and development. They are also critical to whether an organization can be fair in giving out rewards and punishments,

can enhance employee morale, achieve its operational performance and formulate strategies in reconstruction and reformation (Dresang, 2002). Job performance is an indication of the work attitude of employees. It is necessary to provide timely incentives to employees in order to enhance their loyalty to the organization (Li and Chou, 2003). Therefore, the assessment and application of performance reviews is one of the top priorities for high-performing organizations (Tsai, 2007).

Leadership is critical to any given organization. It enables the internal maintenance and external adaption of an organization and guides members toward the goals of the organization (Sun et al., 2003). Chen (2009) proposed that leadership is the application of various behaviors and methods, leading members to achieve shared goals. Throughout this process, leaders interact with members and influence each other, in order to accomplish tasks and achieve goals. Liao (2007) suggested that effective and efficient leadership can make or break an organization. Leadership is critical to any given corporation, as leadership behavior affects how employees work and the level of their performance. After reviewing recent literature on leadership, Judge et al. (2004) indicated that the supportive leadership and directive leadership defined by the research team at Ohio University has a lingering legacy that deeply affects current studies on leadership. Therefore, this research designed its measurement with two dimensions, supportive leadership and directive leadership, as the tools to evaluate leadership styles.

This research divided its literature reviews and hypothesis developments into five sections as follows:

Correlation between work values and work attitude

Chuang and Li (2002) examined interior designers, and suggested that there is a positive correlation between work values and work attitude. The more emphasis management places on work values, the better the work attitude. Chen and Lu (2000) indicated that the better the work values of employees are aligned, the stronger their organizational commitment and work involvement will be. Huang and Huang (2004) surveyed hotel management students who are doing internships, and found that all of the factors related to work values have a significant influence on work involvement. Wang et al. (2008) examined employees in the marketing departments of companies in the green energy industry, and found that work values have a positive, direct and significant influence on organizational commitment. Therefore, this study inferred that the values of employees in the green energy industry affect their work attitude. The following hypotheses were developed:

H₁: There is a positive correlation between the work values and work attitude of employees in the green

energy industry.

H₁₋₁: There is a positive correlation between the work values and work involvement of employees in the green energy industry.

H₁₋₂: There is a positive correlation between the work values and organizational commitment of employees in the green energy industry.

Correlation between work attitude and job performance

Chu et al. (2005) explored the relationship among role conflicts, work attitude, work pressure and departure tendency. Their results indicated that work attitude is the behavior tendency at work, which has a direct impact on work behavior. Wei and Chu (2008) performed a survey on employees in the financial service industry, and found that work attitude has a positive effect on job performance. Better work attitude leads to better job performance. Chih et al. (2008) indicated that work satisfaction and work involvement have a positive effect on job performance. Organizational commitment influences job performance via the identification and internalization of individuals within the organization. When employees are emotionally committed to an organization, their sales improve (Hunter and Thatcher, 2007). Chen et al. (2008) examined employees working in companies after merging, and found that their commitment to the new organization has a significant influence on job performance. Therefore, this research inferred that the work attitude of employees in the green energy industry has an influence on work behavior. The following hypotheses were developed:

H₂: There is a positive correlation between the work values and job performance of employees in the green energy industry.

H₂₋₁: There is a positive correlation between the work involvement and job performance of employees in the green energy industry.

H₂₋₂: There is a positive correlation between the organizational commitment and job performance of employees in the green energy industry.

Correlation between work values and job performance

Lyons et al. (2006) indicated that work values dictate work behavior and job selection. In other words, work values affect behavior at work, including job performance. Adkins and Naumann (2001) argued that work values can raise employees' morale, and can predict their work behavior and performance. Liu et al. (2006) examined members of pyramid selling networks, and found that better alignment of work values across the hierarchical

levels results in better operating performance. Cuong and Swierczek (2008) proved that work value is one of the key factors influencing employee performance. Wang and Kao (2009) suggested that the work values of entry-level police officers have a significant and positive influence on their organizational commitment and job performance. Hence, this research inferred that the work values of employees in the green energy industry influence their job performance. The following hypothesis was developed:

H₃: There is a positive correlation between the work values and job performance of employees in the green energy industry.

Mediating effects of work attitude on work values and job performance

Chuang (2002) argued that when the management places more emphasis on work values, the professional commitment and work involvement of employees will be higher. Chen (2007) surveyed taxation personnel, and found that work involvement helps to enhance their auditing performance. Elci et al. (2007) suggested that there is a significant and positive correlation between organizational commitment and job performance/satisfaction. Chou (2007) suggested that if teachers can identify with the values of their school, they will be dedicated and committed, and the performance of the school will improve as a result. Wang and Kao (2009) surveyed entry-level police officers, and found that organizational commitment has a positive mediating effect on work values and job performance. Hence, this research inferred that the work values of employees in the green energy industry have an influence on their work attitude and job performance. The hypotheses were proposed as follows:

H₄: The work attitude of employees in the green energy industry has a mediating effect on their work values and job performance.

H₄₋₁: The work involvement of employees in the green energy industry has mediating effects on their work values and job performance.

H₄₋₂: The organizational commitment of employees in the green energy industry has a mediating effect on their work values and job performance.

Moderating effects of leadership styles on work values and work attitude

Chu and Shih (2007) indicated that a highly considerate and structured leadership allows employees to have a better sense of achievement. This research defined a sense of achievement as one of the indicators of work

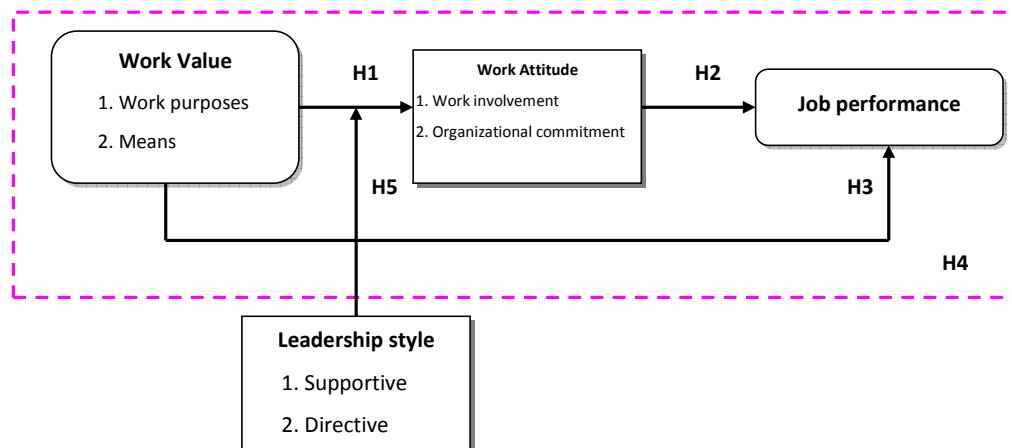


Figure 1. Research structure.

values, and inferred that leadership affects the work values of employees. Tsai (2007) suggested that supportive leadership has a mediating effect on the relationship between interactive justice and organizational commitment. Under strongly supportive leadership, there is a positive correlation between interactive justice and organizational commitment. In contrast, under weakly supportive leadership, there is no correlation between interactive justice and organizational commitment. In other words, supportive leadership can reinforce the work drive and sense of interactive justice among employees, enhance their commitment to the company, and encourage them to demonstrate organizational behavior. Hence, this study inferred that leadership styles have a mediating effect on the work values and work attitude of employees. The following hypotheses were developed:

H₅₋₁: Supportive leadership styles have a mediating effect on the work values and work attitude of employees in the green energy industry. Highly supportive leadership enhances work values and work involvement. Weakly supportive leadership undermines work values and work involvement.

H₅₋₂: Supportive leadership styles have a mediating effect on the work values and organizational commitment of employees in the green energy industry. Highly supportive leadership enhances work values and organizational commitment. Weakly supportive leadership undermines work values and organizational commitment.

H₅₋₃: Directive leadership styles have a mediating effect on the work values and work involvement of employees in the green energy industry. Highly directive leadership enhances work values and work involvement. Weakly directive leadership undermines work values and work involvement.

H₅₋₄: Directive leadership styles have a mediating effect

on the work values and organizational commitment of employees in the green energy industry. Highly directive leadership enhances work values and organizational commitment. Weakly directive leadership undermines work values and organizational commitment.

RESEARCH METHODS

Research structure

This study referred to work values as the predictive variable, work attitude (i.e. work involvement and organization commitment) as the mediating variable and job performance as the result variable, in order to explore whether there was any significant correlation among these three factors. Leadership styles were defined as the moderating variable, in order to explore whether leadership effects have a moderating effect on work values and work attitude. Figure 1 illustrates the research structure.

Population and sampling methods

This study referred to the structure laid out in the "Green Energy Industry Service Platform" implemented by Green Energy and Environment Research Laboratories, ITRI, under the commission of the Bureau of Energy. By collecting market and industry information, this study established a complete database of seven industries: solar, LED illumination, wind power, biofuel, energy ICT, hydrogen and fuel cells, and electric vehicles. The statistics showed that there were a total of 548 companies in these green energy sectors (Bureau of Energy, 2011). This study intended to explore the relationship among the work values, work attitude, and job performance of employees and leadership styles in the green energy industry. In order to avoid the possible bias of self-assessment on job performance, this study only surveyed full-time employees who had worked for at least one year at their current companies, and also asked direct line managers to select three to five employees and assist them in answering the questions regarding job performance.

This study issued questionnaires on the basis of stratified and convenience sampling. As a high level of engagement was required

Table 1. Correlation analysis coefficients of the variables.

Variable	Mean	Standard deviation	1	2	3	4	5	6	7
Work values	4.731	0.57	(0.926)						
Work attitude	3.892	0.58	0.812***	(0.928)					
Work involvement	4.136	0.738	0.62***	0.82***	(0.820)				
Organizational commitment	4.623	0.68	0.796***	0.96***	0.63***	(0.948)			
Job performance	4.453	0.56	0.05	0.28*	0.11	0.15*	(0.948)		
Supportive leadership	4.843	0.86	0.49***	0.42***	0.33***	0.47***	-0.03	(0.920)	
Directive leadership	4.841	0.67	0.61***	0.46***	0.34***	0.52***	-0.04	0.80***	(0.790)

(1) $n = 485$; two-tailed test. (2) * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. (3) Reliability is shown in brackets.

from the respondents, this study asked for the consent of the companies willing to take part in the survey and explained the research goals to the management teams of those companies. The questionnaires were delivered either in person or via post to the willing companies, and the survey was performed with assistance from the managers. The completed questionnaires were sent back to the researcher. The survey was performed on 48 companies in the green energy industry in northern, central, southern and eastern Taiwan. A total of 650 questionnaires were released to employees and 120 were released to managers. After the elimination of incomplete questionnaires or unqualified questionnaires, a total of 485 effective questionnaires from the employees and 92 effective questionnaires from the managers were collected.

Research tools

This study conducted a survey to facilitate data analysis. The questionnaire consisted of the questions designed by this researcher and others. The external source of the questions came from literature found in domestic as well as overseas journals and papers. In addition, this study designed questions based on in-depth interviews with senior executives of the industry, experts and scholars. The questions were modified by the research team after discussion. This study referred to the work value measurement developed by Liu et al. (2006) and added eight additional questions. The Cronbach's α of the original questionnaire on work values was 0.92. For the measurement on work attitude, this study referred to the questionnaire developed by Kanungo (1982) and quoted by Hsieh and Yen (2004). The Cronbach's α of the original questionnaire was 0.72. For the measurement on organizational commitment, this study referred to the questionnaire developed by Chen and Chung (2007) and quoted by Hsu and Chen (2009). The Cronbach's α of the original questionnaire was 0.92. For the measurement on job performance, this study referred to the questionnaire developed by Yu (1996) and constructed it with the two dimensions of task performance and context performance. The Cronbach's α of the original questionnaire was 0.95. For the questionnaire on leadership styles, this study referred to the questionnaire developed by Chu, Lu and You (2008). The Cronbach's α of the original questionnaire on supportive leadership was 0.88 and that of the questionnaire on directive leadership was 0.73. All of the questionnaires were based on a Likert 5-point scale, with answers ranging from "strongly disagree" to "strongly agree".

Convergence validity analysis was conducted on all measurements, and the factors were all found to have good convergence validity. In order to ensure individual dimensions were discriminated, this study conducted discrimination analysis, and the KMO value was 0.863. Bartlett's test of sphericity also reached

statistical significance ($p < 0.001$). The tests on discrimination validity suggested that the questionnaire was fit for factor analysis. The results also suggested that the factor loadings of the dimensions were all larger than 0.68, in line with the sample classifications of the original questionnaire and the expected results. Therefore, it was inferred that all of the dimensions had discrimination validity. The questionnaire is listed in Appendix.

ANALYSIS RESULTS

Descriptive analyses of samples

The demographic distribution suggested that most of the respondents were male (52.8%), followed by female (47.2%); in the age group of 26 to 30 years old (35.6%), followed by 31 to 35 years old (23.4%); were single (51.3%), followed by married (46.1%) and others (2.6%); had educational background of college and university (44.6%), followed by high school and vocational school (32.3%) and junior college (17.6%); had three to five years of tenure in their current company (46.9%), followed by two years or less (20.6%); had three to five years of experience in the green energy industry (38.8%), followed by two years or less 29.5%; were in the function group of engineering (38.6%), followed by marketing (31%) and management (14.5%); had a monthly salary of NT\$30,000 or less (70.3%), followed by NT\$30,000 to 40,000 (20.4%).

Variable analysis

This study derived the coefficients of different research variables in order to understand their correlation. The results are shown in Table 1. There was a positive and significant correlation between work values and work attitude ($\gamma = 0.812$, $p < 0.001$). Work values and work involvement reported a positive and significant correlation ($\gamma = 0.62$, $p < 0.001$). Work values and organizational commitment were also significantly and positively correlated ($\gamma = 0.769$, $p < 0.001$). As the work values of employees in the green energy industry appear more

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(1) $n = 485$; two-tailed test. (2) * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. (3) Reliability is shown in brackets.

positive, their work involvement and organizational commitment would be higher. Work attitude and job performance were significantly and positively corrected ($\gamma = 0.28, p < 0.05$). Work involvement and job performance were positively but not significantly corrected ($\gamma = 0.11, p < 0.05$). In contrast, organizational commitment and job performance were positively and significantly correlated ($\gamma = 0.15, p < 0.05$). When the organizational commitment of employees in the green energy industry was stronger, their job performance perceived by managers would be better. Work values and job performance were positively but not significantly correlated ($\gamma = 0.05, p > 0.05$).

This study analyzed the relationship between moderating variables and other variables. The results showed that work values and leadership styles were significantly and positively correlated ($\gamma = 0.56, p < 0.001$). Work values and supportive leadership were also positively and significantly correlated ($\gamma = 0.49, p < 0.001$), which was the same with work values and directive leadership ($\gamma = 0.61, p < 0.001$). In terms of work attitude, there was a positive and significant correlation between work involvement and directive leadership ($\gamma = 0.33, p < 0.001$). Work involvement and directive leadership reported a positive and significant correlation ($\gamma = 0.34, p < 0.001$). Organizational commitment was significantly and positively correlated with supportive leadership ($\gamma = 0.47, p < 0.001$) and with directive leadership ($\gamma = 0.52, p < 0.001$). Job performance was negatively correlated with supportive leadership ($\gamma = -0.03, p < 0.05$), as well as with directive leadership ($\gamma = -0.04, p < 0.001$).

Model establishment and validation

This research established a structural equation model (SEM) of work values, work attitude and job performance using Amos, a statistics and graphics software package. The validation consisted of two stages. In the first stage, the overall fit of the model was tested. If it was within a reasonable range, the second stage would start with tests on the causal relationship between the variables. This

covered the indirect effects among the three variables and validated whether work attitude had a mediating effect on work values and job performance. Discussions and clarifications were then made based on the empirical results.

Model fit tests

All of the following test values fell within the acceptable range. This indicated a good model fit. Table 2 summarizes the overall model fit.

Effects of work values on work attitude and job performance

According to Figures 2 and 3, the path coefficient of work values and work attitude was statistically significant ($\gamma = 0.849, p < 0.001$). This showed that the work values and work attitude of employees in the green energy industry were positively and significantly correlated. When there were more emphasis placed on work values, the work attitude would be better. Therefore, H1 was supported with the empirical data. Meanwhile, the path coefficient of work values, work involvement and organizational commitment was also statistically significant ($\gamma = 0.683, p < 0.001$).

The work values, work involvement and organizational commitment of employees in the green energy industry were positively and significantly correlated. With greater focus placed on work values, the work involvement and organizational commitment would be better. Hence, H1-1 and H1-2 were supported with the empirical data. The path coefficient of work values and job performance was not statistically significant ($\gamma = 0.378, p < 0.001$). This suggested that the work attitude and job performance of employees in the green energy industry were positively but not significantly correlated. Therefore, H2 was not supported with the empirical data. Meanwhile, the path coefficients of work involvement, organizational commitment and job performance were not statistically

Table 2. Fit of modified model (1).

Indicator	Value	Criteria	Result
Absence of negative error variances		No negative error variances.	Good
Absence of large standard errors		No large standard errors.	Good
χ^2/df	1.06	The closer it is to 0, the better the model and the statistics fit.	Acceptable
Chi-square p value	0.061	Probability value derived with discrepancy and degrees of freedom. A value of > 0.05 means a good fit.	Good
RMR.011	Close to 0	RMR< 0.05 indicates a good model fit.	Good
RMSEA.053	Close to 0	RMSEA<.1 indicates a good model fit.	Good
GFI	0.989	GFI> 0.9 means a good model fit. The closer it is to 1, the better.	Good
AGFI	0.966	AGFI> 0.9 means a good model fit. The closer it is to 1, the better.	Good
NFI	0.989	The closer it is to 1, the better.	Good
CFI	0.996	The closer it is to 1, the better.	Good
IFI	0.995	The closer it is to 1, the better.	Good

Source: Jung (2008); This research.

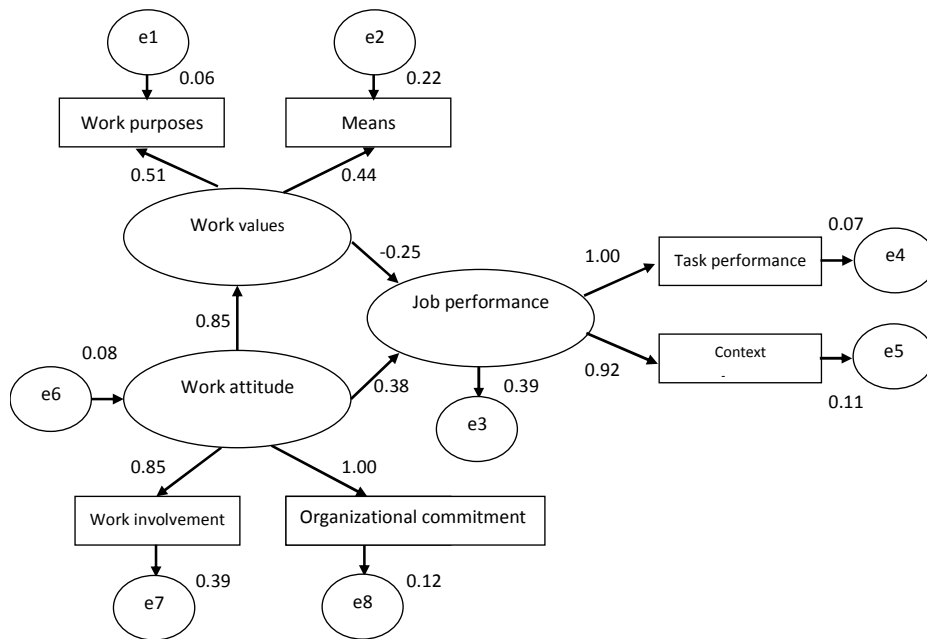


Figure 2. Causal relationship path of work values, work attitude and job performance.

significant ($\gamma = 0.038, p > 0.05; \gamma = 0.081, p > 0.05$). This indicated that the work involvement, organizational commitment and job performance of employees in the green energy industry were positively but not significantly correlated. Hence, neither H2-1 nor H2-2 was supported with the empirical data. The path coefficient of work values and performance was not statistically significant ($\gamma = -0.247, p > 0.05$). This implied that the work attitude and job performance of employees in the green energy

industry were negatively but not significantly correlated. Therefore, H3 was not supported with the empirical data.

Moderating effects of work attitude on work values and job performance

As seen in the above model, there was a negative but insignificant correlation between work values and job

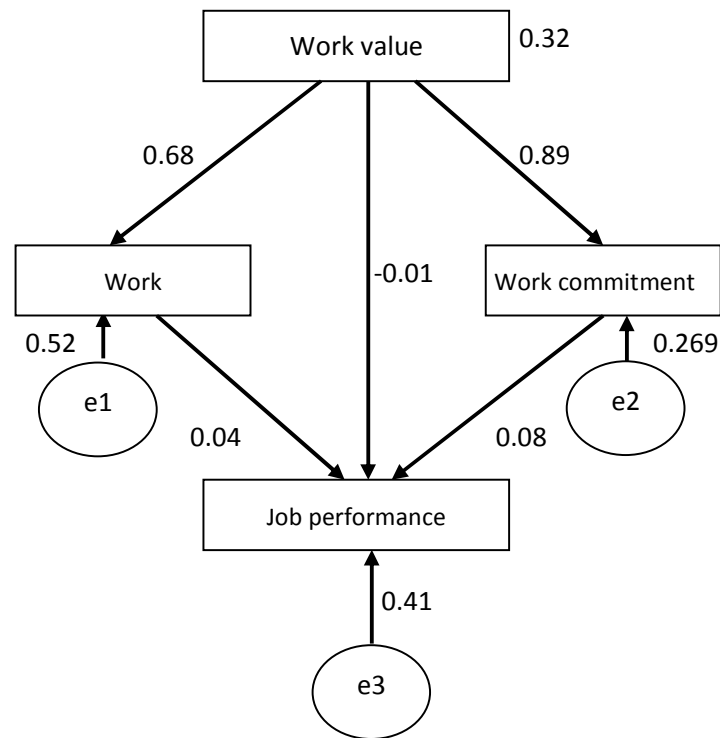


Figure 3. SEM Model (2): causal relationship path of variables.

Table 3. Moderating effects of work attitude on work values and job performance.

Hypothesis	Path	Direct effects	Indirect effects	Presence of moderating effects
H ₄	Work values -> job performance (work attitude)	-0.253	0.343	Yes (Indirect effects > direct effects)
H ₄₋₁	Work values -> job performance (work involvement)	-0.02	0.026	Yes (Indirect effects > direct effects)
H ₄₋₂	Work values -> job performance (organizational commitment)	-0.02	0.082	Yes (Indirect effects > direct effects)

performance. This research intended to explore whether the effects of work attitude would change the influence of work values on job performance. According to Jung’s (2008) definition of moderating effects, moderating variables do not work when the direct effects are greater than the indirect effects, hence, the moderating variables can be ignored. However, if the indirect effects are greater than the direct effects, the moderating variables do have an influence. The moderating effects are a product of the direct effects of the independent variables on the moderating variables, multiplied with the direct effects of the moderating variables on the dependent variables.

According to Table 3, the direct effects of work values and job performance were -0.253. The indirect effects of these two variables via work attitude became 0.343 (a value of 0.88, the direct effect of work values on work attitude, multiplied with the value of 0.39, the direct effects of work attitude on job performance). The indirect effects were greater than the direct effects, and hence, this proved the existence of moderating effects. Therefore, H₄ was supported with the empirical data.

The direct effects of work values on job performance were -0.01. The introduction of work involvement caused the indirect effects to become 0.26 (the direct effects of work values on work involvement, 0.66, multiplied with

Table 4. Regression analysis of the effects of supportive leadership on work values and work involvement.

Variable	Work involvement (n = 485)		
	M1	M2	M3
Step 1: control variable			
Total tenure in green energy industry	0.028	0.018	0.030
Education	-0.174**	-0.154**	-0.154**
Job level	-0.081	-0.036	-0.022
Major effects variable			
Work values		0.391***	0.048
Supportive leadership		0.045	-0.468
Step 2: moderating effects variable			
Work values × supportive leadership			0.736
R ²	0.043	0.209	0.223
ΔR ²	0.043	0.166	0.009
F value	5.39***	19.00***	16.59***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

the direct effects of work involvement on job performance, 0.04). The indirect effects were greater than the direct effects, and hence, this proved the existence of moderating effects. Therefore, H₄₋₁ was supported with the empirical data. The direct effects of work values on job performance were -0.02.

The introduction of organizational commitment caused the indirect effects to become .082 (the direct effects of work values on organizational commitment, 0.91, multiplied with the direct effects of organizational commitment on job performance, 0.09). The indirect effects were greater than the direct effects, and hence, this proved the existence of moderating effects. Therefore, H₄₋₂ was supported with the empirical data.

Moderating effect of leadership styles on work values and work attitude

Hierarchical regression was performed to examine the moderating effects of leadership styles on work values and work attitude. The symbol M1 denotes regression model 1, with the addition of the control variables in the first level. Similarly, the symbols M1 and M2 denote regression models 2 and 3, with the addition of the key effects and moderating effects. The results are shown in Tables 4 to 7.

Moderating effects of supportive leadership on work values and work involvement: According to Table 4, when regression models M2 and M3 incorporated the function of work values multiplied by supportive leadership, R² became 0.223, and the delta in R² was 0.009. The coefficient of work values multiplied by supportive leadership was not statistically significant ($\beta = 0.736$, $p > 0.05$). This showed that supportive leadership

did not have a moderating effect on work values and work involvement. Hence, H₅₋₁ was not supported with the empirical data.

Moderating effects of supportive leadership on work values and organizational commitment: According to Table 5, when regression models M2 and M3 incorporated the function of work values multiplied by supportive leadership, R² became 0.430, and the delta in R² was 0.011. The coefficient of work values multiplied by supportive leadership was statistically significant ($\beta = 0.794$, $p < 0.001$). This showed that supportive leadership had a moderating effect on work values and organizational commitment. Figure 4 illustrates the correlation between work values and work involvement under strong and weak supportive directive leadership in the context of moderating effects.

Figure 4 illustrates the relationship of the interaction between work values and supportive leadership on organizational commitment. Under a strong supportive leadership, the greater the emphasis placed on work values, the higher the organizational commitment of employees. In contrast, under a weak supportive leadership, there was no significant correlation between work values and organizational commitment. In other words, the individual slopes of the two lines suggested that work values had stronger predictive power under a strong supportive leadership, but not quite so under a weak supportive leadership. Hence, H₅₋₂ was supported with the empirical data.

Moderating effects of directive leadership on work values and work involvement: According to Table 6, when regression models M2 and M3 incorporated the function of work values multiplied by directive leadership, R² became 0.237, and the delta in R² was 0.028. The

Table 5. Regression analysis of the effects of supportive leadership on work values and organizational commitment.

Variable	Organizational commitment (n = 485)		
	M1	M2	M3
Step 1: control variable			
Total tenure in green energy industry	0.001	0.011	0.002
Education	-0.19***	-0.16***	-0.16***
Job level	-0.12	-0.05	-0.04
Major effects variable			
Work values		0.54***	0.17
Supportive leadership		0.15	-0.41
Step 2: moderating effects variable			
Work values × supportive leadership			0.79*
R ²	0.052	0.42	0.43
ΔR ²	0.052	0.37	0.01
F value	5.56***	51.99***	44.95***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

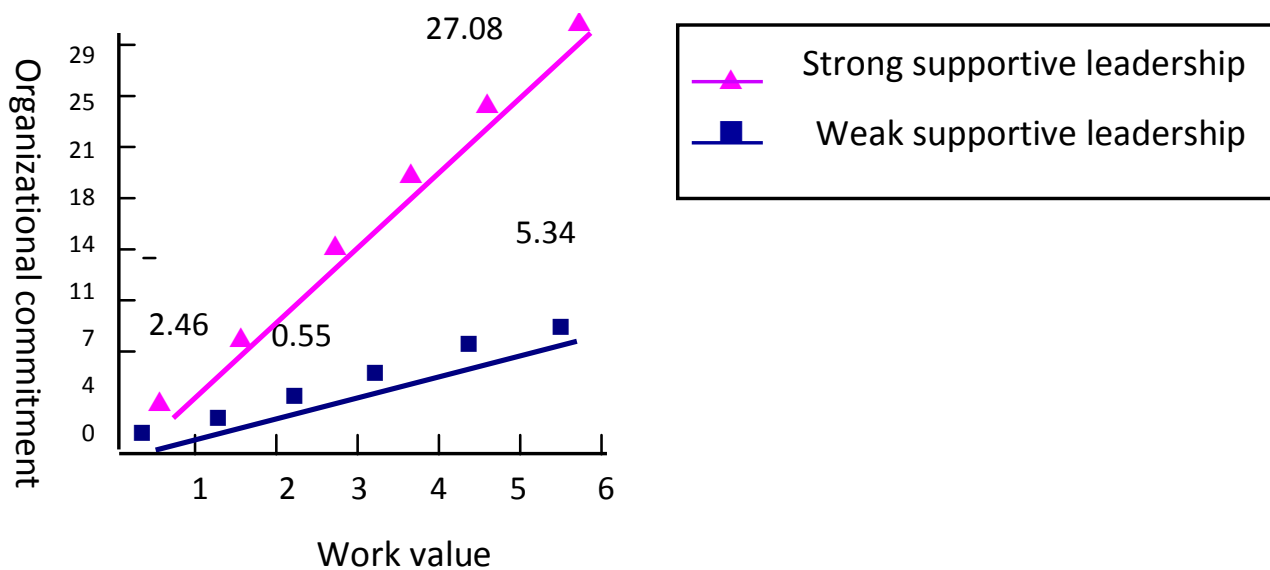


Figure 4. The moderating effects of supportive leadership on work values and organizational commitment.

coefficient of work values multiplied by directive leadership was statistically significant ($\beta = 0.736, p < 0.001$). This showed that directive leadership had a moderating effect on work values and work involvement. Figure 5 illustrates the relationship of the interaction between work values and organizational commitment under a strong supportive leadership and a weak supportive leadership.

Figure 5 illustrates the relationship of the interaction between work values and directive leadership on work involvement. Under a strong directive leadership, the greater the emphasis placed on work values, the higher

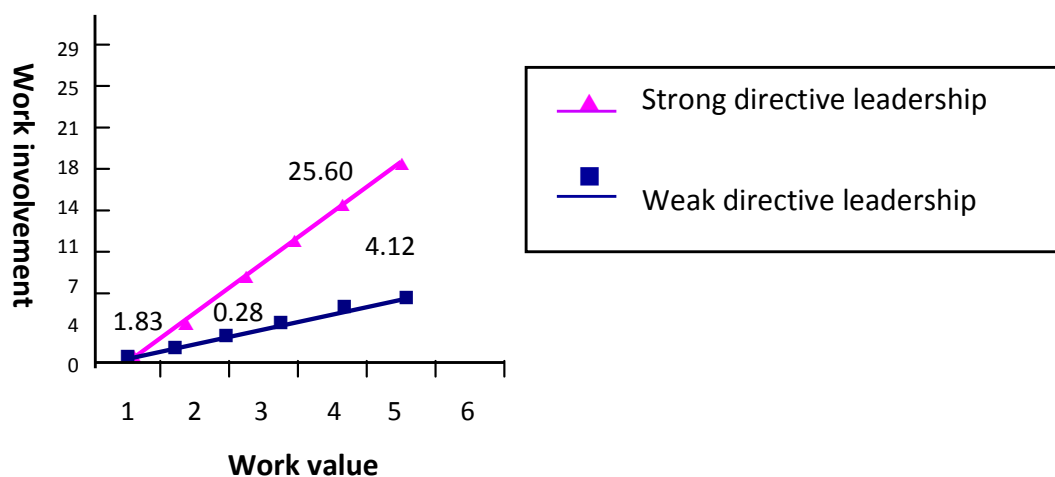
the work involvement of employees. In contrast, under a weak directive leadership, there was no significant correlation between work values and work involvement. In other words, the individual slopes of the two lines suggested that work values had a stronger predictive power under a strong directive leadership, but not quite so under a weak directive leadership. Hence, H_{5-3} was supported with the empirical data.

Moderating effects of directive leadership on work values and organizational commitment: According to Table 7, when regression models M2 and M3

Table 6. Regression analysis of the effects of directive leadership on work values and work involvement.

Variable	Organizational commitment (n = 485)		
	M1	M2	M3
Step 1: control variable			
Total tenure in green energy industry	0.028	0.014	0.030
Education	-0.17***	-0.15**	-0.14**
Job level	-0.08	-0.04	-0.01
Major effects variable			
Work values		0.45***	0.023
Directive leadership		-0.05	-0.49
Step 2: moderating effects variable			
Work values x directive leadership			0.756***
R ²	0.04	0.21	0.237
ΔR ²	0.04	0.17	0.028
F value	5.39***	19.07***	18.09***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

**Figure 5.** The moderating effects of directive leadership on work values and work involvement.

incorporated the function of work values multiplied by directive leadership, R^2 became 0.446, and the delta in R^2 was 0.036. The coefficient of work values multiplied by directive leadership was statistically significant ($\beta = 0.723$, $p < 0.001$). This showed that directive leadership had a moderating effect on work values and organizational commitment. Figure 5 illustrates the relationship between work values and organizational commitment under a strong supportive leadership and a weak supportive leadership.

Figure 6 shows the influence of the interactions between work values and directive leadership on organizational commitment. Under a strong directive leadership, the greater the emphasis placed on work values, the higher the organizational commitment of

employees. In contrast, under a weak directive leadership, there was no significant correlation between work values and work involvement. In other words, the individual slopes of the two lines suggested that work values had a stronger predictive power under a strong directive leadership, but not quite so under a weak directive leadership. Hence, H_{5-4} was supported with the empirical data.

Conclusions

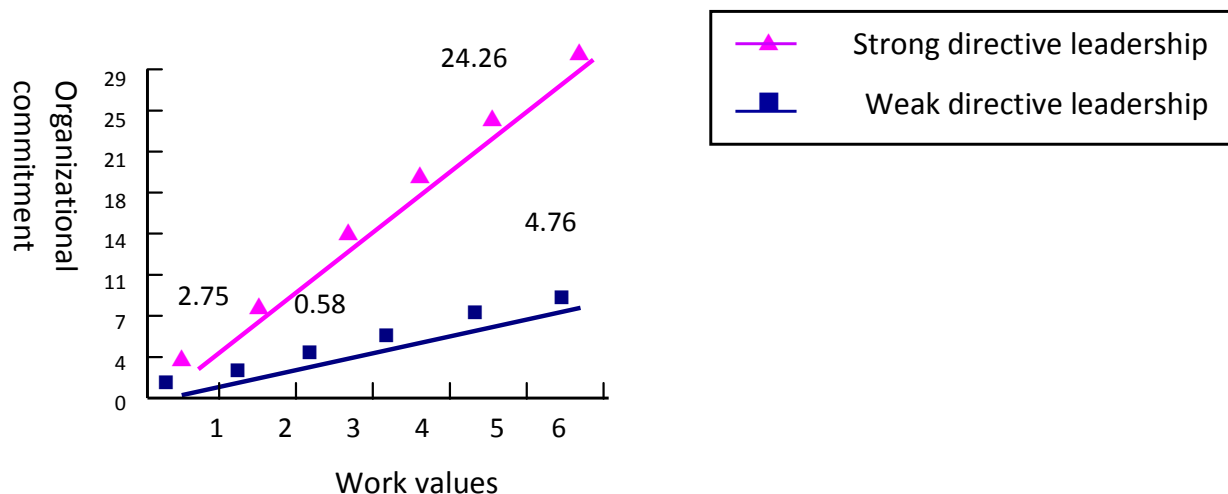
Work values

The empirical results showed that there was a positive correlation between the work values and work attitude of

Table 7. Regression analysis of the effects of directive leadership on work values and organizational commitment.

Variable	Organizational commitment (n = 485)		
	M1	M2	M3
Step 1: control variable			
Total tenure in green energy industry	0.001	-0.008	0.007
Education	-0.192***	-0.167***	-0.154***
Job level	-0.124	-0.059	-0.029
Major effects variable			
Work values		0.528***	0.144
Directive leadership		-0.145**	-0.259*
Step 2: moderating effects variable			
Work values x directive leadership			0.723***
R ²	0.052	0.418	0.446
ΔR ²	0.052	0.367	0.036
F value	6.557***	51.615***	46.500***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

**Figure 6.** The moderating effects of directive leadership on work values and organizational commitment.

employees in the green energy industry. When greater emphasis was placed on work values, the work attitude would be better, which was consistent with Chen and Lu (2000), who suggested that as more employees identify with work values, their organizational commitment and work involvement will be higher. An interview with a manager in Company S indicated that only those who shared the same work values could form a team. In other words, people with the same work values share similar attitudes and behavior, and it is easier for them to communicate. This finding was consistent with the literature. In terms of management implications, when employees were positive about their work, they became more dedicated to their work. By understanding the work

values of employees, a company can improve employees' work performance and encourage work involvement. Therefore, it is necessary to select employees whose work values are similar with the company or who can identify with the values of the company, in order to ensure that the employees will be committed to the company and be willing to make an effort.

Direct effects of work attitude on job performance

The empirical results showed that there was a positive but not significant correlation between the work attitude of

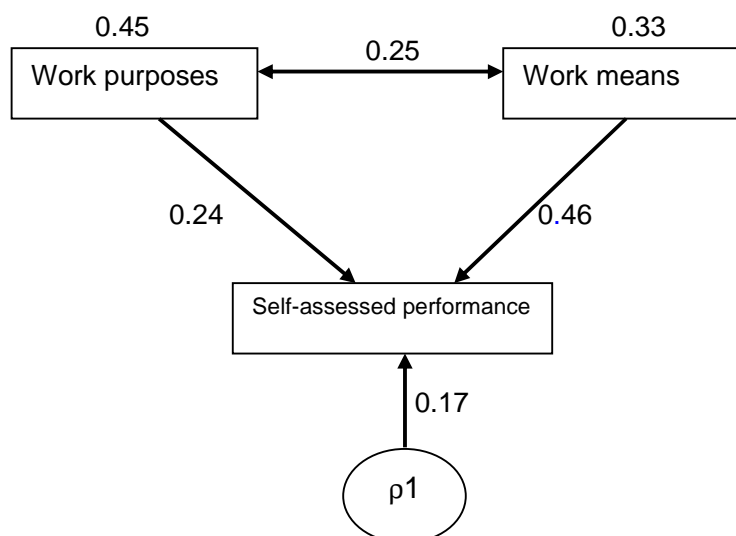


Figure 7. SEM Model: Causal relationship path between work values and job performance.

employees and the job performance assessed by managers in the green energy industry. This indicated that work attitude cannot predicate job performance. The effects of work involvement and organizational commitment on job performance were also not significant, which was inconsistent with the majority of the literature. Most of the past studies have measured job performance using self-assessments and have analyzed data using regression. However, this research evaluated job performance based on reviews by managers, and analyzed the data using structural equation models. Although this approach could not prove the hypothesis, it may be a more robust approach than the past studies, and it may be one of the factors contributing to the results that were inconsistent with the existing literature. The interview with Manager C at a solar company suggested that work involvement did not equate to job performance, as doing something right and doing the right thing are not identical. If the direction is wrong, it is not possible to achieve good performance, no matter how much effort is put into it.

Direct effects of work values on job performance

The empirical results suggested that there was a negative but insignificant correlation between the work values of employees and job performance (reviewed by managers) in the green energy industry. This conclusion was inconsistent with most literature. Meanwhile, this research performed a path analysis on work purposes and work means under work values and self-assessed job performance. The results, as shown in Figure 7, showed that the path coefficients of work purposes and

work means to self-assessed job performance were statistically significant ($\gamma = 0.241, p < 0.001$; $\gamma = 0.456, p < 0.001$). As employees placed more emphasis on work purposes and means, their self-assessed job performance would be higher. However, this fell below the expectations of the managers and created a negative correlation between the work values of employees and the job performance assessed by managers.

Mediating effects of work attitude on work values and job performance

The empirical results showed that the work attitude of employees in the green energy industry had a mediating effect on their work values and their job performance, as assessed by managers. In other words, work values and job performance (evaluated by managers) were not directly related, but were only correlated via work attitude. Meanwhile, work values were positively correlated with job performance (assessed by managers) via work involvement and organizational commitment, showing that they had a stronger influence on job performance. Wang and Kao (2009) examined the relationship among work values, organizational commitment and job performance. Their research found that organizational commitment had a positive moderating effect between work values and job performance. An interview with HR Manager W in an LED lighting company suggested that work values were the beliefs that an individual had. They affected the individual's attitude, and the attitude affects outcomes. If employees could fully support the organization, this could be beneficial for the organization to achieve its targets, which was consistent with existing

literature. The management implication of this conclusion is that a company should strive to make its employees identify with and be committed to its values. This is the only way to ensure that employees will work diligently, as it improves the job performance of employees, as well as the top line of companies.

Moderating effects of leadership styles on work values and work attitude

The empirical results suggested that supportive leadership did not have a moderating effect on work values and work involvement, but that directive leadership had a moderating effect on work values and organizational commitment. During an interview, Vice President L at a solar company suggested that when possible, managers should allow employees to take a break or do other things if they were in a bad mood or were distracted. The company should also assist employees in resolving problems, which would benefit the company in the long term because the employees would be more committed to the company and be less susceptible to offers from other companies. Managers should be constantly concerned about their employees and extend help whenever possible to employees with difficulties.

The empirical results implied that directive leadership had a moderating effect on work values, work involvement and organizational commitment. Chu and Shih (2007) suggested that a highly considerate and structured leadership enables employees to have a strong sense of achievement. This research defined the sense of achievement as an indicator of work values and inferred that leadership affects the work values of employees, which was consistent with existing literature. When interviewed, HR Manager W suggested that it was important to ensure his employees knew what his goals were. Simply respecting employees and listening to them without setting up specific targets is not as effective as giving them reasonable goals and appropriate support. In practice, performance should be the most important motivator because it drives employees to complete their tasks. Employees are involved at work on the basis of their targets. When managers prompt employees to complete the targets and focus on performance, it enhances the work involvement and organizational commitment of employees. Vice President K in the technology division of an LED lighting company, and Marketing Manager S in a solar company, both mentioned the importance of caring and supervision. In practice, managers should care about their employees, as well as give them appropriate pressure. They should use a combination of incentives and penalties when necessary, and should integrate supportive leadership with directive leadership. This is the only way to enhance the relationship among work values, work involvement

and organizational commitment.

RESEARCH LIMITATIONS

This research released questionnaires only to key sectors of the green energy industry, such as solar technology and LED illumination, and did not address other promising sectors, such as wind power, biofuel, hydrogen and fuel cells, energy ICT and electric vehicles. Therefore, the research results may not be completely representative of the green energy industry. Meanwhile, due to limitations of time and costs, this research gathered samples based on convenience sampling, and did not reach to all of the research subjects or collect a large number of samples. Although the self-assessment bias of employees on their own job performance was reduced by sourcing evaluations from managers, work involvement was still based on self-assessment. Employees may have over-evaluated or under-evaluated their own work involvement due to differences in perceptions. This may have resulted in distorted research results, as job performance was gauged by managers.

This research referred to leadership styles (that is, supportive leadership and directive leadership) as the moderating variable. However, there are many leadership styles other than supportive leadership and directive leadership. As a result, there may have been a bias in the research result. The questionnaire was designed based on a literature review and interview findings. Although it strived to ensure the robustness and explanatory power of the questionnaire, it had to make choices among certain questions in order to ensure the respondents completed all of the questions. It was not possible to cover all of the desired questions.

SUGGESTIONS

Expansion of the research scope

This study surveyed employees of the green energy industry. Whether the conclusions are applicable to employees of other industries is yet to be validated. It is suggested that follow-up studies could expand the research scope to other industries.

Examination of differences in the work values between employees of the surveyed green energy sectors and other sectors

This research surveyed employees in the solar and LED illumination sectors. However, do employees in the wind, biofuel, hydrogen and fuel cells, energy ICT and electric vehicle sectors share the same work values? Future studies could examine employees of various sectors to

find out whether there are any differences in their work values.

Further investigation into different dimensions of work values

In this paper, work values were divided into work purposes and work means. However, other scholars have proposed different dimensions. Future studies may delve into different work value dimensions and explore the correlation between work values, work attitude and job performance, thus establishing a deeper understanding of the work tendency of employees in the green energy industry.

Addition of peer reviews or customer feedback

This study referred to the job performance evaluated by managers to avoid potential self-assessment bias by employees. It is recommended that future studies could incorporate peer reviews or customer feedback and compare the results with the self-assessments to ensure objectivity.

Understanding of corporate values by employees

The results indicated that the work values of employees affected their work involvement and organizational commitment. Work values also affected job performance via work involvement and organizational commitment. When recruiting, managers should first understand the work values of the applicants and inquire about their perceptions and attitude for the job. It is suggested that managers could explain the corporate values to employees in meetings or during training sessions, so that employees could identify with the corporate values and establish organizational commitment.

Understanding of work content and organizational goals by employees

The research findings showed that work involvement and organizational commitment did not affect job performance. Perhaps efforts made in the wrong direction would contribute to poor job performance. In order to encourage employees to be involved at work, managers should ensure that employees understand the work content or organizational targets.

Timely and appropriate care and pressures to employees

According to the findings, the adoption of both supportive

leadership and directive leadership could enhance the positive effects of work values on work involvement and organizational commitment. The interviews with industry executives found that the adoption of both styles yielded better results. In other words, timely and appropriate care as well as pressure to employees can enhance their work involvement and organizational commitment.

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APPENDIX

Questionnaire

Work values

1. I can do what I am good at in this company.
2. I have a sense of achievement working in this company.
3. I can learn and develop by working in this company.
4. Working in this company is my enjoyment.
5. I learn how to work with others in this company.
6. I have a secure and stable life from working in this company.
7. Working in this company is a way of life that I enjoy.
8. Working in this company makes my life interesting.
9. Working in this company gives me a comfortable work environment.
10. I seek changes and new things when working in this company.
11. I work efficiently in this company.
12. I can express my humble attitude when working in this company.
13. I am a team player in this company.
14. I am tolerant in this company.
15. I am patient in this company.
16. I am friendly in this company.
17. I can express my friendly side when working in this company.
18. I can express my sincere side when working in this company.
19. I can express my collaborative side when working in this company.

Work attitude

1. To me, the most important thing is my current job.
2. To me, this job is only a small part of life.
3. I feel my work is everything to me.
4. Most of my hobbies are related to my work.
5. My life is closely related to my current job.
6. Most of my life goals are centered on work.
7. I feel work is the focus of my life.
8. I consider the company's reputation as my own honor.
9. I am willing to work extra hours to make work procedures smooth.
10. I am willing to make an extra effort for the company by increasing the work efficiency of my department.
11. I am happy to accept any tasks assigned by the management team, as long as they fall within a reasonable scope.
12. I feel honored when I mention to others that I work in this company.
13. I cherish the opportunity of working in this company.
14. I am happy to stay in this company, as long as the status quo remains.

15. I feel it is a good thing to work in this company.
16. I am pleased to have found this job.
17. Staying in this company is good for my future.
18. I agree with most of the company's policies toward employees.
19. Compared to other companies, I believe this company is the best place to be.
20. I can fully exercise my strengths by working in this company.
21. I feel that my values are similar to the company's management philosophy.
22. I believe my current job descriptions match my professionalism.
23. I do my best because I consider the interests of the company to be my own interests.

Job performance

1. I know my job and how I should do my job.
2. I understand the criteria of performance reviews.
3. I can usually reach the standards of performance reviews.
4. I can always resolve unexpected events.
5. I maintain good attendance records.
6. I can complete assigned tasks quickly and efficiently.
7. I can maintain good service standards.
8. I am very familiar with SOP (standard operational procedures).
9. Generally speaking, I can complete the tasks assigned by managers.
10. I rarely receive complaints from customers or colleagues due to poor work.
11. I often acquire new knowledge and new skills related to work.
12. I take a proactive approach to resolving work issues.
13. I usually collaborate with colleagues to complete tasks.
14. I maintain the reputation of the company and focus on the discipline of the company.
15. I often expect to be assigned to a challenging job.
16. Generally speaking, my manager is pleased with my job performance.

Leadership style

1. My line manager has a definite attitude. He/she is straightforward in his/her demands from sub-ordinates.
2. My line manager makes sure I understand the company's expectations for me.
3. My line manager asks tasks to be completed before deadlines.
4. My line manager treats all subordinates equally.
5. My line manager expresses his/her concern when staff is in trouble.
6. My line manager makes sure we know how important

we are.

7. My line manager supports what we do.

8. My line manager pays attention to our benefits.

9. My line manager expresses complements and appreciation when staff completes tasks.