Journal of Tourism, Hospitality and Environment Management
JTHEM
EISSN: 0128-178X
Volume 7 Issue 29 (September 2022) PP. 64-75
DOI 10/35631/JTHEM.729006

JOURNAL OF TOURISM, HOSPITALITY AND ENVIRONMENT MANAGEMENT (JTHEM)
www.jthem.com

GLOBAL ACADEMIC EXCELLENCE

INCREASING ENERGY EFFICIENCY IN AEROSPACE INDUSTRY THROUGH EMPLOYEES' ENERGY AWARENESS AND KNOWLEDGE

Amar Hisham Jaaffar[1], Say Keat Ooi[2]*

[1] Institute of Energy Policy and Research, Universiti Tenaga National, Malaysia
Email: Ahisham@uniten.edu.my
[2] Graduate School of Business, Universiti Sains Malaysia, Malaysia.
Email: ooisaykeat@usm.my
* Corresponding Author

Article Info:

Article history:
Received date: 16.11.2020
Revised date: 09.05.2022
Accepted date: 03.06.2022
Published date: 01.09.2022

To cite this document:

Jaaffar, A. H., & Ooi, S. K. (2022). Increasing Energy Efficiency in Aerospace Industry through Employees' Energy Awareness and Knowledge. *Journal of Tourism Hospitality and Environment Management, 7* (29), 64-75.

DOI: 10.35631/JTHEM.729006.

Abstract:

Typically, the aerospace industry used numerous non-renewable resources, like titanium and alloy. Additionally, the design of the flight's materials also involves the use of fossil fuel. In fact, the aerospace industry is strongly related with air pollution. Nonetheless, energy is important in improving social and economic and its increasing demand related to increase in industrialization, population and has improved people's lifestyles. Hence, this study aims to examine the relationships between employees' energy awareness, knowledge and energy efficiency in the aerospace industry in Malaysia. Based on the data collected from 210 employees in the aerospace industry, findings show that energy awareness and knowledge of the employees are strongly influencing energy efficiency practices of the organisation. As such, this paper sheds some light on organisational energy efficiency practices and provides valuable insights on how businesses can capitalise on employees' energy awareness and knowledge in enhancing energy efficiency practices leading towards sustainable development.

Keywords:

Energy Awareness, Energy Knowledge, Energy Efficiency, Aerospace Industry, Sustainable Development.

Introduction

Malaysia is one of the main suppliers for the aerospace production industry specifically for aero-shape parts and components in addition to properly avionics components. The commercial enterprise is supported by means of a strong nearby deliver the chain encompass each global

Journal of Tourism, Hospitality and Environment Management
JTHEM
EISSN: 0128-178X
Volume 7 Issue 29 (September 2022) PP. 64-75
DOI 10/35631/JTHEM.729006
and local enterprise players particularly Spirit Aero Systems, Honeywell Aerospace Avionics, Composite Technology Research Malaysia (CTRM), SME Aerospace, Senior Aerospace Upeca and Aerospace Composites Malaysia (MIDA, 2017).

The government focus on the Aerospace Industry by setting up the National Aerospace Industry Coordination Office (NAICO) to monitor the progress and add to the competitiveness of the Malaysian aerospace industry, which is in line with steps and targets set out in the Blueprint, Initiative Project (EPP) and the 11th Malaysia Plan. NAICO also serves as a centre consideration in linking aerospace industry players, related government ministries & agencies, academics and research institutions to work together in encourage the capacity and the local aerospace industry (MIDA, 2017).

Report from the Star Online on Tuesday 21 March 2017 stated that Malaysia's Aerospace Industry grew by 7% these 12 months. The previous International Trade and Industry Minister Datuk Seri Mustapa Mohamed said Aerospace production, big a part of the enterprise in Malaysia, is expected to make a contribution 55% to the general value of the industry this year. The overall revenue generated via this enterprise presently stood at RM11.8 billion. By 2030, Malaysia's Aerospace Industry enterprise is projected to make contribution revenue of RM20.4 billion for Maintenance, Repair and Overhaul (MRO), RM21.2 billion for aero-production and RM13.6 billion for engineering and design offerings (The Star, 2017).

Typically, the aerospace industry used numerous non-renewable resources, like titanium and alloy. Additionally, the design of the flight's materials also involves the use of fossil fuel. In fact, the aerospace industry is strongly related with air pollution (Martin et al., 2008). This study aims to examine the relationships between employees' energy awareness, knowledge and energy efficiency in the aerospace industry in Malaysia. In fact, the air-to-air or dispersal techniques may no longer successfully mix and transport pollutants as a result of the aerospace industry's release of waste residues and excessive residual wastes into the atmosphere (MIDA, 2017). As a result, there may be haze and air pollution phenomena at the location, which can contribute to climate change. Energy influence on climate change, because energy releases carbon into the air (Adeneye et al., 2021). Carbon will make global warming and all. Increased attention of pollutants because of the weakness of the air dispersion manner may have a poor impact mainly on human fitness as well as bodily health surroundings (Ramanathan et al., 2009).

Energy management is a major subset of management. Energy management is important to aerospace industry because this industry used a lot of energy and non-renewable energy. Energy management has a relationship with human resources (HR), and that are human resources need to provide the latest training to energy awareness, interact learning, add more energy knowledge that leads human resources. Aerospace industry in Malaysia is dearest lack of study. Carbon is classified as a greenhouse gas and is created as a by-product of consuming non-renewable fossil fuels, such coal, petroleum and natural gas as energy sources (Ooi & Amran, 2018; 2019; Adeneye et al., 2021). Carbon emissions led to climate change, which further exacerbates economic risks from severe weather events such as floods that can, in turn, lead to the disruption of the supply chain and operational losses (Halldorsson & Kovacs, 2010). The threat of economic loss and destabilisation of global supply chains due to global warming and climate change has created a vested interest by both governments and the public to become

Journal of Tourism, Hospitality and Environment Management
JTHEM
EISSN: 0128-178X
Volume 7 Issue 29 (September 2022) PP. 64-75
DOI 10/35631/JTHEM.729006
aware of the downsides of unmanaged carbon emissions (Lam et al., 2010; Fernando & Hor, 2017; Ooi & Amran, 2019).

Energy is a crucial issue and one that is likely to increase in importance over the coming years as the effects of oil peaking and the pressure to reduce greenhouse gas emissions intensify. It is worthy of management time in all organisations. Clearly the optimum amount of time and resource applied to it will be a function of many factors, including the size of the organisation, its relative energy intensity, interest from senior management and market perception. Whatever time and resources have been or are currently being committed to the energy problem, they are likely insufficient to address the current and upcoming challenges given that we have just come out of a long period of relatively cheap energy prices and prices have escalated dramatically. (Ooi & Amran, 2019).

In the aerospace industry, all aircrafts can be upgraded following the increase of demand aircraft from Malaysia and all over the world. Additionally, the aerospace industries can also renew the shipbuilding machines, how to dispose of smoke, how to repair damaged aircraft or improve their skills among employees. The aerospace industry used energy in efficiently. Even though many through industry-led research and technology (R&T) initiative in aerospace industry to minimize the impact of the business operations, there is comparatively lack of study that focus on employee awareness and knowledge on energy efficiency. Therefore, this study aims to examine the factor that led to energy efficiency practices from the human resource management perspective by assessing the employees' energy awareness and energy knowledge.

Literature Review

Energy management is contracted to decrease energy wastage beyond influencing production numbers of yield quality while at the same time together limiting the environmental effects of firm activities (Abdelaziz et al., 2011). This occurs through the change of existing technology and processes or investments in new vitality proficiency headway to meet energy demand absolutely when and where they are required. However, no authority of energy management practices exists because of the complicatedness of industrial processes and the considerable number of variations in applications among different countries and regions. Thereby energy management team showing an indication of permanent commitment to produce continuous energy efficiency gains. Therefore, energy awareness and knowledge are part of energy management.

Energy Awareness

Awareness defined as knowing something, having knowledge of something due to the fact you have got found it or someone has discussed about it, figuring out something or noticed it, mindful that something exists because you recognise that is happening, informed, properly knowledgeable about what is occurring within the world or about the modern-day developments. Now, awareness is referred to know something. Energy awareness is related to power protection application (Vesma, 2002). Based on Williams (1993), he states that through awareness can motivate employees to preserve electricity and by creating awareness is the most successful effort. Organisations plays an essential role in lowering utilities bill and be able to make a big impact, so by raising awareness is part of the answer (Camp, 2005). Raising awareness has been applied as the approach to preserve energy, for instance, the Imperial College of Science, Technology and Medicine in London has targeted to create awareness on

Journal of Tourism, Hospitality and Environment Management
JTHEM
EISSN: 0128-178X
Volume 7 Issue 29 (September 2022) PP. 64-75
DOI 10/35631/JTHEM.729006
increasing staff's and scholar's awareness of energy conservation problem as one of the approach to protect the environment by reducing the expenditure on fuel bills (Pancucci, 1998).

Energy Knowledge

Energy management is a part of energy knowledge. Energy knowledge is one of the important part of energy management. Energy management is an intelligent way of utilising energy to gain more profits and also to create more competitive advantages by organisational measures and optimisation of energy efficiency in the process (Thumann, 1998). Energy management programme is just not just merely technical, but its introduction also implies a new administration discipline. Energy management it combines the knowledge of engineering, management and housekeeping. In each industry, energy management is most important for financial, social and environmental reasons. The monetary causes focus on the profitability and competencies growth of the corporations, whereas the social and environmental factors focus on the benefits that the enterprises, their staff and the society get from energy management programme. There are five important factors on energy knowledge. Firstly, the energy management members have adequate capabilities in energy administration. Secondly, the energy training programme has been developed with bright outcome by the energy management. Thirdly, external energy specialist was invited to evaluate the present ability of the management. Fourthly, the organisations have a complete energy administration database. Fifthly, the organisations have good techniques and steps in imposing an energy administration program (Fernando & Hor, 2017).

Energy Efficiency

Energy is important in improving social and economic and its increasing demand related to increase in industrialization, population and has improved people's lifestyles. A country will be dependent on imported energy, when the local energy resources are unable to maintain up with the demand (Hepbasli et al., 2004). Therefore, a more recognition has been located on ensuring stable energy supply and strength protection than on energy intake. Fossil fuels has become a crucial element for transportation including air transportation even as coal and natural gases are the favoured assets of energy manufacturing due to the fact they are reasonably priced (Dincer, 1999). The level of carbon emissions keep increasing since there is no other energy that can be replaced. From the other side, excessive consumption of energy indicates a stable economic interest. On the opposite side, an excellent on economic improvement is needed since there is an increase in economic activities. Therefore, a strong interest was showed by the government in start developing energy efficiency (Ooi & Amran, 2018; Adeneye et al., 2021).

Government controls the energy consumption and the manufacturing of energy with a clear guideline (Fernando & Hor, 2017). The consumption of energy is depending on increase the level of residing even as power efficiency is driven in most cases by using financial reasons. However, it is frequently cheaper to preserve electricity than to discover a new source of energy, and the cheapest manner to provide the electricity is to preserve it (Dincer, 1999). Recently, a drop in environment quality has made a very poor consequences on social well-being and may causes economy problem because of global warming effect and climate trade. This has affected in declining productiveness and has reignited hobby in energy control. Voluntary agreements are appropriate over law as they discover a higher participation price, despite the fact that the overall strength financial savings is probably slower to broaden (Phylipsen et al., 2002). The fulfilment of electricity guidelines depends at the ability to expect industrial region reaction and need to be primarily based on scientific proof. However, plenty

Journal of Tourism, Hospitality and Environment Management
JTHEM
EISSN: 0128-178X
Volume 7 Issue 29 (September 2022) PP. 64-75
DOI 10/35631/JTHEM.729006

empirical research has shown a "strength performance paradox" wherein corporations reject energy performance investments despite the fact that strength pleasant practices are definitely correlated to company productiveness (Martin et al., 2012).

Framework & Hypotheses Development

Raising awareness is very important. However, most of the organisations still never focus on the benefits that can get from energy awareness. This is because facility managers and plant operators have a tendency to be sceptical of behavioural technique and have little expertise of them and their ability. Just because of that, 'lack of awareness' becomes one of the reasons of energy inefficiency. The employee's energy awareness improved the potential to reduce carbon emission. This carbon reduction can be done through recycling of waste energy (Ooi et al., 2013). The way to enhancing energy efficiency is lack of motivation and information of the protection and operation of workers (Yik & Lee, 2002). Hence, it is proposed that:

H1: There is a correlation between energy awareness and energy efficiency.
H2: There is a correlation between energy knowledge and energy efficiency.

Figure 1 presents the framework of this study.

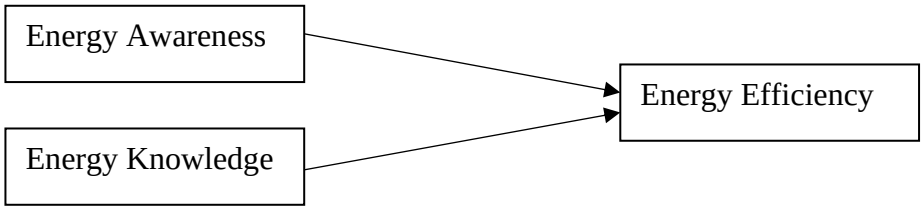

Figure 1: Research Framework

Research Method

Malaysia is at the forefront of the aerospace industry, particularly the field of composite and manufacturing designs, design and manufacturing aircraft components, avionics and design and manufacturing systems. Currently, there are eight aircraft assembly companies, 28 aircraft component manufacturers including ground support equipment and over 50 companies involved in overhaul, maintenance and repair (MRO) activities. A conducive business environment in the country has been an attraction for international players like GE Engine Services Malaysia, Spirit AeroSystems and Honeywell Aerospace Services to make Malaysia an operating site to grow their business. Local companies have also made great progress in the aerospace arena. Among local companies are SME Aerospace, CTRM Aero Composite, Sepang Aircraft Engineering, Airod and Malaysian Aerospace Engineering (MIDA, 2017).

The targeted population or group of respondents of this research are the employees of the aerospace industry. The respondents cover the production level employees. This population was targeted for this research because the researcher been interest in studying the relationship between employee awareness and knowledge and its relationship with organisational energy efficiency practices.

Journal of Tourism, Hospitality and Environment Management
JTHEM
EISSN: 0128-178X
Volume 7 Issue 29 (September 2022) PP. 64-75
DOI 10/35631/JTHEM.729006

Convenient sampling was used to recruit respondents for this study. This technique is completely based on the convenience of the researcher. Thus, the selection is of those who happen to be at the data-collection venue. Units are selected conveniently. Elements not at the data-collection venue have no chance of being selected. Advantages of convenience sampling are convenience sampling is easy to implement with some rules governing how samples are to be collected. The relative cost and time required to perform a convenience sampling are small (Sekaran & Bougie, 2013).

Based on the a priori power analysis performed through G*Power (Faul et al., 2009), a minimum sample size of 107 would be required (effect size = 0.15 [medium], $\alpha = 0.05$) for this study to achieve 95% statistical power. Similar approach has been applied in other social science studies (Gim et al., 2022).

The research instrument of this study was a questionnaire. Meanwhile, the measurements were adapted from Fernando and Hor (2017). Similar to Ooi et al. (2020), a drop-off and pick-up approach was used to collect data, in which the researchers drop off questionnaires for the respondents to complete in their own time, and the completed forms are mailed back to the researcher or picked up again at some later date. In this context, the researchers drop questionnaire to the one of officer in the Celestica Aerospace, then the officer distributes the questionnaires to the employees. Then after 3 weeks, the researcher collected back the questionnaire. Of the 278 set of questionnaires returned, 210 responses were valid and useable.

Analysis & Findings

Descriptive Analysis

Of the 210 valid responses, there are 77 males and 133 female respondents. The percent of male respondents is 36.7% and the percent of females is 63.3%, shows that the female respondents are more than the male respondents. There are 14 respondents aged less than 20 years old which is 6.7%, 94 respondents aged between 21 to 30 years old, 78 respondents aged between 31 to 40 and 23 respondents aged between 41 to 50 which is 11%. There is only one respondent aged more than 50 years old. Hence, most employees who involved in this survey are from the group age between 21 to 30 years old, which is 44.8%. Moreover, there are total of 14 respondents whose education level is PMR with 6.7%. SPM level respondents are 115 with the highest percentage of 54.8%. Respondents whose education level is STPM, A-LEVEL and DIPLOMA are 47 respondents, which is the second highest with 22.4%. There are 83 operators with 39.5%. About 38 respondents are quality controller and 34 respondents are quality assurance. There are 39 supervisors as the respondents with 18.6%. Next, the total number of production manager is 16 respondents with 7.6%. Most of the respondents are operator. There are 59 respondents are below 5 years of working experiences. Respondents with working experiences between 6 to 10 years are 109 respondents with the percentage of 51.9%, which is the highest. About 26 respondents have working experiences between 11 to 15 years with 12.4%, and 16 respondents have working experiences more than 15 years, which is 7.6%.

Reliability Analysis

Reliability analysis aims to assess internal consistency of the items composing the scale and the properties of the measurement scale. Table 1 presents the Cronbach's Alpha values of the constructs.

Journal of Tourism, Hospitality and Environment Management
JTHEM
EISSN: 0128-178X
Volume 7 Issue 29 (September 2022) PP. 64-75
DOI 10/35631/JTHEM.729006

Table 1: Reliability Assessment

Constructs	No. of items	Cronbach's Alpha	Internal consistency
Energy efficiency	5	0.941	Excellent
Energy knowledge	5	0.944	Excellent
Energy awareness	5	0.941	Excellent

Correlation Analysis

Correlation analysis was performed to measure the relationship between energy awareness, knowledge and energy efficiency. According to Sekaran and Bougie (2013), correlation is a term that mentions the strength of connection between two variables. The stability of a correlation is estimate by the correlation coefficient. The following table 2 presents the interpretation of the strength of correlation coefficient as suggested by Sekaran and Bougie (2013).

Table 2: Correlation Coefficient Interpretation

Value	Interpretation
0.7 and above	Very strong relationship
0.5 – 0.69	Strong relationship
0.3 – 0.49	Moderate relationship
0.1 – 0.29	Weak relationship
0.01 – 0.09	Very weak relationship

Source: Sekaran and Bougie (2013)

Energy Awareness and Energy Efficiency

The relationship between employees' energy awareness and energy efficiency was tested. The result shows that there is a very strong relationship between employees' energy awareness and energy efficiency practices of the organisation, in which the beta value = 0.790 ($p<0.01$). Therefore, the hypothesis 1 was accepted. Table 3 presents the Pearson correlation finding between energy awareness and energy efficiency.

Table 3: Relationship between Employees' Energy Awareness and Energy Efficiency

Correlations			
		Energy awareness	Energy efficiency
	Pearson Correlation	1	.790**
	Sig. (2-tailed)		.000
	N	210	210
	Pearson Correlation	.790**	1
	Sig. (2-tailed)	.000	
	N	210	210
**. Correlation is significant at the 0.01 level (2-tailed).			

Energy Knowledge and Energy Efficiency

Next, the relationship between employees' energy knowledge and energy efficiency was assessed. Similarly, the result shows that there is a very strong relationship between employees' energy knowledge and energy efficiency practices of the organisation, in which the beta value

Journal of Tourism, Hospitality and Environment Management
JTHEM
EISSN: 0128-178X
Volume 7 Issue 29 (September 2022) PP. 64-75
DOI 10/35631/JTHEM.729006

= 0.820 ($p<0.01$). Therefore, the hypothesis 2 was accepted. Table 4 presents the Pearson correlation finding between energy knowledge and energy efficiency.

Table 4: Relationship between Employees' Energy Knowledge and Energy Efficiency

Correlations			
		Energy knowledge	Energy Efficiency
	Pearson Correlation	1	.820**
	Sig. (2-tailed)		.000
	N	210	210
	Pearson Correlation	.820**	1
	Sig. (2-tailed)	.000	
	N	210	210
**. Correlation is significant at the 0.01 level (2-tailed).			

Discussion

This study aims to investigate the relationships between employees' energy awareness, knowledge and energy efficiency in the aerospace industry in Malaysia. Based on the data collected and analysed, findings indicated that energy awareness and knowledge of the employees are strongly influencing energy efficiency practices of the organisation.

Fernando and Hor (2017) stated positive relationship between energy awareness and energy efficiency through the empowerment of people to effort on developing environmental performance by their own struggle to a certain degree without the interruption of management. However, as a result, the reciprocal results of consequences emanating from such activities are limited as exposure is limited to individuals and the same environmental concepts. These findings show that energy awareness is very important for employees to support firm is initiates toward energy efficiency. Based on the result obtained using Pearson correlation and the analysis shows a correlation 0.790 so the result indicates there is a very strong relationship between energy awareness and energy efficiency. Despite the awareness of aerospace firms for the necessity to increase corporate environmental performance needful the utilization of unique organisational resources and capabilities. Accordingly, energy awareness of employees must be developed in the potential to reduce carbon emissions over the reduction of straight energy use or through recycling waste energy in other processes. Minimum suggestion is that management should be skilled to be aware of such emerging environmental desires. Obviously, existing regulations and policies about carbon emissions controls are, in large measure, ineffective. A respondent from this aerospace company has a wide knowledge about the energy management because a high technology company will not simply recruit employees. All employees has a wide understanding in energy management. In-depth awareness training must be instilled in universities or vocational facilities to improve the capabilities and culture of environmental awareness in a fresh generation of workers and managers, although the results may take time before significant improvements can be recognized.

The relationship between employee's energy knowledge and energy efficiency. The result shows that, there is very strong relationship between employee's energy knowledge and energy efficiency (0.820) that shows that hypothesis 2 was supported. The strong correlation may be

Journal of Tourism, Hospitality and Environment Management
JTHEM
EISSN: 0128-178X
Volume 7 Issue 29 (September 2022) PP. 64-75
DOI 10/35631/JTHEM.729006
due to company have provided training to employees to establish energy knowledge. The company also may provide or create a rating centre, performance evaluation and 360-Degree feedback. In addition, strong correlation is may related to high motivation. The employee's may know what they need to do and then they do it successfully. Motivated workers will work hard to achieve their goals while fulfilling organisational objectives. According to Saboori (2012), proof points is showed to growing power intake as a main reason of expanded carbon manufacturing, managing energy performance is one strategic to growing more sustainable economic increase although simultaneously reducing environmental and social effects. Energy practice and management need substantial effects on the sustainable improvement of industrialized firms and improved energy efficiency is perilous (Gahm, 2016).

Energy knowledge can increase efficiency. Energy management is a part of energy knowledge. Sufficient skills training and energy awareness programs attached thru strong upper management support would battle resistance to change and support build confidence as a replacement for fear or resentment towards energy management activities. In related research, suggestion that knowledge and awareness would implant "energy efficiency life cycle decision making" into a firm's organisational beliefs in which energy saving choices are reutilised, the value of energy efficiency is unquestioned, and the quest of energy efficiency is second nature (Martin et al., 2012). Energy efficiency has been postulated because the alterations in the complete vigour consumption used by a system, material or product after power management practices were practiced. Carbon emissions decrease has been outlined as activities that result in reducing levels of carbon emissions that create the greenhouse outcome that hints to global warming, climate change and the degradation of human fine of existence. Energy efficiency upgrading has remained praise in some studies as the greatest cost-effective way to help conserve the environment and simultaneously prepare cost savings and enhance firm reputation.

Research Implications

Energy management is a major subset of management. Energy management is important to Aerospace Industry because this industry used a lot of energy and non-renewable energy. Energy management has a relationship with human resources (HR), and that are human resources need to provide the latest training to energy awareness, interact learning, add more energy knowledge that leads to improvement of human resources management practices. Aerospace industry in Malaysia is dearest lack of study.

The research strives to contribute to the practitioners. First, energy management practices remain active in improving energy efficiency, and the aerospace industry must carry on investing and developing them for cost-reduction benefits and developed organisational performance. Spending in increasing human capital shows proof of empowerment to succeeding the needed results and, together with organisation support and commitment, the aims performance is achievable. Energy is an important issue and one that is likely to increase in importance over the coming years as the effects of oil peaking and the force to reduce greenhouse gas emissions intensify. It is worthy of management time in all organisations. Clearly the optimum total of time and resource useful to it will be a function of many factors, including the size of the organisation, its parallel energy intensity, interest from senior management and market perception. It is likely given that we have just emerged from a long period of relatively low energy prices and prices have increased dramatically, that whatever

Journal of Tourism, Hospitality and Environment Management
JTHEM
EISSN: 0128-178X
Volume 7 Issue 29 (September 2022) PP. 64-75
DOI 10/35631/JTHEM.729006

the level of time and resources have been, or are currently being applied to the energy problem, they are insufficient to face the current and forthcoming challenges (Ooi & Amran, 2019).

Although energy management practices still not become mandatory in Malaysia the market pressure will force these practices, thus it is better to be prepared to take advantage on energy management practices of altering competitive landscapes as a differentiator to leads first-mover benefits when the time comes. Most highly management need first know the concepts and value of environmental issues then in what way they can leverage the firm's ability to adventure new opportunities developing from strongly regulated regions. Aerospace industry have challenges in ensure the accuracy of low carbon estimations. Through regard to this point, government financing is wanted to plan an institutionalized instrument and marker to quantify carbon outflows lessening. The legislature can prepare the ventures from side to side the exhortation of authorities, an information transference that is straight associated with the assembling execution. The Malaysia government necessities to be proactive in supporting vitality proficiency and low carbon evaluations underway procedures. This battle can assist Malaysia with achieving status as a creating nation, which can oversee carbon emanations. The legislature can empower green innovation and eco-developments to switch over the top vitality utilization in their inventory network systems.

Conclusion

This study aims to examine the relationships between employees' energy awareness, knowledge and energy efficiency in the aerospace industry in Malaysia. The data analysis was based on a total of 210 employee responses that currently work in this aerospace industry. This study has a total of 2 objectives which aimed to study the relationship between energy awareness and energy efficiency, and to study the relationship between energy knowledge and energy efficiency. Results show that significant relationships between energy awareness, knowledge and energy efficiency of employee in the aerospace industry were observed, and their perception on firm energy efficiency. The results show that energy management practices are very vital to aerospace industry and the way to inculcate this kind of practices is starting from employee.

References

Adeneye, Y. B., Jaaffar, A. H., Ooi, C. A., & Ooi, S. K. (2021). Nexus Between Carbon Emissions, Energy Consumption, Urbanization and Economic Growth in Asia: Evidence From Common Correlated Effects Mean Group Estimator (CCEMG). Frontiers in Energy Research, 8, 415.

Abdelaziz, E. A., Saidur, R., & Mekhilef, S. (2011). A review on energy saving strategies in industrial sector. *Renewable and sustainable energy reviews*, *15*(1), 150-168.

Camp, A. (2005). Counting every drop. *Facilities Management*, *12*(4), 16-17.

Dincer, I. (1999). Environmental impacts of energy. *Energy policy*, *27*(14), 845-854.

Fernando, Y., & Hor, W. L. (2017). Impacts of energy management practices on energy efficiency and carbon emissions reduction: A survey of malaysian manufacturing firms. *Resources, Conservation and Recycling*, *126*, 62-73.

Gahm, C., Denz, F., Dirr, M., & Tuma, A. (2016). Energy-efficient scheduling in manufacturing companies: a review and research framework. *European Journal of Operational Research*, *248*(3), 744-757.

Gim, G. C., Ooi, S. K., Teoh, S. T., Lim, H. L., & Yeap, J. A.L. (2022). Green human resource management, leader–member exchange, core self-evaluations and work engagement:

Journal of Tourism, Hospitality and Environment Management
JTHEM
EISSN: 0128-178X
Volume 7 Issue 29 (September 2022) PP. 64-75
DOI 10/35631/JTHEM.729006
the mediating role of human resource management performance attributions. International Journal of Manpower, 43(3), 682-700.

Halldórsson, Á., & Kovács, G. (2010). The sustainable agenda and energy efficiency: Logistics solutions and supply chains in times of climate change. *International Journal of Physical Distribution & Logistics Management*, *40*(1/2), 5-13.

Hepbasli, A. & Akdemir, O. (2004). Energy and exergy analysis of a ground source (geothermal) heat pump system. *Energy conversion and management*, *45*(5), 737-753.

Lam, M. K., Lee, K. T., & Mohamed, A. R. (2010). Homogeneous, heterogeneous and enzymatic catalysis for transesterification of high free fatty acid oil (waste cooking oil) to biodiesel: a review. *Biotechnology advances*, *28*(4), 500-518.

MIDA. (2017). Malaysian Aerospace Industry Report. Malaysian Investment Development Authority.

Martin, R., Muûls, M., de Preux, L. B., & Wagner, U. J. (2012). Anatomy of a paradox: Management practices, organizational structure and energy efficiency. *Journal of Environmental Economics and Management*, *63*(2), 208-223.

Ooi, S.K. & Amran, A. (2018). Enabling climate change reporting in Malaysia. World Review of Entrepreneurship, Management and Sustainable Development, 14(4), 507–527.

Ooi, S.K. & Amran, A. (2019). Malaysia's response and strategies towards climate change. World Review of Entrepreneurship, Management and Sustainable Development, 15(3), 360–378.

Ooi, S. K., Amran, A., & Zainuddin, Z. (2013). Success factors for clean development mechanism implementation in Malaysia. *Issues In Social and Environmental Accounting*, *7*(3), 185-200.

Ooi, S.K., Ooi, C.A. & Memon, K.R. (2020). The role of CSR oriented organizational culture in eco-innovation practices. World Review of Entrepreneurship, Management and Sustainable Development, 16(5), 538-556.

Pancucci, D. (1998). Imperial College and Energy Savings. *Facilities Management. 5(3): 10-11*.

Phylipsen, D., Blok, K., Worrell, E., & De Beer, J. (2002). Benchmarking the energy efficiency of Dutch industry: an assessment of the expected effect on energy consumption and CO 2 emissions. *Energy policy*, *30*(8), 663-679.

Ramanathan, V., & Feng, Y. (2009). Air pollution, greenhouse gases and climate change: Global and regional perspectives. *Atmospheric Environment*, *43*(1), 37-50.

Saboori, B., Sulaiman, J., & Mohd, S. (2012). Economic growth and CO2 emissions in Malaysia: a cointegration analysis of the environmental Kuznets curve. *Energy policy*, *51*, 184-191.

Sekaran, U. & Bougie, R. (2013). Research methods for business: A skill-building approach (6th ed.). West Sussex, UK: John Wiley & Sons.

The Star. (2017). Malaysia aerospace industry to grow by 7% this year. Retrieved from: https://www.thestar.com.my/business/business-news/2017/03/21/malaysia-aerospace-industry-to-grow-by-7pc-this-year/

Thumann, A. and Mehta, D. P. (1997). Handbook of Energy Engineering (Fourth Edition). *Liburn: The Fairmont Press, Inc.*

Vesma, V. (2002). Power to the People Facilities Management. *Facilities Management*, *9*(5), 26.

Williams, M. A. (1993). Initiating, organizing, and managing energy management programs. *Energy Management Handbook, Fairmont Press, Lilburn, GA.*

Journal of Tourism, Hospitality and Environment Management
JTHEM
EISSN: 0128-178X
Volume 7 Issue 29 (September 2022) PP. 64-75
DOI 10/35631/JTHEM.729006

Yik, F. W., & Lee, W. L. (2002). A preliminary inquiry into why buildings remain energy inefficient and the potential remedy. *HKIE transactions*, *9*(1), 32-36.