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Article

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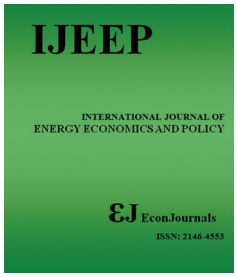

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The Contribution of Environmental Strategies, Entrepreneurial Innovation and Entrepreneurial Orientation in Enhancing Firm Environmental Performance and Energy Efficiency

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ABSTRACT

The objective of the current study is to empirically investigate the link between entrepreneurial attributes, strategic capabilities, and environmental nexus in Malaysian manufacturing firms. In doing so, the present study is motivated to recognize the role of entrepreneurial innovation, entrepreneurial orientation and environmental strategies in influencing firm's energy efficiency potential and environmental performance. To the best of our knowledge, the current study is first of its kind in investigating the effect of the considered explanatory variables on energy efficiency. Moreover, in line with the rising emphasis on environmental impact of firms, the current study is novel for identifying the relationship of firm's internal expertise and capabilities in leading environmental performance. The data is collected from different multinational firms in Malaysia. We applied PLS-SEM on the 300 samples which suggested that environmental strategy, entrepreneurial innovation, and entrepreneurial orientation have a positive and significantly influenced environmental performance and energy efficiency. Technical speaking, the results confirm that the environmental strategy, entrepreneurial innovation, and entrepreneurial orientation are the key contributors to enhance the energy efficiency and environmental performance of multinational firms in Malaysia.

Keywords: Environmental Strategy, Entrepreneurial Innovation, Firm Performance, Energy Efficiency, Malaysia
JEL Classifications: L26, E01, L25

1. INTRODUCTION

The significance of environmental management has witnessed to gain popularity in modern times (Zhai et al., 2018; Marchese et al., 2018). Given the rising decline in environmental condition, the focus of governments is diverted in building a green economic structure that motivates businesses to enhance eco-friendly operations and functions to boost the objectives of sustainable development (Yang et al., 2018; Jansson et al., 2017). In pursuance of green environmental practices, organizations seek to heavily depend on their internal organizational capabilities to cope with the rising environmental concerns and deteriorations. In this regard, many firms relied on strategic managerial capabilities, resources, and technical assistance that can assist in exploring and exploiting existing opportunities to provide solutions to growing environmental issues (Roxas et al., 2017).

Many studies contended that external ecological conditions influence an organization's performance (Ramanathan et al., 2017; Malarvizhi and Matta, 2016; Shirokova et al., 2016; Testa et al., 2016). In this regard, the aspect of a firm's internal expertise and innovation capability are considered vital to affect firm's environmental performance and eco-friendly practices (Liu et al., 2019). Among them, the role of entrepreneurial firm's attributes is important to support organization's vision of sustainable performance (Zhai et al., 2018; Jansson et al., 2017; Roxas et al., 2017; Shirokova et al., 2016). The significance of entrepreneurial activities lies in firm's ability to engage in innovative operations,

competitive initiatives and aggressive business strategies that lead the way of firm's unique positioning. Given the importance of environmental conservation in firm's processes, the entrepreneurial characteristics of firm are crucial in directing firm's environmental policies and strategies.

In the line of the above discussion, the objective of the current study is to empirically investigate the link between entrepreneurial attributes, strategic capabilities and environmental nexus in Malaysian manufacturing firms. In doing so, the present study is motivated to recognize the role of entrepreneurial innovation (henceforth, EN-IN), entrepreneurial orientation (henceforth, EN-OR), and environmental strategies (henceforth, EN-ST) in influencing firm's energy efficiency potential and environmental performance. To the best of our knowledge, the current study is first of its kind in investigating the effect of the considered explanatory variables on energy efficiency. Moreover, in line with the rising emphasis on environmental impact of firms, the current study is novel for identifying the relationship of firm's internal expertise and capabilities in leading environmental performance. The expected findings not only benefit in shedding higher insights on the general relationship among the considered variables but also help the government in findings resolution to the rising energy dependence and assist in deriving the energy-efficient solution of firm future growth and performance.

The remaining of the article is explained in the following. Section-2 would present a review of the latest literature comprising of historical theories and empirical findings that emphasis on the studied phenomenon. Section-3 would offer research methodology. Section-4 would present empirical outcomes and explanation of the results. Section-5 would summarize the article and give policy implications.

2. LITERATURE REVIEW

Many studies in the current era have been structured to highlight the significance of environmental performance to meet the objective of sustainability in businesses (Morioka and de-Carvalho, 2016). In this regard, the focus of several studies has been recognized towards identifying crucial determinants of firm's environmental performance (Oh and Shin, 2019; Long et al., 2017; Braam et al., 2016) and strategies of environmental conservation (Yook et al., 2017; Bennett, 2016; Zhang et al., 2015). Also, from the theoretical aspect, the theory of natural resource-based view (NRBV) puts stress on the role of green resources and expertise to enhance firms' sustainable performance (Hart, 1995). More recently, the shift of interest has been recognized to shift towards entrepreneurial attributes of firms and their eco-driven environmental strategies (Zehir et al., 2015).

However, the statistical findings in this context are rather inconclusive to apprehend the exact relationship among the entrepreneurial attributes and strategic capabilities of the firm (Miao et al., 2017; Zehir et al., 2015; Lumpkin and Dess, 2001). Among them, Gupta and Batra (2016) investigated the contribution of EN-OR in affecting organizational performance. In doing so, the authors studied the small and medium organizations of India. The outcomes of the empirical results reported that EN-OR is significant to affect SMEs' performance. Particularly, the findings stated that a rise in SMEs EN-OR increased firm's performance. Similarly, Roxas et al. (2017) examined the role of EN-OR and environmentally sustainable orientation (ENS) in influencing firm performance. For this, the study utilized the data of 183 small firms of Philippines. The results of the investigation documented the significant impact of EN-OR and ENS on small firms' performance. Specifically, the outcomes revealed that the increase in EN-OR further enhances an organization's performance.

On the other hand, Tang et al. (2018) also examined the impact of EN-OR in affecting organizational performance. In doing so, the authors studied the manufacturing organizations and reported that EN-OR is significant to affect organizational performance. Particularly, the findings stated that the impact of EN-OR on performance is not constant, and highlighted cases where increased EN-OR caused a decline in firm performance. Similarly, Yoon and Solomon (2017), while inspecting the relationship between EN-OR and performance documented that rise in EN-OR could result in reducing organization's performance. Shu et al. (2019) investigated the contribution of EN-OR in affecting organizational performance. In doing so, the authors studied the 230 organizations in China. The outcomes of the empirical results reported that EN-OR is significant to affect Chinese-based firms' performance. Particularly, the findings stated that rise in EN-OR increased firm's performance. Similarly, Gupta et al. (2019) also examined the role of EN-OR in influencing firm performance. For this, the study utilized the data of small and medium enterprises of USA. The results of the investigation documented the significant impact of EN-OR SMEs firms' performance. Specifically, the outcomes revealed that the increase in EN-OR further enhances an organization's performance.

Also, Jeong et al. (2019) investigated the contribution of EN-OR in affecting organizational performance. In doing so, the authors studied the 321 industrial organizations of South Korea. The outcomes of the empirical results reported that EN-OR is significant to affect the industrial firm's performance. Particularly, the findings stated that rise in SMEs EN-OR increased firm's performance. Similarly, in other recent literature, Hayat et al. (2019) examined the role of EN-OR in influencing firm performance. For this, the study utilized the data of ICT based small and medium firms of Pakistan. The results of the investigation documented the significant impact of EN-OR on SMEs firms' performance. Specifically, the outcomes revealed that the increase in EN-OR further enhances an organization's performance.

Discussing the role of Entrepreneurial innovation (EN-IN), Autio et al. (2014) also investigated the role of EN-IN in leading organizational performance. The study conclusively outlined numerous public and private policies for enhancing the supportive role of technological innovation in changing industrial dynamics. The outcomes of the study reported that EN-IR is positively related to performance and could play a substantial role in augmenting firm's performance. Alternatively, Similarly, Rosenbusch et al. (2011) debated the role of EN-IN in driving firm performance. For this, the study utilized the data of small and medium enterprises.

The results of the investigation documented the significant impact of EN-IN on SMEs' performance. However, the meta-results of the study concluded that duration of organizations, innovation categories and culture dominantly influence the role of innovation on performance.

Moreover, Zehir et al. (2015) investigated the contribution of EN-OR and EN-IN in affecting organizational performance. In doing so, the authors studied the 330 medium and large organizations of Turkey. The outcomes of the empirical results reported that EN-OR is significant to affect SMEs' performance. Moreover, the findings also found the significant role of EN-IN in leading firm performance. Particularly, the findings stated that EN-IN mediated the positive impact of EN-OR on a firm's performance. Stressing on the role of environmental strategies (EN-ST), Latan et al. (2018) examined the role of EN-ST along within ecological uncertainty and ecological management accounting in influencing firm environmental performance. For this, the study utilized the data of Indonesian firms and analyzed the responses of 171 respondents. The results of the investigation documented the significant impact of all studied variables on firms' environmental performance. Specifically, the outcomes revealed that the increase in EN-ST further enhances organization's environmental performance. Similar results were reported for EN-ST and performance link in the studies of Claver-Cortés et al. (2007) and Carmona-Moreno et al. (2004) while examining the performance of hotels in Spain.

Also, Lee and Min (2015) inspected the notion of energy efficiency, eco-R&D, and CO_2 toxic discharge and EN-IN in the context of driving organization performance. The study contended that EN-IN is substantial in reducing air pollution and toxic environmental discharge. Likewise, product-development in firms also supports to enhance a firm's performance by driving energy efficiency and a decline in CO_2 levels. Particularly, relying on the information gathered from Japanese firms, the outcomes comprehended that EN-IN is vital to decline CO_2 levels and substantial to improve organizations' energy efficiency capabilities.

Thus, in light of the above literature, the current study hypothesized that:

Hypothesize-1: EN-ST is significant to affect a firm's environmental performance.
Hypothesize-2: EN-IN is significant to affect a firm's environmental performance.
Hypothesize-3: EN-OR is significant to affect a firm's environmental performance.
Hypothesize-4: EN-ST is significant to affect a firm's energy efficiency.
Hypothesize-5: EN-IN is significant to affect a firm's energy efficiency.
Hypothesize-6: EN-OR is significant to affect a firm's energy efficiency.

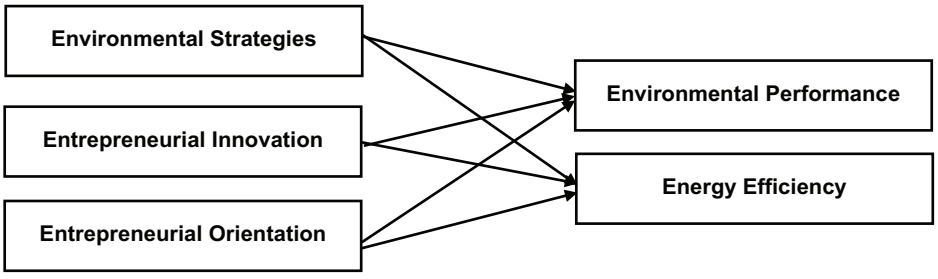
In the following, Figure 1 portrayed the conceptual framework of the current study.

3. METHODOLOGY

In this present evaluation, the procedure for information gathering is done by accumulating the data from the distinctive multinational firms in Malaysia. Moreover, we select 24 different multinational firms in Malaysia for the data collection process. To get a quick and smooth data accumulation method, we make an understanding of our study into the English language and forward to the opted multinational firms of Malaysia. Moreover, we assemble a total of 397 research surveys utilizing printed and social media sources. The ideal period for information collection took a time of a complete three months and seven days and assembled 339 examination study with a response pace of 85.34%. The key respondent for the present research is the lower, middle and upper-level managers of different multinational firms of Malaysia.

Besides, the present assessment examines the effect of environmental strategies, entrepreneurial innovation, and orientation on performance of environment and efficiency of energy in multinational firms in Malaysia. To achieve this target, the present assessment examines a framework on past literature, and the structure is shown in Figure 1. The basic structures of the components are clarified by using the Likert scale system from 5 (Strongly Agree) to 1 (Strongly Disagree). In direct, the present stud uses five explicit variables. The factors used in this research are the Environmental strategies (ENST), entrepreneurial innovation (ENIN), entrepreneurial orientation (ENOR), environmental performance (ENP), and energy efficiency (ENE). In addition, the items of the factors utilized in this present assessment are adopted from various past researches. The four items of ENST are collected from the earlier research of Latan et al. (2018). Moreover, the four items of ENIN are adopted from the previous study of Shu et al., (2019). In addition, the four items of ENOR are received from the earlier research of Zehir et al. (2016). Finally, the four items of ENP

Figure 1: The conceptual framework



and ENE are collected from the previous research of Ninlawan et al. (2010). The present assessment furthermore fulfills all methods for moral ideas.

Table 1: Descriptive statistics

		Frequency	Percent
	Gender		
Valid	Female	178	59
	Male	122	41
	Total	300	100
	Age		
Valid	20-30 years	77	26
	31-40 years	129	43
	41-50 years	34	11
	51 and above	60	20
	Total	300	100
	Working experience		
Valid	1-5 years	32	11
	6-10 years	174	58
	11-15 years	43	14
	More than 15 years	51	17
	Total	300	100
	Education		
Valid	Undergraduate	44	15
	Graduate	138	46
	Postgraduate	43	14
	Others	75	25
	Total	300	100

Source: Authors estimation

Table 2: Means and pearson correlations

Variables	MEAN	ENST	ENIN	ENOR	ENP	ENE
ENST	3.892	-				
ENIN	4.022	0.324**	-			
ENOR	4.183	0.382**	0.338**	-		
ENP	3.993	0.424**	0.328**	0.392**	-	
ENE	4.225	0.401**	0.412**	0.309**	0.291**	-

n=300, **Correlation is significant at the 0.01 level (2-tailed)

4. RESULTS AND INTERPRETATION

In this study, the data analysis is performed by using two novel statistical software, which is the Statistical Package for Social Sciences (V-25) and Smart_PLS V-3.2.9 (Ringle et al., 2015). The valid information used for the present assessment is 300, realizing barring univariate and multivariate abnormalities from the standard. The technique for the recognizing of univariate and multivariate inconsistencies from the standard are Z-test scores and Mahalanobis Distance (D2) with the assistance of SPSS, and further investigation is finished with the assistance of SmartPLS. Shown Table 1 is the structure and composition of the information used in this study to examine the effect of environmental strategy, entrepreneurial orientation and innovation on environmental performance and energy efficiency in Malaysia. The descriptive statistics are also disengaged into four differing sub-classes, which are education, age, gender, and experience. Table 1 explains the illustrative of the considerable number of subclasses.

In Table 1, the proportion of male and female are unique. 59% of information is gathered by female managers, be that as it may, 41% of information is accumulated from the male managers. Also, 15% of information is gathered by the manager with the capacity equal to undergrad, 46% are from proportionate to graduate, 14% are postgraduate, and 25% are comparable to different capabilities. Looking at working experience, 11% of directors and managers having an encounter of 1-5 years, 58% managers are with the experience of 6-10 years, 14% managers are with the working experience of 11-15 years, and 17% managers are with the experience of equivalent or over 16 years.

In like manner, Table 2 depicts the mean and Correlation (Pearson's coefficient) of the data used in the ongoing assessment. Moreover, to manage the matter of multicollinearity, we channel for the examination of Hair et al. (2010) expressed that a gigantic variety in the estimation of connection (Pearson's coefficient) relationship

Table 3: Measurement model results

Variables	Items	Factor loadings	Cronbach's alpha	Composite reliability	AVE
Environmental strategy	ENST1	0.845	0.843	0.834	0.603
	ENST2	0.768			
	ENST3	0.809			
	ENST4	0.827			
Entrepreneurial innovation	ENIN1	0.777	0.885	0.793	0.593
	ENIN2	0.745			
	ENIN3	0.755			
	ENIN4	0.749			
Entrepreneurial orientation	ENOR1	0.751	0.873	0.863	0.612
	ENOR2	0.732			
	ENOR3	0.780			
	ENOR4	0.706			
Energy efficiency	ENE1	0.761	0.843	0.814	0.583
	ENE2	0.724			
	ENE3	0.749			
	ENE4	0.724			
Environmental performance	ENP1	0.741	0.903	0.893	0.543
	ENP2	0.733			
	ENP3	0.727			
	ENP4	0.712			

Source: Authors estimation

ought to under 0.90. Along these lines, to help the nonappearance of multicollinearity in the midst of the factors (Sharif and Raza, 2017). Moreover, content authenticity is made whether the relationship of the items utilizing in the investigation showed up with higher qualities in their exact variable interestingly with the things showed up in the system, while internal constancy is confirmed that the gauge of Cronbach's alpha and composite dependability are more obvious than 0.7 (Kleven et al., 2013; Khan et al., 2019). Also, the loadings of factor and composite dependability quality show in Table 3, which clarifies that an even gauge of the factor loadings of variables is higher than 0.70. Additionally, these estimations of elements reflect in their different sections, which guaranteeing the internal authenticity of the selected items.

In addition, the convergent authenticity reveals to which sum an item concerning a particular variable appeared to different sections where they are foreseen to show up (Khan et al., 2019; Afshan et al., 2018). In the present investigation, convergent authenticity is appeared by utilizing an Average Variance Extracted (AVE) for each factor (Mehmood and Najmi, 2017; Fornell and Larcker, 1981). They give the standard of further overwhelming than and revealed particularly in relationship with 0.50 for mentioning the convergent authenticity. The consequences of AVE in Table 3 are guaranteeing huge coefficients.

In the accompanying stage, discriminant authenticity is uncovered concerning whether an item of a variable is extraordinary and unique from different factors utilized in a structure (Afshan et al., 2018). As appeared by Fornell and Larcker (1981), discriminant authenticity is adequate if the square root parameter of AVE is higher than the pair-wise relationship of the unknown variable (latent). The findings in Table 4, italic and bold parameter are the AVE square root, which is higher than beyond what many would consider possible, which is the pair-wise relationship of each factor. In addition, Table 5 shows the loadings of factors of other and explicit factors, saying the edge of standard. Like this, the discriminant validity is also confirmed if the Hetro Trait and Mono Trait (HTMT) esteem are lesser from 0.85, as anticipated by Henseler et al. (2015). The discoveries in Table 6 found that whole parts have Discriminant authenticity.

In the last phase, we utilized a partial least square structure with taking a gander at the model and hypothesis checking, which displaying beta values, t-stats, and p-value. As pursued by Chin (1998) proposition, a bootstrapping structure utilizing 1000 sub-test was connected to mentioning the significant processable computations of the shifted amount of qualities. Table 7 finds beta coefficients, t-stats, and their importance esteem with the explanations about the hypothesis and model checking.

The findings of the PLS-SEM are revealed in Table 7. The table presented the beta coefficient, t-stats value, P-value, and the status of hypothesis testing against each hypothesis. Normally, the findings establish that all chosen factors have a significant and positive influence on the energy efficiency and environmental performance of multinational firms in Malaysia. Furthermore, the findings of the structural equation modelling recommended that environmental strategy ($\beta = 0.302$, $P < 0.000$), entrepreneurial innovation ($\beta = 0.325$, $P < 0.000$) and entrepreneurial orientation ($\beta = 0.284$, $P < 0.000$), have a positive and significantly influenced on environmental performance, hence confirming H1, H2, and H3. Moreover, the results further suggested that environmental strategy ($\beta = 0.227$, $P < 0.000$), entrepreneurial innovation ($\beta = 0.324$, $P < 0.000$), and entrepreneurial orientation ($\beta = 0.385$, $P < 0.000$), have a positive and significantly influenced on energy efficiency, hence confirming H4, H5, and H6. Technical speaking,

Table 4: Discriminant validity Fornell-Larcker criterion

	ENST	ENIN	ENOR	ENP	ENE
ENST	0.777				
ENIN	0.375	0.770			
ENOR	0.295	0.401	0.782		
ENP	0.431	0.443	0.333	0.764	
ENE	0.309	0.428	0.367	0.496	0.737

Source: Authors estimation

Table 5: Results of loadings and cross loadings

Variable	ENST	ENIN	ENOR	ENP	ENE
Environmental strategy	**0.845**	0.384	0.534	0.260	0.543
	0.768	0.627	0.408	0.380	0.459
	0.809	0.159	0.299	0.345	0.515
	0.827	0.531	0.514	0.412	0.560
Entrepreneurial innovation	0.151	**0.777**	0.531	0.243	0.321
	0.145	**0.745**	0.322	0.497	0.273
	0.147	**0.755**	0.235	0.435	0.305
	0.146	**0.749**	0.267	0.325	0.395
Entrepreneurial orientation	0.187	0.145	**0.751**	0.298	0.412
	0.183	0.141	**0.732**	0.326	0.530
	0.195	0.151	**0.780**	0.300	0.466
	0.176	0.136	**0.706**	0.208	0.405
Energy efficiency	0.369	0.180	0.361	**0.761**	0.417
	0.350	0.171	0.636	**0.724**	0.564
	0.352	0.161	0.374	**0.749**	0.399
	0.360	0.171	0.231	**0.724**	0.344
Environmental performance	0.354	0.485	0.159	0.338	**0.741**
	0.315	0.408	0.158	0.380	**0.733**
	0.459	0.473	0.152	0.463	**0.727**
	0.366	0.382	0.148	0.428	**0.712**

Source: Authors estimation

Table 6: Results of HTMT ratio of correlations

	ENST	ENIN	ENOR	ENP	ENE
ENST					
ENIN	0.503				
ENOR	0.552	0.597			
ENP	0.605	0.542	0.635		
ENE	0.485	0.482	0.582	0.668	

Source: Authors estimation

Table 7: Results of path coefficients

Hypothesized path	Path coefficient	C.R	P-value	Remarks
ENP ← ENST	0.302	3.895	0.000	Supported
ENP ← ENIN	0.325	3.564	0.000	Supported
ENP ← ENOR	0.284	4.032	0.000	Supported
ENE ← ENST	0.227	4.122	0.000	Supported
ENE ← ENIN	0.324	3.384	0.000	Supported
ENE ← ENOR	0.385	2.997	0.000	Supported

Source: Authors' estimation. Level of significance (5% i.e. 0.050)

the results confirm that the environmental strategy, entrepreneurial innovation, and entrepreneurial orientation are the key contributors to enhance the energy efficiency and environmental performance of multinational firms in Malaysia.

5. DISCUSSION AND CONCLUSION

The significance of environmental management has witnessed to gain popularity in modern times. Given the rising decline in environmental conditions, the focus of governments is diverted in building a green economic structure that motivates businesses to enhance eco-friendly operations and functions to boost the objectives of sustainable development. In pursuance of green environmental practices, organizations seek to heavily depend on their internal organizational capabilities to cope with the rising environmental concerns and deteriorations. The objective of the current study is to empirically investigate the link between entrepreneurial attributes, strategic capabilities and environmental nexus in Malaysian manufacturing firms. In doing so, the present study is motivated to recognize the role of entrepreneurial innovation, entrepreneurial orientation and environmental strategies in influencing firm's energy efficiency potential and environmental performance. To the best of our knowledge, the current study is first of its kind in investigating the effect of the considered explanatory variables on energy efficiency.

Moreover, in line with the rising emphasis on the environmental impact of firms, the current study is novel for identifying the relationship of firm's internal expertise and capabilities in leading environmental performance. The data is collected from different multinational firms in Malaysia. We applied PLS-SEM on the 300 samples which suggested that environmental strategy, entrepreneurial innovation, and entrepreneurial orientation have a positive and significantly influenced environmental performance and energy efficiency. Technical speaking, the results confirm that the environmental strategy, entrepreneurial innovation, and entrepreneurial orientation are the key contributors to enhance the energy efficiency and environmental performance of multinational firms in Malaysia.

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