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Assessment of Imbalance among Environmental and Economic Performance within Malaysian Manufacturing Industry: A Sustainable Approach

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ABSTRACT

Sustainability has emerged as a key area of concern especially for manufacturing industry to address major environmental issues. Carbon dioxide emission has increased rapidly over the past few decades resulting in harmful outcomes such as global warming, climate change, water and air pollution and degrading environmental performance. The objective of this study is to assess a descriptive study evaluate the imbalance between economic and environmental performance of Malaysian manufacturing industry in general. Secondary data of both economic performance and environmental performance (2011-2016) was descriptively examined. The findings are revealed a significant imbalance between two indicators. In addition, this study also proposed a conceptual model based on previous literature how to reduce this imbalance and create sustainable performance within Malaysian manufacturing firms.

Keywords: Environment, Carbon Dioxide Emission, Environmental Performance, Economic Performance, Sustainability

JEL Classifications: L6, Q5, Q50, Q51

1. INTRODUCTION

Human wellbeing and economic growth sustainability depends on how well we manage the environment (Stern, 2008; Horváthová, 2010; Howarth, 2012; Kahle and Gurel-Atay, 2013). Sustainability has emerged as a key area of concern especially for manufacturing industry to address major environmental issues. Carbon dioxide (CO₂) emission has increased rapidly over the past few decades resulting in harmful outcomes such as global warming, climate change, water and air pollution and degrading environmental performance (international energy agency [IEA], 2015; Kazdin, 2009; Stern, 2011; Swim et al., 2011; Robertson and Barling, 2013; Al-Mulali et al., 2015). The growing environmental awareness among customers, governments, stakeholders' demands and stringent environmental regulations are building pressure on manufacturers to adopt environmental management system (EMS) and improve environmental, social and economic performance

(Berry and Rondinelli, 1998; Waddock et al., 2002; Khidir et al., 2010; Ghazilla et al., 2015).

Sustainable corporate performance (SCP) is a growing area of research vital for industrial growth and reduce the imbalance between economic, environmental and social performance (Hubbard, 2009; Maletic et al., 2015; Maletič et al., 2016). Manufacturing organizations should consider environmental and social aspects along with economic considerations, to ensure SCP and reduce negative impacts on society and environment (Elkington, 1994; Young and Tilley, 2006; Hubbard, 2009). SCP refers to the integration of three dimensions including economic, social and environmental performance (Norman and MacDonald, 2004). The manufacturing organizations in response to address the environmental problems (IEA, 2015; Kazdin, 2009; Stern, 2011; Swim et al., 2011; Robertson and Barling, 2013) are adopting sustainable human resource management (SHRM) practices

(Ehnert, 2009; Cohen et al., 2012) to ensure environmental protection and improve sustainable performance (SP). A further aspect of SHRM is Green HRM practices which provide a roadmap to sustainable HRM (Cohen et al., 2012). The term of Green human resource management (GHRM) was initially introduced by (Renwick et al., 2008) is relatively a new research area that aims to align HRM practices and environmental management (Jackson and Seo, 2010; Renwick et al., 2013; Jabbour, 2015). It is quite challenging for organizations human resource to implement environmental initiatives (Daily et al., 2011; Daily and Huang, 2001; Govindarajulu and Daily, 2004), because of growing international environmental standards (Daily and Huang, 2001) and low level of environmental compliance, ineffective environmental laws and regulations in developing countries (Cascio, 1997; Sudin, 2011). Since the GHRM practices perform a critical role in adopting EMS (Daily and Huang, 2001; Daily et al., 2009; Jabbour and Santos, 2008) to foster pro-environmental behaviours (Boiral et al., 2015).

EMS such as ISO 14001 is a well-established practical tool adopted by companies in developed countries. The employees' participation and involvement in EMS is highly required (Kitazawa and Sarkis, 2000; Boiral, 2007; Yin and Schmeidler, 2009). The first step to adopt and implement ISO 14001 increase environmental awareness within employees (Sakr et al., 2010). Similarly, EMS helps the company to develop, implement environmental policies, set objectives and targets for reducing environmental impacts and improving SP (González-Benito and González-Benito, 2005). The previous studies have reported that ISO 14000 EMS certified manufacturing companies can better manage environmental and economic performance (Eng et al., 2006; Darnall, et al., 2008; Testa et al., 2014; Aziati et al., 2015).

However, merely adopting the Green HRM practices and implementing EMS are insufficient to improve SCP. Consequently, the success of EMS depends on modification of traditional employees' behaviors towards more pro-environmental behaviours (Daily et al., 2009), to mitigate the imbalance between economic and environmental performance. Therefore, the EMS ISO 14001 cannot be more effective and successful without considering the vital role of pro-environmental behaviors (PEB) at workplace (Boiral, 2007; Christmann and Taylor, 2006). In nutshell organizations need to adopt Green HRM practices (Renwick et al., 2013) to foster PEB (Boiral and Paillé, 2012; Lamm et al., 2013; Lülfs and Hahn, 2013; Mesmer-Magnus et al., 2012; Ones and Dilchert, 2009; 2012a; Paillé and Boiral, 2013) such as organizational citizenship behaviour for the environment (OCBE) (Boiral and Paillé, 2012) to implement EMS ISO 14001 (Prajogo et al., 2014) and improve SCP.

2. GLOBAL OVERVIEW OF THE MANUFACTURING INDUSTRY

The World Energy Outlook (2015) special report by International Energy Agency has revealed that Global emissions of CO₂ stood at 32.1 billion tons (IEA, 2015). The two largest CO₂ emitters are China and the United States (IEA, 2015). On other hand,

global economy grew by 3.1% annually (IMF, 2015). Overall, industry's use of energy has grown by around 61% between 1971 and 2004, due to rapidly growing energy demand in developing countries and stagnant energy demand in OECD countries mainly include (United States, United Kingdom, Japan, Germany, Sweden, Australia). The Organisation for Economic Co-operation and Development (OECD) is an intergovernmental economic organisation with 35 member countries. The OECD countries will impose a CO₂ substantial cost of \$30/tonne by 2020; major non-OECD emerging economies like China will have CO₂ cost after 2030, ranging from \$35 to \$40/tonne by 2040 (Newell et al., 2016). The industry is a key contributor to economic growth and prosperity. According to the World Bank, in 2013, the total amount of CO₂ emissions from manufacturing industries in Malaysia were 53 million metric tons or 20 percent of total CO₂ emission (IEA, 2015).

3. SUSTAINABILITY CHALLENGES TO MALAYSIAN MANUFACTURING INDUSTRY AND ECONOMY

Malaysia is a newly industrialized country backed by well-planned government support in economic and industrial development. The industry is contributing around 41% of the gross domestic product (GDP) with a growth rate of 7.5% annually. Malaysia is ranked 28th by GDP amounting 815,646 (USD). Malaysia has ranked 24th globally amongst all exporting countries, leading exporter of electronics, oil and gas, palm oil and rubber which drive the economic growth (IMF, 2016). Other key industries include, light manufacturing, pharmaceuticals, medical technology, tin mining and smelting, logging, and timber processing. Malaysia's exports are expected to grow 10.1% annually to US\$ 407 billion in 2017. The world economic forum (WEF) inaugural inclusive growth and development report 2015-2016, has ranked Malaysia 18th, the second-best economy after Singapore in Association of Southeast Asian Nations (ASEAN), on global competitive index. Thailand is ranked 32nd followed by Indonesia with ranking position of 37th in the ASEAN region (WEF, 2016).

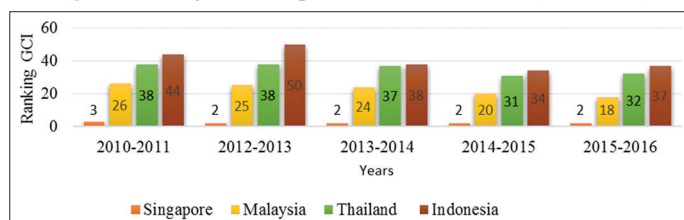
The industry related indicators include skills development, employment and labour compensation, asset building and entrepreneurship, financial intermediation of real economy investment. The statistics in Figure 1 revealed the that Malaysia position has made 8 points increase in their ranking spot from 26th to 18th in the (WEF, 2016).

The 10th Malaysian Plan (2011-2015) has focused on socio-economic development to sustain the Malaysian economy and ensure high growth rate and income. According to the statistics reported in Table 1. Contribution of manufacturing sector to GDP has increased from RM 192.5 to RM 243.9 billion in 2015 representing 23% with a growth rate of 4.7%. The total exports of manufactured goods have increased from RM 489.6 to 636.7 billion from 2010 to 2015. The share to total exports has raised from 76% to 81% respectively. This sector has contributed around 18% of share in total employment for year 2015 (Department of Statistics, 2015; Economic Planning Unit, 2015).

Table 1: Major indicators of manufacturing sector, 2010-2020

Items	2010	2015	2020	10 th MP (achieved)	11 th MP (targets)
Contribution of manufacturing sector to GDP (RM billion)	192.5	243.9	312.5	1,110.9	1,417.3
Annual growth rate (%)	12.1	4.7	4.4	4.8	5.1
Share to GDP (%)	23.4	23.0	22.1	23.1	22.5
Total exports of manufactured goods (RM billion)	489.6	636.7	812.8	2,801.3	3,677.9
Share to total exports (%)	76.6	81.8	83.4	76.4	82.8
Share to total employment (%)	17.0	18.0	18.2	3.9	2.5

Source: Economic Planning Unit (2015-2020). GDP: Gross domestic product

Figure 1: The global competitiveness index WEF (2010-2016)

The Malaysian government is committed to maintain, preserve and enhance its manufacturing sector through various green initiatives. The Eleventh Malaysia Plan, (2016-2020) provides a critical platform for Malaysian economy and industry to join the list of high growths emerging and green economies in 2020. The manufacturing sector is forecasted to grow with 5.1% per annum, contributing, 22.1% to GDP in 2020 as highlighted in Table 1 (Economic Planning Unit, 2015). Overall, the sector is expected to provide 2.5 million jobs, representing 18% of total employment in 2015. The manufacturing sector is expected to grow at 5.1% per annum, contributing 22.1% to GDP and 18.2% of total employment in 2020 (Department of statistics, 2015; Economic planning unit, 2015).

The first initiative is to focus on Green growth (resource-efficient, clean, and robust) ensuring the Malaysian government commitment to grow the economy and industry by protecting the environment for present and future generations. The Eleventh Malaysia Plan (2016-2020) has highlighted key manufacturing industries related environmental issues such as increasing CO₂ emission, environmental waste and hazards and depletion natural resources. The government will continue to take measures and pursue the green growth goal under the EMP (2016-2020). In addition, it focuses to foster sustainability agenda enabling green growth, sustainable consumption and production, conserving natural resources to mitigate environmental problems. The government has announced a voluntary commitment to reduce 40% of CO₂ emissions by 2020 (Kamaruzzaman et al., 2016). These actions will further reduce industrial and environmental waste.

The CO₂ emissions have increased rapidly over the years as a result of increasing energy consumption and rapid economic growth in Malaysia. However, direct and indirect energy consumption contributes to CO₂ emission that harms the environment. According to the World Bank in 2013, the total amount of CO₂ emissions from manufacturing industries was 53 million metric tons or 20 percent of total CO₂ emission in Malaysia. Over the years, manufacturing industry is growing in Malaysia. With respect to this government has to ensure policies and regulations about

ensuring sustainability and safety of the environment. According to Business-As-Usual (BAU) Scenario that major sector of CO₂ emissions come from electricity generation (43.45%), transport sector (30.25%), followed by industrial sector (26.26%) and finally residential sector (0.03%) in 2020 (National Energy Balance, 2005).

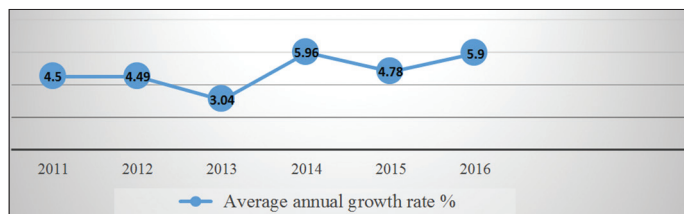
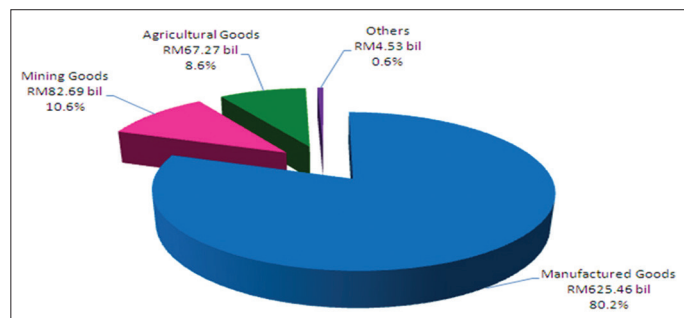
4. ECONOMIC PERFORMANCE

Malaysian manufacturing sector grew with rate of 4.78% in December 2015 and expected to grow by 5.9% in 2016. Figure 2 depicts the increasing trends in average growth rate from 2011 to 2016. The average annual growth rate was 4.5% in 2011 and reduced significantly in 2013-3.04 on average but regained the momentum in 2014 and 2015 from 3.04% to 5.96 and 4.78% respectively. The major sub-sectors which recorded an expansion in February 2016 were: Electrical and Electronics Products (5.8%); petroleum, chemical, rubber and plastic products (2.9%) and Wood Products, Furniture, Paper Products, Printing 9.6%. (Department of Statistics and Ministry of Finance Malaysia, 2011-2016).

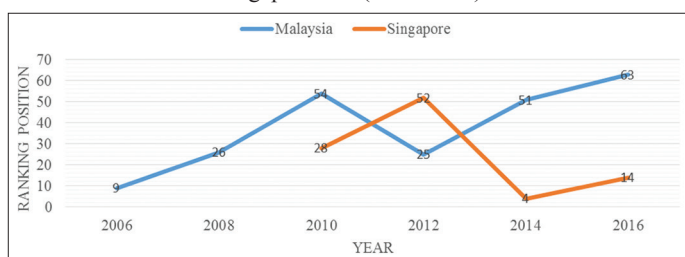
The manufacturing sector has grown at 4.8% per annum on average during the 10th Malaysia Plan, and made around 23% contribution to GDP in 2015, as shown in Figure 3 Manufactured goods also dominated other sectors (agriculture goods and mining) exports, contributing 80% of total exports in 2015. Figure 4 shows that manufactured goods contribute around 80% to the exports amounting RM 625.46 billion. The share of agricultural goods and mining goods are 8.6% and 10% respectively to the total export amount RM 779.95.

5. ENVIRONMENTAL PERFORMANCE

According to the Compendium of Environment Statistics Malaysia, 2013/14, although the manufacturing sector is one main contributor to the GDP of Malaysia, it is also one of the main contributors to environmental pollution. The manufacturing sector has contributed amount RM 1,328.5 million for environmental protection to reduce environmental damage caused by manufacturing companies. Consequently, all the activities in the manufacturing sector that produce pollutants which result in poor environmental performance (Compendium of Environment Statistics Malaysia, 2014/15). Environmental performance index (EPI) have reported the unstable spot of Malaysia throughout the past versions of the EPI. Figure 4 illustrates that in 2006 EPI, the country ranked 9th followed by 26th in 2008, 54th in 2010, 25th in 2012, and 51st in 2014 and recently ranked 63rd in 2016 on EPI index. In comparison, the ASEAN member country Singapore has improved their ranking

Figure 2: Manufacturing industry growth rate: Department of Statistics Malaysia, (2011-2016)**Figure 3:** Components of Malaysia's Exports 2015

Source: Department of Statistics Malaysia (2015)

Figure 4: Environmental performance index: Malaysian versus Singapore EPI (2006-2016)

position significantly by improving from lowest 52nd in 2012, 4th in 2014 and currently sliding down to 14th in 2016.

6. DISCUSSION AND CONCLUSION

In recent years, the importance of the sustainability agenda for the manufacturing industry has become inevitable. The manufacturing industry is one of the major source of environmental problems worldwide. The IEA has reported that nearly 36.8% CO₂ emission contributed by manufacturing industries to the environment worldwide (IEA, 2016). Although Malaysian manufacturing industry provides approximately 23% share to GDP in sustaining economic growth and development (Department of Statistics, Malaysia 2014/15). However, statistics indicate that industry is responsible for around 53 million metric tons of total CO₂ emission. The industrial sector is the third larger contributor to CO₂ emissions in Malaysia with 26.26 % after transport, power and electricity generation. Emissions from industrial sector contributed by manufacturing are mainly electronics, chemical and rubber industries (IEA, 2015). The BAU research survey has estimated the CO₂ will increase up to 285.73 million tons by 2020, because of growing energy and industrial production demands (National Energy Balance, 2005). The growing increase in CO₂ emission by

industrial sector result in major atmospheric pollution and solid wastes (Al-Khidir and Zailani, 2009) reducing environmental performance (Compendium of Environment Statistics Malaysia, 2014/15).

The degradation of environment as the outcome of industrial production creates imbalance among economic and environmental performance (Horváthová, 2010). The growing environmental issues have forced the manufacturing organizations to adopt EMS (Khidir et al., 2010; Ghazilla, et al., 2015). The implementation of EMS ISO 14001 has become important environmental standards for all companies irrespective of their size, sector or nature worldwide (Zutshi and Sohal, 2004). In developed countries, the Companies have higher tendency in getting ISO 140001 certification by adding environmental value to improve SP and foster industrial development (Krut and Gleckman, 1998; 2013). The ISO 140001 survey has revealed, that the rate acquiring of EMS ISO 14001 certification by companies are miserably low in developing countries as compared to the most developed OECD countries (US, UK, Japan, Germany, Sweden, Australia). since mostly companies are lagging behind in developing countries of AISA and complain about cost consideration, extensive documentation, economic and social barriers in acquiring ISO 140001 certifications (Krut and Gleckman, 2013; Babakari et al., 2003).

Lack of required GHRM practices and policies, ineffective environmental regulations are the major challenges for companies in developing countries to implement ISO 14001 EMS (Zutshi and Sohal, 2004; Massoud et al., 2010). Similarly, in the context of Malaysia only 490 manufacturing companies have ISO 140001 certification out of total 2561 manufactures registered with Federation of Malaysian Manufacturers in 2015. Similar evidence has reported by Malaysia external trade and development corporation (MATRADE) about ISO 14000 certification. The ISO 140001 certified manufacturing companies comprise of only 18% of total registered companies which show less tendency of following environmental standards, compliance and regulations of EMS in Malaysia. The research statistics have reported that overall environmental performance reduced significantly in past 10 years (EPI, 2006-2016). While the government, corporations, and industries are primarily responsible for the dramatic decrease in environmental performance. The Malaysian manufacturing firms are facing barriers in adopting green initiatives (Wooi and Zailani, 2010) and the drive for sustainable practices (Seidel et al., 2011; Rosen and Kishawy, 2012; Nordin et al., 2014) is important to make shift towards more sustainable manufacturing practices by adopting Green HRM practices, and implementing EMS (Zubir and Habidin, 2012).

The 11th MP (2016-2020) focuses on to foster sustainability agenda and committed to improve sustainability performance. To meet the targets of 11th MP in 2020 the Malaysian industry should adopt sustainable green HRM practices and implement EMS to foster green growth, improve SP (economic, environmental and social) and reduce CO₂ emissions from manufacturing sector. The Malaysian Standards based EMS is applicable to all the organization, regardless of size, type and nature, and encourage

companies to adopt ISO 14000. The EMS ISO 14001 helps organizations to enhance environmental performance, fulfilment compliance obligations and achieve environmental objectives (Department of Standards Malaysia, 2016).

However, researchers believe that merely implementing Green HRM practices and adopting EMS cannot improve SCP. Consequently, the success of EMS and GHRM practices depends on pro-environmental behaviours (Daily et al., 2009), to mitigate the imbalance between economic and environmental performance and improve SP. Therefore, the EMS ISO 14001 cannot be more effective and successful without considering the vital role of PEB at workplace (Boiral, 2007; Christmann and Taylor, 2006). Therefore, to overcome this problem the current study will examine the relationship among sustainable GHRM practices, organizational citizenship behavior for the environment (OCBE) and EMS to predict SP (SP) at Malaysian manufacturing industry.

Malaysian economy and industry is facing the sustainability challenge to balance the economic, social and environmental performance especially in industrial sectors to meet the growing energy and production demand, without degrading the environment. The manufacturing sector is one of a significant contributor to GDP, exports, and vital source of foreign investment and job creation (Department of Statistics, 2015; Economic Report 2014/2015). However, the imbalance between economic and environmental performance, resulting environmental problems. Taking into consideration the growing energy and production demands for sustainable Malaysian economy. It is a prerequisite that manufacturing industry needs to adopt sustainability agenda as planned in EMP (2016-2020). In addition, it addresses the barriers and enablers to the SP of manufacturing companies in Malaysia. Therefore, this study scope is limited to the manufacturing industry of Malaysia.

REFERENCES

- Abdullah, M., Zailani, S., Iranmanesh, M., Jayaraman, K. (2016), Barriers to green innovation initiatives among manufacturers: The Malaysian case. *Review of Managerial Science*, 10(4), 683-709.
- Al-Mulali, U., Ozturk, I., Lean, H.H. (2015), The influence of economic growth, urbanization, trade openness, financial development, and renewable energy on pollution in Europe. *Natural Hazards*, 79(1), 621-644.
- Aziati, A.N., Chian, N.S., Bon, A.T., Ngadiman, Y., Ahmad, M.F. (2015), Exploring the ISO 14001 Environmental Management System (EMS) towards SMEs organizational performance: Case study of southern Malaysia furniture manufacturers. In: *Industrial Engineering, Management Science and Applications*. Berlin, Heidelberg: Springer. p459-472.
- Babakri, K.A., Bennett, R.A., Franchetti, M. (2003), Critical factors for implementing ISO 14001 standard in United States industrial companies. *Journal of Cleaner Production*, 11(7), 749-752.
- Berry, M.A., Rondinelli, D.A. (1998), Proactive corporate environmental management: A new industrial revolution. *The Academy of Management Executive*, 12(2), 38-50.
- Boiral, O. (2007), Corporate greening through ISO 14001: A rational myth? *Organization Science*, 18(1), 127-146.
- Boiral, O., Talbot, D., Paillé, P. (2015), Leading by example: A model of organizational citizenship behavior for the environment. *Business Strategy and the Environment*, 24(6), 532-550.
- Boiral, O., Paillé, P. (2012), Organizational citizenship behaviour for the environment: Measurement and validation. *Journal of Business Ethics*, 109(4), 431-445.
- Cascio, J.O.S. (1997), Implications of ISO 14001 for Regulatory Compliance. Fourth Interna.
- Christmann, P., Taylor, G. (2006), Firm self-regulation through international certifiable standards: Determinants of symbolic versus substantive implementation. *Journal of International Business Studies*, 37(6), 863-878.
- Cohen, E., Taylor, S., Muller-Camen, M. (2012), HRMs Role in Corporate Social and Environmental Sustainability. SHRM Report.
- Compendium of Environment Statistics. (2013-2014), Available from: <https://www.statistics.gov.my>. [Last retrieved on 2015 Aug 05].
- Daily, B.F., Huang, S.C. (2001), Achieving sustainability through attention to human resource factors in environmental management. *International Journal of Operations and Production Management*, 21(12), 1539-1552.
- Daily, B.F., Bishop, J.W., Govindarajulu, N. (2009), A conceptual model for organizational citizenship behavior directed toward the environment. *Business and Society*, 48(2), 243-256.
- Daily, B.F., Bishop, J.W., Steiner, R. (2011), The mediating role of EMS teamwork as it pertains to HR factors and perceived environmental performance. *Journal of Applied Business Research (JABR)*, 23(1), 95-110.
- Darnall, N., Henriques, I., Sadorsky, P. (2008), Do environmental management systems improve business performance in an international setting? *Journal of International Management*, 14(4), 364-376.
- Department of Standards Malaysia. (2016), Available from: <http://www.jsm.gov.my>. [Last retrieved on 2016 Sep 11].
- Department of Statistics Malaysia. (2011-2016), Available from: <https://www.statistics.gov.my>. [Last retrieved on 2015 Nov 11].
- Director for Malaysia, IMF Country Report No. 16/110, Washington D.C. Economic Report. (2014/2015), Available from: <https://www.statistics.gov.my>. [Last retrieved on 2015 Nov 11].
- Ehnert, I. (2009), Sustainability and human resource management: Reasoning and applications on corporate websites. *European Journal of International Management*, 3(4), 419-438.
- Elkington, J. (1994), Towards the sustainable corporation: Win-win-win business strategies for sustainable development. *California Management Review*, 36(2), 90-100.
- Eng, A.G., Zailani, S., Abd-Wahid, N. (2006), A study on the impact of Environmental Management System (EMS) certification towards firms' performance in Malaysia. *Management of Environmental Quality: An International Journal*, 17(1), 73-93.
- Ghazilla, R.A.R., Sakundarini, N., Abdul-Rashid, S.H., Ayub, N.S., Olugu, E.U., Musa, S.N. (2015), Drivers and barriers analysis for green manufacturing practices in Malaysian SMEs: A preliminary findings. *Procedia CIRP*, 26, 658-663.
- González-Benito, J., González-Benito, O. (2005), An analysis of the relationship between environmental motivations and ISO14001 certification. *British Journal of Management*, 16(2), 133-148.
- Govindarajulu, N., Daily, B.F. (2004), Motivating employees for environmental improvement. *Industrial Management and Data Systems*, 104(4), 364-372.
- Horváthová, E. (2010), Does environmental performance affect financial performance? A meta-analysis. *Ecological Economics*, 70(1), 52-59.
- Howarth, R.B. (2012), Sustainability, well-being, and economic growth. *Minding Nature*, 5(2), 34-39.
- Hubbard, G. (2009), Measuring organizational performance: Beyond the triple bottom line. *Business Strategy and the Environment*, 18(3), 177-191.

- IEA. (2015), World Energy Outlook Special Report: Energy and Climate Change. Paris: OECD, IEA. Available from: <https://www.iea.org/publications/freepublications/publication/CO2EmissionsFromFuelCombustionHighlights2015.pdf>.
- IMF. (2016), Malaysia-2016 Article IV Consultation-Press Release; Staff Report; and Statement by the Executive.
- Jabbour, C.J.C. (2015), Environmental training and environmental management maturity of Brazilian companies with ISO14001: Empirical evidence. *Journal of Cleaner Production*, 96, 331-338.
- Jabbour, C.J.C., Santos, F.C.A. (2008), Relationships between human resource dimensions and environmental management in companies: Proposal of a model. *Journal of Cleaner Production*, 16(1), 51-58.
- Kahle, L.R., Gurel-Atay, E., editors. (2013), *Communicating Sustainability for the Green Economy*. Armonk, NY: ME Sharpe.
- Kamaruzzaman, S.N., Lou, E.C.W., Zainon, N., Zaid, N.S.M., Wong, P.F. (2016), Environmental assessment schemes for non-domestic building refurbishment in the Malaysian context. *Ecological Indicators*, 69, 548-558.
- Kazdin, A.E. (2009), Psychological science's contributions to a sustainable environment: Extending our reach to a grand challenge of society. *American Psychologist*, 64(5), 339-350.
- Khidir ElTayeb, T., Zailani, S., Jayaraman, K. (2010), The examination on the drivers for green purchasing adoption among EMS 14001 certified companies in Malaysia. *Journal of Manufacturing Technology Management*, 21(2), 206-225.
- Kitazawa, S., Sarkis, J. (2000), The relationship between ISO 14001 and continuous source reduction programs. *International Journal of Operations and Production Management*, 20(2), 225-248.
- Krut, R., Gleckman, H. (1998), *ISO 14001: A Missed Opportunity for Global Sustainable Industrial Development*. London: Earthscan.
- Krut, R., Gleckman, H. (2013), *ISO 14001: A Missed Opportunity for Sustainable Global Industrial Development*. London: Routledge.
- Lamm, E., Tosti-Kharas, J., Williams, E.G. (2013), Read this article, but don't print it: Organizational citizenship behavior toward the environment. *Group and Organization Management*, 38(2), 163-197.
- Lülfes, R., Hahn, R. (2013), Corporate greening beyond formal programs, initiatives, and systems: A conceptual model for voluntary pro-environmental behavior of employees. *European Management Review*, 10(2), 83-98.
- Maletič, M., Maletič, D., Gomišček, B. (2016), The impact of sustainability exploration and sustainability exploitation practices on the organisational performance: A cross-country comparison. *Journal of Cleaner Production*, 138, 158-169.
- Maletic, M., Maletic, D., Dahlggaard, J., Dahlggaard-Park, S.M., Gomišček, B. (2015), Do corporate sustainability practices enhance organizational economic performance? *International Journal of Quality and Service Sciences*, 7(2-3), 184-200.
- Massoud, M.A., Fayad, R., Kamleh, R., El-Fadel, M. (2010), Environmental management system (ISO 14001) certification in developing countries: Challenges and implementation strategies 1. *Environmental Science and Technology*, 44(6), 1884-1887.
- Mesmer-Magnus, J., Viswesvaran, C., Wiernik, B.M. (2012), The role of commitment in bridging the gap between organizational sustainability and environmental sustainability. *Managing Human Resources for Environmental Sustainability*, 19(4), 155-186.
- National Energy Balance. (2005), Ministry of Energy, Green Technology and Water. Available from: <http://www.meih.st.gov.my/documents/10620/717f207d-1308-4d2c-b5e1-9f84b24d2e0b>. [Last accessed on 2015 Oct 06].
- Newell, R.G., Qian, Y., Raimi, D. (2016), *Global Energy Outlook 2015* (No. w22075). National Bureau of Economic Research.
- Nordin, N., Ashari, H., Hassan, M.G. (2014), Drivers and barriers in sustainable manufacturing implementation in Malaysian manufacturing firms. In: *Industrial Engineering and Engineering Management (IEEM)*, 2014 IEEE International Conference on IEEE. p687-691.
- Norman, W., MacDonald, C. (2004), Getting to the bottom of "triple bottom line". *Business Ethics Quarterly*, 14(2), 243-262.
- NRE, Environmental Performance Index for Malaysia. (2012), In: Ahamad, R.B., editor. 2013, Ministry of Natural Resources and the Environment (NRE): Johor Bahru. Available from: http://www.epi.utm.my/v3/pdf/2012_full.pdf.
- Ones, D.S., Dilchert, S. (2009), Green behaviours of workers: A taxonomy for the green economy. *Annual Meeting of the Academy of Management*, 3(2), 321-343.
- Ones, D.S., Dilchert, S. (2012), Environmental sustainability at work: A call to action. *Industrial and Organizational Psychology*, 5(4), 444-466.
- Robertson, J.L., Barling, J. (2013), Greening organizations through leaders' influence on employees' pro-environmental behaviors. *Journal of Organizational Behavior*, 34(2), 176-194.
- Robertson, J.L., Barling, J., editors. (2015), *The Psychology of Green Organizations*. USA: Oxford University Press.
- Paillé, P., Boiral, O. (2013), Pro-environmental behavior at work: Construct validity and determinants. *Journal of Environmental Psychology*, 3(6), 118-128.
- Prajogo, D., Tang, A.K.Y., Lai, K.H. (2014), The diffusion of environmental management system and its effect on environmental management practices. *International Journal of Operations and Production Management*, 34(5), 565-585.
- Renwick, D.W., Redman, T., Maguire, S. (2013), Green human resource management: A review and research agenda. *International Journal of Management Reviews*, 15(1), 1-14.
- Renwick, D., Redman, T., Maguire, S. (2008), *Green HRM: A review, process model, and research agenda*. University of Sheffield Management School Discussion Paper, 2008(1), 1-46.
- Rosen, M.A., Kishawy, H.A. (2012), Sustainable manufacturing and design: Concepts, practices and needs. *Sustainability*, 4(2), 154-174.
- Safaai, N.S.M., Noor, Z.Z., Hashim, H., Ujang, Z., Talib, J. (2011), Projection of CO₂ emissions in Malaysia. *Environmental Progress and Sustainable Energy*, 30(4), 658-665.
- Sakr, D.A., Sherif, A., El-Haggar, S.M. (2010), Environmental management systems' awareness: An investigation of top 50 contractors in Egypt. *Journal of Cleaner Production*, 18(3), 210-218.
- Seidel, S., vom Brocke, J., Recker, J.C. (2011), Call for action: Investigating the role of business process management in green IS. *Sprouts: Working Papers on Information Systems*, 11(4), ???.
- Stern, N. (2008), The economics of climate change. *The American Economic Review*, 98(2), 1-37.
- Stern, P.C. (2011), Contributions of psychology to limiting climate change. *American Psychologist*, 66(4), 303-310.
- Sudin, S. (2011), Strategic green HRM: A proposed model that supports corporate environmental citizenship. In: *International Conference on Sociality and Economics Development, IPEDR*. Vol. 10. p79-83.
- Swim, J.K., Stern, P.C., Doherty, T.J., Clayton, S., Reser, J.P., Weber, E.U., Howard, G.S. (2011), Psychology's contributions to understanding and addressing global climate change. *American Psychologist*, 66(4), 241-249.
- Testa, F., Rizzi, F., Daddi, T., Gusmerotti, N.M., Frey, M., Iraldo, F. (2014), EMAS and ISO 14001: The differences in effectively improving environmental performance. *Journal of Cleaner Production*, 68, 165-173.
- Waddock, S.A., Bodwell, C., Graves, S.B. (2002), Responsibility: The new business imperative. *The Academy of Management Executive*, 16(2), 132-148.
- Wooi, G.C., Zailani, S. (2010), Green supply chain initiatives:

- Investigation on the barriers in the context of SMEs in Malaysia. *International Business Management*, 4(1), 20-27.
- World Economic Forum. (2016), *Global Competitiveness Reports (2011-2016)*. Available from: <https://www.weforum.org/reports>. [Last retrieved on 2016 Jun 07].
- Yin, H., Schmeidler, P.J. (2009), Why do standardized ISO 14001 environmental management systems lead to heterogeneous environmental outcomes? *Business Strategy and the Environment*, 18(7), 469-486.
- Young, W., Tilley, F. (2006), Can businesses move beyond efficiency? The shift toward effectiveness and equity in the corporate sustainability debate. *Business Strategy and the Environment*, 15(6), 402-415.
- Zutshi, A., Sohal, A.S. (2004), Adoption and maintenance of environmental management systems: Critical success factors. *Management of Environmental Quality: An International Journal*, 15(4), 399-419.