

THE DEVELOPMENT OF AN ORGANIZATIONAL ECO-SUSTAINABILITY INDEX: IS YOUR ORGANIZATIONAL ECO-SUSTAINABILITY ON THE RADAR?

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ABSTRACT

This paper lays the foundation for developing an evaluation metric and a methodology that facilitates decision-making and assessment of eco-sustainability policies adoption that will have a desirable effect on the business performance of a company. The metric developed here is called the *Organizational Eco-Sustainability Index* (OESI). The OESI score differentiates the levels of adoption both as a whole and also across the seven dimensions. And the area of OESI indicates that the bigger the area, the more an organization adopts eco-sustainability practices. For demonstration purpose, of how the OESI is used, the ‘material industry group’ is chosen.

INTRODUCTION

This paper lays the foundation for the development of an evaluation metric. This metric can be used to numerically assess the extent to which Australian Securities Exchange (ASX) “Top 200 Organizations” (i.e. ASX 200) have individually adopted environmental sustainability (eco-sustainability) practices. This metric also enables comparison of organizations’ eco-sustainability practices adoption, relative to other organizations in the same industry and provides an indication of an organization’s relative eco-sustainability position. More importantly, the metric developed in this paper lays the foundation for the development of a methodology that facilitates decision-making and assessment of the impact on business performance of the sustainability policies adopted, enabling selection of the most appropriate policies for the future. Despite the recognized importance of addressing eco-sustainability issues, which are critical to public and private organizations’ growth and long-term success [21], limited studies have investigated the effectiveness and success of an organization’s eco-sustainability policy at the *strategic* level [8]. Similarly, in spite of many companies’ efforts to minimize their environmental impact through activities such as decreasing carbon footprints and improving their closed-loop productions systems, economic growth continues to deplete natural resources [20].

STRATEGY AND ORGANIZATIONAL ECO-SUSTAINABILITY

Consistent with the Brundtland Commission’s [4] definition, organizational sustainability refers to a company’s ability to meet its current needs without impeding the ability to meet its future needs and those of its stakeholders [7]. It is usually reflected by the capacity of an organization to satisfy the interdependent dimensions of the “triple-bottom line”, namely economic (profit), environmental (planet) and social (people) dimensions [9]. The focus here is on an organization’s environmental sustainability [19] [30].

The scale of costs for environmental regulation compliance [14] and environmental risks mitigation is likely to increase [21] and directly influence an organizations' profitability. Christmann [6] argues that organizations should integrate environmental efforts into their business strategy. Hart [16] identifies three interconnected eco-sustainability strategies pollution prevention, product stewardship and clean technology, as supporting a sustainability vision, being either reactive or proactive strategies [17]. Orsato proposes that adopting eco-efficiency, beyond compliance leadership, eco-branding and environmental cost leadership can achieve strategic competitive advantage [27]. Whilst other strategies can also be adopted [2] [27], these strategies, nevertheless, are poorly understood [5]. Some business leaders view eco-sustainability to be in conflict with fiduciary responsibility, outside the realm of business strategy [13] and costly [28]. Organizations can implement certain "best practices" of environmental management [1] to improve their competitive positioning while reducing the business operation's negative environmental impacts because "meeting sound business objectives and resolving environmental concerns are not mutually exclusive" [15, p.778].

Organizations must be able to evaluate and measure their performance and determine progress but limited studies exist to describe environmental performance measurement systems [26]. The definition of organizational eco-sustainability performance is not as straightforward as assumed [18] and no clear or agreed definition of 'greenness' exists to determine which companies are the 'greenest' [25]. From a theoretical perspective, eco-sustainability performance of an organization can be assessed from process, outcome, internal and external perspectives [18]. Epstein and Wisner [10] applied Kaplan and Norton's balance scorecard (BSC) to help inexperienced environmental, health and safety managers to identify key environmental performance indicators that link the strategy implemented. By extending the conventional BSC and formulating a sustainability balanced scorecard (SBSC), three stages of strategic processes were identified [12]. From a practitioners' perspective, assessing organizational eco-sustainability in Australia, includes, but is not limited to, Australian Sustainable Asset Management's Sustainability Index, CERES [5] and Global Reporting Initiatives. This paper research aims to improve the insights into 'greening' businesses, to fill the gap identified by academics [29] and answer the call made [21] by practitioners who argue for research in environmental performance measurement and evaluation to be undertaken. This study, therefore, uses the McKinsey Seven S's (7S) Framework as a foundation to develop an evaluation tool to measure the level of adoption of potential practices related to organizational eco-sustainability strategy and policy at the strategic level. This lays the foundation for developing a methodology to assess the adoption of eco-sustainability policies that will have a desirable effect on the business performance of a company and enable metric driven performance evaluation of actions by business organizations to comply with legislative demands related to the environment.

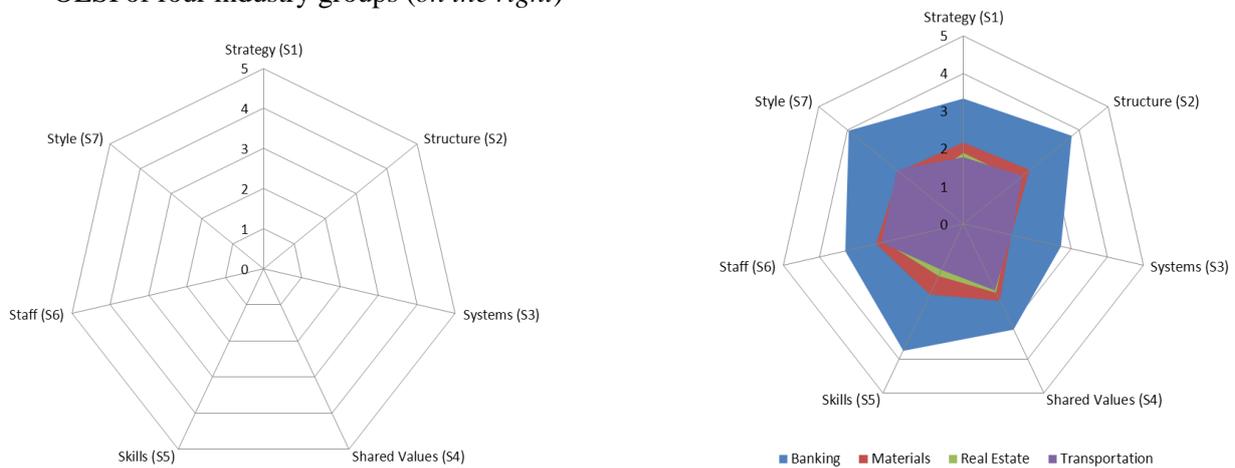
DEVELOPING AND VISUALIZING THE METRIC FOR ASCERTAINING THE LEVEL OF ADOPTION OF ECO-SUSTAINABILITY STRATEGIES AND ACTIONS

In order to determine the impact on a business of eco-sustainability strategies and actions, first, a metric of their adoption must be developed. The metric developed in this paper for this purpose is called the *Organizational Eco-Sustainability Index* (OESI), which is inspired by the Environmental Sustainability Index (ESI) project [11]. The OESI is used to provide a more holistic measure to show the extent of adoption of practices in relation to an organization's eco-sustainability policy and strategy implementation, relative to other organizations in the same and/or across different industry. For the purpose of developing a comprehensive eco-sustainability measurement system, the researcher conducted a comprehensive review of the ASX 200 companies' sustainability and/or annual reports (fiscal year 2010-11). Using content analysis based on McKinsey 7S, the organizational eco-

sustainability activities were categorized. A total of 139 practices were identified and categorized into seven themes corresponding to McKinsey 7S.

The OESI score is an aggregation of the seven indicators where each is weighted equally, since it is assumed that they are equally important. The researcher studied the data and information reported in organizations’ sustainability and/or annual reports, identified the relevant practices and grouped them into the pre-set seven themes. If the item is applicable to the particular organization, a “1” will be indicated, otherwise "0" will be indicated in the relevant box. The calculation of OESI score (which is calculated for each company (if needed) and each industry) is based on the score accumulated for each of the seven indicators. To better understand and discover the patterns and relationships of the seven dimensions in the four industry groups, radar diagrams were used to visualize the data. In the radar diagram, each radius stands for a strategic dimension and represents the value of the measurement for strategy, structure, systems, shared values, skills, staff and style. It is displayed by points of different shapes or colours, or both (Figure 1).

Figure 1 A sample representation of an organization’s eco-sustainability position (*on the left*) and an area of the OESI of four industry groups (*on the right*)



The metric indicators developed are flexible and can accommodate a significant number of dimensions. When this occurs the values of theta (θ) in the formula will change. Table 1 illustrates the possible values of theta (θ) given the changes in the number of dimensions. For this study, the angle $\theta = 51.4286$ (derived from $360/7$) because there are seven dimensions which were considered.

Table 1 Sample computation of the constant for use in the computation of the total area of OESI

No. of possible dimensions	3	4	5	6	7	8	9
Angle theta	120	90	72	60	51.4286	45	40
Sin theta	0.8660	1.0000	0.9511	0.8660	0.7818	0.7071	0.6428

The area of the OESI for an organization is calculated to indicate that the bigger the area, the more an organization adopts eco-sustainability practices (see Figure 1). Similarly, in a study of illustrating organization’s risk profile when managing its information technology risks of outsourcing, [32] calculated the area bounded by the risk profile, to represent the total risk exposure experienced by the organization. Tho [32] uses area to indicate that the bigger calculated area means more risk exposures. The following is the formulas used for different computation of the OESI.

1. Total OESI score for a given company for a given ‘Seven S’ category (k). For the $j(i)^{\text{th}}$ company in industry i, the OESI Score for the k^{th} ‘Seven S’ category is calculated thus:

$$\text{Total OESI score}_{i,j(i),k} = \sum_{l(k)=1}^{L(k)} (S_{i,j(i),k,l(k)}) \quad (1)$$

2. The following formula (based on the work of Tho [32], which focuses on the risks of IT outsourcing) is used to calculate the area of the OESI for an organization. The formula is based on relative measures of area defined by the angles between the various Seven S dimensions.

$$\text{Area of OESI}_{i,k} = \sum_{k=1}^K 0.5 \sin \theta (S_k \times S_{k+1}) + (S_1 \times S_{(K-1)}) \quad (2)$$

3. The OESI score (standardized in a weight of 5) for a given company in a given industry for a given ‘Seven S’ category (k). For the $j(i)^{\text{th}}$ company in industry i, the OESI Score for the k^{th} ‘Seven S’ category is calculated thus:

$$\text{OESI}_{i,j(i),k} = \sum_{l(k)=1}^{L(k)} (S_{i,j(i),k,l(k)} / L(k)) \cdot 5 \quad (3)$$

For (1), (2) and (3):

- i) $i =$ industries of which there are 4.
- ii) $J(i) =$ the total number of companies in the i^{th} industry. Since all companies are unique (i.e., can only appear once) the notation $J(i)$ is required (as is $j(i)$). Note: ($j(i) = 1, \dots, J(i)$).
- iii) $K =$ the number of ‘Seven S’ categories. Note: ($k = 1, \dots, K$).
- iv) $S_{i,j(i),k,l(k)} = \begin{cases} 0; & \text{iff an action } l \text{ in company } j(i) \text{ in industry } i \text{ in the } k^{\text{th}} \text{ “Seven S” category is } \textit{not} \text{ selected for implementation.} \\ 1; & \text{iff an action } l \text{ in company } j(i) \text{ in industry } i \text{ in the } k^{\text{th}} \text{ “Seven S” category } \textit{is} \text{ selected for implementation.} \end{cases}$
- v) $L(k) =$ total number of possible actions in ‘Seven S’ category K (this is the same for all i and $j(i)$). See (ii) for the use of $L(k)$ and $l(k)$. Note: ($l(k) = 1, \dots, L(k)$).

4. To differentiate the hard and soft elements in the Seven S categories is important for organizations, since it allows them to understand where effort is needed and ultimately, where the degree of difficulty is in getting results. The proportion of hard elements (strategy, structure and systems are recognized as the hard elements) chosen out of the total number of possible practices for a given company in a given industry for a given ‘Seven S’ category is calculated as

$$\text{OESI}_{i,j(i),k} = \sum_{l(k)=1}^{L(k)} (S_{i,j(i),k,l(k)} / L(k)) \quad (4)$$

5. To calculate the proportion of soft elements (shared values, skills, staff and style are recognized as the soft elements) chosen out of the total number of possible practices for a given company in a given industry for a given ‘Seven S’ category is calculated

$$\text{OESI}_{i,j(i),k} = \sum_{l(k)=1}^{L(k)} (S_{i,j(i),k,l(k)} / L(k)) \quad (5)$$

For (4) and (5):

- i) $i =$ industries of which there are 4.
- ii) $J(i) =$ the total number of companies in the i^{th} industry. Since all companies are unique (i.e., can only appear once) the notation $J(i)$ is required (as is $j(i)$). Note: ($j(i) = 1, \dots, J(i)$).
- iii) $K =$ the number of ‘Seven S’ categories. Note: ($k = 1, \dots, K$).
- iv) $S_{i,j(i),k,l(k)} =$ $\begin{cases} 0; \text{ iff an action } l \text{ in company } j(i) \text{ in industry } i \text{ in the } 1^{\text{st}}, 2^{\text{nd}} \text{ and } 3^{\text{rd}} \text{ or } 4^{\text{th}}, 5^{\text{th}}, 6^{\text{th}} \text{ and } 7^{\text{th}} \text{ of} \\ \text{“Seven S” category is } \textit{not} \text{ selected for implementation.} \\ 1; \text{ iff an action } l \text{ in company } j(i) \text{ in industry } i \text{ in the } 1^{\text{st}}, 2^{\text{nd}} \text{ and } 3^{\text{rd}} \text{ or } 4^{\text{th}}, 5^{\text{th}}, 6^{\text{th}} \text{ and } 7^{\text{th}} \text{ of} \\ \text{“Seven S” category } \textit{is} \text{ selected for implementation.} \end{cases}$
- v) $L(k) =$ total number of possible actions in “Seven S” category K (this is the same for all i and $j(i)$). See (ii) for the use of $L(k)$ and $l(k)$. Note: ($l(k) = 1, \dots, L(k)$).

Due to extensive data availability, only 84 of 200 companies were purposively sampled from the ASX 200. These 84 companies consist of 4 companies in banking, 51 companies in materials, 18 companies in real estate and 11 companies in transportation industry group. They represent significant market capitalization of the ASX 200. Moreover, some of the companies are identified as significant carbon emitters [31] and they are associated with the issue of growing population and global material resources demands [22]. These industry groups, thus, should further be studied as their impact on the economy, the natural environment and society will continue to grow [22]. For the same reasons and for demonstration purpose, of how the OESI is used, the ‘materials industry group’ was chosen.

RESULTS AND DISCUSSION

The results of the application of the formulae above are shown in Table 3. The OESI score differentiates the levels of adoption both as a whole and also across the seven dimensions. The area of OESI indicates that the bigger the area, the more an organization adopts eco-sustainability practice. The results show that Material Industry Group (MIG) has an area metric of 15.09, which encloses 22.1% of the area. This industry group can be said to have adopted a limited number of eco-sustainability practices, especially in the area of systems (S3), which has the lowest total score and lowest means across the seven dimensions. But the area mean is comparable to other industries, except the Banking Industry Group (BIG), which has an area mean of 31.59 in this study, which encloses 46.2% of the area. It shows that the BIG adopts more than half of eco-sustainability practices adopted by the MIG. Specifically across the seven dimensions, the MIG has a maximum score of 5.00 in both shared values (S4) and staff (S6), but with a relatively low score of 2.71 in systems (S3). Companies in the MIG appear to have organizational eco-sustainability well embedded in the corporate culture (S4) [24] to complement organization’s existing business vision and strategy.

The OESI can also be used to show the degree of variation of one industry (i.e., the consistency of adoption within an industry) against another. The OESI shows that the standard deviation of the seven dimensions of the MIG fluctuate at a significant level, at least half with respect to the mean. To better explain that, coefficient of variation (CV) is used to explain the degree of variation relative to the mean (see Table 2). The CV in strategy (S1) is 51%, with the CV of 62% in style (S7). Similar reason for using the CV to explain the data, ratio scale is used. The results show that the proportion of hard and soft elements for the materials industry group is 67.83% and 32.17%, respectively. With an exception to MIG’s norms, one company has a 50% in the hard elements and 50% in the soft elements, and another company scores very high, 93.33% in the hard elements and very low, 6.67% in the soft elements. Nevertheless, it is insufficient to say how effective their organizational eco-sustainability is, because both company either score a zero or one in the soft elements and vice versa. The results shown are quite consistent across the materials and the other three industry groups.

Table 2 Descriptive results

Industry Group		Hard Elements			Soft Elements				Area Mean
		Strategy (S1)	Structure (S2)	Systems (S3)	Shared Values (S4)	Skills (S5)	Staff (S6)	Style (S7)	
Materials	Total	110.23	117.00	67.50	115.83	106.67	123.75	113.53	15.09
	Max	4.08	4.50	2.71	5.00	3.89	5.00	4.71	
	Min	0.38	0.00	0.00	0.00	0.00	0.00	0.00	
	Means	2.16	2.29	1.32	2.27	2.09	2.43	2.23	
	SD	1.10	1.37	0.77	1.28	1.06	1.45	1.37	
	CV	51%	60%	58%	56%	51%	60%	62%	
	Average Ratio	67.83%			32.17%				

The developed metric has been evaluated with top senior executives who are responsible for their organization's sustainability, e.g the Head of Sustainability, Vice President of Global Sustainability and Sustainability Directors from 15 Australian companies listed on the ASX 200 to confirm the efficacy of the elements in the metric. The top senior executives of the companies find the OESI is useful because it provides a snapshot of the company's current eco-sustainability position and they can compare their position relative to their peers in the same industry. It also provides the companies with an opportunity to reflect and reassess what element across the seven categories are important for the organization, so that they understand where effort is needed, what resources are required and ultimately, where the degree of difficulty in managing the seven categories is to get the desired results.

CONCLUSION AND FUTURE RESEARCH

In conclusion, the OESI developed in this paper forms the foundation of a methodology to assess the effect on the business performance of a company in response to adopting an eco-sustainability strategy. The OESI enables the comparison of organizations' eco-sustainability practices adoption, relative to other organizations in the same and/or different industry and provides an indication of an organization's relative eco-sustainability position. A more robust eco-sustainability evaluation metric such as the OESI was developed to fill the gap identified in literature review and improve the insights of greening businesses. The validity and application of the OESI was already tested by using interviews with top management executives of a total of 15 companies (a sample of the 84 ASX listed companies) to gain an in-depth understanding of organizational eco-sustainability strategy and policy implementation. This research contributes to both the academic literature and practitioners alike. To some extent, it potentially contributes to academic research on the strategic perspective of organizational eco-sustainability strategy implementation [3], addresses the challenge facing the industry to successfully transform strategy to implementation [23] and provides a methodology for practitioners and organizations to make decisions and evaluate their adopted eco-sustainability. Future research will comprise a longitudinal study using the OESI in evaluating organizational eco-sustainability strategy and policy implementation, in order to examine the extent to which adopted eco-sustainability practices will impact on the business performance of an organization over time.

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