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A Descriptive Study of Malaysian Manufacturing Firms’ Experience in Managing Closed-Loop Supply Chains

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Abstract

The objective of this paper is to determine the descriptive information about the extent of the adoption of Closed-Loop Supply Chain (CLSC) activities that have existed in practice in Malaysia’s’ context. A descriptive analysis has been carried out to ascertain the characteristics of the surveyed companies and firm’s experience in managing CLSCs. The study distributed 581 questionnaires through mailing and received a total of 150 usable responses for further analysis. The results indicate that the level of adoption of the CLSC activities is slightly higher than average, which clearly shows that the improvement in the reverse logistics and CLSC activities amongst EMS ISO14001 manufacturers in Malaysia is extremely progressive, as compared with the level of adoption reported in the past.

Key Words: Sustainable supply chain management, Closed-Loop Supply Chains, Descriptive Study

1. Introduction

Sustainable supply chain management (SSCM) is derived from the implementation and extension of the supply chain management [1] by adding the environment and social/ethical aspects in the supply chain itself. SSCM does not only impact on the economic landscape but also to the environmental and social implications from the firms’ conduct or triple bottom line objectives [2], which also include the business transactions along with the suppliers and customers [3].

Whilst it is undeniable that sustainability will bring more cost to the companies, the rational of providing the opportunity to offer better products than competitors in a win-win situation is justified and deemed reasonable [4]. A growing number of researchers share the view of the advantages for adding environmental sustainability issues into the business process: maximum utilisation of resources, gains from investment, higher sales, the opening-up of new markets, the enhancement of the corporate image, product differentiation and increased market superiority [5, 6].

On the basis of this, closed-loop supply chains (CLSCs) are suggested as the utmost concept to achieve the sustainability of supply chains in production [7], which can potentially provide significant benefits to the firm, environment and the society. In this concept, product returns are transformed into resale/reuse products through a series of reverse supply chain
processes, and forward supply chain flow of activities [8]. The logic behind this is that by creating product movement in a cycle or loop, the efficiency of the material utilisation can be achieved. This would contribute to the substantial reduction in the usage of natural resources and, thereby, mitigate the impact to the environment across the supply chain channels [9]. As for the example of electronic products, simply disposing of these products into landfills is not a proper solution to improve the sustainability of the environment [10] as they contain toxic substances that are dangerous to the environment.

However, very little is known on the CLSCs’ adoption in Malaysia. To date, there is no satisfactory explanation that has been provided in the literature so far on the product returns and recovery in the closed-loop system that can lead to the sustainability in the manufacturing operations. In fact, there were mixed reports in the past study, on which the reverse logistics have been stated as low in the adoption [11, 12] but higher in several electronic firms [13]. Hence, this study attempts to provide vital descriptive information about the extent of adoption of CLSC activities that have existed in practice in Malaysia’s context.

2. Literature Review

2.1 Closed-Loop Supply Chains

The concept of CLSCs entails the process of where the reverse supply chain is reconnected to the initial forward supply chain, on which the returns are reintroduced into the downstream production and distribution systems [14] in order to salvage the value of the returns. The loop does not have to be linked to the point of production but can connect to any points along the forward supply chain. It involves the final destination of products at the end of the reverse supply chain where at this point, the companies can make a decision either to create a loop or leave it open [15].

In general, the motivation behind the implementation of the CLSCs comes from different factors, including generating a higher profit. It has also become an important tool to achieve a higher position especially in the same market competition [16]. This is because the value captured from the returns can be channelled for the same, or other, uses of materials or products during the remanufacturing stage. This could eventually save on the overall cost of spending on the raw material purchases. Many internal and external benefits can be garnered by manufacturing firms [17]. Customers, also, can enjoy the benefits of the effective product returns by returning the failed products and also their end-of-life products [18]. Hence, this contributes to the firm’s performance by increasing the present level of competitiveness to meet the changing demand orientation towards the reverse supply chain considerations.
3. Methodology

The sampling frame was decided based on the list of ISO 14001 certified companies from the Malaysian Investment Development Authority (MIDA), SIRIM Berhad (SIRIM) and Federation of Malaysian Manufacturers (FMM) in the year 2013. The chosen respondent was a person holding the post of Supply Chain Manager, Quality Manager, Logistics Manager or Production Manager. The study distributed 581 questionnaires through mailing, which was considered as the appropriate method for data collection in view of its ability to deal with a widely dispersed area across the Peninsula, Sabah and Sarawak.

In this study, descriptive statistics have been used to describe the characteristics of the surveyed companies and respondent firm’s experience in managing CLSCs. The characteristics of the CLSC activities have been evaluated, including the management of product returns and recovery as these two functions are part of the major CLSC activities. By conducting a descriptive analysis on these functions, several important indications have been obtained particularly on the extent of the adoption of CLSC activities by the manufacturing firms in Malaysia.

4. Results and Discussions

A total of 150 usable responses (25.8%) had been received at the end of the data collection. The descriptive analysis has been carried out and presented in Table 1.

<table>
<thead>
<tr>
<th>No.</th>
<th>Concluding Remarks</th>
<th>Category (Open Code)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Majority of respondents were male respondents, experienced employees, carrying out management responsibilities, attached to the Production Department and holding the academic qualification of degree or higher. 150 responses were received from 8 states: Kedah, Pulau Pinang, Perak, Wilayah Persekutuan, Selangor, Negeri Sembilan, Melaka and Johor.</td>
<td>Demographic</td>
</tr>
<tr>
<td>2.</td>
<td>Electrical and Electronics (E&amp;E) firms represented more than half of the participating firms in the survey. Most of the participating firms were considered large in size, with the number of employees between 251-500 employees from large MNC firms. Fewer responses were received from Johor, Negeri Sembilan, Perak and Melaka, with no response received from Pahang, Sabah and Sarawak.</td>
<td>Geographical Locations</td>
</tr>
<tr>
<td>3.</td>
<td>Majority of the participating firms were already established with more than 15 years in business.</td>
<td>Size and Ownership</td>
</tr>
<tr>
<td>4.</td>
<td>Majority of the participating firms were producing industrial and finished products rather than manufacturing consumer and semi-finished products.</td>
<td>Duration of Business</td>
</tr>
<tr>
<td>5.</td>
<td>Majority of the participating firms were export oriented with fewer firms concentrating on the local market only.</td>
<td>Type of Products Produced</td>
</tr>
<tr>
<td>6.</td>
<td>Main sources of returns for the participating firms originated from the export market. However, firms received lower than average of the degree of product returns.</td>
<td>Returns Rate &amp; Source</td>
</tr>
<tr>
<td>7.</td>
<td>Majority of the firms managed the product returns and recovery on a frequent basis, indicating the importance to adopt CLSC activities.</td>
<td>Managing CLSCs</td>
</tr>
</tbody>
</table>
Table 1 indicates several significant backgrounds and characteristics of the surveyed manufacturing firms in Malaysia. A specific category (open code) has been created from the concluding remarks to match with the summary descriptions. In this case, 15 types of descriptive backgrounds of the participating firms have been identified from their: demographic profile, geographical locations, industry, size and ownership until their level of CLSCs’ adoption.

The study received 150 usable responses (25.8%) from 8 states: Kedah, Penang, Perak, Wilayah Persekutuan, Selangor, Negeri Sembilan, Melaka and Johor out of 581 survey questionnaires distributed across Malaysia. The states of Selangor, Penang and Kedah turned out to be the highest to respond as opposed to other states. Three states failed to provide feedback to the study with no response received from Pahang, Sabah and Sarawak. These outcomes were expected in view of the lower number of companies in the sample frame of the study from these three states.

The analysis of the respondents’ demographic profiles revealed that in terms of the job title, the majority of the respondents (more than half) held management responsibilities with the highest posts of manager and higher in their organisations. In terms of the organisation functions, most of them were serving the Production, Logistics and Quality Department at the time the survey were conducted by them. Furthermore, most of the respondents were experienced employees serving their companies for more than six years, with their academic qualifications of a degree and/or higher. As such, the analysis of the respondents’ demographic backgrounds clearly demonstrates that the respondents supported, highly, the sample criteria and, therefore, were qualified to represent the population of the study.

Pertaining to the sector of the industry, the majority of the participating firms were from the Electrical and Electronics (E&E) industry, being the biggest manufacturing industry and the one with the most recipients of the Environmental Management of ISO 14001 certification.
in Malaysia. Besides that, the mainstream of the participating firms comprised large firms with 251-500 employees, mainly from the MNCs’ firms which had been operating for more than 15 years in Malaysia.

A large number of the participating firms were producing industrial and finished products mainly for the export market. This has resulted in many sources of returns originating from the export market. Out of the three types of returns identified, most of the return sources were obtained from manufacturing and customer returns; whilst distribution received the least returns. Nevertheless, most of the firms received lower than average of the extent of product returns in their reverse flow operations. In terms of managing the product returns and recovery, the majority of the participating firms administered these processes on their own on a frequent basis. This marks the importance of the adoption of CLSC activities as a result of the high involvement in CLSC activities amongst the participating firms.

There were three major reasons for the adoption of CLSC activities amongst the participating firms: meeting customer requirements, fulfilling regulatory compliance and meeting the stakeholders’ demand. The level of adoption of the CLSC activities reached by them was slightly higher than average. The majority of those achieved good performance of the CLSC activities and were perceived to be more capable than their competitors in the adoption of the activities. This was mainly as a result of the effectiveness of the CLSC activities that they had garnered in their reverse flow chains. As such, the participating firms have shown a slightly higher extent of the adoption of CLSC activities and attained better performance from the adoption, hence, representing the most appropriate sample characteristic to provide the overall progress of the adoption of CLSC activities that have existed amongst the Malaysian manufacturers.

5. Conclusion

As a conclusion, the descriptive analysis clearly signifies the significant level of adoption of CLSC activities amongst EMS ISO14001 manufacturing firms in Malaysia, with the adoption being slightly higher than average for a majority of the firms that are managing the product returns and recovery on a frequent basis, despite several studies in the past reporting lower adoption of reverse logistics in their operations. This clearly shows that the improvement in the reverse logistics and CLSC activities is extremely progressive to meet the sustainable objectives in the supply chains. Besides that, the high adoption of CLSC activities is also evidenced from the firms’ internal management of the entire product returns and recovery operations rather than outsourcing the functions completely to external parties. This indicates a certain extent of commitment that has been shown by the Malaysian manufacturers towards meeting the customer requirements, regulatory compliance and fulfilling the stakeholder’s requirements.
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Mad Khir Johari Abdullah Sani, Mohamad Noorman Masrek, Noor Zaidi Sobid, Mohd Zailani Endin, Jamiah Baba and Yamin Khanis 3057

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Lim Lee Ping, Ungka Norulkamar Ungka Ahmad and Ong Choon Hee 3063

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Jan Varvrecka and Petr Stepnek 3113

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Soliha Samusi, Rohaya Md Noor, Norliah Omar, Zairilah M. Samusi and Aleezah Alias 3131

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Rahil Al Jaffri Sosd and Norfazieza Sowandi 3137

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Norhayati Zakaria, Nursakirah Ab Rahman Muton 3143

The Effect of Busy Directors, CEO Duality and Ownership on Firm Performance  

Kamaran Nisham Taufi Mohd, Rohaida Abdul Latif, Hasnah Kamardin, Norliah Che Adam 3149

CEO Characteristics and Frequency of Share Repurchases  

Kamaran Nisham Taufi Mohd, Hasnah Kamardin 3155

Online Mail-Handling Design to Support E-Administration in Karanganyar  

C. Dvah Sulistyawiningrum 1, Andre N. Rahman, Anton Subarman, Rosiliti Ari Y. 3161

Determining Tourists’ Behavioural Intention to Use Mobile Tourism Applications: Modelling Effect of Gender  

Tan Gek Siang, Kamarulzaman Ab. Aziz and Zauwiyah Ahmad 3167

Translating Information and Awareness of Green Hotels’ Green Tech Practices Into Lodgers’ Satisfaction and Green Trust Into Lodgers’ Loyalty  

William Joe-Lin Hew, Gerald Guan-Gan Goh and Mong-Kim Yong 3173

Related Party Transactions in Family Firms vs. Non-family Firms: Malaysian Evidence  

Noor Martin Haji-Abdullah, Wan Nordin Wan Hussin 3179

Harmonisation of Contract Laws in ASEAN: Completeness of Contract  

Nurnanizan Jumani and Manop Kaewmorachaureau 3185

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Lukas Cegan 3191

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Mikkyong Wong, Choi Sang Long, Won Khairuzzaman Wan Ismail, Tan Owee Kowang 3197

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Ramli, R and Ali, N 3203

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Chin Fei Goh, Amran Rasli, Owee Kowang Tan, Song Long Choi and Halimah M. Yusof (Continued) 3209

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