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Barriers to Implementing Reverse Logistics in South African Construction Organisations

Unathi Makalima[1,2], Clinton Aigbavboa[1,2], Ifije Ohiomah[1,2], and Nita Sukdeo[1,2]

[1]Computational Intelligence and Complexity, Orlando, FL 32826, USA
[2]Institute for Advanced Systems Engineering, Orlando, FL 32816, USA

ABSTRACT

This paper aims to present a survey of the perception of the barriers to implementing reverse logistics practices in South African construction organizations. Despite the extensive research on forward logistics and RL, there is a paucity of studies that examine the barriers to implementing RL particularly within the South African construction industry that hinders the implementation of RL. Data were collected by utilizing the use of questionnaires. The quantitative survey data were subjected to descriptive analysis. The following barriers were indicated as most significant; lack of awareness of reverse logistics practices, lack of knowledge of the revenue reverse logistics brings. The least ranked barriers are limited forecasting and planning in reverse logistics, lack of pressure from community and perceived idea that the cost of adopting RL is high. First, the reported findings are focused on one study that used questionnaire surveys within the construction industry; therefore, the results may not be generalizable to other contexts. The barriers identified could be used as a road map for the development of appropriate solutions for the successful implementation of RL.

Keywords: Barriers, Reverse logistics, Construction

INTRODUCTION

Reverse logistics in the construction industry can be defined as the movement of materials and products from a salvaged building to a new construction site. Even though there are several studies done on different aspects of the reverse logistics (RL) chain, there is a lack of systematic review of the literature on this significant subject as it is applied to the construction industry (Hosseini et al., 2015). According to Chinda (2017) even though RL is common in the manufacturing field it is very limited in the construction industry. The construction industry is the biggest contributor to filling up of landfill sites however most materials used in construction are recyclable hence the use of RL will assist in addressing these environmental problems (Chinda, 2017:100). According to Schamne and Nagalli (2016) construction waste consist of 67% of the total municipal waste that is generated in a country. RL can help reduce this high figure if it is properly managed and executed. Even though there is a high percentage of waste that can be reused in the

construction industry there is a lack of RL that is done in the construction industry. Sobotka (2017) states that it is essential to have the knowledge as well as methods available to create proper RL chains since RL is not always profitable a proper market research is needed to ensure that RL is properly done. Chinda and Ammarapala (2016) states that using RL as waste management is essential in increasing productivity as well as the green rating image of the company. Lawson et al. (2001) states that England produces 53 million tons of construction and demolition waste per year however more than 50% of that goes to landfill sites. Every 10% of items that are bought in a construction site leave the site as a solid waste (Razak Bin Ibrahim et al. 2010) not a lot of material is reused due to lack of knowledge of reverse logistics in the construction industry. Lawson et al. (2001) further states that due to the fact the construction projects are having limited time it makes it difficult for construction companies to practice RL over and above the fact that there is lack of knowledge of RL. Yuan and Shen (2011) states that lack of storage space in the construction sites is one of the reasons why RL is not implemented to its full potential on construction sites, construction and demolition waste cannot be kept on site but rather cart away to a landfill site. The construction industry is the biggest contributor of waste disposal in landfill sites however most of the materials used in construction are reusable but due to low usage of RL most of the materials end up in landfill sites. The problem investigated in this research paper is the challenges to the implementation of RL in the South African construction industry.

CHALLENGES OF REVERSE LOGISTICS IN THE CONSTRUCTION INDUSTRY

Tam and Tam (2006) states that studies have been don on RL and there is enough literature on RL however there is a need for studies to be done regarding the type of deconstruction techniques to recover materials to be reused. Thormark (2000) states that construction companies should research on proper ways of doing deconstruction with the aim of reusing the material this will help in the awareness and effective implementation of RL. Rao et al. (2007). States that because the demolitions in the construction sites is often done by the subcontractor the focus is mainly on demolition and not on the recovery of reusable material.

Financial Resources

Having sufficient financial resources is vital to implement RL activities as the essential programmes and technology are important in RL. Nevertheless, to set up a cutting-edge technological and information system can be a costly exercise for the organization. According to Ravi and Shankar (2005), Azzone and Noci (1998), it is a fact that SMEs have very limited financial resources. For that reason, they are incapable of developing the basic technologies and programmes. According to Del brio and Junquera (2003) companies are often considering the rate of return in investment when they are making investment and if there is slow rate of return on the investments and the cost of the investments hinder the implementation of RL activities

(Zilahy, 2004). Fleischmanns et al. (2000) states that the problems that the construction industry is facing is regarding the logistics planning there is always a common challenge with the transportation and storage of demolition materials resulting in materials that can be reused not used but transported the landfill sites instead this problem is unique to the construction industry it is not common on the other industry such as the manufacturing industry hence RL is implemented less in the construction industry compared to the other industries. Pollock (2010:8) states the key pressures that organizations must deal with in RL are reducing the costs. RL is a nonrevenue generating process which may result in only a few resources allocated to RL part (Pogorelec, 2000; Rogers & Tibben-Lemke, 2001). Construction organizations view returns as main objective (Biederman 2006) and they feel they run a risk of escalating the operating costs by addressing the RL component (Pogorelec, 2000). According to a study done by the Reverse Logistics Executive Council (RLEC), the excessive cost of processing salvaged returns is around 200 to 300%, compared to forward sale. Consequently, it can be said the cost of reverse logistics may be three times more compared to forward logistics (Norman & Sumner, 2007). A good number of organizations do not have the current cost that is associated with RL because processes may not be properly defined and there is no necessary support for the RL system (Moore, 2006). The unknown costs of RL can be seriously underestimated (UPS consulting, 2004). The challenges for organizations are to determine how much the current RL processes are costing to implement, particularly when they did not distribute the necessary resources to determine what the actual costs are (Schwartz, 2000). These costs that may include the following (Walden, 2005): The cross of processing the salvaged items, the cost of transport to move salvaged items, the cost of storage warehouse, the cost of disposing items that are damaged beyond repair or re-use.

Human Resource

The lack of human resources as well as training is a major obstacle to the implementation of effective RL. Proper training and education of employees are one of the crucial elements for the successful implementation of effective RL in the organizations (Ravi and Shankar, 2005). In addition, Hillary (2004) stated that the lack of RL specialist staff as well as inadequate technical knowledge and RL skills of the staff act as a barrier to RL activities. In addition, the study done by Azzone et. al (1997) and Azzone and Noci (1998) states that SMEs' employees are often having a very low level of awareness of environmental management issues. The advantages of training of the human resource are proving that a higher percentage of skilled employees leads to a higher level of the organizations' environmental action (Del Brio and Junquera 2003). The lack of commitment to environmental management issues; Lack of corporation towards activities that are environmentally friendly; Lack of company culture as well as the lack of support from top management shows another sign of internal challenges (Zilahy, 2004 and Hillary, 2004). Without a planned focus on environmental management issues, normal operating procedures cannot be able to provide

an organization a platform to operate environment friendly (Hillary, 2004) furthermore in this setting, the style of management of businesses is important to execute the activities in relation to the environmental effects of their procedure. The awareness of managers in smaller organizations concerning environmental issues is presented in the study done by Azzone and Noci (1998) and Noci and Verganti (1999) as small, smaller organizations' style of management focuses on complying with the legislations lacking a perspective of environmental management issues. The reason is poor management capacities as well as the incompatibility of the environmental objectives set by the top management (Zilahy 2004).

Lack of Suitable Information Technology (IT) Systems for RL

Zheng et al., (2005) states that the application of IT is the main link in the RL system. The difficulty of a RL program will mean that the information support is completely critical. However, Richey, Chen, Genchev and Daugherty (2005) have discovered that traditional IT systems were designed for the forward logistics only and not for RL. The most crucial problems that construction organizations must deal with in implementing RL is having an operational information system in order (Zheng et al., 2005:852). A shortage of technological and information systems can be a very serious challenge in terms of RL implementation (Ravi & Shankar, 2005). Developing IT tools that will work in RL is particularly complicated since there is a lack of regulation in the RL processes (Richardson, 2006:2). Numerous logistics systems are not properly prepared to deal with RL and if construction organizations do not have the capacity, the whole process can be more inefficient (Rogers & Tibben-Lembke, 1998). The key areas of concern in IT include inadequate IT investment, low dependability of IT solutions, non-existence of information and misinformation.

Insufficient Investment in IT

Insufficient investment in IT is a main challenge and one of the major serious problems that construction organizations are facing in the implementation of operation of RL (Jayaraman, Ross & Agarwal, 2008). Most construction organizations apply labor-intensive methods; manual, unproductive as well as often unmanageable RL processes (Thrikutam & Kumar, 2004). A small number of construction organizations have succeeded in the implementation of automated information systems in the salvaging process as well as the necessary resources assigned to these systems are also pushed to their limit hence, they are not always available for RL applications (Jayaraman et al., 2008; Rogers & Tibben-Lembke, 1998). Lack of reliability of average IT solutions is an additional area of serious concern in RL (Rupnow, 2011:35). Although several effective RL software as well as IT solutions are available, most construction organizations are lacking reliable RL management software (Rupnow, 2011:35). A lot of enterprise resource planning (ERP), customer relationship management (CRM) as well as warehouse management system (WMS) are not adequately reliable and operative to salvage products (Norman & Sumner, 2007:1). Systems like ERP are the backbone

of number organizations' logistics information systems however they are not used frequently used by construction organizations. These systems are integral in facilitating the integrated operations as well as reporting and start, monitor and tracking the critical activities for instance order fulfilment as well as replenishment (Bowersox, Closs & Cooper, 2010). A WMS integrates processes to guide the physical activities as well as product receipts, the movement of material, order selection and storage (Bowersox et al., 2010). Several supply chain management (SCM) system does not provide enough RL capabilities. These systems are also lacking the end-to-end abilities in the areas such as item returns forecasting as well as customer return relationship and are also failing to provide strong decision to support for returns endorsement and disposition (Thrikutam & Kumar, 2004).

Lack of Information Visibility and Competence

A lot of organizations are lacking visibility in their respective information systems (Walsh, 2007). With less data visibility, a wide range of shortages may exist, for instance unreliable and incorrect data capture as well as insufficient monitoring of client satisfaction levels (Thrikutam & Kumar, 2004). Shortage of return statistics visibility is also making the planning as well as productivity of RL to be extremely difficult (Kuzeljevich, 2004). Like the visibility issues in RL is misinformation. Projecting is a challenging task to do in RL where misrepresentation can cause difficulties. Misrepresentation means that the projected return flows are not matching with the actual return flow as a result caused by data being inadequate, abundant, or conflicting (De Brito, 2003). In conclusion construction organizations are still struggling through RL processing without sufficient software system to do data collection (Rupnow, 2011).

RESEARCH METHODS

The aim of this study is to identify the barriers to the implementation of RL in the construction industry. Quantitative research was adopted to evaluate barriers to the implementation of RL practices in South African construction organizations. A questionnaire was distributed to construction professional using the convenience sampling method. The questionnaire returned were 52 in total, a Likert scale was used to transform the data. The questionnaire was analyzed using the SPSS software and the descriptive analysis. The Cronbach alpha was 0.897 which made the questionnaire very reliable. The background of the respondents was represented as follows; 30.8% were Quantity surveyor, 13.5% of Architect, 13.5% were Architect, 19% were project manager, construction manager represents 6% of the respondent, construction manager represents 10% and lastly construction project manager and construction team represented 10% and 7%. The qualification of the respondents revealed that 23.1% of the respondents had diploma certificate, 52% of the respondents represented bachelor's degree holders. 21.2% represented master's degree holders and lastly 3.8% represented doctorate holders. This revealed that the respondents had the necessary knowledge to answer the survey.

Table 1.

Challenges of RL in the construction industry	Mean
Lack of awareness about RL practices	4.00
Lack of knowledge of the revenue RL brings	3.81
Lack of knowledge, training, and experience in RL	3.77
Lack of knowledge of refurbishing and reusing items	3.73
"Lack of responsiveness about RL"	3.71
Lack of knowledge of salvaged goods market.	3.69
Lack of government supportive policies for RL	3.69
Lack of commitment from top management	3.69
Low costs of disposal of materials in landfills which does not justify the costs of RL	3.63
Lack of support or incentives from the government	3.60
Lack of skilled professionals in RL	3.56
Lack of technology for waste management and recycling	3.50
Limited forecasting and planning in RL	3.48
Lack of community pressure	3.48
Higher costs of adopting RL	3.46

Table 1 reveals the respondents' ranking of challenges of reverse logistics in the construction industry. Lack of awareness about RL practices ranked first with a mean score of 4, 00; Lack of knowledge of the revenue RL brings ranked second with a mean score of 3, 81; Lack of knowledge, training and experience in RL ranked third with a mean score 3, 77; Lack of knowledge of refurbishing and reusing items was ranked fourth with a mean score 3, 73; Lack of responsiveness about RL came fifth with a mean score of 3.71; Lack of knowledge of salvaged goods market came sixth with a mean score of 3, 69; Lack of government supportive policies for RL came seventh with a mean score of 3, 69; Lack of commitment from top management came eighth with a mean score of 3, 69; Low costs of disposal of materials in landfills which does not justify the costs of RL came Ninth with a mean score of 3, 63; Lack of support or incentives from the government came Tenth with a mean score of 3, 60; Lack of skilled professionals in RL came eleventh with a mean score of 3, 56; Lack of technology for waste management and recycling came twelfth with a mean score of 3, 50; Limited forecasting and planning in RL came thirteenth with a mean score of 3, 48; Lack of community pressure came fourteenth with a mean score of 3, 48; Higher costs of adopting RL came last with a mean score of 3, 46.

Based on the findings from the respondents on the challenges of reverse logistics in the construction industry Lack of awareness about RL practices; Lack of knowledge of the revenue RL brings; Lack of responsiveness about RL; Lack of knowledge of refurbishing and reusing items; Lack of knowledge, training and experience in RL were ranked top which this findings were in agreement with the with the results in the study done by study done by Chini (2003) there is generally a lack of awareness regarding the advantages of implementing RL. Schult and Sunke (2007) further states that due to high initial cost of RL adoption, potential liabilities on using the recovered items

leads to less support from the companies leading to less awareness of RL. Sassi (2004:163) Also states that RL is time consuming and may result in high labor cost in some instances hence there is a lack of implementation and awareness.

CONCLUSIONS AND RECOMMENDATION

RL has proven to be a sustainable practice that could offer many benefits to the construction industry. However, it has yet to be fully exploited in the real world. The present study provides profound practical implications for construction organizations regarding the adoption of this practice. The challenges facing construction organizations in adopting RL are unearthed from the existing literature while highlighting the potential economic, environmental, and social benefits. As a result, the study brings to light the primary factors to be considered prior to adoption of RL in construction organizations. This has major implications for construction practitioners as the necessary knowledge (i.e., barriers) for the decision-making on RL are synthesized from an exhaustive list of publications and presented in a comprehensible style. The findings also revealed the formidable impediments obstructing the widespread implementation of RL within the construction industry. To overcome such impediments, all stakeholders need to work together and share information. While designers should take the leadership, the role of builders, demolition-subcontractors/ salvaging companies and particularly policy makers need to be reviewed. The limitation of the study is that the study was carried out in the Johannesburg metropolitan, as it was not possible to carry out the study in ither provinces.

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