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Prioritizing critical success factors of reverse logistics in Hamgam Khodro Asia

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ABSTRACT

Today, the rapid increase of the industrial activities and uncontrolled consumption of natural resources cause environmental problems and interested companies in the activities that support sustainable environment. The primary concerns of reverse logistics are waste management, material recovery, part recovery and product recovery. This paper aims to prioritize critical success factors of reverse logistics in HAMGAM KHODRO ASIA. The results were obtained through a questionnaire from the top-level managers and engineers that work in HAMGAM KHODRO ASIA. Results of case study show that critical success factors of expert and trained personnel, customer satisfaction, flexibility of system, financial advocate of managers and flexibility of management are the strength point of company. Weak points of this case study are environmental awareness, environmental issue, reduction in overall production cost, regularity issue and use of existing personnel.

1. Introduction

One of the results of growing environmental concern throughout the past decades is increasing interest in reuse of products and materials. A prime concern in industrialize countries is waste reduction (Fleischmann et al, 2000). Governmental legislations, economic and environmental concerns are three main motivators that increase the attention to reverse logistics. Reverse logistics refers to the group of activities that initiated at the customer level with the collection of products and materials, reverse logistics terminates with the reprocessing of this products and materials (Alshamsi and Diabat, 2015). Effective reverse logistics focuses on the backward flow of materials from the customer to producer and supplier with aims of maximizing value or proper disposal of returned products and materials (Rogers and Tibben-Lembek, 1999).

Critical Success Factors (CSFs) are key factors required for ensuring the success of any business to happen and necessary for an organization to achieve their aims, which are required to be identified evaluated and focused(Haleem et al.,2012). Critical Success Factors is known as a tool for measuring performance in an organisation to achieve their mission (Zawawia et al. 2011).

Alazmi and Zairi expressed that critical success factors refer to the limited areas in which satisfactory results will ensure successful competitive performance for organization and department (Alazmi and Zairi, 2003). Critical success factors are those few key area of activity in which favorable results are implicitly essential, things that must go right to reach goals of management (Rockart, 1979). These factors can have significant impact on performance results by controlling a few developments (Ducker, 1973).

In this contribution, the case of leading Hamgam Khodro Asia in Iran is studied with respect to the essential reverse logistics operations of company. Hamgam Khodro Asia was established on 2004. It has activities in the field of mould manufacture, mass production of pressed parts of vehicle's body, and assembly of the sets. This company, leaning on its founding body's valuable experience as well as the up-to date technology, has a commitment in complying with the laws and regulations controlling the product quality as well as the international standards.

The issue is what are the factors that affecting successful implementation of reverse logistics. There are multiple reasons which are influencing organizations and companies to adopt reverse logistics practices but presence of some weak points make reverse logistics implementation ineffective.

The current research was undertaken to identify weak point of organization. This paper is organized as follows. In section 2 background of reverse logistics expressed. In section 3 methodology of research are presented and finally results of this research are presented, which is followed by discussion and conclusion.

2. Background of Reverse Logistics

The aim of this section is to summarize the main researchers that are concerned with the issue of reverse logistics.

Lue and Yuan (2010) explored critical success factors of waste management. They provided a framework for effective design and implementation of remanufacturing/ recycling operation in reverse logistics.

Kissling et al. (2013) identified specific and generic success factors and barriers in the reuse of electric and electronic equipment. They found success factors and barriers through the conducting of semi-structured interviews with 28 case studied.

Cardoso et al. (2013) developed a mixed integer linear programming (MILP) formulation for the design and planning of supply chains with reverse flows while considering simultaneously production, distribution and reverse logistics activities. The model is applied to a representative European supply chain case study. At last they proposed an optimization model for the design and planning of generic supply chain with forward and reverse flows.

Bansia et al. (2014) developed a reverse logistics performance measurement system for a battery manufacturer. They studied the case of a Leading Acid Battery manufacturer in India with respect to the essential reverse logistics operation. Then, they proposed a performance measurement system, over a sustained period using Fuzzy analytical hierarchy process.

Kaynak et al. (2014) identified the barriers faced in the adoption of reverse logistics (RL) and the respective overcoming schemas provided by the logistics centers. They found that the consolidation of RL functions under the organized structure of logistic center would provide a wide range of opportunities and benefits for the organizations.

Abdulrahman et al. (2014) identified critical barriers in implementing reverse logistics in chines manufacture sectors. They proposed a theoretical reverse logistics implementation model and empirically identified significant reverse logistics barriers with respect to management, financial, policy and infrastructure.

Niknejad and Petrovic focused on a problem of inventory control and production planning optimization of a generic type of an integrated Reverse Logistics (RL) network which consists of a traditional forward production route, two alternative recovery routes, including repair and remanufacturing and a disposal rout. Results show that the repair route is used when there is a high quantity of returned products and for the lower unit production costs, the remanufacturing and forward production routes are more cost Effective.

Prakash and Barua (2015) proposed a methodology base on the Fuzzy analytical hierarchy process and Fuzzy technique for order performance by similarity to ideal solution in order to identify and rank the solution of reverse logistics adoption to overcome its barriers.

3. Research method

The main objective of this research is surveying reverse logistics of HAMGAM KHODRO ASIA and then prioritizing implementation rate of critical success factors at this company. The procedure to prioritizing the critical success factors summarized into five steps.

Step 1. Identifying critical success factors of reverse logistics

In this step 25 critical success factors of reverse logistics was identified using literature of reverse logistics. CSFs of RL with references are expressed in table 1.

Table 1. Critical Success Factors of Reverse Logistics

	CSFs of RL	References
Cost	Reduction in the overall production cost	Donghng et al. (2008), Kissling et al. (2013)
	Use of existing personnel	Dowlatshahi (2005)
	Part standardization	Dowlatshahi (2005), Kissling et al. (2013), Fatimah et al. (2013)
	Transportation	Logzar et al. (2006), Dat et al. (2012), Giannetti et al. (2013), Mutha and Pokharel (2009)
	Research and development	Lou and yuan (2010), Logozar et al. (2006)
Management	Use of appropriate information system and technologies	Lee and Lee lam (2012), Sasikumar and Kannan(2008)
	Innovation	Donghong et al. (2008), Ravi et al. (2005), Autry (2005), Fatimah et al. (2013), Efendigil et al. (2008)
	Expert and trained personnel	Genchev (2009), Abdulrahman et al. (2014), Fatimah et al. (2013), Lee and Lee lam (2012)

Table 1. Critical Success Factors of Reverse Logistics

	CSFs of RL	References
	Construction technologies	Lu and Youn (2010), Power et al. (2001)
	Clear policy	Abdulrahman et al (2014), Bradly et al. (2008)
	Introduction of RL	Ravi and Shankar(2005)
Quality	Reliability tests	Dowlatshahi (2005), Kissling et al (2013), Power et al (2001), Ravi and Shankar(2005)
	Conformance to product design	Dowlatshahi (2005), Ravi and Shankar (2005)
	Features/ variety	Dowlatshahi (2005)
Customer	Location of customer service center	Wright et al. (2011), Chan et al. (2012)
	Meeting divers customer needs and relationship with customers	Dowlatshahi(2005), Genchev (2009), Garcia-Rodriguez et al (2013), Sirvastana (2008), Ravi et al. (2005)
Environmental concerns, political/ legal concerns	Regularity issues	Dowlatshahi (2005)
	Environmental issues	Dowlatshahi (2005), Akdogan and Coskun (2012), Ravi and Shankar (2005), Chiou et al (2012), Sasikumar and Kannan (2008)
	Social responsible business practice	Dowlatshahi (2005), Akdogan and Coskun (2012)
Flexibility	Flexibility of suppliers	Cheng and Lee (2010), Efendigil et al. (2008), Bai and Sarkis (2013)
	Flexibility of management	Donghong et al. (2008)
	Flexibility of system	Dowlatshahi (2005), Ramirez and Girdauskiene (2013), Logozar et al. (2006), Bai and Sarkis (2013)
Infrastructure	Environmental legislation	Dowlatshahi (2005), Abdulrahman et al. (2012), wright et al. (2011), Lu and Yuan (2010), Autry (2005), Kissling et al (2013), Fleischman et al (1997), Dat et al. (2012)
	Environmental awareness	Fleischman et al. (1997), Akdogan and Coskan (2012)
Financial	Financial advocate of managers	Ravi and Shankar (2005), Fatimah et al. (2013), Abdulrahman et al. (2012), Rogers and Lembek (2001)

Step 2. Determining weight of critical success factors

In this step value of any factors determined using ideas of experts. Base on the idea of experts mean of any CSFs in reverse logistics were calculated. Weight of critical success factors expressed in table 2.

Table 2. Weight of critical success factors

critical success factors of RL	Weight
Expert and trained personnel	0.0486
Customer satisfaction	0.0486
Flexibility of system	0.0424
Financial advocate of managers	0.0487
Flexibility of management	0.0404
Standardization	0.0465
Research and development	0.0544
Features/ variety	0.0392
Social responsible business practice	0.0495
Clear policy	0.0516
Conformance to product design	0.038
Flexibility of suppliers	0.0392
Construction technologies	0.0372
Research and development	0.0368
Introduction of RL	0.0434
Reliability tests	0.0297
Transportation	0.0333
Innovation	0.0355
Use of appropriate information system and technologies	0.03
Environmental legislation	0.0417
Use of existing personnel	0.0338
Regularity issues	0.0311
Reduction in the overall production cost	0.0341
Environmental issues	0.0317
Environmental awareness	0.0346

Step3. Designing a questionnaire to evaluation of critical success factors

In this step a questionnaire to evaluating CSFs of RL was designed. The questionnaire comprised two sections. The first section was design to present information about RL. The second section was designed to evaluate CSFs of RL in HAMGAM KHODRO ASIA. Then the level of implementation of critical success factors was asked on a 5-point likert scale, where 5 denoted very high, 4 high, 3 mean, 2 low, 1 very low. Validation of questionnaire was surveyed. The validation is done by comparing the model to what is accepted as the real system. At this step validation of questionnaire was verified by experts. These experts are consists of professors of university, managers and experts in industry.

Step 4. Idea of experts

A total of 10 questionnaires were distributed. By feeding the survey results into excel, the mean of each factor were calculated. Then mean of idea about implementation of critical

success factors are calculated by the result. Mean of idea about implementation of critical success factors are expressed in table 3.

Table 3. mean of idea

critical success factors	Mean of idea
Expert and trained personnel	3.963
Customer satisfaction	3.861
Flexibility of system	3.861
Financial advocate of managers	3.203
Flexibility of management	3.59
Standardization	2.901
Research and development	2.409
Features/ variety	3.394
Social responsible business practice	2.521
Clear policy	2.38
Conformance to product design	3.203
Flexibility of suppliers	3.074
Construction technologies	3.203
Research and development	3.173
Introduction of RL	2.38
Reliability tests	3.394
Transportation	3.022
Innovation	2.784
Use of appropriate information system and technologies	3.203
Environmental legislation	2.155
Use of existing personnel	2.627
Regularity issues	2.826
Reduction in the overall production cost	2.521
Environmental issues	2.627
Environmental awareness	1.952

Step 5. Prioritizing critical success factors of reverse logistics in HAMGAM KHODRO ASIA

In the final step, for each factor Weight*Mean of idea calculated. The CSFs ranked according to their values. Value of each critical success factors expressed in table 4.

Table 4. Prioritizing CSFs of RL in HAMGAM KHODRO

critical success factors of RL	Weight*Mean	Rank
Expert and trained personnel	0.193	1
Customer satisfaction	0.188	2
Flexibility of system	0.164	3

Table 4. Prioritizing CSFs of RL in HAMGAM KHODRO

critical success factors of RL	Weight*Mean	Rank
Financial advocate of managers	0.156	4
Flexibility of management	0.145	5
Standardization	0.135	6
Research and development	0.0135	7
Features/ variety	0.133	8
Social responsible business practice	0.125	9
Clear policy	0.123	10
Conformance to product design	0.122	11
Flexibility of suppliers	0.12	12
Construction technologies	0.119	13
Research and development	0.117	14
Introduction of RL	0.103	15
Reliability tests	0.101	16
Transportation	0.101	17
Innovation	0.099	18
Use of appropriate information system and technologies	0.096	19
Environmental legislation	0.090	20
Use of existing personnel	0.089	21
Regularity issues	0.088	22
Reduction in the overall production cost	0.086	23
Environmental issues	0.083	24
Environmental awareness	0.068	25

4. discussion and conclusion

In reverse logistics critical success factors is becoming very important as it could identify the cause of failure as well as improving the system of reverse logistics. The success of reverse logistics depends on many factors. We categorized critical success factors of reverse logistics into eight primary categories: cost, management, quality, customer, environmental concerns/policy/ legal concerns, flexibility, infrastructure and financial. These eight categories are based on the objective of reverse logistics. Knowing critical success factors in the operation of business can strengthen management strategy. Through a review of literature and expert consultation twenty five critical success factors identified.

Results from this study are expected to help management to achieve specific goal of organization. A total of twenty five critical success factors to implement of reverse logistics are identified using literature and experts opinion. Base on the weight of critical success factors, the most important factors of reverse logistics are research and development, clear policy, social responsible business practice, financial advocate of managers, expert and trained personnel, customer satisfaction, standardization and flexibility of system. The results of the prioritization of critical success factors in HAMGAM KHODRO ASIA show that the organization has sufficient attention to the most important success factors.

Results show that This organization has some weak points about critical success factors, research and development, clear policy, social responsible business practice are three main critical success factors of reverse logistics, this organization must attain these factors and strengthen these factors.
In order to strength the factor of Clear policy, this organization must have distinct organization method and use of upgrade technologies and creation of assurance in customers. In order to strength factor of Research and development, this organization must have continues surveillance in order to identifying opportunities and threats. In order to strength the factor of Social responsible business practice, organization must have technique that refers to any jurisdiction that makes it mandatory for the companies to recover its products. So this company must strength these activities to improve their performance and then has success reverse logistics.
For future research, factor analysis method could be used to investigate the underlying relationship among the identified CSFs to find out the clusters that can better represent all the CSFs.

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