Investigating the effect of reverse logistics on the economy of industrial companies (Case study: Iran Khodro Company)

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Abstract

Nowadays, the rise of global supply companies and the globalization of production with the help of supply companies further underscore the need to pay attention to supply chain management, as companies' competitive advantages depend on the ability of their supply companies. . What exists in the traditional channel flow, and industry managers emphasize on controlling and managing it, is the direct or forward flow of materials and products that flows mainly from suppliers to manufacturers, distributors, retailers, and ultimately customers. But in many industries, there is another important trend called reverse logistics in supply chains, in which products are returned from higher levels of supply chain to higher levels. In this paper, the effect of reverse logistics on the economy of industrial companies (Case study: Iran-Khodro) is examined. All private and public industrial companies in the country are among the beneficiaries of this research. The method of data collection in this research is the use of questionnaires as well as the use of library information and referring to the documents available in scientific and authoritative articles and understanding and inferring from this information. The validity of the questionnaire was obtained by formulating the questions based on the theoretical basis of the research and with the comments and approval of the professors. In order to confirm the reliability of the questionnaire, Cronbach's alpha coefficient was used. The values above 0.7 are acceptable. The mean test was calculated based on the main and specific hypotheses in the SPSS22 software and at a confidence level of 0.95, and the results of this article show that the lack of development and use of new logistics methods causes the products with the desired quality and at the desired time of the customer not to be produced and after production to reach consumers with many problems.

Keywords: Logistics, Reverse Logistics, Industrial Companies, Economy.

1. Introduction

Although the importance of reverse logistics and the reuse of urban and industrial waste in production processes is clear to everyone today, as far back as the 1980s, just 40 years ago, large industrial companies that produce a lot of waste are doing so economically [1,2]. They did not pay attention and were forced to recycle and recycle their waste only due to the pressure of the public institutions that support the environment [3]. But today, due to the increasing population of the world and the lack of renewable natural resources to meet this need, as well as the cost of recycling compared to the extraction of metal raw materials from mines and the extraction of plastic raw materials from oil, many large companies They have resorted to supplying their raw materials through reverse logistics [4].

Logistics, as a supporter of commercial-productive activities, plays a vital role in achieving the economic growth of any country, and the importance of efficient logistics in economic growth and trade is undeniable [5,6]. In the world, the best type of supply chain in terms of cost is the concentration of activities related to aggregation and distribution in one place, which reduces the costs of transportation, storage and control and movement of inventory [7]. Therefore, the existence of centers that provide such services, provided that they create focus, economies of scale and provide specialized services with high quality, can reduce the concern of reducing the cost of the owners of the goods [8,9]. Today, the reverse logistics development strategy is accepted in developed and emerging industries as a vital requirement. In today's age where product life cycles are getting shorter every day, managers at high levels of logistics and supply chain processes need to pay more attention to the supply chain management process [10].

In reverse logistics, the most important principle is that many materials, which are so-called unusable or unusable for the consumer, are valuable and can be re-introduced into the supply chain with a little modification [11]. Many companies and institutions in Europe have found that using a reprocessing strategy and repackaging reversible goods can greatly help improve profitability and reduce environmental pressures [12,13]. In recent years, the managers of industrial companies for some reason want to study and study logistics-reverse using the methodology of management process, and the industrial sector has paid a lot of attention to logistics-reverse [14]. So many companies and institutions in Europe have found that using a reusable strategy and re-closing reversible goods (logistics and reversals) can greatly help improve profitability and reduce environmental stress [15]. In the last ten years, the

information resources and books needed in the field of reverse logistics, which was a new topic, have been very rare. But today, many pamphlets and books have been written on this subject. Undoubtedly, today, with the introduction of new customer satisfaction theories, production based on customer requests and needs and competitive issues in the market on the one hand and profitability for major manufacturers on the other hand, such as large automotive companies and large physical companies [16,17]. And they are geographically complex, and the impact and expansion of the influence of information and communication technologies and the kind of correlations that exist between suppliers and large producers has made this an important and significant discussion [18].

2. Necessity of research

Logistics, as a supporter of commercial-productive activities, plays a vital role in achieving the economic growth of any country, and the importance of efficient logistics in economic growth and trade is undeniable [19]. In the world, the best type of supply chain in terms of cost is the concentration of activities related to aggregation and distribution in one place, which reduces the costs of transportation, storage and control and movement of inventory [20]. Therefore, the existence of centers that provide such services, provided that they create focus, economies of scale and provide specialized services with high quality, can reduce the concern of reducing the cost of the owners of the goods [21,22]. As mentioned, these centers are called logistics centers. That is, the logistics center is a place where all activities related to transportation, warehousing, distribution and other logistics services of goods at the international and national levels are performed by several operators [23]. Today, the reverse logistics development strategy is accepted in developed and emerging industries as a vital requirement [24]. In today's age where product life cycles are getting shorter every day, managers at high levels of logistics and supply chain processes need to pay more attention to the supply chain management process. Reverse logistics is one of the most important issues in the supply chain, which is considered as a strategic activity in various organizations today in terms of creating superior value [25,26].

Proper implementation of reverse logistics in organizations increases revenue reduces operating costs and reduces the cost of defective and expired parts [11,15]. Therefore, along with the increase in economic pressures on the country and the keyword of the resistance economy to deal with these pressures, the need for effective implementation of reverse

logistics and guidance and waste management is increasing day by day [17]. Reverse logistics connect business and environmental factors and influence consumer decision-making [26]. Reverse logistics support activities such as recycling, regeneration and reconstruction that can be used at different levels to complete the industrial environmental cycle [27]. In fact, one of the factors in the success of foreign trade in any country is the existence of efficient chains of business operations. Efficient chains are components that, in coordination with each other, allow the flow of goods from the point of origin to the destination [6]. One of these chains is the existence of logistics and transportation infrastructure from origin to destination [28]. These transport and logistics infrastructures include road, rail, air and sea networks and their connecting terminals. On the other hand, in addition to the above, there should be places for receiving, storing, merging and sending goods and providing all kinds of advanced logistics services in order to achieve this, in addition to the above [21]. Therefore, in order to create the effective chains mentioned above, it is necessary that all its components be developed in a coordinated manner and the obstacles in them be removed [29]. With this introduction, the question arises as to how much the reverse logistics affects the economy of industrial companies. This study examines the role of logistics reverse on the economy of industrial companies.

3. Background Research

In an article, Morgan et al (2018) examines the resource commitment and sustainability: a reverse logistics performance process model. The purpose of this paper is to extend existing and motivate future sustainable supply chain management (SCM) and logistics research by examining a structure-conduct-performance framework linking resource commitment to sustainable SCM, reverse logistics, and operational performance. A sustainable reverse logistics capability is investigated as mediating the performance benefits associated with resource commitments to sustainable SCM. The results of a mediated model suggest that resource commitments may be used to develop a sustainable reverse logistics capability, reducing the environmental impact of reverse logistics activities. Paula et al. (2019) reviewed collaboration and trust sources for innovation in the reverse logistics. The purpose in this paper is to develop a systematic literature review aiming to reveal innovation opportunities associated with the thematic collaboration and trust in the reverse logistics field. Reverse logistics is hardly dissociated from broader sustainable supply chain management approaches,

which make all considerations on collaboration and trust designed for such approaches valuable and valid for reverse logistics. Collaboration and trust concepts in supply chain and in reverse logistics contexts are quite similar, while collaboration/trust is mandatory for managing networks in sustainable approaches and in reverse logistics, as well. Downstream and upstream, the chain disruptive innovation business models may be developed between focal companies and returns system third-party logistics providers, fourth-party logistics providers or end-customers, in a business-to-customer collaboration approach. In their study, Ripanti et al. (2019) examined unveiling the potentials of circular economy values in logistics and supply chain management. The purpose of this paper is to unveil the circular economy (CE) values with an ultimate goal to provide tenets in a format or structure that can potentially be used for designing a circular, closed-loop supply chain and reverse logistics. The values are grouped into principles, intrinsic attributes and enablers. These values can be embedded into the design process of product recovery management, reverse logistics and closed-loop supply chain. Also Mahadevan (2019) in a paper present the research carried out on the development of a conceptual framework termed as the reverse collaboration framework (RCF) to provide supply chain (SC) visibility and information sharing to practitioners in a reverse logistics (RL) operations. This research shows that by integrating tools, systems, tools and techniques with RL processes by means of the RCF will increase performance and productivity of a RL operations. This is demonstrated by applying the RCF to a consumer electronics business that proves that the time taken for the end to end RL operations is reduced by 20%.

4. Research Goals

One of the factors in the success of foreign trade in any country is the existence of efficient chains of business operations. One of these chains is the existence of logistics and transportation infrastructure from origin to destination. These transport and logistics infrastructures include road, rail, air and sea networks and their connecting terminals. On the other hand, in addition to the above, there should be places for receiving, storing, merging and sending goods and providing all kinds of advanced logistics services in order to achieve this, in addition to the above. Therefore, in order to create the effective chains mentioned above, it is necessary that all its components be developed in a coordinated manner and the obstacles in them be removed. The aim of this study is to investigate the role of logistics and reversal on the economy of industrial companies. The role of reverse logistics on productivity,

profitability, sales, liquidity, and value added, and asset turnover in Iran Khodro Company is also examined. All private and public industrial companies in the country are among the beneficiaries of this research. Also, the scientific and research community of the country, such as the executive organs and higher and research institutes of the country, scientific and industrial associations, and all those who are in contact with the customer and the client benefit from the benefits of this research.

5. Research hypotheses

1. Hypothesis 1: Reverse logistics affects the efficiency of Iran-Khodro.

2. Hypothesis 2: Reverse logistics affects the profitability of Iran-Khodro.

3. Hypothesis 3: Reverse logistics affects the sales of Iran-Khodro.

4. Hypothesis 4: Reverse logistics affects the amount of liquidity of Iran-Khodro.

5. Hypothesis 5: Reverse logistics affects the value added of Iran-Khodro.

6. Hypothesis 6: Reverse logistics affects the turnover of Iran-Khodro assets.

6. The method, target population and sample

The statistical population of the study includes all Iran Khodro Company employees. The sample size formulas and procedures used for categorical data are very similar, but some variations do exist. Since the data are qualitatively and the number of statistical community is unlimited, so the sample size calculation formula is as follows:

$$n = \frac{Z\alpha_{/2}^{2} p_0 (1 - p_0)}{\varepsilon^2} \qquad (1)$$

In this study, researcher has set the alpha level a priori at .05, plans to use a proportional variable, has set the level of acceptable error at 5%, and has estimated the standard deviation of the scale as .5. Cochran's sample size formula for categorical data and an example of its use is presented here along with explanations as to how these decisions were made.

$$n = \frac{(1.96)^2 \times 0.5 \times 0.5}{(0.05)^2} = 384.16 \qquad (2)$$

Where $Z\alpha_{/2}$ = value for selected alpha level of .025 in each tail = 1.96.

(The alpha level of .05 indicates the level of risk the researcher is willing to take that true margin of error may exceed the acceptable margin of error).

Where (p)(q) = estimate of variance = .25.

(Maximum possible proportion (.5) *1-Maximum possible proportion (.5) produces maximum possible sample size).

Where ε = acceptable margin of error for proportion being estimated = .1

(Error researcher is willing to except).

According to the formula at least 97 samples are needed. Therefore, 100 questionnaires were sent between experts and were collected.

7. Analysis of information

The statistical sample in this research includes 385 experts based on questionnaires with complete and usable answers. 25% of these experts have a master's degree, 16% have Ph.D. degrees and 59% have a bachelor's degree and less. 43% of these experts are male and 57% are female.

In this research, according to the conceptual model of research, there are 4 hypotheses that a researcher-made questionnaire consisted of 46 questions. There are 8 questions related to the first hypothesis, 7 questions to the second hypothesis, 7 questions to the third hypothesis, 8 to the fourth hypothesis, 8 to the fifth hypothesis and 8 to the sixth hypothesis. SPSS software and LISREL were used for statistical analysis and one-sample t-test was used to analyze the statistical hypotheses. We used SPSS 22 to analyze the data. In following the results of test hypotheses are offered:

7.1. Testing Hypothesis H1. Reverse logistics affects the efficiency of Iran-Khodro.

The results of SPSS are shown below:

Table. 1. One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
H1	360	6.7483	1.9873	.21974

Table. 2. One-Sample Test

	Test Value = 5					
					95% Confidence Interval of the Difference	
	T	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
H1	16.944	359	.000	1.7431	1.04722	1.7885

7.2. Testing Hypothesis H2. Reverse logistics affects the profitability of Iran-Khodro.

The results of SPSS are shown below:

Table. 3. One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
H2	360	6.6438	1.0693	.19893

Table. 4. One-Sample Test

	Test Value = 5					
					95% Confidence Interval of the Difference	
	T	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
H2	16.7832	359	.000	1.75604	1.8732	2.0921

7.3. Testing Hypothesis H3. Reverse logistics affects the sales of Iran-Khodro.

The results of SPSS are shown below:

Table. 5. One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
H3	360	6.8626	1.0869	.26381

Table. 6. One-Sample Test

	Test Value = 5					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
H3	16.0807	359	.000	1.8035	1.0709	1.8492

7.4. Testing Hypothesis H4. Reverse logistics affects the amount of liquidity of Iran-Khodro.

The results of SPSS are shown below:

Table. 7. One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
H4	360	6.8471	1.0697	.23942

Table. 8. One-Sample Test

	Test Value = 5					
					95% Confidence Interval of the Difference	
	T	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
H4	17.7862	359	.000	1.6492	1.6382	2.0987

7.5. Testing Hypothesis H5. Reverse logistics affects the value added of Iran-Khodro.

The results of SPSS are shown below:

Table. 9. One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
H5	360	6.7483	1.9873	.21974

Table. 10. One-Sample Test

| | Test Value = 5 | | | | | |
| | | | | | 95% Confidence Interval of the Difference | |
	T	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
H5	16.8703	359	.000	1.6583	1.1274	1.8738

7.6. Testing Hypothesis H6. Reverse logistics affects the turnover of Iran-Khodro assets.

The results of SPSS are shown below:

Table. 11. One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
H6	360	6.7632	1.0809	.19932

Table. 12. One-Sample Test

| | Test Value = 5 | | | | | |
| | | | | | 95% Confidence Interval of the Difference | |
	T	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
H6	16.8743	359	.000	1.8703	1.7793	2.0887

Logistics management is part of supply chain management, whose main task is to plan, implement and control the direct and reverse flow of materials, channels and related information and store them efficiently and effectively between the point of origin and the point of consumption in order to meet customer requirements. is. Logistics management activities typically include inbound and outbound transportation management, fleet management, warehousing, material handling and order execution channels, logistics network design, supply and demand planning inventory management, and third party management providing logistics services. Logistics performance includes preparation and purchase, production planning and scheduling, assembly and packaging, and customer service. Logistics is active at all levels of planning and implementation: strategic, operational, and tactical. Logistics management is an integration operation that coordinates and optimizes all logistics activities. Obviously, under this management, logistics activities must achieve coordination

and integration with other activities, including marketing, sales, manufacturing, finance and information technology. Logistics activities directly and indirectly affect all areas of human life; From personal and daily affairs to family life, as well as the life cycle of organizations, etc., all and sundry are comprehensively affected by logistical issues and concepts, and since the logistical goal is to minimize the organization's costs by creating time and space for The channel uses methods such as pure logistics, outsourcing, virtual logistics, reverse logistics, integrated logistics and supply chain management and other logistics theories and methods to create a competitive advantage for the organization and increase productivity and reduce logistics costs to Titles are an important part of production costs, so that the effective development and application of logistics science and the use of scientific concepts in the management of channel supply chain in recent years in some countries has reduced their GDP by 5%.

8. Conclusions

Logistics involves a significant portion of the added value of a good or service. As a result, in order to create a better competitive advantage in the field of free economy today, one of the factors that can reduce costs and increase profits is logistics and supply chain. Due to this point, many companies have recently attracted the attention of this need and many scientific and experimental studies have been started at the level of universities and industrial and research centers. The establishment of automotive parts companies and their empowerment at the global production level with the help of supply companies is such that the role of these companies has shifted from the last category to the last category and thus the competitive advantages of their manufacturing companies depend on the ability of companies. Is. Reverse logistics is the process by which manufacturers receive their previously shipped products from end consumers or recipients for redirection to another customer, recycling, remodeling, repair or annihilation. Reverse logistics principles will increase customer service and loyalty, restore asset value faster, improve customers' brand image, better communicate with shareholders, increase personal motivation, and ultimately achieve the organization's sustainable vision and goals.

In the field of supply chain and logistics, it should be noted that product quality, competitive prices, time cycle tailored to orders, timely deliveries, low damage and such issues have always been important and will continue to be so in the future. Today, there are acceptable

prices in the field of global competition, and all competing companies in terms of basic customer needs, important logistical properties, etc. have reached a series of common and specific standards. Organizations that do not meet these standard requirements often cannot even imagine being able to purchase goods or services or make decisions about outsourcing. When a company achieves acceptable standards in terms of such logistics properties, it differs in its decision-making from others. That is, it can change the customer's purchasing decision. One of the most important factors in such a situation is the science of reverse logistics, which many companies today offer.

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