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Optimization of Process and Flow Of Goods In Logistics Supply Chain Management

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Abstract- Logistics management is the part of supply chain that arranges, actualizes, and controls the proficient, powerful forward, and turns around stream and capacity of merchandise, administrations, and related data between the purpose of inception and the purpose of utilization with a specific end goal to meet client's requirements. The main goal of the study is to investigate the implementation of bearing material supply system in local industry with simultaneous pick-up and delivery within time limitation and examine its effects on overall performance and total cost. Our aim is that the conduction of the research provides optimization of the supply chain network for the development of bearing logistics in industry as an alternative system.

Keywords: Logistics management, bearing material, supply system, local industry, pick-up, bearing logistics.

I. INTRODUCTION

Supply Chain Management can be defined as the management of the flow of products and services, which begins from the origin of products and ends at the product's consumption. It also comprises movement and storage of raw materials that are involved in work in progress, inventory and fully furnished goods.Image result for Supply Chain Management The main objective of supply chain management is to monitor and relate production, distribution, and shipment of products and services. This can be done by companies with a very good and tight hold over internal inventories, production, distribution, internal productions and sales.

Logistics management is the part of supply chain that arranges, actualizes, and controls the proficient, powerful forward, and turns around stream and capacity of merchandise, administrations, and related data between the purpose of inception and the purpose of utilization with a specific end goal to meet client's requirements (Waters, 2009). An expert working in the field of logistics administration is known as a conceivable expense. Creating logistics value is costly. Logistics represent one of the highest costs of doing business. The expenditure normally goes from 5% to 35% of sales depending on the type of business. In this manner thus logistics even though very important part for any business success remains one of the most expensive part (may 2016). Logistics is the science of management, engineering and activities concerned with maintaining the resources which helps to improve the plans and operation taking place in any Kamlesh Thakre. International Journal of Science, Engineering and Technology, 2020, 8:6 International Journal of Science, Engineering and Technology Page 2 of 8 business. The role of the logistics is to maintain the balance between supply and demand. 2.

LITERATURE REVIEW

Maina et al. (2020) presented the literature and identified Supply Chains adopting simulation to aid in the decision making process thereby improving Supply Chain Performance. A critical analysis of the case studies was conducted and the results reveal

that simulation is a powerful tool that can be used in modeling complex supply chain activities. Simulation models however fail to provide optimum solutions for decision variables inherent in predefined objectives. Therefore, integrating optimisation models would offer best likely alternatives for decision makers. Managers should therefore select the most suitable model that best symbolizes the system under study.

Dudziak, Sylwia et al. (2020) presented to support works performed through the entire supply chain. Which is aimed at reducing the time needed from the moment of receipt of the goods to its release. Increasing the efficiency of warehouse operations and reducing the cost of maintaining and operating the facility. The article also introduces the concept of intralogistics as applied to internal systems. Evtodieva et al. (2020) presented importance of the informational technologies in the sphere of logistics. That was noticed in the 1970's while an information and data rate become a competitive advantage. Since that time technology's progressed deeply and nowadays Intelligent systems transform a paradigm of business and Supply Chain. The leading approach to the study of this problem is synthesis of the different researches views and practice analysis allowing a comprehensive review of the actual informational technologies in SCM.

The article presents challenges facing the SCM Industry, disclosed the Internet of Things in SCM definition, discovered that IoT-based SCM take a middle part between customer IoT and Industrial IoT. The materials of the article are of practical value for the Internet of Things applications in SCM. Fan, Ming et al. (2020) presented With the rapid development of the mobile Internet, the degree of the logistics industry is deepening, the logistics operation process has produced a large number of data, how to use the computer for visual logistics operation management, is the entire logistics industry is facing the opportunity and problem. The application of computer technology can help logistics enterprises improve their management level; realize the purpose of intelligent decision-making and accurate prediction. Furthermore, it can also predict the future demand of commodities, open up new markets, expand the business scope, and realize refined and visual control of the commodity circulation process. Garai, Arindam et al. (2020) presented one reallife-based cost-effective and customer-centric closed-loop supply chain management model. The review of the existing literature identifies the classical performance indicators to any supply chain management model as the aggregate revenue, the customer satisfaction and the environmental concern. However, this review fails to find a single optimization-based supply chain management model that considers these three indicators, simultaneously. In this article, the proposed model maximizes the customer satisfaction index and the aggregate revenue both under the environmental considerations via the reverse chain, whereas many existing studies took the reverse chain and the associated subsidies into account; this is the first mathematical model that optimizes the customer-satisfaction index, at the same time. This article employs the T-set that represents the inherent impreciseness to objective. functions to the proposed model.

The corresponding optimal values are superior than stipulated goals to both the objective functions in Tenvironment. The managerial insights extracted from sensitivity analysis of parameters suggest the managers to stabilize the environmental concern and the customer satisfaction, while ensuring the cost-effectiveness in real-life-based T-environment. Also, this analysis finds that the subsidy assists any supply chain to sustain, only if it is offered without any break and within the optimally determined bounds.

Santander et al. (2019) presented the economic and environmental feasibility of this distributed plastic recycling approach from a logistics perspective, as a step towards its validation. To achieve this, an optimization mixed integer linear programming (MILP) model was used as an evaluation tool, representing a local closed loop supply chain (CLSC) network. The proposed model is illustrated using a case study of a university seeking to implement a distributed recycling demonstrator in order to recover 3D printing wastes from secondary schools in the northeast of France. Following this step, a sensitivity analysis was carried out considering the market variations (price of virgin plastic filament) and the amount of available plastic waste derived from the schools. The results obtained show positive economic and environmental benefits of

carrying out this new method of plastic recycling. This work serves as a basis for continuing to explore the feasibility and replication of the distributed plastic recycling network in other contexts. Chakir, Imane et al. (2019) presented optimize the exchanges, or flows, that the company maintains with its suppliers and its customers. These flows can be of various natures. It can be information flows relating to supplies or product design, financial flows linked to purchases, or even flows of goods. The crisis management logistics is getting more and more attention, especially in the current context of the COVID-19 pandemic. For these systems, where it is never very easy to anticipate the evolution of the environment, the forms of changes undergone are varied and rapid.

We aim to provide an answer to these challenges, in an approach that links optimization methods to the paradigm of artificial intelligence. We therefore propose to find mathematical models, and interagent cooperation protocols, to minimize the risk of stock shortage in any area of the supply chain. Gerini et al. (2019) presented general and special scientific methods of cognition, explores the advantages and shortcomings of the short and reversible supply chain, derived from the traditional and modern supply chain model. All in order to increase the quality of their own products and increase the competitiveness by eliminating the costs of intermediaries in transport and distribution. This is achieved by merging and shortening the supply chain.

The EU has established an institutional framework regulating the operations of producers through a short supply chain. The market situation requires further optimization by producers due to lack of labour and the need to increase competitiveness and leads to the emergence of a reversible supply chain phenomenon. Pavlov et al. (2019) presented novel methodological approach to modelling network redundancy optimization. This allows for simultaneous computation of both optimal network redundancy and proactive contingency plans, considering both supply dynamics and structural disruption risks. The novelties of this study are the integration of sustainable resource utilization and SC resilience based on coordination of structureand flow-oriented optimization. Kamlesh Thakre. International Journal of Science, Engineering and Technology, 2020, 8:6 International Journal of Science, Engineering and Technology Page 4 of 8 Moons, Karen et al. (2019) presented research on performance measurement at the internal hospital supply chain (e.g. inventory management, distribution activities), and more specifically in the operating theatre since it is among the most critical resources for a hospital. At the operating theatre, the requested items should be available at the right time at the right place, in the right condition, at the lowest cost possible. Furthermore, we will also discuss literature on multi-criteria decision-making techniques. 3. RESEARCH METHODOLOGY The basic principle of supply chain as part of logistics management is the orientation on processes, where logistics chain "indicates the sum of all business activities involved in moving a product or service from supplier to customer" (logistics chain, www.timocom.sk).The basic idea for the creation of synergy effects in logistics is suitable allocation of activities and resources as well as their use for the benefit of the overall functioning of the logistics chain. Production System.

Table 3. 1 Classification of Logistics Costs.

Activity	The share of total costs [%]
Transportation	29
Administration	11
Undertake and sending	8
Order processing	6
Storage, manipulation, management, maintenance	34

The Analytical Part The object of the examination was businesses bearings industry located in Bhopal, MP producing and supplying bearings. Business activity of the company can be characterized in three basic areas.

The first area consists of goods (Two rings, inner• and outer, with raceways). The second area consists of Rolling elements - rollers or balls, and third area for A cage which keeps the rolling elements spearted and helps guide motion.. SWOT analysis indicated that the main strengths of the company include: flexible reaction to the customers' demands, quality of production, the price of products, staff qualification, logistics, stable customers, good working environment and service,

creating a good image of the company. Logistics of the company is considered one of the biggest advantages. The notable threats include obsolete machinery, insufficient use of vehicles, strong competition, low motivation and poor working environment and insufficient air conditioning (noise, unpleasant odour). Currently, within the logistics enterprise uses external carriers, despite the fact that company owns 30 vehicles, most of which does not comply due to inability to meet hygienic requirements. The logistics of bearings is shown in Figure 1.

1. Import of material (stainless steel).
2. Import of secondary raw materials (external suppliers).
3. Imports of packaging materials (external suppliers).
4. Raw materials entry to the manufacturing plant. Kamlesh Thakre. International Journal of Science, Engineering and Technology, 2020, 8:6 International Journal of Science, Engineering and Technology Page 5 of 8
5. The processing of packaging (lubricating, greecing, plastic-faced brown paper rolls.).
6. Storage of secondary raw materials (pasteurization, homogenization, centrifugal separation, control).
7. The production process (, packaging, control).
8. Transport of final products to the operational warehouses.
9. Transport of final products to the distribution warehouse.
10. Transport of final products by an external company.

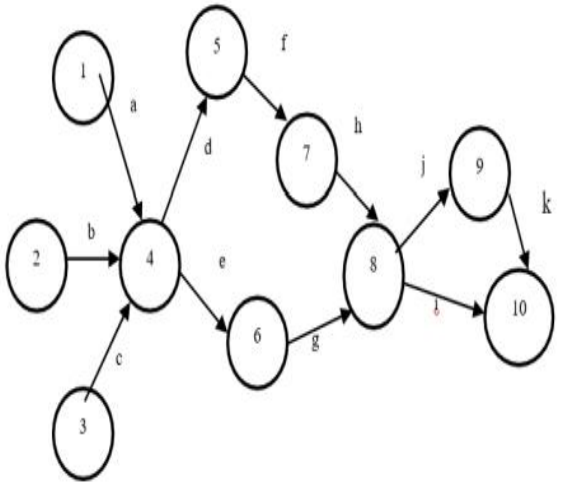

Figure 1. The logistics of bearings

As manufactured, bearings are supplied as precision machine components and should be respected as such during transport, intermediate handling, storage and installation until the associated machinery is brought into active service. Damage may occur at any point which could reduce the ultimate service of the bearing. Route M1 Material flow is performed in the following order: ↓ Freight elevator, ↓ Storage of packaging materials, ↓ railway spurs and/or truck

Table 2. Route M1

Room ↓	Transport [minutes]	Handling during unloading [minutes]
Freight elevator	2	——
Storage of packaging materials	2	9
railway spurs and/or truck	2	15
Transport time - total		6 min
Delay - down time in the room during unloading		24 min
The total average duration of the route		30 min

Material flow is performed in the following order: ↓ Storage of packaging materials ↓ Production of cage, ↓ assembling all parts

Table 3. Route M2.

Room ↓	Transport [minutes]	Handling during unloading [minutes]
Storage of packaging materials	2	3
Production of cage	2	10
assembling all parts	2	15
Transport time - total		6 min
Delay - down time in the room during unloading		28 min
The total average duration of the route		34 min

IV. RESULTS AND DISCUSSION

Routes M1 – M2 The Transport, Manipulation, Repetitiveness per shift are tabulated in the below table for the routes M1 – M2.

Table 4. Routes M1 - M4.

Rout	Transport	Manipulation	Repetitivenes s per shift	Total
M1	6 minutes	24 minutes	2	60 minutes
M2	6 minutes	28 minutes	2	68 minutes
Total duration			330 minutes	

Table 5. Comparison of the duration of the particular stages of production process.

Current state		State after increased production by 30%	State after applying optimization measures
a.	6 hours (360 minutes)	6 hours (360 minutes)	6 hours (360 minutes)
b.	3 hours (180 minutes)	3 hours (180 minutes)	3 hours (180 minutes)
c.	5,5 hours (330 minutes)	7 hours (560 minutes)	6 hours (360 minutes)
d.	2 hours (120 minutes)	3 hours (180 minutes)	3 hours (180 minutes)
e	7 hours (560 minutes)	7 hours (560 minutes)	7 hours (560 minutes)
f.	4 hours (240 minutes)	5 hours (300 minutes)	4 hours (240 minutes)
g.	7 hours (420 minutes)	7 hours (420 minutes)	7 hours (420 minutes)
h.	1 hour (60minutes)	2 hours (120minutes)	1 hour (60 minutes)
i.	1 hour (60 minutes)	1,5 hours (90 minutes)	1,5 hours (90 minutes)
j.	40 minutes	1 hour (60 minutes)	40 minutes
k.	1 hour (60 minutes)	1,5 hours (90 minutes)	1,5 hours (90 minutes)

To shorten the logistic routes in the company is the storage facility located on the ground floor, near the production link. The Comparison of the duration of the particular stages of production process shows that the production is increased by 30 percent and the time for each process is also optimised. 3. CONCLUSION Production companies are now trying to fully utilize the logistics system tailored to specific needs of the company. They are aware that an appropriate use of logistic principles to arrange transport and handling across the enterprise can become evident at least in two areas. The first is inside the company, and that can be achieved by reducing their own cost of production, which also includes logistics costs, which means that while maintaining market prices, the company achieve higher profits. On the other hand, properly selected logistics chain improves business flexibility to market demands enabling better provision of services to customers.

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