

Reverse BISMAS

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Submission date: 07-Feb-2021 11:43AM (UTC+0300)

Submission ID: 1485627658

File name: review_file_fp-411_8372782083.edited.doc (283.5K)

Word count: 2662

Character count: 14352

1 **Proposed Reversed Supply Chain as Problem Solver for Case of**
2 **Returned Beef Products during the Covid-19 Pandemic**

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10 **Abstract**

11 Beef is an agro-industrial product that is perishable has a high risk in the pandemic era.
12 The Covid-19 pandemic impacts decreasing consumption of products in various sectors,
13 including beef, with the closure of restaurants and cafes, will affect the accumulation of beef
14 supplies so that the quality decreases and causes multiple problems. This study aims to
15 provide solutions for beef products returned from customers not to become waste and have a
16 detrimental impact on the company. To design a reverse supply chain model research,
17 begins with field observations, designing a reverse supply chain network strategy, and
18 creating a reverse supply chain flow process. Optimizing beef's economic value returned
19 from customers by selling it to customers who use beef quickly and meat-based industries.
20 Products that humans cannot eat can be used as animal or livestock feed. The research found
21 that the reverse supply chain can positively impact company cash flow and indirectly reduce
22 losses due to products being the waste.

23 **Keywords:** Reverse Supply Chain; Beef; Returned product; Covid-19.

24

25 **1. Introduction**

26 The Covid-19 Pandemic era affected the economy a lot, where starting in March 2020,
27 the economic activity stopped to reduce the spread of COVID-19. Until now, the economy
28 has not fully recovered. Because in terms of entertainment venues, there are still many that
29 are not open normally, and restaurants and cafes. Based on the coronavirus pandemic, per
30 capita, meat consumption has fallen to the lowest level in the last nine years. Moreover,
31 according to data from the World Food Organization (FAO), meat consumption in 2020 is
32 estimated to fall by 2.8 percent to 42.4 kg per year per capita compared to last year's 43.6 kg
33 per year per capita [1]. This condition also has an impact on the accumulation of product
34 stock at retailers and company-owned warehouses. This condition will affect quality
35 degradation because beef's shelf life has an expiration limit of 3 months to 18 months,
36 depending on the type of meat and storage temperature. This condition requires a solution
37 on how to handle products returned from customers not to hurt the company.

38 The reverse supply chain is an activity to provide value-added to products returned for
39 various reasons [2]. The reverse supply chain is widely discussed and developed with
40 economic motives or environmental sustainability [3]. The stage in Reverse Supply Chain
41 (RSC) is determined by the type of product returns, such as returns from customers, returns
42 of unsold products, returns for repairs, returns to packaging for reuse, expired products, or
43 products that are no longer available. [4]. Retrieval and collection, separation, and inspection
44 of the returned product condition; if the product returned is in terrible condition, it cannot be
45 repaired and cannot be used again at the final inspection stage. Then, the product can be

1 destroyed. If the product is found to be in good condition and still can be reused, the
2 provision of added value or the re-production process can be carried out for the returned
3 product [5].

4 Previous research about the reverse supply chain has been done [6] discussed the
5 remanufacturing network facility with lagrangian heuristics. [7] discussed a dynamic model
6 to represent reverse logistics to recover product in the end-of-life (EoL) stage, model the
7 dynamics of cost, revenue, and strategic and regulatory decisions. This study to make a
8 strategy for the recovery of electric vehicle batteries. [8] Study the reverse supply chain (RSC)
9 network and design a robust optimization model to cope with the ripple effect's
10 uncertainties, a case study from an enterprise disassembling the household appliance in
11 condition. [9] research about the reverse supply chain for a perishable product with four
12 objective functions was considered to maximize profitability and the level of satisfaction
13 with the use of technology, minimize costs and measure environmental impacts. Results
14 show that objective functions are sensitive to demand. [10] Integrated creation and
15 distribution planning in the reverse supply chain using multi-objective mathematical
16 modeling with research on major technology industry problems. The research objective was
17 to minimize total costs, listing costs for creation, maintenance, inventory, and human energy
18 sources. Optimizing customer and supplier satisfaction and maximizing product quality. In
19 this research, the supply chain consists of several suppliers, manufacturers, customers, a
20 revision center for revision of customer items, and a revision center and maintenance for
21 revisions or disposal of products that have passed the warranty period. The results to obtain
22 the maximum value comes from the purpose. In this research, it was discussed about the
23 beef reverse supply chain, which had not been discussed earlier. Like an expensive product,
24 widely consumed but perishable, the reverse supply chain theme for beef is imperative for
25 helping actors in this industry.

26 Reverse supply chain applications have become a necessity for many industries, with
27 economic reasons to minimize the costs of conducting reverse supply chain activities or
28 transportation costs. Environmental reasons also have a powerful idea, where the pressure to
29 implement green production and green supply chains continues to be voiced to reduce the
30 amount of waste produced. Beef is an agro-industrial product that is easily damaged, so the
31 handlers need special treatment so that the product's shelf life becomes long. It will
32 economically continue to provide benefits and reach a full market. Beef quality is regulated
33 in the Republic of Indonesia laws and has standards based on Indonesian national standards
34 [11] and international standards [12].

35 The state of this research's art is the reverse supply chain model for beef; this research
36 produces a reverse supply chain model that can be a reference for continuous improvement
37 and the flow of decision-making on returned products based on the quality of the products
38 returned.

41 2. Method

42 This research begins with conducting literature studies and field studies to obtain facts
43 about the problems that exist in the field. Based on these conditions, a strategy is made to
44 apply a reverse supply chain. The reverse supply chain design strategy is made in four
45 stages until we get an outcome from the product's reverse supply chain activity. After that,
46 the reverse supply chain process flow is created as an analysis and decision-making tool
47 based on the product's condition being returned from the customer.

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3. Result and Discussion

To prevent the product from being returned from becoming more damaged, a back supply chain network is created, and a reverse supply chain flow process is created.

3.1. Design Network of Reverse Supply Chain

Regarding the number of products returned from customers due to reduced consumption during the Covid-19 pandemic, the first thing that must be done is to prepare a strategy to deal with these returned products—starting from the location, equipment, and market needs. The technique developed in the reverse supply chain is to maximize the economic value and reduce environmental impacts. Another goal is that the product can be absorbed by the market and has not impacted the environment. Beef products are perishable and can be consumed according to standards so as not to affect health. So in the reverse supply chain, the target that must be set is to provide added value to the product while still paying attention to product quality, product prices, and environmental sustainability. To design a network of beef reverse supply chains, the strategy is made as in Figure 1 below.

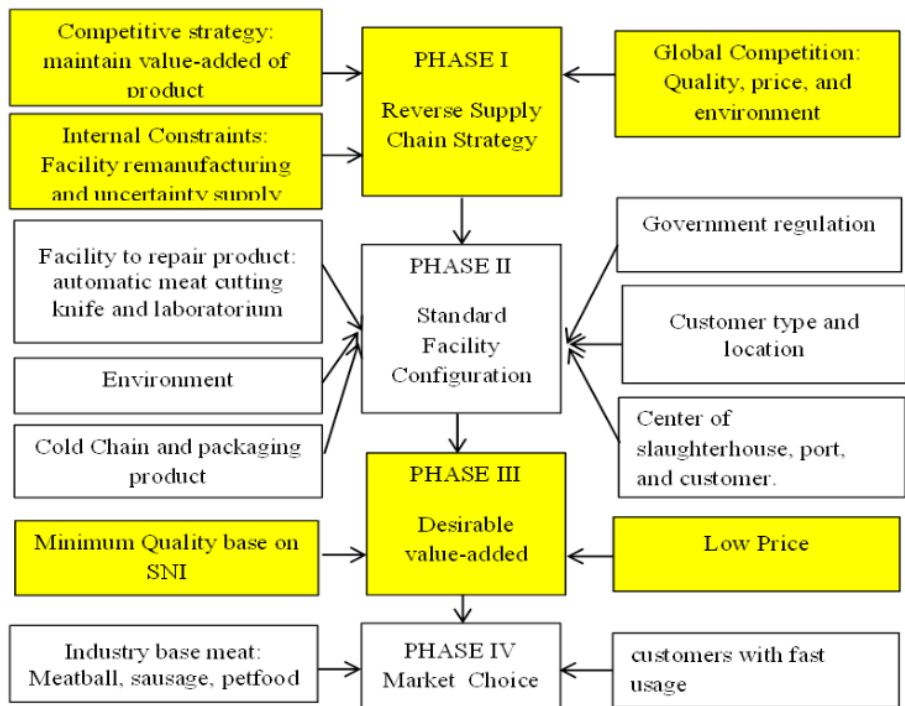


Figure 1. Strategy design network reverse supply chain.

Phase I: Reverse Supply Chain Strategy

The strategy used is controlling uncertainty and providing the remanufacturing facilities to maintain product quality. The value-added is maintained, which prevents the meat product from being damaged and becoming waste.

1 Determine the location closest to the customer and most accessible for reverse supply
2 chain activities.

3 **Phase II. Reverse facility Configuration**

4 Products returned from customers due to quality and specification reasons must be
5 provided with supporting facilities such as equipment to check product specifications
6 ranging from meat size, color, smell, texture, and bacterial content. The facilities that must be
7 provided are cutting knives, a laboratory, adequate lighting, and proper packaging
8 equipment so that contamination does not occur.

9 **Phase III. Desirable Value-added**

10 Products returned from customers for various reasons should be checked by quality.
11 Detailed checks are carried out on returned products on the grounds of faulty specifications
12 and decreased product quality. Beef products 100% meet with Standard National Indonesia
13 (SNI) can be sold directly to customers. Products whose quality has decreased are
14 categorized into categories A, B, and R according to the following table 1.

15 Table 1. Category Beef based on Characteristic

No	Beef Characteristics	Good Product	A	B	R
1	Color	Normal Red	Dull red rather brownish	Dark red- brown	Green / Bubble
2	Smell	Normal (typical beef)	Normal (typical Beef) / Over Aging	Sour smell	Bad odor
3	Texture/ Consistency	Elastic	Elastic	Elastic / rather soft	soft and sticky

16 **Phase IV. Market Choice**

17 Products with categories A, B, and R are decreasing in quality, so the product must be
18 able to sell as soon as possible so that the product's quality does not more decrease and
19 damage anymore. For products in this category, companies can choose alternatives:
20

- 21 1. Selling products to customers who are immediately using, and the product is not stored.
- 22 2. Selling products to become raw materials for a mixture of the food industry, such as
23 sausages, meatballs, or animal feed industries.
24

25 Thus the company's losses can be reduced, products can be sold following the value of the
26 remaining products, but can still provide revenue for the company. However, because the
27 number of products in categories A, B, and R is uncertain, the availability of this product's
28 stock can only be used as a substitute for raw material or additional raw material.
29

30 **3.2. Flow of Reverse Supply Chain**

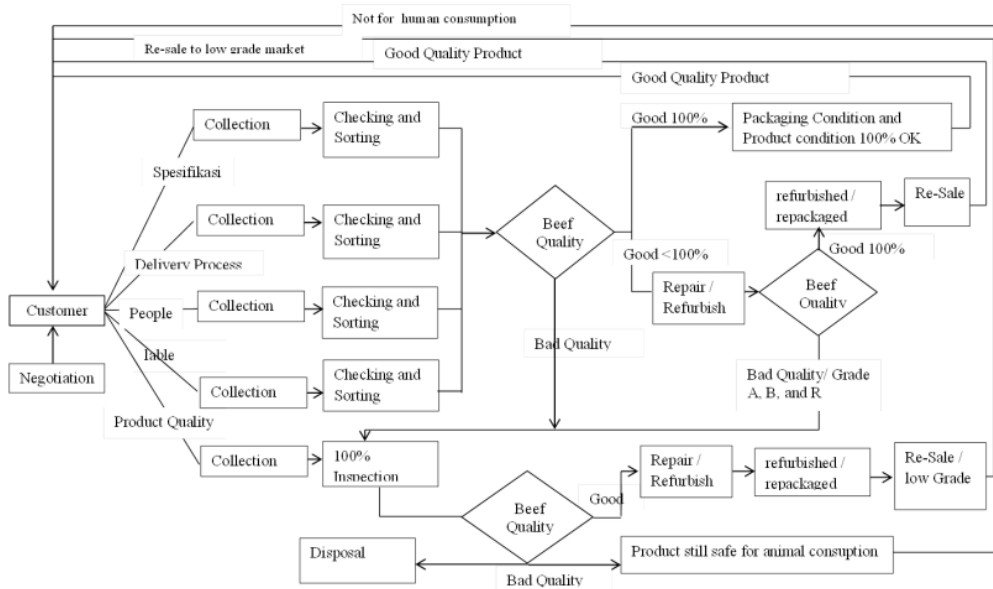
31 To prevent repeated product returns and to make decisions quickly, a reverse supply
32 chain flow chart was created first. Using this flow chart, the company or distributor can
33 control the reasons for product returns and provide preventive measures so that the same
34 incident does not happen, with continuous improvement. After the product is withdrawn
35 and is in the distributor's warehouse, the inspection procedure is carried out. Decision
36 making can be made based on product quality and corrective steps that must be taken so that
37 the product does not accumulate and is immediately handled, does not become increasingly
38 damaged, and can remain economically valuable. In general, the steps taken to accelerate

1 decision making and continuous improvement based on reverse supply chain flow as in
 2 Figure 2 in this study can be described as follows:

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1. Negotiations

The company can negotiate before withdrawing the product to be returned. Consultations can be done by giving discounts to customers so that they do not need to return products by providing compensation in the form of discounts, taking into account the cost of withdrawal and product risk. The negotiation process must also be carried out when the product is rejected for various reasons, considering that refrigerated trucks' transportation costs require high costs.



13
 14 Figure 2. Flow Reverse Supply Chain based on the detailed reason for returning product [13]
 15

16 2. Evaluate the reason for the return

17 In this COVID-19 pandemic condition, the reasons for returning products must be
 18 considered, considering that the returned products are not only related to low product
 19 quality, but there are also administrative reasons and poor communication that cause
 20 products to be returned from customers to distributors. For that, the company must evaluate
 21 contracts with customers and evaluate the performance of the supply chain.
 22

23 3. Product Recall

24 The product recall is carried out if negotiations fail. Product recall must consider
 25 product quality and product recall facilities so as not to get damaged in transit. The company
 26 must also consider the withdrawal costs located far away and transportation costs according
 27 to the value of the products being recalled.
 28

29 4. Checking and Shorting

1 Control of the quality of products returned from customers is determined at this stage.
2 The quality inspection results will indicate the treatment of the product, and decisions must
3 be made quickly so that losses due to products returned can be reduced.
4

5. Product Quality

6 The status and product categories of the products returned are determined at this
7 stage. All products inspected in detail are based on SNI (Indonesian National Standard),
8 which has been translated into company Standards. Products that still meet the standards
9 and have no damage both in terms of meat and packaging can be directly sold to different
10 customers. If there is no demand, the product is returned to the warehouse and re-entered
11 into products with CL, CI, and FR categories according to the first category. For products
12 whose quality has declined will be examined in detail and determined to fall into the type A,
13 B, or R. Specifically for products with the category R directly decided to be destroyed
14 immediately or given to the pet or livestock feed processor.
15
16

4. Conclusion

18 Reverse Supply Chain Design Network results in products from the reverse supply chains
19 sold to customers who use meat quickly and do not store meat, and products can be sold to
20 meat-based industries. Using reverse supply chain flow, the company can evaluate the
21 causes of the product being returned and speed up decision-making based on the meat's
22 condition from quality control inspection. This research provides the potential for further
23 research to apply reverse supply chain to other industries. Moreover, it can carry out further
24 research by optimizing the cost of reverse supply chain activity.

25 The reverse supply chain model can be used to solve the problem of returning beef products
26 from customers for various reasons.
27

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