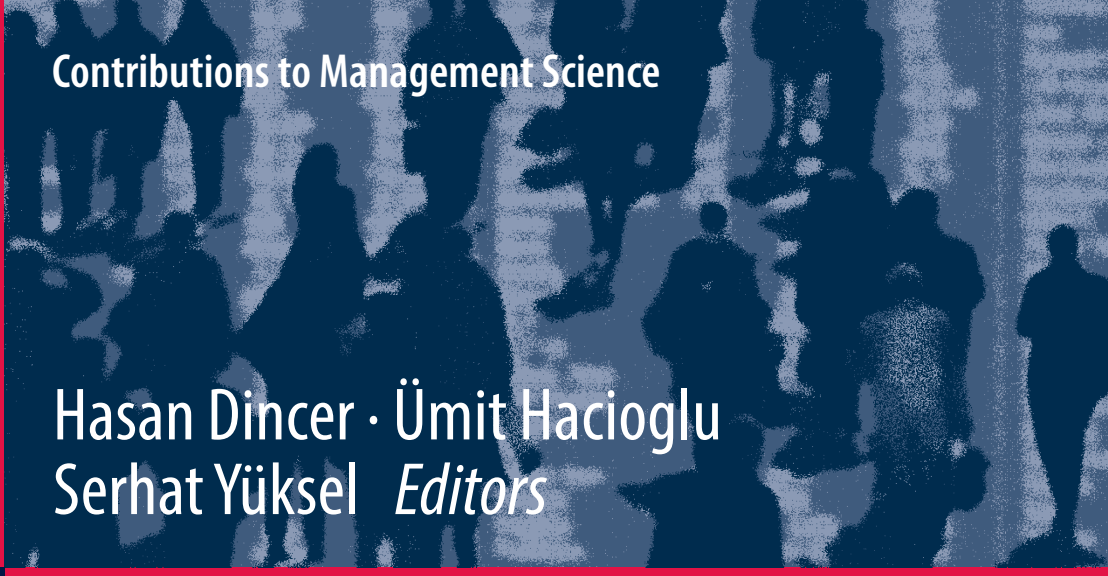
Contributions to Management Science



Hasan Dincer · Ümit Hacioglu
Serhat Yüksel *Editors*

Strategic Design and Innovative Thinking in Business Operations

The Role of Business Culture and Risk Management

Springer

Contributions to Management Science

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ISSN 1431-1941 ISSN 2197-716X (electronic)
Contributions to Management Science
ISBN 978-3-319-77621-7 ISBN 978-3-319-77622-4 (eBook)
https://doi.org/10.1007/978-3-319-77622-4

Library of Congress Control Number: 2018940270

Printed on acid-free paper

This Springer imprint is published by the registered company Springer International Publishing AG part of Springer Nature.
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

Competition increased almost in all sectors all over the world especially in the last years. This situation caused significant threats for the companies. Therefore, it becomes necessary for these companies to take some actions. Otherwise, it cannot be possible for them to survive in such a competitive environment. Hence, it is understood that companies should take strategic actions in order to be different from its competitors, such as generating new products or services. Owing to this issue, it can be preferred by many different customers.

Within this framework, strategic decisions taken by top managers play a very key role. The main reason behind this situation is that their decisions have an influence on many different parties. It can be said that top mangers should consider many different factors at the same time while developing new strategies. For this issue, top managers should design future with innovation and potential risks should also be taken into consideration in this process. With the help of this condition, companies can increase their competitive power in the market.

Similarly, the main purpose of this book is to provide a unique approach to strategic issues in management with innovative thinking and strategic design. Within the scope of this book, authors of contributory chapters develop innovative insights on supportive business culture, innovation, and strategy for competitive business operations. The main novelty of this book is to identify such a significant factor of the companies by considering different aspects. Therefore, it is believed that this study has an important contribution to the literature.

The book mainly consists of four different parts, which are business and organizational environment, strategic design on business operations, innovative thinking, and risk management activities in business operations. With respect to the business and organizational environment, some studies emphasized the effects of competition. In addition to this situation, the importance of customer selection is also underlined in this category. Moreover, the effects of the globalization are also underlined in this part.

On the other side, the part of strategic design on business operations focuses on mainly the actions taken by the companies in order to survive in competitive

environment. Within this framework, there is a study that focuses on the relationship between strategic design and financial performance. Additionally, the effects of strategic design on business operations are also analyzed in this part. Moreover, in the category of innovative thinking, some studies regarding the product and service development are taken into account. In addition to them, there are also some studies related to the know-how and incremental innovation. The importance of disruptive innovation is also emphasized in this category.

In addition to them, regarding the risk management category, different kinds of risks for the companies are taken into consideration. For example, some studies focus on market risk which shows the risk of the companies in case of any changes in the market. Moreover, political risk is also emphasized in some different studies. Additionally, document risk in international trade is underlined in this category.

We believe this premier reference book will have a major role in the literature of business and strategy with its pioneering effects on strategy development process for competitive business environment.

Beykoz Istanbul, Turkey — Hasan Dincer
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Contents

Part I
The Importance of Business and Organizational Environment

The Effects of Companies' Reverse Logistics Motivations on Their Reverse Logistics Networks

Metehan Feridun Sorkun and Meltem Onay

Abstract The aim of this paper is to show how the differences in the motivations of companies to implement reverse logistics affect their reverse logistics networks. Effective reverse logistics management facilitates the accomplishment of many goals for companies, such as reducing operational costs, increasing customer satisfaction, boosting brand value, and meeting the requirements of environmental regulations. However, the prominence of these motivations may vary according to sector. In some sectors, the strict government regulations in force may compel companies to implement reverse logistics, while in others, consumers may be highly conscious of the environmental-friendly production, encouraging companies to engage into reverse logistics activities. This situation calls for studies that analyse the differences in companies' motivations to implement reverse logistics, and explain in turn how these differences shape their reverse logistics networks. Hence, this study has adopted a multiple-case study analysing reverse logistics activities of four companies each representing one of the following sectors: textile, battery, building materials, and food. Such cross-sectoral analysis enables an examination of the reverse logistics network design according to different motivation factors. The results reveal that different RL motivations have an impact on three reverse logistics design issues: the collection of returns, the location to inspect returns, and forward/backward integration on RL networks. This study explicates the theoretical and practical implications of these results as well.

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H. Dincer et al. (eds.), *Strategic Design and Innovative Thinking in Business Operations*, Contributions to Management Science,
https://doi.org/10.1007/978-3-319-77622-4_1

1 Introduction

Managing reverse product flows effectively provides many benefits to companies, which has recently put a spotlight on reverse logistics (RL). The companies having effective RL program are able to benefit from greater competitive, operational, environmental, and financial gains (Jayaraman and Luo 2007). First, RL directly affects customer service level. For example, the rapid repair and return of a customer's product increases customer satisfaction (Daugherty et al. 2002). Similarly, the source reduction in production via the reuse of the product parts and via the recycling of materials provides low-cost inputs to the company's production (Jack et al. 2010). Good RL management may also enable companies to capture more revenue by reselling on secondary markets those products, which could not be sold on primary markets (Ye et al. 2013). Alternatively, the collection and proper disposal of end-of-life products may arouse a feeling in consumers that a company executes its operations in an environmental-friendly way, boosting the company's brand value (Kumar and Christodoulopoulou 2014). In the same vein, when there is either government regulation or incentive with respect to the disposal and recovery of the returned products, the companies having effective RL activities can more easily satisfy these regulations and more frequently benefit from the incentives (Demirel et al. 2016).

Not all the above-mentioned motivation factors encouraging companies to adopt RL are equally significant in all sectors. The critical factor in one sector might be irrelevant in others. Therefore, the significances of the RL motivation factors largely depend on the sectoral characteristics and contingencies (e.g., customers' acceptance of used products, the importance for the customers of companies' having environment friendly operations etc.). For instance, whereas the government regulations for the recovery of products mainly drive the RL activities of electric-electronic and battery sectors in Turkey, such regulations are not binding in many other sectors. Nonetheless, that is not to say that RL is unimportant for other sectors. However, its importance may derive from distinct motivating factors. As an example, despite lack of binding regulation in textile sector in Turkey, RL is still important for the management of unsold products because fashion trends may quickly change. Similarly, the opportunity of recovering some valuable materials (e.g. lead in battery sector) from end-of-life products to feed the production of new original products can become major motivation to implement RL.

The companies' major motivation, partly influenced by sectoral factors, may significantly determine their RL network designs. Assuming that customer satisfaction is more important for a company than its cost reduction objectives, in this case, its RL network should be designed to keep the customer service level high. This requires the set of supporting RL network design decisions. Accordingly, many collection points should be available close to customers. In case the returned product needs to repaired and returned to the customer, partial shipments and fast transportation modes should be preferred for quick delivery despite their effects on costs. Similarly, the location where the condition of returned product is examined should

be close to customers in order not to prolong the process. After this examination, if it is understood that resolving the problem takes time, the product ought to be replaced, but it should also be sent from the distribution centre close to the customer for quick delivery. This is just one example how the dominant reverse logistics motivation factor (customer satisfaction in this case) plays a significant role in the design of RL network. If the dominant motivating factor exemplified was cost minimization, then the above-mentioned network design decisions would be made to exploit the scales economy for higher efficiency. In that case, the centralized RL might be more favourable, in which RL activities (e.g. collection, inspection and processing) would await until the returns reach the sufficient amount to achieve economies of scale.

The aim of this paper is to show the dynamics of companies' RL networks with respect to their major motivations for implementing RL. Accordingly, a multiple-case study is adopted, in which the RL activities of four companies are examined. The case companies are selected from different sectors (textile, battery, building materials, and frozen food sectors) to increase the likelihood that they have different motivations for implementing their RL activities, since each operates within its own idiosyncratic context. Such cross-sectoral analysis makes a theoretical contribution by highlighting the relationship between RL motivation factors and RL network design. Similarly, the findings of this study provide useful managerial insights, guiding practitioners to design their RL networks with respect to their companies' main RL motivation.

The structure of this study is as follows. Section 2 first introduces the term "reverse logistics" and the related RL activities, and also provides information on RL motivation factors and RL network design. Section 3 explains the research design and methodology applied. Section 4 examines the case companies' RL activities and their RL networks. Section 5 makes cross-case analysis that enables the identification of the linkages between RL motivation factors and RL network design. Last, Sect. 6 concludes the study by discussing the theoretical and practical implications of the research results.

2 Literature Review

This section starts with the definition of the term "reverse logistics", and introduces related activities. Subsequently, it lists the most common motivations that may draw companies' attention to RL. Finally, it covers fundamental issues about RL network design.

2.1 Reverse Logistics Activities

The product flows across supply chain can be divided with respect to their directions: (i) forward flows, and (ii) reverse flows. The forward flow, which has long been the focus of scholars, refers to the forward movement of materials, parts, and products from upstream to the downstream supply chain stages. In contrast, the reverse flow refers to the movement of materials, parts, and products in the opposite direction. Recently, the necessity for the systematic management of reverse product flows for sustainable competitiveness has become well understood (Agrawal et al. 2015).

Rogers and Tibben-Lembke (1999) define reverse logistics as: "[T]he process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal". Das and Chowdhury (2012) list the reasons for the reverse flows across supply chain as follows:

- After use (end of life or before end of life);
- Returned under warranty;
- Defective;
- Obsolete products returned by the retailer (obsolescence due to emergence of new model or new technology)
- Products returned by consumers under exchange programs.

RL activities start with the collection of product returns, mainly for the reasons listed above. The condition of returns is then assessed, which provides an input to the disposition decision that aims to maximize the value recaptured from returned product, while carefully considering its proper disposal. Three main disposition alternatives for the decision makers are: (i) direct recovery, (ii) reprocessing, and (iii) final disposal, as shown below in Fig. 1 (Silva et al. 2013). Whereas it is possible to recapture value via the first two (i.e. direct use and reprocessing), the third aims to ensure the appropriate disposal of the returned products through incineration or landfilling.

Direct recovery is the disposition alternative, referring to recapturing value without processing the returned products. That is to say, the returned product can directly be resold at secondary markets, or its working parts can be re-used in other products without additional processes. Another disposition alternative is to reprocess the returned products. Depending on their conditions, value can be recaptured through different reprocessing operations—repairing, remanufacturing, and recycling. Thierry et al. (1995) makes the distinction between these three reprocessing operations in their study. Accordingly, the repairing involves fixing or replacing parts in order to return products to working order. The remanufacturing disassembles the product for testing, inspecting, and replacing all worn-out parts to restore the quality of returned product to the level of a new product. The recycling recovers the materials (e.g. plastic, glass, paper) from returned products to use them in the production of new original products. Figure 2 shows the supply chain stages at which each RL activity is usually implemented.

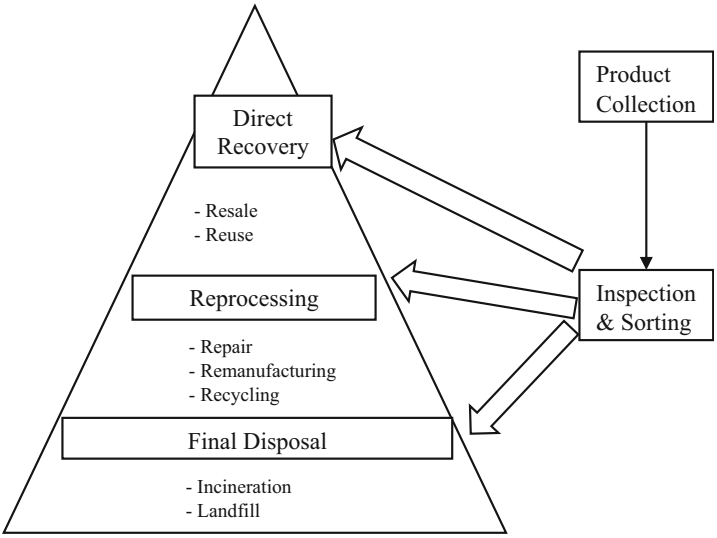

Fig. 1 Reverse logistics activities. Source: Silva et al. (2013, p. 379)

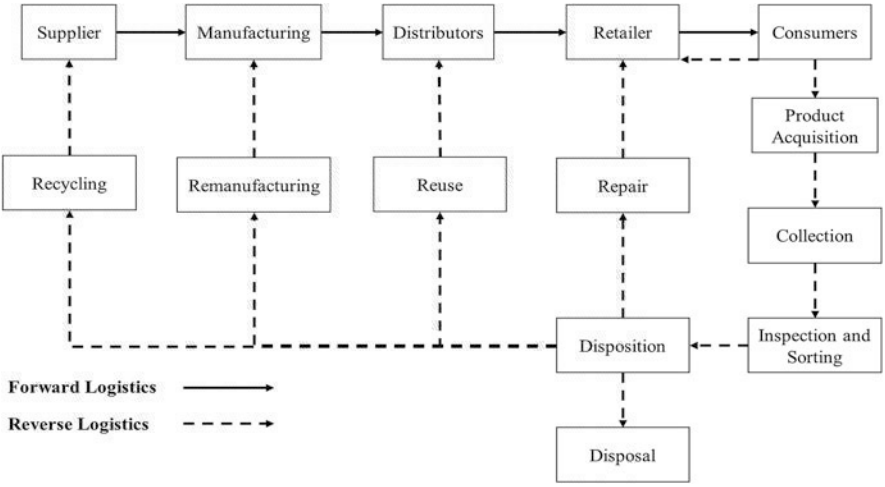

Fig. 2 Reverse logistics activities and supply chain stages. Source: Agrawal et al. (2015, p. 78)

2.2 Reverse Logistics Motivation Factors

Many incentives are available to motivate companies to adopt RL practices. These cover wide range of topics, such as marketing, competition, environment, social, and legislation. Nikolaou et al. (2013) classify these motivation factors either proactive or reactive. The factors within proactive group refer to the willingness of companies to apply RL to obtain benefits such as cost saving, retaining customers, improving company image, and increasing environmental performance. Factors, classified as reactive, imply that companies are compelled to adopt RL practices to meet the legislative requirements.

In a similar classification, the investigation of Ye et al. (2013) reveals three institutional pressures on managers to implement RL programs: government, customer, and competitor. Accordingly, government pressure encompasses the laws, regulations, and standards that enforce the production, collection and disposal of products in an environmentally friendly way. The customer pressure represents the expectations of the downstream supply chain members and end-consumers. Supply chain partners expect to be able to return the products back if they cannot sell. Similarly, in case end-consumers have problems after-sale, they demand a repair or replacement. The last pressure identified by Ye et al. (2013) is competitor pressure, which indicates the obligation of companies to implement RL due to competition. Any superiority of the company's rivals in terms of green actions, cost reduction and customer service via RL may cause a company to lose its customers, and thus decrease its profits.

As seen above, the studies categorize the drivers of RL in different ways; thus, each categorization may lack some RL motivations factors at micro level. Sorkun (2018) synthesises the categorizations available in literature, and then, extracts the RL motivations at micro-level in order to rank them hierarchically. Table 1 lists the companies' RL motivations identified by Sorkun (2018).

Table 1 Companies' reverse logistics motivations

• Boosting the repurchasing behaviour of customers
• Creating good corporate social image
• Exploting financial opportunities (e.g. second-hand market sales or extracting valuable items like gold)
• Meeting government requirements
• The preferential subsidy and tax policy
• Reducing raw material cost
• Reducing inventory
• Reducing transportation costs
• Increasing product quality
• Reducing supply chain carbon footprint

2.3 *Reverse Logistics Network Design*

Logistics network design encompasses the set of strategic decisions given on the configuration of supply chain, such as the number of facilities, their locations, capacities, integration, roles, and the quantities of flow between them (Pishvaee et al. 2010). Since these decisions significantly affect companies' costs and customer service levels, the logistics network design has long been a focus of studies (Ramezani et al. 2013; Ghayebloo et al. 2015). The synthesis of these studies indicate that the logistics network design should be in accordance with the companies' objectives, such as quality level, responsiveness, and efficiency.

Logistics network design consists of the forward and reverse logistics network designs. Forward logistics network represents the roles, numbers, locations, capacities, and links (transportation and information) of facilities utilized to manage the product flows towards end-customers, such as supplier facilities, manufacturing plants, distribution centres, and retailer stores. The RL network similarly represents the roles, numbers, locations, capacities and links (transportation and information) of facilities; however, the facilities considered in RL network handle reverse flows, such as collection points, inspection points, remanufacturing site, recycling centre and disposal centres (Pishvaee et al. 2010). The RL network is usually not designed from scratch, but based on the forward logistics network (Srivastava 2008). For example, the facility, a part of forward logistics network (e.g. to store products), can also be used for inspection of the returned products in RL network.

RL network design decisions usually have contrary effects on costs (facility, distribution, and inventory costs) and customer service elements (e.g. quality, flexibility, responsiveness) (Shen and Daskin 2005). For instance, whereas the increase in the number of collection points means less distance for customers to travel to return products (Srivastava 2008), it is likely to raise the facility and distribution costs. Similarly, the use of same facility for both reverse and forward product flows may provide a saving in facility and distribution costs, although, such integration can increase inventory and information costs (Chopra 2003). The functions of facilities in network design are also important; remanufacturing centres requires higher investment than repair centres (Srivastava 2008) but their resulting lower production costs might outweigh this expense. On the other hand, repair centres are critical to customer satisfaction. The existence of such trade-offs shows the necessity of considering companies' priorities, and operational contexts while designing their RL networks (Fleischmann et al. 2004).

3 Research Design and Methodology

The research design of this study aims to illustrate how companies' RL motivations affect their RL network design. This cause-effect relationship requires a research methodology that provides rich and in-depth information, due to many variables

involved in the research constructs of this study: RL motivations and RL network design. Therefore, a case study, as a qualitative research, is an appropriate methodology, since it supports the exploratory and descriptive purposes of this study (Yin 1994). Hence, in order to better explain the effect of RL motivation factors on RL network design, the multiple-case study was found appropriate (Miles and Huberman 1994) because it covers the analysis of distinct sectors across which the dominant RL motivation factor is likely to vary.

Two considerations are important while sampling in multiple-case study research, according to Seawright and Gerring (2008): (i) the sampled cases should represent the population of interest, and (ii) they should allow exploration of the variation in theoretical interest. With respect to the studies' positions along these two considerations, Seawright and Gerring (2008) list seven sampling methods: typical, typical, diverse, extreme, deviant, influential, most similar, and most different. The current sampling methodology can be categorized in "diverse", because this study examines how different motivations to implement RL affect companies' RL network designs. As motivations of RL activities vary across the sectors, four companies were selected, representing textile, building materials, battery, and food sectors. One difference is the shelve life of products, short in textile sector, but long in the building materials sector. Alternatively, while the recovery of products in battery sector provides low cost input, the recovery of frozen food provides no substantial gain to companies. These types of variations across sectors are assumed to have impact on the RL designs of the case companies. Therefore, this sampling allows this research examine the effect of the variations in RL motivation factors on RL network design.

The unit of analysis adopted in this multiple-case study is a company with substantial RL activities. For data collection, the semi-structured interview method was used to examine the RL activities of the following companies: (i) Jimmy Key, in textile sector, (ii) AKG Gazbeton, in building materials sector, (iii) İnci GS Yuasa, in battery sector, and (iv) Feast, in frozen food sector. The companies' senior managers with control and knowledge on their companies' RL activities were contacted for interviews. After getting necessary permissions from the companies for them to participate in this study, the list of open questions planned to structure interviews was e-mailed to the respective managers (interviewees) to allow them to prepare for interviews. These questions were developed after a comprehensive literature review by the authors of this study. Before the interviews, the authors also examined the company documents and company news, to guide question development. The interviews lasted for about two hours on average. In the meetings on the RL activities of Jimmy Key and Feast, there was one interviewee, the supply chain managers of their respective companies. In the meetings where the RL activities of AKG Gazbeton and İnci GS Yuasa were examined, multiple interviewees were available. For AKG Gazbeton, these were the director and deputy general manager, and for İnci GS Yuasa, these were the quality manager, purchasing manager, and sales manager. In all meetings, both authors of this study were present and individually took notes related to the research questions. In addition to interview notes, the companies provided their written answers to the questions e-mailed to them before interviews.

For data analysis, this study followed the structure of Eisenhardt (1989) which suggests a two-phase-analysis. First, the authors examined each company's RL activities and RL networks to become familiar with them and understand the unique patterns of each. In the second phase, a cross-case search was made between the case companies to compare their patterns (i.e. their similarities and differences). Here, the tactic followed was to make pairwise comparisons between the companies' RL motivation factors, and then to identify the similar and/or different effects on companies' RL network designs. To increase the reliability of analysis, the authors exchanged notes, and coded them with respect to this study's research questions.

4 Case Study: The RL Activities of the Case Companies

This section gives basic information on the case companies, and conveys their RL activities within their sectoral boundaries.

4.1 Jimmy Key

Jimmy Key, established in 1997, operates in the textile sector. Jimmy Key sells causal and comfortable clothing products, such as dresses, t-shirts, trousers, and skirts, procuring most of its products from Sun Tekstil. The company has a very strong relationship with Sun Tekstil, which are the members of the same holding company (Sun Holding). The company's manufacturing facility and the distribution centre are located at the same site in İzmir, Turkey. The number of Jimmy Key employees is around 90. The number of stores exclusively selling Jimmy Key products is 18, mostly on the coastal regions of Turkey, but the company also has two stores abroad in Ukraine and Azerbaijan. In addition, Jimmy Key products reach to final consumers through nearly 40 dealer stores, which sell other brands' products.

Sun Tekstil not only manufactures textile products but also sells products' design to big retailers such as Zara and Marks & Spencer. For these products, Jimmy Key is not the producer; instead, it procures products and designs from its sister company, Sun Tekstil, or supplies them from contract manufacturers, again through Sun Tekstil. However, Sun Tekstil is not involved in Jimmy Key's supply of the accessories. Jimmy Key directly procures the accessories for its products from various accessory suppliers. The company outsources its transportation activities to UPS for outbound logistics, and to local transportation firms for inbound logistics.

The reasons for the product returns in the Jimmy Key supply chain are mainly quality problems and unsold products. Most quality problems are identified with the arrival of products at the Sun Tekstil warehouse. These problems are generally related to product packaging, labelling, or size. In these circumstances, products are rejected and returned back suppliers.

The seasonality of demand in textile sector is another major reason for product returns. The products that cannot be sold in season are returned. Similarly, keeping products on shelves for a long time can cause product defects (e.g. hanging a t-shirt for a long time may create a defect). In these cases, returned products are sold in Jimmy Key outlet stores which sell second quality products at lower prices. If the defects are at a reasonable level, Jimmy Key takes one of the following three actions: (i) selling them to wholesalers, (ii) donating them, and (iii) upcycling to design new products.

End-consumers may return their products to Jimmy Key stores after-sale. The return policy of the company is very flexible, and most consumers are pacified by offers of product exchange, gift card, and reimbursement. However, if the problem with the product becomes widespread, it is withdrawn. Since the disposition decision on the returned products does not require any technical knowledge, the head of the Jimmy Key warehouse can make rapid disposition decisions. Note that Jimmy Key does not ship the products returned from consumers immediately to its distribution centre, makes monthly deliveries to allow the returns reaching a certain level for higher operational efficiency.

4.2 AKG Gazbeton

AKG Gazbeton, operating in building materials sector, produces autoclaved aerated concrete (AAC) blocks that are heat-insulated, light, non-combustible block, as well as, reinforced products with earthquake safety and Minepor Insulating Board. AKG Gazbeton has currently 472 employees, and has the production capacity of 1,713,960 m^3/year, with its three manufacturing facilities in the Turkish cities of Kırıkkale, İzmir, and Çorum. The company's manufacturing facility in Çorum had the world's largest capacity in its sector by the time it was established. Raw materials (e.g. aluminium, lime and cements), consumable material, and pallets are the main supply categories of the company. AKG Gazbeton sells its products to building firms' construction sites, dealers in specific regions, and retailers from which households purchase building materials.

The product fracture is the main cause of returns to AKG Gazbeton from its customers. In these instances, the company's quality team visits the customer's site to examine the case instead of returning these products to AKG Gazbeton's facility, to avoid the excessive transportation costs (note that the company outsources all transportation activities to various transportation companies). After the quality team's examination, if the customer is found right, the product is replaced. Another purpose of the quality team's visits is to educate customers since most product fractures are due to the inappropriate treatment of their workers.

The reuse of materials in the production of ACC is possible and the product shelve life of the products is very long. These properties diminish the amount of efforts made for waste management. Nevertheless, it is necessary to carefully handle potentially dangerous material, including aluminium and some oils. AKG Gazbeton

accumulates these materials during production up to a certain level and then sends them in certain quantities to the disposal centre authorized by government in return for a fee. On the other hand, AKG Gazbeton can generate extra profit by selling the surplus production materials. While metals can be sold to scrap dealers, wooden pallets can be sold to employees at an affordable price as firewood.

AKG Gazbeton's product selling price includes the cost of pallet used to transport the product. If these pallets are returned from customers in good condition, AKG Gazbeton reimburses the cost of the pallets. These pallets can be made of wood or plastic. Although the cost of plastic pallets is currently higher than the cost of wooden pallets, AKG Gazbeton has implemented an EU funded project (Horizon 2020 programme) to increase the use of plastic pallets owing to their many advantages. First, the high robustness of plastic pallets enables multiple use. Besides, the assessment criteria for the condition of the returned plastic pallets are more objective, eliminating the disputes with customers. Moreover, there is little risk of theft for plastic pallets because their use for other purposes is limited in contrast to wooden pallets (e.g. wood is used for heating). Plastic pallets also weigh less, lowering transportation costs and improving job safety. Last, the use of plastic pallets has positive environmental effects, eliminating the need to cut trees for wooden pallets.

4.3 İnci GS Yuasa

İnci GS Yuasa was established in 2015, as the joint venture of İnci Akü and GS Yuasa. The company operates in the battery sector, and has over 700 employees. İnci GS Yuasa has the highest level of battery export in Turkey and the second largest market share in Turkish domestic market. İnci GS Yuasa has two factories in Manisa (Turkey) where it produces industrial and starter batteries. For the production of these batteries, İnci GS Yuasa purchases lead, plastic, chemicals, battery terminal, separator and other materials from suppliers. To increase the value generated along the supply chain, the parent company, İnci Akü, sometimes becomes the second-tier supplier of İnci GS Yuasa, supplying plastic and battery terminals to the first-tier suppliers of İnci GS Yuasa.

İnci GS Yuasa sells its products directly to major automotive OEMs (original equipment manufacturers) and also to these giant manufacturers' OESs (original equipment services), such as Fiat, Ford, Mercedes Benz, Hyundai, Cat, and Peugeot. For the after-market, generally consisting of individual users replacing their vehicle batteries, İnci GS Yuasa has 60 main dealers dedicated to selling the products of İnci GS Yuasa. Alternatively, these main dealers may get the batteries to the individual end consumers through sub dealers spread all over Turkey.

The product life of batteries ranges between 2 and 5 years. It is also noteworthy that after the battery is produced, it starts depleting even if unused. Thereby, İnci GS Yuasa operates the built-to-order production system. That is to say, the company's production activities start in response to customer demand. İnci GS Yuasa's production system is designed to produce a high volume and low variety products.

Therefore, the efficiency in production, avoiding the stoppage of the production lines is crucial. If it occurs because of the supplier's failure, both the related components are shipped back to the respective supplier, and that supplier is compelled to compensate for the loss incurred due to the stoppage. The returns from individual end-consumers through dealers is another cause of reverse flow on the İnci GS Yuasa's RL network. The customer service team examines these returned batteries. Unless the problem is obviously due the consumer, actions are taken to increase customer satisfaction, even if guarantee period (generally 2 years) has expired.

If manufacturing defects occur due to the operations of İnci GS Yuasa, these defective products are kept first in the company's waste unit. As they reach up to certain level (usually once a month), the defective products are shipped to the recycling centre. Similarly, the company's policy to collect returns from dealers aims to strike a balance between costs and the customer service level provided to dealers. İnci GS Yuasa's frequent collection of the returns from its dealers increases its transportation costs, but on the other hand, long waits disadvantage its dealers, because the low collection frequency increases their holding costs.

The recovery of lead constitutes the important part of İnci GS Yuasa's RL activities. After the batteries are returned due to manufacturing defects, product problems, and completed lifecycles, they are broken down to recover the lead. This reuse option is profitable for the company when it is less costly than the price of imported lead which is determined by the lead commodity exchange market based in London. Another important driver of the company's RL activities is the government regulations enforcing battery manufacturers to collect 90% of the batteries produced. İnci GS Yuasa needs to pay the battery owners, even if the battery lifecycle has ended because the reusability of materials in batteries (e.g. lead) gives them commercial value. At this point, coping with scrappers who are competing for the end-of-life batteries from owners is a challenge for İnci GS Yuasa.

The collection of end-of-life batteries is carried out by the company's sister company, İnci Logistics. Since a battery contains materials such as lead and polypropylene, it is categorized as dangerous cargo, and requires the preparation of specific transportation document (ADR). After the end-of-life batteries are collected, they are sent to an authorized recycling centre. Based on the results of the chemical analysis made in this centre, İnci GS Yuasa decides how much lead recovered from returned batteries should be used in the final mix, in which high quality pure imported lead and recovered lead are mixed for the production of new batteries.

4.4 Feast

Feast, a company operating in the frozen food sector, was established in 2000. The company has around 1300 employees, and has a plant covering around 85,000 m^2 in İzmir, Turkey. This plant, having 100,000 tons annual capacity, is used to produce potato products, fruit and vegetables, coated and pastry products. In addition, Feast has six warehouses, one of which is the one of largest in its kind within Europe. This

warehouse is equiped with computerized technology that can keep up to 30,000 tons of products at either −25 °C or 0–4 °C.

Feast claims its products (frozen foods) are fresher than the foods reaching the consumers through traditional channels because the company freezes the products just after harvest. In contrast, the foods delivery to retailer stores over traditional distribution channels takes much longer, since they have to pass through various wholesale market locations. Therefore, Feast works closely with its farmers to provide the freshness promised, and to increase its production productivity. Likewise, to capture higher productivity, Feast makes R&D on the seed production and procures some of the imported seeds through its sister company, Öztar. After Feast completes its production processes (e.g. collecting food, sorting them, and packaging), the products are directed to the company's cold storage warehouse until shipment to customers. For transportation, Feast works with transportation companies that have special refrigerated vehicles.

Feast mainly has three types of customers: supermarkets, chain stores, and local grocery stores. Feast has collaborative relationship with its supermarket customers such as Migros and Bim, cooperating on aggregate production planning and product customization (e.g. sizes, packaging etc.) with respect to the supermarket customer needs. Feast also sells its products to chain stores such as Burger King and McDonalds. Additionally, the company has regional dealers through which its products are delivered to the local grocery stores.

The reasons for the reverse product flows on the Feast's RL network are mainly due to packaging problems, the sensorial complaints of consumers about foods, and the visual distortions on foods perceived by consumers. Packaging problems are the major cause of product returns. Improper handling of products, the overturns and falls of products from shelfs, and the shocks and vibration during transportation are the main causes of packaging problems. These are usually identified by the Feast's customers (by other supply chain members) before they reach to the end-consumers. In these cases, Feast sales personnel go to the customer's site and send photos of the problematic product to their quality department. If no customer fault is found, the products are returned on trucks on their return journeys if there is enough capacity to deliver the damaged products back to Feast's facility. This integration between reverse and forward transportation is necessary because the transportation of frozen food is costly, requiring considerable energy (fuel) to keep the foods at the predetermined temperature. After the products are returned to the site of Feast, the examinations are made to see if the damage to the packaging has caused any harm to the food. If not, the product is repackaged, and alternative markets are sought for these products.

The returns due to the sensual and visual complaints of end-consumers are handled differently because they concern the important issues of the company's image, and human health. For this reason, in the case that Feast suspects any risk to products might be incurred, the company has the policy of recalling all respective products. Even if this problem has not yet happened in the company's history, the managers take this issue very seriously. The visual and sensory complaints of consumers are assessed by the company's food engineers to check if the company

Table 2 The major RL motivations of the case companies

Jimmy Key	• Increasing customer satisfaction • Reselling unsold products
AKG Gazbeton	• Reducing transportation costs • Reducing supply chain carbon footprint
İnci GS Yuasa	• Meeting government regulations • Reducing raw material cost
Feast	• Maintaining good corporate image • Reducing transportation costs

has any fault. If there is any risk (i.e. even there is a slight probability that the consumers are right), Feast takes all necessary actions to eliminate the problem, because these issues are closely related to human health and corporate image.

The foods delivered from farmers might also create quality problems for Feast. In these cases, the company separates the parts of food that can be used, and returns the rest to the farmers. On the other hand, the waste caused by the production processes of Feast is held for disposal in amounts of 100 tons. If the waste (food) sorting is possible, it is used to feed animals, if not, it is incinerated.

5 The RL Motivations as the Dynamics of RL Network Design

The previous section has depicted the case companies' RL activities shaped by their RL program goals. Based on their RL activities, this section aims to explain the role of RL motivations in companies' RL network design decisions. For this purpose, the authors have made cross-case analysis and identified key differences and similarities across cases, considering the companies' major RL motivation factors, as illustrated in Table 2. This analysis allows making propositions on the following three RL network design issues: (i) the collection of returns, (ii) the location of product inspection, (iii) forward and backward integration for RL activities.

The method of collecting returns is the first critical design decision for RL networks. Among the four case companies, the results show that İnci GS Yuasa is the only company that is proactive and willing to collect returns. The other three case firms aim to handle returns efficiently but do not look motivated to initiate the collection process. Therefore, they are reactive in collecting returns because their product returns usually occur due to problems. The main reason for Jimmy Key usually taking products back is failure to sell because of seasonality factors. AKG Gazbeton have returns due to the product fractures. Likewise, Feast receives the products back when there are packaging problems. In contrast, İnci GS Yuasa acts proactively in order to meet government regulations, enforcing battery manufacturers to collect back the 90% of the batteries produced. Besides, the returned batteries, even if they complete their lifetimes, enable them to reduce their raw material cost by reusing the recovered lead for new original battery production.

Proposition 1 *The RL motivations of meeting regulations and reducing raw material costs make companies act proactive in collecting product returns from their customers.*

Another important RL network design issue is a choice of location where product inspection is made to assess the condition of returns. Some differences exist between the case companies in this parameter of RL network design. Feast and AKG Gazbeton inspect the returned products at the customer-site to avoid an extra shipment to their own facility that would incur a large transportation cost. For İnci GS Yuasa and Jimmy Key, transportation costs are also significant, but they are able to delay the returns to the some extents, allowing them exploit a scales economy in transportation. In addition, Jimmy Key and İnci GS Yuasa have the opportunity to recover value from the returns. In contrast, the value that can be recovered from the product returns of AKG Gazbeton and Feast are very limited.

Proposition 2 *The RL motivation of reducing transportation cost makes companies to inspect the returns on customer-sites.*

Proposition 3 *The RL motivation of recovering value from returns allow companies to make inspection at their own facilities.*

There are variations in supply chain stages with which the case companies integrate for RL activities. The analysis results indicate that the respective forward/backward integration of the case companies depends on the purpose (motivation) of their RL activities. To begin with, there is forward integration on Jimmy Key's RL network. The company's distribution centre highly integrates with other aspects of the business, since the products have high seasonality, thus, the company has to find ways of reselling unsold products. Moreover, to keep the customer satisfaction level high, Jimmy Key establishes close relationships with its stores to find solutions to the problems of returned products.

Proposition 4 *The RL motivations of increasing customer satisfaction and reselling unsold products lead to forward integration on RL network.*

When RL network of İnci GS Yuasa is examined, backward integration draws attention. Two main motivations of İnci GS Yuasa's RL activities are collecting end-of-life batteries, and reusing lead for new original battery production. For collection, İnci GS Yuasa works with its sister transportation company, İnci Lojistik. To recover lead, İnci GS Yuasa has a strong relationship with the authorized recycling centre that carries out the chemical analysis of returned batteries and reports the reusability of lead for new original product production. Similarly, Feast integrates backward with its suppliers (farmers), because the food health is very important for maintaining its corporate image. In order to prevent incurring a risk from food supplies, Feast carefully selects and trains its farmers.

Proposition 5 *The RL motivations of reducing raw material cost and maintaining good corporate image lead to backward integration on RL network.*

A final distinctive point is how AKG Gazbeton's aim to reduce supply chain carbon footprint results in both forward and backward integration on its RL network. In parallel to this goal, the company focuses on decreasing the number of returns by

educating customers rather than handling returns efficiently and effectively. Similarly, the AKG Gazbeton's plastic pallet project, which aims to increase the reusability of pallets, helps company reduce carbon footprint. However, this project requires company to make R&D on material technology, enforcing AKG Gazbeton to work closely with the producers of materials used in plastic pallets (i.e. with its suppliers).

Proposition 6 *The RL motivation of reducing carbon footprint results in both forward and backward integration on RL network.*

6 Conclusion

The prior research has attempted to reveal the dynamics of RL networks with various variables such as the demand level for used products (Mutha and Pokharel 2009), product modularity (Sorkun and Onay 2016), uncertainty (Lee and Dong 2009), and retailer competition (Savaskan and Wassenhove 2006). This study contributes to this line of research by showing possible ways that companies' RL motivations influence their RL network designs. The multiple case study conducted for this purpose illustrates that the collection of returns, the location to inspect returns, and forward/backward integration on RL networks are the three RL network design issues that vary with respect to companies' RL implementation motivations. These findings have a number of important theoretical and practical implications, providing insights on the nature of relationship between the companies' RL motivations and RL networks.

First, the findings imply that whether companies should act proactively or reactively to collect their returns depends on companies' expectations from RL activities. Different from other case companies analysed, only İnci GS Yuasa was found to act proactively. The main reason for this is that the increase in the number of product returns helps İnci GS Yuasa accomplish its goals of meeting of government regulations and the reduction in raw material costs. Nonetheless, when the main RL motivation is the reduction of negative consequences of product returns (e.g., loss of reputation, cost), it is important to take managerial actions to reduce the number of returns, because no return means no RL cost and no customer complaints. Therefore, companies that expect to reduce negative consequences of returns via RL activities, do not waste their efforts in collecting higher number of returns, instead, their consideration is to manage effectively the after-customer return process.

This study also reveals that the location choice for inspecting returns on RL network, where the condition of returns are assessed, is influenced by the companies' motivations to implement RL activities. For this choice, two factors play a major role in companies' decisions: transportation costs and the recovered value obtained from the returned product. According to results, as the recovered value is high and the transportation cost of returns is negligible, companies prefer inspecting their returns at their own facilities. However, when the transportation cost is high and the

recovered value is limited, the companies choose to inspect their returns on customer-site or close to the collection points, to decrease transportation costs. If there is high (low) transportation costs and high (low) value that can be recovered from returns, practitioners should make cost-benefit analysis and then should determine the optimal inspection location for company.

The results suggest that the companies' RL motivations, at least partly, determine the level of forward or backward integration on RL network. The findings indicate that the market-oriented motivation factors (i.e. increasing customer satisfaction and reselling unsold products) encourage companies to integrate forward on their RL networks. As companies are able to increase the level of coordination and collaboration with their stores and distribution centres, they are able to better address customer complaints, and find profitable ways of selling their unsold products. On the other hand, the results demonstrate that when the RL motivation is focused on keeping costs low and improving corporate image, companies rely on close relationships with their suppliers, and keep control on them. Such control mechanism causes a backward integration on companies' RL network. Finally, it is noteworthy to state that carbon footprint reduction requires both forward and backward integration.

This study has a number of limitations that might guide future research to explore further factors relevant to the relationship between RL motivation factors and RL network design. The number of companies that this study has examined is limited to four. Therefore, this study's cross-analysis on these companies' RL activities may not be sufficient to explore all factors involved in the cause-effect relationship between companies' RL motivations and RL network designs. Thus, future research may use a larger company sample, which will allow more precise conclusions. This further research endeavour will also help test the validity of the propositions in this study. Another possibility for future research is using different case selection techniques. This study's research design was planned to select the case companies from different sectors to ensure the diversity of RL motivations, hence, it will be possible to observe their distinct effects on RL network design. Nevertheless, other case selection techniques might also be useful to shed further light on this study's research questions. For example, selecting companies within same sector and with the same RL motivations will allow a comparison of their RL networks. Such research design could help testing the significance of the proposed relationship between RL motivations and RL network designs.

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Business Performance, Corporate Structure and Competitiveness in Mexico

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Abstract This paper aims to analyze the structure, characteristics and business performance in the 32 States of Mexico, to determine their levels of competitiveness. It follows a previous study by Unger, Flores and Ibarra (*Productividad y capital humano: fuentes complementarias de la competitividad de los estados mexicanos*, 2013), in which a model is applied to measure business competitiveness. The variables that are taken are the salary and the value added in the model to measure competitiveness. The research results confirm the hypothesis that the competitiveness of States can be determined by the business structure, productivity and therefore higher wage advantage.

1 Introduction

The objective of this research is to determine the structure, characteristics and business performance of MSMEs and the large company (LC) within 32 States of the Mexican Republic, in order to observe that States are competitive or noncompetitive. It departs from a previous study by Unger et al. (2013), in which a model is applied to measure the competitiveness of States, creating two sub-groups. The first includes the competitive States and the second noncompetitive States. The application of this model will be for all States classifying MSMEs and LC to meet corporate behavior and show whether or not these States are competitive.

For purposes of this paper, it presents an analysis of each of the economic activities of the States of Mexico that is done by selecting the total industrial branches. In addition, the variables of interest in the study that were selected are

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H. Dincer et al. (eds.), *Strategic Design and Innovative Thinking in Business Operations*, Contributions to Management Science,
https://doi.org/10.1007/978-3-319-77622-4_2