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Analysis of the logistics of home delivery of food and household goods. Implementation in Consum in the Valencia area. Proposals for improvement.

Rosa Arroyo López*, José Vicente Colomer Ferrándiz

[a]*Transport Department, School of Civil Egineering, Universitat Politècnica de València, Camino de Vera s/n, Valencia 46022, Spain*

Abstract

The problem of urban distribution in large cities, particularly the home delivery of goods, does not have a simple solution, given that it involves a range of different factors and parties with different interests. The purpose of this article is to analyze the main characteristics of this service, which has been studied very little in urban logistics, with a view to proposing measures which will guarantee its sustainability economically, socially and environmentally. The analysis is applied to the company Consum, which will be studied in major detail and will then be followed by 29 actions (for this case of study).

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Keywords:

1. Introduction

According to data from the 2015 White Book of E-commerce [1], for every 100€ spent in e-commerce, 40€ are spent on physical items, which must therefore be transported to their final destination in the supply chain, the end consumer.

* Corresponding author. Tel.: +34 686 44 34 78

E-mail address: maarlo3@cam.upv.es

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Nowadays, we are getting used to purchasing a product online which can then be delivered to within metres of our homes. This shift in mentality is leading to large amounts of these home deliveries. Some companies charge the delivery costs to the customer, while others, viewing it as a tool to generate customer loyalty, cover the costs themselves.

Some common lifestyles, with long working days and little time being spent at home, contrast with the growing demand for home delivery. This explains why 25% of deliveries fail to reach their recipients, a problem which when combined with the logistics involved in sending back the delivery, significantly increases the costs of the operation. To solve this issue, various solutions for undelivered goods are used, such as lockers, parcel drop boxes and collection from designated locations.

The logistics of home delivery of food and household goods also presents its own distinctive characteristics, related to the high volume and weight of goods, as well as perishable and high-rotation goods, which require fast and flexible transport.

As a result, the demand for home delivery is increasing every day, with the subsequent growth in externalities related to the traffic of commercial vehicles in cities and which causes companies to contemplate the long-term sustainability of the way that they manage urban logistics nowadays and in the future on an economic, social and environmental level.

2. Methodology

Firstly, the current existence of home delivery services and the way they operate in different companies is presented, using public data which has been obtained through the internet, telephone calls and visits to shops.

Later, Consum's situation is analysed in detail, using information gathered directly through interviews with SD Logistica (the company which operates Consum's home delivery service) and with Consum's logistics department.

Using this knowledge, a diagnosis of the main advantages and disadvantages is made, taking into account the different parties involved and a SWOT analysis is carried out.

Once the main weaknesses and threats have been detected, and the strengths and current opportunities established, different proposals for action are considered, using a multi-criteria analysis which takes economic, social and environmental criteria into account, as well as the views of the parties which are involved.

3. Home delivery of food and household goods.

3.1. General characteristics

In order to understand the particular characteristics of home delivery of food and household goods, a qualitative analysis is carried out based on shop visits, telephone interviews and public data from the websites of the companies which offer this service. The data collected is focused on the products' characteristics, consumer trends and the location of the shops which determine this distribution model.

Using this information, a summary of the main characteristics of food and household goods shopping is:

- The increasing frequency of the service. The purchase of food is characterized by its delivery within a maximum period of 24 hours. The expiry dates of the transported products is the factor which differentiates it from other consumable goods.

- The services uses a defined range of hours for delivery, rather than an exact time. Unlike the home delivery of non-food products, where buyers choose to receive their order within a wider defined time period (4-6 hours), in the food and household goods sector, time periods are defined at around 2 hour slots. This characteristic is also common to other types of specialist transport such as that of larger products like furniture.

- Customers usually have a low amount of storage space.

- High-rotation products.

- Inverse logistics. Returns are made of empties and given the characteristics of the service, it is difficult to find a solution to this problem. Reusable boxes and containers are used and packaging, such as plastic bags, is not delivered to the consumer.

- When consumers purchase food and domestic products for home delivery, the orders are large in terms of volume and weight, e.g. drinks and cleaning products.

- A large variety of products. They are extremely varied and so are the transport requirements: frozen goods, fresh produce, glass bottles and containers, other fragile products, etc.

- Intensive picking process for boxes. Basic warehouse units for home delivery are boxes that can be easily stacked and loaded. Some are isothermic and the boxes are open. As there is a very wide range of products of different sizes, shapes, weights and with different requirements, it is complicated to standardize modes of transport and storage methods.

- Consumer behaviour. This type of purchase tends to become regular, it seems that there are different customer profiles who require the service with a certain regularity, mainly in local stores. However, there are others who only buy sporadically.

- Mileage. The distances covered are not that large in nearby stores, due to the large number of different shops in residential areas, although for hypermarkets the distances can be larger. However, both limit their delivery areas.

- Loading. This is done in shops' storage areas or in car parks, although it is often not possible in cities which have interior loading bays for receiving goods. The vehicles used for home delivery are smaller and they can fit in these loading bays.

- Unloading in the street. Unloading is mainly carried out in the street, using conventional car parks and loading and unloading areas. Likewise, unloading sometimes takes place using unauthorized parking, on pavements, pedestrian crossings and by double parking.

- Delivery locations. Given the characteristics of these products, the place of delivery is inside homes, unlike other types of delivery where the goods are left outside or the delivery is when people are not at home.

- Vehicles are not shared with other loaders.

- Fleets of vehicles are owned by the company or are rented exclusively for this purpose.

- GPS systems are not used and delivery routes are mainly planned manually.

3.2. Analysis of the service

The Ministry of Agriculture, Food and the Environment is carrying out market research through the Observatory of Consumption and Food Distribution and is setting up an Index of Quality Service. This allows us to obtain qualitative and cumulative variables on the population's consumer trends and trends in food product distribution and involves 400 mystery shopper visits in which customer service and different aspects of the system are evaluated.

The mystery shoppers asked in shops if they offered a home delivery service and we can see the percentage of the different type of stores which offer one in Table 1. This table shows the data that comes from the most recent surveys and will simply serve as a reference, as we do not have more up-to-date studies.

Table 1. Percentage of businesses which offer home delivery. Source: MAGRAMA.

Type	2007 (%)	2008 (%)	2010 (%)	2011 (%)
Traditional shops	11,3	8	22,4	16
Markets	20	20	35,5	24
Discount Stores	4	10	1,3	4
Self-service/ Supermarkets	64	60	68,4	64
Supermarkets (400 – 999 m^2)	82	94	87,2	84
Hypermarkets (1000 – 2499 m^2)	92	96	95,2	100

Taking into account the most recent data, from 2011, it can be seen that of the major supermarkets which have been interviewed, all offer a home delivery service. If we look at medium-sized supermarkets, this figure decreases to 84% and for small supermarkets and self-service it decreases to 64%.

Hypermarkets reach the highest figure, at 96%. The same is not seen with smaller businesses, such as markets or traditional shops or convenience stores, where it is much less common.

After studying the main companies in the sector in the Valencian Region and making a classification according to the price of the service and their features, the following conclusions can be highlighted:

E-commerce/ phone sales: when analysing home delivery, we have to take into account whether a shop offers online shopping, given that it determines the provision of the service.

Processing orders: in light of this data and without knowing the internal management of the service, it does not seem that any company has a warehouse which processes orders for customers.

Dispatch from hypermarkets; in hypermarkets, different types of products are also delivered, which is something that determines the dispatches and gives rise to different models: from total integration of the ordering system to independent ordering systems according to the route.

Timetables and slots: the available delivery times range between 2 and 4 hours. In terms of how many hours shops offer delivery in, it varies between 44 and 78 hours per week. In terms of maximum time from purchase to delivery, it appears to be the same as in all supermarkets, at around 24 hours.

Prices: the main variable that determines the cost of transporting goods is the cost of the shopping itself in the majority of cases, although there are other models such as a fixed price or price which depends on the mileage or area.

Types of transport management: companies which offer home delivery of food and household goods can opt to outsource the process or do it in-house with their own resources. Depending on the degree that they outsource and the

services that they outsource, we can classify this as follows: direct integrated management, direct management with subcontracted transport and total outsourcing.

Comparison with other models: in order to be able to buy using other more advanced models, we can see the features of large suppliers such as Walmart and Tesco. The main differences that are found are:

- A wide range of hours of around 15 hours non-stop per day, which meets demand outside working hours.
- More defined slots.
- Automatic communication systems with the customer.
- An online shop which operates independently of the physical shop.
- Automated order processing warehouses
- Rates which depend on the slot.

4. Analysis of the home delivery in the company Consum

Consum is a cooperative company, made up of working partners and customers which operates in the commercial distribution sector, through the supermarkets Consum, Consum Basic and the Charter franchises. It is the largest cooperative in the Mediterranean and one of the main companies in the Spanish distribution sector, comprising a network of more than 638 supermarkets.

The management of home delivery is completely outsourced to the company SD Logistica. The service's operator has always dealt with organizational factors and it is done manually.

The delivery area is a maximum of 8km and 3km in main cities and delivery is guaranteed within a defined 2-hour period that the customer chooses when making the payment. The service is available from Monday to Friday in the morning and in the afternoon and on Saturday mornings. Most shops offer this service; in the city of Valencia, only 10% do not. Customers can also place their orders by telephone, for which they pay a surcharge for the preparation of the order.

Different concessionary prices are available for working partners and pensioners, which are up to a maximum of 6€ and free for any order of 60€ and over.

Delivery hours are not the same for all shops and predicted demand is estimated based on historical precedents. Each delivery person is assigned a vehicle of which she/ he is responsible for the basic maintenance: cleaning, refuelling, technical inspections, servicing, etc. Despite this, each Consum does not necessarily need to have a designated delivery person.

Consum guarantees its customers home delivery within a defined 2-hour period. The procedure for allocating delivery hours is manual and there is not any kind of route management nor prior planning.

4.1. Diagnostic of Home Delivery Logistics

With the aim of understanding the different perspectives, a SWOT analysis is carried out, considering the different parties involved: SD Logistica, Consum, the customer and society as a whole.

SWOT Analysis of SD Logistica

Weaknesses	Threats
• Unflexibility of the delivery service • Type of delivery dealt with • Food and home delivery goods: perishable goods require flexibility when being transported. • A compromise with Consum on meeting targets. • Delivery in a defined 2-hour time period: little flexibility in traffic conditions.	• A lot of competition in the sector. • High unit cost of each delivery • Difficult to make the process automated. • Highly-specialized logistics process. • Varied municipal regulations. • Restrictions on the entry of commercial vehicles in many cities.

Strengths	Opportunities
• Specialized in home delivery. • Close relationship and direct communication with Consum. • Use of Consum's facilities: supermarkets, allocated use of car park spaces and office space. • Exclusivity with Consum. Plenty of resources.	• New and emerging delivery methods. • Positive results seen with their use of electric vehicles. • Route-optimization systems and management programmes.

SWOT Analysis of Consum

Weaknesses	Threats
• Pays a high unit cost per order. • Doesn't recoup its costs. • Transport makes up a large amount of its activities: by outsourcing it loses the ability to monitor them and make decisions. • Increase in demand for the service that could become unsustainable in the current situation.	• Increased demand for the service, which makes the current situation unsustainable. • Outdated delivery and information management system which is disconnected from its working partners. • Sustainability of home delivery for several groups of people.

Strengths	Opportunities
	• New specialized logistics operators. • New systems of information management and communication. • Potential new dispatch methods • Potential new e-commerce.

SWOTS Analysis of the clients

Weaknesses	Threats
	• Long-term unsustainability of the service in the same conditions.
Strengths	**Opportunities**
• Low price for the service compared to competitors. • Free purchases starting from a relatively low price. • Advatages for some working partners. • Guaranteed receipt of orders in a defined time 2-hour time period. • Benefits that come from being a working partner.	• Possible new delivery methods • Possible e-commerce

SWOTS Analysis of the Society

Weaknesses	Threats
• Traffic and congestion • Pollution • Noise • Use of roads and badly-parked commercial vehicles.	• Growth in transport externalities.
Strengths	**Opportunities**
• A well-managed transport system which optimizes traffic flow and reduces individual journeys in a private vehicle.	• Sustainable vehicles: new fuels. There are already trials with electric vehicles.

4.2 Proposals for improvement

Given the complexity of the home delivery system, owing to the big casuistry that it involves and the multitude of parties involved, a multicriteria analysis is carried out, evaluating the different ways of action from economic, social and environmental perspectives.

In the end, 29 possible actions have been proposed in different fields:

- Regulatory and administrative measures: possibility of time slot parking, multipurpose lanes, online reservation for loading operations…

- Service: training for drivers, night freight distribution, loading operations in the parking of the company, new logistics platform, new routes software, different prices according time slots, etc.
- Vehicles: more electric vehicle, study of renting, leasing and acquisition options.
- Analysis of the general management systems
- New delivery options: between different shops, online, collection boxes, etc.
- Scheme of a whole new delivery system.

5 Conclusions

Until now, many companies have used free delivery as a marketing strategy to attract customers. According to comments made by Consum's Logistics Manager, only 19% of purchases (those which are considered 'provisions' worth more than 100€) can support the cost of the service.

Given this data, future considerations can be developed on the long-term sustainability of the current urban logistics models and their compatibility with new social trends. The application of methods aimed at mitigating transport externalities and streamlining the use of space in cities is going to be fundamental to guaranteeing economic, social and environmental sustainability in the future.

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