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Olsson, Annika

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LUND UNIVERSITY

PO Box 117  
221 00 Lund  
+46 46-222 00 00



# **INTERNET SALES CHANNEL EFFECTS ON PACKAGING LOGISTICS METHODOLOGIES**

**Annika Olsson<sup>\*</sup>**

<sup>\*</sup>) Dep. of Design Science, Div. Packaging Logistics, Lund University, 221 00, Lund, Sweden  
E-mail: annika.olsson@tlog.lth.se, Tel: +46 46 222 9734; Fax: + 46 46 222 4615

## **ABSTRACT**

The research area of packaging logistics naturally comprises the product, its package and packing operations, the physical distribution system and the information systems involved throughout the whole logistical value chain, including the end user.

This paper focuses on the effects of the sales channel of the Internet on the research discipline of packaging logistics and aims at identifying methodologies that are applicable in the area.

The paper also elaborates on the possibilities of theory and methodology development with a new logistics perspective. A literature review from three different search areas takes an inventory of research methodologies in the field of e-commerce *related* to packaging logistics from the consumer's perspective.

The objective is to draw conclusions about applicable methodologies used and to elaborate on the adoption of methodologies for future research in the new discipline of packaging logistics and e-commerce.

The contribution of this article is to introduce the suggestion to integrate the areas of consumer behaviour, marketing and logistics in order to capture the issues in the research on B2C e-commerce in the packaging logistics discipline.

*Key Words:*      *Packaging logistics, E-commerce, Consumer behaviour, Logistics, Marketing, Methodology.*

# **1. INTRODUCTION**

## **1.1. Packaging logistics research**

Packaging and logistics have been considered two separate disciplines in research and have thus been researched separately in most cases. However, the integration of the two disciplines into one research area offers advantages, as shown by Johnson (1998), in the ability of influencing costs and effectiveness in the whole logistic process by considering the package a prime element in that process. The possibility of influencing productivity and cost efficiency in materials handling as well as the cost effectiveness of the product by focusing on package design is emphasised. This supports the new integrated research approach in packaging logistics. Unfortunately few methodologies have been developed in the field so far, due to the novelty of the integrated approach.

The new area of packaging logistics creates synergies from an integrated system approach that naturally comprises the product, its package and packing operations, the physical distribution system and the information systems involved throughout the whole logistic value chain including the end user. It has been suggested that packaging logistics may be described as *"the interaction and relations between the logistical system and the packaging system that "add on" values to the combined, overall, system - the Enterprise"* Björnemo et. al. (2000).

The evolution of e-commerce as an influential factor in the area of packaging logistics is of particular interest, since no previous research in this area can be found. One advantage of focusing the package as a prime element in the e-commerce value chain is the ability to identify changes as compared to traditional retail in package handling throughout the logistics system, all the way to the end consumer.

## **1.2. The area of logistics**

Stock (1997) elaborated on the benefits of borrowing theory, methodology, concepts and principles from already established disciplines into the fairly young discipline of logistics, a pattern that can be discerned in other new disciplines as well. This supports the idea of borrowing theory and methodology into packaging logistics as a new discipline. Areas pointed out by Stock (2000) as being relevant to logistics are for example: psychology, consumer behaviour, marketing, economics, computing, mathematics and management. These areas apply in packaging logistics which can be further enhanced by gaining additional knowledge from theories and methodologies in packaging technology, package design, product development and simulation.

The different approaches taken in logistics support the idea of using a combination of qualitative and quantitative methods in order to understand the complexity of logistics. Mentzer and Kahn (1995) mentioned positivism as the major orientation in qualitative logistics research, while a lack of theory building based on qualitative interpretative

research in the field was noticed. The major part of previous empirical research in logistics is based on surveys aimed at quantifying results, while deeper qualitative research is more rare. Kenth and Flint (2000) used a few unstructured in-depth interviews to gain a deeper interpretative understanding in the field of logistics research using small sample size, which supports eliciting a wealth of information.

### **1.3. Logistics and customer value changes**

In previous logistics research, Flint and Mentzer (2000) emphasise the importance of understanding changes in customer desires and identifying driving forces in customer value changes. They also note a lack of empirical understanding of these customer value changes and desires and suggest a qualitative theory-building approach to gain a deeper understanding through interpreting and discovering irretrievable knowledge of individuals.

### **1.4. The consumer perspective – the essence of this research**

As previously established, consumer values and behaviour are important and will thus be focused on in this specific study. Empirical research in the areas of marketing and consumer behaviour mainly involves surveys based on questionnaires returned by consumers. Tan (1999) referred to public research in the field of marketing connected to the Internet, and his search showed no previous empirical research on consumer behaviour in a virtual shopping environment. According to Tan (1999), previous research rather explored the use of the Internet for marketing purposes

### **1.5. The interaction with packaging**

From a psychological perspective, Rettie and Brewer (2000) mentioned the lack of empirical research on consumer influence in combination with packaging design, since most previous work has focused on package-design techniques. The importance of the consumer is however pointed out, since the introduction of self-service in retail has assigned another role to the package and the interaction with the consumer is focused on. This justifies a need for qualitative research into consumer behaviour regarding package purchase and design. The evolution of e-commerce will probably also entail a change in the role of package design in interaction with consumers.

The researchers at the Department of Industrial Engineering and Management, Helsinki University have reported interesting and discerning research in articles on e-commerce of groceries and home deliveries, using simulations as method for home deliveries and for evaluating comparative perspectives in related issues. Their research could be one starting point for further research on packages bearing on the whole concept of e-commerce of groceries to consumers.

## **1.6. Objective**

This article is based on a literature review where the intention was to take an inventory of methodologies found in related research disciplines and to adapt them to the field of packaging logistics. Consumer behaviour research, marketing research and logistics research were identified as interesting areas related to this study. The aim of the article is to adopt methodologies into the field of packaging logistics in research *related* to e-commerce from a consumer perspective.

## 2. MATERIALS AND METHOD

An interdisciplinary approach to packaging and logistics research has resulted in the fairly new discipline of packaging logistics. Since this new, integrated perspective is based on a limited amount of literature, a limited number of methodologies have been developed in the field. In addition, the evolution of e-commerce is a relatively new influence on packaging logistics research, which will affect the discipline by placing new and different demands on the packaging logistics system.

The aim of the present article is to investigate methodologies for the field of packaging logistics *related* to e-commerce from a consumer perspective. An inventory of methodologies in related research disciplines was compiled with a view to adapting these methodologies to the field of packaging logistics. Consumer behaviour research, marketing research and logistics research, were identified as interesting areas related to this study.

The following three search areas were identified as relevant to our research focus: business-to-consumer e-commerce and home delivery of groceries from a packaging logistics perspective. The inventory of methodologies from the areas was based on a literature review carried out in three areas using different databases, including the Ebsco Academic search elite, Emerald library and Compendex. In the articles found, special attention was paid to the methodology sections. A certain notice was taken of articles where the methods sections were missing in order to determine whether this was characteristic of certain journals or to certain research areas.

The first search area focused on the field of consumer behaviour in combination with grocery shopping. Here the purpose was to find research methodologies that are able to capture various aspects of consumer behaviour in the specific area of grocery shopping. It was considered particularly interesting to discover whether both qualitative and quantitative methods were used and to analyse the differences in outcome resulting from different methodological approaches.

The second search area focused on the methodology of logistics and, if possible, in relation to food or grocery distribution, preferably in the area of home deliveries. In this area, research articles from the International Journal of Physical Distribution and Logistics, International Journal of Logistics Management and Journal of Business Logistics were studied as well as ongoing work at the Department of Packaging Logistics at Lund University and at the Department of Industrial Engineering and Management, Helsinki University.

The third search area was that of e-commerce and packaging of groceries, not only from a marketing perspective but also from a merchandising point of view. In this field, articles from the Journal of Consumer Marketing, International Journal of Retail and Distribution Management, Journal of Brand Management and Journal of Retailing were studied with a focus on the methodologies used.

### 3. RESULTS

#### 3.1. Database search

A literature review from three major perspectives related to packaging logistics in an e-commerce context was made in order to compile an inventory of methodologies used. The three perspectives were consumer behaviour, marketing and logistics, since they are all studied to achieve an integrated system approach in the research area of business-to-consumer e-commerce of groceries in the packaging logistics discipline.

A database search using key words related to the research area yielded 20 articles relevant to the area. The criterion for being considered relevant was that the article should have sections presenting findings or suggest further research in one related perspective applicable to the integrated approach of this research.

*Table 3.1 Keyword database search*

Keywords	Sections	Database	Result	Relevant to area
Package	Title & Abstract	Compendex	0	0
Packaging	Title & Abstract	Compendex	0	0
Grocery	Title & Abstract	Compendex	0	0
Packaging	All	Compendex	3	0
Grocery	All	Compendex	0	0
E-commerce	All	Compendex	2	1
Consumer behaviour	All	EBSCO	19	1
Consumer behaviour and package	All	EBSCO	0	0
Consumer and package	All	EBSCO	7	3
Consumer and grocery	All	EBSCO	13	3
Grocery and package	All	EBSCO	13	2
E-commerce	All	EBSCO	2581	n.a.
E-commerce and grocery	All	EBSCO	2	2
E-commerce and package	All	EBSCO	34	0
Consumer behaviour	Abstract	Emerald	620	n.a.
Consumer behaviour and package	Title	Emerald	1	0
Consumer behaviour and grocery	Title	Emerald	7	3
Grocery and package	Title	Emerald	0	0
E-commerce	Title	Emerald	34	5
E-commerce and grocery	Title	Emerald	0	0
E-commerce and package	Title	Emerald	0	0
			<b>Total</b>	<b>20</b>



It can be concluded that, although the area of e-commerce is frequently represented in the literature, the amount of literature related to packaging logistics and groceries is very limited. This implies that additional research is required to cover research questions on e-commerce in the integrated discipline of packaging logistics.

### 3.2. E-commerce and packaging in marketing journals

In an attempt to search the same issues from a marketing perspective, a search for e-commerce and packaging of groceries was made in Journal of Consumer Marketing, Journal of Product and Brand Management and Journal of Retail and Distribution Management from 1999 to 2001. This search showed that the number of articles in areas related to packaging logistics is limited. It is, however, interesting to note that one entire issue of the Journal of Retail and Distribution Management is devoted to e-commerce, where general phenomena of e-commerce covered in the literature are reviewed. Most of the articles in the marketing-related journals include a brief description of methodology.

*Table 3. 2 Marketing journals*

<b>Journal</b>	<b>Total number of articles</b>	<b>B2C or Internet of FMCG<sup>a</sup></b>	<b>Related to food or packaging</b>	<b>Related to Internet areas</b>
Journal of Consumer Marketing	74	3	0	5 <sup>b</sup>
Journal of Product and Brand Management	63	1	1	1
Journal of Retail and Distribution Management	65	8 <sup>c</sup>	5	3
<b>Total</b>	<b>202</b>	<b>12</b>	<b>6</b>	<b>9</b>

a) Fast moving consumer goods

b) One article on catalogue shopping, which is, however, relevant to the research.

c) One whole issue is a critical review of e-commerce in general.

### 3.3. E-commerce and packaging in logistics journals

In journals with a logistics perspective such as Journal of Business Logistics, International Journal of Logistics Management and International Journal of Physical Distribution and Logistics, business-to-consumer e-commerce is however rarely discussed. The Journal of Business Logistics, which often publishes articles focusing on logistics methodology, did not deal with e-commerce, even in articles where integration with marketing was suggested. Packaging in relation to e-commerce or logistics is not found in the logistics journals either.

### 3.4. Methodology from different perspectives

A study of the different methodologies used in the three areas of consumer behaviour, marketing and logistics shows that different methodology approaches are adopted in the different fields. However, many articles in the field of marketing had adopted a theoretical evaluative approach but had no detailed methodology section, which was probably due to the lack of empirical academic research identified by many authors. Table 3.3 shows the different methodology approaches found in various articles from the different areas.

*Table 3. 3 Methodologies and essential statements*

Area	Title of article	Author	Methodology	Essential statements
Marketing	Selling home entertainment on the Internet: an overview of a dynamic market place	McQuitty, S. Peterson, R.	Online search for journals with “marketing” and the Internet; also refers to previous consumer surveys	Claims a paucity of academic research related to marketing and the Internet. Also an increased recognition of importance assigned to the area.
Marketing	Internet shopping, consumer search and product branding	Ward, M.R. & Lee, M. J.	Survey based on questionnaires, cross tabulation	Indicates change in brand loyalty and required product information on the Internet
Marketing	The use of pharmaceutical Web sites for prescription drug information and product requests	Maddox, L.	Case study by means of consumer questionnaire. T-test and variance analysis	Discusses advertising on Internet and segmentation
Marketing	Does it pay to be a first mover in e-commerce? The case of Amazon.com	Mellahi, K. & Johnson, M.	Case study by means of literature survey and other secondary data	
Marketing / Consumer behaviour	Strategies for reducing consumers’ risk aversion in Internet shopping	Soo Juian Tan	Consumer survey with conjoint analysis of considered risks of Internet shopping	Claims lack of empirical studies on consumer behaviour in virtual shopping environment
Consumer behaviour	Vicarious exploration and catalogue shopping: a preliminary investigation	Stell, R. & Paden, N.	Surveys, questionnaires to consumers	
Consumer behaviour	Consumer response to online grocery shopping	Morganowsky, M.A. & Cude, B.	Qualitative survey based on secondary retailer data	
Consumer behaviour	Package Graphics and Consumer Product Beliefs	Fitzgerald Bone, K. & Russo France, K.	Factorial experimental design	Graphical design can influence attributes of belief, thus affecting consumer’s buying behaviour
Logistics/ Marketing	eCommerce: a critical review	Reynolds, J.	Review issue in International Journal of Retail and Distribution Management	
Logistics/ marketing	Marketing/Logistics Integration and Firm Performance	Stank, T.P., Daugherty, P.J. & Ellinger, A.E.	Survey , convergent and discriminant analysis	Claims that little research has focused on the integration of marketing with other interdependent areas

Logistics/ Marketing	Logisticians as Marketers: Their Role when Customers' Desired Value Changes	Flint, D. J. & Mentzer J.T.	Qualitative theory-building approach. Inductive methods of grounded theory through in-depth interviews	Supports effort in answering how and why questions. Claims lack of empirical understanding of changes in customers' demands
Logistics/ Marketing	Comparative views of logistics and marketing practitioners regarding interfunctional co-ordination	Murphy P. & Poist, R.	Comparative study survey by means of interviews, discriminant analysis	Co-ordination of marketing and logistics, considering the "place" a marketing channel where logistics is involved
Consumer behaviour/ logistics	Viewpoint: reaching the consumer through e-grocery VMI	Småros, J. & Holmström, J	Theoretical, evaluative	Discusses data collection to capture customer value creation
Logistics	An analytical model for home delivery in the new economy	Saranen, J. & Småros, J.	Simulation-based analytical model	
Logistics	The reception box impact on home delivery efficiency in the e-grocery business	Kämäräinen, V. Saranen, J. & Holmström, J.	Case study and scenario building of home deliveries	
Logistics	Applying theories from other disciplines to logistics research	Stock, J.R.	Literature review of four dominant journals	Suggests benefits of borrowing and applying existing theories from other disciplines into other integrated areas
Logistics	Perspectives on the evolution of logistics thought	Kent, J. & Flint, D.	In-depth interviews, exploratory approach	Logistics has moved through six eras and is complex and constantly changing, integrating with other areas
Logistics	On a responsive supply chain information system	Lau, H.C.W. & Lee W.B		Focusing on the information system throughout the supply chain
Logistics	Logistics research methods: Employing structural equation modeling to test for construct validity	Garver, M.S. & Mentzer, J.T.	Structural equation modeling which accounts for errors in latent variables, to test validity.	Calls for a stronger theoretical foundation in logistics research, increased scientific rigour and a focus on theory testing, while maintaining relevance to practitioners
Logistics	A framework of logistics research	Mentzer, J.T. & Kahn, K.B.	Literature review	Little theory development and testing in previous research. Researchers should also discuss validity, reliability and precision of work
Logistics	Cost-effectiveness in the e-grocery business	Kämäräinen, V. Småros, J. Jaakola, T. & Holmström, J.	Simulation	
Package technology	Efficient Package Design in Logistics	Ge Changfeng		New package development is driven by environmental, legislative and consumer demands
Package Design	The verbal and visual components of package design	Rettie, R. & Brewer, C	Image tests through market stimuli exposures	Claims there is little empirical research in package design and communication/branding

First it can be concluded that academic research in the area of the Internet and marketing is limited. The main focus in the area has been to investigate how to use the Internet as a marketing tool rather than focusing on e-commerce issues. Secondly, it is found that most studies derived from this field are based on consumer surveys by means of questionnaires or secondary data collection.

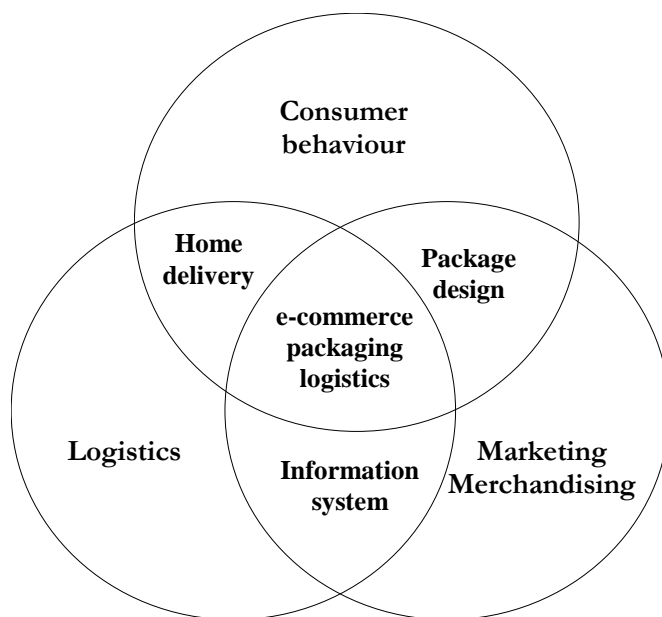
Authors of articles in the consumer behaviour discipline identify a lack of empirical research on consumer behaviour in the virtual shopping environment and stress the importance of studying consumer behaviour in order to understand the drivers and demands in e-commerce. A few of the authors establish the fact that package design and graphics will affect consumers' buying behaviour and that new package development will be driven by consumer demands, but otherwise the relation between package and consumer behaviour is seldom covered.

From the logistics perspective it has been established that integration with other disciplines is important since logistics is becoming increasingly complex and consequently will benefit from borrowing theories and methodologies used in other fields. In logistics research a variety of methodologies was found. One explanation of this may be the integration of research into other areas. Among the methodologies, case studies and surveys based on interviews are frequently used, but methods like simulation and equation modelling are also used. Major logisticians state, however, that there is a lack of theoretical foundation and validity testing of theories in logistics research.

#### 4. COMBINATION OF DIFFERENT SEARCH AREAS

Although research on B2C e-commerce is mainly found in business disciplines, a lack of empirical research in virtual shopping environment is identified. In technical disciplines, consumer-related research is rarely focused and with few exceptions, no integration of packaging issues with consumer-related research is found neither in business nor in technical disciplines. E-commerce is placing new demands on packaging logistics systems from all the three search perspectives of consumer behaviour, marketing and logistics. In e-commerce, many single-item orders to several delivery addresses on irregular occasions and different geographical positions represent one shift of demands as compared to traditional retail. Consumer and product requirements also imply changes in the system in terms of specific needs, such as delivery window requirements, temperature conditions, information needs and practicability.

To reach full system integration of packaging logistics research in e-commerce, a merger of the three research areas, i.e. consumer behaviour, marketing and logistics, is proposed; see Figure 4.1. Additionally it is suggested that the package be considered the prime element of research, since it adheres to the product throughout the entire value chain. Thus package design will influence the efficiency of the entire value chain in terms of functions, features, information and cost aspects. The efficiency of a product in these aspects will depend on package design, since a package has the potential to improve efficiencies through optimum design.



*Figure 4.1 Integration of research areas*

Discipline integration is pointed out as advantageous by many authors in the logistics area, in particular with marketing in order to gain enhanced transparency of information throughout the value chain. However, consumer or end-customer aspects as well as packaging aspects are often neglected in these suggestions for integration, where information systems have usually been considered the main common denominator in the integration of marketing and logistics. Package handling, package distribution and package storage in the area of Internet grocery shopping will add another perspective to the combination of logistics and marketing, since the package is the main carrier of information.

From the articles found in the combined area of marketing and logistics it can be concluded that the main part of consumer research is based either on questionnaires or on secondary data. Future research would benefit from empirical qualitative studies aiming at adding consumer interaction to the marketing and logistics perspectives of virtual shopping. Qualitative studies will provide a deeper understanding of the consumer demands placed on the system of grocery packaging and home deliveries in an e-commerce context.

The researchers at Industrial Engineering and Management at Helsinki University dealt with home delivery issues through a combination of consumer behaviour or demands and logistics research, where simulation was the method used. Consumer demands for certain categories of groceries and different delivery alternatives were elaborated on in the simulation models. However, this research did not cover such affects of packaging in home delivery transports as filling grade, weight of packages, information, and environmental aspects. Additional research where these package aspects are considered would provide a better understanding of the integrated area of packaging logistics and e-commerce, thus contributing additional parameters to the simulation models.

Consumer behaviour and marketing, the third combined research area identified in the literature embrace consumer demands and segmentation based on consumer behaviour. The issues of how package design affects consumers was addressed by a few authors. Distribution issues, however, were neglected, and the package was considered an isolated phenomenon in these articles. By adding elements of logistics to these findings, the integrated approach will be further enhanced, since packaging technology combined with distribution technology are important factors in meeting consumer demands on the package logistics system in e-commerce.

When, as suggested, the aspects of all the three areas of consumer behaviour, marketing and logistics are considered in the research of e-commerce and packaging logistics an integrated research approach is adopted. In future research, the demands of the different perspectives can be considered and the aim of the research can be to suggest solutions to meet these demands. As an outcome of the integrated research approach, these solutions have to be weighted against the efficiency of the whole system from economic and environmental perspectives. With the package system in a central position, important aspects such as product protection, information needs, distribution issues, and consumer practicability needs are considered at the same time as these needs are balanced against environmental aspects as well as towards the main driver of economics.

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