

PACKAGING DESIGN IN ORGANIC FOOD SUPPLY CHAINS – A CASE STUDY IN SWEDEN

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ABSTRACT

Packaging design is vital in the consumer product industry. This is why the recent consumer preferences for locally produced and organic food need to be met by product and package producers in the packaging design process. The purpose of this study is to understand how packaging design is managed in food supply chains with a special focus on organic and locally produced food in Sweden. It also identifies and elaborates on challenges met by small and medium sized food producers in the packaging design process. The results show deficiencies in organic food packaging design and the main issues can be divided into three areas: package design and material selection, supply chain imbalance, and knowledge aspects. The deficiencies are obvious for small local producers, but the study also indicates challenges for national brand enterprises in focusing on eco-design and sustainable packaging solutions, since tradition and supplier decisions seems to dominate.

Keywords: Packaging design, organic food, local food, food supply chain

1 INTRODUCTION

Packaging has become increasingly important in its role as a value-adding element for customers and is an important factor for business success on the consumer market. The package has also become important for several actors in the supply chain or network, since they all are dependent on the overall success of a product on the market. This, however, has not always been the case: as long as the performance of the packaged product constituted the single most important competitiveness factor on the market, the design of this product represented the most effective and efficient means of increasing competitiveness for a company. In those times, the traditional view that packaging depended only on the product was true. However, as the adaptation to business, sales, markets, consumers, etc., has become equally important in handling the competition for product producers, the actual use of packaging as an intermediate between the product and the user is more interesting than ever [1]. In line with this, packaging has become an essential component of marketing and distribution systems and is vital and irreplaceable in the consumer product industry [2]. Packaging design therefore needs a new strategic role in product development processes in order to meet ever changing consumer demands [3]. Consumer preferences for locally produced and organic food are, for example, recent trends that product and package producers need to address. This market continues to grow throughout Europe, with a turnover of organic food on the European market of approximately 18,000 million € in 2008. The largest market is Germany followed by the UK, France and Italy.

In the consumer product industry, packaging is an important source of differentiation, making innovative packaging design a key factor in avoiding commodity “me too” products. Still, many professionals see packages just as co-products that are a necessary evil and an unnecessary cost. In line with this view, the public also regard packaging as only an addition to the core product and eventually as waste. These viewpoints on packaging arise from the limited knowledge or the limited considerations of what functions a package has to perform – primary functions that have to be understood when developing new packages. With a holistic view of packaging, taking all functions into account, the overall knowledge required for designing packaging underlines the necessity of integrating multidisciplinary teams and competencies in the packaging development process [4]. The concern of environmental impact, raised by regulators and consumers, for example, gives rise to an increased need for skills in eco-design, which is of particular interest to study from a packaging design perspective.

From a supply chain perspective the view of packaging design becomes even more complex, since the different actors in the supply chain all place requirements on the packaging, and most often conflicting demands. This means that competencies are needed to be able to balance these demands and to prioritise them in order to design packages that fulfil the required primary functions. Imbalance in the supply chains is another issue. While some players are small or medium sized enterprises (SMEs), others are large, global corporations. The packaging industry is among the global and large ones, while food producers vary from global corporations to small local companies based on one or few entrepreneurs [5]. The imbalance between small food producers and large packaging corporations often leads to problems. It is thus of interest to study the packaging design processes that take place in organic and local food producing organizations that are considered small in relation to the global packaging industry. The research question that has guided this research is: How is the packaging design and selection carried out among Swedish organic and local food producers?, and what challenges are met in this process?

The purpose of this study is to understand how packaging design is managed in food supply chains with a special focus on organic and locally produced food in Sweden. The study also aims to identify and elaborate on challenges met by small and medium sized food producers in the packaging design process.

2 PACKAGING DESIGN

Sonneveld [2] established that primary consumer packaging is the most vital extension of a company towards the consumer. Packaging solutions that attract retail outlets and end users will create a “demand-pull” effect, which leads to a change in market position and market segment value [6].

It is evident that the development of consumer packages is a matter of designing packages that attract the consumer and draw attention on the retail shelf, while at the same time providing superior functionality and convenience in order to make the consumer repeat the purchase [7]. Poorly designed packages as an outcome of disregard for the role of the package, will result in frustrated users along the supply chain. Thus packaging development has to be: “consumer driven, distribution driven and technology driven” as expressed by Coles et al. [8]. The primary functions a package needs to fulfill are, according to Robertson, [9]: containment, protection, apportionment, unitisation, convenience and communication. Packaging designers need to work in multidisciplinary teams to integrate all these functions and aspects of packaging [4]. For containment and protection, product specialists knowledgeable about product requirements are needed. For apportionment and unitisation, mechanical engineers and logistics competencies are needed, while for convenience and communication, designers and business competencies are needed. These competencies are given as examples. Additional competencies, not mentioned but still important, such as those in eco-design, need to be integrated into the entire product and packaging design process, but that is seldom the situation.

2.1. Packaging design for food products

A package and its design need to affect users in terms of both functional and emotional responses. Food packaging development can thus be viewed as driven by consumer desires; but distribution needs, new materials, and the functional, industrial, or legislative developments that continuously put new demands on packaging materials also need to be considered [10]. The defining attributes of an initial food purchase decision are price, quality, and food security [11]; package typically reflects an image of quality and food safety that is critical. Special concern needs to be taken when developing and designing food packages since food places tougher requirements on product quality and safety than other products. Food packaging must be regarded as an integrated system consisting of the food and its package, and also integrated with the supply chain environment: in other words, food packaging design must be viewed holistically. With such a view, packaging can further be looked upon as a system that is built up of a product with aligned services to the users, such as product safety, product information, and user practicability, to mention a few [12].

In the marketing of value-added products, the package design has become a powerful tool to differentiate companies from competitors in the food industry [13]. A typical food consumer does not evaluate the reasons why a certain package is appealing before picking it up in the store, although these reasons can be articulated later when the package is used. This is why consumer insights are important to consider. In order to succeed in this matter, Sherwood [8] suggests redefining the

consumer usage benefit through a new integrated communication, thereby differentiating from the customary supplier-driven development.

Consumer demands on food products have driven the market towards more convenience and differentiation in a market with a wide spread of consumption patterns [5]. A recent trend among consumers is preferences for organic and natural products. In this evolution, food packaging has become a valuable aid in providing safe food to consumers [2; 11]. Food manufacturers actively work on anticipating customer needs and desires in order to satisfy the new demands of value-added products that fit intermediate, pre-cooked foods, and food that is adapted to new consumer trends. However, in the development of packaging systems for food products, new demands of customers and markets in the macro environment must be balanced with the requirements from the food products and from the ambient environment [11].

2.2 Packaging design in a food supply chain perspective

The product and its packaging need to be regarded as a system, since almost all products have packages that serve as a bridge between the product and the supply chain environment. A package adheres to the product throughout the entire value chain, which means that the package design will influence the efficiency of the entire chain in terms of functions, features, information and cost aspects. The efficiency of a product in these areas will depend on the package design, since a package has the potential to improve efficiency through optimum design. It is therefore important to consider the package in the value creation process across the entire distribution chain from production to end consumer [4;6]. However, packaging producers are often regarded as suppliers to a “core” supply chain (i.e. the food production supply chain), and thus seldom are regarded as equal partners of this chain. This result in them having limited ability to affect the early stages in the product design process. Fearne et al. [14] stress that business success is the result of companies focusing on the enhancement of the total performance of the supply chain, through which improved value to customers is obtained. To deliver such value, closer and longer-term working relationships, even partnerships, with suppliers at all levels in the supply chain is recommended. However, packaging design most often takes place in isolation from the core product development processes, and is carried out with few or specialised competencies, rather than in multifunctional teams as suggested by Olsson et al. [4].

When comparing the Swedish food industry with other industries, the oligopoly in the food industry is denoted as being a hindrance for co-operation. Other industries with several actors in each step show greater ability to co-operate in order to create customer value as a common ground and shared responsibility throughout the chain [15]. The transfer of power from several producers in the Swedish food industry to a few wholesalers and retail chains has further intensified the difficulties of sharing problems as well as business opportunities along the chain [4;15]. The power of distributors is also strong in other European countries, such as in France where six distributors shared 90.7% of national food sales in 2008.

Locally produced food has no strict definition on the Swedish market when it comes to distance between producer and consumer. However, it is clear that the strong consumer trend of Europe to prefer organic food has spilled over to Sweden, where local, organic food has increased. In 2007, 666 of the members in the Swedish farmers’ organisation [16] had local production and sales of food on the farm. The corresponding number for 2009 was 829. In 2010, an “app” called “local food farms of Sweden” was introduced to make local food more accessible to consumers. This trend lead consumers to drive to local farmers for food purchase, which has shortened the supply chain since the production and sales take place at the same point. But the supply chain has in a way also been reversed, meaning that consumers drive to the food production rather than food being transported to the place of sales at retail locations.

2.3 Eco-design of packaging

The European public policy has for a long time attempted to get industrial actors to reduce the volume and environmental impact of packaging. The first step was to apply Directive 94/62/EC 1994 [17]. The success of its application made European institutions increase the requirements on the criteria for eco-design (contents of material recycled, recycling, etc.) when they were upgraded in 2006. The global objectives of the directive are to reduce waste, reuse products, recycle or compost the material, recover energy and reduce the disposal of products in landfills. To achieve these objectives, pressure

has been put on each European Union Member State through Directive 2004/12/EC [18] in which a set of criteria was established to be achieved by 2008:

- A minimum of 60% of the weight of packaging waste will be recovered or incinerated at waste incineration plants with energy recovery.
- Between 55 and 80% of the packaging waste weight needs to be recycled.
- Minimum level of materials contained in packaging waste must be attained: 60% by weight for glass, paper and board; 50% by weight for metals; 22.5% by weight for plastics; and 15% by weight for wood.

The legislation has resulted in pressure being put on companies in their efforts to restrict the environmental impact of their packaging. Legislation is not the only pressure on companies. Indeed, the awareness of environmental pollution related to transport, waste treatment and visual degradation of urban spaces also plays against the image of brands. These elements are factors in questioning companies about what they can do to reduce the disadvantages associated with their food packaging. As one example, a US Gallup survey showed that 90% of consumers claim that they are willing to make a special effort to buy products from companies that try to protect the environment [19].

The first and principal action taken by companies is to reduce the mass of the primary package. This solution also helps to reduce material cost, which is a strong argument. This, however, presents some limits because an excessive reduction of the material entails destroyed packages in the production and transportation chains, which is a risk from a food security point of view. The case of food packaging is very special because its primary role is to protect and extend the usability of food. In most cases, the environmental impact associated with packaging is negligible with respect to the environmental impact associated with the food itself, as shown by Jungbluth et al. [20] and by Wrap [21]. Yet, in many situations packaging is unfairly judged as the major contributor to the solid waste problem [20]. So if a package contributes to reduced food loss, it becomes a way to reduce the environmental impact in itself [22].

A second step for the integration of the environmental concerns in food enterprises is to redesign not only the primary package but the entire packaging system – primary, secondary and tertiary packages – in order to achieve efficient transport with as high a filling grade as possible. This approach is a necessity for an effective optimisation of the overall packaging design in terms of technical constraints that follow throughout the value chain to the consumer.

The above mentioned actions demonstrate that the true efficiency of any environmental initiative is its ability to deal with a systemic analysis of the package design and finding solutions that fit throughout the chain of creation value. This holistic approach has the following prerequisites:

- Acquisition of knowledge in business [23].
- Increasing links between supply chain partners to achieve a global optimisation that can induce non-local optimisations [24; 25].

Accordingly, companies need time to change their practice of design and offer products to achieve true environmental satisfaction. It is also necessary that they develop partnerships with other players in the supply chain and with the stakeholders affected by their activities. Svanes et al. [26] suggest a holistic approach to packaging design and use of the following areas: environmental, economic, combined product and package characteristics, whole life cycle including the distribution chain, product losses, product protection, user friendliness and market acceptance. Doing so will result in an overall assessment tool.

3 METHODOLOGY

As the aim of this study is to understand the role of the packaging design in organic food supply chains in Sweden, the methodology used is a qualitative case study. This is because there is limited previous knowledge about packaging design among small and medium sized food producers in the academic field. The advantage of using case studies and interviews lies in the ability to achieve rigour in input and an in-depth, holistic view of issues from the perspectives of different actors as suggested by Yin and Eisenhardt [27; 28]. In the study, we analyze the degree of evolution of food packaging design for these case companies.

3.1 Selection of companies

The case companies were selected based on their role as small local food producers, national brand producers or importers of organic consumer food products. All selected companies have organic food as part of or as their entire portfolio. Company N5 was used as a comparative case, since few previous studies have been carried out on local and organic food production in Sweden. The intent was to be

able to compare small local producers with the process of packaging design that takes place in a larger well established organisation also working with organic food production. The respondents were chosen in consultation with the companies on the basis of who in the organisation is most involved in decisions and processes regarding choosing/designing packages for their organic products. Since the focus of the study is on organic food products, the table presents the part of the portfolio with the national brands that are part of the organic segment of each company. The interviews were semi-structured and an interview guide with open-ended questions was used. Where the respondents approved, the interviews were taped and transcribed. For the small local producers, a workshop complemented the interviews. In the workshop the product and package process were described by the local producers, as well as the challenges met by them in the supply chain. In addition to interviews, data from websites were used. The analysis was based on thematic coding and keywords.

Table 1: Respondents and characteristics of the selected companies and organizations

Company	Organic products	Package solutions	Own production	Number of employees	Respondents
LOCAL SMALL PRODUCERS with entirely organic products					
L1	Fresh raspberries, jams, jelly, raspberry drinks	Glass jars, glass bottles, paper crates	Yes	2	Owner (one of two)
L2	Chocolate, cacao powder	Paper bags and packages	Yes	7	Owner, CEO
L3	Organic lamb meat	Plastic bags vacuum pack	Yes	2	Owner
NATIONAL BRANDS with a mix of organic and conventional products (only organic in table)					
N1	Coffee, tea, spices, chocolate, candy, snacks, marmalade, vinegar, sugar etc.	Glass jars and bottles, paper packages, plastic pouch etc.	No	5	Purchase & product development manager
N2	Tomatoes, beans, rice, pasta, sugar, marmalade, tea etc.	Retort cans, glass jars and bottles, plastic pouch etc.	No	30	CEO, owner (one of three)
N3	Nuts, dried fruits, seeds etc.	Plastic pouch	Yes	22	Marketing manager
N4	Jam, marmalade, etc.	Glass jars	Yes	60	Quality and R&D manager
N5	Spices, fresh salad, mango chutney, coconut milk.	Paper and plastic pouches, glass jar, retort can.	Partly	1300	Purchasing manager of packaging material; Pack. Dev. Engineer

4 RESULTS FROM INTERVIEWS

The results from the interviews show deficiencies in organic food packaging design and the main issues can be divided into three areas: package design and material selection, supply chain imbalance and knowledge aspects.

4.1 Package design and material selection

Small local food producers (L1, L2) buy existing packages from small suppliers and are not able to influence the package design. One producer (L3) even claims that they have no involvement in the selection of packaging; when the product is sold in large retail stores, the package design decision lies totally with the retailer. L1 differentiates their products by designing a unique label to put on the standard package. L1 and L2 clearly stated that glass and paper are the preferred packaging materials, and that plastic is rejected even if it might have a better environmental profile. It is at the same time clear that the selection of packaging materials is based on feelings rather than on knowledge about the effects of using a certain material with different food products.

The national brands, N1 and N2, do not have any production of their own and use packaging concepts provided by the product supplier. Both N1 and N2 differentiate the packages with uniquely designed brand labels. They have no direct influence on package material and design. N2 comments that they choose product suppliers primarily based on their ability to supply high quality products, with the

given package provided by the supplier. If it is possible to influence the packaging selection, its environmental impact is considered. A selling package and a high quality product are, however, emphasized by N2, while the environmental concerns regarding the package are not a high priority. They do, though, try to choose transportation modes that have low environmental impact and “climate compensate” all their transports. For N1, a large portion of the products are imported and sold under other brands than their own. It is not possible for them to directly influence the packaging of these products, although they communicate and mediate consumer viewpoints to the supplier. Both N1 and N2 comment that they are able to influence their suppliers at least when it comes to adjustments, although in some cases it takes too much time and considerable effort.

N3 uses plastic pouches for most products, with brand unique labels. The same packaging material is used in all pouches, but for products that require better protection, the material is laminated with a barrier material. They have three standard size pouches and a separate type of pouch for organic products. They have good co-operation with packaging suppliers and experience good opportunities to influence the package design. The producing company N4 uses a standard packaging concept with a brand unique label, provided by a packaging supplier. Four standard sizes of glass jars are used for organic products. Tests have been made with other materials, however, the present packaging solutions were found superior both in adaption to the product production process and to consumer appreciation. Both N4 and N5 try to use a limited number of different packages. The larger company (N5) produces some products and purchases others from suppliers. They comment that the package selection is easier to control for the products they produce in-house, although they state that they have good possibilities to influence the type of package used on supplier products. They further mention that they supply the producer with package material. Both N3 and N5 claim to develop and make packaging decisions in functional teams, and packaging is discussed in parallel with product development (N1, N3, N4 and N5).

When selecting or designing a package, all the national brand companies mention that adaption to consumer requirements concerning packaging size is important. The size is chosen based on the target group, the price and the shelf life of the product. This is noted by some companies as being especially important considering the shorter shelf life of organic products because no preservatives are used.

4.2 Imbalance in the food supply chain

The local producers with small production volumes meet a large global packaging industry that prioritises large customer accounts for large volume sales. The small local producers (L1, L2, and L3), on the other hand, lack resources and skills to make their own packaging design. The interviews indicate that they have problems finding suitable packaging solutions and that they lack the ability to consider the overall supply chain environmental impact (including the consumer behaviour of using the food and package) when selecting packages. It is also clear in the interviews that the packaging industry shows little or no interest in small local producers, since their capacities are too limited. The interviews further show that the food producers want to purchase small volumes and small series, and that they do search for flexible solutions and possibilities to automatically or semi-automatically pack. However, there is a lack of flexibility in existing filling machines and this blocks the development or change of sizes and materials used in packaging. For automated filling, the high investments in filling machines prevent companies from investing in changes in the packaging.

Another aspect of imbalance in the supply chain is the problem for the small producers to integrate into the large supply chains and large retail stores to increase their exposure. The majority of the produce is hand packed in small volumes, which is a hinder to entering into larger supply chains. On the other hand, not all small local producers show an interest in marketing their products in the large retail outlets; if they succeed in getting there, they feel that their high quality brands will devalue and have to compete with large product brands of commodity quality.

The interviews reveal a common interest from small local producers to co-ordinate packaging and distribution related matters in order to balance the gap with the large retail chains and with the large volumes of the food supply chains in Sweden. The respondents request guidance in packaging design but also in general, such as for databases where packaging experts, packaging manufacturers, and other relevant parties can be gathered and located.

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also in general such as for example in databases where packaging experts, packaging manufacturers etc. can be gathered and found.

4.3 Knowledge aspects of packaging design

The main results from the interviews with the local producers show that they have no or very limited knowledge about packaging producers and what they can provide. When it comes to packaging, the local producers all claim that they have problems finding the type of package that they want. They also claim that they have limited or no knowledge of the role the package has to perform and would appreciate professional help with packaging design.

For the national brands (i.e. the somewhat larger players), the knowledge level is a bit higher; but still some of them claim to use the package that is suggested by the supplier, while others tend to use the same package as they have always done. One national brand (N3), for example, mentions some recognised weaknesses in the existing design regarding the amount of air in the packages, and admits that it just turned out to be like that in the first design and has not been changed since. The larger comparative case company (N5) has a clear strategy of organic design, but tends to focus more on the graphic design than on a holistic eco-design of the entire packaging system and its effects on the supply chain.

5 ANALYSIS & DISCUSSION

The different actors interviewed, can be categorised based on the framework of Svanes et al [26] as described in Table 2.

Table 2: Framework of holistic package design

	Local L1-L3	N1	N2	N3	N4	N5
<i>Product protection</i>	Based on feelings rather than knowledge.	Rely on packaging supplier.	Rely on packaging supplier.	Standard package. Barrier if needed.	Prioritize heat resistant material.	Prioritize mechanical protection.
<i>Product Losses</i>	Lack competence Do not consider.	Do not consider.	Awareness of package size related to waste.	Do not consider.	Recognize package size/consumption relation. Regard shelf-life aspect.	Product protection primary. Aware of energy losses of waste.
<i>User friendliness</i>	Lack competence.	Lack competence Do not consider.	Recognize “stackability” for cans.	Recognise “easy to open” and handle.		Recognise functionality as very important
<i>Market acceptance</i>	Lack competence.	Realize importance for sales.	Emphasised stress effect on sales.	Visibility, “window” in packaging design.	In relation to material selection – not emphasised.	Emphasised special work on design for attracting eco-consumers.
<i>Environmental</i>	Lack competence. Do not consider.	Rely on packaging supplier. Concerned about efficient packing for transport.	Rely on packaging supplier. Product quality more important than environment.	Environmental and cost efficient “tight” packaging of primary packages.	Volume utilisation in primary, secondary and tertiary packaging.	Environmental policy not to use aluminium, optimise pallets, secondary package.
<i>Whole life cycle , SCM</i>	Lack competence Do not consider	Lack competence Do not consider	Social responsibility on transports, Efficient sec. packaging	Lack competence Do not consider	Lack competence Do not consider	Consider entire process, effective transports.
<i>Integrated prod. and pack dev.</i>	Lack competence Do not	Packaging design discussed in	Lack competence Do not	In parallel. Multi-disciplinary	Choose package in parallel with	Package choice in parallel. Multi-

	consider	parallel	consider	decision council	label design and prod. dev	disciplinary teams.
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5.1 Eco-design of packaging for local and organic food production

Clearly the design of the packaging is rarely managed by the local organic food SMEs, and different difficulties limit their capacity to acquire this know-how. The lack of knowledge and time to develop their packaging and production size do not allow them to invest in R&D activities to specify adapted packages for their products, as suggested in literature about integrated product and packaging development [4;8;9]. It is also often difficult for small food producers to truly know their customers since they do not have at their disposal a dedicated marketing team. Consequently, a majority of these local producers use standard packages proposed by larger package manufactures leading to environmental under-optimisation for their food product (excess of volume, thickness of material, material not recyclable in the country where the food is sold, etc.).

The national brands claim to have integrated development, however, it seems that most packages used are standard packages developed and provided by packaging suppliers. Moreover, in the food sector targets to lower production costs have led to pressure on the purchase price of packaging. The consequences of this, is lack of innovation both at packaging machinery producers, manufacturers and packaging producers themselves.

5.2 Local food producer in the global supply chain - a way forward

As in other totally different supply chains (e.g. automotive, electronic), the need to develop environmentally friendly products induces the necessity to increase links and trust between the different actors of the supply chain [14]. This objective can be achieved in the food supply chain, through effective work on the packaging and reduction of the impact associated with the travel of consumers sourcing locally. However, the lack of knowledge and technical and financial resources hinder the collaborative development of packaging. N1 for example mentions their own limited company size, whereas company N2 refers to the limited resources at their small suppliers as the reason that makes investments in new expensive filling lines/packaging machines and their own packaging design impossible. It therefore appears essential to provide producers with information and training on the topic of eco-packaging design.

A first step for these companies would be to integrate the actual environmental expectations of their consumers. This evolution can be facilitated by technical centres and by links with academic and research institutes. The strengthening of partnership links is further necessary in order to permit a sharing of the marketing, economical and technical constraints associated with a real aspiration to come up with eco-design packaging. The major wholesalers could federate the means required to increase the level of competence of the local producers who work for them. These competencies can later be disseminated to the other local producers by mutualisation between local producers.

A second step would be to implement the technical adequacy of the package used. To improve the eco-design of their packages, these companies need to develop new partnerships giving them access to new competencies. This objective can be met by the support of an agency that can help them to build adapted requirements charts that integrate classical functional needs with environmental aspects. A purchasing group could further provide them with sufficient size to negotiate the price of the package.

6 CONCLUSIONS

This study demonstrates that individually, small foods producers have neither the technical capacity nor the necessary authority in the supply chain to achieve the objective of designing sustainable package solutions for their products. Furthermore, they have no real option to freely choose packaging concepts due to constrained investment opportunities, making it hard for them to influence the package decision. Consequently, suppliers of packaging and packaging machines are not interested in those customers who represent a small share of their business. A similar tendency is found in the relation to large retail stores who deal with small producers, where the small producers have little to contribute.

Even for national brand companies, packaging design constitutes more or less the design of the label and package decisions lie in most cases with the supplier. History and tradition are important factors as to why a certain package design and packaging material is used by habit.

To limit the impact on the environment and to avoid being rejected by consumers, food packaging should be designed and manufactured in a holistic integrated perspective. Indeed, small producers do not have the qualifications themselves. Thus, the most obvious improvement for them is to work with an optimized choice of packaging, within a space of existing solutions defined by the manufacturers of packaging. They can, however, improve their selection by extending their specifications with criteria that take into account the real masses and distances associated with the transport of their packaging (i.e. the supply chain perspective). They can also use the fact that sales and use are local, and make their choice appropriate to the existing packaging collection and recycling facilities. They can benefit from this situation by developing ways to reuse their packaging. For that, they have to master the sales, or be able to develop relationship with the sellers. To explore all the possibilities of solutions, it appears clear that they must achieve a holistic approach such as that recommended by Svanes et al. [26]. In this perspective, they need to receive training and information that enables them to understand the reasons behind the need for change and how to achieve it.

The situation is quite similar for the national brands; they also lack skills to structure the process of packaging design and fail in their ability to develop a holistic approach including sustainability considerations. However, they can evolve from internal resources in their relationships with packaging suppliers in the search for new technical solutions.

Consequently, if they do not benefit from the proximity to customers, they may try to increase their partnerships with their suppliers in order to develop more environmentally friendly solutions globally. Due to different geographical areas of sales and of their respective influences on the supply chain, the best possible organic food packaging solutions of the local producers may have to be different from those of the national brands. What appears to be most urgent today, however, is that this issue is properly addressed to initiate a process of improvement.

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REFERENCES

- [1] Olsson A. Petterson M. and Jönson G. Packaging demands in food service industry. *Food Service technology*, 2004, 4, 97-105.
- [2] Sonneveld K. What drives (food) packaging innovation? *Packaging Technology and Science*, 2000, 13(1), 29-35.
- [3] Olander-Roese M. and Nilsson F. Competitive Advantage through Packaging Design – Propositions for Supply Chain Effectiveness and Efficiency, In *International Conference on Engineering Design, ICED'09*, Vol. 1, Stanford USA, August 2009, (Design Society).
- [4] Olsson A. and Larsson A.C. Value Creation in PSS Design Through Product and Packaging Innovation Processes, In *Introduction to Product/Service-System Design*, 2009, 93-108 (eds. Sakao and Lindahl, Springer)
- [5] Beckeman M. and Olsson A. The role of Swedish retailers in food innovations. *International Review of Retail, Distribution and Consumer Research*, accepted for publication 2011.
- [6] Olsson A. and Györei, M. Packaging throughout the Value Chain in the Customer Perspective Marketing Mix. *Packaging Technology and Science*, 2002,15, 231-239.
- [7] Sherwood M. Winning the Shelf Wars - Unique packaging gives marketers a real selling advantage. *Global Cosmetic Industry*, 1999,164,(3), 64-67.
- [8] Coles R. C. and Beharrell B. Packaging Innovation in the Food Industry. *British Food Journal*, 1990, 92(9), 21-31.
- [9] Robertson G. L. Good and Bad Packaging: Who Decides? *International Journal of Physical Distribution & Logistics Management*, 1990, 20(8) 37-41.

- [10] Gerding T. K., Rijk M. A. H., Jetten J., van den Berg, F. and de Kruijf N. Trends in food packaging: Arising opportunities and shifting demands. *Packaging Technology and Science*, 1996, 9, 153-165.
- [11] CRIOC (2010) Consumer Behavior Monitor, <http://genie-alimentaire.com/IMG/pdf/CRIOC-2010.pdf>
- [12] Alerstam T., Bovin J.-O., Jönson, G. et al, *Lundaforskare föreläser 1995*, 27 (Lund University Press, Lund, Sweden)
- [13] Alfranca O., Rama R. and von Tunzelmann N. Innovation spells in the multinational agri-food sector. *Technovation*, 2004, 24 (8) 599-614.
- [14] Fearne A., Hughes D. and Duffy R. Concepts of collaboration: supply chain management in a global food industry. In *J.F. Eastham, L. Sharples, S. D. Ball, Food Supply Chain Management*, 2001 (Reed Educational and Professional Publishing Ltd. Oxford).
- [15] Wikström, L. Bristande konkurrens gör handeln lat, *Svenska Livsmedel*, 2009, 2, 6-7.
- [16] LRF report 2009, Entreprenad, hästverksamhet, uthyrning, turism och småskaligt livsmedelsföretagande.
- [17] EC Directive 94/62/EC, of the European Council, 1994 #232.
- [18] EC Directive 2004/12/EC, of the European Parliament 11 February 2004.
- [19] Gray V. and Guthrie J. Ethical issues of environmentally friendly packaging. In *Packaging a major influence on competitive advantage in the 1990s*, 2007 (Emerald Backfiles).
- [20] Jungbluth N., Tiedje O. and Scholtz R.W., Impact from the consumers' point of view investigated with a modular LCA, *International Journal of LCA*, 2000, 5(3), 134-142.
- [21] WRAP. Waste arising in the supply chain and drink to households. In *The UK, Document RSC 002-005*, 2010.
- [22] Williams H., Wikstrom F., Lofgren M. A life cycle perspective on environmental effect of customer focused packaging development. *Journal of cleaner production* 2008, 16, 853-859.
- [23] Le Pochat S. Bertoluci G. and Froelich D. Integrating ecodesign by conducting the change in SMEs. *Journal of Cleaner Production*, 2007, 15(7), 671-680.
- [24] Bras B. Incorporating environmental issues in product design and realization. *Industry and environment*, 1997, 20, (1-2).
- [25] Bertoluci G. and Millet D. Integrating Functional Product enrichment and supply chain disorganisation: two barriers for sustainable design, *International Journal of Product Development*, 2009, 7(1-2), 149-168.
- [26] Svanes E., Vold M., Möller H., Kvalvåg Pettersen M., Larsen H. and Hanssen O.J. Sustainable Packaging Design: A Holistic Methodology for Packaging Design, *Packaging Technology and Science*, 2010, 23, 161-175.
- [27] Yin R. K. *Case Study Research: Design and Methods*, Second revised ed. 1994 (Sage Publications, California, USA).
- [28] Eisenhardt K. M. Building Theories from Case Study Research. *Academy of Management Review*, 1989, 14(4), 532-550.