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2005

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Summary
Packaging logistics is fundamental to the success of retail supply chains. Implementing system-wide change in this field is however complex. This paper introduces packaging logistics in retail supply chains and compares and contrasts the change processes in the introduction of plastic trays to retail food systems in the UK and Sweden.

Introduction

It can not escape even the casual consumer's notice that the way in which fresh food is sold has changed. This is evident across Europe both in the changing formats of food retailing, but also in the ways in which fresh food is presented and retailed within shops. Transformations of the retail structure in many countries have altered the supply system and logistics requirements, as retailers have gained power and control from manufacturers, producers and wholesalers (e.g. Burt and Sparks 2003, Fernie and Sparks 2004). Some logistics changes have been driven by enhanced legal requirements on the safe and healthy handling and supply of food products. Others arise from alterations to consumer demands and requirements and the development of new products by manufacturers and retailers. New approaches to supply chain activities, such as ECR, and new developments in technology have also played a part.

Substantial retail logistics change has been enabled by a realisation that supply chains, particularly in fresh food can be simplified and reorganised, so as to become more efficient and effective (see Fernie and Sparks 2004). The packaging, handling and movement of products have become of vital concern for all involved in supply chains. In particular the scope for improvements in packaging logistics to produce better solutions for timely and appropriate handling and supply has been considerable. Packaging logistics takes a supply chain approach to the development of packaging, seeking efficiency and effectiveness across supply chains by the co-ordinated development of packaging activities and solutions. However, identifying changes that need to be made in supply chains to make them more efficient is one thing. Carrying through and implementing such changes is more problematic, with many opportunities for delays or errors.

The aim of this paper is to understand how change has been implemented in the area of retail fresh food packaging logistics. It examines the introduction of plastic trays into fresh food logistics systems. In the United Kingdom, such trays have become ubiquitous in both distribution and shop floor settings. The United Kingdom situation is compared and contrasted with the implementation of a similar change in Sweden. The two situations are used as exemplars of different retail power bases and culturally different approaches to change management. Through such a comparison it is anticipated that implications for companies, supply chains and academic conceptualisations may be developed. In this discussion the intention is to raise the issues and to point the way for further research. The paper is structured into four sections. First, we provide an introduction to packaging logistics in retailing. Secondly, a brief methodological section is provided. Thirdly, the two cases of the Untied Kingdom and Sweden are compared and contrasted. Finally, lessons are drawn.

Packaging Logistics in Retailing

Packaging is the underbelly of logistics and supply chains. It is absolutely essential to the efficient functioning of supply systems, but has a tendency to be taken for granted or ignored. An analysis of six recent UK textbooks in the supply chain and logistics field shows that consideration of packaging and packaging logistics is uncommon. Only three contained any reference to packaging and these were no more than three pages in length and concentrated in two cases solely on the basic functions of packaging. This reinforces the literature searches by Johnsson (1998) and Saghir (2002) who found few articles that examined packaging from a logistics viewpoint. Indeed Johnsson (1998) noted that packaging was generally only discussed from a protection and palletisation perspective. This lack of coverage is rather strange given that packaging acts as a logistics and supply chain integrator and brings considerable channel benefits.

There is an initial distinction to be drawn amongst primary, secondary and tertiary packaging. Primary packages hold the basic product and are brought home from the shop by the end consumer. Secondary packages, or transport packages, are designed to contain several primary packages. A secondary package could be taken home by the end consumer or be used by retailers as an aid when loading shelves in the store. The third level of packaging, tertiary packages, comes into use when a number of primary or secondary packages are assembled as for example on a pallet. Figure 1 considers the package life cycle as a whole.

As might be anticipated from Figure 1, there are different purposes and functions of packaging depending on the type and role of the packaging involved and its place in the distribution channel. Figure 2 attempts to provide a guide to the most important functions of packaging at different levels. The main levels of protection, performance and information are subdivided into further functions. Figure 2 also summarises the drivers influencing packaging and the benefits deriving from packaging. It is clear that many elements of the performance component and of the benefits have direct impacts on logistics and supply chains.

Fresh food includes fruits and vegetables, meat, poultry and fish as well as dairy products. Normally fruits and vegetables are packed directly into transport packaging, while other products must be packed in consumer packaging before they are put into transport packaging. Protection of a product is usually ranked as the most important packaging function as it is the package that will ensure that the product reaches the consumer at an agreed and expected quality. The fragility of the product must be known, covering all factors that can influence the product during production, transport, handling and storage. The choice of a suitable packaging system is dependent on available packaging systems, costs and marketing demands as well on the demands of the product during its life, including for how long it is transported and stored, under which conditions (i e frozen, chilled, ambient etc) and climate (temperature, humidity, atmosphere) the product is handled and the microbiology of the product.

In addition to the demands arising from the product characteristics, packaging has other logistics dimensions. In all systems there are issues of unitisation and inter-stackability. Packaging has to be designed so as to allow both the easy development of standard unit sizes and the ability of different sizes and shapes of packages to be ‘stacked’ together in one load. This minimizes

handling costs and provides more secure loads, with less damage to the product. Packaging also has to consider the environment. There is much concern over excess packaging, particularly at the consumer end of the channel, and legal requirements to minimize packaging have been developed by the European Union. There are thus potential efficiency and productivity benefits from considering packaging as an environmental issue. Additionally, depending on the product, there are concerns over packaging hygiene and the need to ensure that any packaging used is inert.

There is also store level interest in packaging. From a channel productivity perspective, there is some evidence that the largest handling costs occur at the store when products have to be placed on display. Packaging design and packaging materials can help reduce costs and time in this regard. Secondly, there are aspects of visual merchandising. Packaging carries information for consumers both in technical and in visual attractiveness terms i.e. what does the display look like?

These concerns have resulted in retailers looking very carefully at how they package and supply products. However the changes are most effective when the supply system as a whole adopts one system. However, getting retail businesses to agree common standards is not an easy task. In the case of retail fresh food in the early 1990s, the 'solution' to many packaging logistics issues seemed clear. It involved the introduction of a reusable plastic tray system. Whilst there was some resistance from corrugated cardboard manufacturers, the channel was moving towards using plastic. But, whilst the basic approach seemed straightforward, getting the details right, agreeing standards and implementing change was by no means easy. It often involved many parties with their own particular ways of working and positions and sunk costs to defend. The challenge of implementing this change is the focus of the case studies below.

Methodology

The implementation of system-wide change can take many forms. Here, the two cases of the United Kingdom and Sweden are considered. These are contrasting cases and have been deliberately chosen for this reason. The United Kingdom case is an example of a 'dominant designer' (see Lee et al 1995, Koehurst et al 1999), who through their market position and leadership is able to construct and press change on their own supply partners and then on the wider system. The Swedish case is more collaborative and reflective, involving a sequence of industry-wide learning and missions before decisions are finalized and change implemented.

The methodology in the United Kingdom case is that of participant research. One of the authors was actively engaged in driving change in logistics, initially in Tesco and in a system wide advisory role. He has spent the last seven years developing a more reflective and academic stance ion his previous activities. The case is developed from personal knowledge and involvement, reflection and confirmatory interviews with key other participants. A similar pattern of case development was followed in Sweden, but here the lead researcher also had access to written documentation, prepared as the business project developed.

Case: United Kingdom - Implementing the Second Generation Tray in Tesco's Supply Chain

It has been argued that Tesco's retail transformation demanded a concurrent logistics transformation (e.g. Sparks 1986, Smith and Sparks 1993, 2004a, b, Smith 1998). Within this, issues of packaging logistics were important, particularly given impending European Union legislation. Three phases in the change to a full plastic tray system can be identified.

Phase I: The first phase from 1990 to 1992 involved the Board decision to proceed with a new approach for disposing of secondary packaging by the retail stores. This involved the setting up of specialised recycling service units that would recycle plastic and cardboard and clean the proposed increasing volume of plastic trays, so that the suppliers could reuse them. This strategy repositioned the impending EU legislation on recycling from a threat into a business opportunity. The Board's decision was based on an assessment of the costs and benefits. There were the costs of change and implementation that were set against the penalties being imposed by the EU legislation. The benefits were to be found throughout the business, retail, commercial, logistics, suppliers and the environment. Retail were able to work more productively in store using the plastic tray for displaying products, especially fruit and vegetables. Commercial prioritised which product groups would benefit from lower costs in using the plastic tray rather than corrugated secondary packaging. Logistics improved their handling and stacking using the plastic tray. Suppliers paid less by using the plastic tray. The environmental benefits contributed to the reputation of Tesco as a company acting as a good citizen.

The second generation plastic tray has a footprint of 600 by 400 mm as well as a half tray footprint of 300 by 400 mm. They fit both the Euro pallet and the UK pallet. They have different heights to suit different types of products, which together with a folding and adjustable handle improve the space efficiency. An inefficient use of space was one of the criticisms made of the first generation plastic tray system compared to the use of corrugated secondary packaging, which is designed to fit closely to its products. There was considerable development effort at the design stage to find workable solutions, which would retain the benefits of rapid handling and product protection that are strong features of the plastic tray system, but with minimal loss of space efficiency. The adjustable bale arm was the chosen design solution, which was made possible with the improvements in plastic materials.

The second generation 600 by 400 mm plastic tray was designed as a modular system that would work efficiently with other equipment in the handling and transport process along the supply chain from supplier to store. Whilst they fit both the Euro and the UK pallet dimensions, a further part of the modular system design development at that time was a dolly. This is a plastic base on wheels that stacks 50 trays in two columns of 25 with a clip at the top designed to hold them in place. The use of dollies provided productivity benefits in retail store handling, warehouse handling and transport cube efficiency. At the retail store and in the warehouse assembly dollies are very popular as they are easy to move around and when empty, stack on each other, which again uses less space. The transport cube is more efficient as a standard length 13m trailer will hold 60 dollies compared to 45 roll cages.

The design development of this entire second generation plastic tray and dolly system provided supply chain, logistics and retail productivity and utilisation efficiencies. These were an essential part of the transformation from the earlier more static storage to the modern dynamic, fast

moving and tailored volumes of products that resulted in no stock being held in the supply chain, except what was in transit between suppliers, distribution and stores.

Phase II: The implementation phase from 1992 to 1994 was intense. A national network of recycling service units needed to be located next to the composite distribution centres which handled the fresh food product range. All the cardboard and plastic which used to be disposed of locally through the store waste compactors, as well as the plastic trays, was going to be collected from the stores by the composite delivery vehicles on their return journeys. Suppliers would then be able to collect the trays they needed after their deliveries to the distribution centre. It was decided to give the contract for the operation of these recycling service units to one contractor as part of the Tesco strategy to benefit from applying best practice throughout the network. There was a standard design for all the recycling service units. This design needed to balance the capacity and space for the operation in order to keep the costs of the land and building as low as possible. One of the influences on the amount of space required was the empty nesting ratio (empty interstackability) of the plastic tray. The first generation tray had a ratio of 2:1. The target for the second generation tray was 4:1. This was not an easy task at the time but the tray manufacturer did eventually succeed. The commercial division had the task of prioritising which product groups should go into plastic trays and then instilling the new disciplines with those suppliers.

At this time Tesco had already implemented key changes to its infrastructure for information technology, supply chain and temperature controlled logistics (Sparks 1986, Smith and Sparks 1993). This placed it in a very good position to develop a national strategy of recycling service units alongside each of its multi-temperature composite distribution centres. These handled the most volatile and sensitive food products, which were the very products that it was logical to transfer into the plastic tray system. This transformation in retail supply was an evolution from storage to rapid handling by all the parties along the chain. Logistics became focused on movement rather than holding stock. This faster pace of logistics was a powerful driving force. Some of the conflict in change management during this transition arose because the old way of doing logistics for storage did not meet the need for faster handling and the very rapid movement of the goods from the supplier to the retail store. However suppliers who had earlier experiences of successful change by Tesco were more able to give their credibility to this development in the recycling strategy.

Phase III: From 1995 to 1997 there was a phase of growing the number of products using plastic trays to reach an annual volume of 100 million. The unit cost of a plastic tray trip was linked to the total volume going through the recycling service unit network. The first product group had been fresh fruit and vegetables as there was a high cost to the secondary packaging of good quality corrugated cardboard. The next product group was fresh meat and poultry that had by that time been reorganised into a centralised factory production system with the fully prepared meat and poultry going directly into the plastic trays and quickly through the logistics supply chain to the retail store, with no stock being held in the composite distribution centres. The production quantity was determined by the anticipated retail sales with no buffer stock in the supply chain. The plastic trays fully protected the product during its handling and assembly into store orders in distribution. The next set of product groups were lighter in weight with a lower corrugated cost and needed a lower cost for the use of the plastic tray to be economical. This was now possible

as the volume moved through to a higher level justifying a reduction. The commercial, retail, supply chain and logistics cost benefits were evaluated to prioritise the selection of the next product group (specialist bakery products, such as croissants and pastries).
A valuable part of the implementation with the suppliers of these products was a supplier day held at a recycling service unit. A small group of suppliers and representatives from commercial, technical, supply chain, logistics and retail worked together to agree the optimum configuration of products in a tray and discuss the implications of the change. These events were highly successful in gaining the positive involvement of the suppliers in this change process. This had big implications for their production and packaging methods.

During this phase there was also a broader assessment of the feedback from the suppliers about the implications for the whole industry servicing the retailers. Manufacturers said that they understood the application and benefits of the plastic trays but pointed out that there were different sizes and specifications from different retailers. This puts demands of complexity into their production and distribution processes. The manufacturers asked the retailers to act together and agree a common standard. The outcome of this review was a consensus on a single design which all the retailers would use. This eliminated the cost of complication for the suppliers if each retailer had continued to insist on using their own distinct design.

The key themes that come thorough in the Tesco study derive from the 'dominant designer' paradigm. Tesco's power meant that they were able to take control of the process and to drive both the outcome and the speed of the implementation. By being further advanced than other retailers in this process, first-mover advantages allowed them to dominate the industry solution as well. There are disadvantages in this, but system efficiency overall was enhanced by the rapid process of change.

Case: Sweden - The Development of Multi-Party Nationwide Pool System in Sweden
During 1992-1999, a group of logistics specialists within the Swedish food supply chains took part in a development process, which included much learning and new thinking. The process contained eight separate missions (Table I). After several years of discussions, tests, investigations and new tests, the suppliers and the retailers within the Swedish business sector for food and commodities formed a jointly owned non-profit company in 1997, which started its physical operations in 2000. This company, Svenska Retursystem AB (www.retursystem.se), now has the mission to introduce returnable transport packaging into the Swedish food supply chains. The product range includes a family of nestable and interstackable plastic trays and plastic pallets in two sizes. This pool system is unique, since it is the only open, business-wide and national pool system in operation in the world.

Working Group 1, 1992-1994: In 1992, this process started when the first working group was formed. The members of this group represented a wide spectrum of actors in the Swedish food supply chain: growers, manufacturers, transporters, wholesalers and retailers. The chairman was a senior retailing logistics expert, well known and respected for his deep knowledge of the business sector.

The most important initial issue was to make sure that all group members were equally aware of the potential of the pool concept. The overall objective was to create a packaging system with

lower supply chain total cost. Additional objectives were increased product quality due to less transport damage, improved ergonomics, less time-consuming in-store handling as well as waste reduction. This first mission also included the task of selling the vision to governmental agencies in order to obtain the necessary financing of the upcoming development process. At an early stage it was concluded by the working group members that government agencies could be suitable project sponsors, as the group thought that a government-sponsored process would have a higher credibility and authorisation than if the actors themselves had sponsored the project.

The working group members therefore undertook a study visit to Austria, where the Kisten-Pool system was visited. At an early stage, after the trip to Austria, and as soon as the group had convinced itself of the potentials of a national pool system, it was decided to plan and perform a large-scale pilot test. The purpose of this test was not to try out different tray and pallet designs, but to test and evaluate the pool *system* from logistical, economical, ergonomical and environmental perspectives. This was the second mission, and the most cost- and time consuming part of this phase of the process. During the pilot test phase, the working group decided to start looking at the design of an administrative concept for the pool system, but this mission was postponed, and taken up again in 1998, as the eighth and last mission.

At this stage, the first working group looked at both trays and pallets. The need for a new type of returnable pallet was one of the main triggers for several of the working group members to join the process. For this reason, the working group decided in 1993 to design a material neutral functional standard for half pallets (800 x 600 mm footprint), to become a European standard. This mission was completed by the end of 1994.

The fifth and final mission of the first working group was started in early 1994, as a new sponsor, the Swedish Board of Agriculture, entered the scene. Sweden was soon going to become a member of the European Union, and the agricultural sector was facing a totally new market situation, where the open European market was identified as both a threat and an opportunity. The Board asked for a concept design of a pool system for returnable trays for vegetables.

After the large-scale pilot tests, the working group agreed on a number of system and product requirements. On the system level it was decided that the actors wanted an open-loop pool system, open for all suppliers, wholesalers and retailers to become accepted as pool system members. All members of the working were clear on the need for a neutral pool system solution that would not interfere with normal commercial competition. The pool system design would be deposit-based in order to achieve a high circulation speed and reduce loss of trays, already mentioned as two of the key parameters for pool system total economy. There was also full unity behind the conclusion that no one desired a third-party operator to run the pool system solution. The reason for this was that all actors wanted to keep full control on system cost and future development issues. Finally, the search for a suitable technology for the cleaning of used crates was identified as a high-priority system requirement. This had been identified during the study visit to Austria, where the cleaning of used trays was still an unsolved issue in 1992.

It was concluded at an early stage that both trays and pallets would follow the European pallet standard and its modules. The trays were designed with stack/nest functions based on 180º rotation. This was considered as the optimal way of reducing the space requirements for the

return handling and transport of empty trays. Other design solutions for space reduction of empty trays was turned down e.g. no foldable/collapsible or bale-arm stack/nest tray due to the bad quality of existing trays (e.g. hinges) and hygiene (difficulties in cleaning).

The first working group ended at the beginning of 1995, when the logistics manager at the largest retailer in Sweden stopped the vegetable growers from taking an initiative in starting and driving the development of a packaging pool.

Working Group 2, 1995-1999: Two new working groups, one for trays and one for pallets, were formed during 1995 as a result of a common initiative by the suppliers and the retailers. When Working Group 2 was formed in 1995, new group members were invited into the process. Knowledge continuity was secured, as three of the members from the first working group became members of the second group. The study visit strategy in Mission 1 was repeated.

Working Group 2 accomplished three missions. The first mission was the most time-consuming and effort-demanding of all eight missions (Table I). The working group was asked by the suppliers and the retailers to develop a specification of requirements on a business-wide, returnable tray, followed by a tender process (1995-1998). The second mission was to perform an environmental evaluation of a plastic tray (1996-1997). The third mission (how to design an administrative concept for the pool system and establish a member-owned pool company, 1998-1999) was taken up from the first working group.

The mission of developing a specification of requirements and undertaking a tender process has been selected here for further description and analysis, as it provides the basis for understanding how multi-party co-operation concerning change management, learning, reaching consensus and decision making, has been managed in this process.

In 1995-1996, two conflicting parties were identified. The suppliers of meat and cured meats, poultry and delicatessen stood against the suppliers of fruits and vegetables. These two parties continued to fight for their own interests throughout the process. The two groups could not agree upon various issues. Should the trays should be ventilated/drained or closed? Should handles be perforated or non-perforated? Another hot topic, repeatedly being put on the agenda, was the debate on tray height dimensions. Even the colour to be chosen for the trays caused conflicting views. To move forward, the working group identified two questions to be carefully considered when deciding on tray properties. Which of the two groups had the most urgent need/use of a common tray? Which of these two groups had the larger volume?

Nonetheless, certain decisions were iterated repeatedly or deliberately postponed. The decision-making was based on a negotiation- and majority-based consensus decision strategy. This was time-consuming. The definition of tray heights is one example of this. At a working group meeting during a study trip to Finland in August 1996, it was decided to start a project to test how the most frequent products would fit into different tray heights. First, a test protocol was compiled. During October 1996, a large number of test packing operations took place all over Sweden. More than 200 different frequent products were included in the test. In order to achieve a unified height on loaded pallets, as well as acceptable fill rates, the following three heights were proposed and decided upon in November: 110, 140 and 165 mm.

However, in May 1997, one group member came back from a trade fair in Brussels, where he had seen a new type of tray with interesting properties. This was the second generation bale-arm tray developed by Tesco. The empty nesting space reduction capacity was an impressive 75 % (to be compared with the 50-55 % offered by the 180º rotation stack/nest trays). This parameter, *empty tray space reduction*, had not been in focus earlier in the development process, since the working group had decided on the 180º rotation stack/nest tray concept, for quality and hygienic reasons. The Tesco tray gained support from the retailers' point of view, thanks to its space reduction features. Now the process entered into what is described as *"the U-turn"* by four of the group members. Or as another member described it: *"it went from evolution to revolution"*.

The second half of 1997 and 1998 were turbulent times, as the retailers argued for the Tesco tray, while the meat industry together with other suppliers fought for their positions, which had been formally agreed upon in the working group's specification of requirements for a returnable tray. In May 1999, the pool system company was finally provided with the investment capital required for concluding contracts concerning pallets and trays. The Tesco tray supplier was selected as supplier to the pool system. During 2000, the first trays were introduced in the market. It can be noted that the heights of the trays in operation today are somewhat different than what was decided after the large packing test in 1996: 106, 167 and 199 mm.

The key themes that come through in the Swedish case are focused on the idea that a commonly shred vision and objective is best implemented by a consensual decision-making process. From this stem a number of procedural avenues that attempt to take the entire market structure along with the decisions. The problems with this are that it may not be possible to move forward quickly and decisions may be postponed or endlessly debated in order to attempt to get consensus. The decisions that are made may become less viable as the time for implementation or discussion expands and so they may have to be revisited. Ass groups change their composition and minds, or as technology moves forward, so the process slows down further. By focusing on what was know, rather than what was desired, the stage was set in Sweden for the dramatic "U-turn".

Conclusions

Table II provides a summary of the contrasts between both cases and from this identifies some of the 'lessons'. No criticism is intended by this contrast. Organisations and individuals found themselves in a set of situations and circumstances and acted in the ways they felt appropriate. The 'lessons' are drawn to raise (self-)awareness of the potential issues for tackling change in such circumstances. It is important to note that in both countries the reusable plastic tray systems continue to expand.

The most obvious difference between the two cases in the pace of development, being very much more rapid in the UK. This pace stems from the direction given to the process by Tesco and in particular its high Board level interest. This was added to by the involvement of a multi-functional team to the process, stemming from internal and external (supplier) involvement. In Sweden the process was more passive and less directive and organisations, whilst perhaps having greater group dynamics, tended to revert to their own organisational requirements. There may also have been some 'groupthink' in Sweden due to the dominance of logisticians and the lack of

contributors from 'commercial' and other areas of the businesses involved. Perhaps surprisingly this pace was not adversely affected in the UK by an unwillingness to accept the current technological situation. Technological solutions were demanded to 'fix' problems, yet this did not seem to delay the process. In Sweden by contrast, initial acceptance of supposed limits to technology, closed off debate and choice, but did not speed up the process. In essence the pace of the solution was determined by a clear dominant force having the power and vision to seek rapid solutions. This vision extended to the supply chain as a whole as opposed to simply being company-specific solutions. The process in the UK was opportunity-driven rather than problem-oriented as in Sweden.

Packaging logistics takes a supply chain approach to the development of packaging, seeking efficiency and effectiveness across supply chains by the co-ordinated development of packaging activities and solutions. This is admirable, but there are major issues of implementation as these cases here show. There is need for further research to be undertaken in this area to understand not only the advantages and disadvantages of certain changes in this area, but also the best way to implement such changes. Imposition by a dominant designer is one way forward, but if that forces other competitors to incur extra costs to adapt to the dominant design then it could be seen as undesirable in the long term. Similarly, whilst consensus is admirable, if it takes too long to achieve, then inefficient supply chains are being maintained unnecessarily.

The contribution of this paper lies mainly in opening up this area for further research. The very limited previous research in detail on aspects of packaging logistics is somewhat surprising given the importance of the subject in both practical and academic terms. Practically it is clear that companies around the world are struggling with implementing similar solutions and there are implications and lessons for companies and supply chains to be drawn from the cases. In an academic sense, much is often written about the importance of integration in supply chains, and much for example has been written about ECR, but often the details of the actual physical activity needed to move products is ignored. Packaging by its nature has integrative functions and a better understanding of how packaging logistics works and how integration can be best achieved may produce revised conceptualisations of logistics changes and challenges. Much could be gained by contrasting the detailed implementation of such packaging logistics developments with the current conceptual descriptions of supply chain behaviours. A variety of approaches could be utilised in this regard. We hope that through these contrasting situations, we have begun to open up the subject for further work.

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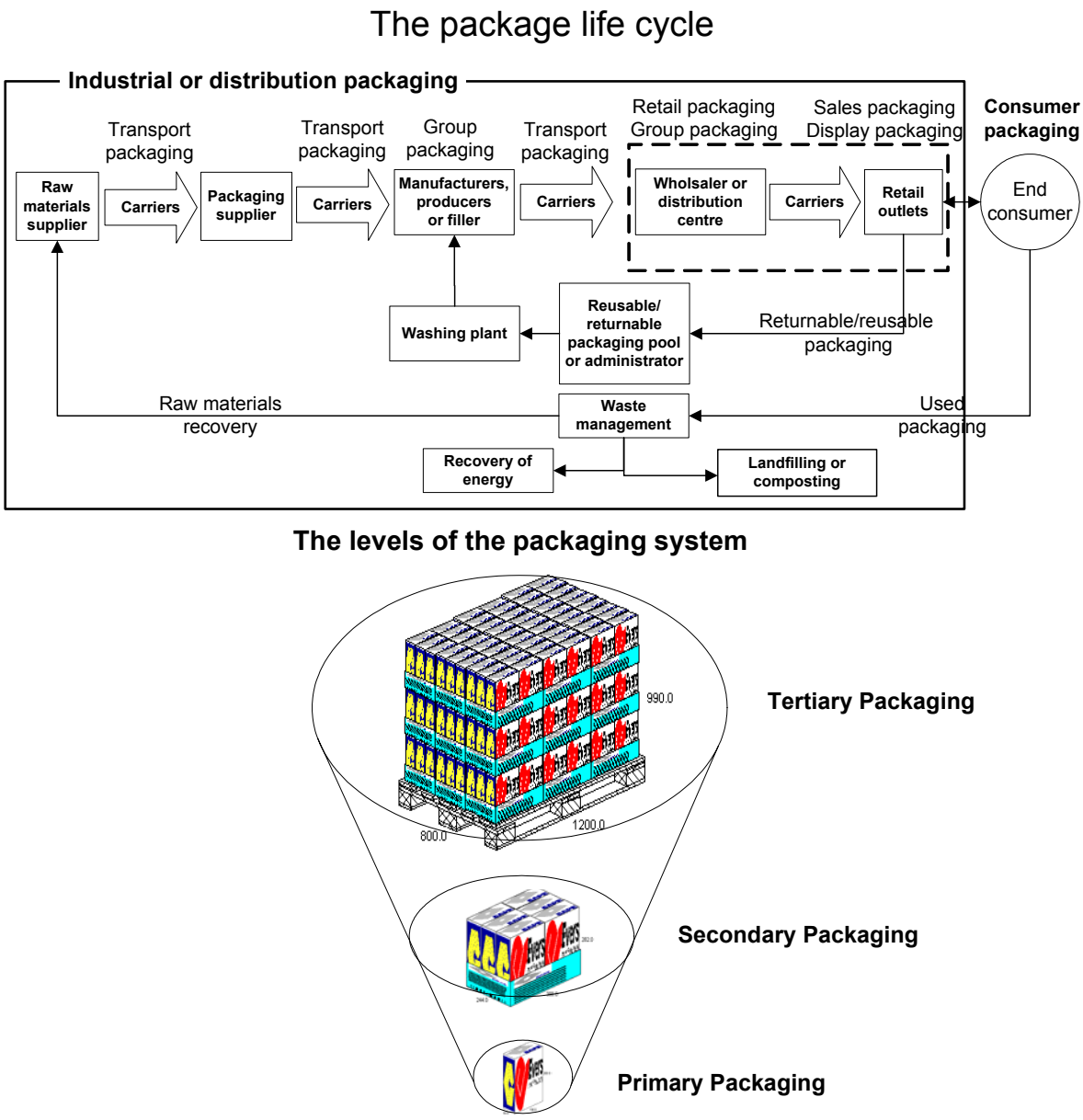
Table I: The Swedish Missions

	Working Group I
1	Identification of potential of pool concept and securing government support
2	Large scale pilot test
3	Administrative system developments for pool system (postponed to mission 8)
4	Design of material neutral functional standard for half pallets
5	Concept design of a pool system for returnable trays for vegetables
	Working Group II
6	Specification of requirements for a business-wide returnable tray (tender process)
7	Environmental evaluation of a plastic tray
8	Administrative system developments for pool system and establishment of a member owned pool company

Table II: Issues from the Case Studies

	UK Case	**Swedish Case**
Pace of Development	Rapid development period, 2 years	Slower development period, 8 years
Top Management Approach	Driven by Tesco Board as business priority	Management support from companies, but essentially passive
Importance of Logistics	Board level priority	Not on the agenda at board level
Functional Approach	Logistics and supply chain orientation so multi-functional teams introduced	Some multi-functional components but mainly separate identities maintained
Awareness of Technology	Technological improvements demanded to 'fix' problems	Acceptance of current technological state
Group Dynamics	Imposition by Tesco, but some dynamic 'following' – industry as a whole came into line later	Good working group and study tour dynamics. Involving and learning together encouraged interactions. Wider discussions ensued.

Figure 1: Different packaging terms used and the levels of the packaging system.

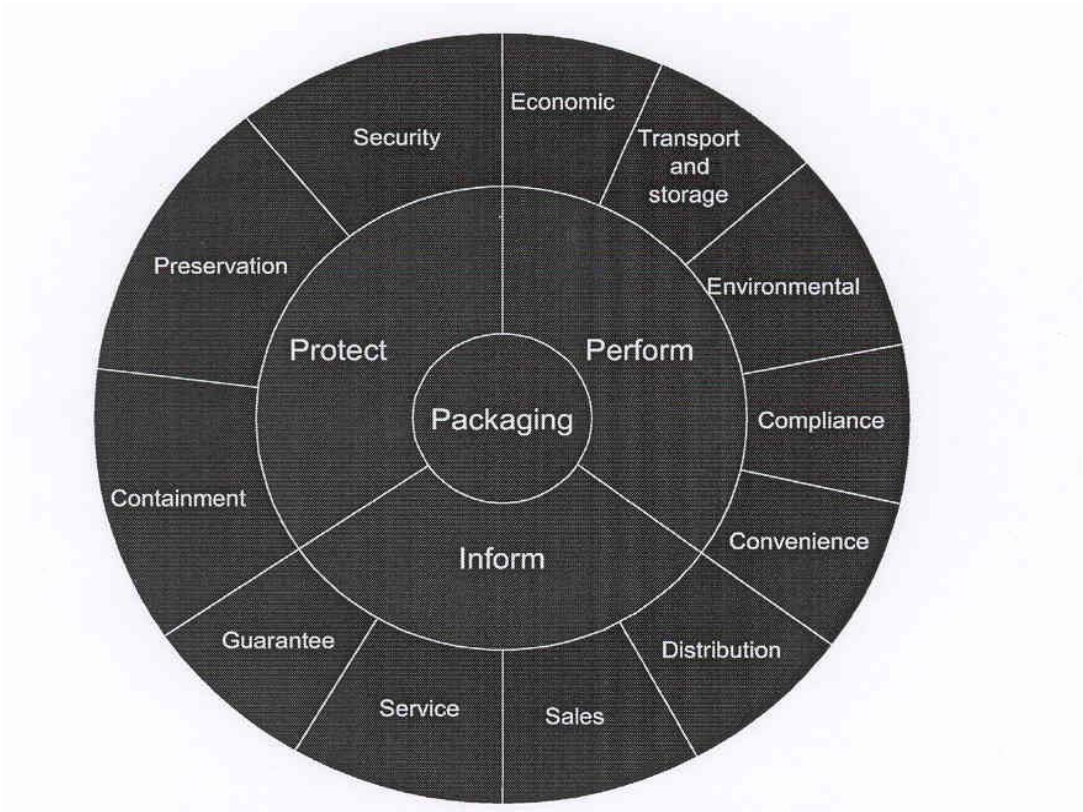


Source: (Saghir 2004)

Figure 2: The Purposes of Packaging

Drivers Influencing Packaging

Ageing population	Consumer tastes – fashion and culture
Smaller households	Technology advancements
Greater disposable income	Competition
Time pressures	Raw material costs
Health awareness	Supply chain performance
Environmental awareness	Globalisation



Benefits delivered by Packaging

Consumer choice	Convenience
Tailored portion sizes	Product protection (waste minimisation)
Packaging minimisation (reduced packaging per functionality)	

Source: Pira/University of Brighton (2004)