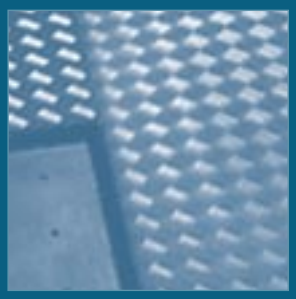


Packaging in the 3rd Millennium

Competitiveness Study for The Packaging Industry in the UK

Main Report

dti the department for Enterprise

pira

The Packaging Federation

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FOREWORD AND ACKNOWLEDGEMENTS BY PIRA

The overall aim of the Department of Trade and Industry is:

"To increase competitiveness and scientific excellence in order to generate higher levels of sustainable growth and productivity in a modern economy."

This new study prepared by Pira has been designed to assist the DTI in its overall aim, by focusing on the packaging manufacturing industry in the UK to analyse its performance and make recommendations for an Action Plan.

The work was carried out in partnership with the Packaging Federation. Acknowledgement goes to Ian Dent of the PF for authoring Section 3, International Benchmarking, as well as providing input to the rest of the report.

Thanks also to the following for their assistance:
Peter Davis, British Plastics Federation
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Tony Woods, Metal Packaging Manufacturers Association
Sue Bridger, British Print Industry Association
Walter Lewis, Faraday Packaging Partnership

An electronic version of the Executive Summary and Main Report can be found on the Pira and Packaging Federation web sites.

Ann Stirling Roberts
Director, Pira International

INTRODUCTION

Study objectives

Competitiveness studies have been commissioned by the DTI for a variety of industry sectors, which include paper, printing, plastics and metals with glass to be commissioned shortly. These studies include packaging issues but only as part of a wider industry picture.

In order to provide the packaging industry with its own competitiveness study, Pira International has collected into one report the packaging related outputs from those studies already in existence. Further value has been added through incorporating input from Pira's own Strategic Futures research programme together with contributions from The Packaging Federation on market data and the subject of international benchmarking.

The objective is to produce a report of relevance to the UK packaging industry which establishes its competitive position and makes recommendations as to how this could be improved.

Scope

This study is for the UK only and provides quantitative data for the packaging manufacturing industry. However, it has been one of the key objectives of the authors of this study to present the UK packaging industry against all the participants of the supply chain of which it constitutes an integral part and to benchmark it against the international packaging industry.

Methodology

The following methodology has been adopted in order to present the DTI and the packaging community with a study which covers the vital issues and problems facing the sector, and identifies opportunities to improve competitiveness:

- Existing relevant competitiveness studies commissioned by the DTI have been read and all packaging-related material has been extracted and summarised. The following studies have been selected:

TITLE	**AUTHOR**	**DATE**
Enhancing the Competitiveness of the UK Corrugating Sector	Pira International and CPA	January 2003
Print 21: coming of age? A Study into the Competitiveness of the Printing Industry	BPIF (British Printing Industries Federation) Pira acted as a Steering Group member	2001
Competitiveness Analysis of the UK Metal Packaging Industry	Quo-Tec Ltd	April 2001
Competitiveness Study for Paper Related Industries in the UK	Confederation of Paper Industries	December 2000
Plastics Processing in the UK	British Plastics Federation	1996

- *Putting Progress in Perspective* (2000 Annual Report 1) and *Unloved, Misunderstood – but Necessary* (2001 Annual Report 2) published by The Packaging Federation have been extensively used and incorporated into the study.

- Relevant material from the recent *E-Commerce Impact Study of the Packaging Sector* report commissioned by the DTI and produced by PricewaterhouseCoopers has also been included in the study

- The study considers the issues of international competitiveness; how does the UK industry compare with other countries in terms of productivity, cost base, etc. Some of this information was contained within the existing materials studies, but further analysis was carried out in conjunction with the Packaging Federation.

- Further information was obtained through accessing Pira's Strategic Futures research programme. This extensive research project seeks to understand the future issues and challenges facing the packaging industry and includes identification of emerging supply chain needs. Changing customer demands form an essential element of any competitiveness evaluation. *Packaging in the 21st Century*, a Strategic Futures report published in 2001, was a particular source of material .

Input was sought from the following organisations:

- The Packaging Federation, who acted as partners throughout the study
- Metal Packaging Manufacturers Association
- British Glass Manufacturers Confederation (British Glass)
- British Plastics Federation
- British Printing Industry Federation
- Confederation of Paper Industries
- Faraday Packaging Partnership (formerly The White Rose Packaging Partnership)

all of whom work closely with Pira.

- This report depended primarily on ***knowledgeable interpretation of existing sources of information*** and does not include any significant new research or interview programme.

Definitions

Raw materials manufacturer (also referred to as **Substrate manufacturer**)

A manufacturer who produces a range of raw materials such as polymers, unprinted plastic films, aluminium foils, corrugated case materials, cartonboard, tinplate, and similar. Substrate producers are packaging manufacturers' suppliers.

Converter (also referred to as **Packaging materials manufacturer**)

A company which produces packaging materials ***ready to use*** by a packer/filler. Converters are packer/fillers' suppliers.

Packer/filler

A company which uses packaging materials for filling and packing of fast moving consumer goods (fmcg), consumer durables, commercial and industrial products. In this category, the following types of companies are included:

- Brand owners who package their own products
- Contract packers and fillers, who pack product on behalf of the brand owner
- Commercial and industrial users

Retailer

A retailer selling own branded goods ('own label') and proprietary brands to the consumer.

Consumer

An individual person who purchases goods from a retail outlet.

Market

In the context of this study the UK packaging market is defined as:

Production + Imports - Exports = Market (= Consumption).

When talking about the value of the packaging industry, the authors of this report always refer to the value of the packaging ***manufacturing*** industry, and exclude the value of the market for packaging machinery as well as the value created by packing/filling operations.

Abbreviations and acronyms

The following abbreviations have been used to indicate polymers and substrates:

Alu	aluminium
BOPP	bi-oriented polypropylene
COC	cyclic olefin copolymer
CPP	cast polypropylene
HDPE	high-density polyethylene
EVOH	ethylene vinyl alcohol
LCP	liquid crystal polymer
LDPE	low-density polyethylene
LLDPE	linear low-density polyethylene
metPET	metallised PET
PA	polyamide (nylon)
BOPA	bi-oriented polyamide
PE	polyethylene
PET	polyethylene terephthalate
PEN	polyethylene naphthalate
PP	polypropylene
PVC	polyvinyl chloride
PVdC	polyvinylidene chloride

Other abbreviations used:

bn	billion
CAGR	compound annual growth rate
CCL	Climate Change Levy
DTI	Department of Trade and Industry
EU	European Union
FDI	foreign direct investment
FMCG	fast-moving consumer goods
f.o.c	free of charge
g	gram
GDP	gross domestic product
GVA	gross value added
IGD	Institute of Grocery Distribution
IPPC	Integrated Pollution Prevention Control
IT	Information Technology
ITC	Information and Communication Technology
j.v.	joint venture
kg	kilogram
m	million
NI	National Insurance
NPD	new product development
NTO	National Training Organisation
PPS	Premium Packaged Spirits
ONS	Office for National Statistics
R&D	Research & Development
SWOT	Strengths, Weaknesses, Opportunities and Threats
tes	tonnes
UN	United Nations
VOC	volatile organic compound
VMI	vendor-managed inventory

Currencies:

USD	US dollar
EUR	Euro
GBP	British sterling
DEM	German mark

OVERVIEW OF THE UK PACKAGING INDUSTRY

1.1. MARKET SIZE

Packaging is a large and important business both in the UK and in the world. There can be little doubt that packaging is one of the most prominent and visible sectors. The nature of packaging is such that it is intertwined with all industries, both large and small. It cannot exist on its own, but only as an integral part of the food and drink, personal care, pharmaceuticals or chemicals industries, to name just a few.

The role of packaging is vital to the commercial success of both consumer and industrial products in that it:

- Protects the product
- Provides information about the product
- Provides tamper-evidence for the product.

Additionally, in the case of fast-moving consumer goods, it also:
- Markets the product

1.1.1. The UK versus global and European packaging industry

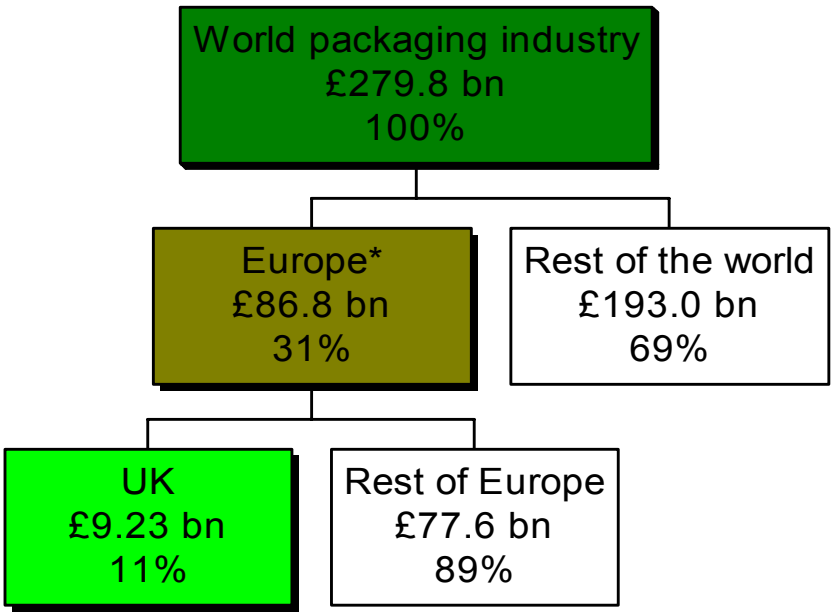
The global packaging industry is one of the world's largest and most diverse manufacturing sectors valued at nearly £300 billion in 2001. The UK packaging industry accounts for 3.3% of the global, 13% of the EU and 11% of the European packaging industry value.

Table 1.1:
Value of the UK and world packaging manufacturing industry, 1999-2001, £ billion

Country/Region	Year			
	1999	2000	2001	% (2001)
UK	**9.05**	**9.13**	**9.23**	**3.3**
W. Europe*	76.0	76.5	76.9	27
E. Europe	8.0	9.0	9.9	4
N. America	73.1	75.3	73.7	27
Japan	43.6	41.4	40.1	14
R.o.W.	71.8	74.9	79.2	28
Total	**272.4**	**277.0**	**279.8**	**100**

** Includes the UK*
Source: The Packaging Federation

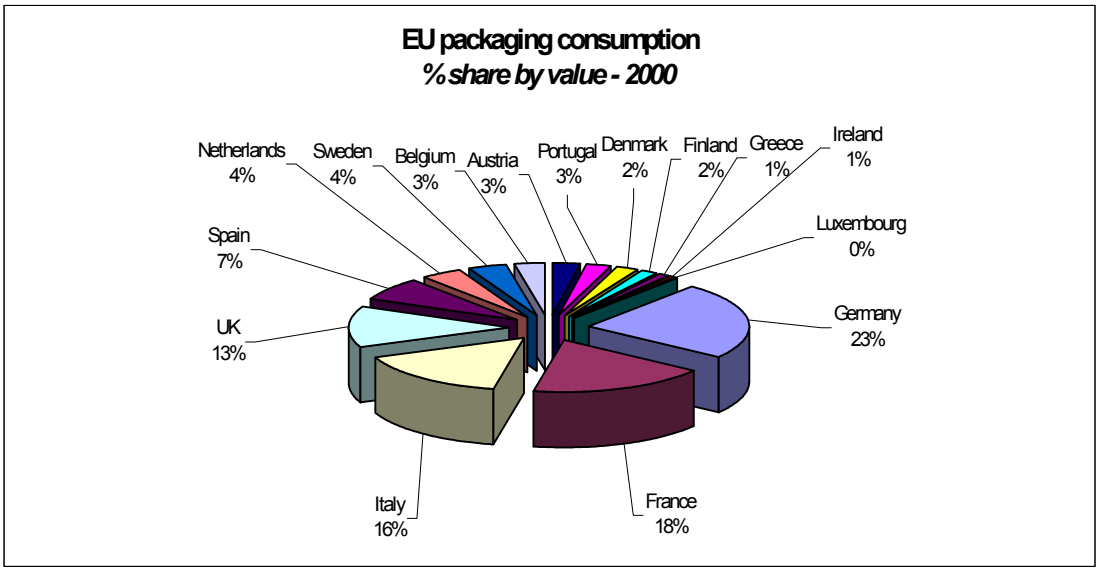
Figure 1.1:
The value of the UK versus the world and European packaging manufacturing industry, 2001



*Includes Western and Eastern Europe

Source: The Packaging Federation

Figure 1.2:
EU packaging consumption % share by value, 2000



Source: Pira International Ltd

Pira estimates that a total of 74 million tonnes of packaging materials were consumed in the EU in 2000. In volume terms, similarly to value, the UK packaging materials consumption accounts for 13% of the EU total.

Table 1.2:
Volume of packaging materials consumption by country and sector, European Union 2000

tonnes	Paper and board	Plastic	Metal	Glass	Wood and other	Total packaging
Austria	774000	300000	100000	246477	119652	1540129
Belgium	1201000	371200	112000	294667	45798	2024665
Denmark	568000	200000	108000	190476	211386	1277862
Finland	528000	200000	16000	52174	99160	895334
France	5175000	1700000	636000	4054794	2409552	13975346
Germany	6749000	2500000	704000	3720763	921736	14595499
Greece	523000	200000	116000	183893	186905	1209798
Ireland	256000	125900	41000	97297	38096	558293
Italy	5292000	2300000	552000	2736196	2818020	13698216
Luxembourg	38000	28800	9000	22862	14639	113301
Netherlands	2461000	600000	256000	463855	362020	4142875
Portugal	507000	200000	50000	497808	551226	1806034
Spain	3202000	1100000	344000	1745062	385638	6776700
Sweden	951000	300000	105229	170238	393890	1920357
UK	**4014000**	**1500000**	**1004000**	**1952515**	**1092000**	**9562515**
Total	**32239000**	**11625900**	**4153229**	**16429077**	**9649718**	**74096924**

Source: Pira International Ltd

The per capita spend on packaging materials in the UK suggests that Britons are among the most efficient packaging users in the developed world. Also when volume of packaging materials consumption is analysed, the UK per capita packaging usage is one of the lowest in the EU (Table 1.3).

Table 1.3:
Volume of per capita packaging materials consumption by country and sector, European Union 2000

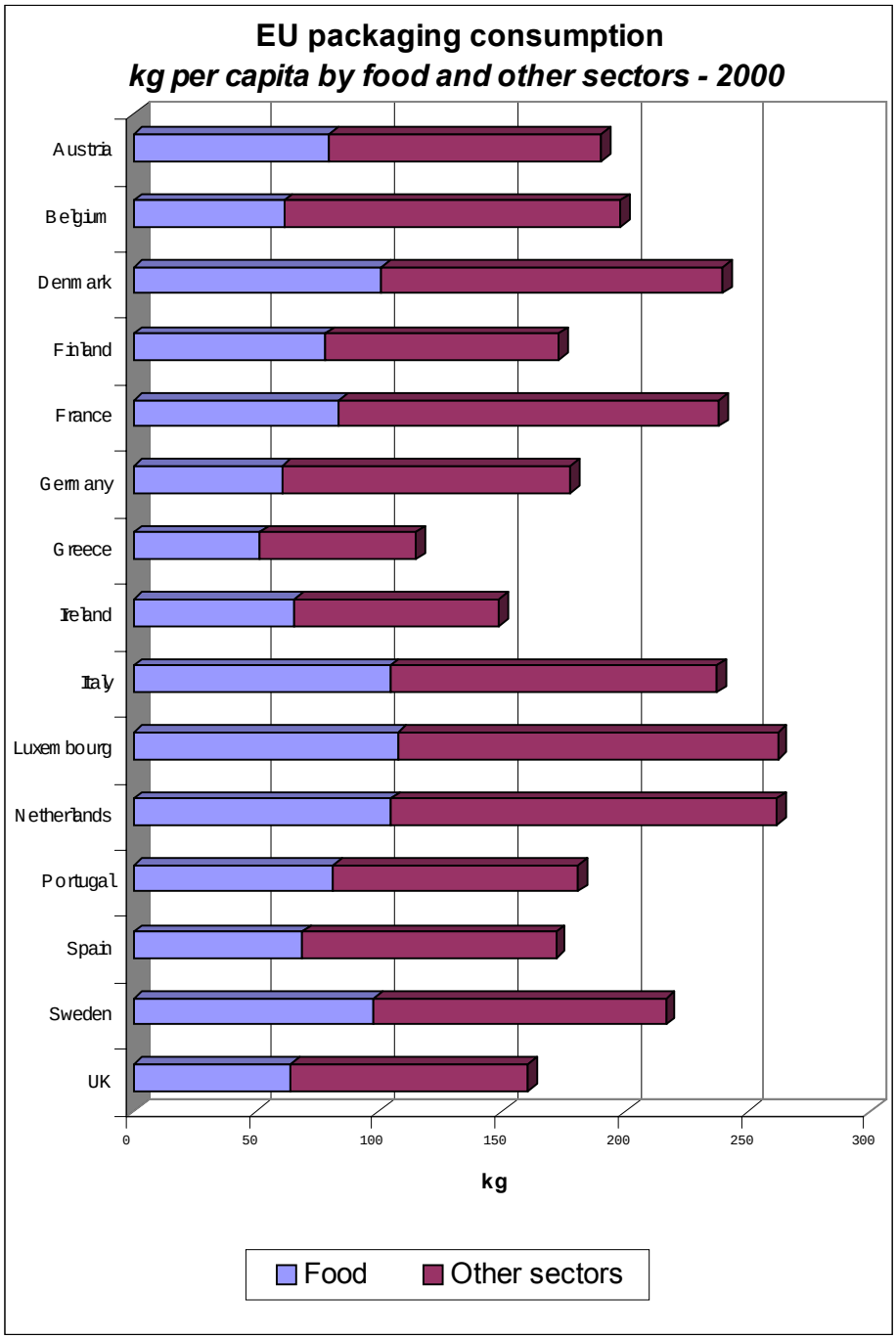
kg/person	Paper & board	Plastic	Metal	Glass	Wood and other	Total packaging
Austria	95.65	37.07	12.36	30.46	14.79	190.33
Belgium	117.45	36.31	10.95	28.82	4.48	198.01
Denmark	106.65	37.55	20.28	35.76	39.69	239.93
Finland	102.21	38.71	3.11	10.09	19.19	173.31
France	88.28	29.01	10.85	69.17	41.11	238.42
Germany	82.2	30.45	8.57	45.32	11.23	177.77
Greece	49.63	18.98	11.01	17.45	17.74	114.81
Ireland	68.23	33.56	10.93	25.93	10.15	148.80
Italy	91.8	39.89	9.58	47.47	48.88	237.62
Luxembourg	87.96	66.67	20.83	52.92	33.89	262.27
Netherlands	155.71	37.96	16.19	29.35	22.91	262.12
Portugal	50.76	20.02	5.01	49.84	55.18	180.81
Spain	81.25	27.91	8.73	44.28	9.79	171.96
Sweden	107.37	33.87	11.88	19.22	44.47	216.81
UK	**67.46**	**25.21**	**16.87**	**32.81**	**18.35**	**160.70**
Average	**85.87**	**30.96**	**11.06**	**43.76**	**25.70**	**197.35**

Source: Pira International Ltd

The consumer (i.e. retail supply chain) market dominates both the global and UK packaging industries, accounting for an estimated 70% of sales, while industrial packaging has an estimated 30% share. The food industry is the largest single end-use market, accounting for a 35% share of the global packaging industry.

Figure 1.3 shows that the 2000 per capita consumption of packaging for food and non-food applications in the UK in volume terms was similar to the global end-use market split, i.e. 36/64%.

Figure 1.3:
EU packaging consumption (kg per capita) by food and other sectors, 2000

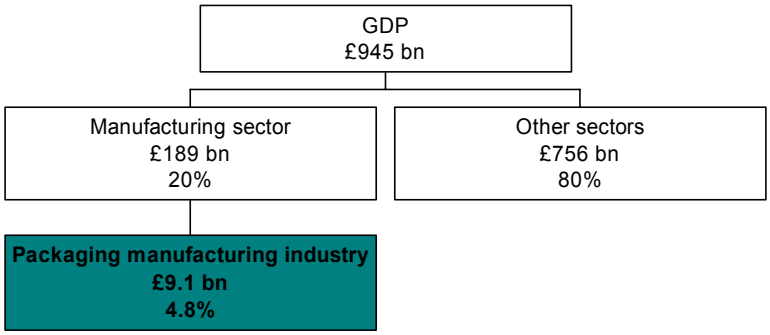


Source: Pira International Ltd

1.1.2. The UK perspective

The value of the UK economy expressed as GDP value was £945 bn in 2000 and the manufacturing sector accounted for some 20% of the total. The packaging manufacturing industry therefore accounted for some 5% of the manufacturing sector of the UK economy in 2000.

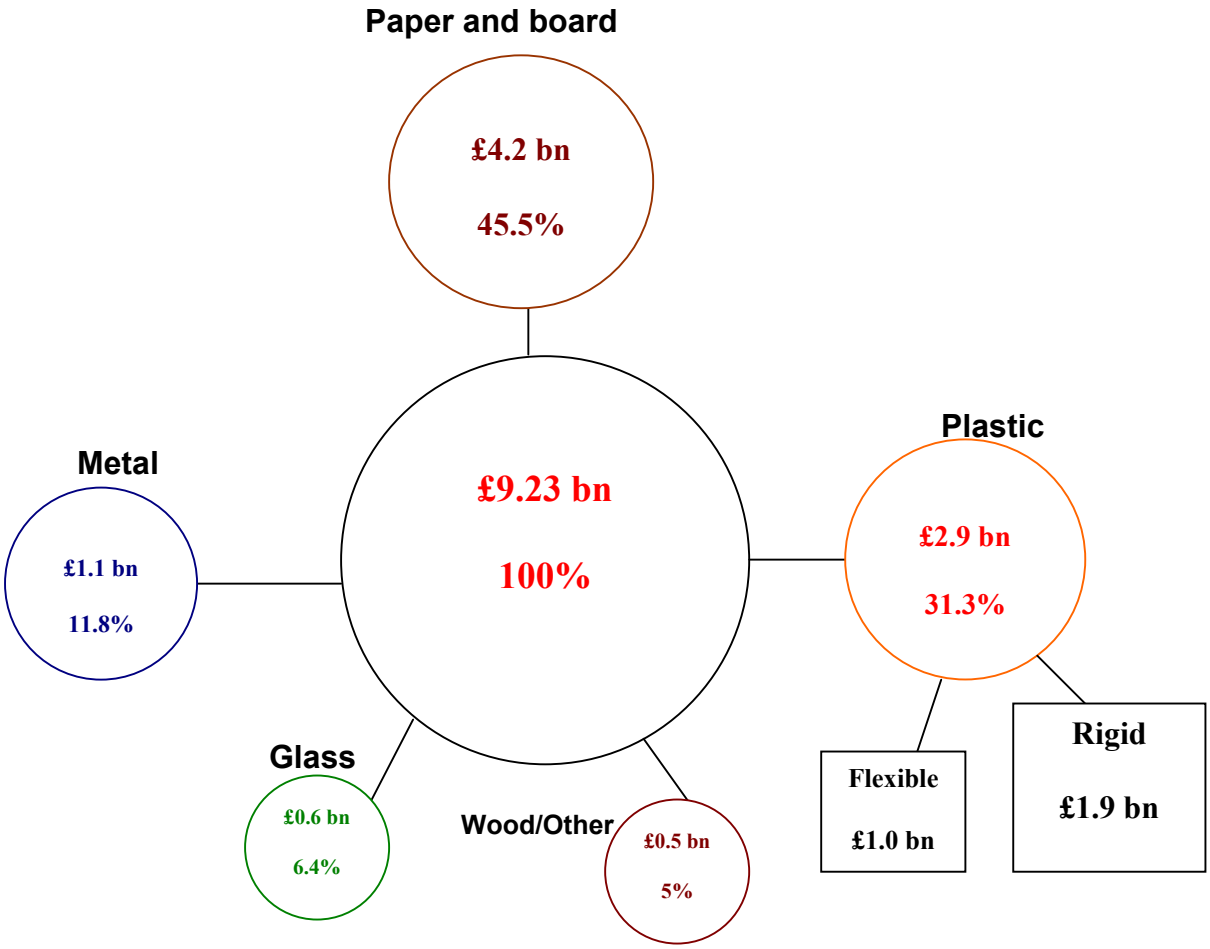
Figure 1.4:
Packaging manufacturing industry as part of GDP in 2000



Source: DTI/The Packaging Federation

The 2001 packaging market value in the UK grew by 1% on the previous year to reach £9.23 billion. Figure 1.6 shows the split of the value of the UK packaging market by material.

Figure 1.6:
Value of the UK packaging market in 2001



Source: The Packaging Federation/Pira International Ltd

Paper and board packaging remains the largest segment of the UK packaging industry. Both paper and board as well as plastics have been increasing market share in value terms at the expense of metal, glass and wood.

Table 1.4:
Value of the packaging manufacturing market in the UK, 1999-2001, £ million

Market value (£ million)	**1999**	**2000**	**2001E**	**% (2001)**
Paper/ board	3807.3	4008.7	4203.0	45.5
Plastics	2844.0	2872.7	2892.0	31.3
Metals [1]	1305.8	1185.8	1092.2	11.8
Glass [2]	606.7	596.8	594.0	6.4
Wood & other [3]	482.8	467.3	451.2	4.9
Total	9046.6	9131.3	9232.4	100

1. *Includes light metal packaging, steel drums and all other aluminium and steel products.*
2. *Includes non-packaging hollow glass*
3. *Includes wooden pallets, cork stoppers and all other packaging.*

Source: The Packaging Federation

In the last three years the value of the UK packaging industry has been steadily growing at some 1%.

Table 1.5:
Growth/Decline rates of the packaging manufacturing market in the UK, 1999-2001

Segment	**Annual growth/decline rate**			**CAGR**
	1999	**2000**	**2001**	**1999-2001**
Paper/ board	-	**5%**	**5%**	**5%**
Plastics	-	**1%**	**1%**	**1%**
Metals	-	**-9%**	**-8%**	**-9%**
Glass	-	**-2%**	**0%**	**-1%**
Wood & other	-	**-3%**	**-3%**	**-3%**
Total		**1%**	**1%**	**1%**

Source: The Packaging Federation

Paper and board sector has recorded above-average growth rates, whilst the metal and wood sectors have generally been in decline. The volume growth, however, has been higher than value in all cases.

1.1.2.1. The UK paper and board packaging industry

KEY FACTS

☛ UK paper and board is the largest segment of the UK packaging manufacturing industry accounting for 46% of its total 2001 value.

☛ The value of the paper and board packaging market in the UK in 2001 was £4.2 billion. The 2000 market value grew by 5% and the same growth rate was achieved in 2001. The paper and board packaging growth is attributed to its ease of use, light-weight, strength, cost, printability and recyclability.

☛ The market share of the top 7 paper and board packaging producers is approximately 45%.

☛ The paper and board packaging manufacturing base is dominated by foreign-owned companies whose market share is more than half of the total.

☛ There were 760 VAT registered enterprises which manufacture paper and board packaging in the UK. It is estimated that these producers employ some 40,000 people.

☛ The fall in the number of paper and board manufacturing enterprises and the number of employees for the second consecutive year indicates that the sector is consolidating through economies of scale, mergers and acquisitions.

☛ It is forecast that the value of the market for paper and board packaging will continue to grow, as demand will be sustained by environmental influences, product development, production costs and proximity to markets.

Market development

The paper and board packaging sector has remained the most important in UK packaging because of its ease of use, light-weight, strength, cost, printability and recyclability.

Products in this sector primarily comprise corrugated boxes, cartons, bags, sacks and packaging paper, made from paper and board using virgin fibre and recovered paper raw materials.

Slower rates of growth in recent years are attributable to a number of factors, including efforts on behalf of end-users to reduce the volume of packaging entering the waste stream, increasing competition from plastics, and a slower rate of economic growth in the UK.

Corrugated products, representing approximately 62% of the market in value, are the largest sector of the UK paper and board packaging market. One reason for the success of corrugated board is that it represents the most widely recycled form of paper packaging with recovery and recycling rates in excess of 73%.

Corrugated products have historically grown rapidly gaining market share from traditional forms of packaging such as wooden boxes and solid board cases and creating new markets through their cheapness and adaptability. In the form of boxes and trays it is mainly used in the warehousing and distribution of products as diverse as food, drink, textiles, electronics and automotive components. Corrugated packaging is produced as mainstream transit packaging for shipping products, decorative/point-of-purchase packaging for consumer products and heavy duty corrugated used by industrial producers. One-trip transit packaging, however, has been the key substitution area by returnable transit packaging, i.e. plastic crates.

Corrugated packaging operations comprise:

- Sheet feeder operations producing corrugated sheet board only and selling to sheet plants
- Sheet plants converting corrugated sheet board into various forms of packaging, from simple boxes and trays to multi-point glued boxes and highly printed display packs and point of sale units
- Integrated corrugated plants producing both corrugated sheet board and converted packaging on one site.

Folding cartons represent the second largest segment of the UK paper and board packaging, accounting for some 30% of its value. The UK is the largest European market for folding cartons, ahead of France and Germany. There has been a trend towards light-weighting in the sector in response to cost and environmental pressure.

The market for cartons, usually used in retail packaging, is large but fragmented with low growth in volume. The recent consumer trends such as increased take-away food and ready meal consumption continue to stimulate the cartonboard market. Supplier rationalisation programmes remain evident and many carton end-users have initiated tendering exercises to reduce their supplies base.

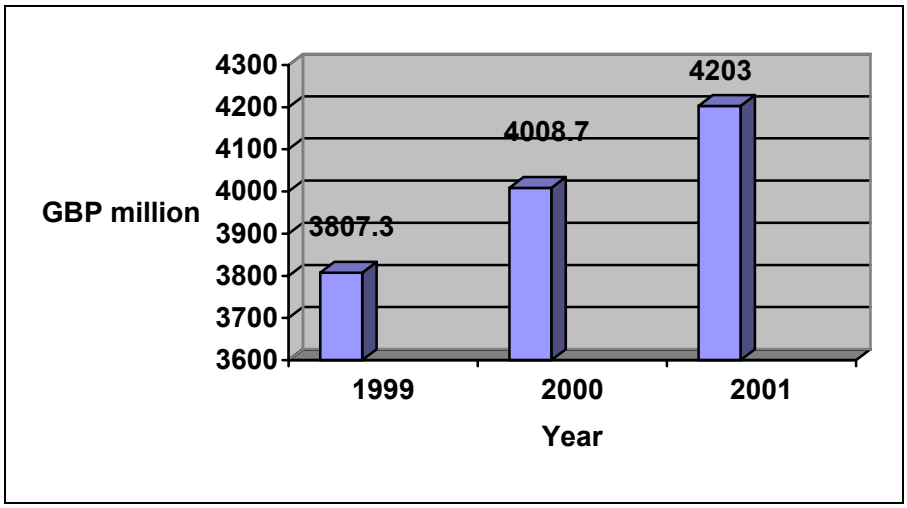
Annual sales of paper bags and sacks have suffered from overseas competition and from other materials such as plastics. The major markets for paper sacks are food, chemicals and building products. Other paper and board packaging products include fibreboard tubes and drums, packaging paper, cardboard pallets and liquid containers (such as Tetra Briks/Paks and Combiblocs). The recent launch of Tetra Recart, a retortable Tetra Pak for wet foodstuffs proves that this segment is constantly searching for new market opportunities.

Food remains by far the most important end-user of paper and board packaging, representing over 50% of the value of the market. About half of all food is packed in paper and board, although this market has come under increasing competition from flexible packaging in recent years.

Market size

The 2001 paper and board packaging market in the UK was valued at £ 4.2 billion and grew by 5% on the previous year.

Figure 1.8:
Market for paper and board packaging in the UK, value in £ million, 1999 – 2001



Source: The Packaging Federation

Imports of paper and board packaging materials have been declining in recent years, but the UK continues to be a net importer of these products.

Table 1.6:
Market for paper and board packaging in the UK, value in £ million, 1997 – 2000

£ Million	1997	1998	1999	2000	00/99 %
Manufacturers' Sales	4,001.6	3,946.0	3,759.3	3,944.9	4.94
+ Imports	219.4	251.6	236.8	230.5	-2.66
- Exports	207.7	204.7	188.8	166.7	-11.71
= Net Supply	**4,013.3**	**3,992.9**	**3,807.3**	**4,008.7**	**5.29**

Source: The Packaging Federation

Table 1.7:
Market for corrugated board in the UK, value in £ million, 1997 – 2000

£ Million	1997	1998	1999	2000	00/99 %
Manufacturers Sales	2,250.4	2,262.1	2,135.9	2,379.1	11.4
+ Imports	44.3	54.6	55.8	58.4	4.7
- Exports	67.5	71.0	66.3	58.1	-12.4
= Net Supply	**2,227.2**	**2,245.7**	**2,125.4**	**2,379.4**	**12.0**

Source: The Packaging Federation

Table 1.8:
Market for cartonboard in the UK, value in £ million, 1997 – 2000

£ Million	1997	1998	1999	2000	00/99 %
Manufacturers' Sales	1,200.0	1,133.4	1,067.5	969.1	-9.2
+ Imports	129.2	151.9	136.9	117.9	-13.9
- Exports	87.6	75.2	66.8	60.6	-9.3
= Net Supply	**1,241.6**	**1,210.1**	**1,137.6**	**1,026.4**	**-9.8**

Source: The Packaging Federation

The number of VAT registered enterprises manufacturing paper and board packaging declined by 7% in 2000 and 6% in 2001 a result of the sector restructuring through corporate changes such as economies of scale or mergers and acquisitions.

Table 1.9:
Number of VAT registered enterprises manufacturing paper and board packaging, 1999 – 2001

Paper/board packaging manufacturing	1999	2000	2001
No. of VAT enterprises	865	805	760
Annual decline rate	.	-7%	-6%

Source: The Packaging Federation

Major players

The main corrugated packaging manufacturers are:

- **D S Smith (St Regis Paper & David S Smith Packaging),** part of the UK DS Smith Plc (the group changed its name from David S. Smith Holdings in September 2001), focused on the production of corrugated and plastic packaging as well as manufacture and distribution of office products
- **Kappa Packaging UK Ltd**, part of the Dutch Kappa Holding BV. Kappa which has recently purchased corrugated interests from AssiDoman
- **Linpac Containers**, part of the UK Linpac Group Ltd, a leading packaging group with a spread of interests encompassing corrugated, plastics and metal packaging products
- **Mondi Packaging (UK) Ltd,** part of the UK Anglo American plc
- **SCA Packaging Ltd,** part of the Swedish Svenska Cellulosa Aktiebolaget, a major global and integrated manufacturer of hygiene products, corrugated packaging and containerboard. SCA has recently acquired major corrugated operations from Metsa Serla (now M-real)
- **Smurfit UK Ltd,** part of the Irish Jefferson Smurfit Group plc, a large integrated manufacturer and converter of a wide variety of paper and board packaging such as corrugated, folding cartons and sacks.

Market leadership is a close contest between the major players, but in 2002 Mondi is considered to be the largest UK supplier.

Since 1990, the carton industry has undergone a major period of consolidation, reflecting merger and acquisition activity within its own customer base. In the UK, the top 10 leading carton makers now account for about 60% of total output. The major players are:

- **Chesapeake Corporation** (USA) acquired Field Group plc (1999) and First Carton Group plc (in 2000)[1]
- **Mayr-Melnhof Packaging UK Ltd,** part of the Austrian Mayr-Melnhof Karton AG, the world's largest producer of recycled cartonboard and large converter of folding cartonboard

[1] In 2000,Chesapeake also acquired Boxmore International, a large UK plastics packaging manufacturer specialising in rigid plastic containers (mainly HDPE containers and PET bottles, preforms and closures)

- **A & R Carton (UK) Ltd,** part of the Swedish A & R Carton AB
- **Stora Enso Ltd,** part of the Finnish integrated manufacturer of cartonboard and paper
- **M Y Holdings,** a UK company recently acquired by Malbak of South Africa
- **CPC Packaging**, a French cartonboard manufacturer active also in the label segment.

All the major cartonboard packaging manufacturers in the UK are now foreign-owned having been acquired in the last ten years.

Future prospects

Demand for corrugated is forecast to increase as wider and more extensive uses develop, and the European economy improves. Growth, however, will be slower than in the past as a result of packaging minimisation and substitution by plastics.

Future trends in the paper and board packaging sector will include:

- an increase in the use of recovered paper compared to virgin fibre in corrugated materials
- corrugated will maintain its market share despite competition from shrink films and plastic crates
- the penetration of returnable plastic crates in the retail supply chain will continue to impact on the corrugated industry, but substitution is believed to have slowed and the market itself continues to grow
- further consolidation in the corrugated industry will occur
- the increased use of large-size packs and multipacks will provide increased opportunities for paper and board packaging. These formats are popular with supermarkets as they provide a more economical use of packaging, and the trend towards bulk shopping in out-of-town outlets has further encouraged this trend
- increase in demand for postal packaging formats as mail order and internet selling increase
- reduced paper weight and microflute grades with high quality printing are enabling corrugated to compete in primary consumer packaging
- some switching between cartonboard and flexibles is expected, but in both directions
- cartons will continue to have upmarket appeal
- retortable wet food cartons are well placed to pose a challenge to food cans and jars
- honeycomb paperboard, although a niche segment at present, due to its environmental credentials, in the long term could substitute EPS protective packaging
- focus by paper packaging suppliers on selling supply chain solutions, with growth expected in ready to merchandise and point of sale formats.

1.1.2.2. The UK plastics packaging industry

KEY FACTS

☛ Plastics packaging is the second largest segment of the UK packaging manufacturing industry accounting for 31% of its total 2001 value.

☛ The UK plastics packaging industry's market value together with the paper and board packaging market are the only two segments of the packaging industry which unquestionably continue to grow. In 2001 its market value reached £2.9 billion which marked a 1% increase on the previous year.

☛ Plastics packaging offers benefits such as low weight, shatter-resistance and excellent product protection at the lowest price. These factors make it the packaging material of choice. Although in terms of volumes, the plastics packaging materials market shows higher than value growth rates (some 2-3%), the two diverging trends, namely pack downgauging (minimisation) and price erosion, reduce the market value growth rates.

☛ The plastics packaging industry, after wood, remains the most fragmented sector in the packaging industry due to the fact that the barriers to entry are low and the end-use sector is very diverse.

☛ In 2000, there were an estimated 530 VAT registered enterprises carrying out plastics packaging manufacture, employing some 30,000 people.

☛ It is envisaged that the plastics packaging market will continue to grow both in value and volume terms and will substitute all other packaging formats.

Market development

Packaging is the largest end-use application for polymers and its market share is growing at the expense of sectors such as furniture, construction, and more recently, telectronics.

The plastics packaging industry can be split into:

☛ Rigid plastics
☛ Flexible plastics

Rigid plastics packaging is achieved through one of the following processes:

☛ Moulding (incl. injection, blow, rotational and compression moulding)
☛ Sheet extrusion and subsequent thermoforming.

Rigid plastics remains one of the most dynamic packaging formats. The last few years have continued to see above-average growth. Rapid advances in polymer science and conversion developments have contributed to increased market share enjoyed by rigid plastics at the expense of metal, glass and paperboard.

Flexible plastics packaging is also a very dynamic sector. This segment has the most diverse base of raw materials suppliers as apart from plastic films, it also utilises cellulose films, aluminium foil and packaging papers.

The main processes carried out by flexible plastics converters are:

☛ Film extrusion or co-extrusion
☛ Lamination
☛ Coating/Lacquering/Varnishing
☛ Embossing
☛ Slitting/welding
☛ Printing

Like rigid, flexible plastics packaging is replacing traditional materials such as glass, metal and paperboard.

Compared to flexible packaging converters who supply packer/fillers mainly with rollstock, rigid plastics packaging manufacturers have to think carefully about logistics as it is very uneconomical to transport empty HDPE milk bottles or PET beverages bottles. This consideration has stimulated the development of either in–house blow moulding operations routinely set up in bottling plants using PET bottles, or hole-the-wall operations typical in the dairy segment where HDPE bottles are blow-moulded next to the milk bottling plant.

Plastic packaging serves primarily the consumer industry with materials such as single- and multi-layer (barrier) films for form-fill-seal applications, adhesive labels, shrink sleeves, collation wrap, pre-made pouches and stand-up pouches, thermoformed tubs, pots, trays and containers, injection moulded containers and closures; blow moulded HDPE and PET bottles,

wide-mouth PET jars and various single and multi-layer polyolefin containers. It also supplies a variety of packaging materials for industrial packaging. These include shrink films, injection-moulded, blow-moulded and roto-moulded large containers and drums.

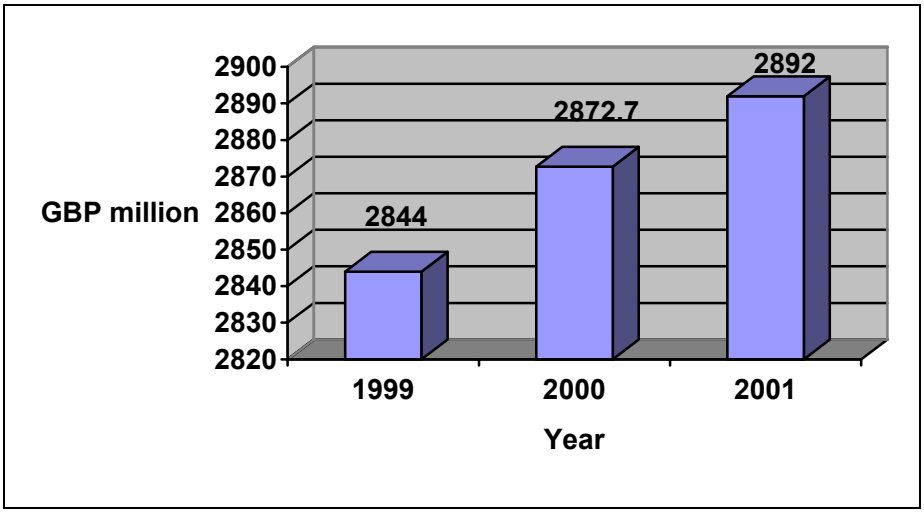
Packaging uses mainly commodity thermoplastics such as PP, PE, PET, PS and PVC, however packaging grades of engineering polymers such as PA, as well as EVOH or PVdC are also used providing barrier properties. New packaging grades are being constantly developed and these include metallocene PE, new linear grades of LDPE, PEN, COC and LCP. New polymers usually offer much needed properties such as stiffness, ability to downgauge, better barrier and similar. Speciality polymers are used as tie layers and sealant layers in multi-layer films.

Polymers are extremely versatile and, for example, when PVC bottles came under environmental attack, the industry replaced them with PET bottles. PET bottles initially were used exclusively for soft drinks due to the lack of necessary barrier properties of PET. Recent development of plasma coating of PET bottles makes them suitable for beer and cider.

Market size

In the last three years the UK plastics packaging industry has been growing at 1% per annum to reach £2.9 billion in 2001. The 2001 rigid plastics packaging, valued at £1.9 billion, accounted for 66% of the total value of the sector, while the flexible plastics packaging for the remaining 34%.

Figure 1.8:
Value of the plastics packaging market in the UK, 1999 – 2001



Source: The Packaging Federation

The plastics packaging industry, after wood, remains the most fragmented sector in the packaging industry due to the fact that the barriers to entry are low and the end-use sector is very diverse.

The plastics packaging segment, like all other segments, is restructuring itself. The number of VAT registered enterprises which carry out plastics packaging manufacture declined by 7% in 2000 and by further 3% in 2001, a sign that the industry is searching for improved profitability.

Table 1.10:
Number of VAT registered enterprises manufacturing plastics packaging, 1999 - 2001

Plastics packaging manufacturing	1999	2000	2001
No. of VAT enterprises	555	515	500
Annual growth rate		-7%	-3%

Source: The Packaging Federation

Major players

The plastics packaging industry has many sub-segments and each of them has its leaders. This segment is the most fragmented and diverse among other packaging sectors.

- ***Nampak,*** the South African company which acquired Plysu and Blowmocan, is one of the largest blow moulders supplying the drinks, dairy and other industries with HDPE and PET bottles. Nampak has now made a j.v. with Malbak, another major South African producer and owner of M.Y. Holdings.

- ***RPC,*** is the second largest (after Rexam) British packaging manufacturer. The company specialises in injection moulding and thermoforming of thin-walled containers for applications such as dairy products, chilled and uncooked ready meals, salads and snacks. RPC also has major manufacturing operations in Germany and plants in Belgium, France, Italy, Netherlands, Spain, Poland and Hungary.

- ***Rexam*** (formerly Bowater), number 1 in the UK; 3 in Europe and 10 in the world, Rexam carries out injection moulding of rigid thin-wall containers for ice cream, margarine, salads and similar chilled products. The company is also active in flexible healthcare packaging materials manufacture. It has undergone a major restructuring of its products portfolio in recent years to become a global player in plastics markets as well as can and glass manufacture.

- ***Huhtamaki*** is a Finnish company which acquired in 2000 the plastics assets of Van Leer. The company manufactures both rigid and flexible packaging materials and specialises in a wide variety of food applications. It has recently sold its industrial packaging operations acquired from Van Veer to the US Greif Bros.

- ***Pactiv*****,** formerly Tenneco, now is part of the US converter. Like RPC, the company specialises in injection moulding and thermoforming of thin-walled containers for applications such as dairy products, chilled and uncooked ready meals, salads and snacks.

- ***Linpac,*** a large UK plastics packaging manufacturer, is active in injection moulding (primarily of HDPE and EPS transit crates, tubs and pails) and in EPS sheet extrusion for in-house fresh food tray thermoforming. Apart from plastics, Linpac Group Ltd's interests encompass corrugated and metal packaging products. About 40% of its operations are in the UK with over 70 locations throughout Europe, N. and S. America, S. Africa and Australasia. The company has also one of the UK's largest rigid plastics recycling operations.

- ***Amcor Flexibles Europe*** is the largest flexible packaging converter in Europe with 10 plants in the UK. The company with its HQ in Australia supplies the full spectrum of end-

use applications offering a very wide portfolio of primary (retail) flexible packaging materials. In May this year Amcor has entered the rigid plastics and closure segment by acquiring the German Schmalbach Lubeca PET container and White Cap closure business.

- ***British Polythene Industries*** is the largest UK PE film extruder and the second largest flexible packaging converter specialising in industrial packaging. The company has over 30 plants in the UK and in China.

- ***Lawson Mardon,*** part of the US group Alcan Inc., is the third largest flexible packaging manufacturer in the UK focusing on premium consumer packaging. The parent company is also active in paper and board and metal packaging.

- ***Britton Group***, a UK-based film extruder and flexible packaging converter with 3 divisions: Britton Print and Conversion, Britton Security, Britton Film. The group manufacturers consumer and industrial flexible packaging materials as well as films for applications such as hygiene products or vehicle tyres.

Out of the selected top ten plastics converters, five are owned by non-British capital. The recent most prominent acquisition of the UK-owned plastics converters was the Nampak's take-over of Blowmocan and Plysu.

Future prospects

It is envisaged that the good fortune of plastics packaging will continue in the long term as the lower packaging materials cost combined with excellent performance is a great attraction to packer/fillers who have a constant need to reduce the cost of all purchased raw materials. The market value is predicted to show a steady year-on-year growth of at least 1%.

There is little doubt that rigid plastics packaging formats will continue to replace glass, metal and paper/board containers; while flexible packaging will continue to replace not only its traditional target, cartonboard, but also metal cans and glass containers, offering the innovative packaging formats such as flat and stand-up pouches.

There are a number of market opportunities for plastics packaging:

- growing market for plastic transit packaging - both shrink wrap and returnable plastic crates

- shrink sleeves continue to replace conventional labels in niche markets

- microwavable/ovenable CPET trays are increasingly used for ready meals whose consumption is rapidly growing

- increased consumption of fresh foodstuffs such as cold salads stimulates usage of thermoformed containers

- PET bottle and container usage for hot fill (e.g. ketchup) is expected to continue to grow

- many active and intelligent packaging formats have plastics applications

- potential niche market for plastic beer and even wine bottles

- plastics packaging has high potential for innovative design due to its versatility in terms of different shapes and styles. For example, there has been extensive innovation in plastic confectionery packaging.

1.1.2.3. The UK metal packaging industry

KEY FACTS

☛ UK metal packaging is the third largest segment (after paper/board and plastics) of the UK packaging manufacturing industry accounting for 12-14% of its total 2001 value.

☛ The UK metal packaging industry's market value is put at £1.1 billion in 2001. The market value declined for the fourth consecutive year, however, the value of the total production of metal packaging in the UK in 2001 was up by 3%. This upward trend was due to an exceptionally good year for beverage can sales in the UK and Europe, which counterbalanced packaging inter-materials substitution as well as metal packaging price erosion evident in 2000.

☛ In unit terms, the market continues to show higher than value growth rates due to constant light-weighting.

☛ Fierce competition has spearheaded the sector consolidation and today the top five metal packaging manufacturers' turnover accounts for some 90% of the industry value.

☛ Only one out of the top five metal packaging manufacturers in the UK is a British company which reflects the general trend of packaging industry globalisation.

☛ The UK metal packaging industry's trade balance is positive which proves that the sector continues to be competitive in Europe.

☛ It is envisaged that although the value of the metal packaging industry in the UK will show a downward trend in the next few years due to food and general line can usage decline, this will be offset by increased demand for beverage cans.

Market development

The metal packaging industry can be segmented into:

- Light metal packaging (serving primarily the consumer goods sector)
- Industrial metal packaging (steel drums for industrial applications)

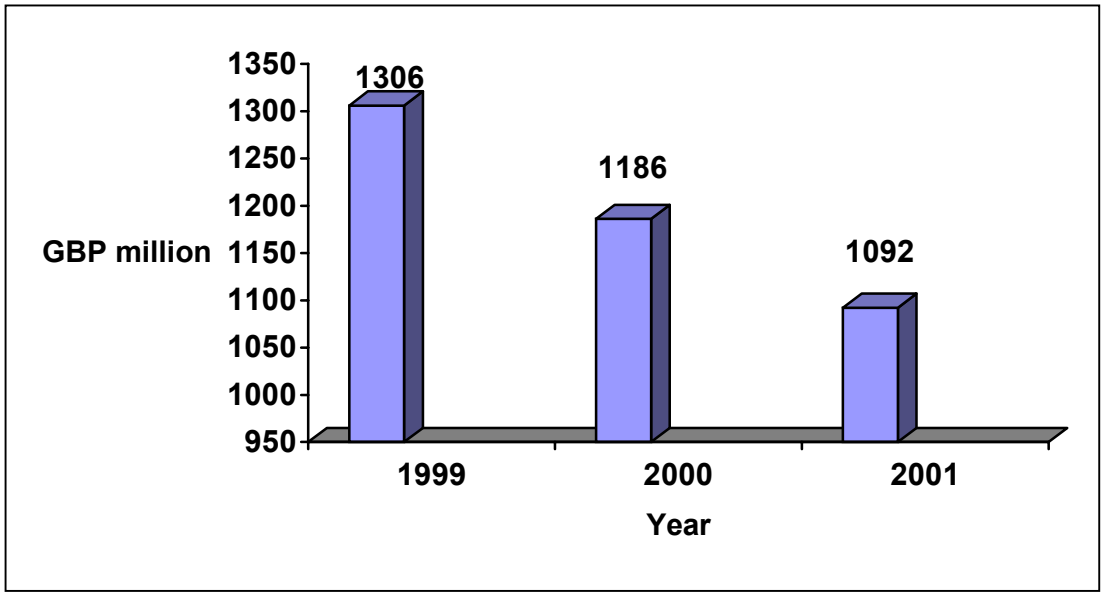
In the UK light metals packaging sector, both steel and aluminium are prominent, with the presence of Corus (formerly British Steel) and Alcan Aluminium. The indications are that the quantity of steel used in packaging will continue to decline gradually while aluminium will show strong growth. However, the dominance of the market by tinplate and tin-free steel means that the overall impact of aluminium on the total packaging market will be comparatively small.

There has been major rationalisation in the can-making companies since the mid-1990s, mostly driven by economies of scale. The ability to sell on a global basis to the major soft drinks, food and toiletries companies has also been a factor, in response to the demand for a few primary suppliers.

It is often said that the general line business (including cans for paint, chemicals, oils and decorative packaging) is a declining one, which is true in that many applications, such as motor oil, are no longer packed in metal cans. However, the ability to develop new uses, such as the packaging of spirits in tin boxes, shows how the market can grow, albeit in niche segments.

Faced with stringent environmental legislation that aims to increase recycling and minimise the overall amount of packaging used, metals are well placed to respond to the threats in the beverage container sector, mainly from PET bottles.

Figure 1.9:
Value of the metal packaging market in the UK, 1999 -2001



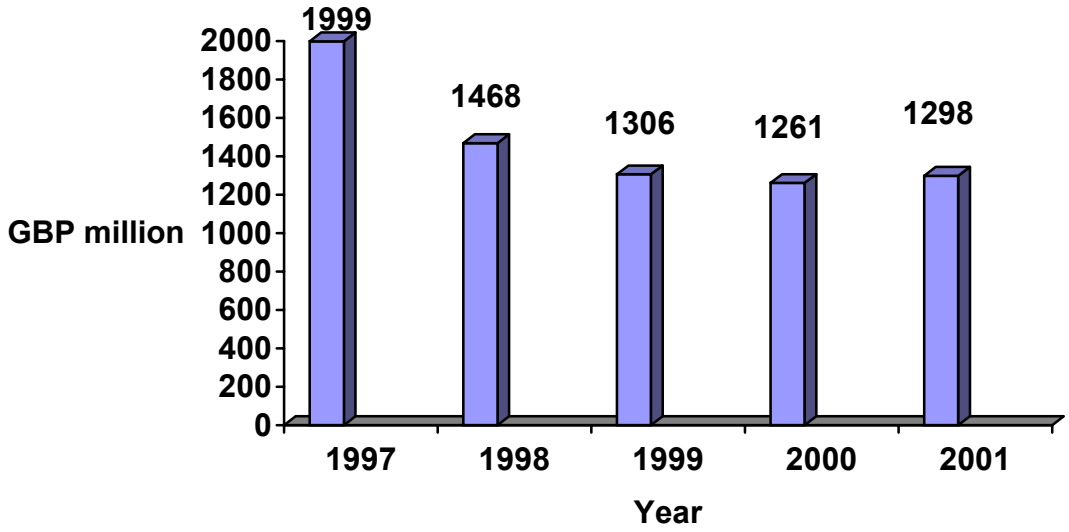
Source: The Packaging Federation

Market size

From a total of approximately 16.5 million tonnes of crude steel produced in the UK, about 800,000 tonnes or roughly 5% is used in packaging production.

In the case of primary aluminium, nearly 240,000 tonnes/year is produced. The sale of aluminium destined for packaging is put at around 95,000 tonnes/year, approximately 8% of capacity. The UK metal packaging production value grew by 3% in 2001 to reach nearly £1.3 billion. This upward trend was due to an exceptionally good year for beverage can sales, which counterbalanced packaging inter-materials substitution as well as metal packaging price erosion evident in 2000.

Figure 1.10:
Value of the UK production of light metal packaging, 1997-2001*

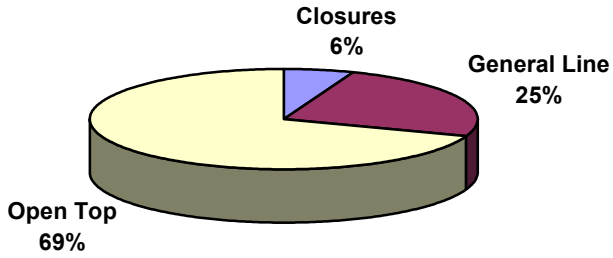


*Production = UK manufacture including exports

Source: Metal Packaging Manufacturers Association

Below is a graphical representation of total sales (UK and exports) by application in 2001 within the industry. It shows that the open top can segment had the greatest total sales, holding almost 71% of the UK metal packaging industry.

Figure 1.11:
UK metal packaging industry, total sales by application, 2001



Source: Metal Packaging Manufacturers Association

Open top cans are used mainly for beverages (both soft and alcoholic), which account for 42% of the can market in the UK, and for food accounting for 27% by value of the UK can market.

The UK light metal packaging industry has a current sales of £1.3 billion and employs around 6,750 people. Hence, its turnover per employee of over £190,000 is amongst the highest in UK manufacturing industry. This is in contrast with the year 1990 when the turnover per employee was £95,000[2] which shows the industry drive towards increased efficiency.

Although National Statistics indicate that there are 125 VAT-registered companies in the UK which are involved in metal packaging manufacture, it is estimated that 65 of these have fewer than 10 employees and are likely to be involved mainly in more general metal forming and fabrication.

The MPMA believes the number of enterprises actively involved in the manufacturing of metal packaging in the UK is approximately 40. This figure includes multiple sites of the major companies.

Table 1.11:
Number of VAT registered enterprises manufacturing metal packaging, 1999-2001

Metal packaging manufacturing	**1999**	**2000**	**2001**
No. of VAT enterprises	45	43	40
Annual decline rate		-4.4%	-7.0%

Source: Metal Packaging Manufacturers Association

The trade balance in the UK light metal packaging industry remains positive, despite the strength of the British pound, as Table 1.12 illustrates:

Table 1.12:
UK trade balance in light metal packaging, 1997 –2000, £ million

Trade	**Year**			
	1997	**1998**	**1999**	**2000**
Exports	227	230	208	255
Imports	163	187	217	193
Trade Balance	**64**	**43**	**-9**	**62**

Source: The Packaging Federation

[2] figure not adjusted for inflation

The above trade figures refer primarily to metal closures and ends as open top and general line cans tend to be produced in proximity to canning operations.

Major players

The UK metal packaging industry is dominated by 5 major international companies. Together they account for 90% of the production of metal packaging in the UK. This small number of companies is the result of recent mergers and take-overs. These main companies are:

- ***Rexam plc*** – Rexam's acquisition of PLM (Sweden) in 1999 and American National Can (USA) in 2000 makes this company the world's largest beverage can maker.

- ***Crown Cork & Seal*** – formerly CarnaudMetalbox, now owned by the USA company Crown Cork & Seal Inc., manufacture food and beverage cans, aerosols and general line packaging in the UK.

- ***Impress Metal Packaging*** – This company was formed from the food can business formerly owned by Pechiney and Schmalbach-Lubeca. Their main business is food cans and cans for paints.

- ***Continental Can Company*** – This company manufacture beverage cans. Its ultimate holding company used to be the German Allianz AG which in Q3 2002 sold it to the US number one can producer, Ball Packaging.

- ***US Can Europe*** –owned by the US Can Corporation, has a modern aerosol can making plant in Merthyr Tydfil. Its Southall plant has recently closed.

Only one out of the top five metal packaging manufacturers in the UK is a British company which reflects the general trend of packaging industry globalisation.

With USD 7.2 billion turnover, Crown Cork & Seal (CC&S) is the world's third largest packaging company. Following a decade of strong growth via acquisitions in the 1990s, the group has recently witnessed a downturn in financial results. This has been caused by a combination of rising debt levels, asbestos lawsuits, and poor sales across core markets. Nevertheless, the company UK and European sales have remained unshaken by these US problems. CC&S has recently opened a beverage can plant in Spain

Also Rexam, world number 10, feels optimistic about the future of beverage can demand and has recently announced plans to invest £40m in two new beverage can-making lines at sites in Russia and Spain.

The vast majority of steel and aluminium, i.e. raw materials for metal packaging manufacture tend be imported into the UK. Leading raw materials suppliers include Corus (the company formed by the merger of British Steel and Hoogovens in June 1999, whose aluminium business was sold in Q3 2002 to Pechiney), Alcoa, Alcan, Pechiney and VAW (in the process of being divested from the former assets of the German conglomerate Viag purchased in 2002 by Norsk Hydro). Today steel and aluminium manufacture is a global industry.

In metal drum manufacture, the leading producers are Blagden Packaging Ltd and Van Leer, now owned by Greif Bros. (USA).

The UK steel drum market is a relatively small market at £146.8 million in 2000. During 1999 and 2000, the value of this market stabilised after a period of substantial decreases driven by a strong trend toward the use of reconditioned drums.

Table: 1.13
UK Steel Drum Market, 1997-2000

£ million	1997	1998	1999	2000	2001 E	00/99 %
Manufacturers' Sales	189.4	165.3	139.5	137.4	136.5	-1.51
+ Imports	42.4	40.8	39.8	39.7	39.7	-0.25
- Exports	34.9	36.5	31.5	30.3	29.0	-3.81
= Net Supply	**196.9**	**169.6**	**147.8**	**146.8**	**147.2**	-0.68

Source: The Packaging Federation

Future prospects

The metal packaging industry is continually seeking ways to reduce the metal content of its cans by reducing the thickness of the sheet (downgauging) and by reducing the diameter of beverage can ends. It also innovates in order to improve its consumer acceptance. Coloured ends have been introduced which allow end-users to extend their brand image using the total package. Customised ends that can be used as a promotional tool to give proof of purchase have been introduced.

The decline in the sales of traditional hot beverages, such as tea and coffee, and the opportunities created for adult soft drinks, are trends that will favour drinks in cans. Beverage cans, however, feel competition from PET bottles which have been used for some time for soft drinks, and recently, thanks to the plasma coating technology, are increasingly used for niche applications.

Although metal packaging formats' position seems to be relatively strong in the beverage segment, the general line and food can volumes are in slight decline. The recent competitive packaging formats threatening the position of general line and food can are:

- Flat and stand-up pouches increasingly used for retortable pet food and tuna. Additionally, Tetra Pak has recently announced the novelty Tetra Recart ® which is said to be the first carton able to withstand the retort process, responding to brand owner search of a fresher image needed for canned foodstuffs

- Plastic roll-on body deodorants replacing metal aerosol cans

- Plastic blow-moulded and rotationally moulded in-bulk containers with improved barrier properties are a lighter alternative to metal drums used for industrial and transit packaging.

Although it is envisaged that the value of food and general line can market will continue to show a progressive downward trend, this will be offset by the growing beverage can demand.

One of the most recent innovations are food cans with peelable membranes which provide superior openability, safety and convenience, and hence are set to compete with not only traditional but also ring-pull cans, and at the same are expected to stimulate the metal packaging sales.

Other examples of the industry will to strengthen its position are innovations such as self-heating/cooling as well as embossed and shaped cans.

One of the scenarios which could improve the metal packaging industry position is linked to Heinz's potential decision to outsource its in-house can-making operation. It is estimated that Heinz makes some 2.6 billion cans in Europe to satisfy its internal demand. The recent move by Heinz in the US to outsource can making to Impress Metal Packaging gives a glimmer of hope to the British can makers as Heinz's main canning operations are in the UK.

1.1.2.4. The UK glass packaging industry

KEY FACTS

☛ UK glass packaging is the fourth largest segment of the UK packaging industry accounting for 7% of its total 2001 value.

☛ Glass packaging produced in the UK accounts for only about 75% of consumption due to the high level of imports of filled products in the wines, toiletries & cosmetics (perfumery) and in the food sector.

☛ The UK glass packaging industry's market value declined for the third consecutive year in 2001 to reach £0.594 billion, an all time low. This downward trend is due in part to packaging materials substitution in the soft drinks and dairy sectors and to glass packaging price erosion. However, due to the perfection of the narrow neck press and blow process, significant light-weighting and productivity improvement has led to the benefits being reflected in pricing.

☛ In 2001, there were 7 major glass packaging manufacturers employing some 4,000 people, with at least that number again dependent upon the industry for their livelihood. The last twenty years have seen consolidation within the UK glass packaging industry as a result of acquisitions.

☛ In 2002, it is expected that the overall glass packaging industry value will increase partly as a result of increased demand but also because of the beneficial knock on effects of the closure of the Irish Glass Bottle (IGB) plant in Dublin (part of the Ardagh Group).

Market development

The drinks market, both alcoholic and non alcoholic, represented 67% of the value of the glass container market in 2001. In some sectors, notably children's soft drinks and dairy, glass has lost out to plastics but these losses have been more than offset by increased demand for glass in the beer and PPS (flavoured alcoholic beverages) markets. Even in the soft drink sector glass has continued to be the favoured packaging material in the on-trade (food service) and a number of new brands have emerged which have bolstered demand. The industry has also benefited from the move in the on- trade to switch mixers from returnables to one trip - a trend which is likely to continue.

In the food sector some penetration by plastics has occurred in areas such as ketchup and salad dressings but this has been more than offset by increased demand for glass in other sub-sectors such as cooking sauces and oils.

The pharmaceuticals, toiletries and cosmetics markets have also seen some
severe competition from plastics over the last ten years and for the UK glass manufacturers these are now niche markets. The globalisation of the customer base in the traditional spirits

market has also benefited the glass industry as slow but steady demand growth has been experienced over recent years.

Plastic beer bottles, whose novelty has been widely reported by the trade press, have not made any significant impact on the glass beer bottle market and it is envisaged that its potential will be limited (at least in the short term) to niche market applications.

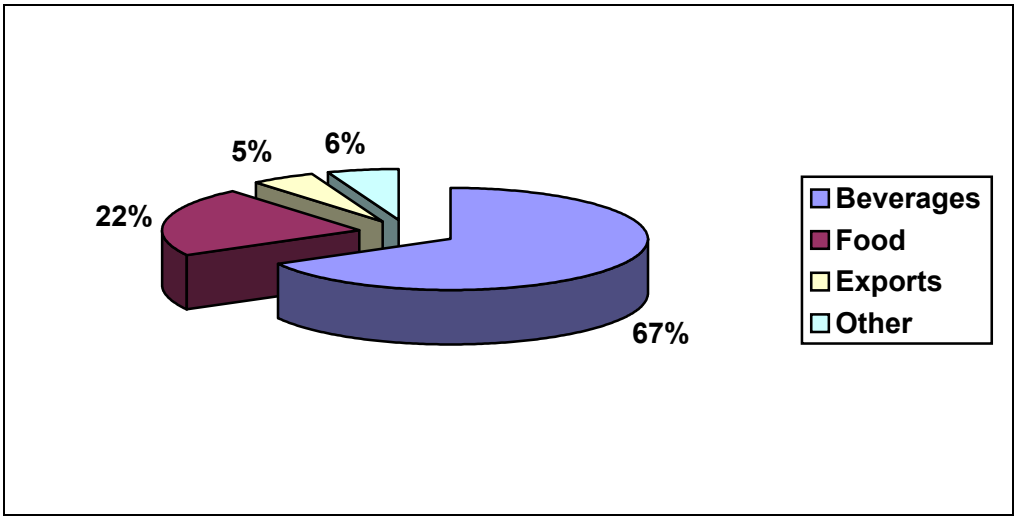
Table 1.14:
The UK market for glass packaging by end-use sector, 2001 (volume)

End-use application	Market share (% volume)
Drinks	67
Beers	26
Spirits	17
Premium Packaged Spirits (PPS)	15
Soft Drinks	6
Wines	2
Ciders	1
Food	22
Dairy	2
Pharmaceutical	3
Toiletry/Cosmetics/Perfumery	0.8
Exports	5.2
TOTAL	**100**

Source: British Glass Manufacturers Confederation

Over the last decade, there have been a number of rationalisations resulting in factory closures and the replacement of older small low productivity machines with larger high productivity machines capable of competing on a global stage in the volume markets. This has also been accompanied by significant technology advance in the older "blow blow" process as well as the introduction and perfection of the "narrow neck press and blow" process. With significant advances in mould design and materials used in their making this has all combined to enable the industry significantly to reduce the weight of its products and to increase the efficiency with which they are produced.

Figure 1.12:
The UK market for glass packaging by end-use sector, 2001 (volume)

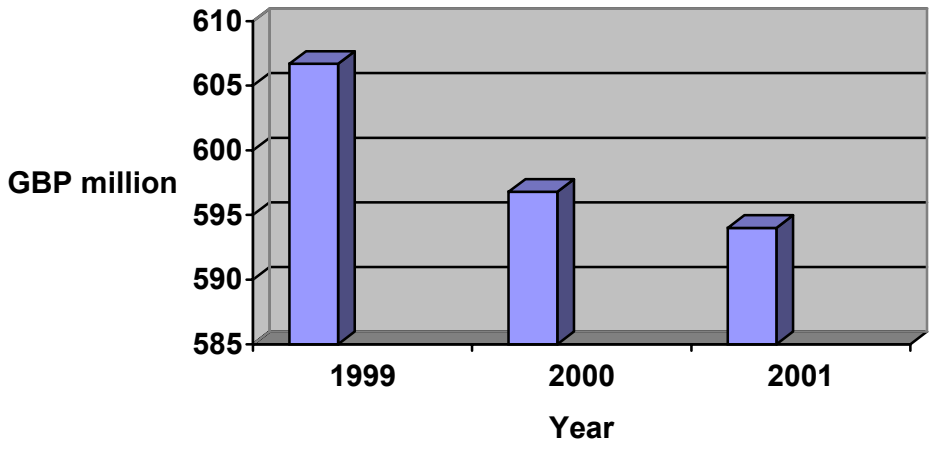


Source: British Glass Manufacturers Confederation

Market size

The 2001 market saw a further decline of the value of the glass packaging market in the UK. It is estimated that the industry value decreased by 0.5% due to price erosion through competition and further light-weighting savings which were passed on to customers. However, in unit terms sales continue to show a year-on-year increase.

Figure 1.13: Value of the glass packaging market in the UK, 1999 - 2001



Source: The Packaging Federation

Major players

The seven major glass packaging manufacturers in the UK are:

- ***Rockware Glass Ltd***, part of the Dublin-based Ardagh Group. It operates from facilities in Irvine (Scotland), Knottingley (West Yorkshire), Doncaster (South Yorkshire) and Worksop (Nottinghamshire). It recently acquired the Italian glass packaging operations of Consumers Packaging of Canada.

- ***United Glass Ltd***, part of the US company Owens-Illinois, the world's leading manufacturer of glass packaging and glass-making technology. It operates out of two plants: Alloa (Scotland) and Harlow (Essex). The Owens Illinois Group operates a number of glass container plants on the fringe of Eastern Europe and in Italy.

- ***Rexam Glass*** (**part of the Rexam Group** active also in metal and plastic packaging) operates out of the UK's largest single glass container plant in Barnsley (South Yorkshire). The Rexam Group recently announced the acquisition of Nienburger Glas in Germany, which will now give it about 20% of the German market.

- ***Beatson Clark Plc***, part of the British Send Group Plc which operates from three plants in Rotherham (South Yorkshire), Barnsley (South Yorkshire) and Edenbridge (Kent).

- **Allied Glass**, until recently a part of the Associated British Foods Empire, operating out of two sites in West Yorkshire, Leeds and Knottingley (the latter through its recent acquisition of Gregg & Company). Now subject to a management buy-out.

- **Quinn Glass,** the latest entrant into the market place with a brand new facility which came on stream in 1997/98, operating from its base in Derrylin, Northern Ireland.

- **Stolzle Flaconnage,** a part of the Austrian-based Stolzle Group operates from a single plant in Knottingley (West Yorkshire).

It is estimated that the above-mentioned companies have a 99% share in the £0.6 billion glass packaging market in the UK. The glass packaging industry in the UK is, therefore, highly consolidated, but unlike the metal packaging segment, has a high level of British-owned producers.

Table 1.15:
Glass packaging manufacturers in the UK, 2001

Company	Country	No. of plants in the UK
Rockware Glass	Ireland	4
United Glass	USA	2
Rexam Glass	UK	1
Beatson Clark	UK	3
Allied Glass	UK	2
Quinn Glass	UK	1
Stolzle Flaconnage	Austria	1

Source: Pira International Ltd

Eight out of the 14 major glass packaging making plants in the UK are based in Yorkshire which stems from the fact that coal was historically the main fuel for glass furnaces. The location of glass container making plants does not make the glass packaging manufacturers' logistics as easy as their counterparts in the plastics packaging segment where production capacity is much easier to transfer closer to customers.

Future prospects

In 2002, it is expected that the overall glass packaging industry value will grow partly as a result of increased demand but also due to glass packaging production transfer from Ireland to the UK (the Ardagh Group in Q2 2002 closed its large glass container plant in Dublin).

In order to retain its share in the packaging materials market in the UK, the glass packaging industry needs to focus on premium niche market applications such as health and beauty or new types of spirits, and to respond to multi-national customer requirements by increasing its efficiency through a further switch to high productivity glass forming lines and to large scale production.

Current and future legislation will play a major part in deciding the future of the glass industry. On the one hand, its environmental credentials are very good when the potential for recycling is taken into account, but the industry will have to comply with a raft of other environmental regulations which will require significant investment upon which there will be little or no productivity return. This will reduce the amount of money available for innovation and performance enhancement which could eventually lead to it losing its competitive edge both against other packaging materials and its European glass competitors.

The glass industry across Europe will need to be rationalised - there are too many players competing in a market place where the downstream customer
base is getting bigger and stronger. This process has already started but has a long way to go. It is too early to predict how this will impact on the UK glass industry but there are likely to be fewer but larger companies operating in the medium/long term future.

Despite having invested significantly in reprocessing and recycling to the extent that the glass industry is currently able to achieve a 60% recycling rate within its own facilities, it remains extremely concerned about the potential competitive impact of overlaying differentiated material-specific targets on the current PRN system.

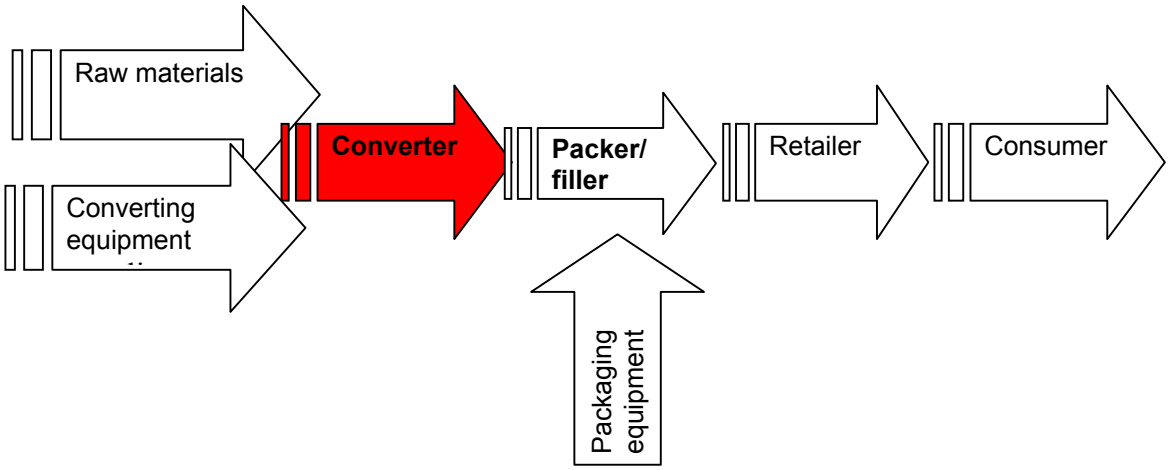
1.2. MARKET STRUCTURE - THE UK PACKAGING INDUSTRY

1.2.1. Industry participants – supply chain

This study focuses on the manufacturing part of the packaging industry, i.e. converters.

To simplify the complicated structure of the supply chain in the packaging industry we can say that it is composed of the packaging converters, their suppliers and their customers.

Figure 1.15:
Supply chain in the consumer packaging industry



Source: Pira International Ltd

Between 70% and 80% of all packaging is used in the consumer goods supply chain (see diagram above) which includes items such as computers, white goods and clothing as well as groceries. However the industrial supply chain should not be ignored. This includes sectors such as bulk chemicals, engineering, agriculture, etc. It should also be remembered that packaging manufacturers are themselves users of packaging; they need packaging to transport their products to their customers.

The type of suppliers the converters are dealing with varies greatly from sector to sector, but includes producers of steel, polymers, inks and papers. In certain sectors some converters are at the same time substrate suppliers. For example, a high level of vertical integration can be noticed in the paper and board industry. In the flexible packaging sector the majority of converters carry out some in-house film extrusion, but rarely are they self-sufficient in terms of the full range of multi-layer films needed for the manufacturing process.

Generally speaking, raw materials suppliers are major international organisations, far larger than the packaging manufacturers themselves. Packaging may form a relatively small part of their customer base, thus they do not necessarily see themselves as part of the packaging industry. It can be difficult for these organisations to understand their markets well as they are so far removed from the final customer.

As mentioned in the Introduction (see Definitions), the packer/filler category includes the following companies:

- Brand owners
- Contract packers/fillers
- Commercial and industrial users

The brand owner participation in the production process is not as high as it used to be a few decades ago, and the use of external contractors is increasing. For example, Danone HP sauce is manufactured under Danone licence by Premier International Foods. Even where brand owners do manufacture their product in-house, the packing operation may be sub-contracted (e.g. Sonoco pack razor blades for Gillette). It is becoming increasingly common for short runs such as promotions, new product launches, etc., to be contracted out. Organisations are looking critically at return on resource and it is expected that this trend towards outsourcing will continue to increase. Decisions will be based on lowering supply chain costs and improving efficiency.

Most UK retailers are both retailers and brand owners, due to their high (indeed the highest in the world) proportion of own-branded products. While some of them get involved in the packaging specification process and (controversially) in the purchasing process, they are rarely packer/fillers. Retailers, too, are moving towards outsourcing strategies for example, ASDA no longer runs a packaging development department in-house but out-sources this function.

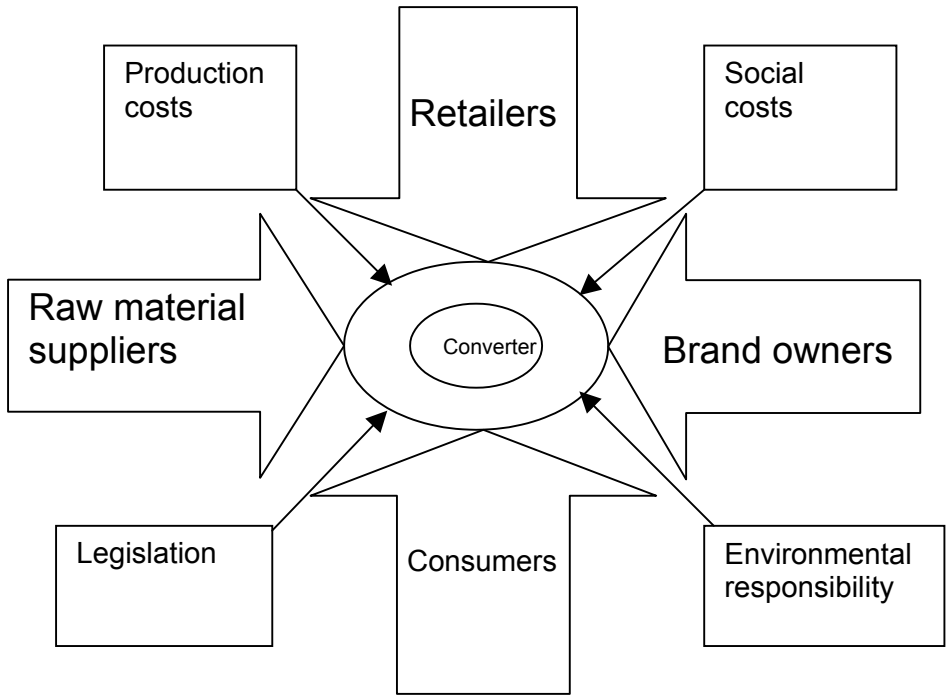
Other important supply chain participants include brand design consultancies.
Brand design consultancies are looking after brand owner needs and are focused on creating and differentiating the brand image, a process which often includes packaging design.

Consumers do influence the supply chain, but indirectly rather than directly. Further information on consumer influences can be found in a later section of this report.

Packaging machinery suppliers tend to be situated outside the UK While the UK is a large market it is not a major producer of either packaging conversion or packaging application machinery. Many of the organisations selling into the UK market do so through agencies or subsidiaries.

As previously mentioned, raw materials manufacturers tend to be large, international conglomerates. Packer/fillers, too, are also very often large international organisations. As a result, packaging manufacturers find themselves squeezed between large suppliers and large customers:

Figure 1.16:
Supply chain squeeze



Source: Pira International Ltd

This relatively weak position is made worse in the UK, where the retailers are particularly strong. Recent research undertaken by Pira asked a large number of supply chain participants to state who has most power and influence in the retail supply chain. The study firmly concluded that in the UK the retailers have the most power. (This was not always the case in other countries in Europe, however.)

1.2.2. Number of companies and employees per sector

The Packaging Federation estimates that the total number of companies which manufacture packaging materials in the UK in 2000 was 2,095 and these companies employed 100,102 people. This number excludes all other packaging supply chain participants such as contract packers, packers/fillers and machinery manufacturers. However this data is based on SIC codes used by ONS which are not precise enough and need to be better defined. As a result a number of companies which do not manufacture packaging are included in the statistics.

This qualification applies to Tables 1.16 and 1.17, i.e. the total number of VAT registered packaging materials manufacturers includes companies active in manufacture of:

- light metal packaging, steel drums ***as well as*** all other aluminium and steel products.
- non-packaging hollow glass
- wooden pallets, cork stoppers and all other packaging.

As a result, while table 1.16 states there are eighty manufacturers of glass packaging in the UK, according to British Glass statistics there are only seven. The figures are similarly overstated for metal packaging.

Table 1.16:
Number of VAT registered packaging materials manufacturers by sector

Sector	Year		
	1999	**2000**	**2001**
Paper/board	865	805	760
Plastics	555	515	500
Metals	150	110	125
Glass	90	80	80
Wood & other	560	585	555
Total	**2,220**	**2,095**	**2,020**

Source: The Packaging Federation

As some large manufacturers have multiple sites, the number of local units in the UK in 2000 was higher than indicated in Table 1.16, i.e. 2,580 (see Table 1.17).

Table 1.17:
Number of local units in the UK packaging industry, by employee size band, 1999 - 2001

Size Band (By no. of employees)	**Number of Local Units**		
	1999	**2000**	**2001**
1-19	1,605	1,540	1,505
20 – 49	550	515	515
50 – 99	240	235	255
100 – 499	305	285	290
500 – 999	10	5	5
1000 +	0	0	0
Total	**2,710**	**2,580**	**2,570**

Source: The Packaging Federation

It should be noted, however, that 60% of these 2,580 manufacturing units have less than 20 employees and therefore may not be considered companies operating on an industrial scale.

The workforce employed in the packaging manufacture sector accounts for 3% of the workforce in the UK manufacturing sector (estimated at some 4 million people).

The results of the industry mapping project carried out by the Institute of Packaging may provide better employment figures. These were not available to Pira.

1.2.3. Geographical distribution of packaging manufacturers per sector

The largest concentration of packaging manufacturers is in North West England (14%), followed by East Midlands (13.3%) and Yorkshire/Humberside (12.2%). These three regions collectively account for 40% of all packaging sector employees. Packaging manufacturers seek proximity to their customers (packer/fillers) as transporting empty packaging materials is highly uneconomical.

Table 1.18:
Total number of employees and number of employees in the packaging industry in the UK by region, 2000

Region	**Number of employees**			
	Total	**Packaging Industry as part of the Total**	**Packaging Industry**	
	'000	*%*	*'000*	*%*
N.E.	962.1	0.5	5.0	5.0
N.W.	2,835.3	0.5	14.0	14.0
Yorks./Humberside	2,079.4	0.6	12.2	12.2
E. Midlands	1,732.3	0.8	13.3	13.3
W. Midlands	2,285.9	0.4	9.2	9.2
Eastern	2,230.6	0.5	12.0	12.0
London	4,052.7	0.08	3.4	3.5
S.E.	3,645.1	0.2	8.5	8.5
S.W.	2,010.5	0.4	8.2	8.2
Wales	1,077.6	0.6	6.2	6.2
Scotland	2,229.2	0.4	8.0	7.9
Total	**25,140.6**	**0.4**	**100.1**	**100**

Source: The Packaging Federation (from NOMIS data for 2000)

KEY DRIVERS AND FORCES OF CHANGE

2.1 KEY DRIVERS

The following key market drivers have been identified by Pira in *Packaging in the 21st Century*:

- Consumer trends
- Retailer and brand owner requirements
- Supply chain efficiency
- Globalisation
- Information Technology/E-Commerce
- Environmental sustainability

2.1.1. Consumer Trends

Key consumer trends in the UK have been identified as follows:

- Demographic trends towards more single person households together with changes in eating habits will stimulate demand for convenience formats, 'meals for one' and smaller pack sizes.
- We are seeing the demise of the family meal – families no longer sit down together to eat a home-cooked meal. When they do eat together, they may be eating different things
- Increased amount of snacking and eating 'on the run'
- An ageing population will further stimulate the widespread use of easy open and reclose features, functional dispensing, easy to read labelling.
- High numbers of women in employment create a demand for quick and easy to prepare foods, resulting in a growing convenience food market whether frozen, chilled, or bought from the in-store deli. In line with this, the fast food takeaway market continues to grow.
- Consumers are becoming more discerning about their requirements and brand owners are responding to this by offering a wider range of more closely targeted products in a process known as 'mass customisation'.
- 'Green' consumers are usually keen recyclers, willing to sort their domestic waste, and play a vital role in giving industry access to post-consumer packaging for recycling. However some may have a negative attitude to packaging and prefer not to buy pre-packed foods.
- Consumers are becoming more health-conscious, thus stimulating purchase of products perceived to be fresh and healthy.
- Children are becoming increasingly influential in retail purchase decisions. As a result more and more products are targeted specifically at children.

Implications for packaging:

- Trend towards single person households will increase overall consumption of packaging as more smaller packs are required.
- Increased use of convenience formats will demand higher levels of packaging functionality but also offer opportunities for innovation.
- Continued growth expected in snack food and takeaway packaging, especially formats geared towards eating on the move.

- ‘Senior friendly’ pack design will increase in importance.
- Increasing customisation of consumer products will put pressure on packaging suppliers as smaller quantities of any one design are required.
- The packaging industry needs to continue to convince consumers to sort their domestic waste for recycling. The glass industry in particular relies on post-consumer packaging re-entering the supply chain.
- Those consumers who see packaging as having a negative effect on the environment may continue to lobby for restrictive legislation
- Growing demand for fresh products containing fewer preservatives will result in an increasing requirement for packaging with good barrier properties. The development of active and intelligent packaging formats, which monitor the freshness of pre-packed product, will help to satisfy this demand.
- More packs will be developed specifically for children, for example, small portions of product for lunchboxes

Consumers are changing, but most of these changes will help to stimulate the packaging industry. There is growing awareness of the role packaging can play in helping to market products and enhance brand values. Increasing sophistication of consumers, with their inclination towards convenience formats, provides packaging manufacturers with the opportunity to offer added value solutions. Many of the trends described above will result in an overall increase in the consumption of packaging.

2.1.2. Retailer and Brand Owner requirements

In many instances the retailer and brand owner are one and the same – for example, Marks & Spencer sell only their own brand, and other leading retailers such as Tesco obtain almost half of their sales from their own-branded products.

However, most retailer own-brands are predominantly marketed in the UK, in contrast, international brand owners such as Nestle, Master Foods and Unilever need to satisfy the demands of trading on a global basis.

A summary of strategic packaging issues for retailers and brand owners is as follows:

Retailer	***Brand Owner***
◆ Reduce in-store costs through packaging solutions such as ready-to-merchandise designs	◆ Manage the demands of international branding and the need for consistent brand image world-wide
◆ Optimise transit packaging through using the most appropriate format, whether returnable or one trip	◆ Deal with increasing complexity as retailer customers diversify into a wider range of store formats and distribution channels
◆ Manage in-store packaging waste effectively	◆ Brand protection is becoming a major issue in many countries and anti-counterfeit packaging solutions are required
◆ Manage packaging implications of home shopping service	
Both	
◆ Differentiate own brand through effective packaging design	
◆ Add consumer value through packaging innovation – convenience, functionality, etc	
◆ Use packaging technology to improve supply chain efficiency (RFID tagging; digital printing; intelligent packaging;)	
◆ Speed up new product/pack development process	
◆ Potential for outsourcing various aspects of packaging function: design, testing, packaging technology, packing operations	
◆ Reduce supply chain damage through improving specification process	
◆ Comply with packaging waste legislation at lowest cost	
◆ Reduce complexity – rationalise number of pack sizes and formats, introduce standardisation where appropriate	

Source: Pira International Ltd

The issues listed above come from Pira's *Packaging in the 21st Century* report, but have been updated through recent discussions with the Institute of Grocery Distribution.

Packaging Buyer Behaviour

A recent study by Pira involved interviewing 100 packaging materials buyers in order to identify key influencing criteria.

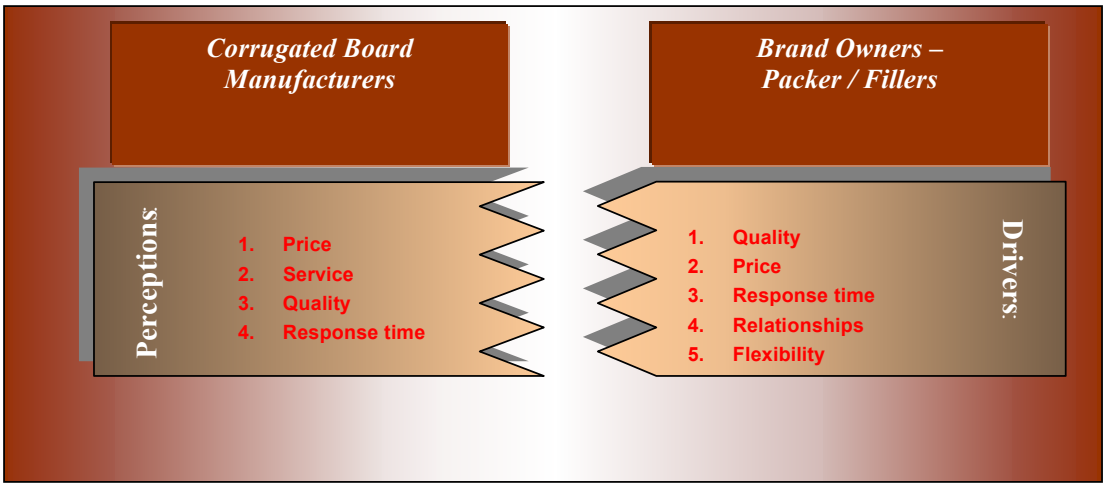
The main influences on packaging purchase decisions are from the following functions:
1. Procurement
2. Marketing
3. Packaging Development/Technology

Thus the marketing department can be seen to be of significant importance in the packaging decision.

Key buying criteria were identified as follows:
1. Quality
2. Reliability
3. Price

However, the DTI sponsored report by Pira and CPA *Enhancing the Competitiveness of the UK Corrugating Sector* (to be published in January 2003) indicates that many corrugated packaging manufacturers consider price to be the most important criteria, thus there is a mismatch between supplier and buyer. The below illustrates this issue.

Figure 2.1:
Corrugated board packaging manufacturers and brand owners buying criteria



Source: *Enhancing the Competitiveness of the UK Corrugating Sector* by Pira and CPA for DTI (to be published in January 2003)

Implications for packaging manufacturers arising from the retailer and brand owner findings include the need to improve understanding of downstream supply chain needs. The above list of strategic packaging issues includes a number of opportunities for packaging manufacturers to offer innovative solutions to address these issues.

One of the key requirements arising from the retailer and brand owner research is the need for a total supply chain perspective in order to enable retailers and brand owners to make the right packaging decisions. For example, a wide range of factors need to be taken into account when choosing between one trip and returnable distribution packaging formats and these can

be highly product/supply chain specific. Unfortunately the mechanism to enable supply chain based decisions does not exist at present.

2.1.3. Supply chain efficiency

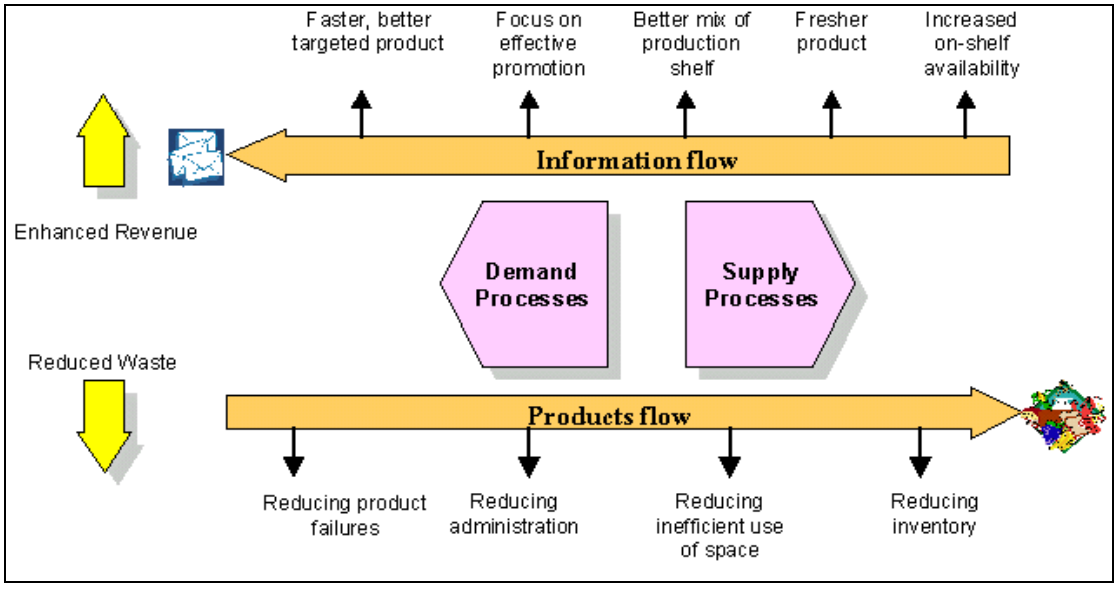
Efficient Consumer Response (ECR) is a Europe-wide initiative, managed in the UK through the Institute of Grocery Distribution (IGD). The UK ECR board members consist of senior representatives from major retailers and brand owners, including Tesco, Sainsbury's, Procter & Gamble and Unilever.

ECR has been around for some time now, but its twin focus on efficient demand management combined with effective supply chain performance continues. ECR promotes the use of partnership collaborations and information sharing to produce efficient supply chain operations. The ECR Europe vision statement is:

'Working together to fulfil consumer wishes better, faster and at less cost'

Benefits on the demand side include better responsiveness to consumer needs, improved product ranges and more effective use of promotions. On the supply side, gains can be made through lowered stock levels, greater synchronisation of production and increased supplier integration. These initiatives are enabled through use of appropriate technologies.

Figure 2.2:
ECR schematic



Source: Introduction to ECR scorecard, www.ecrscorecard.com

Although initially ECR focus was on the supplier-retailer interface, more effort is now being made to involve upstream suppliers such as packaging manufacturers. In fact, the only way ECR can be effective is through engaging the whole supply chain. Tesco are now working to eight hour lead times on some key product lines. ASDA aim to have 40% stockless product lines. These strategies obviously pose considerable challenges for product suppliers, who

must in turn rely on their packaging suppliers to provide the high levels of service required. As a result, packaging manufacturers are under increasing pressure to improve their levels of responsiveness.

CPFR (collaborative planning, forecasting and replenishment) is an extension of ECR, whereby supply chain partners collaborate to improve supply chain performance. Forecast and sales information is shared throughout the supply chain, so that all participants work from a single demand forecast. Implementation is still in the early stages as far as packaging manufacturers are concerned, but there is certainly increasing transparency between supplier and customer.

As ECR continues to develop, ongoing supply chain re-engineering takes place. Initiatives such as vendor or co-managed inventory are becoming more common. Collaborative work continues on standardisation; technology standardisation (e.g. RFID tagging), performance measurement (through use of ECR Scorecards) and use of standard designs for the returnable crates, dollies, etc used by retailers.

Key implications for packaging manufacturers of the supply chain efficiency drive relate to the need for appropriate information technology in order to enable effective communication. The need to provide fast, responsive service will continue, but transparency of information will help to alleviate these pressures.

2.1.4. Globalisation

The trend towards globalisation continues, driven by improved communications and transport as well as the increased political stability of some regions.

Globalisation means two different things – the opening of world markets as sources of supply, and the opportunity of world markets as potential customers. Recognising the opportunity to source cheaper products around the world from places such as China, Thailand and Malaysia is common. This trend will continue as long as cost savings can be made, but these developing countries are also becoming markets in their own right.

UK retailers buy an increasing amount of their product from abroad. Much of the exotic fresh produce now commonly found in our supermarkets is imported over long distances. Walmart has for some time purchased non-perishable goods extensively from the Far East, and ASDA is expected to double its imports from this region. E-procurement makes it easy to buy from any country in the world, hence there is likely to be increased international transportation of goods and an increased requirement for appropriate transport packaging.

At the same time, international brand owners are targeting emerging consumer markets such as Eastern Europe, Latin America and Asia. The communications revolution and globalisation of consumer culture will result in an intolerance of dated design and excessive lead times. The result will be a need for global product consistency, while still retaining the ability to produce local or customised preferences.

Opportunities for packaging manufacturers arising from this trend towards globalisation are as follows:

- packaging supply to global brands in developing countries, either through a greenfield site, a joint venture or acquisition of a local manufacturer
- to supply packaging for developing countries as they move away from dependence on local produce towards a centralised retailing infrastructure. The total global market for packaging will increase as these countries become able to package and transport their products
- to provide packaging solutions for long distance transportation of goods being imported into the UK. These may be transported in bulk and placed in sales packaging nearer the point of sale

- Many brand owners are looking to purchase on a regional or global basis and the ability of packaging manufacturers to respond to this may be a key service differentiator

2.1.5. Information Technology and E-Commerce

E-Commerce Impact Study of the Packaging Sector, a new report published in October 2002 by the DTI, concluded that e-commerce is helping to transform the UK packaging industry.

The report (written by PricewaterhouseCoopers) defines e-commerce as follows:

'Electronic commerce is the exchange of information across electronic networks, at any stage in the supply chain, whether within an organisation, between businesses, between businesses and consumers, or between the public and private sectors, whether paid or unpaid'

The report reveals that, although there is a high take up of basic e-commerce technologies, packaging manufacturers have been slow to develop more sophisticated e-business practices. More than three-quarters of these firms have adopted new technologies that are changing the way they do business. But, in a market worth more than £9 billion, most firms are not taking full advantage of the benefits e-commerce has to offer.

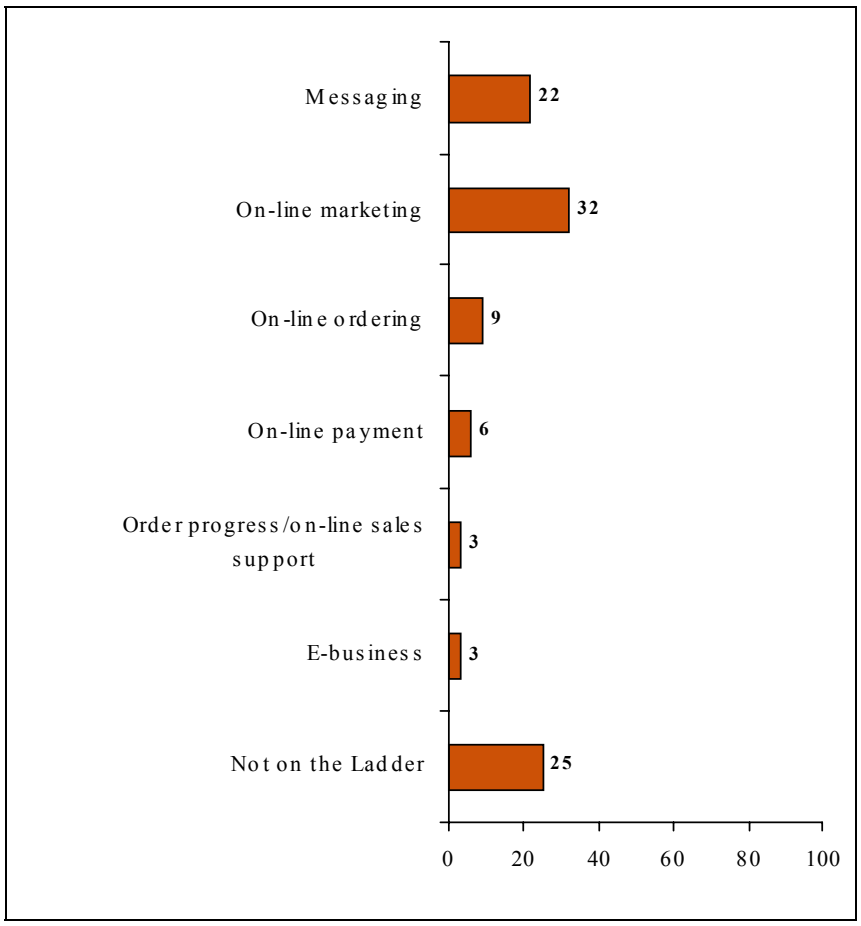
The key findings are:

- 66% of packaging producers have e-mail and a website;
- 33% of packaging producers allow customers to order on-line, with half planning to do so within the next two years;

The report identified that the most common motivations for adopting e-commerce were to improve knowledge management and quality of service. Nearly half (45%) of packaging manufacturers have seen an actual improvement in their service provision and a quarter identified a positive impact on their productivity due to e-commerce.

However, most producers of packaging materials interviewed are either not on the e-adoption ladder nor at its lower end (steps 1 and 2), as Figure 2.3 illustrates.

Figure 2.3:
E-adoption ladder among packaging materials manufacturers



Source: *E-Commerce Impact Study of the Packaging Sector*, published by PricewaterhouseCoopers, October 2002.

A fully functioning 'e' business would use e-commerce technology for on-line messaging, marketing, ordering, payment and progress tracking for customers (steps 1 – 5 above). One quarter of packaging materials producers are not on the ladder, mostly in the paper and board sector. Interestingly, the majority of firms further up the ladder are also paper and board packaging manufacturers, suggesting some polarisation in the sector.

There is a positive correlation between company size and e-adoption; the largest companies are most likely to have adopted e-commerce technologies, and the smallest companies least likely.

The report concludes that e-commerce presents a number of opportunities and threats to manufacturers of packaging materials:

Opportunities:
The ability to develop stronger links with customers and to improve relationships and service levels

Threats:
Increasing customer power and the enhanced ability of firms abroad to compete in UK markets

The challenges facing packaging companies wishing to adopt e-commerce include the ability to:

- *develop cost effective e-commerce solutions that meet customer and supplier needs*
- *ensure that management have positive and realistic attitudes as to the potential of e-commerce and the way it can fit in with and develop business activity*
- *evaluate the impact of e-commerce on the business and improve understanding of the benefits*
- *gain experience of e-auctions and e-marketplaces, understanding the objectives of customers in using such techniques and developing strategies for participation*
- *ensure that internal IT systems and capabilities are robust and enable effective information flow around the business*
- *exploit web marketing and sales tools, ensuring appropriate capture and analysis of customer information*
- *utilise the potential of e-commerce to streamline procurement, product design, manufacturing processes, order fulfilment and delivery; hence increasing service provision and reducing costs*
- *avoid the costs of running dual systems by assisting the transition of less technologically advanced customers and suppliers to e-commerce solutions*
- *maintain market share and limit the risk of being overtaken by competitors*
- *where appropriate, seek opportunities for collaboration with others in the sector*

Source: *E-Commerce Impact Study of the Packaging Sector*, published by PricewaterhouseCoopers, October 2002.

In one of its Strategic Futures reports, *Packaging in the 21st Century,* Pira indicates the following e-commerce implications for packaging companies:

- Company websites and storefronts should be considered as marketing tools and part of a packaging supplier's overall marketing strategy. The importance of an internet presence as part of the marketing mix should not be underestimated.
- Bulletin boards and on-line catalogues have limited scope in that they are most suited to commodity packaging products such as tapes, postal packaging, standard containers; in other words, packaging which has traditionally been bought through distributor catalogues. Bulletin boards may also be a means of selling excess stock or second-hand machinery. This can be a cost-effective way to reach customers.
- Procurement hubs, such as those set up by Transora in the U.S. and CPG Markets in Europe, bring together a number of major users of packaging. However due to the high level of complexity in much of their packaging purchase it seems likely that they will focus on easier procurement targets first, such as raw materials or stationery. In the longer term, those packaging items with a high level of commodity and standardisation will lend themselves most easily to e-procurement
- Another possibility is that major brand owners, either independently or through a consortium, use their buying power to purchase the raw materials used in packaging. These are then supplied to converters who charge a fee for the conversion process.
- At the time of writing there has not been a successful exchange model in the packaging industry, or in fact for many industries. There was a great deal of activity in this field a few years ago which did not prove sustainable due to lack of funding and a proven business model
- E-commerce provides increased transparency of pricing. This puts margins under pressure as it becomes easy to compare pricing, although it should be remembered that an auction is very little different to an invitation to tender in that there is no requirement for

a supplier to put in unacceptably low prices. The key difference is that negotiations happen in real time.

- E-auctions have caused a great deal of concern recently in the packaging industry. Some contracts have been placed at extremely low prices with the result that certain major packaging manufacturers refuse to participate in e-auctions. There is a particular concern regarding lack of transparency and suspicion that bogus prices are introduced in order to encourage lower bids. However research by McKinsey suggests that e-auctions will prove to be a short term response which will eliminate instances of super profit. In the longer term, the real value in e-commerce is through using the technology to reduce transaction costs and improve supply chain efficiency
- It seems unlikely that e-procurement will ever replace relationships, since there will always be a need for organisations to exchange dialogue with suppliers to discuss issues such as new products, processes or supply chain initiatives. What seems more likely is that strategic packaging contracts will continue to involve traditional face-to-face negotiations and e-procurement will be used to manage the order process. However, items considered commodity purchase may become 100% e-procurement.
- While not all issues relating to e-commerce and packaging are fully understood at this stage, what is certain is that in the future a great deal of packaging will be traded through some form of e-commerce.

2.1.6. Sustainable development

Sustainable development is an all-embracing term, which recognises ***the inter-relationships between economic success, environmental protection and social wellbeing***. As an umbrella concept, it attempts to embrace issues as diverse as economic equality, climate change, biodiversity, employee training, health and safety, the ageing population structure, etc.

As such, many companies find the concept of sustainability abstract, confusing, daunting and irrelevant to their everyday activities. But in reality, the push for sustainability will be one of the key influences on the way we do business over the next 5-10 years.

In essence, the past ten years have been about defining the ground rules for sustainable development. The next ten years will be about actions to achieve sustainable development. This is reflected in the themes of the EU's 6th Action Programme and commitments to integrate sustainable development into all aspects of EU and UK government policy.

The involvement of the Packaging Federation in the Pioneers Group (a best practice forum of around 20 sectoral organisations working to accelerate the development and implementation of sectoral sustainable development strategies) will help to ensure that the UK packaging materials and manufacturing sectors are strategically prepared to face the challenge of sustainable development. But it is how individual companies react to this strategic opportunity which will be key to its influence on the competitiveness of the UK packaging sector.

At a strategic level, according to a recent report from KPMG, corporate sustainability reporting is "becoming mainstream business". In the UK, the percentage of the top 100 firms producing environmental, social or sustainability reports rose from 27% to 49% over the past three years. This reflects the demands of stakeholders, especially green investment portfolios.

However, it could be easy for companies to avoid fully embracing sustainable development by dismissing it as an additional cost burden to the company. Some actions will indeed invoke additional costs which may in the short-term reduce competitiveness against foreign producers, especially those from emerging economies. In particular, commitments to social dimensions of sustainability appear at face value to offer limited return, but these investments may provide significant benefits in the medium to long-term. For example, investment in staff training can help to secure staff morale, commitment and loyalty.

However, it is the drive for improved environmental performance (of companies and their products) which offers tangible opportunities which can be turned into immediate competitive advantage. Cost pressures mean that industry, including the packaging sector, is constantly striving to identify incremental resource efficiency opportunities, but sustainable development demands a step change in performance. Commentators estimate that a 10-16-fold improvement in eco-efficiency is needed globally over the next 50 years. This cannot be achieved solely with today's products and technologies – innovation is required in all sectors. In the packaging sector, opportunities for innovation to improve environmental performance include:

- Reduced raw material usage through improved production processes
- Minimisation through improved materials
- Increased use of renewables (e.g. fibre, bio-plastics, etc)
- Increased use of recyclate
- Increased recycling
- Development of biodegradable materials
- Re-engineering the supply chain

By innovating now, UK packaging companies can gain competitive advantage and create new export markets for their products and/or technologies. Funding opportunities such as the DTI's Sustainable Technologies Initiative are potentially vital to this process. Failure to take advantage of these opportunities will mean increased reliance on imported products or technologies.

These innovations must be achieved within the wider context of the role of packaging in the supply chain. Packaging makes a positive environmental contribution by protecting and preserving products, thereby avoiding waste.

Implications for packaging

- Opportunity to raise the profile and importance of packaging through its positive environmental attributes
- Addressing sustainable development will be key for companies to secure their long-term viability
- Reducing costs by environmental improvements in improving resource use and reducing waste
- Adopting sustainable development to match supply chain demands for quoted companies shareholders
- Developing constant improvement programme.

2.2. LEGISLATION

There are three main groups of legislation which have direct impact on the direction in which the UK packaging industry is developing, namely:

- Environmental legislation
- Health and safety legislation
- Employment

While some legislation is UK driven, it should be recognised that an increasing amount is driven from Brussels, making it essential that the U.K. packaging industry is well-represented there.

2.2.1. Environmental legislation

There is a global move towards reducing waste and emissions as well as the use of natural resources. This trend is a result of both environmental and economic considerations.

In the UK, there are five main documents which in different ways try to deal with the environmental impact of ever-increasing packaging waste and interconnected issues of environmental sustainability, and at the same time have (or may have) impact on the packaging manufacturing industry. These are:

- The Producer Responsibility Obligations (Packaging Waste) Regulations 1997 and the Packaging (Essential Requirements) Regulations
- Climate Change Levy
- UK Waste Strategy
- Pollution Prevention and Control regulations
- Aggregates Levy

While the first four relate to the UK packaging manufacturing industry as a whole, the Aggregates Levy, is relevant only to the UK glass packaging manufacturing industry.

The above documents have different legal status and originate from different sources. Table 2.1 summarises them.

Table 2.1:
Environmental documents in the UK affecting the packaging manufacturing industry

UK documents	***Legal Status***	***Driver***
The Producer Responsibility Obligations (Packaging Waste) Regulations 1997	Legislation	EU Packaging & Packaging Waste Directive (94/62/EC)
Climate Change Levy	Legislation	Kyoto Summit Agreement
UK Waste Strategy	Strategy	EU Landfill Directive (1999/31/EC)
Pollution Prevention and Control regulations	Legislation	UK Government followed by EU Integrated Pollution Prevention and Control (96/61/EC)
Aggregates Levy	Legislation	UK Government

The Producer Responsibility Obligations (Packaging Waste) Regulations 1997

The Producer Responsibility Obligations (Packaging Waste) Regulations 1997 needs to be discussed in the context of:

Packaging and Packaging Waste Directive

The EU Packaging & Packaging Waste Directive (94/62/EC) was adopted in Brussels in 1994. The main aim of the Directive was to harmonise national measures concerning the management of packaging and packaging waste in order to:

- reduce the amount of packaging going to landfill
- ensure the functioning of the internal market
- avoid barriers to trade.

In order to achieve this, the Directive aimed to promote re-use, recycling or other means of recovery of packaging waste thereby reducing the burden of final disposal. Recovery and recycling targets were set for the period up to mid-2001.

These were:

- a recovery target of between 50% and 65% by weight of packaging waste and within this,
- a recycling target of between 25% and 45% by weight of all packaging waste with a minimum of 15% by weight for each packaging material, i.e. plastics, metals, paper/board, glass.

These targets have recently been reviewed as required in the Directive. A Proposal was put forward by the Commission and this has since been debated by the Council and the Parliament. No specific targets were proposed for wood, textiles or composites. However, the Council of Ministers in October 2002 have recommended a specific wood recycling target of 15%, plus other amendments. Table 2.2 outlines the positions of the Council and Parliament.

Table 2.2:
Proposed revised European targets for recovery and recycling

	Commission proposal	**European Parliament 1st reading**	**Council Agreement**
	%		
Recovery – min - max	60 75	60	60
Recycling – min - max	55 70	65	55 80
Material-specific targets			
Glass	60	60	60
Paper & board	55	55	60
Metals	50	50	50
Plastics	20	20	22.5
Wood	No target	No target	15
Timing	30 June 2006	31 Dec 2006	31 Dec 2008

Source: European Bulletin, Issue 17, October 2002

The revisions of the Directive have still not yet been agreed and will have to go before a second reading in the Parliament. It is now unlikely that the revisions will be adopted before late 2003.

The current Directive also contains single market requirements, namely the Essential Requirements Directive and Heavy Metals limits. The Essential Requirements outline design requirements which all packaging placed onto the market must meet. These are:

- minimisation by weight and volume
- minimisation in terms of noxious and hazardous substances
- a requirement for all packaging to be recoverable at the end of its life.

Within the minimisation of hazardous substances is a requirement to reduce the aggregate heavy metal limits to cadmium, mercury, lead and hexavalent chromium in packaging materials to no more than 100 parts per million on or after 30 June 2001.

Implementation in the UK

Producer responsibility targets
Objectives and targets established in an EU Directive are legally binding on each Member States (MS), but the choice of mechanism for achieving these objectives and targets is left open. The result has been the emergence of different systems in different MS. This has allowed the UK in particular to follow an implementation strategy unique to the rest of the EU through a shared producer responsibility regime and a financial mechanism called the packaging recovery note system (PRNs) based on a laissez-faire market.

Most countries have transposed the recovery and recycling targets from the Directive by placing the obligation for compliance on those who first place packed goods on the market, i.e. product manufacturers and importers whilst stating that the whole chain must provide assistance. The UK, however, has adopted a different system by placing specific obligations on companies at each stage in the chain (see Table 2.3).

Table 2.3:
Business shared obligations based on annual packaging usage in the UK

Activity	Obligations till 31.12.98	Obligations with effect from 1.1.99
Substrate (raw materials) producers	6%	6%
Converters	**11%**	**9%**
Packer/Fillers (Pack/filling)	36%	37%
Retailers/Distributors (Selling)	47%	48%
TOTAL	**100%**	**100%**

Additionally, there is a secondary obligation for transit packaging whereby this constitutes a pack/fill and selling operation and thus incurs a 85% obligation (37% + 48%).There is also a “rolled-up” obligation on imports such that if any part of the above process is performed outside the UK, then the first party to import the packaging picks up that external obligation also, e.g. a converter importing non-UK raw material picks up 15% (6% + 9%) on that raw material; a retailer importing packed products picks up 100% obligation on all of the primary packaging.

Exports are excluded as are indirect exports, i.e. if a raw material is used to convert and pack/fill a product in the UK which is eventually exported, then all of that upstream obligation is removed also.

In theory, this should mean that all packaging which ends up in the UK waste stream has picked up 100% of its obligation en route wherever the source.

Companies which meet the following criteria are obligated under the Packaging Regulations and must comply with the Regulations either by joining a compliance scheme or 'going it alone'. The criteria which must be met are:

- A turnover greater than £2 million (adjusted from £5 million in 2000) and
- Handle more than 50 tonnes of packaging annually
- Perform an activity and
- Supply packaging which it owns onto another stage in the supply chain

Obligated companies calculate their obligation using the following formula:

(tonnage of packaging supplied) x (activity obligation) x (recovery or recycling target)

The recovery and recycling targets were set to allow the UK as a whole to meet the requirements set out in the EU Packaging and Packaging Waste Directive. These targets have been increased year on year within the UK. Table 2.4 shows targets for 2002 and 2003:

Table 2.4:
UK packaging recovery and recycling targets for 2002 and 2003

Obligated business targets *	**%**
Total recovery of which	59
each material-specific recycling target is min.	19

* intended to achieve a national recovery target of min. 50% and min. material targets of 15%.

Whilst the targets for obligated businesses remain static to end 2003, businesses should be prepared for a significant increase in 2004 if the current debate in Brussels results in the recommended 55% or 65% overall recycling targets.

This will be compounded if the additional recommendation of differentiated material recycling targets is also part of the final deal since both glass and metals will need to increase collection rates substantially from the household waste stream, which in turn will impact on the value of associated PRNs. This may affect the overall costs to the supply chain and distort the market place.

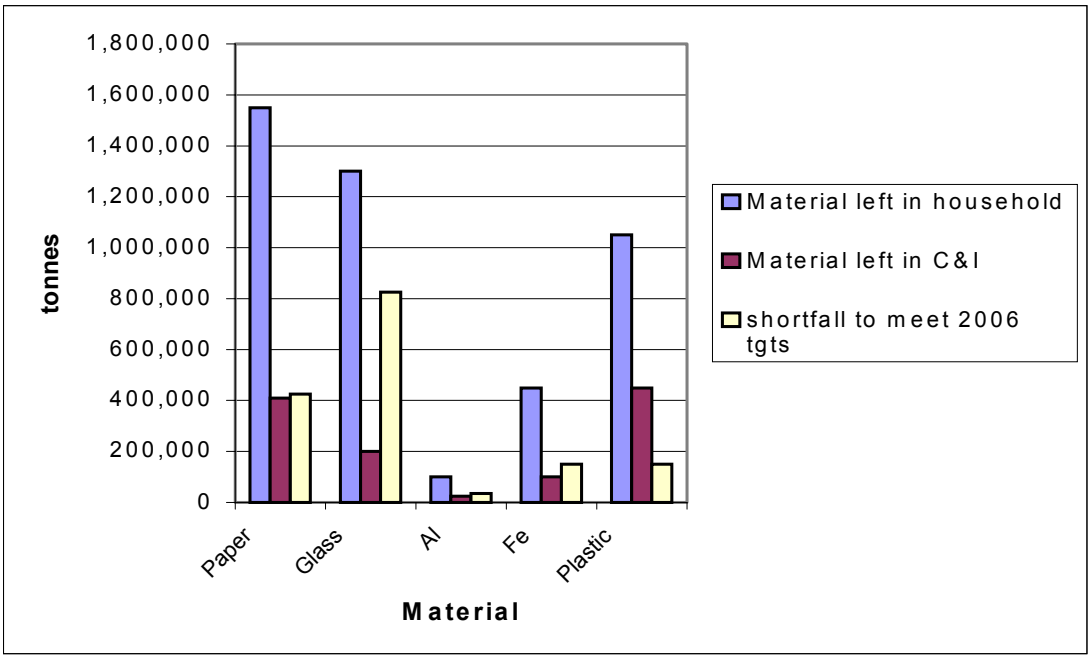
A more serious analysis needs to be made of the economic impact and environmental benefits on the market through the introduction of differentiated targets to the unique UK system.

The UK system is based on a multi-compliance scheme basis plus between 10 – 20% of obliged businesses registered individually with the Environment Agencies. There are several compliance schemes in operation in the UK of which Valpak is the largest representing approximately 80% of the compliance schemes market. When companies join compliance schemes they defer their obligations for achieving/demonstrating recovery and recycling to

the scheme. The second largest scheme is Wastepack which hit the headlines as it failed to meet its 2001 obligations by a large margin and was therefore key to UK as a whole failing to meet the 2001 recovery target. A furore followed in which calls were made for Wastepack to be deregistered as a compliance scheme. Wastepack claimed however that they had held discussions with SEPA (the Scottish Environment Agency) to explain their business plan which included new infrastructure which had not yet come on line hence explaining their shortfall. However, continued lack of confidence in the UK PRN scheme to deliver increased recovery and recycling remains a concern for obligated companies.

The UK to date has met its obligations primarily through the recovery and reprocessing of commercial and industrial waste. This has kept direct compliance costs in the UK low compared to other EU Member States, where systems achieve higher recycling rates by also targeting household packaging waste. However, in order for the UK to meet future targets it will be necessary to increase the collection, sorting and reprocessing of household waste which will prove to be a significant challenge. The availability of material in the UK for achieving the proposed 2006 targets is summarised by Figure 2.4

Figure 2.4:
Packaging waste available to meet increased recycling targets



Source: Presentation of ACP report

The need to begin sourcing material from the household waste stream will inevitably result in sharp increases in PRN prices, with the recent House of Lord's Select Committee report predicting a seven-fold increase in direct compliance costs if the UK is to meet the proposed 2002 targets. Added to this, the complexity of the UK regulations creates a significant indirect cost burden which is not experienced in other MS where the regulatory regime is much simpler and less data intensive.

Increased direct compliance costs combined with the high indirect compliance costs may be a disadvantage to competitiveness of many parts of the supply chain in the UK.

The Essential Requirements
The Essential Requirements have been transposed into national legislation by most of the EU Member States. Only UK, France and now the Czech Republic are enforcing this in a format recognisable as the Essential Requirements, but both Belgium and Spain require companies of certain size to submit a packaging prevention plan to appropriate authorities. These plans are structured around the Essential Requirements. In the UK, the Essential Requirements were implemented by DTI through the Packaging (Essential Requirements) Regulations which came into force in January 1999. These regulations are monitored and enforced by Trading Standards Officers.

CEN (the European Committee for Standardisation) was mandated by the European Commission to prepare a set of standards to assist companies to conform with the Essential Requirements across the EU. A series of standards were published but only two of the original six principal standards were accepted by the European Commission and published in the Official Journal of the EU. These are:

EN 13428:2000 Packaging – Requirements specific to manufacturing and composition – Prevention by source reduction (published with a warning notice) and

EN 13432:2000 Requirements for packaging recoverable through composting and biodegradation – Test scheme and evaluation for the final acceptance of packaging.

Attempts to seek a compromise through a revision process is still being sought between the EC and CEN for the other standards, which are:

EN 13427:2000 Packaging – Requirements for the use of European Standards in the field of packaging and packaging waste
EN 13429: 2000 Packaging – Requirements for relevant materials and types of reusable packaging
EN 13430: 2000 Packaging – Requirements for packaging recoverable by material recycling
EN 13431: 2000 Packaging – Requirements for packaging recoverable in the form of energy recovery, including specification of minimum interior calorific value

It is not clear at this stage if a compromise will be reached or whether the EC will seek to dictate their own standards. The Standards which have not been published in the Official Journal still exist as harmonised standards which individual member states are free to use.

Climate Change Levy

Climate change is a global problem requiring actions on a global scale. After a shaky start at the Earth Summit in Rio in 1992, the Kyoto summit in 1997 agreed a legally-binding commitment by the developed nations to reduce greenhouse gas emissions by 5.2 per cent below 1990 levels over the period 2008-2012. Ratification of the Kyoto protocol has been a difficult process, with the US and other key countries failing to ratify and therefore not taking actions or incurring costs from reducing global warming gas emissions.

The EU Member States collectively agreed to an 8 per cent reduction at Kyoto. The UK's contribution to this target has been set at a 12½ per cent reduction on 1990 levels in emissions of a basket of six greenhouse gases.

The UK has also set itself a domestic objective that goes beyond our legally binding Kyoto target - to reduce emissions of carbon dioxide by 20 per cent on 1990 levels by 2010. This has been implemented in the UK through the Climate Change Levy (CCL) which is raised by a levy on energy prices for the manufacturing and service sectors only as of April 2001. It does allow for rebates up to 80% for high-energy users based on the criteria of being registered for IPPC (Integrated Pollution and Prevention Control) Part A. This is still a bone of

contention in manufacturing industries, and in particular packaging operations, where the rebate system managed under sectoral negotiated agreements (NAs) has meant that plastics operations and some paperboard converters do not qualify for a rebate, whilst the glass, majority of metal and paper packaging converters do – albeit they still pay a high levy due to their higher energy usage. The CCL was supposed to be fiscally neutral by offsetting the levy by reductions in National Insurance (NI) contributions with £1bn expected to be raised p.a.. However, for largely capital intensive industries like packaging, the NI reductions do not equate to the CCL and in total are estimated to cost up to 10% of their already lean profits. To add insult to injury, academic and industry research, e.g. Cambridge Econometrics, shows that the UK may not achieve its targets as any gains by manufacturing are expected to be more than offset by increases from the transport and domestic sectors, which are not taxed.

The future lies with Emissions Trading, which the UK adopted in 2002 on a limited basis. Although there are various energy taxes in other parts of Europe, the manufacturing sector is not penalised to the same extent as the UK. The European Commission is focused on an EU-wide Emissions Trading scheme from 2005 to achieve the required reductions, and is currently debating their proposals, which include mandatory participation by certain high-energy industry sectors, and only based on CO_2, whilst the current UK system is voluntary and applies to all GHGs.

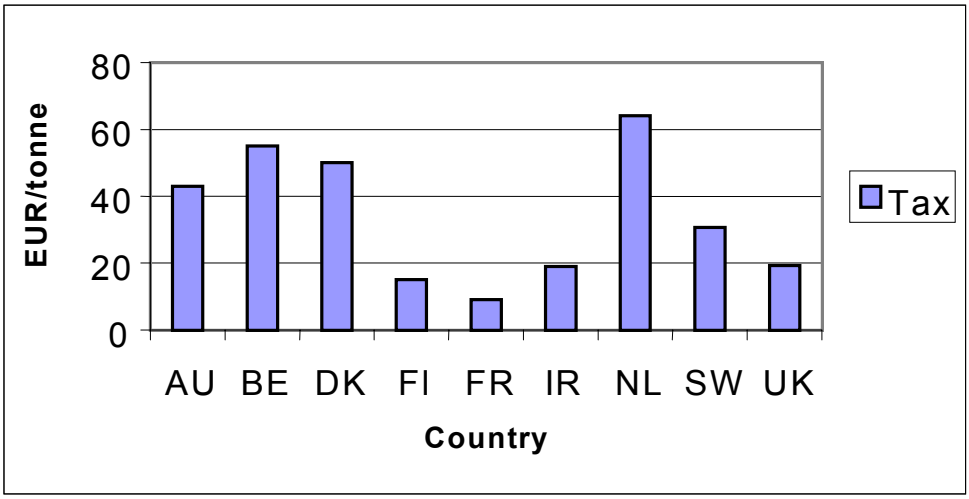
UK Waste Strategy

The Landfill Directive dictates a gradual reduction in landfill use for BMW (biodegradable municipal waste) only through a series of targets based on a base of 1995, i.e. final target is by 2020 to reduce BMW to landfill to 35% of that landfilled in 1995. The UK Government are seeking to address this situation through its UK Waste Strategy, which imposes on local authorities complementary targets, i.e. final target to recycle or compost at least 33% of household waste by 2015.

This will have an impact on paper/board packaging, and may to some extent affect a switch to biodegradable plastics for refuse and carrier bags.

The landfill tax affects all industry sectors, not just packaging. However the relative cost of landfilling waste in the UK compared to other EU countries will affect the competitiveness of the UK packaging industry. The graph below compares the landfill tax by country where this information is available. It can be seen that the landfill tax in the UK is relatively low at the present time however predictions are for this to rise.

Figure 2.5:
Landfill tax prices in Europe



Source: Adapted from Costs for Municipal Waste Management in the EU, Eunomia Research and Consulting

Pollution Prevention and Control regulations

Integrated pollution control approaches in the UK have provided the basis for the EU Directive on Integrated Pollution Prevention Control (96/61/EC). Full implementation of this Directive is not scheduled to be achieved until October 2007, but implementation has already begun on a sectoral basis, for example, all paper and board making operations in the UK are now subject to the IPPC regime.

UK implementation of the Solvent Emissions Reduction Directive 99/13/EC has impacted on printing operations using solvent based inks. All operations using more than 200tpa solvents require a permit, and need to reduce their solvent emissions – VOCs (volatile organic compounds) - to no more than 20% of their total solvent usage through abatement. This sector has been targeted by the UK Government for phasing in by July 2003, and will affect all flexible packaging operations. The latter have already taken steps to reduce their VOC emissions due to a UK Government process guidance note (PG 6/17) issued in December 1998, which required a reduction in emissions to max. 150mg/m^3 by end 2007.

It is estimated that the flexible packaging industry invested £30 – 40m in capital equipment at that time to meet this requirement. The move to water-based or high solids formulations has a marked impact on production efficiencies so much so that only a limited transition to these systems has taken place.

The current Solvent Emissions Directive calls for reductions by abatement at the emission point plus fugitive emissions. The interpretation of this Directive into UK Regulations is still under debate, but if applied rigidly may involve additional capital expenditure and increased pressure on the competitiveness of the flexible packaging market.

The reduction in overall emissions under IPPC is an issue for other packaging operations like glass, where to meet the requirements may introduce anomalies such as the introduction of ESPs (electro-static precipitators) to reduce sulphur emissions whilst newer and more energy-efficient technologies are being developed in the USA. If the ESP route is implemented due

to UK IPPC implementation phasing requirements, then this will increase the overall energy levels and hence impact on the CCL as well detracting from investment in more environmentally beneficial technology.

Aggregates Levy

The Aggregates Levy is a new environmental tax on the commercial exploitation of aggregate in the United Kingdom which came into effect on 1 April 2002. For the purposes of the levy, aggregate is deemed to be sand, gravel and rock, with some exceptions.

Exports of aggregate will be relieved from the levy and imports taxed on the first sale or use in the UK, to protect international competitiveness.

Many other countries, particularly those in the EU are making increasing use of "green taxes" to pursue environmental aims. Denmark, France and Sweden have introduced similar taxes and the Netherlands are also considering a minerals tax.

It is expected that the Aggregate Levy will raise approximately £305 million in first year - all of which will be returned to business through a 0.1% point cut in employer NICs and a new Sustainability Fund to deliver environmental benefits. There will be no net gain to the Exchequer.

Aggregate which is exported from the UK, or aggregate which is used in a prescribed industrial or agricultural process, for example, silica sand used in glass container manufacture is relieved from the levy. The glass packaging industry, however, is negatively affected by the aggregates industry's actions which, as a result of the Aggregates Levy, have claimed an increased share of recycled glass from bottle banks, grinding it down into sharp sand to use in road building and thus reduce their burden from virgin aggregate use.

Recycled glass accounts for some 40-60% of a glass container used for packaging. The higher the proportion of recycled glass used in glass packaging manufacturer, the less energy the manufacturers use. For every 10% of recycled glass used, glass packaging manufacturers make an energy saving of 3% , and the energy is their biggest cost. Use of cullet as a raw material also has the knock on benefit of reducing emissions and quarrying.

Future environmental legislation

Packaging Legislation

With greater attention to producer responsibility by both Brussels and national Governments, especially Germany, more focus is being paid to product taxes such as refillable quotas, deposit systems and eco-taxes on carrier bags. Many of these have been introduced without serious environmental analysis and therefore must be questioned on any basis other than a stealth tax.

More holistic thinking is needed to ensure that packaging legislation is kept in balance with genuine environmental improvement v. appropriate functionality and free from artificial trade barriers.

EU 6th Environmental Action Programme

Within the current 6th Environmental Action Programme adopted by the European Parliament this year, there are several elements which will impact on the packaging manufacturing industry.

Chemicals Policy Directive

In February 2001 the EC adopted a White Paper "Strategy for a Future Chemicals Policy" (COM(2001)88 final), which has been under heated debate with the chemicals industry ever since as this is a precursor to legislation expected to be brought before the EP during the current session. It sets out plans to test and authorise most chemical substances placed on the market and produced in excess of 1tonnes/year since 1981 which have not been subject to the same requirements as more recent products. Industry estimates have been as high as Euro 7bn. to meet these proposals, which would impact on the packaging industry, not only due to the chemicals used in their production, but also affecting the onward processing and product manufacturers as chemical combinations would be included.

Integrated Product Policy (IPP)

This has also been the subject of the White Paper and is still under discussion on its form and shape. Essentially, it aims to bring together various initiatives and Directives, including the Packaging Directive, under one framework Directive based on a holistic approach to product design, manufacture, sale and waste management. It does embrace such philosophies as eco-labelling and returnable deposit systems; it is expected to take shape during 2003.

Thematic Strategies

There are two strategies – resource use and recycling - which could/would impact on packaging. Whilst details are still vague and possibly two years away from initial evaluation, the outcome may be overall material recycling levels on an EU basis with sub-sets of other Producer Responsibility recycling targets, e.g. packaging, electronic, automotive. The resource use strategy may aim to set goals and targets for resource reduction.

2.2.2. Health and safety legislation

There are three main regulatory documents relating to the health and safety issues that shape the state of the packaging industry in the UK. These are:

- Food Contact Legislation
- Dangerous Goods Legislation

Food Contact Legislation

Prior to 1976 the UK had no specific food contact legislation. Prior to that there were just two general requirements:

- Nothing shall transfer from the packaging to food at a concentration where it could be harmful to human health; and,
- Nothing shall transfer from the packaging to food at a concentration that causes a detrimental effect on the taste or odour of the food.

In this respect the UK was different to the USA, Germany, France, Holland, Belgium, Spain and Italy (in that they had more detailed legislation governing which chemicals were allowed in plastics, paper etc.), but essentially the same as the rest of the world. Since 1976 the UK has been gradually adopting EC Directives on food contact materials into our law. The consequence of this is material-specific legislation covering 3 packaging types - plastics, coatings and regenerated cellulose film. Other packaging types, such as paper, glass and metal, are only covered by the general sort of legislation that existed prior to 1976.

Financial impact of Food Contact Legislation on the packaging industry:

Plastics

Legislation on food contact plastics has had some degree of financial impact all along the packaging supply chain:

Raw Material Suppliers:
There are two impacts at this point. Firstly there is the cost of migration testing to prove compliance, generally £600 to £1200 per grade of a plastic. For the large, often multi-national companies, that supply plastics this is a fairly trivial cost, even when multiplied by a number of grades and repeated on an annual basis. However, should they wish to introduce a new chemical into a plastic then they have to submit a dossier to the EC's Scientific Committee for Food to prove that it is safe. The cost of the studies necessary for such a dossier vary from £40,000 to £750,000 depending on the amount of the chemical that migrates and its toxicological properties. However, only some £10,000 to £15,000 is necessary to fairly accurately predict the likely total cost and it is then a commercial decision as to whether to proceed with the rest of the study. Although the costs are potentially high they are not high enough to prevent a large chemical company proceeding with a new chemical that will give them a significant improvement in properties and thus potential sales.

Converters:
Converters carry a relatively heavy burden of compliance testing costing £400 to £1200 per item that they produce. However, this is mitigated by being able to restrict testing to representative samples, or worst case samples, from a wide range of similar packs varying perhaps only in capacity, colour or gauge. Testing has to be repeated annually. The impact this has on a large converter like Linpac is fairly small, but increases as the size of company decreases and the range of packs that they produce increases. Nevertheless even the largest companies only spend £20,000 to £30,000 per annum on compliance testing and more typically the figure lies between £1,000 and £5,000.

Packer Fillers and Retailers:
These companies are only required to test a selection of the packs they use. Annual costs therefore range from less than £1,000 for a small packer/filler to £10,000+ for a major retailer.

In the immediate future, from 2003, the above-mentioned costs for compliance testing will increase as more plastics additives are assigned limits in the legislation and thus become part of the compliance testing regime. However, costs will be mitigated by the use of mathematical modelling to minimise the amount of testing that will need to be done. By 2005 this will have caused compliance testing costs to rise by 20% per annum.

It is also worth noting that plastics compliance testing is the most onerous and will remain so. Other materials escape more lightly.

Coatings

Coatings legislation is currently limited to a single class of epoxy compounds only extensively used in coatings on metal cans. Therefore chemical and raw material suppliers will have to bear considerable costs to register new chemicals in the future. Also compliance testing costs will increase as the legislation becomes more comprehensive. However, it will be many years, and several more Directives, before compliance testing costs approach those currently borne by the plastics sector.

Regenerated Cellulose Film (RCF)

There is only one European supplier of RCF (namely UCB) and only 2 major US companies competing with them. Registration of new chemicals follows the same procedure, with the

same cost implications as plastics. However, the amount of compliance testing called for is restricted to coatings on the RCF and is only £5,000 to £10,000 per annum for the raw material supplier and neglible for users of this type of packaging. Costs here will not rise significantly over the next 5 years.

Paper and Board

EC legislation could be with us by 2005. At that point the chemical suppliers to this sector are going to have difficult decisions to make regarding whether to proceed with dossiers to register their products for food packaging. The costs will be on the same scale as outlined above for plastics. Compliance testing will be on a smaller scale than that currently carried out on plastics, with most of the burden falling on paper and board manufacturers. Testing of each grade of virgin paper will be a few hundred pounds per annum, but rising to approximately £10,000 per annum for recycled grades that will be in contact with moist or fatty foods. This is mitigated by the fact that most paper and board is used to pack dry foods. Only limited testing will be carried out further along the supply chain for due diligence purposes.

Other Materials

Eventually all materials will be covered by legislation. However, we probably will not have anything beyond the 4 sectors discussed above until after 2010. Costs of chemical registration and compliance testing for rubbers, elastomers and printing inks will be similar to those for plastics in the fullness of time. Those for the more inert materials like metals and glass will probably always be low.

Discussion

From the above the cost of compliance testing will not be an excessive burden on the UK packaging industry. However, it is a higher burden than that faced by similar companies in the rest of Europe. For the latter it is only necessary to show compliance once, whilst in the UK it is necessary on an annual basis. However, this extra cost brings with it the possibility of using the defence of “all reasonable precautions and all due diligence” should a company be selling non-compliant packaging in the UK, whilst in Europe there is no option but a plea of guilty.

The cost of registering new chemicals is quite high. This will act as a barrier to innovation unless the potential rewards are themselves high. Even if the reward is high a smaller company may hesitate before starting a programme that could take 2 years and cost £750,000. This will become a major issue for the upstream suppliers of chemicals in several sectors including coatings, paper and board and inks. A helpful modification to current procedures would be the introduction of a threshold of regulatory concern similar to that used by the FDA in the USA. This would reduce the cost of registering chemicals that either do not migrate or hardly migrate, and are not carcinogenic, to approximately £20,000.

Conclusions

➢ Food contact legislation does not make the UK packaging industry uncompetitive.

➢ The adoption of the American concept of a threshold of regulatory concern would be a useful modification to current EC procedures for registering new chemicals for use in food packaging. It would encourage smaller companies and thereby aid innovation on a broader front.

Dangerous Goods Legislation

Dangerous Goods legislation in the UK primarily comes in two parts. The domestic regulations for road viz. 'The Carriage of Dangerous Goods (Classification, Packaging and Labelling) and Use of Transportable Pressure Receptacles Regulations 1996', and for international movements and domestic air and sea movements enabling acts which bring into force the international regulations. The International Maritime Organisation's 'IMDG Code' for sea freight and the International Civil Aviation Organisation 'Technical Instructions for the safe transport of Dangerous Goods by Air' all the regulations are based on the 'UN Recommendations on the Transport of Dangerous Goods'. This publication lays out in general principles the types of packaging that might be suitable, the tests required on the packaging and when such tested packaging should be required.

The UN system for the packaging of Dangerous Goods is a performance test orientated one as opposed to a more traditional based specification system. It has a notional requirement that every packaging design type should be tested but this is mitigated by allowing 'Competent Authorities' to permit selective testing. This relaxation is regularly used to give packaging suppliers increased flexibility and to reduce testing costs.

A further significant relaxation from the formal testing requirements for Dangerous Goods packaging are the Limited Quantity provisions. Dangerous Goods in combination packages ((an) inner packaging(s) in an outer packaging) up to 30kg gross mass and dependent on the actual substance in the package are exempt from formal testing. This effectively gives free access to the market. However the driving force for packaging will come from the manufacturer / shipper of the Dangerous Goods and the packaging supplier may not know that his packaging is so used.

Financial impact of Dangerous Goods Legislation on the packaging industry:

Beyond the limited quantities the Regulations are not a particular bar to any packaging type. Although formal testing of packaging is required and a typical package test may typically cost £700 to £1200 there are no other restrictions. Market penetration of packages being offered for sale for Dangerous Goods varies by packaging type. Steel and plastic drums and jerry cans for Dangerous Goods, as freestanding packagings, are nearly all certified to the manufacturers of the container and offered for sale, whereas fibreboard box certificates for combination packaging are rarely held by either the box or the inner receptacle manufacturer. These certificates are usually held by the manufacturer of the Dangerous Goods and often incorporate unique inner packaging. One combination package is however offered by many box and bottle manufacturers:- the four by five litre plastics bottles in a fibreboard box combination. The prevalence of this confirms that where there is a reasonable market for a packaging there are no real bars to entry.

It should be recognised that the Dangerous Goods packaging market is a small part of the packaging industry. In some ways it encourages smaller companies to be involved through niche marketing. A number of small companies have spent considerable amounts of time and money developing selections of packaging for placing in the market. In addition once a certificate has been issued for a fibreboard box combination it is easy and cheap to add additional sources of supply for the box (subject to a f.o.c. check).

The most significant bar to entry into the market by UK companies is the different interpretations of the regulations by other countries. Although an ISO standard covering the UN tests is to be published shortly and this should result in a level playing field, it is by no means clear though that every country in Europe will actually implement the standard. The possibility of cheap inferior European certified packages is likely to remain a threat to the domestic industry and the possibility of almost uncontrolled 'UN' packaging from the Far East a real long term threat.

2.3. PACKAGING R&D IN THE UK

Research and development is a key method of achieving sustainable competitive advantage. While Crown Cork & Seal still retains its CarnaudMetalbox research centre in the UK, many other packaging manufacturers either do not have an R&D function, or have facilities abroad (for example, Smurfit has facilities in France).

This does not mean that there is no innovation in the UK. Successful innovation may be based around new design concepts for which the basic technology already exists (for example, RPC supply of innovative confectionery designs to Nestlé). Innovation may also depend on raw materials suppliers, who have their own R&D facilities.

Some R&D is carried out independently of the packaging industry, then adopted by industry through technology transfer. (For example, the electronics industry has developed a number of technologies which can be applied to the packaging supply chain.)

Some of the key areas of current research include:

Pack minimisation

The trend of pack minimisation (weight and size reduction) continues. This process has been influenced by the requirement for cost reduction and improved environmental performance. Nanotechnology is a new science which involves making materials 'from the bottom up', building them from atoms and molecules. The use of this technology will help the minimisation process through enabling better performing materials to be developed.

Shelf-life prolongation

Consumer expectations of product quality and changes in the distribution chain means increasing shelf-life which requires new and improved barrier materials and techniques.

Tracking and traceability

Tags with chips and those without will find more applications throughout the supply chain for tracking and tracing. The improvement in tracking and traceability will reap benefits for both the supply chain and the end-consumer. Tags will become even smaller, printable on flexible materials and able to be interrogated from greater and greater distances.

Active and intelligent concepts

In addition to tagging, all kinds of indicators and product monitors will come to market to provide more product information and the means of ensuring product quality, especially those with short shelf-lives as well as product and pack security and verification.

Improved functionality

There will be continuing development of pack formats to meet changing consumer demands. Many developments will come from the transfer of technologies from other categories and other industry sectors. Pack functionality and added convenience will be a focus for development.

New printing technologies

There will be more integration and automation of systems and processes enabling greater customisation and reducing supply chain costs. These are likely to become commonplace, especially in the short term, as a way of gaining the advantages of high quality conventional print combined with the variable imaging capability of digital print.

The implementation of distributed but networked pre-press systems for the preparation of artwork for packaging printing will continue. As a result timescales will be reduced to hours, and in combination with digital print it will be possible to implement marketing ideas that have not so far been feasible.

Biodegradables

Research will continue into developing packaging materials which are degradable or compostable. These may be polymer-based or starch-based or a combination of both.

Many of the challenges facing the packaging industry – across all sections – would be significantly better met with investment in new research and development. Overall the industry has tended to be pre-occupied with the issues of today and has sacrificed long-term development for immediate survival. This is particularly the case for opportunities arising from current consumer trends. As far as the packaging industry is concerned these are positive trends which can lead to substantial new opportunities. In particular there are very attractive margins for supply chains which can provide high consumer benefits, or more specifically:

- Emotional appeal and image to meet consumer values and aspirations
- Enhanced convenience of delivery of products
- Enhanced product quality
- Value for money

Whilst all these can be partially met by current technology, the major winners will be those who invest in developments which can deliver radical, ‘step change’ innovation. This will require investing in technological development which might otherwise be seen as the domain of other, ‘sexier’ sectors.

Desired Outcome	Exemplar Characteristics	Underpinning Technologies
Emotional Kick	• Brand Enhancement • Fun! • Personal values • Customisation/Batch of 1	✓ Human Factors ✓ Electronics/Photonics ✓ Systems Engineering ✓ Automation & Robotics
Convenience (Incl. Intelligent Packaging)	• 'Use on the Go' • Openablity/Closability • Freshness Indicators • Doneness Indicators • Product Delivery Devices	✓ Human factors ✓ Biotechnology ✓ Electronics/Photonics ✓ Mechatronics
Product Quality (Incl. Active Packaging)	• Freshness • Increased Shelf life • Security • Brand validation • Child resistance	✓ Advanced materials ✓ Electronics/Photonics ✓ Simulation & Modelling ✓ Human factors
Value for Money	• Speed to market • Supply efficiency • Materials Minimisation	✓ Automation and Robotics ✓ Systems Engineering ✓ Advanced materials

Source: Faraday Packaging Partnership

There is clear evidence from a number of quarters that companies at the head of fmcg supply chains – brand owners and retailers – are investing in these areas. Unless and until the packaging converter starts to match that investment, the industry will be doomed to be the low cost, low margin intermediary layer in the supply chain.

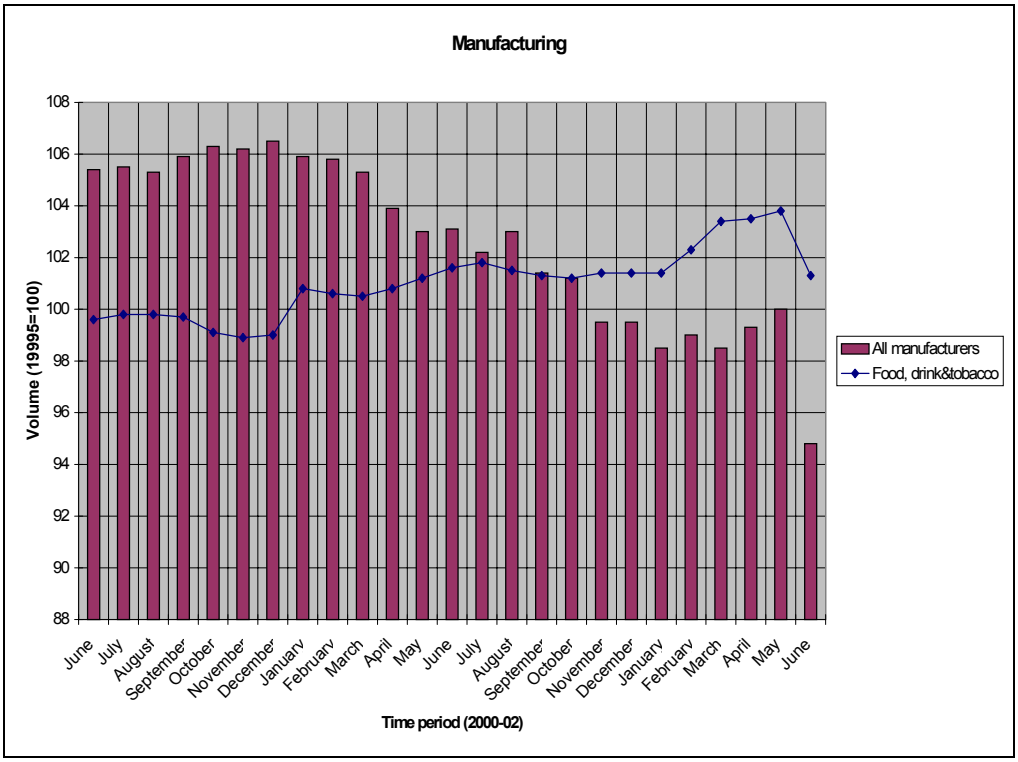
Fortunately the UK is well endowed with Higher Education resources and research institutes in the core technologies needed by the industry. Furthermore, one of the longest established – Faraday Packaging Partnership – has been set up specifically with the remit of increasing productive and profitable interaction between the science base and the packaging industry. For further information on the Faraday Packaging Partnership, refer to Appendix II.

INDUSTRY PERFORMANCE - SECTOR ANALYSIS AND INTERNATIONAL BENCHMARKING

3.1. CURRENT AND ECONOMIC ENVIRONMENT

According to the ONS, the mood in private business in both Britain and mainland Europe has deteriorated sharply over the last six months as the US economy continues to struggle and the threat of a Gulf war intensifies. The index of business confidence among European firms backed by venture capital group 3i has fallen to a level lower than in February, eliminating the gain recorded in the last survey in May. The index dropped most sharply in the UK, from –7 to –81. British companies also believe that the economic and political climate is now less favourable to expanding existing business activity (a balance of –36%) or to starting new business (-51%).

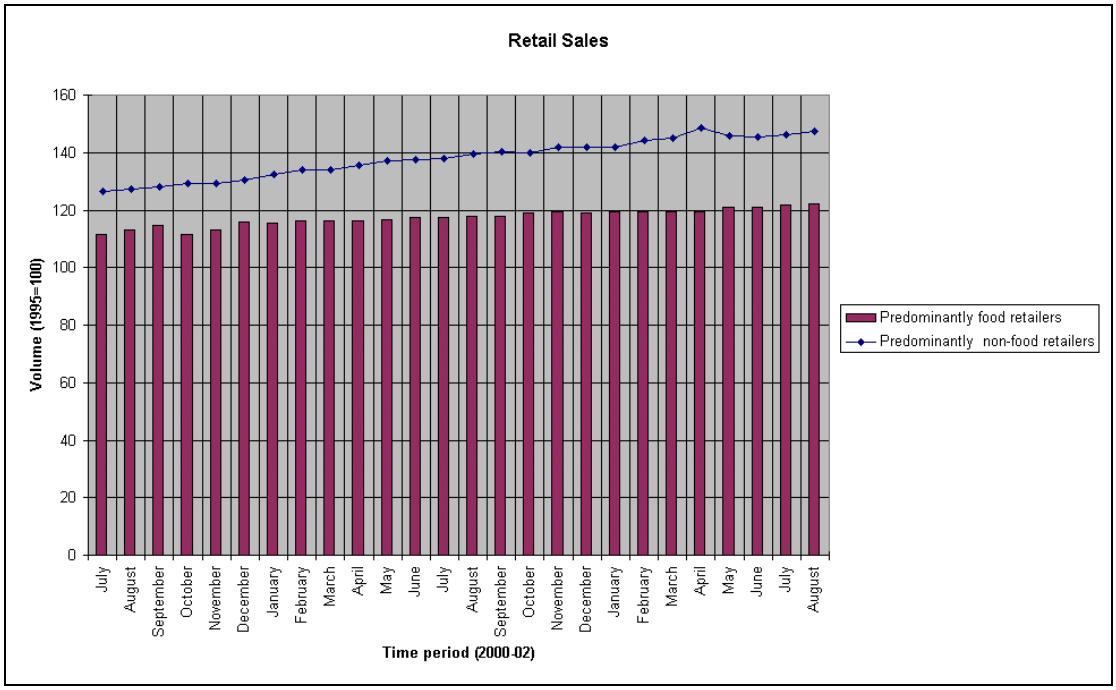
Figure 3.1:
Manufacturing in the UK, 2000-2001



Source: ONS (Index: 1995=100)

Optimism among British consumers, however, appears to be holding up much better, bolstered by the strong housing market.

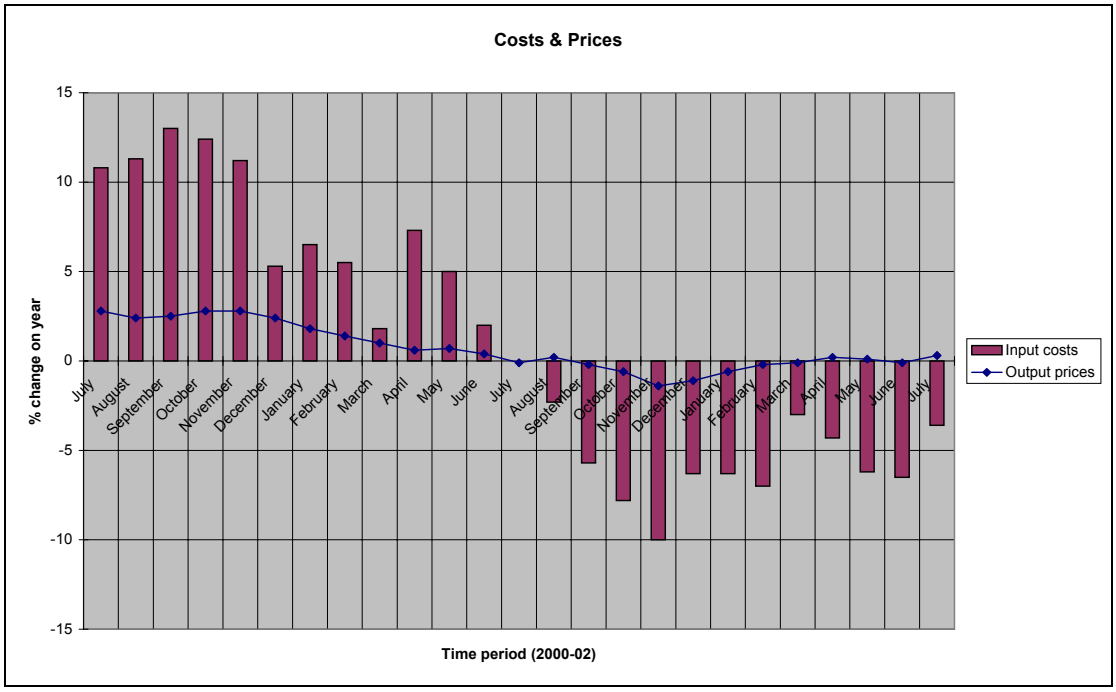
Figure 3.2:
Retail sales in the UK, 2000 - 2001



Source: ONS (Index: 1995=100)

Figures 3.1 and 3.2 demonstrate the growing differential between the fortunes of the "two-speed economy" The packaging manufacturing industry is impacted negatively as part of the overall manufacturing scenario above, plus the increase in the retail sector impacts negatively due to increased exports.

Figure 3.3:
Cost and prices in the UK, 2000 - 2001

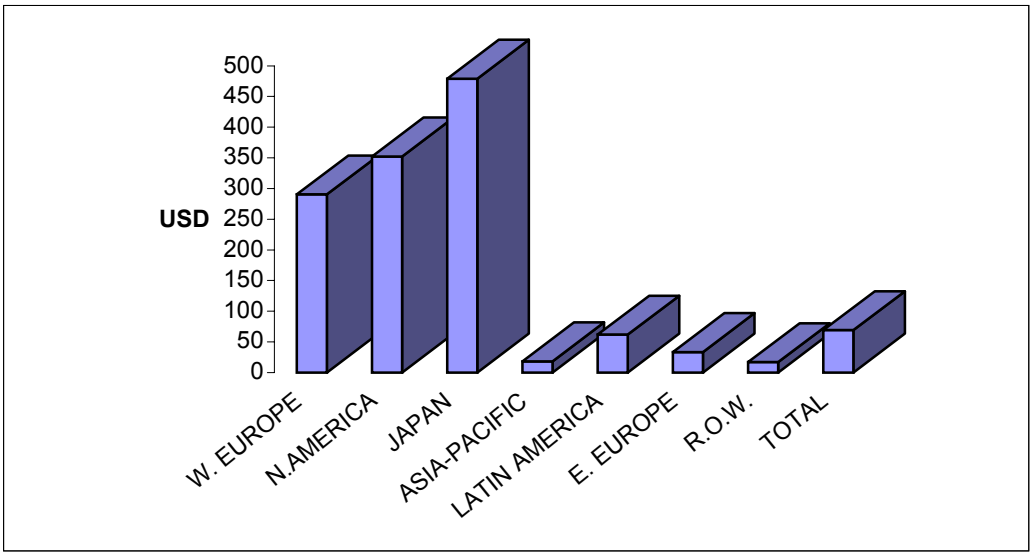


Source: ONS (Index: 1995=100)

3.2. PACKAGING INDUSTRY DEVELOPMENT

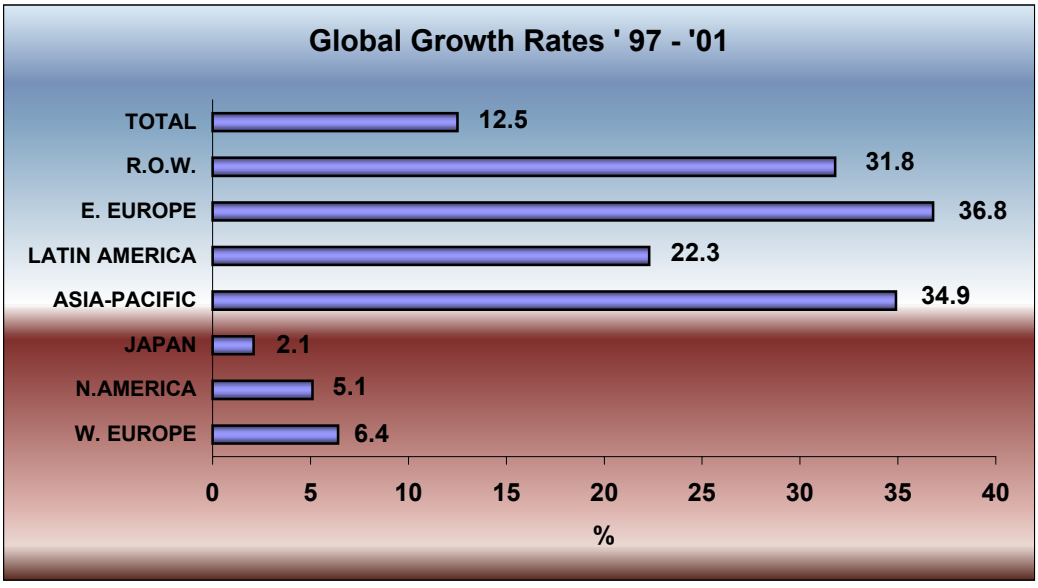
Packaging is generally seen as a good barometer of economic development and improvements in life-style, as is evident from the figures below showing the global picture in 1997 and the growth patterns to 2001, where the global packaging spend per capita is far higher in North America, Western Europe and Japan compared to the rest of the world. Conversely, growth rates are typically higher in emerging regions such as Eastern Europe, Latin America and Asia.

Figure 3.4:
Global packaging spend per capita, 1997



Source: The Packaging Federation

Figure 3.5:
Global packaging industry growth rates, 1997 - 2001

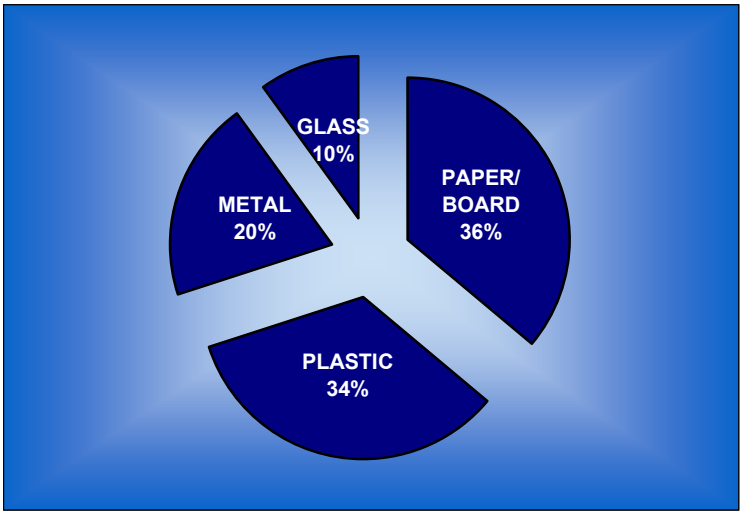


Source: The Packaging Federation

The primary packaging manufacturing industry, i.e. excluding wood, is composed of four competing material sectors each with a different set of operating conditions, i.e. paper/board, plastics, glass and metals. Within this make-up there are sub-divisions noted previously, i.e.

corrugated board, cartons, rigid plastics, flexible plastics, steel and aluminium as well as a combination of one, two or even three of these sub-divisions.

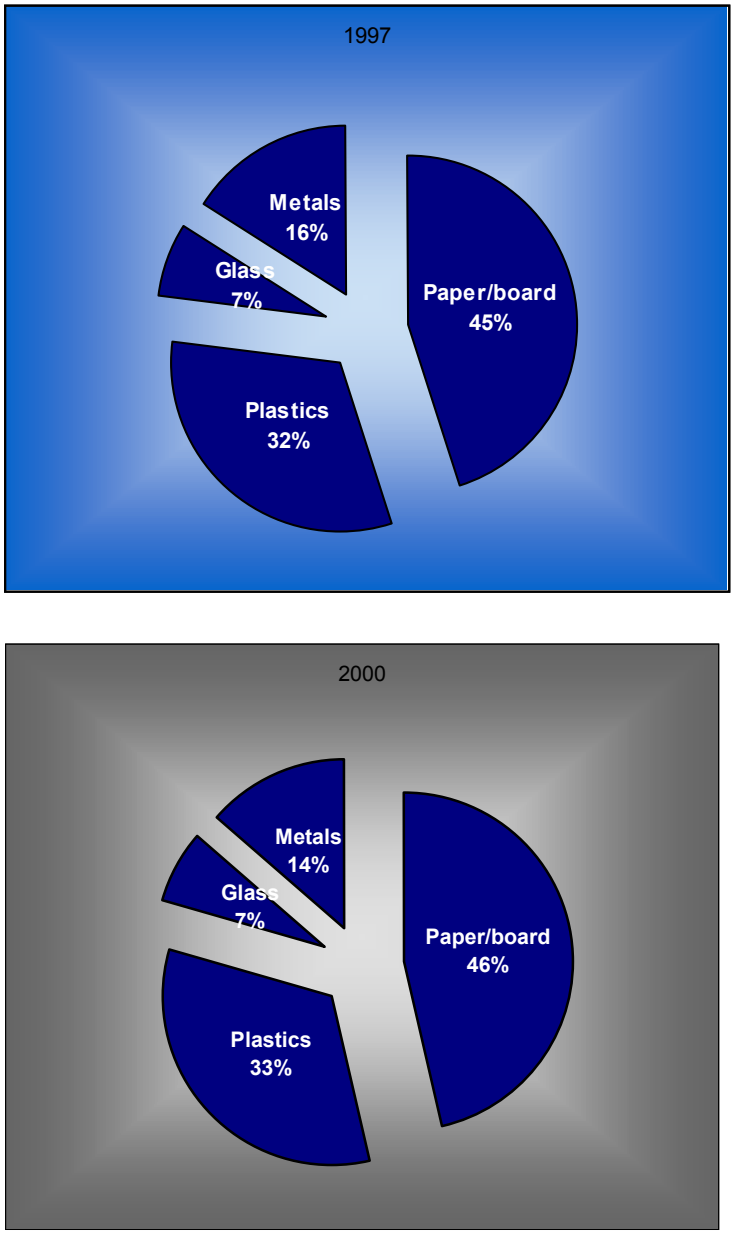
Figure 3.6:
Value of the global packaging industry by material (exc. wood), 1997



Source: The Packaging Federation

The UK market distribution by material is different however, reflecting a range of factors such as legislation, different stages of development and consumer preferences.

Figure 3.7:
Value of the UK packaging industry by material (exc. wood), 1997 and 2000



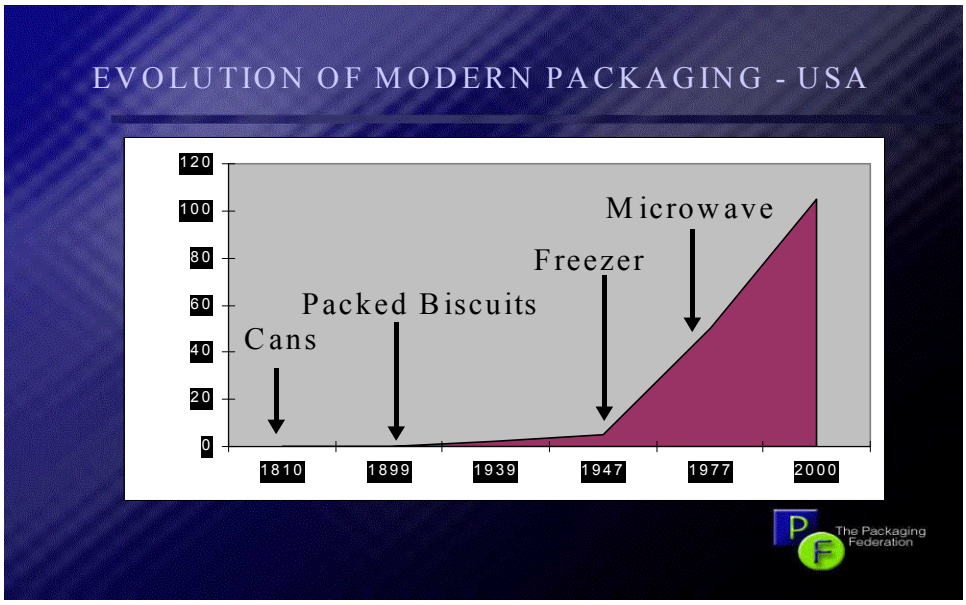
Source: The Packaging Federation

The growth in the UK packaging market was more marked in the period 1986 – 1996 than in the last 5 years, which can be attributed to both efficiency in light-weighting of all materials, environmental and cost pressures to reduce the amount of packaging, plus the increase in imported packed goods.

Modern packaging that we know today is relatively recent only coming of age in the last century, and especially since the end of the 1950s, when the consumer boom started bringing with it the advent of home technological improvements - refrigerator, freezer, microwave - and the supermarket. The evolution of modern packaging is most closely identified with the

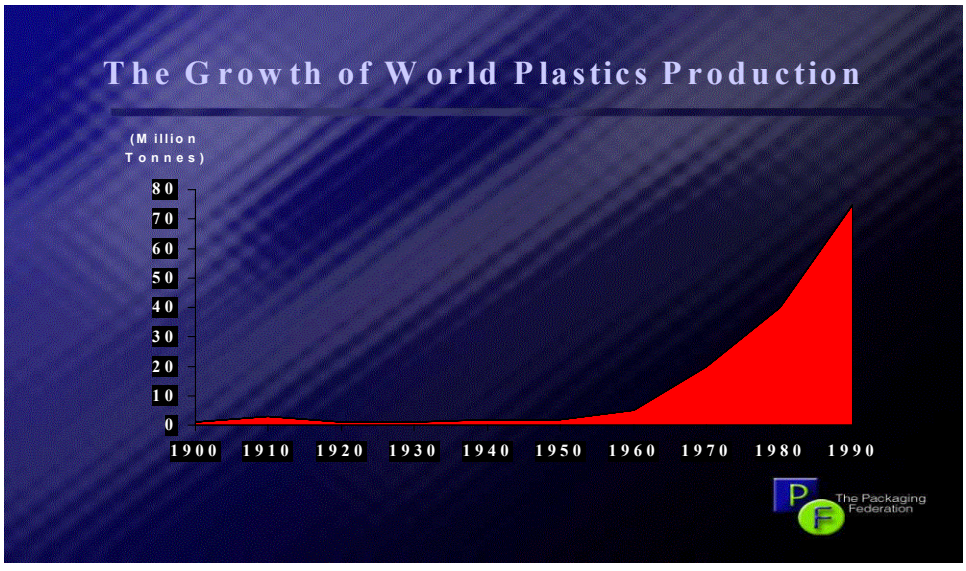
development of plastic packaging, as growth patterns in the following charts visibly demonstrate:

Figure 3.8:
Evolution of modern packaging in the USA, 1810-2000



Source: The Packaging Federation

Figure 3.9:
World plastics production, 1990 - 1990



Source: The Packaging Federation

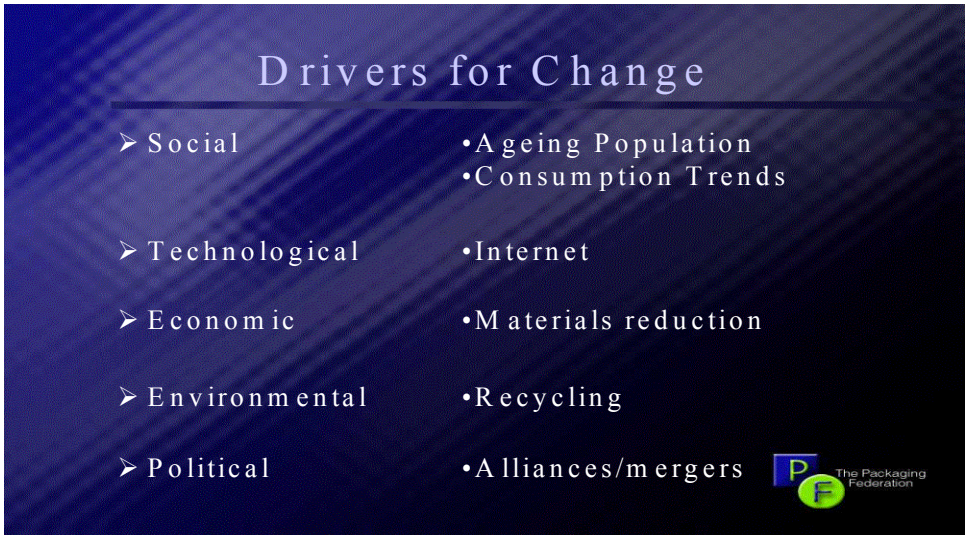
Packaging is the largest end-use application for polymers and its market share (nearly 40%) is growing at the expense of other segments such as furniture, construction and telectronics. The plastics industry has been the main beneficiary from the global increase in packaging use, not only benefiting from substitution in the other traditional material markets, but acting as a catalyst for technological changes in material and packaging development. This has in turn spurred the other materials into similar technological developments.

The demographic and technological changes are significant in terms of productivity and benchmarking since their impact has not always been uniform, and thus has driven packaging manufacturing at different paces across the world. The USA has been at the forefront of these changes and operated on a much larger market scale than its European competitors, who have adopted the social changes at a different pace and until relatively recently operated on a national scale. These factors have shaped the size and productivity of the UK and European sector.

As with many industries, the commodity elements of the market are becoming more and more susceptible to global pressures, especially from the Asian developing countries, who have access usually to cheaper raw material sources, cheaper labour rates, and the benefit of investment in more modern machinery and lay-out based on a growing domestic and global export market.

The drivers for change which shape the competitiveness of the industry can be sub-divided into 5 main areas as shown below. How they are responded to will depend on the productivity of the sector, and the supporting economic and social framework of the UK.

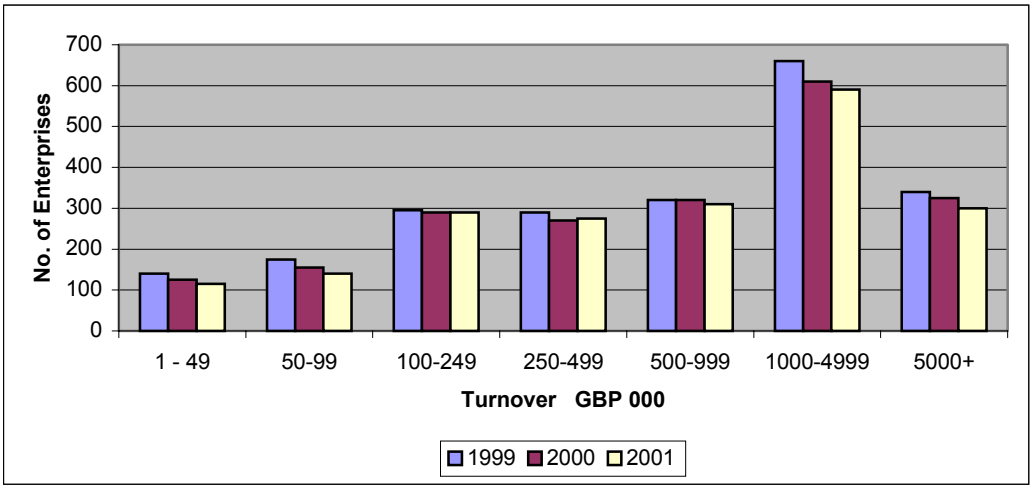
Figure 3.10:
Drivers for change



Source: DTI Foresight/The Packaging Federation

Whilst there are some large and ever-increasing global players in the packaging industry, it is dominated by SMEs, particularly in the plastics and paperboard sectors.

Figure 3.11:
VAT registered UK packaging enterprises, 1999 - 2001



Source: The Packaging Federation

Ownership in the >£5 m bracket is gradually moving out of the UK, which is the reason for the demise of the packaging sector in FTSE in 2000.

Thus, we are likely to see the profile of the industry continuing to change (in response to the drivers for change) with the larger companies becoming more global and market focused to achieve greater synergy with their customer base in the consumer markets, whilst the smaller players will concentrate on more niche sectors in their national markets.

This has been highlighted recently by a survey by Plimsoll Publishing, which ranks financial performance as Strong, Good, Mediocre, Caution or Danger. Competitive strategy is examined under the headlines Winners, Losers, Chancers and Sleepers based on sales growth and debt as a percentage of sales. The conclusions of this analysis are that of the 1,000 companies included in the report 216 are ranked as losers but on the plus side an equal number classified as winners:

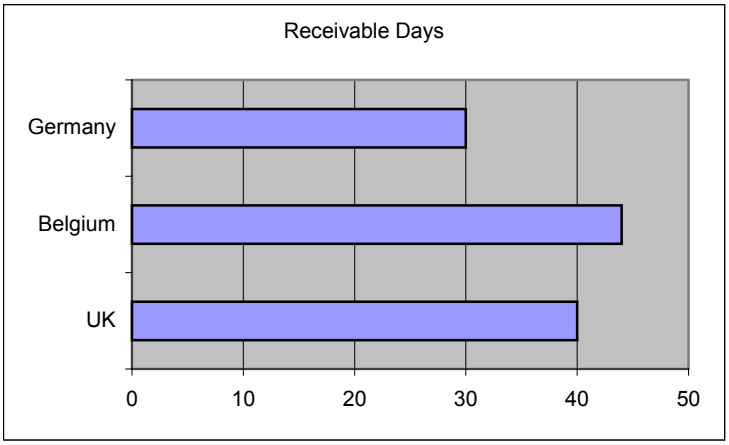
Table 3.1:
Packaging manufacturers financial performance in the UK, 2000/2001

Rating	Companies	Pre-tax margin	Debt as % of Sales	Retained Profit
Strong	261	5.6%	4.0%	2.1%
Good	90	2.8%	9.4%	0.9%
Mediocre	100	2.5%	13.0%	1.0%
Caution	153	1.7%	20.0%	0.3%
Danger	396	-1.5%	37.9%	-1.6%

Source: Packaging, Third Edition 2002, Plimsoll Publishing Ltd

With regard to the debt ratio, an important factor is the difference in Europe towards receivable days. The following comparison is made:

Figure 3.12:
Variation in EU receivable days, 2002



Source: The Packaging Federation

This would indicate that the competitiveness of the UK industry could be improved by reducing the number of receivable (debtor) days.

It is estimated that in some sectors profitability has halved in the last decade due to over-capacity, increased pressure from customers, especially the multinational brand owners and retailers.

3.3. CORPORATE ACTIVITY

The packaging manufacturing industry is in the state of constant flux. The sector constantly re-aligns itself in order to either survive or to perform better.

The UK converters are, however, the most vulnerable participants of the packaging supply chain. In the period 1998-2000 there were 20 major plant closures. Table 3.2 is a summary of the most important corporate activity and ownership changes which took place this year. A closer analysis of the figures indicates that packaging manufacturers have suffered most job losses. Over 1000 jobs have been lost in the packaging manufacturing sector due to plant closure or administration/receivership.

There have been seven management buy-outs this year so far among packaging (inc. label) manufacturers, which proves that the industry value is suppressed.

Only a few large converters (for example Rexam and Linpac) have invested in plants outside the UK. British investment in the UK was not very pronounced, but the total of 315 new jobs were created at the packaging manufacture level.

For detailed list of major corporate changes in the packaging industry in 2002, please refer to the Appendix.

Table 3.2:
2002 corporate activity and ownership changes in the UK packaging industry

Activity / Business Type	Raw Material Supplier	Packaging Manufacturer	Packaging Machinery Manufacturer	TOTAL
UK Acquisition in the UK		11	1	12
Administration/Receivership	1	6 / -189	2	9 with 189 job loss
UK Management Buy Out		6		6
UK Merger with Foreign Company		1		1
Closure	2 / -280	9 / -839	2 / -200	13 with 1319 job loss
UK Investment in the UK	1	11/ +315		12 with 315 job gain
Sale of UK to Foreign Business		6		6
Foreign Investment of UK Packaging Co.		2		2
Foreign Investment of UK Packaging Co. (Acquisition)		2		2
TOTAL	4	54	5	63

Source: Pira International Ltd

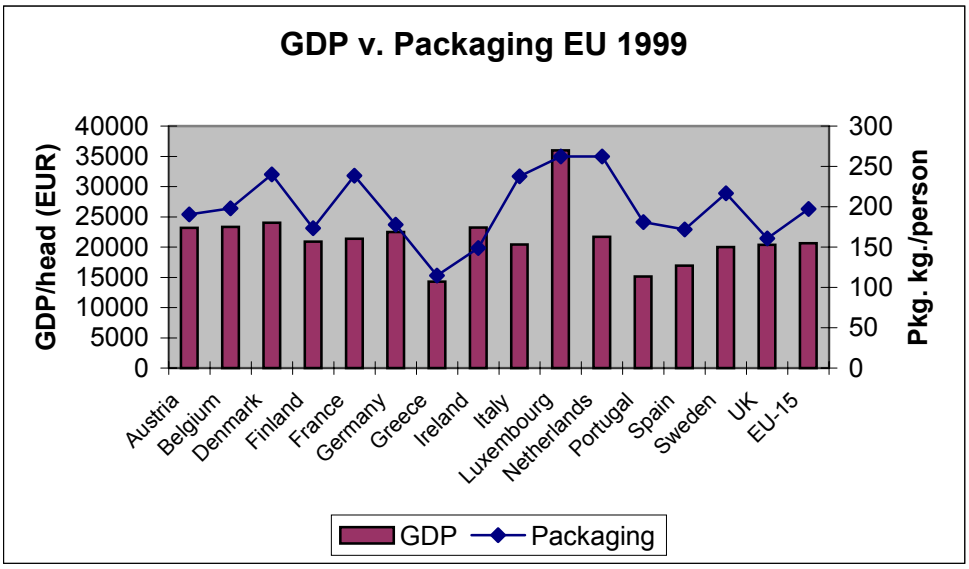
3.4. SUSTAINABILITY

Whilst sustainable development will be the subject of separate reports from The Packaging Federation and PIRA in the coming months, it is worth noting that this is another element in the competition stakes due to packaging having a relatively high profile politically.

There is a general public perception that packaging is a major contributor to waste and that many products are over-packed. However, the ever-greater use of packaging can be largely attributed to consumer life-style demands.

This can be shown in the chart below which equates GDP measured in purchasing power parity as a common denominator and indicator of life-styles with the packaging usage. There is no real correlation with the "greener" countries such as Denmark, Sweden and Netherlands appearing to have a greater packaging usage compared to GDP. Any correlation will probably be drawn from more complex factors, such as demographics of family size, single parents, ownership of household appliances as well as national shopping and eating habits.

Figure 3.13:
Per capita GDP versus per capita packaging consumption in the EU, 1999

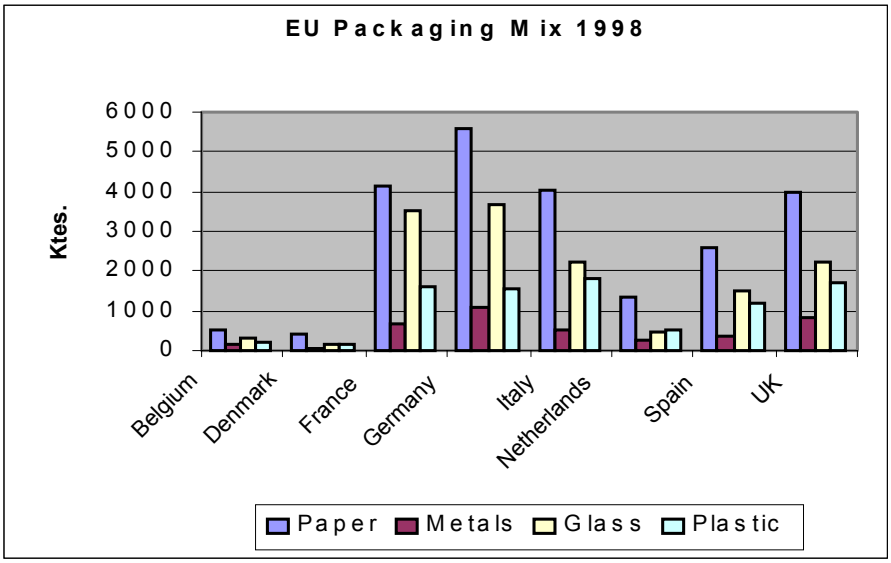


Sources: *A Community of Fifteen: Key Figures (European Commission & Eurostat)*

GDP is calculated on the basis of purchasing power standards i.e. identical volume of goods and services everywhere, irrespective of price levels, on basis of demographic data included in the national accounts.

Although European politicians wish to see "a one size fits all" solution to most issues, the cultural differences need to be taken into account.

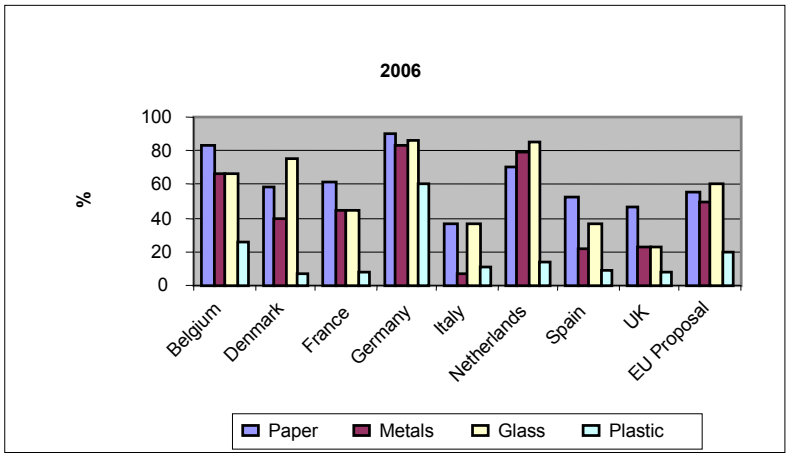
Figure 3.14:
EU packaging mix, 1998



Source: European Commission

Similarly, with waste management, there are different systems and cultural attitudes to waste, which is reflected in the diagram below - and this is against a background of an EU Directive aimed at harmonisation since 1994!

Figure 3.15:
EU recycling rates in 1998 v. EU proposals 2006



Source: European Commission

The introduction of the Accession States can only make this picture more uneven.

As highlighted in the Legislation section, UK packaging manufacturers have been at the forefront of environmental expenditure, but like any investment this needs to achieve a pay-back period of improvements to the environment, and fiscal improvements through recognition by the customer base. This latter recognition will only be gained however if there is a level playing-field for all suppliers. The introduction to the market of the Accession States, especially the former Soviet bloc, may jeopardise that strategy since their environmental expenditure and investments are shown to be much lower than UK manufacturing, but may still gain business due to this lower cost base. The current and future levels of investment in environmental improvement will be valueless if the sales base move to the Candidate countries.

Table 3.3:
Comparison of current and future levels of investment in the UK and selected Eastern European countries, 2000

Environmental Protection Expenditure 2000 (Total of Current Expenditure + Investments)								
	Total Industry		% Share					
	Euro M.	**of which:**	Manufacturing	**of which:**	Food, Beverage & Tobacco	Pulp, paper & printing	Chemicals, Plastics & Rubber	Metal Products
UK	6935		78		12	8	20	25
Bulgaria	151		43		1	5	8	2
Czech.	245*		45		1	0	21	8
Estonia	44		35		8	11	2	5
Poland	729*		46		5	1	5	6
Rumania	298		85		10	5	15	15
Slovenia	85		52		1	11	22	10

* Investment only - current expenditure unknown!

Pollution *Treatment* Investments 2000								
	Total Industry		**% Share**					
	Euro M.	**of which:**	Manufacturing	**of which:**	Food, Beverage & Tobacco	Pulp, paper & printing	Chemicals, Plastics & Rubber	Metal Products
UK	1029		78		22	5	23	19
Bulgaria	68		17		0	0	2	0
Czech.	NK*							
Estonia	21		12		1	0	1	3
Poland	521		50		4	1	6	6
Rumania	NK*							
Slovenia	60		39		1	14	12	8

* NK = not known

Pollution *Prevention* Investments 2000								
	Total Industry		**% Share**					
	Euro M.	**of which:**	Manufacturing	**of which:**	Food, Beverage & Tobacco	Pulp, paper & printing	Chemicals, Plastics & Rubber	Metal Products
UK	1303		67		4	6	19	26
Bulgaria	6		64		9	0	55	0
Czech.	NK*							
Estonia	6		79		0	73	4	0
Poland	208		35		8	2	3	4
Rumania	NK*							
Slovenia	0		0		0	0	0	0

* NK = not known

Source: Eurostat

It is imperative that, whilst enhancing the market development and providing support to new members, the existing Member States are not disadvantaged and allowed to recoup the investments noted above.

The attraction of these Applicant States was noted in a recent survey by Ernst & Young where in the first six months of 2001 the ex-Soviet bloc attracted an increase of 54% in inward investment to achieve 34% of the EU total. Poland and the Czech Republic were the main

winners, as exemplified by the move of Black & Decker. This is against a background of falling investments in Europe also, mainly due to the US. Unfortunately, Britain is disproportionately dependant upon US investments. The knock-on effect on the packaging manufacturing sector should not be ignored.

3.5. COMPETITIVENESS

Competitiveness is often confused with productivity. The distinction drawn here is that productivity is a component – but a key component – of competitiveness with the former being in the control of the business whilst the latter is subject to external forces, not always in the control of the business.

It is worth using as a yard-stick the DTI's own competitiveness indicators (second edition). These indicate the following parameters:

3.5.1. Business environment

i.e. macro-economic environment, competition, labour market, business perceptions of institutions and quality of life.

In its summary, the DTI claims that "*many aspects of the business environment have improved in recent years, providing UK firms with a supportive framework in which to operate."*

It is undoubtedly true that the long period of low and managed inflation is a real benefit to industry for planning and investment, but often there is a considerable gap between investment and results.

Using the World Economic Forum competitiveness index 2002 as a measure, this shows that overall the UK has improved slightly and performs better than its EU partners, except for the Nordic countries. However, it still lags way behind the USA, the main yard-stick often used by the DTI and HM Treasury in such assessments:

Table 3.4:
World Economic Forum competitiveness index 2002

	2002	**2001**
1	USA	Finland
2	Finland	USA
3	Taiwan	Canada
4	Singapore	Singapore
5	Sweden	Australia
6	Switzerland	Norway
7	Australia	Taiwan
8	Canada	Netherlands
9	Norway	Sweden
10	Denmark	N. Zealand
11	UK	Ireland
12	Iceland	UK
13	Japan	Hong Kong
14	Germany	Denmark
30	France	
39	Italy	

Source: World Economic Forum

Whilst it is credible to see the UK ranked above its main EU competitors, on the issues of macro-economic environment and perceptions of institutions, it cannot be denied that the constant source of irritation is the claims of "red tape" now estimated to be at a cumulative cost of £47bn to UK businesses since 1997. It will be interesting to see the impact on the tables and comments noted above of the ex-Soviet bloc entrants to the EU for 2003.

The issue of regulations is not just about costs, but more about implementation. The UK appears to still thrive on a constant consultation exercise between Government and businesses, but due to the length of time and nature of the consultation, business still feels their views are not heeded. Furthermore there is a culture of infinite detail and accuracy attached to all implementation, which is not witnessed elsewhere in Europe, and which adds cost to business compliance.

There is also a feeling of distrust between Government and industry which is opposite to that seen in other parts of Europe and especially the USA and Japan, where partnerships appear more common.

For the packaging industry, this is evident in the House of Lords Inquiry into the Costs of the Packaging Waste Regulations to Industry July 2002, when the Government were heavily criticised for advising businesses too late on their annual recovery and recycling targets after a consultation, and the lack of adequate monitoring to ensure consistency.

The implementation and enforcement in other areas is seen as a significant factor in competition between UK business and other EU Member States. The UK CCL system and IPPC implementation are two particular pieces of legislation which are highlighted for review and concern over cost-effectiveness as well as the lack of "joined-up" thinking to ensure that complimentary pieces of legislation are managed better.

There are too many piece-meal initiatives in the environmental area. This has already been acknowledged in the European Parliament from whence approximately 70% of such

legislation emanates, and needs support and encouragement from the UK Government for rationalisation.

More attention is required to ensure that implementation of EU Directives are harmonised, both in the way in which they are enforced and measured. There is sufficient evidence to show that is not the case at present to the disadvantage of UK manufacturing.

3.5.2. Resources

i.e. human capital, physical capital, finance, ICT, and science & technology.

The DTI analysis suggests *"that economic performance has been held back by poor skills and a shortage of intermediate-level vocational skills. The UK's productivity record has also been adversely affected by decades of under-investment. The science base is strong but there are weaknesses in R&D."*

It is worthy of note that the Bank of England advises that since 2001 business investment in Britain is down 15 percentage points as opposed to "Euroland" down 2 percentage points and USA up 2 percentage points and Japan down 6 percentage points. Thus it depends at which point in the economic cycle and period one takes when making such analysis, but investment decisions are a factor of confidence in the Government's ability to provide a satisfactory environment to earn a suitable return on that investment.

The skill base will be addressed in the DTI/Institute of Packaging Industry Mapping Project, but in general terms whilst the current trend towards modern apprenticeships is welcome, it is perhaps the whole further education system which needs revisiting as there is still too much predominance on university entrants for a "knowledge-based" society as opposed to a system based on both academic and vocational achievement which can both satisfy those students who are not academically gifted or interested in such a path as well as fill the growing gap for qualified skilled manual workers.

The packaging manufacturing industry believes that the UK does perform more strongly than many EU competitors in developing ideas and providing better control techniques.

3.5.3. Innovation process

i.e. technology commercialisation, knowledge transfer, receptiveness to foreign ideas and entrepreneurship.

The DTI believes that "the UK is receptive to new ideas and is effective at accessing the global knowledge pool. However, the UK performs relatively poorly in terms of turning new ideas into commercial success. In this respect, attitudes to entrerpreneurship and risk-taking more generally, are key factors."

The UK packaging manufacturing industry is at the forefront of innovation and does exploit process technique improvement.

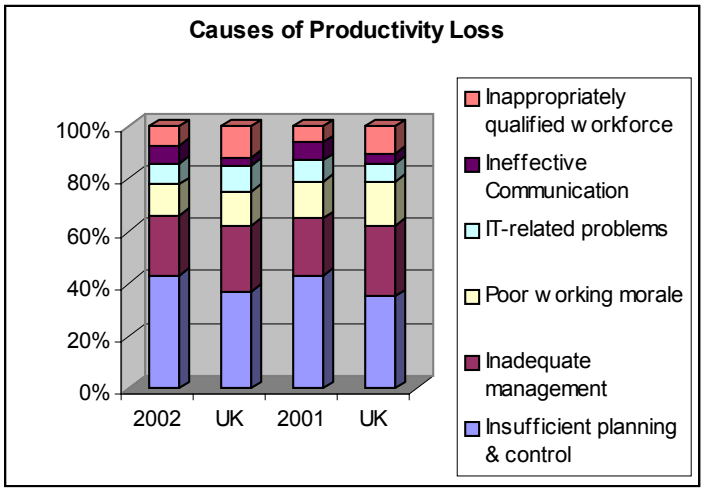
3.5.4. Results

In the final analysis, the DTI ascertains that "a substantial gap in productivity and living standards remains relative to the US and parts of Europe."

3.6. PRODUCTIVITY

It is worthwhile comparing productivity issues with a recent analysis by Proudfoot Consulting *Untapped Potential, a Global Productivity Study* (published in October 2002) as it is used as a reference point by Government. Their analysis conducted across Europe, USA, Japan, Australia and South Africa is relevant to the packaging industry due to the UK's changing ownership. Benchmarking across these countries is part of the investor management process. Thus, the increasing globalisation of the packaging industry in the UK may add benefits by the transfer of technology and management techniques from USA and Australia. Extraction from the Proudfoot report shows the following pictures:

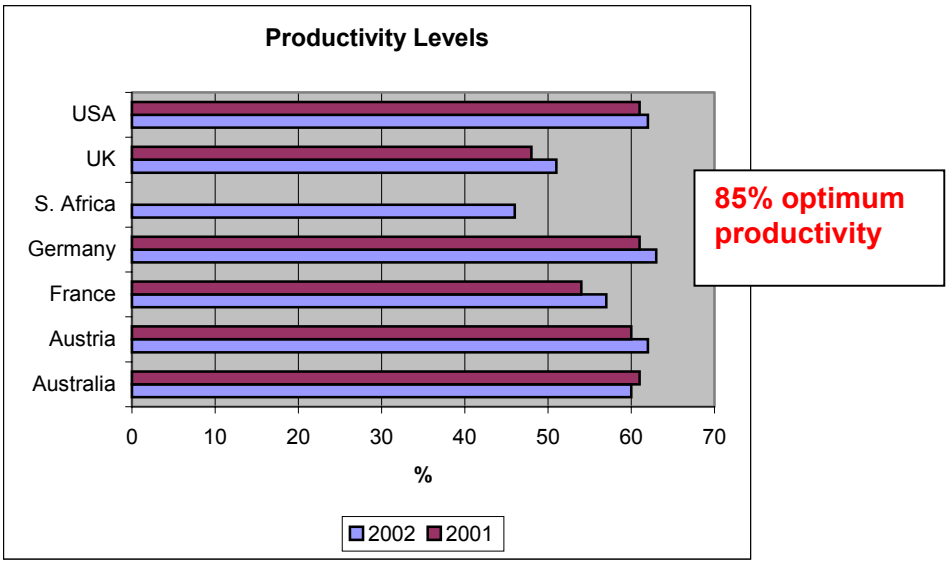
Figure 3.16:
Causes in productivity loss in the world, 2001 and 2002



Source: Proudfoot Consulting

This would appear to show that compared to the average, the UK suffers more greatly from inadequate management and an inappropriately qualified workforce as well as IT-related problems.

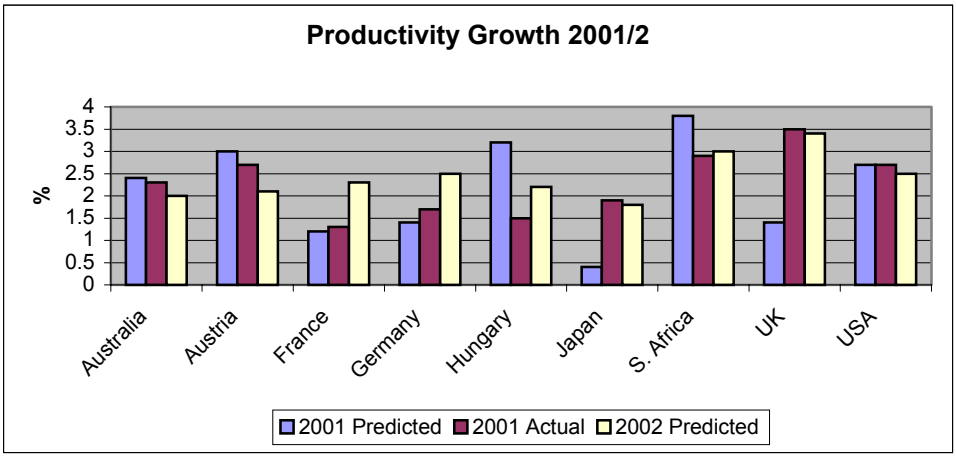
Figure 3.17:
Productivity levels in the world, 2000 - 2001



Source: Proudfoot Consulting

Proudfoot estimate that the optimum productivity level is 85% of the total working days in a year, and made an analysis on the average country productivity levels. Whilst no single country achieved the optimum level, the results reinforce the UK Government belief that the UK lags behind the USA, most of continental Europe and Australia, whilst South Africa lags behind the UK.

Figure 3.18:
Productivity growth in the world, 2001 - 2002



Source: Proudfoot Consulting

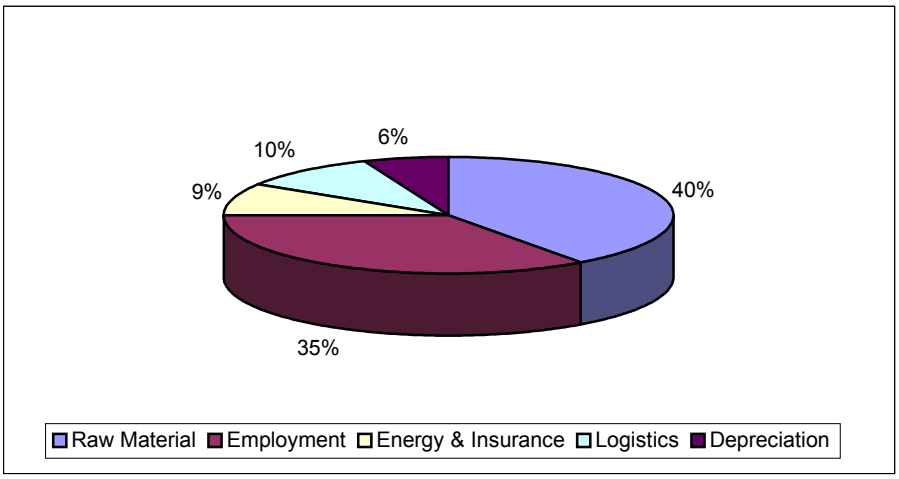
What is interesting from the above chart, which is based on interviews with CEOs in the various countries, is the lack of ability to "see round the corner" in that both the UK and Japan remained pessimistic in 2001, whilst South Africa and Australia were optimistic. Only the USA CEOs appeared to have their fingers on the pulse, which is a key success factor - erring on either side means potential missed opportunities.

This chart also demonstrates that emphasis on productivity must allow for time-lag in implementation of improvements, with the UK predicted to show the largest improvement in 2002 – let's hope that prediction is on line.

3.6.1. Productivity in packaging sector

The main areas which affect the productivity of the packaging sector and in turn competitiveness are all concerned with supply chain issues, i.e. raw materials, energy, logistics and associated customer purchasing requirements and methods; plus associated capacity utilisation and output per man hour.

Figure 3.19:
Average cost ratio for packaging producer in the EU, 2001

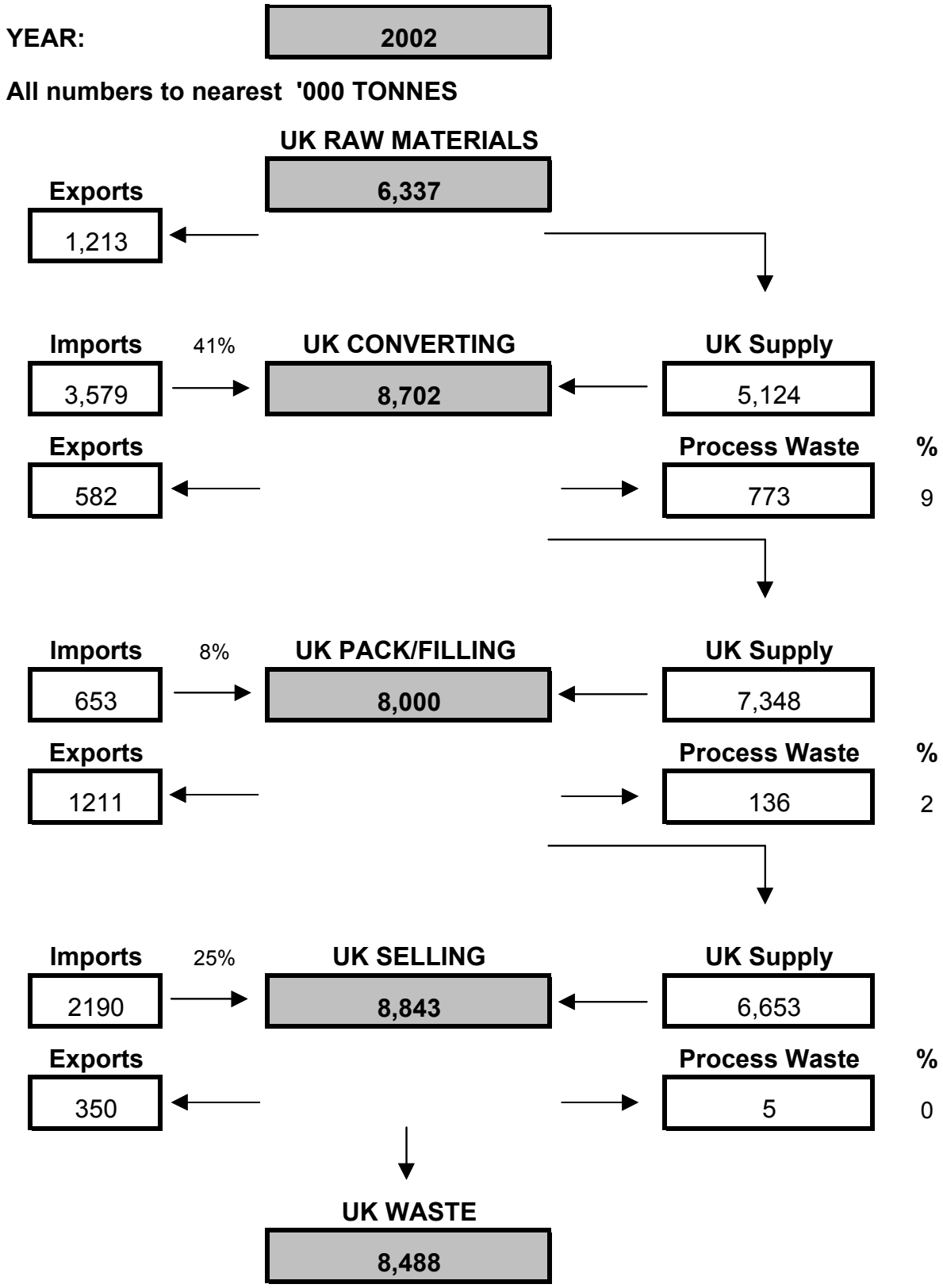


Source: The Packaging Federation

- ***Raw materials***

The analysis undertaken within the ACP Task Force on Data Flows shows the following trade patterns based on data from obligated companies under the UK Packaging Regulations, estimated to cover 85% of the total market plus input from the Material Organisations. The data below excludes wood and "others", but all individual flow diagrams can be found in the *Report of the Task Force of the Advisory Committee on Packaging*, DEFRA Nov. 2001, ref. PB 6282.

Figure 3.20:
UK packaging materials flow, 2002



Source: Report of the Task Force of the Advisory Committee on Packaging, DEFRA Nov. 2001, ref. PB 6282

The flow diagram shows a high degree of imported raw material – over 40% plus a quarter of supply for packed goods at the retailer level satisfied by imports. It also shows that of the total packaging waste which the UK has to recover and recycle, over three-quarters originates from outside the UK in the form of raw material and imported packed goods.

Raw materials supply is not uniform across all material sectors and does depend on whether a packaging manufacturer is vertically integrated, as is the case with glass container and some paper packaging conversion, or non-integrated as is the case with metal and the majority of plastics conversion. The large degree of reliance on imported raw material does leave the industry vulnerable to both exchange rate variations, especially the Euro, and the ability of competitors to source raw materials more cheaply, especially in the Far East. This is particularly the case in plastics, where conversion of plastic carrier bags for the UK supermarkets is now almost entirely met by supply from the Far East.

- **Energy**

Energy is of prime importance to all packaging conversion operations, and efforts to reduce this by better utilisation of primary energy or use of recycled material, where significant savings can be made in glass and primary metal production, is an on-going activity.

Table 3.5:
Interruptible gas supplies in selected EU countries

Country	**Price p/kWh (Inc. tax)***
Italy	1.204
Germany	0.997
France	0.905
Netherlands**	0.860
Belgium	0.853
UK	0.460

* 2Q 2000
** non-interruptible supplies

Source: Energy Advice Ltd.

Table 3.6:
Gas prices in third quarter 2000

	2nd Quarter 1999	**2nd Quarter 2000***	**August 2000**
Average price I, D, F, NL, B p/kWh	0.54	0.46	098**
UK price p/kWh	0.49	0.46	0.75***

*taken from Table 3.5
**estimate
***source: The Paper Federation

Source: Energy Advice Ltd.

Table 3.7:
European electricity costs in selected European countries

Country	Price p/kWh*
Italy	4.09
UK	2.67
Belgium	2.56
France	2.46
Netherlands	2.46
Germany	2.39
Finland	1.87
Sweden	1.58
Norway	1.43

*25 MW demand at 80-90% load factor.
Includes all taxes except VAT

Source: Energy Advice Ltd

Whilst the UK may have enjoyed low electricity prices, the gas prices cause concern. The UK converters also suffer from a larger energy bill due to the UK CCL arrangements as Table 3.8 illustrates.

Table 3.8:
EU Energy Taxes, 2000

Country	Type of Tax	Rates of Taxes[1] (p/kWh)				Discounts to Industry	Other	Recycling of tax and Other Comments
		Electricity	Gas	Coal	Fuel oil		Exemptions	
Austria	energy tax	0.92	0.27	0.00	0.20	Manufacturing only pays 0.35% of Net Production Value[2]. Other sectors pay tax in full.		There are no cuts in other taxes
Belgium	energy tax	0.08	0.00	0.00	0.00	Only small SMEs pay tax on electricity. Rest of industry is exempt from any tax on energy.		
Denmark	energy, CO2 and SO2 taxes	0.83	0.04	0.07	0.06	CO2 tax discounts range between 10 to 97%, and depend on energy use and Voluntary Agreements. Energy tax only applies to space heating in industry.	Renewables	Taxes on business are fully recyled through cuts in social security contributions and energy efficiency funding.
France[3]	energy tax	0.12	0.01	0.02	0.01	Exemptions on an increasing basis depending on the energy consumed as a proportion of value added		The Tax is expected to raise 8 billion FF (£0.75 billion).
Finland[4]	energy and fuel tax	0.26	0.11	0.37	NK	Companies paying tax worth more than 3.7% of value added production[5] get an 85% discount on the excess value, minus £31,000.	Renewables and CHP	
Germany	energy tax	0.80	0.10	0.00	NK	Manufacturing receive 80% discount, plus further discounts depending on relative level of cuts in social security.	Renewables and CHP	The tax is recycled via 0.1% cut in social security contributions. No manufacturer pays more than 120% of its social security cut (plus 1000 DM) in energy tax.
Italy	energy and SO2 taxes	0.06	0.05	0.0045	NK			There is some recycling of tax revenues back to business via cuts in social security contributions.

Country	Type of Tax	Rates of Taxes[1] (p/kWh)				Discounts to Industry	Other	Recycling of tax and Other Comments
		Electricity	Gas	Coal	Fuel oil		Exemptions	
Netherlands	energy and	0.13-2.3	0.09-0.64	0.00	0.00	Although there are no discounts for		Tax revenues are recycled to business via
	fossil fuel tax					businesses, the level of tax applied		cuts in corporate tax, cuts in social security
						depends on level of energy use.		and income taxes. Some revenues also go for
								tax credits for energy efficiency investment.
Norway	energy and	0.00	0.00	0.00	0.27	The business sector does not pay		Note: Almost all electricity in Norway is
	CO2 taxes					any taxes on the non-transport use		generated from hydro power.
						of energy- except on fuel oils.		
Sweden[6]	energy, CO2	0.21	0.50	0.84	0.73	Manufacturing is exempt from the		The CO2 tax also applies to LPG.
	and SO2					energy tax. There's 50% discount from		There is also an electricity production tax in
	taxes					CO2 tax for this sector, and a further		Sweden, paid by the generators operating
						discount for those paying more than		nuclear or hydro plants.
						0.8% of sales value.		
UK[3]	energy tax	0.43	0.15	0.15	0.00	Manufacturing companies covered by	Renewables	Tax revenues are recycled back via 0.3% cut in
						IPPC regulations get 80% discount	and CHP	National Insurance Contributions and an
						in return for an energy eff. target.		energy efficiency programmes. Renewables
								also benefit from the tax revenues.
								LPG is also taxed.
N.B. Greece, Ireland Portugal and Spain do not have energy taxes and are not likely to introduce them in the near future.								
1- Does not include sulphur dioxide taxes, or taxes which only apply to the domestic sector.								
2- Production costs minus the cost of materials and services from other firms.								
3- France and the UK will be introducing their energy tax in 2001.								
4- Tax rates given for Finland are 1999 rates								
5- Production costs minus the cost of materials								
6- Tax rates given for Sweden are only CO2 taxes.								
NK- Rates not known, or not known in p/kWh.								

Source: CBI, September 2000

This table shows that the taxation burden on UK manufacturing industry is unduly heavy taking into account all the exemptions and rebates, and thus requires further attention.

- **Insurance**

Since September 11 2001, insurance premiums for Property and Business cover have caused considerable concern. The practice of "filling in an insurance line" with a lead underwriter, who sets an initial premium rate, e.g. 0.1% of sum insured is a major issue. Only 4-5 companies can write pan-EU business, who will only wish to take a limited % of cover, leaving smaller companies to complete for the rest but usually based on a higher premium, e.g. 0.15%. The latter then sets a new premium level for all the insurers, resulting in an overall increase of 50%.

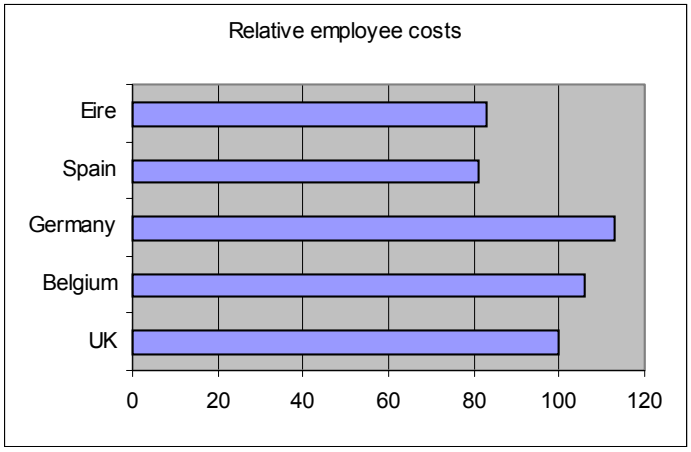
The British Chambers of Commerce reported in November 2002 of their members survey which showed more than 6% of businesses and 9% of manufacturers had been refused insurance cover totally, and approximately 20% of manufacturers were seeing increases of 50 – 100% for employers' and public liability cover.

- **Employment**

Commentary on the skill base will be provided by the forthcoming DTI/ Institute of Packaging *Industry Mapping Project.* However, in terms of productivity it is perhaps more pertinent how that skill base is utilised and trained internally. This forms the key drivers for improvement.

The elements of employment are also driven by the national framework on social costs and inflation. Taking into account *hours worked, gross pay and social costs*, the following comparison has been made by one European converter taking the UK as base 100:

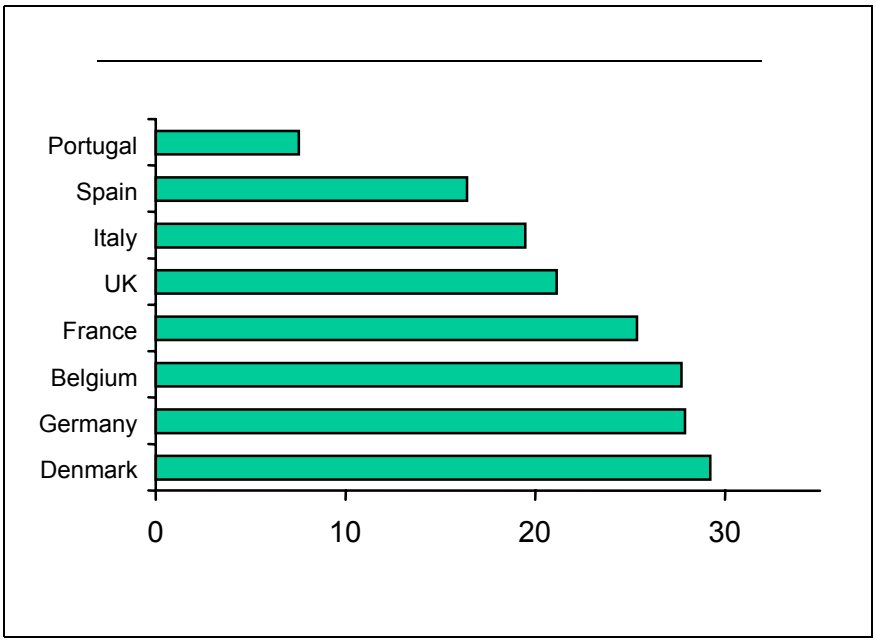
Figure 3.21:
Relative employee costs in selected EU countries, 2002



Source: The Packaging Federation

This indicates that at this level, the UK fares slightly better than Germany and Belgium, but lags a considerable distance from Spain and Eire. This comparison is in line with official data shown below:

Figure 3.22:
Indicative worker costs in selected EU countries (EUR/hour), June 2001



Source: Eurostat and IDS Employment Europe

Social costs

The increase in National Insurance Contributions to come into effect in 2003 will also add significant cost to the packaging industry. This will negate any benefit gained through the CCL relief on N.I.

Additionally, the packaging industry feels that the EU Directive on Working Time will impact negatively on its performance in terms of profitability and productivity.

- **Output**

This is the most common measure of productivity, and in simple terms is output per hour at work. There are a variety of base-lines however, e.g. this may be measured in volume terms, which is generally the case in packaging; or value which is often the case in other sectors. It may be measured in straight production units, or in terms of added value.

It is common amongst the larger packaging manufacturers with EU and global operations to conduct their own internal benchmarking exercises, which are naturally subject to commercial sensitivities. Hence, only limited data is available for public dissemination, but a more formal industry survey should be a recommendation from this study.

However, given the usual emphasis on comparisons with our US counterparts, The US Packaging Machinery Manufacturers Institute (PMMI) conduct a biennial Productivity Trends Indicator. Their report for 2000 was reported upon in Packaging Digest Magazine in October 2001. Given that capital investments in machinery are high in the majority of packaging operations, it is naturally worth exploiting that capital to the optimum level as part of the productivity. Thus, the following extracts are taken from the PMMI survey:

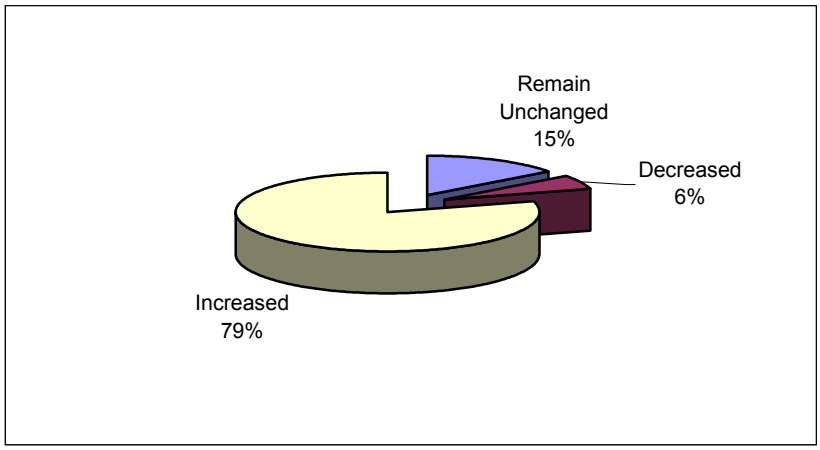
The survey was based on an analysis of data provide by a representative sample of 808 respondents, who employ over 17 packaging lines in their operations and covers packaging-dependant industries within the US market.

Two measures were used – labour productivity and multi-factor productivity, i.e. factors of employee benefits and wages as well as packaging material usage and costs plus capital inputs, e.g. energy, machinery. The latter measure is therefore more related to added value and profitability.

In terms of labour productivity, the data showed an increase of 7.8% over the period 1999 – 2000, whilst the multi-factor data showed an increase of 6.4% reflecting the retarding effect of higher wages and benefits plus higher raw material and energy costs. The nearest EU comparison is shown in Fig. 3.21 based on much more limited data and on a relative basis only.

As with all surveys, the results are aggregated and averaged with the range of responses indicating:

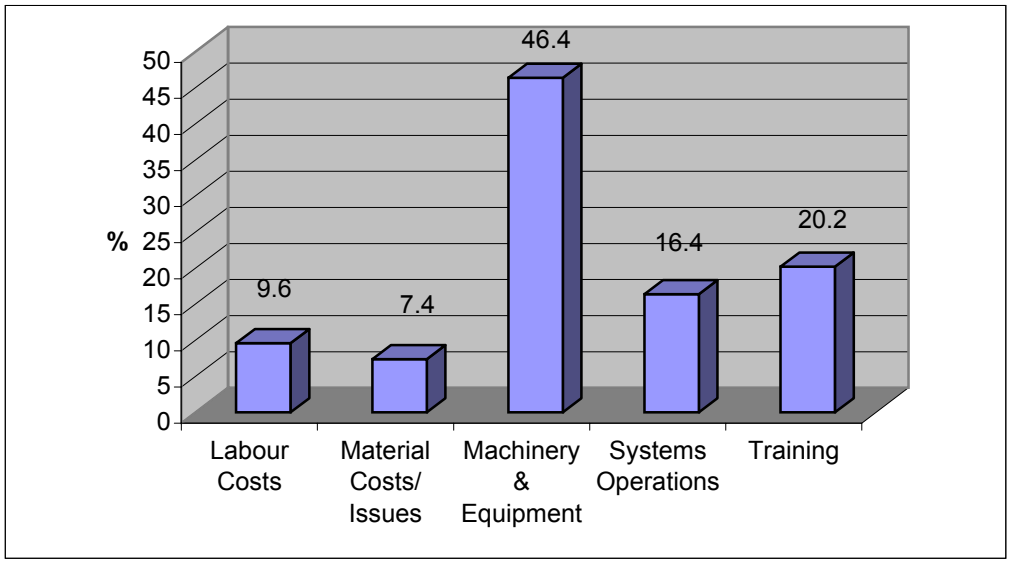
Figure 3.23:
US study on productivity levels, 1999 - 2000



Source: PMMI/ Packaging Digest

The final question in the survey asked for the respondents' opinion on which of a range of options offered the most potential for improving productivity. The results are shown below:

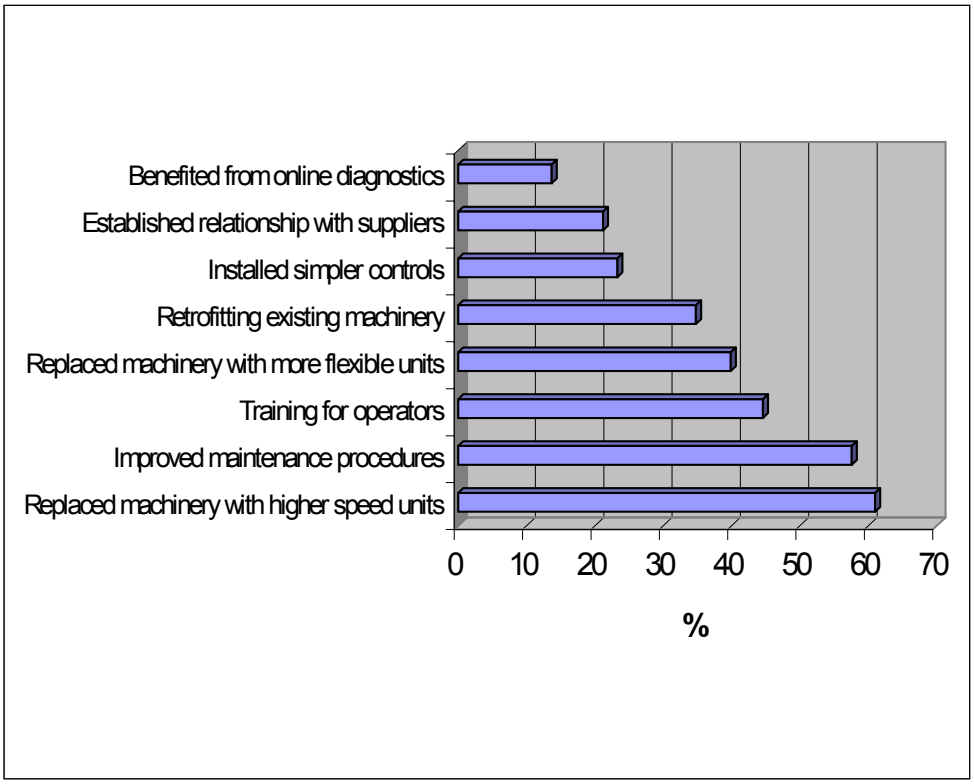
Figure 3.24:
Most potential for improving productivity, 2000



Source: PMMI/Packaging Digest

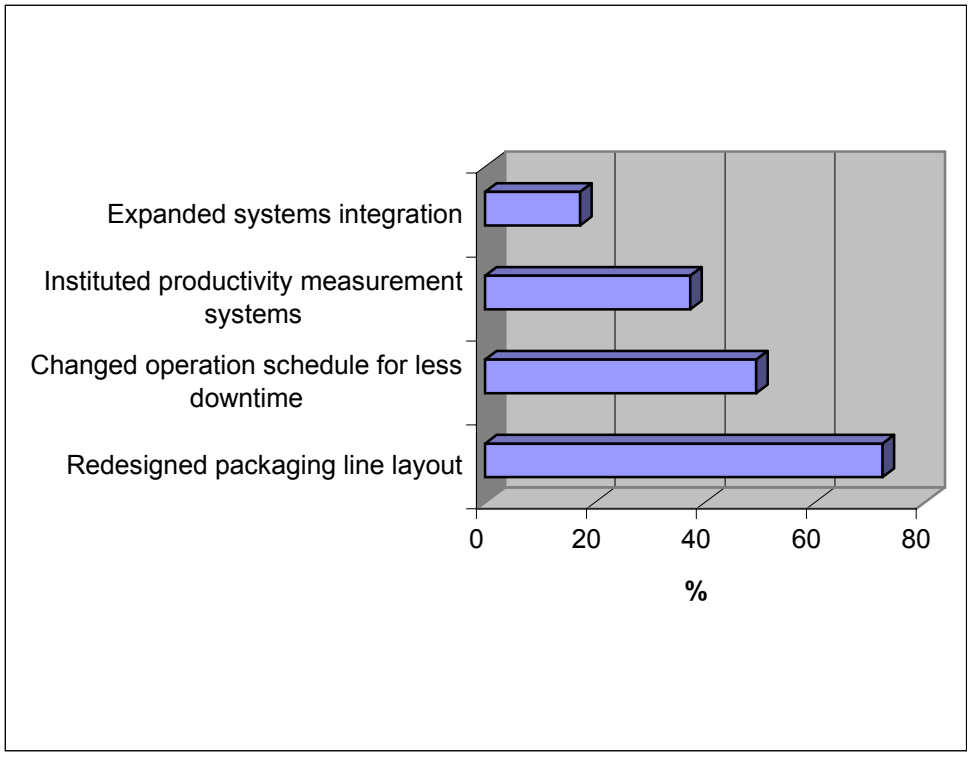
Within each of the categories above, the survey showed the following detailed productivity improvements undertaken:

Figure 3.25:
US machinery efficiency improvements, 2000



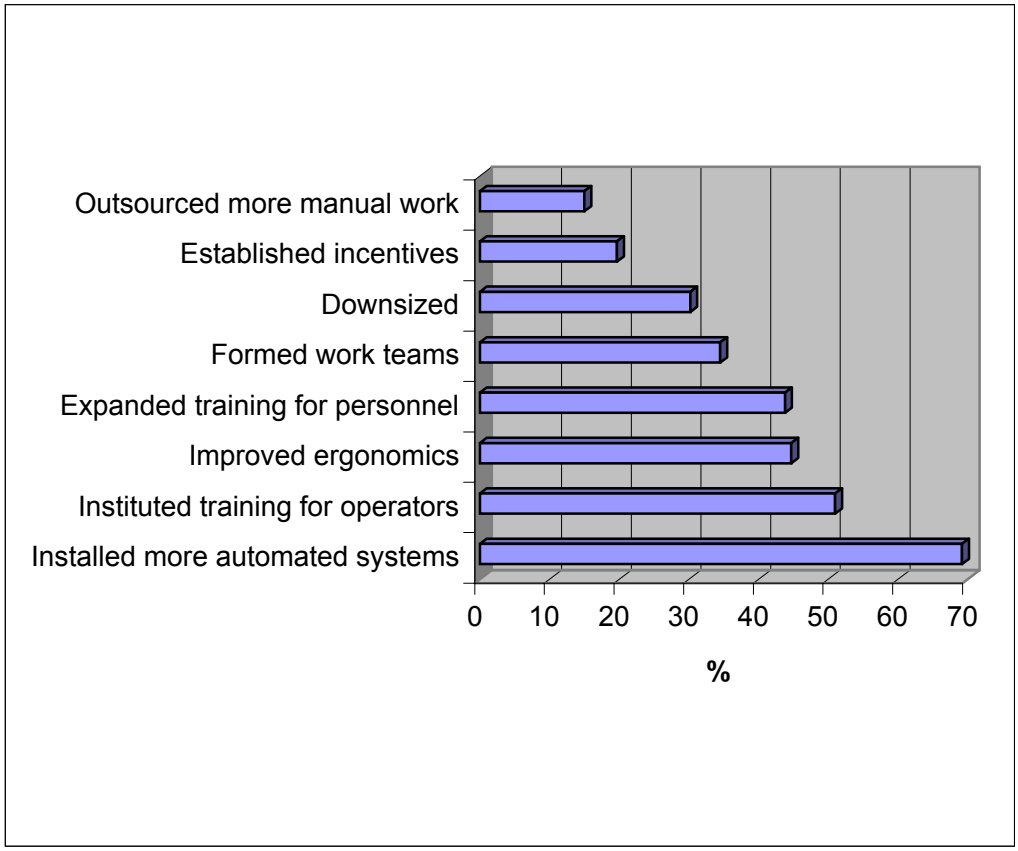
Source: PMMI/ Packaging Digest

Figure 3.26:
US systems operation improvements, 2000



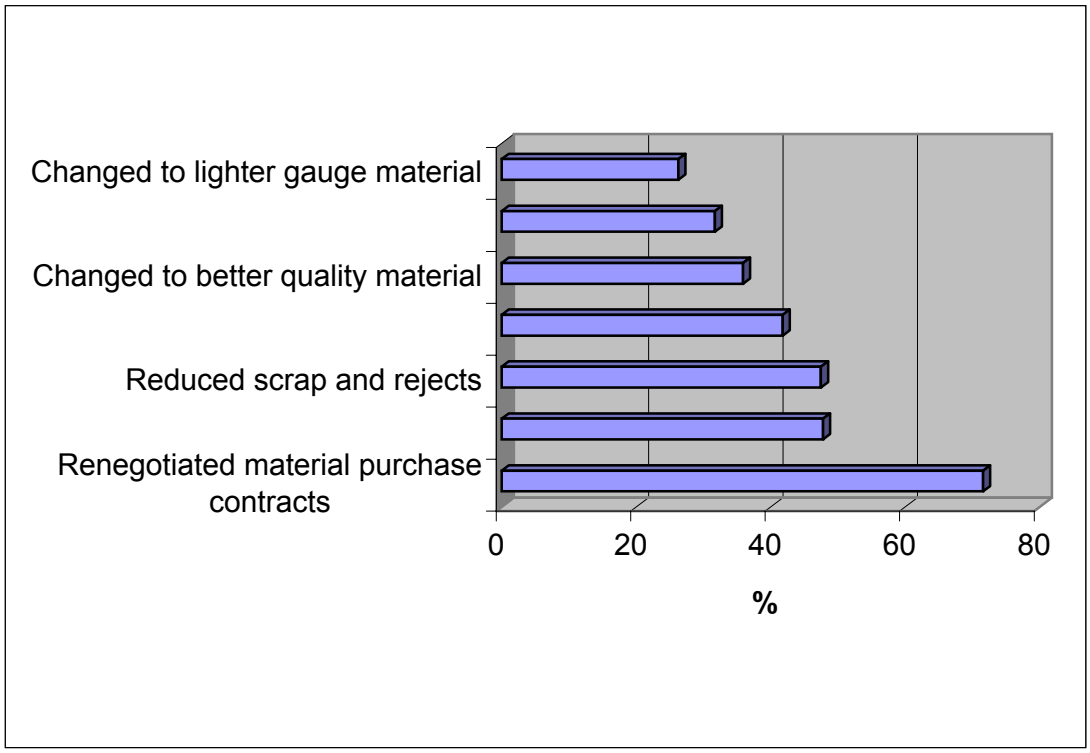
Source: PMMI/Packaging Digest

Figure 3.27:
US labour cost improvements, 2000



Source: PMMI/ Packaging Digest

***Figure 3.28**:*
US material cost improvements, 2000



Source: PMMI/ Packaging Digest

Inevitably, much of what is reflected in the US operations above is also being conducted in the UK. However, what the UK does lack is the same degree of reporting and factual analysis.

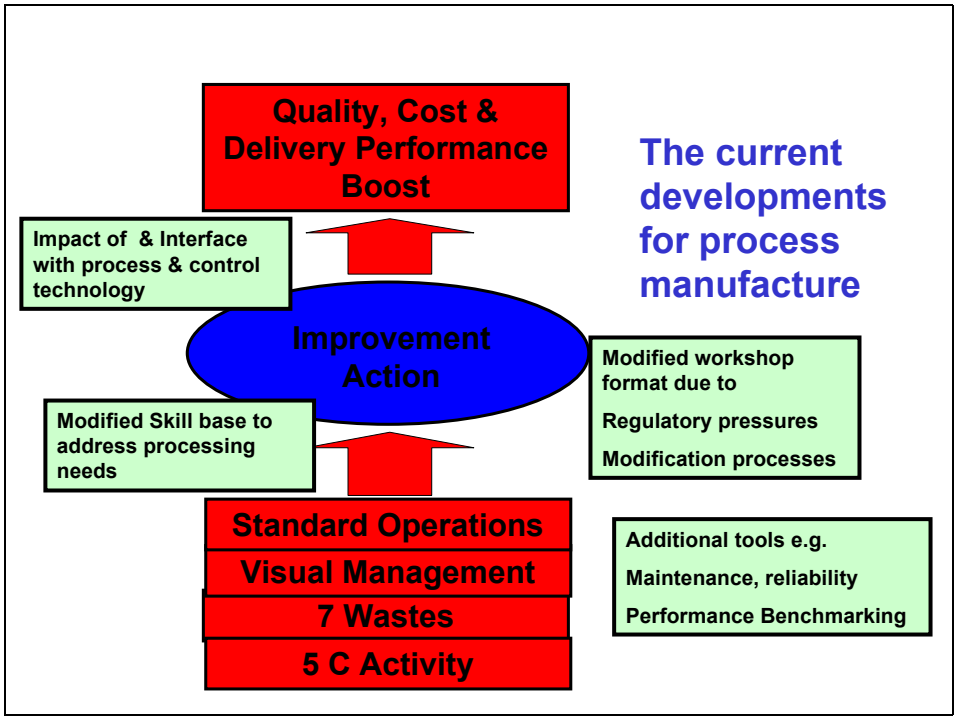
It is recommended that The Packaging Federation initiates such a survey with allied trade associations in the sector in partnership with the DTI and the Industry Forum Concept.

- **Lean manufacturing**

This is being adopted by some in the industry, especially the major players, but it is felt that considerable productivity gains can be made by employing such techniques more widely in the industry.

The following shows the current DTI process and achievements:

Figure 3.29:
DTI Industry Forum Approach



Source: DTI

Process Improvement Centre for Manufacturing Excellence (PICME) is the DTI's partner whose task is to carry out improvement programmes. Its performance to date is shown below:

Figure 3.30:
PICME performance to date

First Workshop Results

Industry Sector	Improvement Target	Before	After
Plastic	Changeover	11hr 30 min	1hr 40 min
Chemical	Output	21 batches	25 batches
Pharmaceutical	Changeover	9hr 40 min	3hr 40 min
Fine Chemicals	Yield Lead time	81% 5-7 days	90-95% 28hrs
Rubber	Cleandown	158 min	41 min
Plastic	Changeover	7hr	1hr 6 min

Current Value of benefits – over £50m

Source: PICME

3.7. EXCHANGE RATES

Whilst the current debate of when, rather than if, the UK joins the Euro continues in Government, the Packaging Federation believes that the economic tests set by HM Treasury are valid. However, there is some concern that current exchange rates are estimated to over-value £ sterling by a much as 14% which makes the UK competitiveness weaker. A level of Euro 1.40 – 1.45 is seen as the optimum level for entry at this point in time.

Clearly the exchange rate has had significant bearing on the trade balance in the UK packaging in recent years. As Table 3.9 indicates, imports of empty packaging materials have been annually growing at some 5% in the last two years, widening the negative trade balance value.

Table 3.9:
Trade balance in the UK packaging manufacturing industry, 1999-2001 (£ million).

Trading activity	**1999**	**2000**	**2001**
Imports	1,353.3	1,423.8	1,491.2
Exports	1,039.9	997.5	967.1
Trade Balance	**(313.4)**	**(426.3)**	**(524.1)**

Source: The Packaging Federation

3.8. E-COMMERCE

Whilst the general e-adoption ladder from the DTI impact study is to be examined and developed, the focus of attention at present is the rapid evolution of e-auctions and the potential damaging effects on the packaging industry.

The impacts are largely felt in the paper and plastic packaging sectors, where larger volumes of more commodity-type products are perceived by purchasers attracted by financial savings in the short-term rather than long-term supply benefits. The increasing stories of reductions in excess of 25% within a day on e-auctions belittles and belies the value of packaging to the product supply chain, and is grave danger of driving out not just costs, but suppliers.

A Code of Practice is urgently required to avoid closure of UK capacity through this short-term effect.

Summary

Packaging is often viewed as a barometer of economic activity, and it would seem logical to benchmark the manufacturing industry in this sector. Unfortunately, there is relatively little data in the public domain, but the key action from this study should be a recommendation to undertake an international benchmarking study.

The nature of the UK packaging manufacturing industry is changing irrevocably due to the changing customer base, and increasing customer and legislative demands. The need to be able to compete on a European and global platform is ever-more challenging, although this does not necessarily mean consolidation of production capacity on the same scale, as packaging still tends to be required as close to the product manufacturing base as possible.

What is required therefore, is the need for the UK packaging manufacturing operations to be as good as, or better than, their counterparts in the rest of mainland Europe. This is usually measured in terms of productivity, which in turn is seen to rely heavily on the raw material cost base, labour rates and energy costs. They are all largely dependant upon the macro-economic environment, although the raw material base is more susceptible to global pressures and raw material availability as well as exchange rates. The latter play a significant part generally in the packed goods field as over three-quarters of UK packaging waste started its life outside of the UK with over 40% of raw materials for packaging production being imported.

In order to maximise the productivity of the elements within direct control, it is essential that UK manufacturers engage in as much benchmarking as possible as well as adopting lean manufacturing processes.

The challenge of the enlarged Europe cannot be ignored, both in terms of market growth and the potential to attract product manufacturers from the UK.
The UK converters (manufacturers) are the most vulnerable participants in the packaging supply chain, and need extra vigilance to strengthen their position wherever possible. This is most effectively done by maintaining an up-to-date knowledge and analysis of competing operations and the changing customer base.

SWOT ANALYSIS

4.1. PAPER AND BOARD

4.1.1. Corrugated

STRENGTHS	WEAKNESSES
♦ There is good product quality ♦ Strong customer relationships exist ♦ Operate within an environmentally friendly packaging medium ♦ Domestic supply of recovered paper ♦ High recovered fibre content of UK produced corrugated ♦ Innovation	♦ Volatility of recycled paper price and availability ♦ Sales predominantly to a few large customers ♦ Variable customer service focus ♦ Difficulty in recruiting and retaining high quality staff
OPPORTUNITIES	**THREATS**
♦ Build closer customer relationships. ♦ Further light-weighting ♦ Better management of recycled fibre collection infrastructure. ♦ Exploitation of positive environmental credentials ♦ To innovate around emerging customer needs and offer supply chain solutions	♦ Uncertain global recycled paper market. ♦ Excessively stringent food contact legislation ♦ Growth constrained by packaging minimisation or returnable systems ♦ Further customer base consolidation ♦ UK does not attract new investment due to unfavourable investment climate ♦ Strength of Sterling causes filling operations move out of UK

Source: DTI Competitiveness Study for Paper Related Industries in the UK, December 2000 Updated in conjunction with Pira, November 2002

4.1.2. Cartonboard and carton making

STRENGTHS	WEAKNESSES
♦ Full product and process range available ♦ Market recognition of Added Value concepts ♦ Sustainable material, both recyclable and recycled ♦ Registration of Designs and Patents	♦ Cyclical pulp prices ♦ Business cycles ♦ Current UK recycled cartonboard production is limited, so demand therefore is often reliant on imports
OPPORTUNITIES	**THREATS**
♦ Specialisation within carton range. ♦ Exploitation of niche markets. ♦ Research and development for further investigation	♦ Major retailer purchase dominance. ♦ Increasing imports. ♦ Ingress of plastics in both current and new carton makers: - plastic is light weight - and formable. ♦ Environmental costs: - PRNs - Landfill Directive - Energy Levy - Cost of cross material subsidies in Packaging Regulations. ♦ Limited by an ageing skill base. ♦ Fluctuations of a floating currency.

Source: DTI Competitiveness Study for Paper Related Industries in the UK, December 2000 Updated in conjunction with Pira, November 2002

4.2. PLASTICS

STRENGTHS	WEAKNESSES
♦ Versatility of plastics incorporates the flexibility of paper, strength of metal and clarity of glass ♦ Penetrate the markets of all the 'traditional' packaging materials ♦ Co-extrusion techniques have meant that processors can customise their plastics materials to provide better barrier properties to meet very specific applications ♦ Development of genuinely new packaging markets (stand up pouches) ♦ Downgauging has meant reductions in unit material costs and so an increasing price advantage over other materials ♦ Good product and process development ♦ Strong production of PET in the UK ♦ Increased consumption of plastics due to growth in blow moulding ♦ The industry representation is regarded as the most effective in Europe ♦ UK rich in resources – North Sea oil & gas, salts, chemicals.	♦ Difficulties created by environmental groups/lobbies ♦ Industry restructure lowers purchasing power to obtain raw materials at the best prices ♦ Price sensitive market where speed of processing and efficient use of raw materials is crucial to competitiveness ♦ Isolation from suppliers undertaking research into new polymer grades and processing technologies ♦ Lack of e-business capability
OPPORTUNITIES	**THREATS**
♦ High volume of stand alone investments ♦ Rising end-user investment ♦ Possibilities of outward investment in continental Europe ♦ Downgauging maintains a competitive advantage ♦ Improved raw material selection can help to reduce costs ♦ CAD improves design process ♦ Increase in amount of plastics recyclate available for further processing ♦ UK is considered a world leader in the manufacture of high quality, specialised packaging materials ♦ Improving PVC reputation ♦ Predicted growth in Central and Eastern Europe	♦ Limited export opportunities and threat of increased importing of some products ♦ Green Peace's campaign against PVC ♦ Packaging and Packaging Waste Directive recycling targets especially difficult for plastics industry to meet ♦ Raw materials price fluctuations

Source: DTI Plastics Processing in the UK Report, 1996
Updated in Conjunction with Pira, November 2002

4.3. METAL

STRENGTHS	WEAKNESSES
♦ Metal packaging has an established reputation for safe, reliable protection of its contents ♦ Food and beverages when stored in metal cans have a long shelf life and can be stored at room temperature without fear of deterioration or contamination ♦ Metal packaging has an established position in the market place and this position is at present stable or growing slightly (especially in the beverage can segment) despite competition from other forms of packaging in particular plastics ♦ Metal packaging is readily recycled, unlike plastics ♦ The UK industry has a number of major global players with manufacturing plants in the UK plus successful SMEs, which occupy specialist niches in the market place ♦ The UK industry is particularly strong in digital technology for can decoration	♦ The UK industry is suffering from a squeeze in margins from suppliers and customers and if this continues it will weaken the ability of UK based manufacturers to invest in new plant and equipment and develop new products and improved processes ♦ The UK industry finds it difficult to attract the most able graduates. It is also losing experienced process engineers and finds it difficult to recruit skilled workers at all levels ♦ The major metal packaging making equipment companies are no longer UK owned and future machines are likely to be developed outside the UK ♦ Investment in R&D is lower than it was 10 years ago and is unlikely to generate the product and process innovation needed to sustain the competitiveness of the UK industry ♦ SMEs and smaller converters have lack of IT use

4.3. METAL (cont)

OPPORTUNITIES	THREATS
♦ Recent product innovations such as the bottle can and the ring pull food can illustrate that new metal packaging opportunities are still to be found ♦ Competition is so fierce that the surviving companies will be in better shape to compete further ♦ The increasing concern about food safety could increase the demand for canned foods ♦ Growth in the demand for aerosol cans is strong ♦ Beverage can demand is expected to be the main growth engine for metal packaging	♦ The strength of the pound sterling is encouraging customers to source filled metal packaging from lower cost regions ♦ Globalisation means fewer customers and this drives metal packaging prices down ♦ Environmental legislation including the Climate Change Levy is increasing UK manufacturing costs and is likely to increase the trend to source metal packaging from outside the UK ♦ Other forms of packaging are threatening metal packaging, e.g. PET bottles replacing beverage cans; plastic pouches replacing food and pet food cans and plastics are being considered for aerosols ♦ Aerosol manufacturers need to find alternative propellants/systems which do not damage the environment before 2010

Source: DTI Competitiveness Analysis of the Metal Packaging Industry Report, April 2001, in consultation with the Metal Packaging Manufacturers Association
Updated in conjunction with Pira, November 2002

4.4. GLASS

STRENGTHS	WEAKNESSES
♦ Heritage – the industry has long-standing tradition and expertise ♦ Inertness – products cannot be contaminated nor can products contaminate the packaging, so taste is totally guaranteed ♦ Long-shelf life of glass-packed products ♦ Design ability: potential is almost unlimited and brand owners find it most attractive ♦ Icon status: Coca Cola depicts glass bottles on their can, PET packaging and even paper cups ♦ It can be clear – you can see what you are getting ♦ Infinite range of secondary processes and at least four basic furnace colours ♦ Made from plentiful, cheap and naturally occurring raw materials, hence potentially 100% recyclable ♦ Strong customer relationships and genuine supply chain partnerships ♦ Highly trained and expert workforce ♦ Industry representation in the UK and Europe ♦ Stability in processing on high speed filling lines ♦ Can be pasteurised, sterilised, microwaved, even at high temperatures and is used to transport even the most acid products ♦ Tactility ♦ Can be used as returnable or non-returnable items of packaging ♦ Quality image ♦ Resealable	♦ The glass packaging manufacture is highly capital-intensive ♦ Relatively high energy-user ♦ Product can break if abused ♦ Comparatively heavy (when empty) compared to other materials ♦ Major equipment manufacturers and suppliers are mainly foreign ♦ Profitability in recent years is insufficient ♦ Imbalance between the amount of coloured glass returned by consumers for recycling and the amount required by UK industry

Source: British Glass Manufacturers Confederation, November 2002

4.4. GLASS (contd)

OPPORTUNITIES	THREATS
♦ Tensile strength ♦ Further light-weighting ♦ Development of more secondary processes ♦ Productivity improvements. ♦ Removal of USA Soda Ash tariffs ♦ Extended supply chain involvement ♦ Increased recycling leading to reduction in environmental liabilities and energy usage ♦ Technology transfer between producers of other types of glass ♦ Increase home market for coloured glass thus using post-consumer recyclate more efficiently	♦ Multi-national nature of customer base ♦ EU/UK legislation such as Climate Change Levy, and IPPC ♦ UK/EU social policy reforms, e.g. Working Time Directive ♦ Implementation of the Revision to the Packaging Waste Directive ♦ Competition from other materials in a highly competitive market place

Source: British Glass Manufacturers Confederation, November 2002

4.5 PACKAGING MANUFACTURING INDUSTRY

STRENGTHS	WEAKNESSES
♦ Receptive to change: performing continual assessment of its performance and rationalisation requirements ♦ Innovative and employing most recent technological developments to improve consumer satisfaction ♦ Increasingly customer-oriented – strong customer relationships and supply chain partnerships ♦ Local: long distance transport is uneconomical for many packaging materials ♦ Serving primarily consumer goods sector makes it virtually recession proof ♦ Dynamic due to materials substitution and search for pack optimisation ♦ Good industry representation	♦ Relatively mature industry growing at only 2-3% p.a. ♦ Packaging companies not considered a dynamic investment by the City ♦ Low barriers to entry in sectors such as corrugated and plastics create excessive competition ♦ Suppliers and customers very powerful and margins are squeezed ♦ R&D activity is limited to few, large converters or suppliers ♦ Poor image (packaging = litter) which attracts environmental lobby ♦ Quality of recruits an issue - packaging not seen as an attractive career prospect for graduates. ♦ Raw material price fluctuation makes forward planning and investment decisions more difficult ♦ Major equipment and raw materials suppliers are foreign ♦ Many major UK packaging manufacturers are foreign owned, less obligated to UK as a home base. ♦ The industry includes many SMEs who have funding constraints and may not be able to invest in required technologies ♦ Need for better quality data, especially downstream. Confusion caused by inappropriate SIC codes. ♦ Excessive legislation and high levels of bureaucracy in UK implementation of EU directives ♦ Over capacity

4.5 PACKAGING MANUFACTURING INDUSTRY (cont)

OPPORTUNITIES	THREATS
♦ Added-value activities such as pack/brand design as well as new material/product development could be in the converters' exclusive domain ♦ Consumer desire for added convenience will stimulate growth ♦ Home shopping may stimulate more sophisticated packaging ♦ Continue to develop high levels of customer focus and provide packaging solutions which address needs of downstream supply chain ♦ Capitalise on supply chain expertise gained through working in very demanding UK retail environment ♦ Further switch to hole-in-the-wall operations, VMI or other service initiatives will create additional value ♦ Increased usage of recycled materials can improve environmental performance ♦ To be a world leader in development of a sustainable packaging industry ♦ Exploit opportunities in developing parts of the world as they mature sufficiently to require more packaging ♦ Use IT to its best advantage: e-commerce, CAD, production control, MIS ♦ Convince the public of the environmental benefits of packaging ♦ Packaging should be sold on the basis of its supply chain cost, not on price	♦ Profit margins reduced further through brand owner regional or global purchasing strategies ♦ Reduced competitiveness in Europe due to the strong pound ♦ Threat of increased packaging imports ♦ Productivity affected by difficulty in recruiting high calibre graduates ♦ High imported raw material prices affect profitability and investment ♦ Increasing environmental taxation and social costs will reduce further the UK converters' competitiveness ♦ Lobbying by environmental extremists results in inappropriate legislation ♦ As UK costs become uncompetitive, brand owners move packing and filling activities to lower cost locations overseas ♦ Organisations without sufficient European presence risk losing customers who want pan-European suppliers ♦ Industry representation too fragmented thus reducing effectiveness ♦ Overall industry growth constrained by more use of returnable packaging ♦ Lack of IT capability may damage ability to serve market effectively ♦ Packaging manufacturers lose added value activities to other parts of the supply chain

Source: Pira International Ltd, November 2002

KEY ISSUES AFFECTING THE COMPETITIVENESS OF THE UK PACKAGING INDUSTRY

This chapter summarises key issues indicated in the relevant DTI studies on competitiveness (for paper & board, metal packaging and printing) and supplements the information with consultation work carried out by Pira.

5.1. KEY ISSUES - PAPER AND BOARD PACKAGING

Source: *DTI Competitiveness Study for Paper Related Industries in the UK* by CPI published in December 2000, updated in consultation with Pira.

- Raw materials

The high fluctuation in pulp prices makes it difficult for mills dependent on market pulp to plan long term investment. Major pulp suppliers are often also paper manufacturers and have greater ability to adapt in the marketplace to fluctuating pulp prices than papermakers dependent on market pulp.

- Energy

For paper manufacture in particular, energy is a major production cost element, and current electricity prices put the UK at a competitive disadvantage with most of Europe.

- Employment, Education & Training

The skills level of the industries' employees is a key element in competitiveness particularly in Europe where there are not the advantages of low raw material and labour costs that obtain in some competing areas of the world. In the UK the ability to achieve maximum employee effectiveness is in jeopardy.

- Environment

The industry continues to fail to gain recognition for the very real environmental strengths of paper, in spite of the progress made. This adversely affects the industry's ability to compete with other materials and inhibits growth.

Environmental improvements, particularly if in advance of the rest of Europe, can have a major effect on competitiveness.

The Climate Change Levy could have a very serious impact on UK paper manufacturing and converting competitiveness leading to major decline (as occurred in the 1960s and 1970s when the EFTA treaty had a devastating effect on the industry).

- Transport

Paper is a high volume and relatively low cost product with substantial transport requirements during its manufacturing, converting and distribution stages. There is currently no viable alternative to road transport, the costs of which compare very unfavourably with those of competitors.

- Financial Aspects

The current level of exchange rates with the Euro, and the high volatility over relatively short periods, is causing extreme damage to the competitiveness of UK paper manufacturing and converting industries.

An economic climate that is attractive to overseas and UK investors in the paper industry is an essential prerequisite for improving competitiveness.

- Market Issues

The rapid development of e-commerce is likely to produce many opportunities and challenges to meet changed market requirements.

♦ Communications and Industry Lobby

A positive image for paper and paper products is essential if the industry is to compete effectively over the other materials and against other media.

♦ Legislation, Regulation and State Aids

The method of implementing EU legislation by the UK can adversely affect competitiveness. For example the cost of implementing the Packaging Directive in Germany is born by the end consumer whereas in the UK the packaging chain bears the cost.

The UK's packaging waste regulations disadvantage the paper industry insofar as they allow for cross-material subsidy. In a market where inter-material competition is already fierce, the industry's excellent recycling performance will make a disproportionate contribution to meeting the UK's overall recovery targets.

5.1.1. Key issues - corrugated

- The fundamental issue facing both sides of this sector is the future demand for corrugated cases. Traditionally corrugated case demand has grown somewhat ahead of GDP. Running counter to this, however, is the political and economic pressure for packaging minimisation and a switch to returnable systems within the retail environment while also relevant is the worsening balance of trade in manufactured goods. There should be clear recognition of the excellent environmental credentials of corrugated packaging.

- For the corrugated sector, one of the main problems faced is that the cost of entry into the industry is relatively low which has encouraged the building of a number of large state-of-the-art facilities, while the cost of closure remains relatively high discouraging elimination of sub economic units. This has resulted in endemic over-capacity. This over-capacity coupled with the strength of the customers, the packer/fillers, and the high proportion of total costs accounted for by raw materials, has tended throughout most of the business cycle, to depress profitability.

- A related problem is the fact that many Pan European customers operate a single buying office and compare prices across Europe. This puts UK suppliers, who are geographically at the margin and incur costs in a strong currency, at a significant disadvantage.

- There would appear to be two routes whereby the case manufacturing sector can break out of this situation. The first is to continue as at present in concentrating resources on a smaller number of highly efficient manufacturing units. The second is to work more closely with the user to develop innovative packaging solutions which either add value or decrease the total cost within the supply chain.

- The corrugated case materials manufacturing sector faces all the general problems experienced by the wider paper industry. However, a threat specific to this sector is the possible effect of food contact regulations, the proposed rules for which appear to owe more to political pressures than scientific fact, and which could inhibit (or even reverse) the further substitution of virgin fibre based papers with recycled products.

- A key issue to be addressed has been excessive raw material price volatility which in turn has been fuelled by the inability of the waste paper recovery infrastructure to rapidly increase supplies in the face of increasing demand. UK supply and demand is generally in balance and volatility is mainly driven by offshore demand – particularly in Asia and the Far East.

- It will be noted that significant opportunities exist for import substitution and virgin fibre grade replacement. However, given the relatively high utilisation of the existing capacity within the sector, this will only occur if one or more groups either invest in a new facility or

undertake a major rebuild of an existing operation. Given the global nature of the business, decisions to invest in the UK will require the appropriate economic, social and political environment. It should be recognised however, that packaging paper and board has the highest recovery rate of all materials, and extracting the smaller source arisings will be much more costly.

- Two further opportunities are available to the corrugated case material manufacturing sector. The first of these is to work with all partners in the total packaging supply chain to improve the recovery infrastructure for recycled fibre and this is already in hand through the industry's PaperChain campaign. This may help to alleviate short term shortages of material and will encourage confidence within the ultimate customer base in respect of the continued long term use of corrugated cases.

5.1.2. Key issues - cartonboard

- In common with other sectors of the paper industries, folding cartons have faced increased levels of competition from plastic materials – both flexible and rigid – over the past decade. In total it is estimated that the latter have increased their share of the UK packaging market, from 29% in 1990 to 38% in 1999, whilst the market share held by cartons has declined from 12% to 9%.

- The environment credentials of paper-based packaging appear as yet, to carry insufficient weight in the cost/benefit analyses of retailers and other specifiers – in spite of global concerns about environmental issues.

- Although there are continuing concerns in the hygiene, health and safety aspects of migration in plastics, paper is continuing to lose market share. The industry has a duty to itself to prevent further losses and for the end-user to be convinced, through better marketing, of the advantages of a product made from an infinitely renewable raw material, which can be recycled and is non-toxic in final disposal.

- The environmental balance favours paper but whilst it is the industry which must bring this message home to consumers through better information and education, there is concern that it is also being disadvantaged through the application of legislation. In particular, the operation of the Packaging Waste Regulations in the UK allow paper, (which is infinitely easier to recycle) to cross-subsidise plastics. Environmental costs such as the Climate Change Levy, the Landfill Directive and Landfill Tax also hit paper harder. Government should ensure that in all these areas, as well as in food contact legislation, rules are applied without discrimination and that they should be based on sound scientific fact rather than political expedience.

- The printing, packaging and graphic communications industry relies very heavily on road transport and currently spends some £300 million on it. With over 60% of printing materials imported, and 'just-in-time' customer requirements, an efficient and economic road transport system is vital.

- Any Government or local interference by route restriction or mandatory charges will disadvantage UK competitiveness.

- With UK industry already disadvantaged over diesel costs, increasing imports and reducing margins and return on capital, Government money needs diverting to ease transport costs.

- The printing and publishing industry with a £19 billion turnover employs more than 200,000 people. However, at a time of accelerating technological change, it has an ageing workforce and a skills deficit resulting from insufficient recruitment and training.

The downward trend in employment is likely to continue, whilst demand for new skills, re-training and new approaches to management are likely to increase.

- Recognising the need for a strong and independent training organisation, the British Printing Industries Federation (BPIF) in a joint initiative, are proposing to develop training through a funding proposal based on modest contributions from all companies and under-pinned by legislation. This will cover the sectors already within the NTO's remit, including printing, packaging, converting, desktop publishing, and graphic communications. It will focus on the needs of small firms and be used to encourage best practice in training. It is hoped to introduce the new system in April 2001.

- A further issue which deserves consideration is the likely impact of electronic media. Although electronic publishing does not exert the same pressure on packaging printing as it does on the printed publishing, it is possible that the use of packaging to carry a message may be at risk; however packaging provides other functions such as product protection, which cannot be met by electronics.

- The UK carton market has increasing foreign ownership and growth in imports whilst margins are declining and UK sources of supply are diminishing. The weaknesses of the Euro and the relativity of Sterling continues to accentuate UK producers' decline.

5.2. KEY ISSUES - PLASTICS

Source: *DTI Plastics Processing in the UK* by BPF published in 1996, updated in consultation with Pira.

- Climate Change Levy

The Climate Change Levy, based on energy consumption, disadvantages the plastics industry. The glass and metal industry are much heavier users of energy but they have negotiated 80% rebates and therefore do not pay the true cost of their energy usage. A major producer of plastics bottles pays £500k in levy a year; were they to shift production to France and ship in preforms they would save a considerable sum. There is therefore a major risk that this levy might encourage plastics packaging production to move abroad to countries with lower taxation.

- Public Perception

The public have a poor image of the plastics packaging industry, an immediate reaction being that plastics are not good for the environment. However research demonstrates that on further questioning people show a good appreciation of the benefits of plastics packaging. Unfortunately lobbying by organisations such as Greenpeace (who have a disproportionately loud voice compared with number of members) may encourage governments to believe that plastics are bad for the environment and thus pass inappropriate legislation which discriminates against plastic packaging. (For example, a tax on plastic carrier bags)

- Recruitment

The plastics packaging industry has a skills shortage. There are fewer graduates with skills in engineering, chemicals and other appropriate disciplines. However this is a problem generally for the manufacturing industry in the UK rather than specific to plastics packaging. It is also difficult to recruit people for unskilled or semi-skilled work due to competition from retailing or other service based industries. These service based industries are seen as a more pleasant environment to work in than manufacturing.

Is this a general Europe wide problem?

- Investment

Plastics packaging companies are disadvantaged when it comes to investment as shares in this industry sector are not seen to be attractive. In addition, the UK industry is not attracting investment due to low profitability levels, the strength of Sterling, and a general lack of confidence which is holding back further investment.

- SME Challenges

The industry includes a large number of SME's. These face particular difficulties through not having sufficient in-house technical resource and needing to rely on suppliers for advice. This advice is less readily available, as raw material suppliers are cutting back on their technical departments and in any case may only deal with smaller customers via distributors. As a result SME's may not always be using the best materials. Capital investment may be restricted by lack of funding and therefore the best equipment may not be available.

- Low Cost Imports

The plastics packaging sector is particularly vulnerable to low cost imports from areas such as the Far East, where production costs are very low. The cost of transporting lightweight packaging such as film and carrier bags is relatively low, therefore imports are a viable option. This problem is particularly acute in the UK compared with other parts of Europe, partly due to high levels of retailer consolidation. These powerful retailers have the buying power to negotiate attractive deals and the infrastructure to manage the import process.

- Raw Materials Suppliers

Many of the major polymer producers are headquartered outside the UK with the result that R&D activity and technical back-up are geographically distant. (The exception to this is PET.)

- Recycling

The EU recycling targets pose particular problems for plastics packaging. There are many different grades on the market and collection and sorting are major issues, particularly for post-consumer packaging waste. As a result much of the recyclate produced is of poor quality with limited end uses, and cannot often be re-used for packaging applications. The cost of producing good quality recyclate is usually prohibitive, and the environmental dis-benefits (high use of energy, water, etc) would outweigh the benefit. Research continues into means of automatic coding and resorting of different grades of plastic. While C&I (commercial and industrial) sorting of waste has been relatively successful, the main problem is post-consumer plastics packaging.

Unfortunately this problem is particularly acute in the UK where we do not have sufficient capacity for recovery through incineration. The best way to deal with post-consumer plastics packaging waste is through incineration with energy recovery, thus contributing towards the packaging waste recovery target. However the UK has not invested in incineration capacity - Denmark, with a population of 5 million people, has 32 incinerators; the UK has a far higher population, yet only 12 incinerators. Until this problem is resolved the UK is disadvantaged compared with many other countries in Europe, either forced into commercially unviable recycling of plastics, or resorting to landfill.

- Pricing

Plastics packaging, in common with most plastics, suffers from unstable raw material pricing which proves a distraction and does not help the industry to move forward.

- Innovation

On the plus side, the UK is a world leader in terms of specialised packaging materials, for example co-extrusions and MAP. This is driven by demands from retailers and branded goods companies who are constantly trying to win market share through innovation. As the UK retailing market is particularly competitive, innovation levels are correspondingly high.

5.3. KEY ISSUES - METAL

The participants of the metal packaging industry were invited to comment on 11 competitiveness issues detailed in the 1998 Competitiveness White Paper as part of the *Competitiveness Analysis of the UK Metal Packaging Industry* study (DTI-sponsored prepared by Quo-Tec Ltd, published in April 2001). The key issues identified by the study authors are:

- **People and skills**

•Metal packaging is not perceived as an exciting career for school leavers or graduates apart from the graphic design area.

•All companies find it difficult to recruit and retain people with good programming and other IT skills.

•It takes around 2 years to train a fresh recruit as no higher education establishment runs courses that prepare students specifically for work in packaging or the metal packaging industry.

•There has been a steady loss of experienced process engineers (including those involved with printing, seaming & welding technologies) from the industry, coupled with a reduction in R&D support. Many of the technical staff who have been released did valuable work on process development and process trouble shooting. Some companies have retained apprenticeship schemes.

•Amongst the major players, benchmarking/performance indicators which give, for example, the number of cans produced/quality levels, are commonplace.

•The Print Unions have inhibited the introduction of new technology in some companies through restrictive practices, e.g. insisting on higher pay for multi-colour work. Decoration is a key product development opportunity. However other companies said that the level of skills in printing in the UK is amongst the best in the world and maybe the unions deserve some credit for this.

There is a significant difference between the global operators and the local can-makers in their skill needs.

- **Creation and Exploitation of Scientific Knowledge & Technology**

•Patents and licences are not perceived to be as important to the industry as they were in the 1980's.

•The recent major product innovations — e.g. the bottle can and the ring-pull food can - originate outside the UK. Product innovation is the result of international collaboration.

•The UK does have world-class skills in graphic design and its application, and is perceived to be a world leader in this area.

•Research and development effort is greatly reduced (by at least 50%) since the early 1980's. This has occurred largely as a result of take-overs by companies who are either not committed to R & D, or conduct their R&D outside the UK. Much of the R&D effort has been devolved to the material suppliers. There is less speculative R&D in the industry. All R&D is customer needs driven. Much of the R&D effort has been re-directed to general production/customer problem solving.

- **Changes in Customer Demands**

•Customers are demanding shorter lead times, more flexibility in terms of supply patterns, and have introduced 'just-in-time' requirements, which can be as short as 15 minutes. 50 to 60 modifications per day to customer orders are not unusual.

•Supermarkets dominate the supply chain dynamics, and expect their suppliers to bear the cost of inventory.

•Consistently high levels of quality are taken as a standard requirement and will not command any price premium.

•Customers are looking for year-on-year price reductions (rather like the automotive industry). Long-term contracts for aluminium beverage can supply exist in the USA, but are rare in Europe.

- **Impact of Information & Communication Technology (ICT)**

•Some equipment makers and operators are fitting modems to monitor output and possible incipient problems in real time. However, worries about the confidentiality of data on production statistics are inhibiting this innovation.

•Digital graphic design is compressing the time to introduce new decorative designs and design changes, and can be implemented globally. A world market leader is based in the UK and has received substantial investment recently.

•The ability of digital graphic design companies to change and monitor the quality of new graphic designs puts them in a pivotal position in the supply chain which they did not have before the new technology on digital design and communications was available to the industry.

•The approach of the industry to e-business is as follows:
50% claim to be already using it
42% plans to use it by 2004
8% states it is not relevant for their business

•In the USA, the computer and IT companies are perceived to be persuaded by the government to offer more help with training and new technology awareness (road shows) for its customers than in the UK and Europe.

•Most major players are around 3 years from implementing e-commerce within their operations.

- **Key Relationships With Other Sectors**

•The main players in the supply chain e.g. raw material manufacturers, production equipment makers, metal packaging manufacturers, packaging fillers and retailers (supermarkets) have consolidated into a small number of large groups in the past 5 years. The main effect is the squeeze on margins throughout the supply chain. When there were many more independent players and the retail market was less dominated by a few supermarket chains, the loss of.an account was less serious than the loss of a major account in today's market place.

•If market forces work, the most able companies will survive and the ultimate customer, the consumer, should benefit from lower prices. However, if the process of consolidation continues, with further squeezing of margins, then the supply chain could be weakened to a point where quality and choice suffer.

•In this climate, supply chain partnerships are difficult to sustain and manufacture is likely to migrate to lower cost countries.

•The major product sectors, i.e. beverage and food cans, now face significant competition from other packaging forms.

- **Functioning of Capital Markets**

•Funding for investment is internally generated, and the static market in the UK makes this difficult. Several of the smaller companies contacted said that they lacked the investment needed for new technology.

•Generally, packaging is not seen as an exciting investment by the financial analysts.

- **Sustainable Development**

•Packaging generally has borne the brunt of new 'environmental' legislation and therefore cost.

•Restrictions on volatile organic compound emissions from printing inks and lacquers have necessitated very large investment in 'clean-up' equipment. This investment adds to manufacturing costs and does nothing for productivity.

•The Climate Change Levy is intensely unpopular. It will add 10-12% to the energy cost of industry. Some businesses in the sector are able to participate in a sector agreement based on the IPPC regime relating to the use of organic solvent bearing materials. However, whilst this may offer the opportunity of a discount for some businesses, it will create a competitive imbalance in the UK, as not everyone will qualify, and a significant disadvantage compared with European competitors who do not face the same additional costs.

•The industry believes that the government should consider a levy on non-recyclable packaging.

- **Exporting**

•The industry is a global one and the major players are multi-nationals. Smaller UK businesses do not actively pursue export opportunities.

- **Trade Associations**

•The main function of the Metal Packaging Manufacturers Association (MPMA) is seen as lobbying of government over issues such as the Climate Change Levy and Packaging Waste Regulations.

•The British Aerosol Manufacturers Association (BAMA) is perceived as a significant technical and communication forum.

•The Canmakers Ltd promote use and recycling of beverage cans and produce detailed statistics on consumption and market trends including competitive packaging materials.

•The cost pressures on the industry led some respondents to question the level of subscriptions and suggest that some consolidation of the Trade Associations may be necessary.

- **SMEs**

•SMEs have important niches in the market for decorative packaging and plant maintenance services, but are often caught up in the commercial battles of the big players.

- **Role of Government**

•Rightly or wrongly the DTI is perceived to be responsible directly or indirectly for:

o The Climate Change Levy
o The strength of the pound.

•Several respondents complained that the DTI do not understand the industry and its problems and needs.

Additionally, Pira in consultation with the Metal Packaging Manufacturers Association, discussed the following key issues:

- Recruitment - difficulty of encouraging good graduates into the industry.

- Training - has traditionally been in-house but now move to buying in trained people. Will there be enough good people available or will we get a skills shortage?

- Investment - metal packaging industry in UK mature, therefore most investment in new plants going into other areas such as Southern and Eastern Europe.

- Image - consumer perception of canned food is that it is old fashioned (and less healthy?) therefore market share going to other packaging formats for food products traditionally packed in UK (canned fruit and vegetables). Growth areas such as canned fish and tomatoes are already packed outside the UK in country of origin.

- Consolidation of customer base - fewer larger customers, therefore prices are driven down as a result.

- Globalisation - raw material now traded globally and is a major cost element in finished product. At present, high Sterling is making this a positive impact.

- Need for one voice - the packaging industry needs to resource and structure its trade associations adequately to enable effective communication with government as one industry.

- Need for collaborative R&D, but on plus side several world class R&D departments exist in UK.

- IT skills - smaller companies lack the necessary IT capability. On the plus side, large companies highly developed supply chain systems (driven by the UK quest for efficient retail supply chain).

5.4. KEY ISSUES - GLASS

The following have been identified by the British Glass Manufacturers Confederation as key issues for the glass packaging industry:

- Economic conditions

For the past five years the industry along with most in manufacturing has had to compete against a background of currency value imbalance vis-à-vis the Pound Sterling versus the Euro. Its customer base has also changed significantly over the last five years. It is now almost entirely pan European if not global.

The combination of these two trends means that the UK industry has been vulnerable in three respects. It has enabled Continental manufacturers to penetrate the UK market and in some cases drive down market price levels. It has meant that the UK cannot retaliate by selling into European markets profitably and it has encouraged some elements of the customer base to relocate production abroad.

- Image

Not seen as a major barrier to competitiveness. Consumer perceptions of glass are generally positive. Recruitment and staff retention are not seen as a major problem. The materials perceived purity and environmental credentials combined with innovative developments in design, light-weighting and secondary processing have contributed to a positive change in the way in which the industry is regarded by both the general public and by its customer base. Major investment programs have been undertaken over the last ten years and continue today. The UK has some of the most modern, productive glass container factories in the world. British Glass is involved in several schools education programmes (funded through PRN monies) and there are hopes that glass may become part of the general curriculum. Glass packaging is very closely associated with the wider glass industry which itself has enchanced its image through innovation – just look at the skylines of any major modern city or the progress made in the fibre optics/fibre glass markets or the fresh designs appearing in the crystal glass sector.

- Legislation

British Glass estimates that the cost of implementing current and envisaged government legislation could run as high as £140 million over the next four or five years. The main issues are costs associated with implementing a 60% recycling rate for glass packaging; CCL; IPPC (the need for abatement equipment); increase in NI premiums; and the Working Time Directive. Some, if not all, of these cost increases will also affect other packaging material. There is also a significant increase in administration costs associated with the implementation of the above.

Environment

The Climate Change Levy and Pollution Prevention & Control legislation hits the UK glass industry particularly hard due to its lack of abatement installations for emission control. However it should be noted that significant reductions in energy usage and emissions has been effected over the past five years through a combination of investment in fuel efficient furnace design, light-weighting and increased use of cullet as a raw material.

The UK faces a particular set of circumstances regarding efficient recycling of glass. Increased use of cullet in the glass making process provides the twin benefits of decreasing the energy required and decreasing emissions. However there is a shortage of flint (clear) cullet in the UK which industry requires, and a surplus of coloured (especially green) cullet derived from imported glass, which UK industry does not require. The market in the UK is predominantly flint, where the maximum amount of cullet used in new batch is limited to about 50%. To compound the problem, the glass industry has to compete for cullet with the

aggregates companies, who achieve tax benefits for using recycled material for road building. This is a reflection of the inadequate infrastructure in the UK for collecting post consumer glass waste. As a result of this the level of cullet used in UK manufacture is below the levels used in many continental European countries leading to lower energy efficiency, increased emissions and potentially exposing the industry to much higher levels of taxation.

Steps are being taken to address these problems - colour separation technology is being developed so that more mixed colour cullet could be collected; consumers are being encouraged to use bottle banks which are colour specific; and discussions are taking place with Local Authorities to win their involvement.

Further issues arising out of environmental legislation include barriers to trade imposed by countries which place a tax on one-trip containers in order to protect their local industries which pack in re-useables. However such practices have been successfully challenged under EU harmonisation laws.

The UK is one of the only EU countries to introduce legislation for the Essential Requirements element of the Packaging & Packaging Waste Directive. This imposes an additional burden on UK industry, which needs to prove compliance and can be prosecuted for non-compliance. Other countries will wait until CEN standards have been agreed and conform with these.

New legislation on the horizon (which includes a Chemicals Directive, new waste and resources legislation, and further energy tax proposals) also causes concern.

Social
Social legislation is set to impact the glass industry. A huge amount of
Health and Safety and Employment legislation either has or is about to be enacted which will increase costs and regulation. Of major concern is the Working Time Directive.

- Globalisation

Another key issue is that of increasing globalisation of the glass industry customer base. In the past the drinks industry was UK controlled; many of the major bottlers are now foreign owned. The food sector is also mostly foreign owned. As a result, a number of threats are introduced:

- the move to pan-European purchasing, which increases the threat of imports. In the past, up to 15% of UK glass production was exported. At present there is very little export. Glass is costly to transport; however multi-national users can easily benchmark relative costs and the strength of Sterling may encourage further imports
- filling operations are moved from the UK to cheaper locations in Europe. Certain products which are managed on a pan-European basis could be produced more cheaply overseas and imported as packed product (e.g. Heinz are now producing some of their baby foods abroad). While certain products such as Scotch Whisky need to bottled in the country of origin, other products such as vodka could be packed anywhere.

- Fragmentation

Fragmentation of the packaging industry into different materials factions could be seen as a barrier to competitiveness, in that the industry cannot always speak with one voice. This makes lobbying less effective. While future legislation is likely to be structured around materials, there is a need for the different parts of the packaging industry to unite where there are clear common interests either at UK or European level. British Glass is unique in that it combines a trade association function with a materials organisation (MO) responsible for monitoring recycling targets. There was also some criticism of UK government not understanding the real issues faced by British manufacturers; this problem is partly caused by the fact that key people are moved around and there is no continuity.

- Pricing

Selling prices began to harden in 2002 after several years of fierce competition which resulted in prices in some sectors falling dramatically. This impacted on profitability which has halved in the glass sector over the past five years. The value of £sterling against the Euro has been partly to blame, making profitable exporting very difficult and opening up the UK to predatory attack from the Continent. Increases in productivity, light-weighting and the increased use of cullet in manufacture have helped to prevent an even worse scenario occurring. Manufacturers have also sought to add value through innovative supply chain partnerships and secondary processing. Significant cost increases in transportation and secondary packaging have been partially offset by light-weighting (less containers to a load) and the increased use of strapping and returnable layer pads.

Investment in on-site warehousing has also contributed to cost containment. Gas price increases averaging nearly 10% per year over the last four years have only been partially offset by reductions in electricity. Sand and limestone cost increases have been well ahead of inflation over the same period whilst soda ash costs have been contained. In most instances the industry does not have a wide choice of suppliers. This situation could be eased, in the case of soda ash, if EU tariffs on imports from the USA were to be lifted. The closure of IGB's facility in Dublin, combined with overall volume growth should see a tightening of capacity in 2003 which, with productivity improvements, should see the industry improve its bottom line performance. However the uncertainty over the availability of good quality cullet is a concern as is the potential for further movement of filling operations abroad.

5.5. KEY ISSUES - PACKAGING PRINTING

Source: *DTI Print 21: coming of age? A study into the Competitiveness of the Printing Industry* by BPIF published in 2001.

- **Currency movements**

These have had a considerable impact on the industry. In the relatively small section which is subject to international competition — primarily packaging, books and large catalogues and directories — there is evidence that significant orders have been lost because of the strength of sterling against the Euro. Many printers, especially those outside South East England have also lost business because of the adverse effect of strong sterling on the manufacturing industry. The longer that sterling remains over-valued, the more serious the effects on the industry will be. Currency instability — through their effects on input prices and the level of competition — also have serious effects on the sector's ability to plan for the future.

- **Skill shortages**

Most people consulted believe that skills shortages are already handicapping the industry and will become worse in future. It is hard to identify any direct effects of this shortage at present. The main impact is probably lower levels of quality than might otherwise have been achieved, and perhaps a lack of confidence in many printers in taking on new areas of business. However, there is a fear that the shortages could become more severe and serious as the requirement for skills increases with technical change and more demanding customers, but supply diminishes because of the large-scale retirement of many qualified staff, the reduction in the number of printing courses and students and the growing difficulties in recruitment because of the industry's poor image.

One important question in long-term responses to these changing skill needs is the balance between training people specifically for print, or recruiting more people with general qualifications and experience and providing them with a print orientation. However, the latter will be difficult until printing has a more positive public image.

- **Anti-competitive practices**

The Competition Commission ruled in 2000 that the buying power of the large supermarkets was such that it affected the competitiveness of some suppliers and distorted the competitiveness of supply markets. One of the practices criticised was the 'third party rebate', which required suppliers to pay up to 10% of the value of contracts with own-brand manufacturers back to retailers. Printed packaging has been particularly badly hit by this and other anti-competitive practices. The Office of Fair Trading is now drawing up a legally binding Code of Practice to govern relationships between supermarkets and their suppliers. It is vital that this prevents further unfair buyer pressure in future.

Some of those consulted also feel that there is anti-competitive behaviour by pulp, paper and board suppliers to keep prices high. This applies to all customers but many feel that UK prices are particularly high vis-à-vis the rest of Europe.

- **Inadequate telecommunications**

The industry is increasingly dependent on telecommunications, and the pace of innovation and opportunities for cost reduction and improved customer service are already being impeded by lack of access to low-cost bandwidth. Penetration levels of broadband are now much lower than in many other European countries, especially Germany, and costs are often higher. If this persists it will be a major handicap to the development of the sector.

There will also be significant regional and sub-regional competitive issues if low-cost broadband access remains unavailable in some parts of the country.

- **Financing problems**

One major difficulty is the poor image of the sector on the capital markets, reflected in very low price earnings ratios. This makes it difficult for quoted companies to expand through acquisition and makes them vulnerable to takeover. It also makes it difficult for private companies to grow through a stock market flotation, or by investment from venture capitalists (who are also dissuaded by the low 'deal size' available from most printing companies). The problem is compounded by poor financial management and control at many printers. This creates a propensity to make investments in new equipment without undertaking a proper investment appraisal, particularly of the sales which might be expected from it. This is widely felt to be a contributory factor to the industry's chronic over-capacity.

These problems are already serious, and will become more so as investment needs increase and more companies seek backing for consolidation and business development.

- **Poor statistics**

As the introduction noted, the absence of accurate statistics is already a major problem for printing, and an even more significant one for printed packaging. This constrains benchmarking and — because there is little available information about UK print market structures and trends — makes it difficult to make considered investment decisions. There is also a belief that current statistics underestimate the industry's true size and growth potential, and thereby contribute to its poor image and disinterest by the capital markets. The vicious circle which this creates — lack of data leading to poor investment decisions and problems in raising capital — are likely to become serious as investment needs increase and more companies seek backing for consolidation and business development.

- **Excessive/inflexible regulation**

There is a strong view amongst print employers that the industry already suffers from excessive and unnecessarily complex regulation. Examples which are cited include employment, environment, health and safety, as well as 'stealth taxes' such as fuel duty and landfill tax. However, there is less consensus about the areas where regulation could be reduced. Other stakeholders, such as the GPMU, do not believe that regulation is excessive.

Environmental regulation was a particularly important concern for many of those consulted. Many printers are already impacted by the Climate Change Levy, and packaging and pollution control regulations, and more would be by any measures to reduce volumes of printed materials such as direct mail and magazines. It is important that any such measures are based on appropriate cost-benefit analysis and are addressed at the organisations which are best fitted to implement them. It is also important that regulation is matched with Government support for more positive approaches to dealing with environmental problems. For example, the industry's replacement of many physical with electronic processes is cutting emissions to air and water. And the best solution to unwanted direct mail is not to introduce restrictions on personal choice, but to ensure that any material received is relevant to people's interests. The evidence is that customers find direct mail to be very valuable when this is the case.

5.6. KEY ISSUES - THE PACKAGING MANUFACTURING INDUSTRY

In order to summarise key issues for the UK packaging industry, the issues raised by the different materials organisations were considered and those common to most sectors were selected:

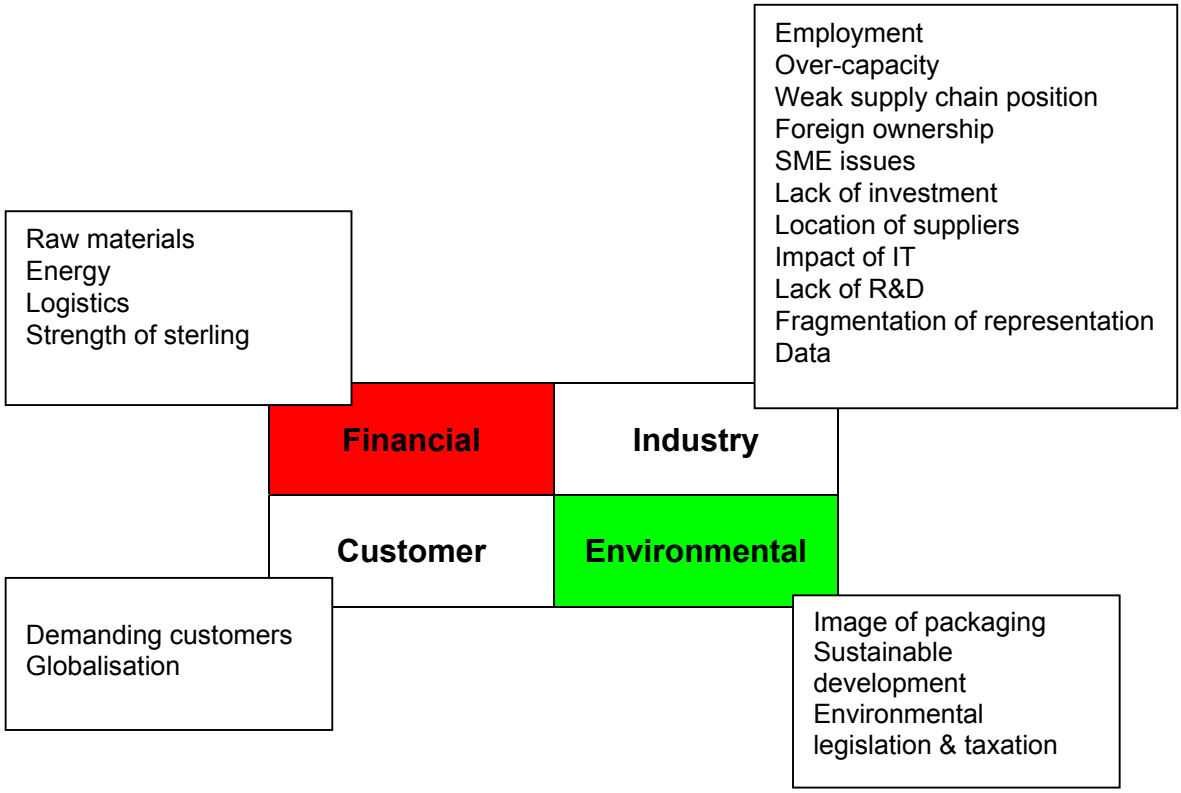
Financial issues
Raw materials
Energy
Logistics
Strength of sterling

Industry issues
Employment
Over-capacity
Weak supply chain position
Foreign ownership
SME issues
Lack of investment
Location of suppliers
Impact of IT
Lack of R&D
Fragmentation of representation
Data

Customer issues
Demanding customers
Globalisation

Environmental issues
Image of packaging
Sustainable development
Environmental legislation and taxation

Figure 5.1:
Key issues for the packaging industry in the UK



Source: Pira International Ltd

Financial Issues

Raw materials
The cost of raw materials is a major problem for most converters, as in the current competitive climate, and in their relative weak position in the supply chain, it is extremely difficult to pass on increases. Raw materials usually form a high percentage of the final packaging price, thus inability to pass on increases puts a significant strain on converters' profitability. Fluctuating raw materials costs cause ongoing problems, particularly in the paper and plastics based sectors, where cyclical trends cause instability and make ongoing investment decisions difficult. The trend towards non-UK supply also exacerbates this situation.

Energy
The cost of energy is a particular issue in all sectors, but especially glass, paper and metals where energy usage is higher than plastics. The overall costs of energy and fuel, taking into account taxation issues such as CCL, provides an uneven playing field both within the UK packaging sector and with EU competitors.

Managing energy efficiency has always been a key criterion for most packaging manufacturers. Further efforts to reduce energy and seek environmental gain through use of small-scale CHP and mines gas have been diluted due to the current NETA arrangements, and the overriding Government principle to address fuel poverty.

Logistics
Transport costs in the UK are considerably higher than in other European countries due to fuel taxation. Many types of packaging are high volume, low value, thus the packaging industry is particularly vulnerable to high transport costs. Those converters involved in recycling also have to contend with transport of waste back to their sites.
The Working Time Directive will also have an impact on the transport movements, especially when responding to increasing calls for just in time by major retailers.
Better supply chain logistics and closer partnerships with customers could potentially reduce the overall inventory levels, thus reducing the need for stock to be held by the converter.

Strength of Sterling
The current high value of the pound is making it difficult for UK packaging converters to export packaging products. At the same time, the amount of imported empty packaging is increasing – estimated to be nearly 17% of the total in 2000, a growth of over 5% from 1999 (amounting to ~£1.5bn). While products such as glass or rigid plastic containers are not usually economical to transport long distances, products such as flexible packaging and closures can be imported cost effectively. As a result the UK industry is suffering increased competition from imports, some from Europe and some from Asia and the Far East. There is also a danger that European packaging manufacturers switch production capacity from UK-based plants to other, more cost effective, locations in Europe.

However the real issue is that high manufacturing costs in the UK might persuade brand owners to move their product packing and filling operations outside the UK (Heinz has already moved some of its baby food operations abroad.) This will result in a serious loss of added value to the UK economy.

Industry Issues

Employment
Recruitment came up as an issue for many packaging sectors, the key exception being the glass industry. Recruitment seems to be a problem at all levels; there is competition from service-based industries such as retailing for unskilled labour, and graduate recruitment is an ongoing problem, particularly as there are fewer graduates in disciplines such as engineering and chemistry. This problem is not necessarily Europe-wide – for example, in Ireland the Jefferson Smurfit graduate training programme is considered a highly desirable career opportunity.

Skill levels are a cause for concern as, in some sectors, such as printing, there is an ageing employee base and skills are being lost through the retirement process. Further information on industry skill levels is available from the DTI sponsored Institute of Packaging study, which Pira has not been able to access for this report.

The new EU proposal on temporary and agency staff may also impact negatively on some packaging manufacturers.

Over-capacity
Parts of the packaging industry such as plastics and corrugated conversion suffer from relatively low barriers to entry. As a result, new entrants move into the industry on a regular basis, often pushing prices down in an effort to gain volume. The industry generally suffers from over-capacity which creates intense competition and drives down prices. This situation is worsening as the volume of imports increases in certain product sectors.

The advent of additional capacity with low labour costs from the Accession States, especially if Turkey is included, may exacerbate this situation considerably.

Weak supply chain position
As previously discussed, the packaging industry finds itself wedged between powerful suppliers and powerful brand owners. The result of this weak supply chain position is that raw material price increases may be extremely difficult to pass on, yet impossible to avoid, thus affecting the converters' profitability. Pira's discussions with brand owners on the future of procurement have more than once uncovered a proposed model whereby brand owners buy raw materials direct from the manufacturer and issue these to converters to make into packaging. A brand owner producing products such as detergent would already be buying in significant quantities from the major polymer producers, so this scenario is quite feasible but would have worrying implications for converters in terms of loss of added value opportunity.

The UK retailer rebate system, whereby retailers negotiate packaging prices on behalf of their contractors then take a cut themselves, is still highly controversial and also impacts negatively on converter margins.

Foreign ownership
Many of the major packaging converters in the UK are ultimately owned by organisations outside the UK. Most of these companies consider themselves to be pan-European or global organisations and manage their businesses accordingly as a necessity to meet their customer expectations. The result is that if conditions in the UK become unfavourable or require supply at a location closer to the customer, the opportunity exists for them to switch production to a more cost effective location and supply their pan-European customers from there. Major brand owners negotiate packaging contracts on a Europe-wide basis and where the packaging is produced is not necessarily an issue for them, provided the price, quality and availability are right.

For industries such as glass, where the packaging manufacture is traditionally located near to the packing plant, this is not such a threat as it is for more transportable products such as flexible packaging or preforms.

Figure E 5.2 shows changes in ownership:

Figure E 5.2:
Changing ownership of the UK packaging manufacturing industry based on turnover, 1995 and 2001

Source: Pira International Ltd

SME issues
With the exception of the glass and metals sectors, which are usually highly capital intensive, there are a large number of small and medium-sized organisations in the packaging industry. If wood packaging is included, then VAT registered enterprises employing less than 50 people amount to 80% of the total packaging companies. These organisations face particular issues in terms of resources. They may not have high levels of technical expertise in-house and thus need to rely on suppliers for assistance. They may find it difficult to raise funding to make ongoing investment in the business. They are also vulnerable to rationalisation programmes by brand owners who are looking for pan-European supply, as they very often do not have capacity outside the UK

In many ways this is the segment that the UK government most needs to interact with, since they are inextricably linked with UK competitiveness issues. However they are very difficult to access since these smaller organisations do not always have the resources to get involved with government and trade association initiatives.

Lack of investment
Like many mature stocks, the packaging industry has suffered in recent times as shares in the industry have not generally been seen as attractive and investment has gone into 'high tech' companies. However the loss of companies from the FTSE due to non-UK ownership has meant the transfer of most Packaging Sector stocks to the Supply Services Sector, which has a higher gearing and thus is attracting more favourable attention. In the meantime difficulties in raising funding as well as a general lack of confidence have held back investment. If the industry is to keep up-to-date in areas such as digital pre-press systems, funding will need to be found to invest in appropriate equipment. Without this, organisations will not be able to offer the required levels of customer service.

However an exception would seem to be the glass packaging industry which is undergoing a number of major investments at present.

Future inward investment has also been affected in the UK by a drop in US investment since September 11 and may also be affected by EU Enlargement, where a marked increase in favour of the ex-Soviet bloc countries, especially Poland and Czech Republic has been seen this year.

Location of suppliers
Many raw material and equipment suppliers to the packaging industry are located outside the UK. This can in some ways disadvantage UK industry as it is more removed from research and development activities and regarded as an export market.

Impact of IT
The UK packaging industry needs to develop the necessary IT skills and infrastructure in order to be able to respond to initiatives such as CPFR, develop appropriate website and online ordering systems, and manage other aspects of e-business as required by customers. This may require significant investment in hardware and software, as well as the ability to recruit suitably qualified personnel. Inadequate IT systems will seriously damage competitiveness and a lack of common industry platforms may also hinder ability to respond to customer demands in the fmcg area.

Lack of R&D
As previously discussed, a great proportion of supplier research and development takes place outside the UK Those packaging manufacturers who do conduct their own R&D tend to be the major multi-nationals, who may also have their facilities outside the UK As a result there is perhaps a lack of focus on creation and exploitation of scientific knowledge and technology in the UK packaging industry.

This lack of ability to develop and exploit R&D potential would seem to be a direct consequence of the issues on weak supply position and inadequate returns.

Fragmentation of representation
While the UK is very well represented in terms of packaging trade associations, most of which are extremely effective, there is an issue whereby the sheer number of associations makes representation seem fragmented. There is a need for a unified 'voice' representing packaging rather than a particular material sector of packaging. Whilst the Packaging Federation was formed to fulfil this role, the proliferation of other, influential, associations could cause confusion to governments both in the UK and Europe. There is also an issue as to whether industry can afford to fund so many associations; the forming of the CPI (Confederation of Paper Industries) is a move towards some kind of consolidation through bringing together a number of paper related associations.

This "silo" mentality is reflected in the current DTI structure, whereby packaging is not recognised as a single industry but is dealt with through a number of different materials-based departments.

Data
The authors of this report feel there is a lack of consistent and reliable data for the UK packaging industry, especially downstream (customer) statistics. One of the reasons for this is the fragmented nature of its representation, as mentioned above, whereby data may be collected on a materials specific rather than industry basis and not always in a consistent way. Data is often collected from a raw material perspective as an input to the converting process rather than by output, which can vary by up to 18%. Some of the data requires expert interpretation as the ONS categories based in current SIC codes often includes non-packaging activities. Good data is essential if industry is to be able to measure and benchmark its performance.

Customer Issues

Demanding customers
As described in Section 2, brand owners and retailers are becoming more and more demanding as they strive to achieve supply chain excellence. The results are shorter lead times, faster new product development, smaller quantities and shorter print runs. Packaging converters need to be innovative, flexible, fast-moving and constantly looking for innovation opportunities. Many brand owners are undertaking supplier rationalisation programmes, significantly reducing the number of suppliers they deal with. While converters are working with customers to build strong supply chain partnerships, use of on-line auctions to push down prices is seriously damaging these relationships. As a result, some packaging converters are refusing to participate in e-auctions.

At the same time the final customer, the consumer, is changing and so are their requirements. There is an ongoing need for industry to understand these changes and respond to them with appropriate innovation.

Globalisation
More brand owners are moving from local or regional purchasing strategies to pan-European or global contracts. As a result, smaller packaging converters who do not have the right geographical coverage are vulnerable to losing business. Those majors who successfully win business may gain additional volume but at reduced margin. Nestlé is a good example of a major purchaser of packaging who is in the process of moving from local to pan-European supply contracts. The brewing industry has moved from being primarily UK controlled to a global structure.

The UK packaging manufacturing sector needs to be able to match its geographical and production capabilities with that of the major customer base if it is to maximise its economies of scale.

Environmental Issues

Image of packaging
The public – and many politicians – are considered to have a negative perception of packaging, often confusing it with a litter problem and seeing packaging as a wasteful use of resources. In reality, however, consumers react well to initiatives which use packaging to add value through improved functionality or convenience. Retailers and brand owners specify the packaging to be used, and know from their research what consumers want. Thus there seems to be no real move towards simpler, more minimal packaging, more a move towards added value features.

Research shows that consumers usually understand the benefits of packaging once they are encouraged to think rationally about it. Despite this, a danger exists that small minority action groups campaign loudly against packaging with the result that inappropriate legislation is introduced.

Sustainable development

The UK Government has defined four key objectives for the delivery of sustainable development:

- Social progress which recognises the needs of everyone
- Effective protection of the environment
- Prudent use of natural resources
- Maintenance of high and stable levels of economic growth and employment

Creating the right balance for all of the above is a challenge for any sector, but the packaging manufacturing industry is well-placed to develop its existing parameters as it naturally fulfils the first two criteria, and achieves the third but often does not receive due recognition. The challenge is ensuring that the industry can demonstrate more effectively the decoupling of material use and wastage v. GDP growth as measured by purchasing power.

Environmental Sustainability =
Reducing resource use + Reducing waste generation/emissions

The concept of environmental sustainability is rising up the agenda of many organisations. Recent research by Pira on future purchasing strategies of major brand owners identified sustainable environmental policies as becoming of increasing importance in supplier selection. This push towards sustainable practices is predicted to become one of the key influences on business over the next 5 – 10 years. There is an opportunity for the UK packaging industry to gain competitive advantage through developing an environmentally sustainable strategy through developing more eco-efficient packaging solutions. There is also a need for these achievements to be recognised through raising the profile of the industry's activities in this field.

Environmental legislation and taxation

While the Packaging and Packaging Waste Directive affects all EU countries, it has not been translated into law in a consistent manner which causes problems for organisations working on a Europe-wide basis. Anomalies such as the Aggregates Levy unfairly disadvantage the UK glass industry. The Climate Change Levy threatens to damage further the sector's competitiveness as their counterparts in Europe do not have to bear this energy tax. In addition, the UK lacks appropriate incineration with energy recovery capacity which puts particular pressure on the plastics industry compared with other countries such as Denmark, which are much better placed to achieve recovery targets.

ACTION PLAN

☛ **Regulatory**
Government, in consultation with industry, should review the current legislation to ensure that competitiveness of the industry is not adversely affected. 'Joined up' thinking is required, rather than piece-meal initiatives which can benefit one sector at the expense of another. In particular, the CCL system and IPPC implementation need urgent review.
Action – Govt in consultation with industry/TA's

☛ **Employment**
Following the 'Print 21' study, the printing industry is currently conducting a DTI sponsored campaign to improve their recruitment process. The success of this should be monitored with a view to conducting a similar campaign for the packaging industry.
Action - industry supported by Govt

(It is considered inappropriate to recommend specific actions regarding skills and training needs without access to the recent IOP industry skills mapping project.)

☛ **Image**
Packaging generally suffers from being an easy target for minority groups and improving its image is not an easy task. An image survey could be conducted to evaluate the extent of the problem and to recommend 'best practice' for tackling this. For example, industry could publish literature demonstrating achievements in light-weighting, design for minimisation and in overall packaging reduction. This has been undertaken successfully by the French Packaging Council. Packforsk in Sweden communicates directly with consumers on the benefits of packaging. 'Best practice' recommendations should include suggestions for the most effective means of communication. The assistance of the product manufacturers and retailers, preferably with Government endorsement and assistance, would be essential to achieve the necessary objectivity and credibility.
Action – industry supported by Govt

☛ **SME's**
Many of the factors affecting UK industry competitiveness are not necessarily major issues for the large multi-national converters who produce throughout Europe. There is, therefore, a need for specific help to be given to SME packaging converters in terms of technical assistance, access to funding, assistance with IT strategies, etc in order to ensure that these organisations remain viable.
Action – Govt funded programme directed towards SME's

☛ **E-auctions**
There is a need for a code of practice to be developed and implemented for e-auctions.
Action – industry and TA's (but needs to be pan-European)

☛ **R&D**
It is known that relatively little UK based R&D is carried out for the packaging industry. However the Faraday Packaging Partnership is now well placed to address this issue, for both collaborative and confidential R&D projects. The profile of FPP needs to be further raised and the benefits to be gained from such research programmes need to be communicated to industry.
Action –Engage co-operation of TA's; Govt to continue to fund this initiative

☛ **Representation**
The DTI needs to make it easier for packaging to represent itself as an industry, rather than by materials sector, perhaps through offering a 'packaging champion' as a single point of contact. This would form a channel through which issues common across the industry could be communicated.

Closer relationships between the various associations and institutes should be encouraged. The paper industry initiative of consolidating into CPI should be monitored to determine its impact.

Action – TA's; DTI to make interface easier

☛ **IT and e-commerce**
The PwC study highlighted the need for industry to appreciate the importance of e-commerce and to have appropriate IT infrastructure in place. There is a need to make sure this is communicated to industry and that assistance is available for those organisations which need it, especially SME's.
Action – Govt/ TA's

☛ **Data**
There is a need for better industry data to be available. A study should be commissioned to fill gaps identified in this report, thus gaining an understanding of where industry is today against which to benchmark future developments. There is also a need for better definitions within the existing SIC codes.
Action – TA's & Govt

☛ **Customer service opportunities**
There is a continued need for the packaging industry to understand its downstream supply chain, from brand owners through retailers to the final consumer. Such understanding will provide opportunities for competitive advantage through targeted product and service innovation
Action – industry

☛ **Supply Chain improvement and exploitation**
There is still scope for further supply chain improvement, particularly upstream between packaging manufacturers and their suppliers. More effective communication has been identified as one key area for attention. A current DTI/CPA/Pira project is in place to evaluate ways of improving the corrugated supply chain and there is potential for this work to be extended to other packaging supply chains.

Adoption of lean manufacturing techniques may also offer a means of improving supply chain performance. This is one key area of follow-on-work to be carried out in the printing industry, following the Print 21 study.
While there is room to improve supply chain performance, it should be recognised that the UK has one of the most efficient retail supply chains in the world. UK packaging manufacturers have developed innovation and supply chain management skills which have potential for exploitation in other areas, whether other geographical regions or industry sectors.

Industry must keep abreast of new technologies which have potential to improve supply chain performance and be prepared to adopt these for competitive advantage (RFID; active and intelligent formats; print on demand).

Finally, there is a real need for industry to sell packaging on the basis of its true supply chain cost, and not on price.
Action – industry

☛ **Sustainable Development**
The packaging supply chain should consider development of a sustainability strategy as a key competitiveness opportunity. Research and development into environmentally sustainable packaging solutions should be considered of high importance.
Action: Industry; Govt to continue to fund sectoral sustainability through Pioneers Group

☛ **Benchmarking**
Relatively little data exists from which to carry out effective benchmarking. Further work should be undertaken to benchmark UK Industry over a range of key performance indicators against overseas competitors
Action: TAs, Industry

☛ **Industry Forum**
All of these actions could be consolidated into an Industry Forum, co-ordinated initially by the Packaging Federation. This could be used to develop an on-going implementation and improvement programme to address the findings of this study.

The forum would focus on those actions which are common to all packaging materials sectors and which would be of benefit to industry as a whole. There is a need to avoid duplicating the activities of the plastics industry forum or the printing industry forum.

It is recognised that there are some issues which are materials specific. The role of the forum would not be one of political lobbying as such activities would remain with the relevant trade associations.

Action: Industry, TA's and Govt

(Definition – TA means any industry member association or institute)

2002 Corporate Activity and Ownership Changes in the UK Packaging Industry

Activity: **UK Acquisition in the UK**

Business Type:

Packaging Manufacturer

- Exel is to acquire a number of supply chain management and packaging services operations in the US and UK from Power Packaging, including assets valued at £4.6m. 04-Sep-02
- Rexam is looking to spend up to £100m a year on acquisitions to expand its consumer packaging business, and is particularly interested in plastics and the European glass market. 30-Aug-02
- Macfarlane is to acquire Tom Brands Electrical Services, the Gourock-based provider of supply chain management services, for £2m. 05-Jul-02
- Bunzl has acquired Lockhart, the Reading-based supplier of catering equipment with annual sales of about £60m, from Sodexho. 28-May-02
- Automatic Handling Europe has acquired SHS Handling Systems, the manufacturer of integrated corrugating and materials handling solutions, and will relocate its Northwich operation to the SHS factory at Ellesmere Port. 23-Apr-02
- BP Chemicals is to sell its Performance Films packaging business, including plants in Barnsley and Poland with more than 400 staff, to Parkside Flexibles of West Yorkshire for undisclosed terms. 05-Apr-02
- Amcor Flexibles Europe is planning to buy two Rexam flexible packaging plants at Ledbury and Thetford for £18m. 25-Mar-02
- Rutland Trust has sold its interests in Coppice Group, the Bridgend-based manufacturer of aluminium foil containers, to a new company called MELH 888 for £4.6m. 11-Mar-02
- Viking Industrial Products, the supplier of adhesives, abrasives and packaging materials, has acquired Industrial & Safety Supplies of Leeds, creating a combined group with turnover of more than £3m. 14-Feb-02
- Jarvis Porter has sold its Leeds-based labels business to CCL Industries for £7m, and has also announced plans to rename itself Grovebirch. 28-Jan-02
- Hovat, the Kent-based food packaging company, has undergone a £3m management buy-out, and the subsequent acquisition of Ascom Addressing of Dartford will create one of the country's leading label printers. 22-Jan-02

Packaging Machinery Manufacturer

- Molins is looking to spend up to £20m on acquisitions to expand its packaging machinery business. 04-Sep-02

Activity: **Administration / Receivership**

Business Type:

Raw Material Supplier
- Environmental Polymers, the developer of plastic pellets for the production of laundry bags, tape and embroidery film, has placed its manufacturing arm into administration. 11-Sep-02

Packaging Manufacturer
- Romney Packaging, the Swindon-based supplier of printed packaging to the food industry, has gone into receivership with the loss of 65 jobs. 21-Mar-02
- Spectra Packaging Display, the Warrington-based manufacturer of corrugated packaging products, has gone into administration with the loss of 50 of the 163 jobs. 12-Mar-02
- Swan Innovations has shed all 34 jobs at its print and packaging business in Corby, following its move into liquidation. 25-Feb-02
- SJP UK, the St Neots-based board and label company, has been bought out of administration by ScandStick of Sweden. 28-Aug-02
- SJP UK, the St Neots-based manufacturer of laminated paper products for labelling, has gone into receivership with the loss of about 40 of the 220 jobs. 17-Jul-02
- Smith & McLaurin, the Renfrewshire-based manufacturer of self-adhesive labels, has gone into administration, putting 94 jobs at risk. 29-May-02

Packaging Machinery Manufacturer
- Premier Packaging, the Norwich-based packaging machinery company, has gone into administration, putting 30 jobs at risk. 26-Jul-02
- Warburton Holgate, the Radcliffe-based manufacturer of paper and board machinery, has gone into administration, putting 45 jobs at risk. 25-Jun-02

Activity: **UK Management Buy Out**

Business Type:

Packaging Manufacturer
- CLF Packaging, the Huntingdon-based corrugated cases firm with 35 staff, has undergone a £1m management buy-out, and has also acquired Essex-based competitor Box-Wise for £0.5m. 27-Aug-02
- Jefferson Smurfit, the Irish packaging group, is to undergo a £2.4bn management buy-out backed by US private equity firm Madison Dearborn Partners. 18-Jun-02
- Coppice Alupack, the Bridgend-based manufacturer of aluminium and board containers for the food industry with annual turnover of £18m, has undergone a management buy-out. 25-Mar-02
- Lin Pac has sold its Cwmbran-based welded products division, which manufactures aerosols used to store glues and solvent, to management for £0.5m, securing 20 jobs. 26-Feb-02
- James Townsend & Sons, the Exeter-based label printer with 90 staff, has undergone a management buy-out backed by NMB-Heller. 28-Aug-02
- Hovat, the Kent-based food packaging company, has undergone a £3m management buy-out, and the subsequent acquisition of Ascom Addressing of Dartford will create one of the country's leading label printers. 22-Jan-02
- Allied Glass has been subject to a management buyout from ABF, Dec 02

Activity: **UK Merger with Foreign Company**

Business Type:

Packaging Manufacturer

- Payne Strapping has merged with Samuel Strapping Systems to form MJ Maillis UK (Greek parent company), a combined manufacturer of steel and plastic strapping with operations in Nottingham, Hinckley, Kilnhurst and Strood. 28-Aug-02

Activity: **Closure**

Business Type:

Raw Material Supplier

- Stora Enso is to close its Papyrus GB paper merchanting division, which includes sites in Waltham Cross, Rugby, Leeds and Bristol, with the loss of 200 jobs. 16-Apr-02
- International Paper is to shed 80 jobs at its paper mill in Inverurie, in order to improve the site's competitiveness. 28-Feb-02

Packaging Manufacturer

- Teich Packaging is planning to close its flexible packaging plant in Derby by June 2003, with the loss of 128 jobs. 23-Jul-02
- Pactiv Europe is to close its thermoforming operation in Caerphilly later this year, in order to consolidate production at its sites in Livingston and Stanley. 18-Jun-02
- DS Smith Packaging is to close its Carlisle factory and transfer 25 staff to a site in Lockerbie. 06-May-02
- Field Group is to close its food and household carton plant in Congleton, with the loss of up to 125 jobs. 16-Apr-02
- Printpack is planning to shed up to 30 jobs at its flexographic business in Saffron Walden. 15-Mar-02
- Ardagh is to acquire the Italian glass packaging operations of Consumers Packaging of Canada for £1.8m, and has also announced the closure of its Ringsend, Dublin, glass container plant. 01-Mar-02
- Smurfit Corrugated is planning to close its packaging plant in Warrington in April, with the loss of 94 jobs. 20-Feb-02
- Graham Packaging is planning to close its plastic bottles plant at Gwersyllt in north Wales in April, with the loss of 67 jobs. 22-Jan-02
- Field Group has confirmed plans to close its carton manufacturing operation in Edinburgh with the loss of 120 jobs, in order to consolidate the business at its East Kilbride site. 16-Jan-02
- Macfarlane is to shed 90 of the 274 jobs at its packaging plants in Glasgow. 14-Jan-02
- Sealed Air is to close its protective packaging factory in Witham in January with the loss of 33 jobs, in order to relocate the business to a larger site in Kettering. 04-Jan-02

- Inveresk has announced plans to close its loss-making label paper business at Westfield Mill, near Bathgate, with the loss of 152 jobs. 24-Apr-02

Packaging Machinery Manufacturer

- Paper Converting Machine Company, the US-owned supplier paper processing machinery, is planning to close its manufacturing operations in Plymouth with the loss of up 200 jobs. 20-Aug-02
- Willett International, the coding and labelling company, is planning to relocate its CIJ manufacturing operation from Corby to Asia over the next 12 months, while the research and development centre will move from Corby to Cambridge. 04-Jun-02

Activity: **UK Investment in the UK**

Business Type:

Raw Material Supplier

- Shotton Paper is to invest £77m in a new fibre pulp facility at its Deeside-based paper recycling plant, which will secure 500 jobs. 16-Jan-02

Packaging Manufacturer

- Servicetoken, the manufacturer of paint packaging products, is buying the Akzo Nobel paint factory in Haltwhistle, and plans to double its workforce from 30 to 60 and create a trading estate and interactive arts centre on the site. 04-Jun-02
- DS Smith Packaging has set up a new sheet plant group to manage 14 corrugated packaging sites across the country, following last year's acquisition of a number of Danisco Pack plants. 24-May-02
- Irish Bonding Company is to invest £9m in a new bottling plant for Guinness and other Diageo drinks at Marshalls Road in Belfast. 28-Mar-02
- Lawson Mardon has announced plans to invest £5m at its packaging factory in Workington, including the installation of a new printing press. 20-Mar-02
- Jubb is creating 50 new jobs at its plastic bottles factory in Leicestershire, due to the increased workload resulting from the recent acquisition of Barclay Stuart Plastics. 14-Mar-02
- A&J Scott is to create up to 100 jobs over the next two years at its new timber pallet manufacturing plant in North Shields. 08-Feb-02
- Barony Universal has announced a £2m expansion at its aerosols supply business in Ayrshire, with the creation of 30 jobs. 05-Feb-02
- Plastek is to invest £1m expanding production at its plastic crates factory in Clydach Vale, with the creation of 55 jobs over the next four years. 30-Jan-02
- Betts is to create 50 jobs at its consumer packaging plant in Colchester, having decided to relocate its injection moulding business from Wrexham. 22-Jan-02

- Decorative Sleeves, the manufacturer of shrink sleeve labels, is to relocate its Wakefield factory and 54 jobs to Pioneer Park, as part of a multi-million pound investment programme that will also involve the expansion of its Norfolk site. 10-Jun-02
- Decorative Sleeves is planning to expand its display packaging plant in King's Lynn by 20,000 sq ft this year, and the 200-strong workforce is likely to rise slightly over the next few years. 01-Mar-02

Activity: **Sale of UK Business to Foreign Business**

Business Type:

Packaging Manufacturer

- Rexam has completed the sale of two Danish plastic containers businesses - Rexam Holmia and Rexam Closures & Containers - to Polimoon Holding of Denmark for £7.2m. 13-Aug-02
- Low & Bonar has sold Spila, its loss-making Italian plastics subsidiary, to Albanova, for a nominal sum. 02-Aug-02
- Wheatley Packaging, the flexible packaging printer with 140 staff, has been acquired by Frantschach Group, the Austrian printer. 23-Jul-02
- Avalon Printing Software of Leicester has been acquired by VantagePoint Systems of Canada for about £0.5m, and will become VantagePoint's retail packaging division. 11-Jun-02
- Rexam is to sell its Image Products coated films and papers business to Sun Capital of the US for £42m. 08-Apr-02
- Rexam is to sell its 70% stake in Rexam Combibloc, the Houghton le Spring-based liquid carton business, to joint venture partner SIG Group of Switzerland. 12-Mar-02

Activity: **Foreign Investment of UK Packaging Company**

Business Type:

Packaging Manufacturer

- Rexam is to invest £40m in two new beverage can-making lines at sites in Naro Fominsk, Russia, and La Selva, Spain. 22-Jul-02
- Linpac Plastics opened a site in Poland to manufacture EPS trays. 10-Oct-02

Activity: **Foreign Investment of UK Packaging Company (Acquisition)**

Business Type:

Packaging Manufacturer

- DS Smith is to acquire Zewathener, the German bag-in-box packaging group with 80 staff, by buying a 51% stake from SCA Packaging and the remaining 49% from the current management. 17-Jul-02
- The Rexam Group recently announced the acquisition of Nienburger Glas in Germany, which will now give it about 20% of the German market. Q3-02

Source: www.ukbusinesspark.co.uk

Faraday Packaging Partnership

Since its launch in late 1994, The Faraday Packaging Partnership has instigated over £6.5M of research and development activities directly related to packaging needs and within this some 24 bespoke projects aiming to deliver specific developments to company sponsors.

Furthermore, in the current political climate, sponsorship does not mean high financial risk – much of the funding is available through support schemes from UK and EU government. The Faraday Packaging Partnership is well resourced with staff familiar with these schemes and able to offer advice and direct assistance.

The Faraday Packaging Partnership now involves a network of over 40 University groups and specialist commercial suppliers, including:

University of Cambridge
King's College, London
University of Leeds
University of Salford
♦ University of Sheffield
University of Wales, Cardiff
University of York

Autotype International
Disperse Technologies
Domino Printing
Epigem
Factory design
IdtechEX
Pira International
Raffo design
Spooner Industries

Recent links have also established initial European contacts with links to TNO Industrial Technology at University of Eindhoven and School of Packaging at University of Reims. These complement links to the renowned School of Packaging, Michigan State University, USA.

The Faraday Packaging Partnership presents a practical opportunity for the industry to engage with international science and engineering and to ensure that on-going basic research can be related to the needs of the industry.
Faraday Packaging is also able to offer unique *Insights into Innovation* workshops which bring a range of experts around the table with company executives to explore in some depth new concepts and ideas. The

♦ Managing Partners

Examples of Developments linked to the Faraday Packaging Partnership

Human Factors

✓ Improved openability and closability with generation of new child resistant pack concepts;
✓ Definition of 'shape grammar' of leading brands to support transfer of brand image to a range of products;
✓ Protyping of 'Sensual Surfaces' – surfaces which can turn you on!
✓ Japan mission to experience Kansai Engineering – a new method of designing for the emotional.

Electronics and Photonics

✓ Synthesis of semi-conductor polymers with potential for inclusion in inks so enabling ' printing of computers';
✓ Research to establish standards for RFID so enabling all production line components to be individually recognised and introduction of 'super' intelligent robots

Advanced Materials

✓ Novel molecules which can act as 'molecular pumps', moving gases from one side of film to another and creating a new generation of active packaging;
✓ Light defracting materials which can be aligned so as to switch from one colour to another, triggered by a range of physical means such as electronics, light or temperature;
✓ Novel low energy, biocompostable polymers for food packaging derived from starch.

Simulation and Modelling

✓ Establishment of low cost systems for shared access to new design concepts enabling rapid transfer and assessment of concepts across design chains
✓ Development of 3-D imaging to create 'virtual prototypes' able to act as the definitive trial product

Automation and Robotics

✓ Development of robots able to construct complex packages such as 'Easter Egg' cartons,
✓ Robots for sandwich-making and packing
✓ Production efficiency and quality improvements through improved process monitoring instruments.

aim is to develop such an understanding that practical steps can be identified towards the realisation of radical new visions. Such workshops are bespoke and confidential to single companies.

In summary, the need and opportunity has never been greater and the delivery and facilitation mechanisms to match have never been stronger. The industry is well supported to be at the forefront of innovation in future years. The question is one of will and commitment to invest time and resources now

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