

Market Transformation Programme - Waste Clothing Textiles

Final Report

October 2005

AEA Technology

Market Transformation Programme - Waste Clothing Textiles

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1 INTRODUCTION

1.1 BACKGROUND

The Market Transformation Programme (MTP) supports UK Government policy on sustainable products. Its aim is to achieve sustainable improvements in the resource efficiency of products, systems and services where these are critical to the delivery of Government commitments in areas including climate change, water efficiency and waste reduction.

The MTP is managed by Defra's Environment, Business and Consumers Division through a consortium of contractors. The lead contractor is AEA Technology Environment; working with the Building Research Establishment, Intertek Research and Testing Centre and Consumer Research Associates and a growing number of other experts as required.

The MTP is commissioning a series of projects under the umbrella of the Waste Scoping Study. The overall objectives of the Waste Scoping Study are to develop and to test a methodology or series of methodologies for:

- determining year on year projections through to 2020 for the contribution of individual products to the overall UK waste stream;
- determining the fate of end-of-life products and their materials and comparing this to relevant recycling targets;
- identifying the barriers to greater recycling where recycling levels are low;
- suggesting potential mechanisms for increasing recycling of the product and outlining these in a policy brief; and
- undertaking consultation with key stakeholders regarding the policy brief to obtain their views on its content.

The Waste Scoping Study is comprised of several projects each investigating a specific product type.

1.2 CLOTHING TEXTILES STUDY - OBJECTIVES

The main objectives of this study were to:

- develop time series projections regarding the end of life fate of clothing textiles; and
- identify barriers to diverting clothing textiles from landfill and achieving higher rates of recycling or reuse.

This study was split into a number of tasks:

- Task 1: Stakeholders in the Clothing Textile Industry. A contact list was developed, including names, organisations, and telephone and email

details along with a list of reports and sources of data used in this study.

- Task 2: Clothing Textiles Groupings. Baseline data on the clothing textile market in the UK were established. An important part of this was developing a set of 'clothing textile groupings' which are appropriate for categorising clothing textiles.
- Task 3: Baseline Data on UK Market for Clothing Textiles. Baseline data was collated on the annual volumes of clothing textiles which are sold in the UK. This included predicting future waste arisings for individual products by looking at market sales data and linking this with the average lifetime of products.
- Task 4: Historic and Future Trends. A database in Excel was developed, providing a breakdown of sales data by textile grouping over the last 10 years.
- Task 5: Post Consumer End-of-Life Fate of Clothing Products. This involved investigating any work that has been carried out to assess how the volumes of clothing textiles which are recycled or reused through charity schemes and recycling organisations relate to the total amount of clothing products which are discarded each year in the UK.
- Task 6: Future Predictions of Textile Waste Arisings. The model and baseline data developed in *Task 3* were used to make projections about future clothing waste textiles being generated.
- Task 7: Barriers to Recycling Textiles. Work carried out on the recycling of clothing textiles was investigated with the aim of identifying and assessing barriers that exist to prevent greater quantities of clothing textiles being recycled.

An interim report was produced upon the completion of *Task 5*.

1.3

STRUCTURE

This final report extends the interim report to encompass the findings from all seven tasks shown above.

The report is divided into sections as follows:

- *Section 2: Industry Stakeholders*. This includes the list of stakeholders, documents and sources used.
- *Section 3: Data On UK Market For Clothing Textiles*. This includes baseline data on the clothing textile market in the UK and the clothing textiles groupings. In this final report, this section has now been expanded to show projections for waste clothing textiles arisings to 2020, as per *Task 6*.

- *Section 4: Post-Consumer End-Of-Life Fate Of Clothing Products.* This provides information on the volumes of clothing textiles which are recycled or reused through charity schemes and recycling organisations and how this relates to the total amount of clothing products which are discarded each year in the UK.
- *Section 5: Barriers To Recycling Textiles.* This shows the types of issues that affect the amount of waste clothing textiles being collected, sorted and recycled. It also discusses the ways in which these barriers could be overcome.

ERM has identified 61 stakeholder organisations. The names and contact details of these organisations are provided in *Table 2.1*.

Table 2.1 *Clothing Textiles - Stakeholder Organisations*

Organisation	Contact Name	Telephone	Email	Address
Association of Suppliers to the British Clothing Industry	Stephanie Bingham	01422 354666	info@asbci.co.uk	Unit 5 25 Square Road Halifax West Yorkshire HX1 1QG
British Apparel & Textile Confederation		020 7636 7788	batc@dial.pipex.com	5 Portland Place London W1N 3AA
British Clothing Industry Association		020 7636 7788		5 Portland Place London W1N 3AA
Confederation of British Wool Textiles		01274 652207	info@cbwt.co.uk	Merrydale House Roydsdale Way Bradford BD4 6SB
Knitting Industries Federation	Mrs Anne Carvell	0116 2541608	director@knitfed.co.uk	53 Oxford Street Leicester LE1 5XY
Lancashire Textile Manufacturers Association		01254 580248	Enquiry@ltma.co.uk	4 St Andrew's Street Blackburn BB1 8AE
National Wool Textiles Export Federation		01274 724235	info@bwtec.co.uk	
Northern Ireland Textile and Apparel Association		028 9268 9999	info@nita.co.uk	5c The Square Hillsborough BT26 6AG
Scottish Textile Manufacturers Association		0131 313 6243	scottish-textiles@scotent.co.uk	Scottish Textiles Scottish Enterprise Apex House 99 Haymarket Terrace Edinburgh EH12 5DH
Silk Association of Great Britain		020 7636 7788	sagb@dial.pipex.com	5 Portland Place London W1N 3AA
Textile Finishers Association		01274 652207		Merrydale House Roydsdale Way Bradford BD4 6SB
Apparel, Knitting and Textiles Alliance		020 7636 7788		5 Portland Place London W1N 3AA

Organisation	Contact Name	Telephone	Email	Address
Guild of British Tiemakers		020 7636 7788		5 Portland Place London W1N 3AA
International Apparel Federation National Childrenswear Association		020 7636 7788		5 Portland Place London W1B 1PW
British Glove Association		020 7631 5445	enquiries@ncwa.co.uk	5 Portland Place London W1B 1PW
		020 8464 0131	<a href="mailto:info@gloveassociati
on.org">info@gloveassociati on.org	C/O Crane & Partners Sussex House 8-10 Homesdale Road Bromley Kent BR2 9LZ
British Hat Guild		07932 678003	<a href="mailto:info@britishhatguil
d.co.uk">info@britishhatguil d.co.uk	P.O. Box 48664 London NW8 6WS
The Performance Textiles Association		01827 52337	<a href="mailto:info@performancet
extiles.org.uk">info@performancet extiles.org.uk	42 Heath Street Tamworth Staffordshire B79 7JH
Register of Apparel and Textile Designers	Laurian Davies	020 7636 5577	<a href="mailto:laurian.davies@ukf
ashionexports.com">laurian.davies@ukf ashionexports.com	UK Fashion Exports 5 Portland Place London W1B 1PW
Salvation Army Trading Company	Garth Ward	01933 441086	<a href="mailto:garth@satraidingco.
org">garth@satraidingco. org	66-78 Denington Road Denington Industrial Estate Wellingborough Northants NN8 2QH
Kettering Textiles Ltd	Nigel Hangar	01933 442833	info@kettex.com	66/78 Denington Road Denington Road Industrial Estate Wellingborough Northants NN8 2QH
TRAID - Textile Recovery for Aid and International Development	Ceridwen Johnson	020 8733 2580	<a href="mailto:ceridwen@traid.org
.uk">ceridwen@traid.org .uk	5 Second Way Wembley Middlesex HA9 0YJ
Textile Recycling Association	Alan Wheeler	0845 6008276	<a href="mailto:info@textile-
recycling.org.uk">info@textile- recycling.org.uk	PO Box 965 Maidstone Kent ME17 3WD
LM Barry & Co		020 7476 2888	lmb@lmb.co.uk	Britannia Mill North Crescent London E16 4TG

Organisation	Contact Name	Telephone	Email	Address
Black Country Rag Co Ltd		0121 520 7586	mail@bcr-recycling.co.uk	4a/4b Greets Green Road Greets Green Industrial Estate W Bromwich W Midlands B70 9EW
M & J Bowers (Recycling)		01935 840308	john@mjbowers.fsn.et.co.uk	Lucott Limington Yeovil Somerset BA22 8EQ
British Heart Foundation (Retail)		01372 477300	branchj@bhfsshops.org.uk	Shops' Division Church Road Claygate Esher Surrey KT10 0BF
Choice Textiles Ltd		020 8743 9090		31-33 Brunel Road Acton London W3 7XR
Chris Carey Collections	Christine Carey	020 8692 5855	christinecarey@hotmail.com	Unit 14 Titan Business Estate Ffinch Street London SE8 5QA
Clyde Recycling Ltd		0141 554 8778		Unit 3 1650 London Road Glasgow G31 4QG
I & G Cohen Ltd		0161 736 8899	info@igcohen.com	Castle Works Bazaar Street Pendleton Salford Manchester M6 6GS
J Cohen & Sons		0161 273 3788		107 Fairfield Street Ardwick Manchester M1 2WG
Coppermill Ltd		0207 729 2999	info@coppermill.ltd.uk	78 - 90 Cheshire Street Bethnal Green London E2 6EH
D B Export Ltd		01933 222990	royellson@bigfoot.com	Unit 102 Leyland Trading Estate Irthlingborough Road Wellingborough Northants NN8 1RT

Organisation	Contact Name	Telephone	Email	Address
Devizes Textiles		01380 724451	devizes.textiles@virgin.net	Unit 3 Garden Trading Estate London Road Devizes Wiltshire SN10 2HW
Denton Hampshire Ltd		01924 280622	sales@denton-hampshire.co.uk	Ings Mill Dale Street Ossett West Yorkshire WF5 9HQ
Fortune International Ltd		01234 364141	vtosh@yahoo.com	Unit #5 Shuttleworth Road Elms Industrial Estate Bedford MK41 0EP
Greenhill Textile Co Ltd		01924 475550		Greenhill Mills Grange Road Batley WF17 6LH
Harris & Co		0117 927 7434		Farr's Lane Prince Street Bristol BS1 4PZ
HB Textiles		01422 884644	wgroup@globalnet.co.uk	Moderna Business Park Mytholmroyd Hebden Bridge West Yorkshire HX7 5QQ
Mudford (Wakefield) Ltd		01924 364771		Crockroft Mill Alverthorpe Road Wakefield West Yorkshire WF2 9NT
Nathan's Wastesavers Ltd		01324 826633	bren@nathans.demon.co.uk	13 Winchester Avenue Denny Stirlingshire FK6 6QE
Oxfam Wastesavers		01484 542021	tclarke@oxfam.org.uk	Units 4 - 6 Ringway Industrial Estate Beck Road Huddersfield West Yorkshire HD1 5DG
Ragtex UK Ltd		0116 234 0648	mail@ragtexuk.com	Units 1-5 Forest Park Industrial Estate 47 Parker Drive Leicester LE4 0JP
Randisi Textile Recycling Ltd		01274 309111	randisitextiles@btinternet.com	Mulgrave Street Bradford BD3 9SE

Organisation	Contact Name	Telephone	Email	Address
Retrograde Ltd		01708 866885	retrogradeltd@hotmail.com	Office 7a - Truckworld Oliver Road West Thurrock Essex RM20 3ED
D Robinson & Co		01536 761963	robinson.co@btinternet.com	Woodside Stoke Albany Road Desborough Northants NN14 2SP
L W Sait & Sons LLP		0208 985 0062		35 Waterden Road Hackney London E15 2EE
Savanna Rags International Ltd		01623 421555	savanna_rags@online.rednet.co.uk	Croft Mill Forrest Road Mansfield Nottingham NG18 4BU
SCOPE (Northern Office)	Carolyn O'Connell	01423 862963	carolyn.oconnell@scope.org.uk	25a High Street Knaresborough North Yorkshire HG5 0ET
SCOPE (Southern Office)		01295 272805	stockrecycling.south@scope.org.uk	7 Parsons Street Banbury Oxon OX16 5LW
The Scrine Foundation		01227 464902	info@scrine.org	Lombard House 12/17 Upper Bridge Street Canterbury Kent CT1 2NF
Staffordshire Textiles UK Ltd	Darren Coggins	01889 270932	darrencoggins@aol.com	Salt Works Lane Weston Stafford ST18 0JE
Terimpex Ltd		01933 460855	terimpexltd@aol.com	18 High Street Ringstead Northants NN14 4DA
Textraders UK Ltd		0115 978 7132	textradersuk@hotmail.com	363 - 369 Haydn Road Nottingham NG5 1DA
WH Tracey Ltd		0161 764 1937	info@whtracey.co.uk	Paradise Mill John Street Bury Lancashire BL9 5AA

Organisation	Contact Name	Telephone	Email	Address
Wastesavers International Ltd		01754 767054	wastesavers@dsl.pi pex.com	Unit 7/8 Skeg Grain Industrial Estate Burgh Road Skegness Lincolnshire PE24 4UF
Wilcox Industrial Supply		01902 357300	martinwilcox@jmp wilcox.co.uk	Company Star Works Batmanshill Road Bilston W Midlands WV14 8AG
J E Williams		0151 647 6532		Unit 2 Freeman Street Birkenhead Merseyside CH41 1BR
World UK Trading Ltd		01234 782823	pauline@pams- uk.fsnet.co.uk	Unit 18 Podington Industrial Estate Airfield Road Hinwick Northants NN29 7JQ

2.1

REPORTS AND REFERENCE DOCUMENTS

In carrying out this scoping study, ERM referred to a number of written reports and documents. These are outlined below:

1. *Textile Recycling, DTI, 2002, website:*
www.dti.gov.uk/sustainability/downloads/textile.pdf
A fact sheet produced by the DTI in 2002 which reports on: Textile Waste Arisings; Textile Recycling Rates; Textile Recycling Operations; Technical and Economic Barriers to Recycling Textiles; Industry Initiatives; and Government Initiatives and Legislation.
This report was of use as a baseline from which to start, in terms of looking at textile waste arisings, recycling rates and recycling systems.
2. *World Markets for Woven Textiles and Apparel, Textiles Intelligence Limited, 2003*
A report based on research conducted by a working group within the Brussels-based organisation CIRFS (Comité International de la Rayonne et des Fibres Synthétiques).
It includes information on: production cost breakdowns and trends for different countries and comparisons of production costs between different weaving technologies; predictions of the future global market for woven textiles and apparel; and forecasts of global and regional markets for woven textiles and apparel to 2010.
This report was used to provide historical data on the volume of imports of clothing into the EU from the major textiles manufacturing

countries of the world. It also provided a basis for the categories used in this report. Finally, the report contained suggested conversion factors for converting weight into number of items/units for different types of apparel.

3. *Clothing and Footwear Industry Market Review, Key Note Ltd, 2003*
This report looks at: economic trends affecting the industry; brand penetration; the structure and competitiveness of the retailer market; a global perspective; and future trends.
This report was of use in identifying the amount of clothing imported into the UK.
4. *Verdict Forecasts Clothing and Footwear 2008, Verdict, 2003*
This report aims to: identify the key drivers of sales growth in the clothing and footwear sector in the UK; forecast market trends up to 2008; provide 10 year historical trends; and analyse the performance and outlook for both specialists and non-specialists in the sector.
This report was of use in providing forecast data on future growth trends for various sectors of the UK clothing and apparel market up to 2008. It also provided information on reasons for these trends.
5. *WTO Agreement on Textiles and Clothing (ATC): Impact on Garment Manufacturing in Cambodia, Laos and Vietnam, Mekong Capital, 30 December 2003*
This report looks at the issues surrounding the ending of quotas in the trade of textiles and garments among WTO member countries resulting from the ATC, and the impact this is likely to have on garment manufacturers in Cambodia, Laos and Vietnam.
This report was of use in getting definitions of the EU textiles and apparel categories for imports and exports. It also provided some background information on the ATC.
6. *Textile Recycling Association website: www.textile-recycling.org.uk*
This is the website of the Textiles Recycling Association, a trade body that represents individual regional and national textiles recycling companies. It provides general information on textile recycling in the UK and a list of TRA members. The TRA is also a member of the Bureau of International Recycling (BIR).
This website was of use when looking to make contact with the TRA to ask about the state of textiles recycling in the UK. It also provided information on the companies involved in textiles recycling in the UK.
7. *Waste Statistics for England and Wales 1998-99, Environment Agency*
This is a supplemental report to the Agency's regional Strategic Waste Management Assessments (SWMAs), and aims to provide consistent, comprehensive, national and regional information on the amounts and types of wastes produced and the methods used to manage it.

The report was of use in trying to determine the amount of textiles in both the Commercial and Industrial (C&I) and the Construction and Demolition (C&D) waste stream.

8. *Business Link website:*
www.businesslink.gov.uk/bdotg/action/detail?type=RESOURCES&itemId=1074467937
This is the website of Business Link, an organisation funded by Government which looks to provide information, guidance and advice to Small to Medium Enterprises (SMEs) around the UK.
This website provided a list of trade associations involved in the clothing and textiles industry from importing to recycling.

9. *Salvation Army Trading Company website:*
www.satradingsco.org/home1.html
This is the website of the Salvation Army Trading Company, one of the UK's leading textile collection and recycling operations. It provides general information on the Salvation Army's textile recycling operations in the UK.
This was of use when looking to make contact with the Salvation Army to ask about textiles recycling in the UK.

10. *Waste Online Textiles Recycling Information Sheet website:*
www.wasteonline.org.uk/resources/InformationSheets/Textiles.htm
The Waste Online website represents Waste Watch on the internet. Waste Watch is a charity dedicated to the reduction, re-use and recycling of household waste. The Information Sheet explains how textiles recycling works in the UK.
This website was of use when formulating the list of contacts as well as providing information on the state of recycling in the UK.

11. *Wake Up To Waste Textiles information website:*
www.wakeuptowaste.org/business/textiles.htm

3.1 BASELINE DATA: DEVELOPMENT OF TEXTILE GROUPINGS

Using information gathered from market research papers in the last few years, an indication of the scale and quantity of imports and production of clothing textiles in the UK was developed.

The first task was to decide how best to group the different types of clothing textiles. The majority of market research presented data in terms of value of sales according to high-level sector (eg men's outerwear, women's outerwear, men's underwear, women's underwear, children's clothing and infant's garments).

Some research had also been carried out ⁽¹⁾ into the amount of textiles imported into the EU by weight, according to certain high level clothing categories. These clothing categories are presented in *Annex A*.

A separate report by Mintel advised that the UK made up 18% of sales of the total EU market in clothing ⁽²⁾.

Furthermore, information was found in a report by Key Note that stated that the UK imports 90% of its clothing, with only 10% manufactured domestically ⁽³⁾.

However, no market research data was found on the split by individual textile types (wool, cotton, man-made, cellulose, etc). This would have proved useful when comparing the sales of clothing against re-use and recycling data which is recorded by textile type. Correspondence with the British Apparel and Textile Confederation (BATC) confirmed the lack of such data, stating that the sales information they keep is not split by fibre type. In fact, the same Key Note report mentioned that the products of the clothing industry are conventionally categorised as follows:

- by material – usually a broad distinction between natural fabrics (cotton, wool, etc) and leather on one side and artificial materials (nylon, acrylic and other plastics, etc) on the other;
- by process – using the two main methods for clothing production, weaving and knitting (knitting is further divided between weft and warp);
- by gender and size – usually womenswear, menswear and infantswear, with subcategories distinguishing between outerwear and underwear;
- by functional character – using the distinction between formal (suits, ladies' separates, overcoats, trousers and skirts) and casual clothing (knitwear, t-shirts and jeans);

(1) World Markets for Woven Textiles and Apparel, Textiles Intelligence Ltd

(2) Clothing Retailing in Europe – UK Retail Intelligence, Mintel

(3) Clothing and Footwear Industry Market Review, Key Note

- by seasonal function – spring and summer ranges versus autumn and winter ranges, although there is an increasing demand for year-round lines driven by the rise in popularity of casual wear such as jeans and fleece tops.

In the course of the research ERM found that all reports that contained clothing textiles data categorised this by either gender and size or functional character but only according to the value of sales. The exception to this was the Textiles Intelligence Ltd Report which provided data according to the methods of categorisation by gender and size plus categorisation by functional character by weight.

As a result, ERM presents the research using these categories in the Textiles Intelligence Ltd report, as shown in *Table 3.1*.

Table 3.1 *Clothing Textile Categories*

Category Name	Category Number
Men's & women's trousers	6
Women's blouses	7
Men's shirts	8
Men's coats	14
Women's coats	15
Men's suits	16
Men's jackets	17
Men's and women's underwear and nightwear	13, 18, 31
Anoraks	21
Women's dresses	26
Women's skirts	27
Women's suits	29
Babies' garments	68

The Category Number in *Table 3.1* refers to the standard EU categories for textiles and apparel as derived by the European Commission. These are used to categorise clothing and textile imports and exports according to set definitions. A full list of these is shown in *Annex B*. Note that the USA and Canada each have their own system of numerical categorisation (not listed in this report).

3.2 **BASELINE DATA: GARMENT WEIGHTS**

In terms of weights of clothing, the Textiles Intelligence report also includes details of standard EU factors conversion factors. The final weights used in this study are presented in *Table 3.2*.

3.2.1 **Assumptions**

Not all of the categories were covered, so garment conversion factors not provided by Textiles Intelligence Ltd have been estimated as shown in *Table 3.2*.

Table 3.2 Garment Weight/Pieces Conversion Factors

Garment type	EU Category	Pieces/kg	Source
Men's trousers	6	1.76	TIL
Women's blouses	7	5.55	TIL
Men's shirts	8	4.60	TIL
Men's coats	14	0.50	ERM / TRA
Women's coats	15	0.80	ERM / TRA
Men's suits	16	0.80	TIL
Men's jackets	17	1.43	TIL
Men's and women's underwear and nightwear	18	8.00	TIL
Anoraks	21	2.30	TIL
Women's dresses	26	3.10	TIL
Women's skirts	27	2.60	TIL
Women's suits	29	1.37	TIL
Babies' garments	68	10.00	ERM / TRA

TIL = Textiles Intelligence Ltd

ERM estimates = based on information given by Textiles Recycling Association in conversation

3.3 **BASELINE YEAR DATA**

Baseline year data starting from 1990 were taken from the report Verdict Forecasts Clothing and Footwear 2005. The data used were presented in terms of retail sales per category. These data were then applied to those taken from other Verdict reports ⁽⁴⁾ and used to plot trends in textiles sales up to 2020.

3.4 **TRENDS IN UK TEXTILE SALES**

Data on the rates of growth of textiles were not given in the Textiles Intelligence Ltd paper ⁽⁵⁾ so were taken from 'Verdict Forecasts Clothing & Footwear 2008'. As the categories used in the Verdict report are of a higher level than those used in the Textiles Intelligence Ltd paper, some assumptions have been made. All Textile Intelligence Ltd categories that fit into a Verdict grouping are given the rate of growth for that Verdict grouping, i.e. men's trousers, men's shirts, men's coats, men's suits and men's jackets are all put in the grouping "men's outerwear", which has a predicted growth rate of 12.7% from 2003 to 2008.

Table 3.3 shows that the UK clothing market is expected to grow up to 2008, with a total average increase of 15.6 % across the whole sector for the five years from 2003 to 2008. Women's outerwear sales are expected to increase by 18.6% in this five-year period, men's outerwear by 12.7%, men's underwear by 11.2%, women's underwear by 14.9% and infantswear by 13.7%.

(4) Verdict Forecasts Clothing and Footwear 2008, Verdict

(5) World Markets for Woven Textiles and Apparel, Textiles Intelligence Limited, 2003

Looking further ahead, assuming the same growth rate continues beyond 2008, the growth rate is expected to result in a total average increase across the whole sector of 60.9%, from 2008 to 2020.

According to the report from Verdict ⁽⁶⁾, factors affecting this include:

- Changes to demographics, with the population increasing in average age and fewer childbirths;
- The population becoming more affluent and willing to spend disposable income on fashion and clothing;
- Increased competition in the sector, especially at the value end of the market, leading to the lowering of prices;
- The lowering and removal of barriers to trade, allowing more imports of cheaper clothing and clothing textiles from overseas;
- Manufacturers and retailers changing their ranges at an increasing rate which leads to faster turnover of clothing by consumers;
- The increasing levels of obesity and larger average body sizes, leading to a faster turnover of clothes and more clothing materials being used to manufacture them.

Conversely, any downturn in the economy over the coming years could have a negative impact on growth in sales of clothing.

3.4.1

Assumptions

Some assumptions were made in producing the data shown in the following Tables, which are listed below:

- the rate of growth for the five year period from 2003 to 2008 was taken from “Verdict Forecasts Clothing & Footwear 2008” and applied to the categories as shown in *Table 3.3*;
- by way of comparison, the rate of growth for the five year period from 1998 to 2003 is shown in *Table 3.4* ;
- ERM has assumed that the ratio of sales of women’s trousers to men’s trousers is 1:1 ;
- ERM has assumed that the ratio of sales of women’s underwear and nightwear to men’s underwear and nightwear is 2:1 ;
- ERM has assumed that the ratio of sales of women’s anoraks to men’s anoraks is 1:1 ;
- The UK makes up 18% of the total EU clothing market ⁽⁷⁾. ERM has assumed that this proportion is constant through the period analysed and the same for each category of clothing; and
- Forecasts in the volume of clothes sold have been calculated using the average annual increase in tonnes over the period 1998 to 2008.

(6) Verdict Forecasts Clothing and Footwear 2008, Verdict Analysis

(7) Clothing Retailing in Europe – UK Retail Intelligence, Mintel

Table 3.3 Forecast Rate of Growth of Sales, 2003-2008

Sector	EU Category	Growth 2003-08	Source
Women's outerwear		18.6%	Verdict
Women's underwear		14.9%	Verdict
Men's outerwear		12.7%	Verdict
Men's underwear		11.2%	Verdict
Infantswear		12.9%	Verdict
Average (for sector)		15.6%	Verdict
Garment type	EU Category	Growth 2003-08	Source
Men's trousers	6	12.7%	Verdict
Women's blouses	7	18.6%	Verdict
Men's shirts	8	12.7%	Verdict
Men's coats	14	12.7%	Verdict
Women's coats	15	18.6%	Verdict
Men's suits	16	12.7%	Verdict
Men's jackets	17	12.7%	Verdict
Men's underwear and nightwear	18	11.2%	Verdict
Women's underwear and nightwear	18	14.9%	Verdict
Men's anoraks	21	12.7%	Verdict
Women's anoraks	21	18.6%	Verdict
Women's dresses	26	18.6%	Verdict
Women's skirts	27	18.6%	Verdict
Women's suits	29	18.6%	Verdict
Babies' garments	68	12.9%	Verdict

Verdict data from "Verdict Forecasts Clothing and Footwear 2008"

The data collected show the amount of clothing sold in the UK is set to rise from 216,900t in 2003 to 250,900t by 2008 ⁽⁸⁾. The import ratios have been high in both clothing and footwear for many years, but UK manufacturing is withering rapidly, with output in some sectors having halved over five years. Imports now account for over 90% of the UK market as a whole. ⁽⁹⁾

Table 3.4 Rate of Growth of Sales, 1998-2003

Sector	EU Category	Growth 1998-2003	Source
Women's outerwear		18.5%	Verdict
Women's underwear		28.1%	Verdict
Men's outerwear		5.7%	Verdict
Men's underwear		5.5%	Verdict
Infantswear		12.9%	Verdict
Average (for sector)		14.3%	Verdict
Garment type	EU Category	Growth 1998-2003	Source
Men's trousers	6	5.70%	Verdict
Women's blouses	7	18.50%	Verdict
Men's shirts	8	5.70%	Verdict
Men's coats	14	5.70%	Verdict
Women's coats	15	18.50%	Verdict
Men's suits	16	5.70%	Verdict

(8) Refer to table in Annex A

(9) Clothing & Footwear Industry, Key Note Ltd, 2003

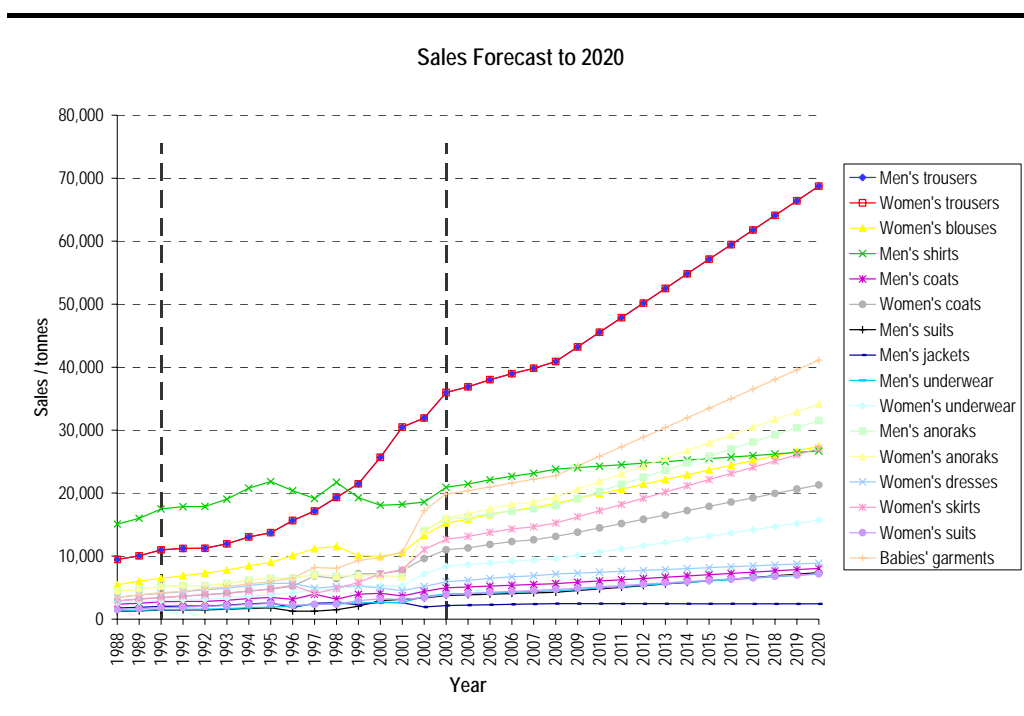
Sector	EU Category	Growth 1998-2003	Source
Men's jackets	17	5.70%	Verdict
Men's underwear and nightwear	18	5.50%	Verdict
Women's underwear and nightwear	18	28.10%	Verdict
Men's anoraks	21	5.70%	Verdict
Women's anoraks	21	18.50%	Verdict
Women's dresses	26	18.50%	Verdict
Women's skirts	27	18.50%	Verdict
Women's suits	29	18.50%	Verdict
Babies' garments	68	12.90%	Verdict

Verdict data from "Verdict Forecasts Clothing and Footwear 2008"

The amount of clothing sold could rise to 403,600 t per annum by 2020. It is likely that the amount of clothing imported will continue to rise, especially in the aftermath of the removal of import quotas under GATT.

Figure 3.1 below shows the historic and predicted sales of clothing from 1988 to 2020 by category, based on the assumed growth rates in sales.

Figure 3.1 Sales of clothing categories from 1988 to 2020



Note that the lines for men's trousers and women's trousers overlap. The area between the vertical dotted lines shows the period for which accurate data was available, i.e. 1990 to 2003. Data pre-1990 was estimated using an assumed percentage. Data from 2003 to 2008 was plotted using predictions from the Verdict report. Data post-2008 was estimated by ERM using the average growth over the period 2003-2008.

The peaks and troughs seen for some of the garment categories such as Men's shirts are due to sales data showing increases and decreases for those categories in those years. This is talked about in more detail in *Section 3.6*.

3.5 ESTIMATING WASTE GARMENT ARISING

The data in *Table 3.5* is based on ERM estimates using the fact that the estimated average lifetime for a garment or item of apparel is 3 years, according to the website Textiles Online ⁽¹⁰⁾. These lifetimes are for the first-owner only. An item of clothing might be replaced for a number of different reasons, such as it wearing out, changes in fashion, it is no longer the correct size, or other consumer behaviour. Much of this sort of clothing will potentially have a second life as it will still be useable.

Table 3.5 *Lifetime of Clothing Categories*

Garment type	Est. Min. Lifetime (yrs)	Average lifetime (yrs)	Est. Max. Lifetime (yrs)
Men's trousers	1.50	3.00	5.00
Women's trousers	1.50	3.00	6.00
Women's blouses	1.00	3.00	4.50
Men's shirts	1.00	2.00	4.50
Men's coats	1.50	4.00	7.00
Women's coats	1.50	4.00	7.00
Men's suits	1.00	3.00	7.00
Men's jackets	1.50	4.00	7.00
Men's underwear	0.50	1.50	4.00
Women's underwear	0.50	1.50	4.00
Men's anoraks	1.50	4.00	7.00
Women's anoraks	1.50	4.00	7.00
Women's dresses	1.00	2.00	4.00
Women's skirts	1.00	3.00	5.00
Women's suits	1.00	3.00	6.00
Babies' garments	0.25	0.50	1.50

It is possible that the lifetimes for women's garments will be different to that for men's, due to factors such as frequently changing fashion trends, percentage of income spent on more clothes and the decreasing prices of new garments. This may be an area in which future study would be useful.

When looking at the differences in lifetimes from one type of clothing to another, it would be reasonable to assume that babies' garments will be used for less time before being thrown away and/or passed to a new owner by the householder, whereas a woollen overcoat would be expected to last for longer. No data could be found on the minimum, average and maximum lifetimes of garments and apparel by individual category or functional category.

Anecdotal evidence from the Salvation Army indicates that the quality of clothing textiles that they collect is decreasing year-on-year. In their opinion

(10) Textiles Online, education for sustainability, www.e4s.org.uk/textilesonline/index.htm

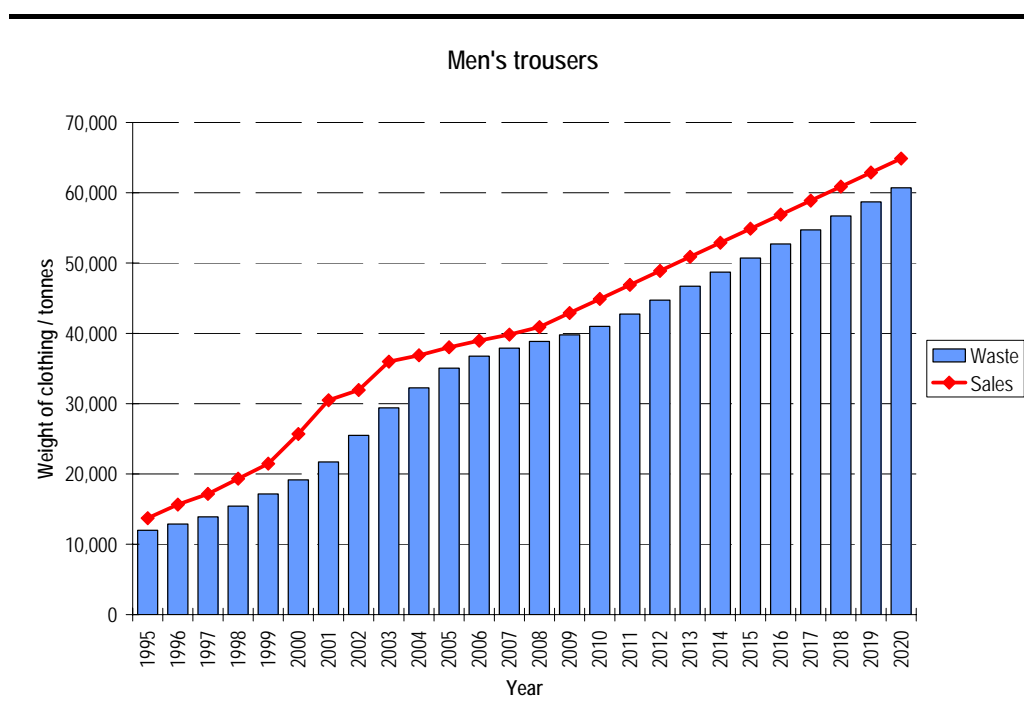
this is due to lower quality fabrics and manufacturing techniques becoming more prevalent in new clothes sold in the UK as consumers demand lower prices and manufacturers and retailers react to meet this whilst also looking to increase profitability. However, no studies have been carried out into assessing the lifetime or quality of clothing that the textiles recycling companies handle. This would be another area worth further investigation in future studies.

Looking at the issue of recyclability, the Salvation Army also mentioned the issue of having to deal with more and more man-made fabrics, composites and treated fabrics, such as those made breathable, waterproof or just plasticized for effect such as prints on t-shirts and sweatshirts. This is looked at in more depth in *Section 5*.

3.6 SALES DATA AND EXPECTED TIMESCALES FOR DISCARDING WASTE GARMENTS

By taking the baseline sales data for each category and applying both the sales forecast data and the average lifetime data we can plot the sales and waste arisings trends up to 2020. The following graphs show this for each clothing category.

Figure 3.2 Forecast of sales and waste arisings of men's trousers from 1995 to 2020



Note that the waste arisings shown on the graphs are actually the amount of clothing textiles predicted to reach the end of their life for first use. This means that some of them will be sent for reuse, some for recycling and some will be discarded with domestic waste. Evidence and opinions on how this is split are discussed in *Section 4*.

Figure 3.3 Forecast of sales and waste arisings of women's trousers from 1995 to 2020

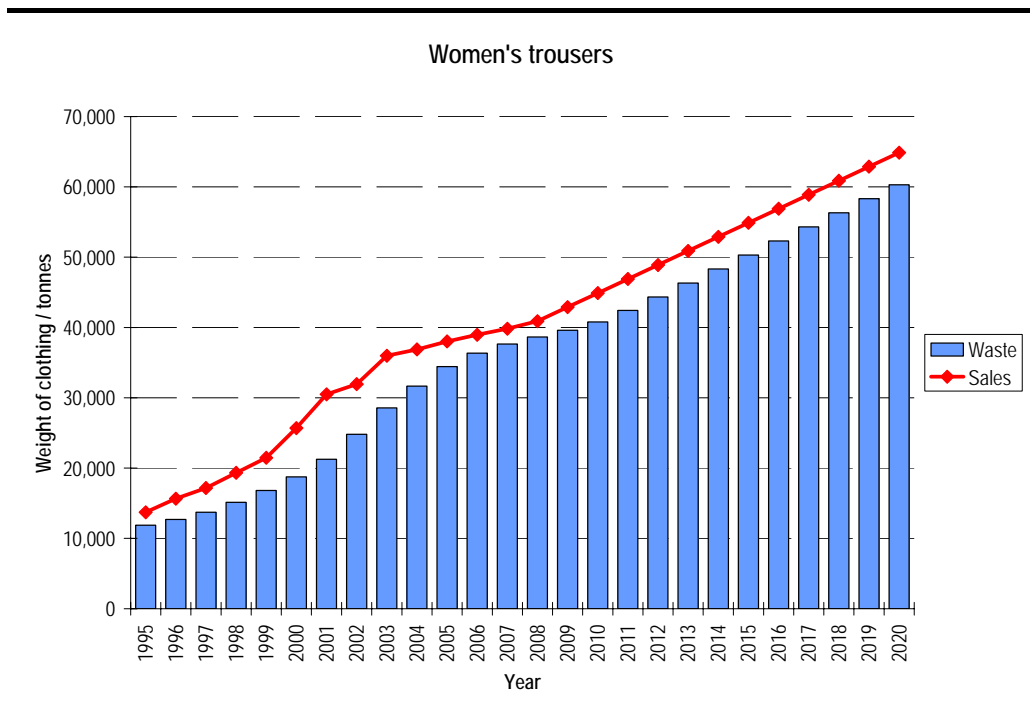


Figure 3.4 Forecast of sales and waste arisings of women's blouses from 1995 to 2020

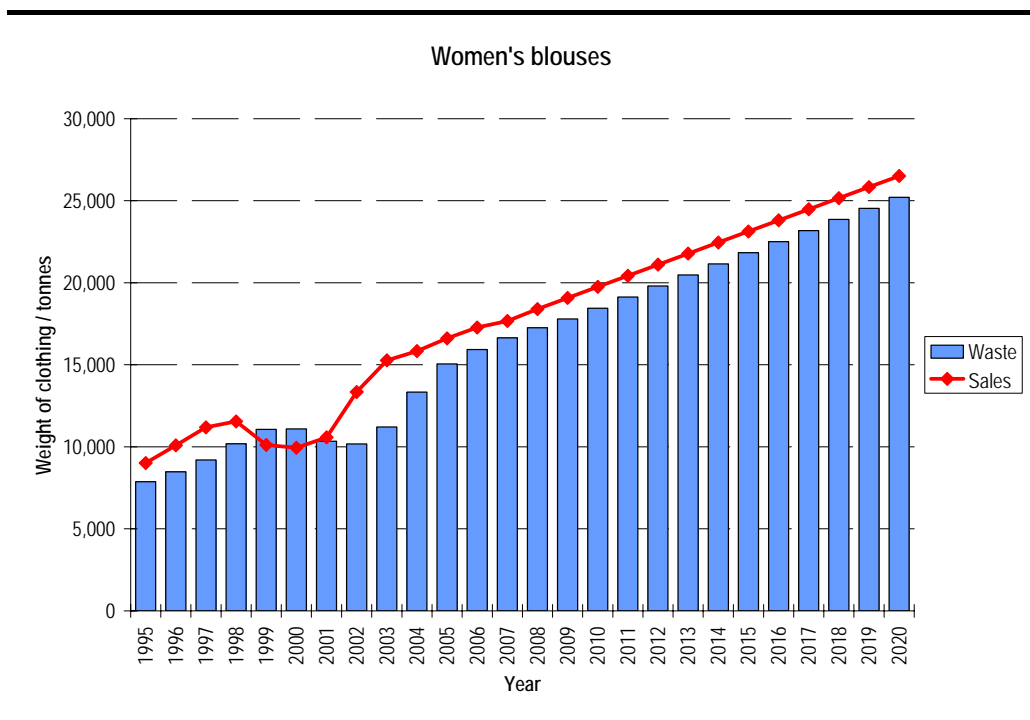


Figure 3.5 Forecast of sales and waste arisings of men's shirts from 1995 to 2020

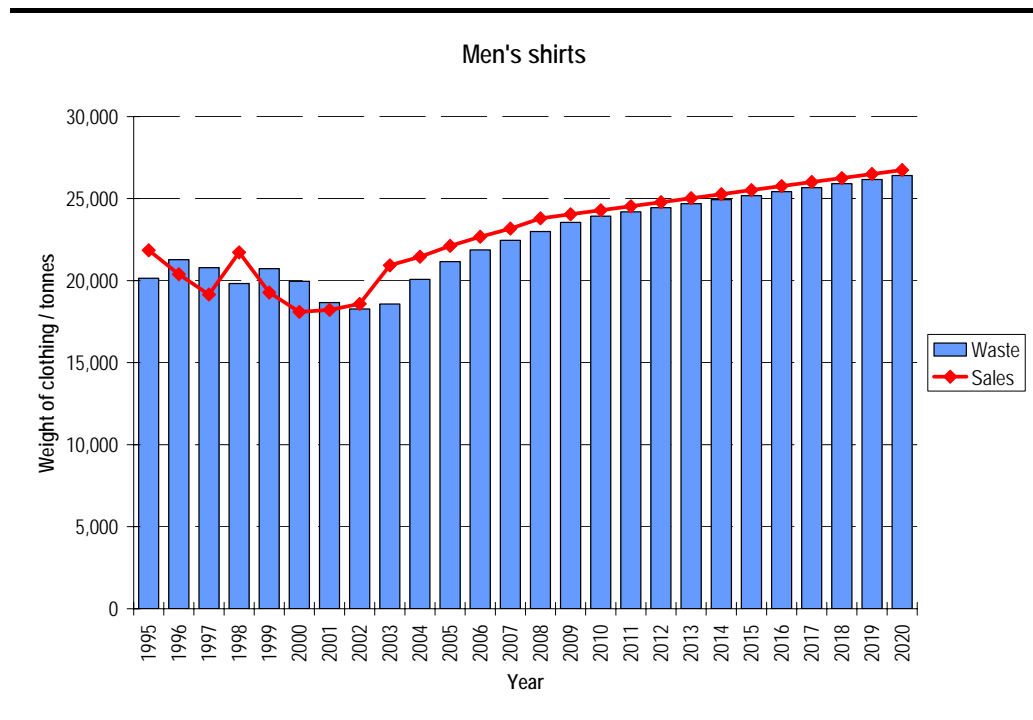


Figure 3.6 Forecast of sales and waste arisings of men's coats from 1995 to 2020

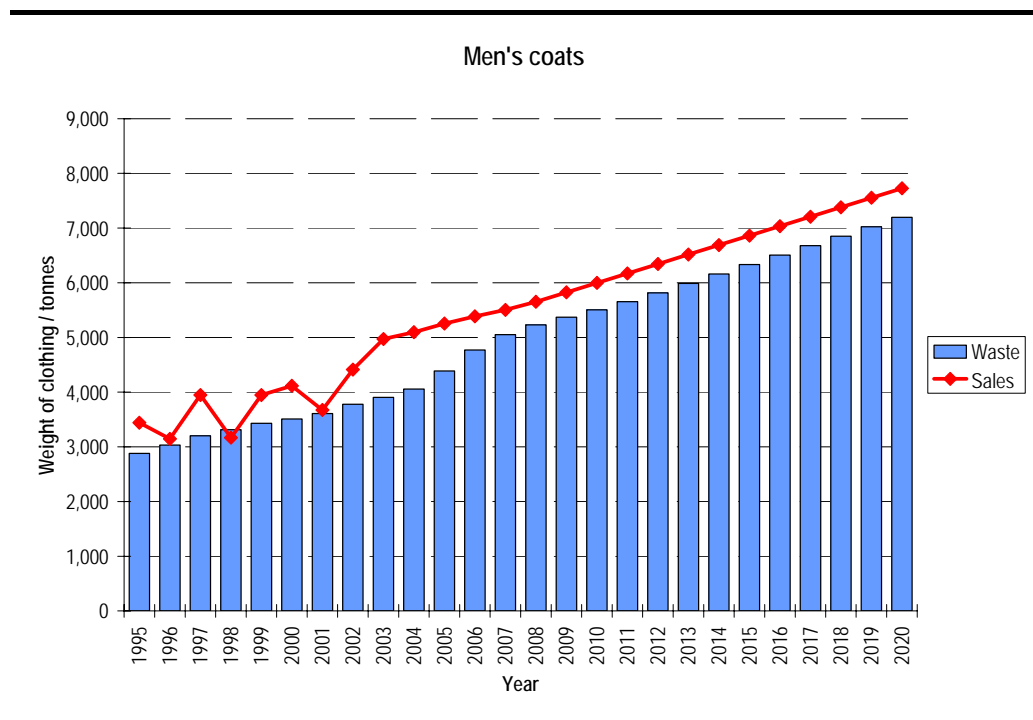


Figure 3.7 Forecast of sales and waste arisings of women's coats from 1995 to 2020

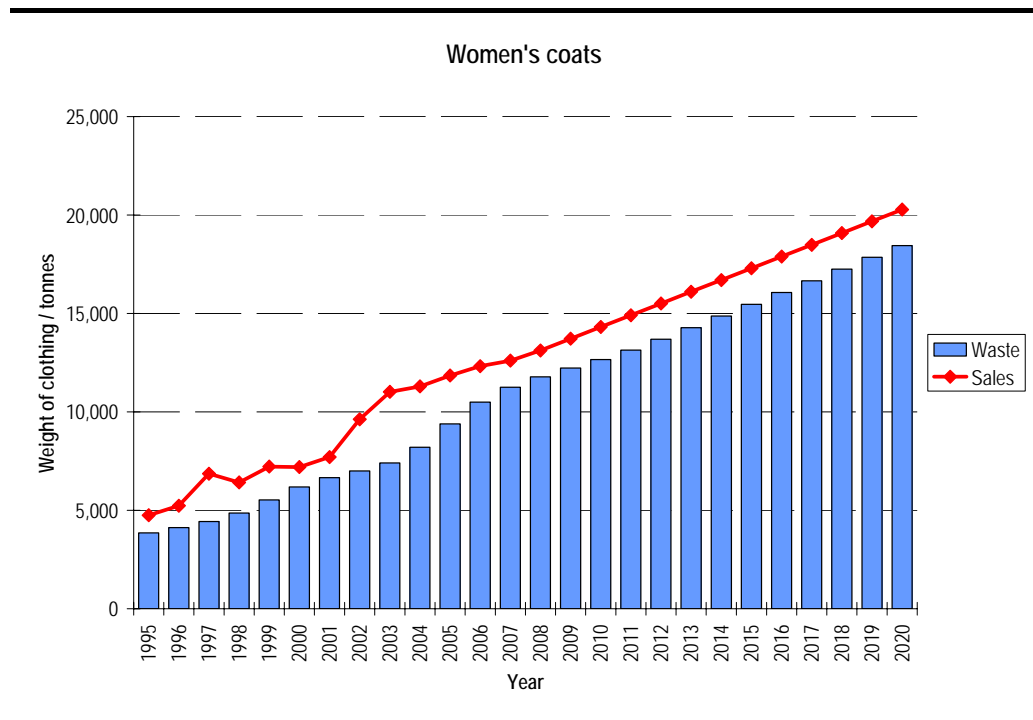


Figure 3.8 Forecast of sales and waste arisings of men's suits from 1995 to 2020

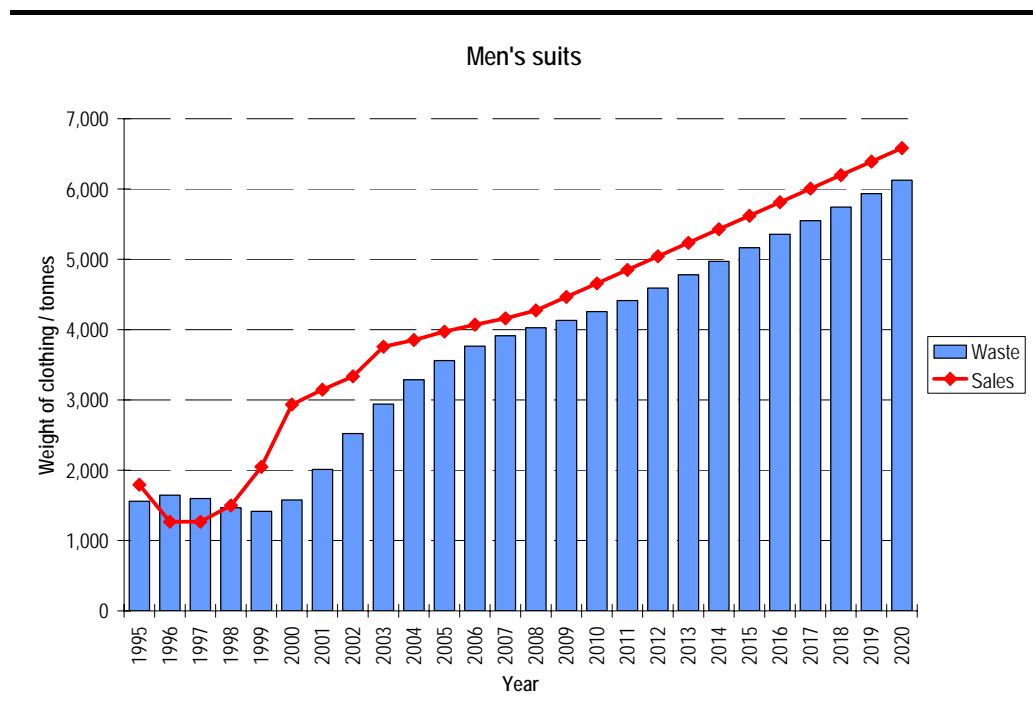


Figure 3.9 Forecast of sales and waste arisings of men's jackets from 1995 to 2020

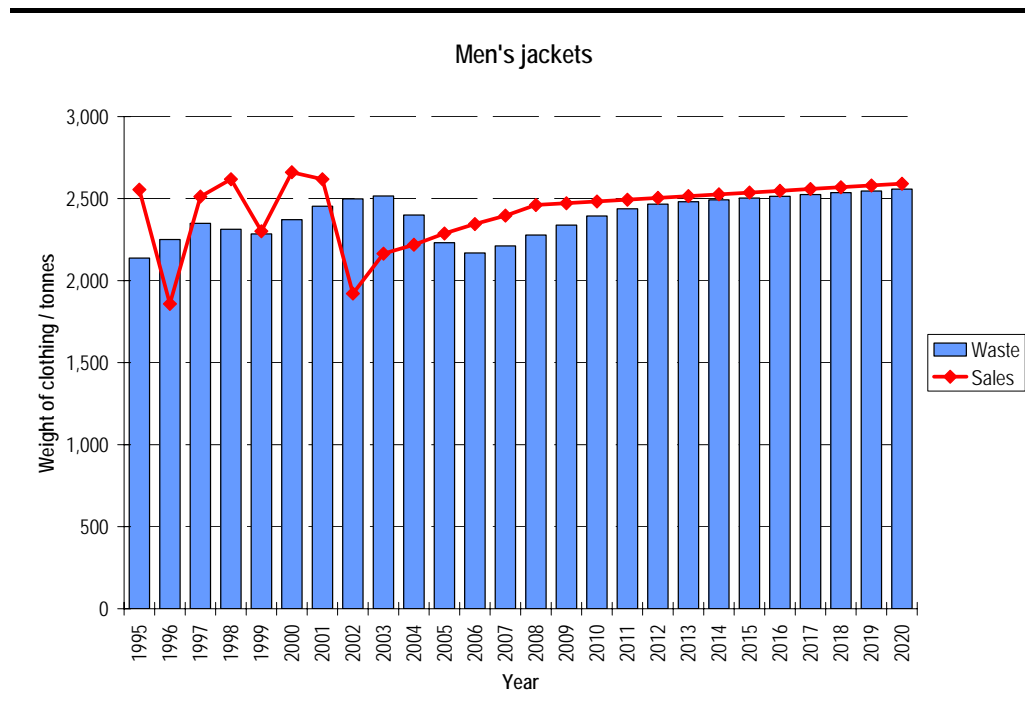


Figure 3.10 Forecast of sales and waste arisings of men's underwear from 1995 to 2020

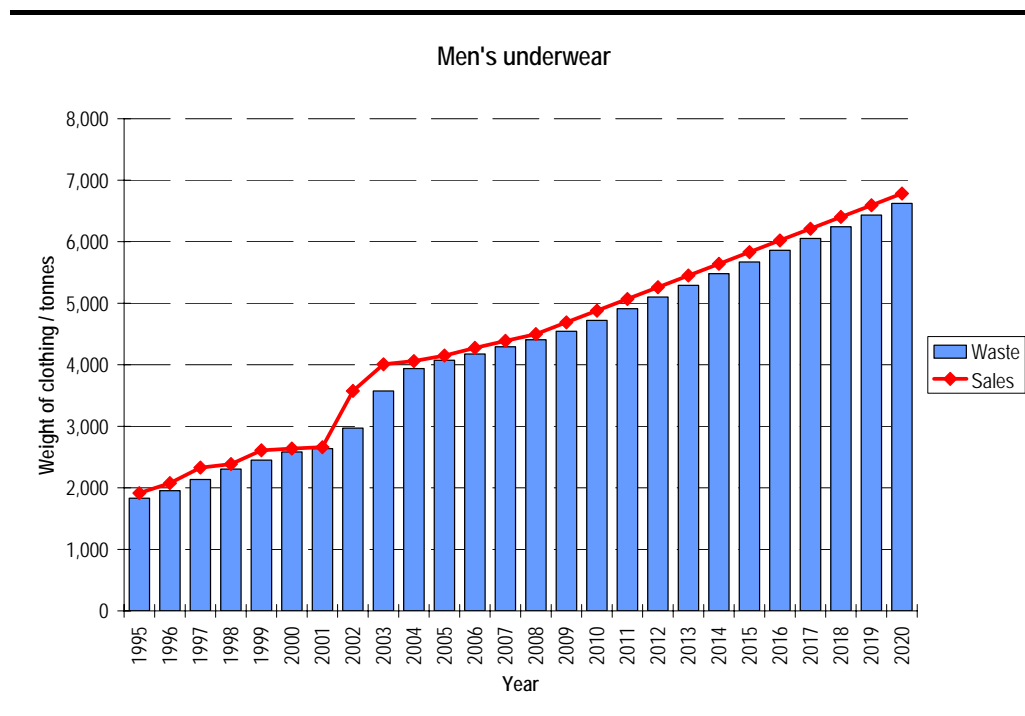


Figure 3.11 Forecast of sales and waste arisings of women's underwear from 1995 to 2020

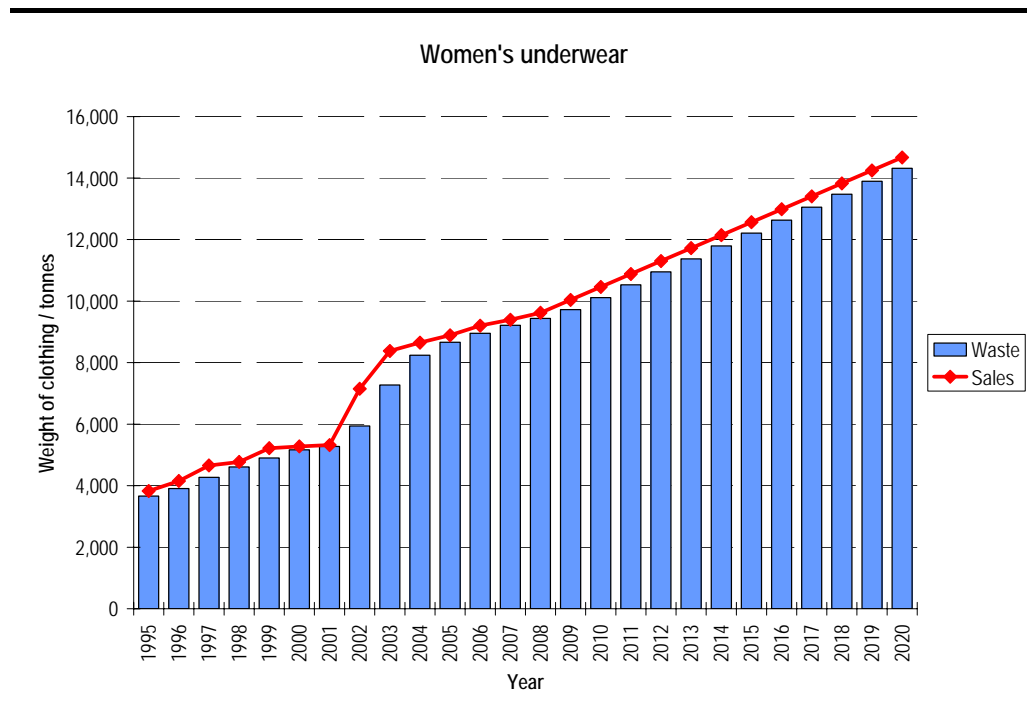


Figure 3.12 Forecast of sales and waste arisings of men's anoraks from 1995 to 2020

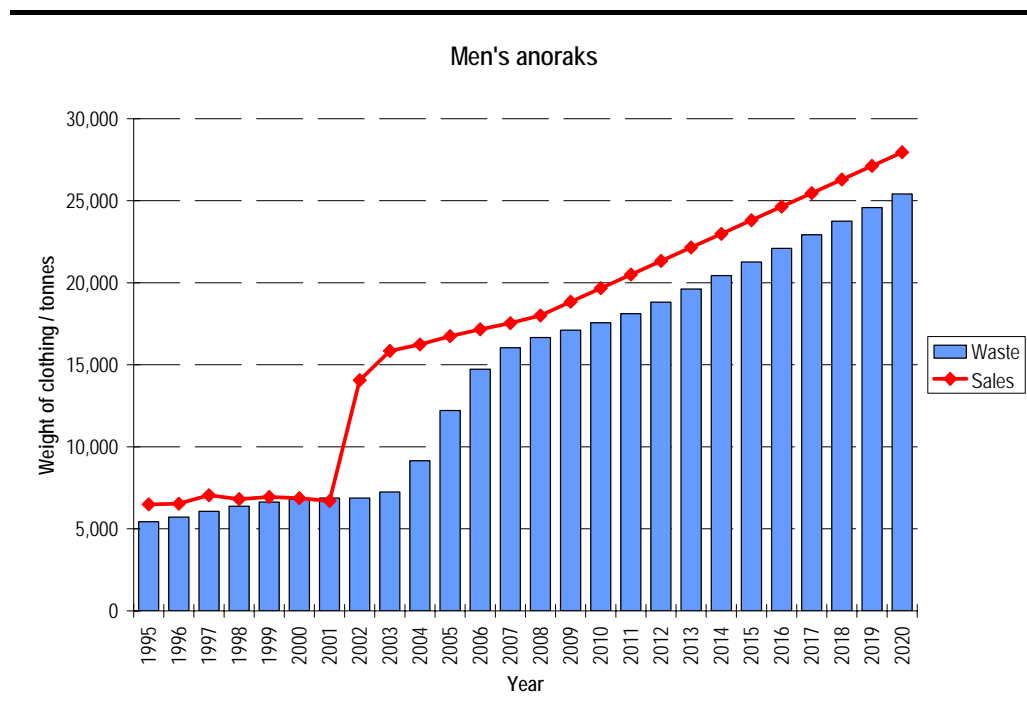


Figure 3.13 Forecast of sales and waste arisings of women's anoraks from 1995 to 2020

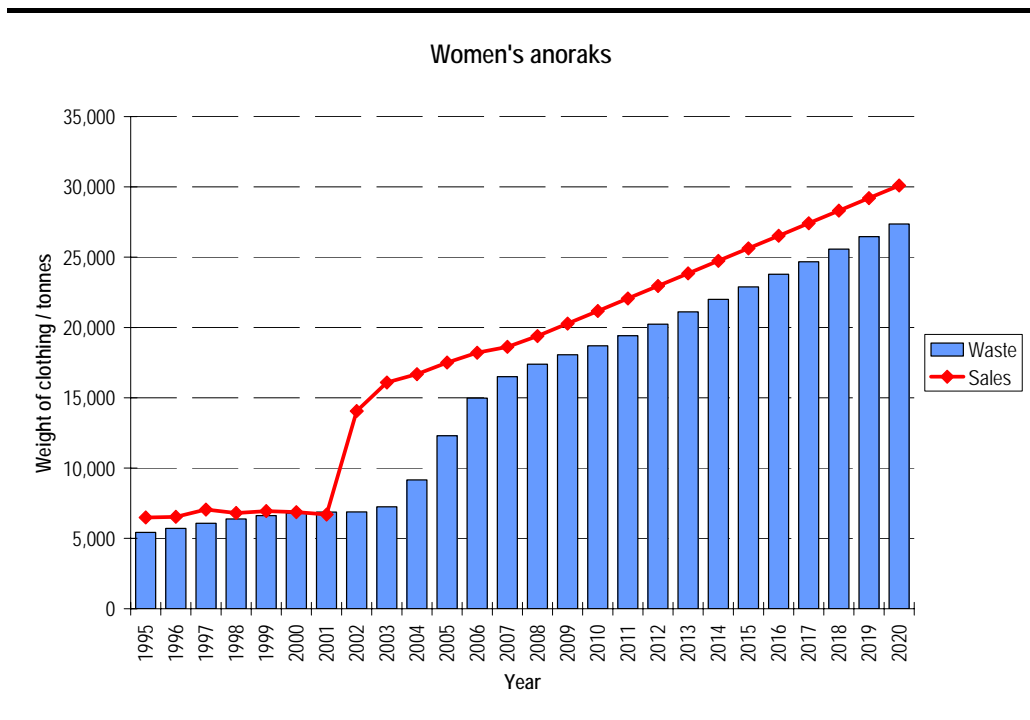


Figure 3.14 Forecast of sales and waste arisings of women's dresses from 1995 to 2020

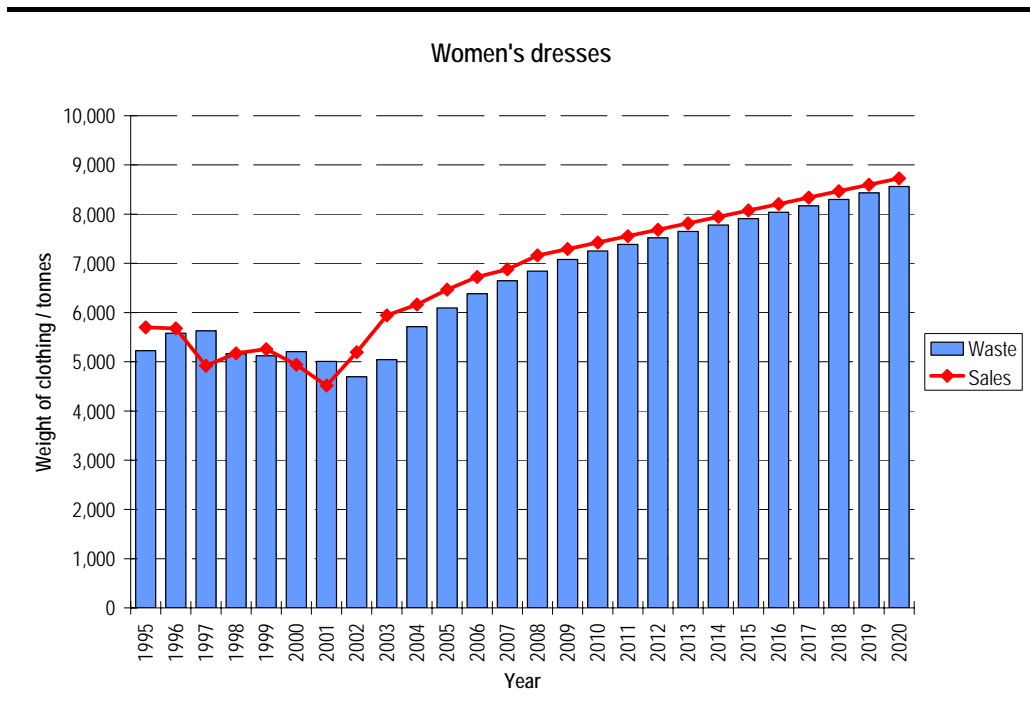


Figure 3.15 Forecast of sales and waste arisings of women's skirts from 1995 to 2020

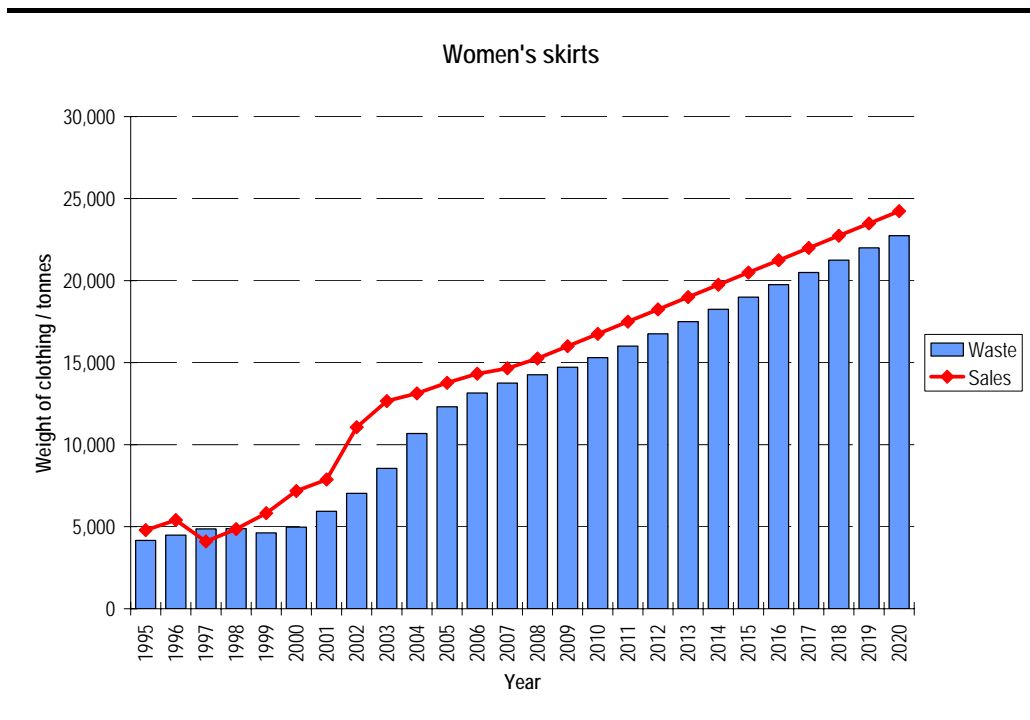


Figure 3.16 Forecast of sales and waste arisings of women's suits from 1995 to 2020

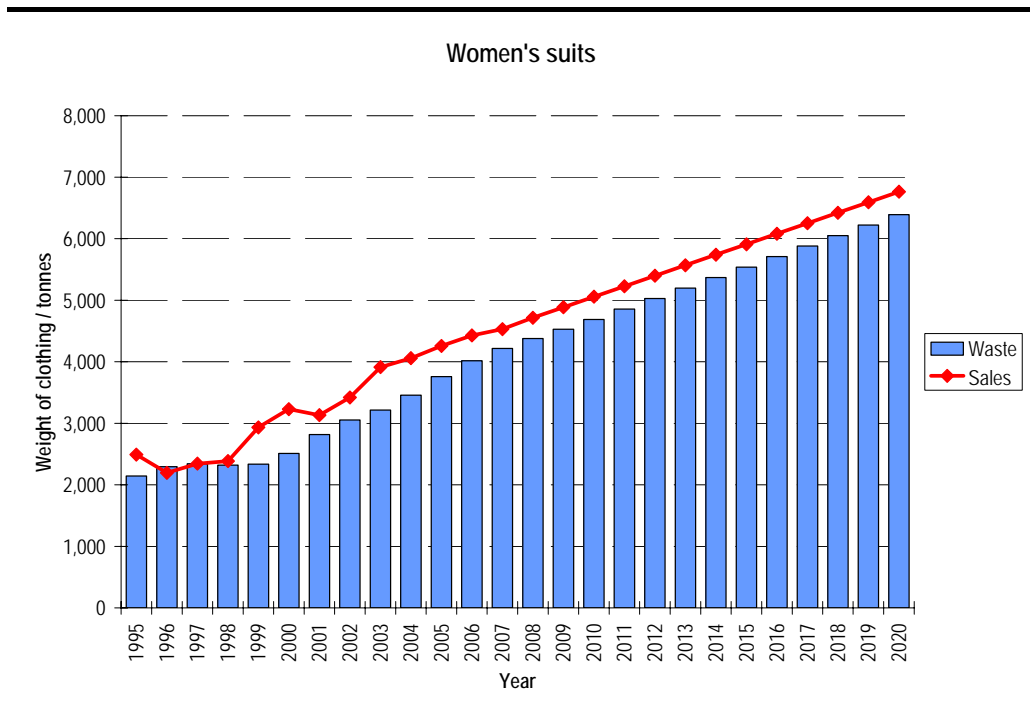
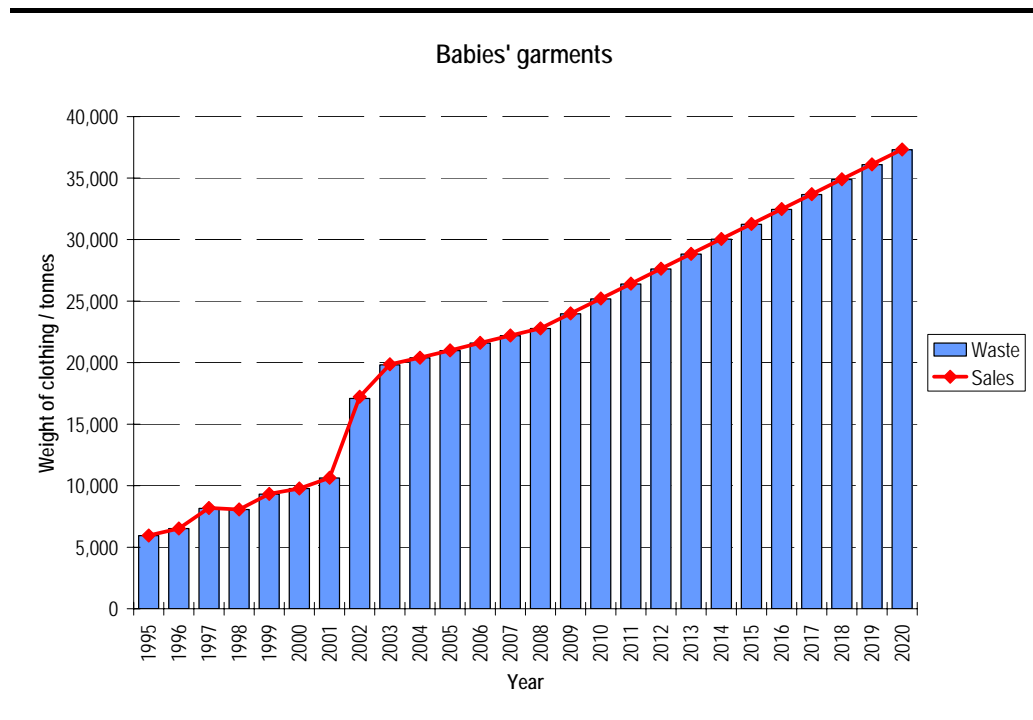


Figure 3.17 Forecast of sales and waste arisings of babies' garments from 1995 to 2020



3.6.1

Comments

Some of the charts, such as Figure 3.5, Figure 3.6 and Figure 3.9 show a series of peak and troughs. These appear to be caused by increases and decreases in sales during the period 1995 to 2001. The underlying factors are unknown but could be due to economic reasons, erratic weather conditions or other unknowns. This would be an area worth looking into in order to help predict future waste arisings more accurately.

4.1 TEXTILES IN THE WASTE STREAM

The DTI study ⁽¹¹⁾ on textiles published in 2002 stated that the amount of textiles estimated to be in the household waste stream is about 3-4%.

A study carried out by WRAP and published in December 2002 ⁽¹²⁾ calculated that the total amount of textiles in the household waste stream is 3.2% by weight (based on a compositional analysis in England in 2000-01), which is equivalent to about 589 000 tonnes or 28kg per household per year. The same study calculated the amount of waste textiles at civic amenity sites to be 2% by weight, equivalent to 111 000 tonnes or 5kg per household per year (based on total CA residuals plus recycling). This gives an overall Municipal Waste total of 5.2% (or about 700 000 t pa).

By contrast, Waste Strategy 2000 ⁽¹³⁾ estimated the amount of waste textiles in household refuse to be 2% by weight.

A number of leading companies contacted in the course of this study (the Salvation Army, the Textile Recycling Association and TRAIID - Textile Recovery for Aid and International Development) all involved in collecting, sorting, reselling and recycling post-consumer textiles broadly agreed with the DTI estimate from 3 years ago, although the Salvation Army thought it could be as high as 6%, possibly 7%.

Defra's website ⁽¹⁴⁾ states that the amount of textiles waste collected for recycling and composting in England and Wales was 130 000 tonnes in 2001-02 and 155 000 tonnes in 2002-03.

For Commercial and Industrial (C&I) waste, a study by the Environment Agency ⁽¹⁵⁾ calculated that textiles comprised about 0.73% of the total across England & Wales. In contrast, a report commissioned by the Greater London Authority in 2004 ⁽¹⁶⁾ calculated that the textiles component of commercial waste amounted to: 2% of retail waste; 0.6% of office waste; and 0.6% of hospitality waste.

(11) Textile Recycling Factsheet, Department of Trade and Industry, 2002

(12) "Analysis of household waste composition and factors driving waste increases", Dr Julian Parfitt, Principal Analyst, WRAP, December 2002

(13) www.defra.gov.uk/environment/waste/strategy/cm4693/pdf/wastv2_4.pdf, Waste Strategy 2000, Annex C.

(14) e-Digest of Environmental Statistics, Published August 2004, www.defra.gov.uk

(15) Waste Statistics for England and Wales 1998-99, Environment Agency

(16) Greater London Authority Waste Composition Scoping Study, GLA and AEA Technology, 2004

Table 4.1 *Estimated quantity of textiles in waste streams*

	Municipal Solid Waste	Commercial and Industrial	Construction and Demolition
Percentage	5.20%	0.73%	Unknown
Tonnage	700 000	547	unknown

Source: Municipal Waste - "Analysis of household waste composition and factors driving waste increases", Dr Julian Parfitt, Principal Analyst, WRAP, December 2002
 C&I Waste - Waste Statistics for England and Wales 1998-99, Environment Agency

In terms of Construction and Demolition (C&D) waste, the Environment Agency conducted their Strategic Waste Management Assessments (SWMA) which looked at the quantity and composition of waste streams in England and Wales. They were carried out in 1998-99 and are currently being updated by way of the 'National Waste Production Survey.'

Data in Table CD1 from the SWMA ⁽¹⁷⁾ looking at Construction and Demolition waste does not show waste textiles as a specified fraction. Instead there are a few of the generic fractions listed that may or may not contain waste textiles, namely 630,000 tonnes of "other inert materials", 7,319,000 tonnes of "Mixed/unspecified C&D Waste/soil" and 2,569,000 tonnes of "Mixed and/or contaminated C&D Waste." There is no further indication as to how much of this is textiles.

Furthermore, a 2004 report by the Building Research Establishment ⁽¹⁸⁾ conducted in Northwest England indicates no waste clothing textiles are found in this waste stream.

Given that it is feasible that some textiles might find their way into C&D waste, further studies could be undertaken to assess the potential arisings of waste textiles in this waste stream, although such arisings may be insignificant in comparison to other sources of clothing textile waste.

The most recent estimate from the Salvation Army is that the amount of textiles discarded in total in the UK is in the region of 850,000 tonnes per annum, although the TRA advised it may be as high as 1 million tonnes per annum. The general consensus is that the volume is increasing, especially as clothing becomes both more affordable and less durable.

The DTI study from 2002 estimated that about 43% of all recovered post-consumer textiles are passed on as second-hand clothing (either in the UK or abroad). A further 22% is sent as filling materials, with 12% being used as wiping cloths. Out of the remainder, 9% is sold as second-hand shoes, 7% is reclaimed fibre and 7% is rejected as waste and sent to landfill.

(17) www.environment-agency.gov.uk/subjects/waste/1031954/315439/169145/176602/341920/?lang=_e, table CD1 "Construction, demolition and excavation waste production 1999 (tonnes)"

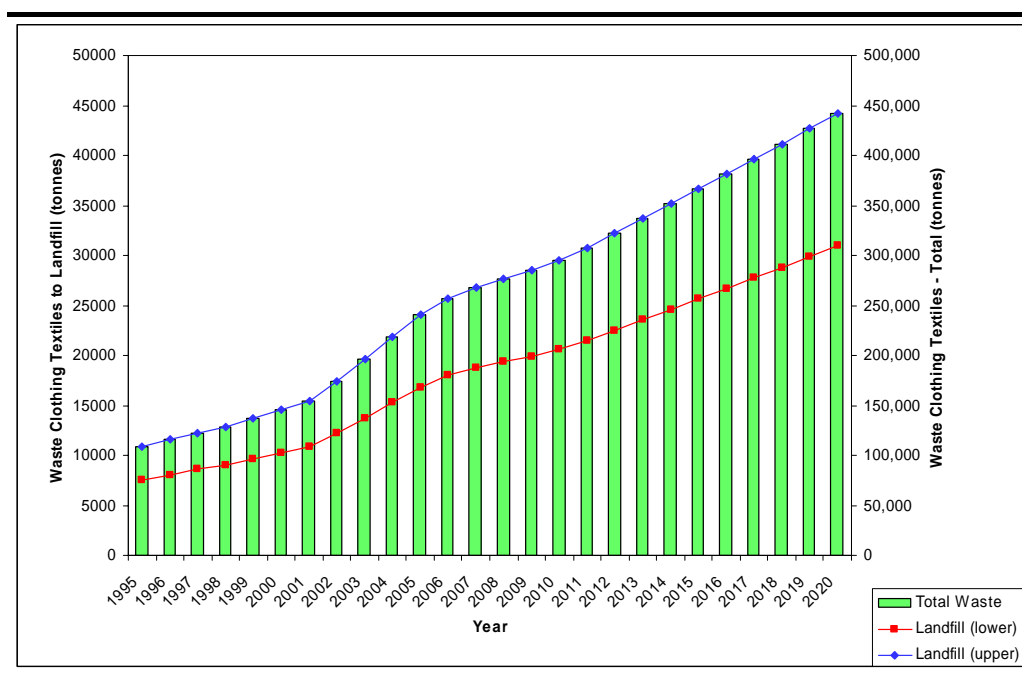
(18) Eco-Region NW England - Integrated Life Cycle of Material Flows and Mass Balance of Construction Resources, Building Research Establishment and Biffa Environment Fund, 2004

An ongoing re-assessment by the Salvation Army of this data based on recent experience led to them estimating that now about 60% is passed on as second-hand clothing, about 30% is recycled into other forms of textiles, such as filling materials and wiping cloths, and about 10% is sent to landfill as waste. However, it was felt that the declining quality of the textiles meant that the proportion that could be re-used in the second-hand market is falling and therefore the amount that is disposed of as waste will increase.

Applying these estimates to the total clothing textile waste arisings estimated in this study, the projected tonnage of clothing textiles disposed of as waste into landfill is shown in *Figure 4.1*.

Based on DTI and Salvation Army estimates, the mass of waste clothing textiles going to landfill is presently between about 14 000 tonnes and 21 000 tonnes (for 2004).

Figure 4.1 *Estimated Waste Clothing Textiles to Landfill*



Note that the data do not take account of stakeholder remarks that the fraction of end-of-life product going to landfill rather than elsewhere may be on the increase due to garment quality declining. It may be that declining garment quality will lead not only to a decrease in re-use but also an increase in recycling into other forms of textiles, with little or no increase in the proportion ending up as waste and going to landfill.

Furthermore, the estimates of total arisings given by stakeholders include categories of textiles not studied in this report, such as shoes and household fabrics (curtains, bed and dining linen, etc).

There are three ways in which clothing textiles are collected for re-use and recycling:

- bring banks – these are similar to recycling banks for other household waste materials such as paper. They are located in recycling centres, civic amenity sites and in shopping centre car parks. Bring banks tend to be the favoured option for local authorities that collect textiles for reuse and recycling. Many banks carry the name of a charity which receives a sum of money for each unit weight of clothing the bank generates. By having a tie-in with a charity, the bank operator is able to make the recycling of clothing textiles a positive action in the eyes of the householder. Also, the charity is able to reinforce its brand in the minds of householders and other potential donors;
- charity shops – these are the main public-facing locations for charities around the UK, with most high streets covered by at least one shop. They enable the public to pass on easily unwanted clothes for resale or donation overseas. Furthermore, the charities get a highly visible presence which generates income from sales of clothes (plus other items). The shops also act as a sorting facility to allow used clothing to be graded; and
- doorstep collections - these tend to happen once or twice a year when empty plastic sacks are given free to householders to enable them to clear out old clothing (and other donations) to pass on to charity.

The DTI study estimated there were 6000 textiles recycling (or “bring”) banks in the UK supplemented by about 7100 charity shops. The Textile Recycling Association (TRA) and other leading collectors and reprocessors now estimate the number of banks to be in the region of 7000 including those on CA sites. It is thought that the number of charity shops has increased to about 7500 nationwide.

At the time of the DTI study, the average bank was calculated to collect 5 tonnes of textiles per year, with 25 tonnes sold per charity shop per year. Since then some increases in the amount collected have been seen with the Salvation Army now estimating that the amount coming through textile banks is as high as 9 or 10 tonnes per bank per year, although according to the Textile Recycling Association an average figure would be about 6.5 tonnes per bank per year. One charity that wished to remain anonymous estimated the year-on-year increase in the volume collected to be in the order of 10%.

However, the volume of textiles coming through charity shops appears to be static; estimates currently range from 25 tonnes to 30 tonnes per shop per year. One increasing problem the industry has come across is that of rogue collectors and traders who claim, for example, to be collecting on behalf of charities but are actually operating on an unlicensed basis. One major collector and reprocessor that wished to stay anonymous also believed that the public need to be given easier routes to collection, perhaps coupled with some form of Producer Responsibility legislation for textiles to encourage the

development of such systems and to regulate the collection process more closely.

4.3 USES FOR POST-CONSUMER TEXTILES

Once sold on to a textile mill, the fabrics are graded according to type and colour. A colour range of 30-40 different shades can be achieved and this removes the need for re-dyeing saving energy, water and raw materials. Initially the material is shredded back to form the original fibres called 'shoddy', these are then cleaned and carded, blending with new fibres and can then be spun into yarn ready for weaving or knitting.

Anecdotal evidence from a number of larger collectors wishing to remain anonymous indicates there is a belief that some smaller, local operators have started to "cherry-pick" the best materials by carefully targeting households, based on the perceived affluency of the owners. By collecting more post-consumer textiles from such sources, the quality of textiles being recovered would be higher and hence more would be viable for sale as second-hand clothing. Such actions might skew data that attempted to show the amount that is recycled versus that which is disposed of as waste.

Some people in the industry said they felt that the estimate in the 2002 DTI study of 25% of all post-consumer textiles being recycled was too high. However, based on today's market the figure of 25% is deemed to be an accurate representation by both the Textile Recycling Association and the Salvation Army.

The Textile Recycling Association also advised it is currently performing a study into the import and export of new and used clothing textiles in the UK. The study is expected to conclude in month with the full results possibly being made available on the TRA website. The work would provide a useful update to this existing study.

4.4 TEXTILES RECYCLING OVERSEAS

In the process of reviewing the interim report it was suggested that a brief section on textiles recycling overseas would provide a useful comparison with the data discussed earlier in this document. As such, information was found on the situation in the USA, in Germany and across the EU as a whole.

4.4.1 United States of America

According to the US Environmental Protection Agency (EPA) ⁽¹⁹⁾, in the USA:

(19) United States Environmental Protection Agency website, Textiles in MSW, <http://www.epa.gov/epaoswer/non-hw/muncpl/textile.htm>

- An estimated 9.625 million tonnes (10.6 million tons) of textiles were generated in 2003, or 4 percent of total municipal solid waste (MSW) generation.
- The textile recycling industry prevents 1.135 million tonnes (2.5 billion pounds) per annum of post consumer textile product waste from entering the solid waste stream, according to the Council for Textile Recycling.
- This volume of post consumer textile waste represents 4.54kg (10 pounds) for every person in the United States.
- Approximately 227,000 tonnes (500 million pounds) of textiles collected are used by the collecting agency, with the balance sold to textile recyclers, including used clothing dealers and exporters, wiping rag graders, and fibre recyclers.
- Most textile recycling firms are small, family-owned businesses with fewer than 500 employees. The majority employ between 35 and 50 workers, many of whom are semi-skilled or marginally employable workers.

4.4.2 *European Union*

According to European Commission research ⁽²⁰⁾, across the EU as a whole about 5.8 million tonnes of used textiles are thrown away each year. Of this, 1.5 million tonnes (about 25%) is re-used or recycled by charities and industry. The rest goes for disposal by incineration or landfill.

4.4.3 *Germany*

According to a leading German textiles recycler, Erdtex, about 700,000 tonnes of used clothing arises in Germany per annum ⁽²¹⁾. In terms of collection points in Germany, there are about 20,000 recycling banks for textiles ⁽²²⁾. Of the 700,000 tonnes that is collected, about 2% of the clothing is sold in German shops as second-hand apparel and about 48% is exported for resale, mainly to developing countries and Eastern Europe ⁽²³⁾. The rest is recycled or disposed.

In all three examples above, textiles are defined as being household textiles excluding carpets, ie clothing, curtains, bedding, towels, etc.

4.5 *SUMMARY & CONCLUSIONS*

In summary, the research carried out shows that by 2020:

- the arisings of post-consumer clothing textiles waste is estimated to rise to 440Kt from an estimated 243Kt in 2005; and
- by 2020 the percentage of clothing textiles suitable for reuse could fall from its current estimated level of 2% of the clothing textiles waste stream as a result of the decline in quality of fibre used to make new clothes.

(20)<http://europa.eu.int/comm/research/growth/gcc/projects/recycling-textiles.html>

(21) http://www.erdtex.de/eng/orga01_eng.htm

(22) <http://www.soex.de/english/efiba.html>

(23) <http://www.fachverband-textil-recycling.de>

One of the main objectives of this report was to develop time series projections regarding the end of life fate of clothing textiles. In the process of carrying out the research it has been possible to estimate the quantities of textiles likely to be sold up to 2020, and to estimate the likely arisings of “waste” textiles at end of first use. However, it has not been possible to make predictions on the potential changes in the fates of these waste materials at end of first use, such as the percentage of waste textiles in 2020 that are likely to be:

- recovered separately;
- sent for reuse; and
- disposed of.

However, factors that may affect the amount of waste textiles going for recovery, reuse, recycling and disposal are discussed in *Section 5*.

As with other waste materials, a large quantity of what is discarded at end-of-life is not recovered and recycled but just disposed of with other general refuse. As part of the study, ERM was asked by the MTP to identify and comment on any such barriers to reuse and recycling. In the course of the research, five main areas were identified; financial barriers; legal barriers; educational barriers; infrastructure barriers and technological barriers.

5.1 *FINANCIAL BARRIERS*

The cost of collecting, sorting and reselling or recycling textiles is not insignificant. In addition, as newer clothes get cheaper to make and sell, there is downward pressure on the price of second-hand clothing and fibre. This results in lower margins for the collectors leading to fewer operators and less capacity. In the UK much of the collection of used clothing and textiles is carried out by charities, who themselves rely on donations to operate. It is foreseen that this will continue to be the case whilst there is still money to be made from the collection, sorting, resale and exporting of used clothing textiles.

As the price of new clothes falls, and as the places in which cheap clothing is available are easier to access (such as 24 hour supermarkets) so people are more willing to buy new ones to replace those that they no longer wish to keep. In the past people may have looked to buy second-hand clothing to replace worn-out or ill-fitting garments or have their clothes repaired, whereas now they may be more likely to buy a replacement. This applies not just to clothing but to other commodities and has led to the term “throwaway society” being coined. To some extent, this decline in demand for second-hand clothing in the UK has been offset by a corresponding increase in demand for such items in the developing world.

It is also possible that there are more speciality clothes nowadays than 25 years ago – particularly linked to leisure activities. So there is made-for-purpose clothing for cycling, walking, fishing, climbing, sailing, skiing, etc that one wouldn't ordinarily wear for any other purpose. Years ago the role of some such activity-specific garments would have been fulfilled by general leisure wear such as shorts/jeans and a tee-shirt, partly due to availability, partly due to cost and partly due to fewer people taking part in such activities.

5.2 *LEGAL BARRIERS*

Laws and trade agreements can also create barriers, for example in terms of restricting the export of re-usable clothing due to waste classifications. Conversely, the removal of trade barriers can result in increased imports of

cheaper new clothing which in turn could lead to a lowering of the quality of textiles that are collected for re-use and recycling.

At the end of 2004, the Agreement on Textiles and Clothing (ATC) was fully integrated into the General Agreement on Tariffs and Trade (GATT). This meant that the restrictions on developing countries exporting clothing and textiles to developed countries were lifted. This is expected to lead to the cost of clothing coming down but also to the market being flooded with poorer quality clothing textiles. Already certain high street and out-of-town retailers in the UK are selling clothes at a fraction of the cost they use to retail for, e.g. the well-documented £3 pair of jeans sold by one supermarket.

The longer-term impact could be that in the developing world the price difference between new clothes and second-hand clothes becomes eroded by lower production costs for new garments. In conjunction with this, the demand in developing countries for second-hand clothing might then drop, leading to more waste clothing textiles needing to be recycled and disposed of. However, fewer garments will be suitable for recycling due to lower quality fibres being used in the manufacturing process in order to keep costs down.

5.3 *EDUCATIONAL BARRIERS*

Few studies appear to have been carried out into the specific reasons behind the current status of textiles recycling in the UK. Indeed the Textiles Recycling Association is currently conducting a study with a view to producing such a report themselves later on this year. A report by the Cork Institute of Technology for the Irish Environmental Protection Agency ⁽²⁴⁾ found that barriers to the recycling of textiles in Ireland include:

- awareness levels;
- personal nature of textiles;
- infrastructural deficiencies;
- throwaway society; and
- a lack of research.

Of course, these reasons may not be completely mirrored in the UK but they are all likely to be factors, albeit of unknown extent. Awareness levels amongst the public over what can and cannot be recycled is increasing as local authorities seek to increase recycling levels and reduce the amount of waste landfilled. However, within the UK, much of the money and hence focus has been on materials such as glass, paper, metals and plastics, likely due to weight-based targets being set. Based on conversations with leading recyclers, the Textiles Recycling Association and information from WRAP, there is the belief that there is currently little financial support for educating the public on the re-use and recycling of clothing textiles.

(24) "A Strategy for Developing Recycling Markets in Ireland - Final Report", prepared for the Environmental Protection Agency by the Clean Technology Centre at the Cork Institute of Technology, under the Environmental RTDI Programme 2000 - 2006.

The personal nature of textiles means that many consumers are averse to passing on used clothing for re-use and recycling. Such behaviour may be down to:

- the initial outlay on the clothes;
- the perceived value of the clothing;
- the belief that the item may come into fashion in the future; or
- the belief that it may fit again in the future.

5.4 *INFRASTRUCTURE BARRIERS*

Deficiencies in infrastructure might mean that fewer clothes are collected than could be. If there are not enough recycling banks or collection points for textiles, or if banks are not situated in convenient places or with other recycling banks, or if banks are not emptied often enough, then there are likely to be fewer people giving used textiles for re-use and recycling. Instead old clothing will end up in the normal domestic waste stream for landfill or incineration.

Furthermore, the location of existing infrastructure in terms of recycling bring banks and charity shops is likely to reflect the density of population, with rural areas having fewer points of access than urban areas.

5.5 *TECHNOLOGICAL BARRIERS*

Other barriers include the problems in dealing with certain types of textiles, such as plasticized prints on garments, composite materials, and garments treated to be waterproof, breathable, UV-resistant, and so on. As clothing technology advances and new synthetic fibres are developed and used in the manufacture of clothes, there is an increased possibility that some of these textiles may not be readily recycled. In addition, many such fibres may not biodegrade so easily when landfilled – it is widely believed that nylon will take about 40 years to decompose in a landfill site.

The longer-term impacts of using more advanced man-made fibres could be that initially the recycling industry is unable to cope with such materials, hence they are sent for energy recovery and/or disposal. However, as recycling technology catches up, the means may be developed to sort and recycle such fibres, as has been the case with plastics recycling technologies in the last decade.

5.6 *SUGGESTIONS FOR FURTHER WORK*

- The research raises the question of the suitability of cheaper, lower quality garments for lower grade applications. It might be that the fibres are not suitable for turning into new clothes (high grade recycling) but might be

suitable for dusters, rags, sound insulation, fill fibre etc (lower grade use). If the overseas demand for the re-use of second-hand clothes drops as a result of lower purchase costs for new clothes in these countries does the capacity exist in the UK to process the material into lower grade applications?

- The TRA report is due to be published soon and should shed more light on the quantities and types of textiles that they are receiving for re-use and recycling as well as their end-of-life fate. If the report does not cover the subject, it would be of use to study the effect of lower grade textiles and increasing use of hi-tech fabrics on the reusability and recyclability of the waste clothing textiles stream as well as to see what effect it has on the end-of-life fate of the waste.
- The quantity of clothing textiles arising in the waste stream is still not clear, especially for the commercial and industrial (C&I) and the construction and demolition (C&D) waste streams. Further studies could be carried out into looking at what types and quantities of textiles appear in these wastes.

Annex A

UK Clothing Textiles Sales Forecast to 2020

Definition	EU Category (refer to Table 3.1)	Average Pieces/Kg	Est. Min. Lifetime (yrs)	Average lifetime (yrs)	Est. Max. Lifetime (yrs)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007													
						,000t pieces	,000t pieces	,000t pieces	,000t pieces	,000t pieces	,000t pieces	,000t pieces	,000t pieces	,000t pieces	,000t pieces	,000t pieces	,000t pieces	,000t pieces													
Men's trousers	6	1.76	1.50	3.00	5.00	13.7	24,151,111	15.7	27,550,844	17.2	30,207,467	19.3	34,015,911	21.5	37,805,778	25.7	45,218,311	30.5	53,671,200	31.9	56,197,778	36.0	63,316,163	36.9	64,899,067	38.0	66,910,938	39.0	68,583,712	39.8	70,092,553
Women's trousers	6	1.76	1.50	3.00	6.00	13.7	24,151,111	15.7	27,550,844	17.2	30,207,467	19.3	34,015,911	21.5	37,805,778	25.7	45,218,311	30.5	53,671,200	31.9	56,197,778	36.0	63,316,163	36.9	64,899,067	38.0	66,910,938	39.0	68,583,712	39.8	70,092,553
Women's blouses	7	5.55	1.00	3.00	4.50	8.0	50,035,167	10.1	56,005,967	11.2	62,098,333	11.5	64,095,167	10.1	56,122,833	9.9	55,185,500	10.6	58,700,500	13.3	74,040,333	15.3	84,745,348	15.8	87,880,326	16.6	92,187,091	17.3	95,874,575	17.7	98,079,690
Men's shirts	8	4.60	1.00	2.00	4.50	21.9	100,510,000	20.4	93,809,333	19.1	88,079,778	21.7	99,927,333	19.3	88,662,444	18.1	83,224,222	18.2	83,806,889	18.6	85,457,778	20.9	96,282,430	21.5	98,689,490	22.1	101,748,865	22.7	104,292,586	23.2	106,587,023
Men's coats	14	0.50	1.50	4.00	7.00	3.4	1,720,556	3.1	1,572,778	3.9	1,973,889	3.2	1,583,333	3.9	1,973,889	4.1	2,058,333	3.7	1,836,667	4.4	2,206,111	5.0	2,485,552	5.1	2,547,691	5.3	2,626,669	5.4	2,692,336	5.5	2,751,567
Women's coats	15	0.80	1.50	4.00	7.00	4.8	3,800,000	5.2	4,188,444	6.9	5,488,889	6.4	5,134,222	7.2	5,759,111	7.7	6,164,444	8.6	7,701,333	11.0	8,613,748	11.3	9,034,092	11.8	9,476,762	12.3	9,855,833	12.6	10,062,517		
Men's suits	16	0.80	1.00	3.00	7.00	1.8	1,435,556	1.3	1,013,333	1.3	1,013,333	1.5	1,199,111	2.0	1,638,222	2.9	2,347,556	3.1	2,516,444	3.3	2,686,444	3.8	3,006,447	3.9	3,081,609	4.0	3,177,138	4.1	3,256,567	4.2	3,329,211
Men's jackets	17	1.43	1.50	4.00	7.00	2.6	3,652,856	1.9	2,656,622	2.5	3,592,478	2.6	3,743,422	2.3	3,290,589	2.7	3,803,800	2.6	3,743,422	1.9	2,747,189	2.2	3,095,166	2.2	3,172,545	2.3	3,270,894	2.3	3,362,667	2.4	3,428,425
Men's underwear	13 & 18	8.00	0.50	1.50	4.00	1.9	15,312,593	2.1	16,607,407	2.3	18,634,074	2.4	19,084,444	2.6	20,885,926	2.6	21,111,111	2.7	21,280,000	3.6	28,989,519	4.0	32,061,799	4.1	32,478,602	4.1	33,193,132	4.3	34,188,926	4.4	35,112,027
Women's underwear	13,18 & 31	8.00	0.50	1.50	4.00	3.8	30,625,185	4.2	33,214,815	4.7	37,268,148	4.8	38,168,889	5.2	41,771,852	5.3	42,222,222	5.3	42,560,000	7.1	57,197,037	8.4	87,044,079	8.6	89,189,489	8.9	91,126,795	9.2	93,616,233	9.4	95,162,174
Men's anoraks	21	2.30	1.50	4.00	7.00	6.5	14,930,833	6.5	15,027,944	7.1	16,217,556	6.8	15,659,167	6.9	15,974,778	6.9	15,804,833	6.7	15,416,389	14.1	32,338,000	15.8	36,434,147	16.2	37,345,000	16.7	38,502,695	17.2	39,465,263	17.5	40,333,499
Women's anoraks	21	2.30	1.50	4.00	7.00	6.5	15,027,944	7.1	16,217,556	7.8	18,629,167	6.9	15,974,778	6.9	15,804,833	6.7	15,416,389	14.1	32,338,000	16.1	37,009,044	16.7	38,378,379	17.5	40,258,920	18.2	41,869,276	18.6	42,832,270		
Women's dresses	26	3.10	1.00	2.00	4.00	5.7	17,670,000	5.7	17,604,556	4.9	15,248,556	5.2	16,033,889	5.3	16,295,667	4.9	15,914,000	4.5	14,005,111	5.2	16,099,333	5.9	18,424,793	6.2	19,106,510	6.5	20,042,729	6.7	20,844,436	6.9	21,323,860
Women's suits	27	2.60	1.00	3.00	5.00	4.8	12,485,778	5.4	14,051,556	4.1	10,648,444	4.9	12,624,444	5.8	15,149,333	7.2	18,662,222	7.9	20,473,556	11.1	28,761,778	12.7	32,916,257	13.1	34,134,158	13.8	35,808,792	14.3	37,239,001	14.7	38,056,498
Women's suits	29	1.37	1.00	3.00	6.00	2.5	3,412,822	2.2	3,007,911	2.3	3,210,367	2.4	3,268,211	2.9	4,020,189	3.2	4,425,100	3.1	4,292,058	3.4	4,685,400	3.9	5,362,180	4.1	5,560,581	4.3	5,833,049	4.4	6,066,371	4.5	6,205,898
Babies' garments	68	10.00	0.25	0.50	1.50	8.0	59,533,333	6.5	65,233,333	8.2	81,911,111	8.1	80,644,444	9.3	93,311,111	9.8	97,744,444	10.6	106,400,000	17.2	172,266,867	19.9	198,680,889	20.4	204,045,273	21.0	209,962,586	21.6	216,051,801	22.2	222,100,943
TOTAL						108.5	378,326,733	112.4	394,123,333	119.9	422,017,444	126.9	444,852,967	132.9	456,459,167	143.1	473,903,911	154.5	503,954,269	190.8	659,510,478	216.8	752,994,295	222.9	774,442,490	230.9	801,635,934	237.9	825,832,996	243.4	845,606,708

Definition	2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019		2020	
	000t	pieces	000t	pieces	000t	pieces	000t	pieces	000t	pieces	000t	pieces	000t	pieces	000t	pieces	000t	pieces	000t	pieces	000t	pieces	000t	pieces	000t	pieces
Men's trousers	40.9	71,985,062	43.2	76,067,200	45.5	80,150,400	47.9	84,233,600	50.2	88,316,800	52.5	92,400,000	54.8	96,483,200	57.1	100,566,400	59.5	104,647,840	61.8	108,731,040	64.1	112,814,240	66.4	116,897,440	68.7	120,980,640
Women's trousers	40.9	71,985,062	43.2	76,067,200	45.5	80,150,400	47.9	84,233,600	50.2	88,316,800	52.5	92,400,000	54.8	96,483,200	57.1	100,566,400	59.5	104,647,840	61.8	108,731,040	64.1	112,814,240	66.4	116,897,440	68.7	120,980,640
Women's blouses	18.4	102,100,958	19.2	106,262,500	19.9	110,467,200	20.7	114,651,900	21.4	118,831,050	22.2	123,015,750	22.9	127,200,450	23.7	131,379,600	24.4	135,564,300	25.2	139,749,000	25.9	143,928,150	26.7	148,112,850	27.4	152,297,550
Men's shirts	23.8	109,464,873	24.0	110,579,400	24.3	111,692,600	24.5	112,805,800	24.8	113,919,000	25.0	115,032,200	25.2	116,145,400	25.5	117,258,600	25.7	118,371,800	26.0	119,485,000	26.2	120,598,200	26.5	121,711,400	26.7	122,824,600
Men's coats	5.7	2,825,859	5.9	2,928,000	6.1	3,028,500	6.3	3,128,500	6.5	3,227,000	6.7	3,327,000	6.9	3,427,500	7.1	3,528,000	7.3	3,628,000	7.5	3,728,500	7.7	3,828,500	7.9	3,929,000	8.1	4,029,000
Women's coats	13.1	10,495,900	13.8	11,042,400	14.5	11,588,800	15.2	12,135,200	15.9	12,680,800	16.5	13,227,200	17.2	13,773,600	17.9	14,320,000	18.6	14,866,400	19.3	15,412,800	19.9	15,959,200	20.6	16,505,600	21.3	17,052,000
Men's suits	4.3	3,419,073	4.5	3,626,400	4.8	3,833,600	5.1	4,041,600	5.3	4,249,600	5.6	4,457,600	5.8	4,665,600	6.1	4,873,600	6.4	5,081,600	6.6	5,289,600	6.9	5,497,600	7.1	5,705,600	7.4	5,913,600
Men's jackets	2.5	3,518,939	2.5	3,513,510	2.5	3,507,790	2.4	3,502,070	2.4	3,497,780	2.4	3,492,060	2.4	3,486,340	2.4	3,480,620	2.4	3,474,900	2.4	3,469,180	2.4	3,463,460	2.4	3,457,740	2.4	3,452,020
Men's underwear	4.5	36,989,827	4.7	37,768,000	4.9	38,544,000	5.2	41,328,000	5.4	43,104,000	5.6	44,880,000	5.8	46,656,000	6.1	48,440,000	6.3	50,216,000	6.5	52,000,000	6.7	53,776,000	6.9	55,552,000	7.2	57,338,000
Women's underwear	9.6	78,986,086	10.1	81,024,000	10.6	83,068,000	11.1	85,112,000	11.7	87,156,000	12.2	89,200,000	12.7	91,244,000	13.2	93,288,000	13.7	95,332,000	14.2	97,376,000	14.7	99,420,000	15.2	101,464,000	15.7	103,508,000
Men's anoraks	18.0	41,422,503	19.1	44,010,500	20.3	46,598,000	21.4	49,185,500	22.5	51,775,300	23.6	54,362,800	24.8	56,950,300	25.9	59,537,800	27.0	62,127,600	28.1	64,715,100	29.3	67,302,600	30.4	69,890,100	31.5	72,477,600
Women's anoraks	19.4	44,588,393	20.6	47,416,800	21.8	50,245,800	23.1	53,074,800	24.3	55,903,800	25.5	58,732,800	26.8	61,561,800	28.0	64,390,800	29.2	67,219,800	30.5	70,048,800	31.7	72,877,800	32.9	75,706,800	34.1	78,535,800
Women's dresses	7.2	22,198,138	7.3	22,845,500	7.5	23,495,000	7.6	23,541,400	7.7	23,587,800	7.9	24,437,300	8.0	24,883,700	8.2	25,330,200	8.3	25,779,600	8.5	26,226,000	8.6	26,675,500	8.7	27,121,900	8.9	27,571,400
Women's suits	15.3	39,657,414	16.2	42,218,800	17.2	44,779,800	18.2	47,343,400	19.2	49,904,400	20.2	52,465,400	21.2	55,029,000	22.2	57,592,600	23.1	60,151,200	24.1	62,714,800	25.1	65,278,400	26.1	67,856,000	27.1	70,400,200
Women's suits	4.7	6,460,339	4.9	6,744,510	5.1	7,029,470	5.3	7,313,060	5.5	7,598,020	5.8	7,881,610	6.0	8,166,570	6.2	8,450,160	6.4	8,735,120	6.6	9,018,710	6.8	9,303,670	7.0	9,578,620	7.2	9,827,220
Babies' garments	22.8	227,875,567	24.3	243,150,000	25.8	258,420,000	27.4	273,690,000	28.9	288,960,000	30.4	304,240,000	32.0	319,510,000	33.5	334,780,000	35.0	350,050,000	36.5	365,320,000	38.1	380,600,000	39.6	395,870,000	41.1	411,140,000
TOTAL	250.9	870,952,954	263.7	915,082,720	276.4	959,217,350	289.1	1,003,358,430	301.8	1,047,490,150	314.6	1,091,621,420	327.3	1,135,764,360	340.0	1,179,884,980	352.7	1,224,016,930	365.5	1,268,158,500	378.2	1,312,289,890	390.9	1,356,494,880	403.6	1,400,565,530

Annex B

Standard EU Clothing and Textiles Categories

Category Number	Definition
1	Cotton yarn, not put up for resale
2	Woven fabrics of cotton, other than gauze, terry fabrics, pile fabrics, chenille fabrics, tulle and other net fabrics, of which other than unbleached or bleached
3	Woven fabrics of synthetic fibres (discontinuous or waste) other than narrow woven fabrics, pile fabrics (including terry fabrics) and chenille fabrics, of which other than bleached or unbleached
4	Shirts, t-shirts, lightweight fine knit roll, polo or turtle necked jumpers and pullovers (other than wool or fine animal hair), under-vests and the like, knitted or crocheted
5	Jerseys, pullovers, slipovers, waistcoats, twin-sets, cardigans, bed-jackets and jumpers (other than jackets and blazers), anoraks, wind-cheaters, waist jackets and the like, knitted or crocheted
6	Men's or boys' woven breeches, shorts other than swimwear and trousers (including slacks); women's or girls' woven trousers and slacks, of wool, of cotton or of man-made fibres; lower parts of track suits with lining, other than category 16 or 29, of cotton or of man-made fibres
7	Women's or girls' blouses, shirts and shirt-blouses, whether or not knitted or crocheted, of wool, of cotton, or man-made fibres
8	Men's or boys' shirts, other than knitted or crocheted, of wool, cotton or man-made fibres
9	Terry towelling and similar woven terry fabrics of cotton; toilet linen and kitchen linen, other than knitted or crocheted, of terry towelling and woven terry fabrics, of cotton
10	Gloves, mittens and mitts, knitted or crocheted
12	Panty-hose and tights, stockings, under-stockings, socks, ankle-socks, sockettes and the like, knitted or crocheted, other than for babies, including stockings for varicose veins, other than products of category 70
13	Men's or boys' underpants and briefs, women's or girls' knickers and briefs, knitted or crocheted, of wool, of cotton or of man-made fibres
14	Men's or boys' woven overcoats, raincoats and other coats, cloaks and capes, of wool, of cotton or of man-made textile fibres (other than parkas) (of Category 21)
15	Women's or girls' woven overcoats, raincoats and other coats, cloaks and capes; jackets and blazers, of wool, of cotton or of man-made textile fibres (other than parkas) (of Category 21)
16	Men's or boys' suits and ensembles, other than knitted or crocheted, of wool, of cotton or of man-made fibres, excluding ski suits; men's or boys' track suits with lining, with an outer shell of a single identical fabric, of cotton or of man-made fibres
17	Men's or boys' jackets or blazers, other than knitted or crocheted, of wool, of cotton or of man-made fibres
18	Men's or boys' singlets and other vests, underpants, briefs, nightshirts, pyjamas, bathrobes, dressing gowns and similar articles, other than knitted or crocheted; Women's or girls' singlets and other vests, slips, petticoats, briefs, panties, night-dresses, pyjamas, negligees, bathrobes, dressing gowns and similar articles, other than knitted or crocheted
19	Handkerchiefs, other than knitted or crocheted
20	Bed linen, other than knitted or crocheted
21	Parkas; anoraks, windcheaters, waist jackets and the like, other than knitted or crocheted, of wool, of cotton or of man-made fibres; upper parts of tracksuits with lining, other than category 16 or 29, of cotton or of man-made fibres
22	Yarn of staple or waste synthetic fibres, not put up for retail sale, of which acrylic
23	Yarn of staple or waste artificial fibres, not put up for retail sale
24	Men's or boys' nightshirts, pyjamas, bathrobes, dressing gowns and similar articles, knitted or crocheted; Women's or girls' night-dresses, pyjamas, negligees, bathrobes, dressing gowns and similar articles, knitted or crocheted
26	Women's or girls' dresses of wool, of cotton or of man-made fibres
27	Women's or girls' skirts, including dividing skirts
28	Trousers, bib and brace overalls, breeches and shorts (other than swimwear), knitted or crocheted, of wool, of cotton or of man-made fibres

Category Number	Definition
29	Women's or girls' suits and ensembles, other than knitted or crocheted, of wool, of cotton or of man-made fibres, excluding ski suits; women's or girls' track suits with lining, with an outer shell of an identical fabric, of cotton or of man-made fibres
31	Brassieres, woven, knitted or crocheted
32	Woven pile fabrics and chenille fabrics (other than terry towelling or terry fabrics of cotton and narrow woven fabrics) and tufted textile surfaces, of wool, of cotton or of man-made textile fibres, of which cotton corduroy
33	Woven fabrics of synthetic filament yarn obtained from strip or the like of polyethylene or polypropylene, less than 3 m wide; Sacks and bags, of a kind used for the packing of goods, not knitted or crocheted, obtained from strip or the like
35	Woven fabrics of synthetic fibres (continuous), other than those for types of Category 114; of which other than bleached or unbleached
36	Woven fabrics of continuous artificial fibres, other than those for types of Category 114; of which other than unbleached or bleached
37	Woven fabrics or artificial staple fibres; of which other than unbleached or bleached
39	Table linen, toilet linen and kitchen linen, other than knitted or crocheted, other than of terry towelling or a similar terry fabrics of cotton
41	Yarn of synthetic filament (continuous), not put up for retail sale, other than non textured single yarn untwisted or with a twist of not more than 50 turns/m
68	Babies' garments and clothing accessories, excluding babies' gloves, mittens and mitts of Categories 10 and 87, and babies' stockings, socks and sockettes, other than knitted or crocheted, of Category 88
73	Track suits of knitted or crocheted fabric, of wool, of cotton or of man-made textile fibres
76	Men's or boys' industrial or occupational clothing, other than knitted or crocheted; Women's or girls' aprons, smock overalls and other industrial or occupational clothing, other than knitted or crocheted
78	Garments, other than knitted or crocheted, excluding garments of Categories 6, 7, 8, 14, 15, 16, 17, 18, 21, 26, 27, 29, 68, 72, 76 and 77
83	Overcoats, jackets, blazers and other garments, including ski suits, knitted or crocheted, excluding garments of Categories 4, 5, 7, 13, 24, 26, 27, 28, 68, 69, 72, 73, 74, 75
90	Twine, cordage, ropes and cables of synthetic fibres, plaited or not
97	Nets and netting made of twine, cordage or rope and made up fishing nets of yarn, twine, cordage or rope
115	Flax or ramie yarn
117	Woven fabrics of flax or of ramie
118	Table linen, toilet linen and kitchen linen of flax or ramie, other knitted or crocheted
136	Woven fabrics of silk or of silk waste
156	Blouses and pullovers knitted or crocheted of silk or silk waste for women and girls
157	Garments, knitted or crocheted, other than those of Categories 1 to 123 and 156
159	Dresses, blouses and shirt-blouses, not knitted or crocheted, of silk or silk waste; Shawls, scarves, mufflers, mantillas, veils and the like, not knitted or crocheted, of silk or silk waste; Ties, bow ties and cravats of silk or silk waste
160	Handkerchiefs of silk or silk waste
161	Garments, not knitted or crocheted, other than those of Categories 1 to 123 and Category 159

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