



# Data Crunch Report

The Impact of Bad  
Data on Profits and  
Consumer Service  
in the UK Grocery  
Industry

A report for the retail grocery  
industry prepared by GS1 UK  
in conjunction with:

- IBM
- The Institute for Grocery  
Distribution
- Cranfield School of  
Management (KTP project)
- Value Chain Vision

October 2009

# 1 Executive summary

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80%

The average level of industry product data inconsistency

£235m

5 year cost of corrections and manual workarounds for retailers and suppliers

The UK retail industry is behind the curve in addressing the challenge of poor product supply chain data. The size of the quality problem is a lot worse than expected, with data shown to be inconsistent in over 80% of instances. It is estimated that this will cost the industry at least £700m over the next 5 years, and a further £300m in lost revenues.

Looking forward, consumers are demanding better product information and labelling for nutrition, health and lifestyle. Planned European legislation is also demanding that the industry provides further information related to packaging and the environment. In this future world manual workarounds and pragmatic fixes employed currently by retailers are no longer sustainable.

The time has arrived for the UK grocery industry to address the data quality issue head on, and reap the considerable benefits.

## Accurate product data – the bedrock of efficient supply chains

UK retailing is a highly competitive, fast-moving and rapidly changing industry. The major supermarket chains have developed supply chains that service a diverse range of outlets with an impressive and growing selection of products and merchandise. Margins and profits are under pressure as consumer spending is curtailed in the economic downturn. The supermarket groups are in a fiercely competitive environment.

The retail sector is under constant pressure to innovate – introducing new ways for consumers to buy (e.g. from the web and mobile devices), providing extended product ranges and addressing increasing demands from consumers and legislators.

The flow of information is critical to these developments. However, for some time, anecdotal evidence has suggested that product data in the supply chain is of poor quality. To prove (or disprove) the 'bad data' argument, GS1 UK compared the data on grocery products held by four of the largest supermarket retailers and matched this against product data from four major suppliers.

The Data Crunch Project has revealed that retailers are working with data that is inconsistent in well over 80% of instances. Given the current overall health of the grocery retailing industry, it was surprising to discover such a high level of poor quality product data currently being held by retailers.

Bad data has a severe cost impact on the industry in three main areas:

- the cost of manual workarounds to source missing data and correct errors
- administrative shrinkage costs in areas such as ordering and invoicing
- lost consumer sales through shelf stock-outs.

We calculate that over the next five years UK retailers and suppliers will experience over £700 million profit erosion and £300 million in lost sales. These are conservative estimates based on the combination of process inefficiencies, duplications and workarounds across the retailer and supplier's supply chains, together with administrative shrinkage and shelf stockouts that inaccurate data causes.

£475m

*The admin shrinkage  
over 5 years*

£300m

*Lost sales over next  
5 years*

66 > 250

*Forecast product  
attribute growth*

### Manual workarounds untenable with data requirements set to grow

Looking forward, the lack of efficient processes for obtaining, maintaining and accessing accurate product data will have a major impact on the ability of retailers to meet increased information demands. Legislators and pressure groups are requiring that retailers adopt higher standards in areas such as packaging, green miles, waste reduction and product sourcing. Consumers are demanding better product information and labelling to provide guidance in areas such as nutrition, health and the environment.

These demands multiply the volume of information that grocery retailers will need to hold for the products they sell – from an average of 66 product attributes today to an estimated 250 attributes in future years. This will make the management of product data by suppliers and retailers even more challenging.

Without efficient processes to obtain, store, update and deliver accurate product information, retailers will continue to incur rapidly increasing internal costs to patch up deficiencies in product data, and potentially suffer sanctions from legislators, pressure groups and consumers.

Industry best practice from around the world tells us that product data should be input once, and in most cases, this should be by the supplier. The good news is that sample checks of product dimension data carried out during the project has indicated that in 4 out of 5 instances the supplier data is more accurate than the retailer data.

### The solution – Global Data Synchronisation (GDS)

The conclusion of the Data Crunch Project is that retailers and their suppliers should consider adopting GDS techniques already in use in other countries such as the USA, Australia and mainland Europe.

Similar techniques can deliver benefits in the UK. However, for GDS to become the de facto way of working in the UK industry, major retail groups will need to move away from tactical solutions and embrace a new industry standard for managing product data where one single, accurate, master source is used by all parties.

## 2 Background

The performance of the UK grocery supply chain compares favourably in many respects to other countries. However, in the extent to which global standards for product data synchronisation have been adopted through collaboration between suppliers and retailers, the UK lags behind countries such as the USA, Australia, Canada, the Netherlands and Germany.

The UK grocery industry has changed markedly over the past 20 years. The market used to be dominated by small grocery stores operating in a comparatively static environment, with consistent manageable ranges of product lines that changed slowly and physical stores as the single type of outlet to the consumer, with stock delivered twice weekly from suppliers.

The intervening years have seen the rapid expansion of mega supermarket chains. These huge organisations have revolutionised the industry. They carry a vast variety of household product and grocery lines, receive multiple daily, just-in-time deliveries from regional warehouses, and satisfy consumers through out-of-town hypermarkets, convenience outlets, online stores, catalogues and, in the near future, by mobile devices. Grocery retailing has become a highly complex and fast moving business.

During this transformation retailers have been focussed on growth, merchandising, aggressive pricing, streamlining supply-chain operations and increasing competitive share of a rapidly expanding market. The retail industry has not spent the time, or had the inclination, to examine the product data that underpins so much of what they do.

Product data describes the characteristics of every item, case and pack bought and sold. It exists and is stored, duplicated and manipulated across departments

for different purposes across business functions (e.g. buying, warehousing, distribution, merchandising and stores) and across retailers, distributors and suppliers. Although the data may relate to the same products, it is rarely managed in a cohesive and consistent manner within individual retailers, let alone across the wider industry.

The systems and processes in place to handle product data are basically the same as those designed when the grocery market was much smaller, slower and less dynamic. After a new product is launched, there are inadequate processes to check the accuracy of data. If manufacturing processes, product content or packaging attributes change, there are no mechanisms to update the many usage points within each of a supplier's many hundred trade retail customers. In the majority of cases, no-one in the supplier or the retailer organisation is charged with ensuring the ongoing quality of data, or for removing obsolete information from master data files.

The supply chain continues to function because each retailer, lacking trust in the suppliers' data, has allowed its many stores, warehouses and trade buyers to develop a multitude of spreadsheets and small databases each containing local product data created and tailored for particular departmental needs.

This keeps the supply chain operating. However, as our survey reveals, it has contributed to enormous data inaccuracies and inconsistencies which are having an impact on retailer and supplier profits and downgrading on-shelf availability. Apart from the problems caused by inaccurate product data, the cost of building and operating these local silos of product information imposes a large and unnecessary operational cost penalty on the supply chain.



### 3 Results of the study

#### Data Crunch Process



Realising the extent to which the grocery retail industries of other countries have adopted GDS standards in advance of the UK, and hearing anecdotal evidence of poor quality product data in the UK grocery industry, GS1 UK set out to establish the true situation in the UK industry and quantify the extent of any product data problems

GS1 UK gained the cooperation of eight of its member organisations and undertook an analysis of the master data files held by the UK's largest supermarket groups (Tesco, ASDA, Sainsbury's and Morrisons).

Using industry standard Global Trade Identification Numbers (GTINs) to uniquely identify the same products across retailers, GS1 UK was able to compare the information held on identical grocery products by each of the retail groups. The analysis, carried out using IBM's InfoSphere software, was extended to examine data held on product cases and trade packs, each of which has its own unique GTIN.

As an indication of the scale of the data quality problem that the survey was about to uncover, GS1 UK encountered a large number of duplicate GTINs within individual retailers. Retailers provided a total of over one million records, of which more than 60% were found to be duplicates. These duplications had to be eradicated before the comparison between the different companies could commence.

Having compared the product data held by the four grocery retailers, the results were then matched with data held by four major suppliers (Nestle, Unilever, P&G and Mars).

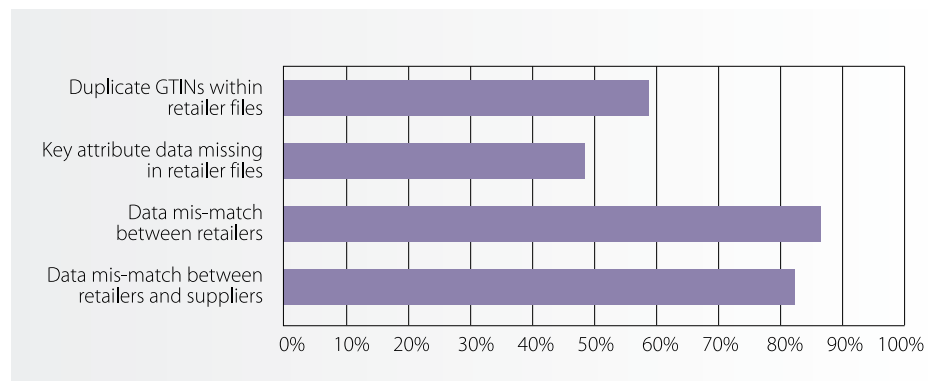
The high degrees of inconsistency and low levels of accuracy in what should have been identical information were significant.

## Overall summary of product data status in the grocery industry

The comparison of data held by retailers and suppliers on the same consumer unit (individual product) and traded unit (case or pack of products) quickly revealed the scale of the bad data problem within the grocery industry.

By contrast with retailers' data, product files held by suppliers contained mostly complete data, with only 3% of key attribute detail missing.

### Product Data Summary



## Extremely low correlation of product data held by retailers

Due to data compatibility issues, the matching of data on consumer units was limited to three retailers.

Having removed own-label, non-food items, duplicate entries and discontinued items from the master data files provided by the three retailers, the total number of GTINs matched across all three retailers came to 17,889 consumer units.

The data files provided by all four retailers had a significant amount of information missing or contained 'dummy entries' (e.g. 1x1x1 size dimensions) to satisfy system data entry validation requirements. In order to normalise the results, null entries and dummy data were omitted from the comparisons.

An analysis of the 17,889 unique items revealed an extraordinarily low correlation between the information held on identical products by the three retailers. The correlation was also extremely low when data was compared between any two of the retailers.





The TI/Hi (number of cases stored on a layer and the number of layers stacked on the pallet) is a critical piece of information for warehouse/distribution planning and management. A high level of mis-matches was found because suppliers provide different pallet configurations to their customers. The main reasons for this are commercial arrangements and warehouse limitations (e.g. specific pallet height restrictions at the retailer).

The one statistic which exhibited a higher degree of correlation was the number of consumer units per traded unit (i.e. the number of items per pack/case or pack size). This data forms the basis for calculating the volume of purchases placed by retailers on suppliers. It is clear that more attention is paid to the accuracy of this data, rather than to other product attributes which impact activities further down the supply chain.



It should be noted that even though this important purchasing data is of a higher quality, 10% of the information relating to case and pack sizes remains inconsistent. These discrepancies in traded unit data between suppliers and retailers will cause problems in invoice matching and show up in apparent stock 'shrinkage', unexpected stock outs, and under- or over-payments to suppliers.



## Low correlation of traded unit data between retailers

A total of 4290 unique GTINs relating to product cases or packs were compared across all four retailers.

There was an extremely low correlation of pack dimensions, volumes and weights, with less than 50% data consistency even when comparing data from two retailers.

## Additional data crunch validations

### 1 FMCG supplier vs. retailers

A leading FMCG supplier provided its latest dimensional data. Only 17% of consumer product dimensional data was matched between the supplier and three retailers' data

### 2 Manual data quality check

GS1 UK undertook a visual check of the retailers' and suppliers' data to review data accuracy and consistency. In four out of five instances, supplier data was more accurate than a given retailer's data.

## Correlation between retailer and supplier data



The final stage of the survey matched consumer unit and traded unit data held by each of the four retailers with the consumer unit and traded unit data held by the supplier.

Less than 25% of the data held by retailers matched with product data from the supplier.

We discovered that the one exception where an improved correlation was apparent (a 43% match) was an instance where one supplier had recently undertaken a particular data quality improvement project concerning product weights.

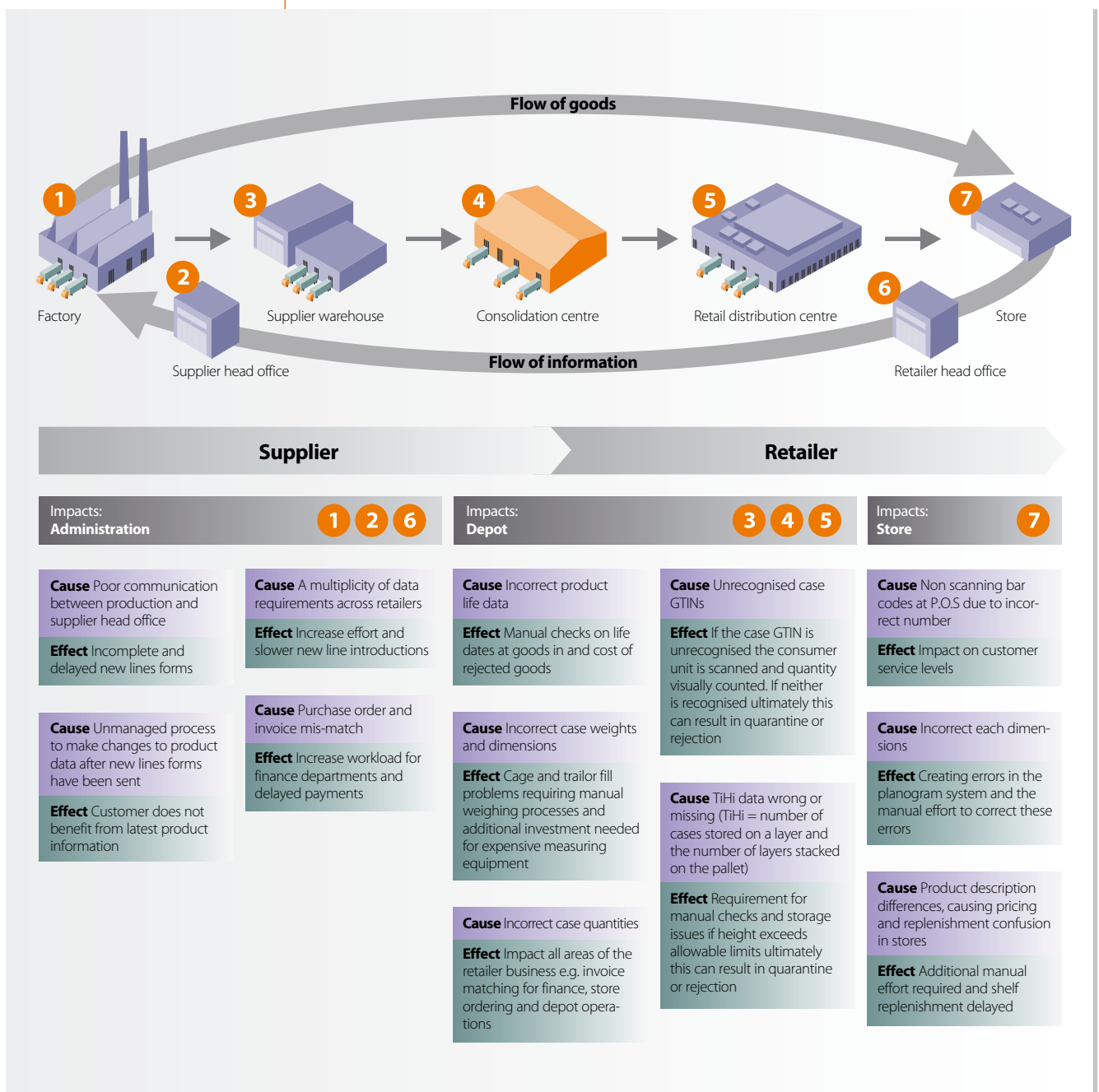




## 4 Critical points that reduce supply chain efficiency

The reasons for much of the inconsistency and inaccuracy of product data held by grocery retailers can be found within supply chain processes. Different functions have different information needs. In the absence of an accurate and standardised source of

data, each department has created its own local repository of information. The following chart identifies key areas where these separate islands of information exist, and highlights the key effects they have on the operational efficiency of the business.



## 5 Cost implications of bad product data

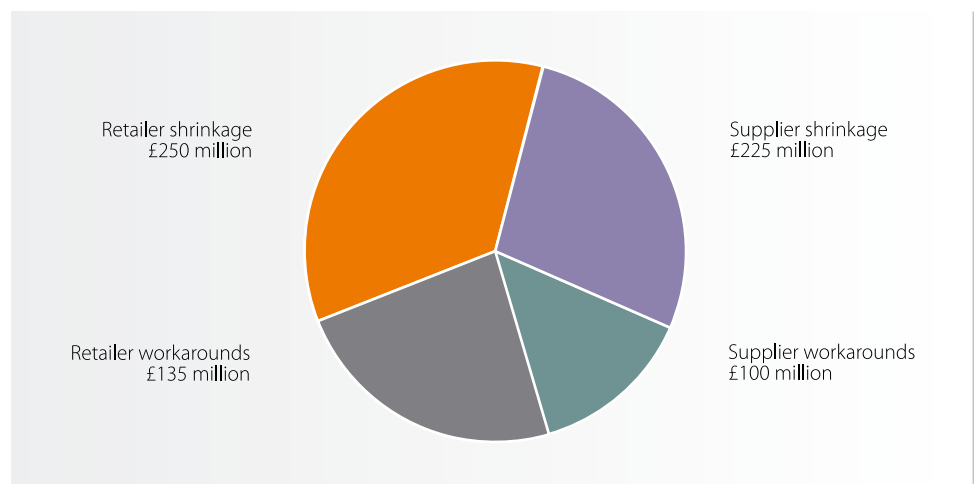
In order to understand the impact of bad product data, GS1 UK discussed the findings of the survey with representatives of large retailers and suppliers. We also assembled views from a panel of industry experts and reviewed other industry reports.

over £140m each year and will cost over £700m over the next 5 years. In addition, we calculate that the cost of lost sales is £60m per annum.

The costs fall into 2 main areas: shrinkage and workaround processes.

In total, we estimate that poor quality data is costing retailers and suppliers

### 5-year cost of shrinkage and workarounds



### Shrinkage

Shrinkage is usually associated with theft or loss of product once it has been received into inventory. The 2003 ECR Europe report, *Shrinkage: A Collaborative Approach to Reducing Stock Loss in the Supply Chain\**, identified that 1.75% of the total retail grocery market value is lost due to shrinkage. Of this, 27% is not attributed to consumer or employee theft and is considered to be “paper” and non-malicious shrinkage often caused

by failures in supply chain processes. A conservative 10% of these process failures are estimated to be attributable to poor data quality. Our research suggests that up to £95 million per annum shrinkage (£50 million in retailers and £45million in suppliers) can be attributed to inaccurate product data.

\* Adrian Beck, Paul Chapman and Colin Peacock “Shrinkage: A Collaborative Approach to Reducing Stock Loss in the Supply Chain” ECR Europe, Brussels, Belgium, 2003 (ISBN: 1 874493 92 8).

## Workaround processes

No one person is responsible for product data in the supply chain. Staff in buying, stores, warehouses, logistics, merchandising and finance each have their own particular data requirements. With no central point for obtaining product data, and an historical distrust of data supplied by suppliers, local spreadsheets are created at numerous points throughout a retailer's operations.

A retailer may carry well over 100,000 product lines, with an average life cycle of 2.3 years. An estimated 40,000 products change each year. Not only does the existence of these many silos of manually entered product data fuel inconsistency and inaccuracies, the hidden cost of staff maintaining the local data is significant.

Inaccurate product data is a major contributory cause of invoice matching errors. The industry estimates that as many as 40% of invoices do not match with deliveries and require manual investigation. Although many of these errors are down to pricing errors, a significant proportion can be attributed to inaccurate product data.

Similarly, shipments of wrong items or variations in pack configurations and quantities lead to delivery rejections, manual investigations and repeat logistics activity between suppliers and retailers.

It is estimated that the 'hidden' cost of these workaround processes required to keep the supply chain running total over £47 million per annum (£27 million within retailers and £20 million within suppliers).

## Lost sales

The ECR Availability report\* calculated that business loses £2.4 billion due to out of stocks. 2.5% of out of stocks\*\* are due to poor quality data which is equivalent to at least £60 million in lost sales.

Poor product data often leads to errors in re-supply by suppliers which leads to stock-outs on supermarket shelves. Incorrect barcode labelling on the shelf edge can mean the wrong products are displayed or fail to match at the checkout.

Inaccurate product dimensions can lead to lost sales and additional in-store workloads if physical products do not fit with the store planograms produced by merchandisers. Recognising this risk, merchandisers will often invest additional cost and effort in physically measuring items rather than rely on product data from suppliers.

Although some stock-outs will see consumers purchasing alternative brands, AMR Research states that in 49% of instances an out-of-stock will lead to a lost sale. If stock-outs recur, they will encourage consumers to seek satisfaction from a competitor store.

Equally for the supplier, 37% (AMR Research) of out of stock situations will lead to a lost sale.

\* *Institute of Grocery Distribution "ECR UK Availability Blue Book 2006", Institute of Grocery Distribution (IGD), Watford, United Kingdom, 2006 (www.igd.com/ecr)*

\*\* *Global Commerce Initiative "Global Data Synchronisation at Work in the Real World – Illustrating the Business Benefits", Capgemini/GCI, Paris, France, 2005 (www.gci-net.org)*

## 6 The future

### Industry evolution drives demand for more product data

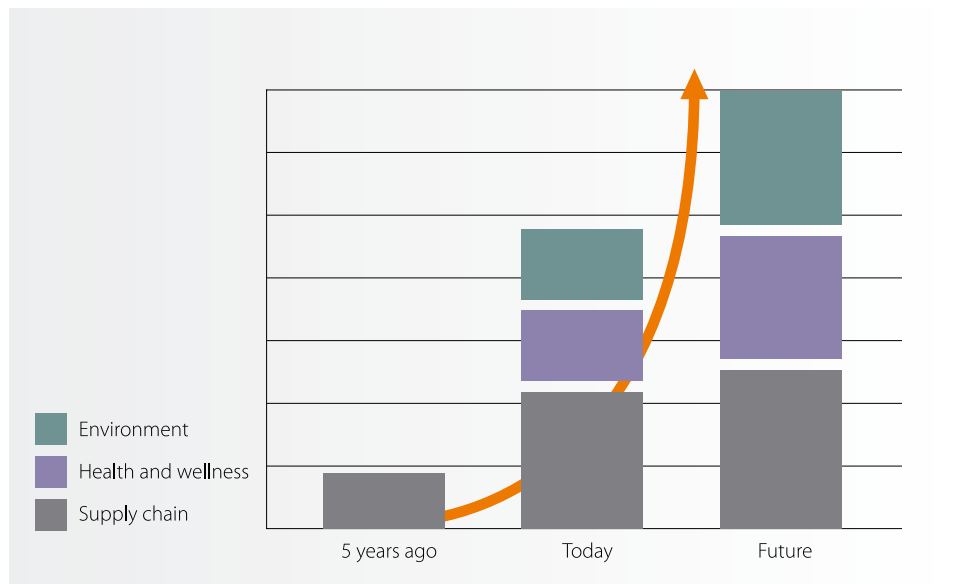
Retailers and suppliers are constantly seeking fresh supply chain initiatives to speed products to market faster and utilise warehouses, delivery vehicles and shelf space more effectively. Key performance indicators funnel down to the two imperatives – increasing sales and reducing costs.

While the objectives are clear, there is little understanding of just how far collaboration between suppliers and retailers, and the implementation of fresh supply chain initiatives that deliver sales growth and cost economies, depend on a solid foundation of accurate, clean and consistent product data.

An additional compelling reason for retailers and suppliers to take action to improve efficiency and manage the quality of product data more effectively, is the increasing demand for better information coming from consumers, governments, regulators and pressure groups.

A study of retailer new product line forms and the master data files held by the four major retailers revealed that an average of 66 attributes are recorded on current products. Industry trends suggest that retailers will need to collate, store, manage and report on up to 250 product attributes – a near 400% increase – within the next five years. This additional data will be required to address demand for information in the following areas:

#### Increase in attributes





**Increase in new lines form attributes from 66 to 250**

**Supply chain**

Currently there are more than 200 GS1 standard attributes. On average only 66 attributes are being used by retailers and suppliers. However, demand and usage of attributes will undoubtedly increase in the next four to five years as the need for additional product information increases, e.g. promotional and price attributes, handling instructions, traceability attributes and classification.

**Health and Wellness**

Demand for data, such as nutritional information and product specification, will increase dramatically driven by the consumer and the growth of multi-channel outlets, e.g. dot com.

**Environment, Packaging and Legislation**

Government, regulatory bodies and increasingly retailers (eg Wal-Mart's green rating) will require timely information regarding packaging waste, detailed tax information, carbon footprint etc.

**Future data challenges**

The image shows a grid of icons and images on a brown background, representing various data challenges. On the left, there are six icons: two upward arrows, a crossed-out box, a wine glass, the number 11, an umbrella with rain, and a solid black square. To the right, there are eight categories with corresponding images:

- Health and Wellbeing**: Image of a golden wheat field under a blue sky.
- Environmental and Ethical**: Image of a person wearing a hat working in a green field.
- Certified**: Logo for 'ASSURED FOOD STANDARDS' featuring a red tractor and a blue wheel.
- Mobile, Web and Store**: A purple square with the text 'http://' in white.
- Tracking Data**: A standard 1D barcode with the number '5 012345 6789' below it.
- Detailed info and Origin**: A close-up of a product label with sections for 'Allergy advice', 'Caution', 'Ingredients', and 'Nutrition'.
- Advice**: A large, bold, black lowercase letter 'i' on an orange background.
- Production and Location**: A close-up of the European Union flag, showing blue with yellow stars.

## Consumer health

Consumer concerns about healthy eating and allergies are placing a growing responsibility on retailers to provide more information on product ingredients – including eggs, milk, fish, soya, wheat and nut contents. The consequences of getting such information wrong could be serious – for the consumer, the supplier and the retailer who would be exposed should inaccurate data cause consumers to be harmed. Any resulting bad media exposure could have a severe impact on brand image.

## New consumer outlets

Consumers exercising increased choice are driving supermarkets to offer alternative shopping outlets. In addition to out-of-town hypermarkets, there has been a rapid increase in convenience stores and online dot com outlets with home delivery. As technology advances, there will be an inevitable demand for grocery shopping from mobile devices and, no doubt, through other as yet unknown channels in the future.

Each new channel places fresh demands on the retailer for new sizes, packs and categories of product which in turn multiply the volume of product information to be sourced and maintained. This exponential demand for data can only be managed effectively through a high quality, centralised data management process that ensures consistency and accuracy.

## Product traceability

Increases in the diversity of products and product sourcing place a heavy burden on retailers to track the origins of product batches and their distribution through the supply chain. It is important to know the constituent ingredients of products so that should any ingredient become the subject of a health alert, action can be swiftly taken to identify all affected products and withdraw relevant product batches. To identify ingredients across the many tens of thousands of products handled by a major grocery chain, and to track products through the complex supply chains, it is essential that comprehensive product attribute data from the supplier be readily available at a central point, rather than buried within a maze of spreadsheets in local stores and warehouses, or simply missing from the entire organisation.

## Diversity of product and sourcing

The variety of products sourced by supermarket chains is constantly growing, with the average product life being 2.3 years. Sourcing of products is also becoming more complex. Fruit, vegetables and grocery products are arriving from more and more countries, with different cross border taxes and quotas, a variety of weight and volume systems, and different labelling, packaging and language standards. This diversity adds to the complexity of product data and increases the risk of error if the quality of data is not properly managed.

At the other extreme, supermarkets are responding to environmental pressures to reduce their carbon footprint by sourcing produce where possible within a tight radius of local stores. Small local producers have less sophisticated methods of measuring, shipping and packing products and for providing product information. Retailers will need to accommodate these extremes of international and local product sourcing within their data repositories.

### Environmental issues

Grocery retailers and suppliers are faced with growing pressures from consumers and lobby groups for comprehensive information regarding how products, packaging, product sourcing and distribution logistics impact the environment. The types and nature of environmental information are continually evolving, adding to the quantity and scope of product attributes that need to be collated, stored and maintained.

Meeting the information demands from consumers, pressure groups and regulators with an increased volume and diversity of stores, consumer outlets, products and suppliers places a heavy toll on the quantity, quality and availability of product information. Couple with this the financial imperatives to move products faster through the supply chain, reduce stock and maintain high shelf-availability for consumers, and an irresistible momentum builds behind initiatives to improve the quality and performance of product data management.

## 7 Industry next steps

### How the grocery industry can address the demand for product data

The need for better quality and improved management of product data is significant and growing. The current tactical approach of developing local processes and fixes to work around bad product data is no longer adequate and is imposing a significant cost penalty on both retailers and suppliers.

*Albert Heijn, the leading Dutch supermarket operator, automated the management of its product data as a precursor to full GDS. The results were greater data accuracy, improved supply chain processes and greater collaboration with trading partners.*

*Wegmans Food Markets pioneered GDS in the USA. It made quantum improvements in the accuracy of product data and cut several days out of the administration processes needed to bring new products into stores.*

The problem needs to be recognised at a corporate level, with a senior executive made responsible for data quality. Collaboration is key and retailers and suppliers must move to an industry standard solution in which master data is created once, used by all, and maintained to a high level of accuracy and integrity.

The problem is not new. In many countries across the world, the challenge has been met by GDS – an internet-based network of interoperable data pools that enable retailers and suppliers to exchange standardised and synchronised supply chain data with trading partners.

According to a recent GS1 benchmark 30 percent of global trading volume is now transacted using master data

synchronised through GS1 certified data pools.

A series of real-life case studies demonstrate that data synchronisation reduces costs, improves productivity, increases sales and provides the essential foundation for trading partner collaboration.

The adoption of GDS has been particularly strong in markets as far apart as the USA, Australia, Canada, France, Germany and the Netherlands. In these markets, GDS has become the accepted standard for the communication of product data.

The advantage of GDS for retailers and suppliers is that there is only one version of product data held in a central database accessible by all trading partners. Instead of supplying specific data to individual trade customers in separate spreadsheets, the supplier creates one central master file of product data which is much easier and more economic to maintain and update.

Retailers are saved the time and effort they currently devote to creating their own product data files in separate stores, warehouses, buying divisions and merchandising departments. Everyone draws from the same product data pool which means everyone has access to consistent information.

Because there is only one source of product information for all its trade customers, each supplier is incentivised to update information regularly and ensure that it is comprehensive and accurate. This collaborative approach increases the quality of product data and engenders trust between retailers and suppliers, eliminating many of the workaround activities currently needed to paste over cracks in the availability of accurate data.



## 8 Summary

*Our survey of the quality of product data held by the large supermarket chains and suppliers within the UK reveals a disturbing level of inconsistencies and inaccuracy.*

The supply chain continues to function and satisfy the needs of consumers but at a high financial cost in manual workarounds, a high incidence of lost sales and significant product 'shrinkage'.

In the past, rapid market growth and the expansion of the large supermarket chains have compensated for the hidden costs in keeping the supply chain functioning. However, growth cannot continue at current rates indefinitely, and supermarket chains will need to place more attention on raising efficiency levels and streamlining activities. Improving the quality of product data and reducing the time and effort it takes to obtain, manage and distribute consistent and accurate information across the business will play an important part in delivering these benefits.

As the grocery industry becomes more complex, product life cycles reduce and consumer outlets become more varied, the demand for faster delivery of more diverse and accurate data will increase. Additional pressures are being imposed by consumers, governments, regulators and pressure groups placing increasing demands for greater information on nutritional, environmental, packaging and other product attributes.

To keep pace with these demands, and manage product information efficiently and economically, retailers and suppliers will need to collaborate in automating and centralising the sourcing, maintenance and distribution of accurate product data.

Proven solutions exist in the form of GDS and implementations of this technology are delivering value in many countries. To date, grocery retailers in the UK have resisted adopting GDS. Although the attractions and benefits are self-evident, the major UK grocery supermarket chains have viewed implementation as too challenging, diverting focus away from expansion and winning share within a highly competitive and growing market.

As market growth slows and it becomes more challenging to increase market share and profit, it's time for the major UK supermarket chains to take action and start to enjoy the benefits of GDS that are already proven in the grocery industries of other advanced countries.

## 9 Appendix – Survey Results Tables

The following are tabulated results comparing data files received from each of the four grocery retailers, and further comparisons with the corresponding product files sourced from the four suppliers.

**Table 1**  
Exact Match for Consumer Unit GTINs between 3 retailers

Attribute matched...	Across all 3 retailers	Across any 2 retailers
Customer unit dimensions	2%	18%
Customer unit Volume	0.1%	4%
Customer unit Net Weight	0%	20%
Customer units per traded unit	90%	99%
Customer units per layer	0.4%	30%
Customer per pallet	0.4%	31%

**Table 2**  
Traded Unit Attributes – Exact Match 4290 Traded Unit GTINs

Attribute matched...	Across any 2 retailers	Across any 3 retailers	Across all 4 retailers
Traded unit dimensions	46%	6%	0.2%
Traded unit volume	36%	0.7%	0%
Traded unit weight	40%	6%	0.2%

**Table 3**  
Traded Unit Attributes – Tolerance Match (5%+/-) 4290 Traded Unit GTINs

Attribute matched...	Across any 2 retailers	Across any 3 retailers	Across all 4 retailers
Traded unit dimensions	87%	54%	15%
Traded unit volume	83%	37%	6%
Traded unit weight	87%	53%	16%

**Table 4**  
Supplier Data Match against retailers

	Supplier 1	Supplier 2	Supplier 3
Consumer unit dimensions	19%	18%	22%
Consumer unit volume	11%	13%	20%
Consumer unit weight	4%	3%	43%
	Supplier 1	Supplier 2	Supplier 3
Traded unit dimensions	26%	37%	30%
Traded unit volume	20%	33%	24%
Traded unit weight	9%	18%	20%

## Acknowledgements

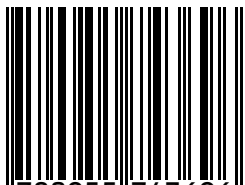
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