KPMG

FMCG and retail value chains

The future of supply chain data
A collaborative study by AFGC
Trading Partner Forum and KPMG

Table of contents

Foreword

Welcome to *FMCG and Retail Value chains: the future of data requirements*, an industry report summarising a six month study into the current and future data requirements of the fast moving consumer goods (FMCG) and retail supply chains in Australia and New Zealand.

The study was initiated by the Trading Partner Forum (TPF) of the Australian Food and Grocery Council (AFGC). The TPF is for Australasian FMCG suppliers and supermarket retailers focusing on delivering end-to-end value chain efficiency.

The purpose of this report is to increase awareness of the key current and future data challenges in the sector – specifically the importance of building a foundation of accurate, timely and aligned data.

Shoppers, consumers and regulators are demanding ever more transparent product and value chain information. They want it in a digital format underpinned by data, in real time and at more granular levels. It will become imperative the information is correct and consistent throughout the many sources of access available to consumer.

FMCG and retail supply chains are being impacted by dynamic product ranges, increasing demanding consumers, an onerous regulatory environment, and the adoption of transformative technologies – all in the face of increased competition.

Increasing adoption of technologies is enabling organisations to create more responsive, agile, and efficient supply chains, and it is also creating massive amounts of data that can be used to unlock growth and profitability.

With this as the backdrop the TPF, in partnership with KPMG, sought to examine and understand the complexity of managing data integrity and alignment between trading partners with an eye on the current realities and future requirements of data management in the sector.

Executive Summary

FMCG and retail supply chains are exposed to a number of challenges and opportunities. Through our industry engagement we have identified six supply chain data themes and challenges. The six data challenges identified for FMCG and retail are:

1 Product Master Data (PMD): Accurate and aligned PMD is a fundamental enabler of an efficient and safe supply chain.

2 Customer (sales, inventory and shopper/consumer) data: Customer data is not yet being used to its full potential to drive business decisions.

3 Empowered consumer: Improved supply chain transparency, trust, customisation and agility enables organisations to deliver on customer value levers.

4 Government regulation and public responsibilities: Supply chain data is a key enable to deliver on government policy objectives, and conversely government policy often requires new forms of supply chain data.

5 Data Security: 80 percent of Australian CEO's rate cyber security as a top investment policy.

6 Supply chain in a digital world: Technology investments are driving the supply chain evolution from linear responsive flows to interconnected predictive smart networks, where consumers are the core focus.

Based on the priorities of the TPF Executive Committee the study conducted a deep dive into Product Master Data (PMD).

For this study we have defined PMD to include data for the product and supply chain dimensions and units (cartons and pallets) as well as consumer facing data such as ingredients, allergens and country of origin.

The complexity of managing data integrity and alignment between trading partners results in significant inefficiency and risk for retailer and suppliers across operational and cost considerations. This risk will accelerate as the supply chain becomes more automated and complex through advanced distributions centres (DC's) and new channels to market.

There is currently a huge amount of re-work and manual handling of data that occurs between each stage of the value chain. A high level assessment, conducted in 2016 by GS1 Australia and the TPF, of fundamental data points relating to product dimensions examined the data held in retailer and supplier systems and found levels of inaccuracy between 20 to 30 percent.

As a result of this level of inaccuracy it has become common for retailers to re-weigh and measure products as it arrives into their DC's even though this information has been provided by suppliers. It is important to note that despite these challenges, the supply chain still operates sufficiently, however the industry could be operating more efficiently if we are able to improve PMD accuracy and alignment.

"The FMCG and retail industry is faced with a data challenge: addressing and fixing the fundamental data issues across the supply chain is imperative."

John Mullins, Foodstuffs SI

"The complication is that the industry cannot fully harness the benefits of emerging technologies if collectively there isn't alignment and initiatives to address fundamental data issues faced today."

Mark Barr, Management Consulting, KPMG

The study team's deep dive into PMD looked to identify and prioritise root causes of misalignment; quantify the impact; and develop suggested improvement opportunities. Five key causes of inaccuracy and/or misalignment were identified and prioritised as:

- new product introduction
- product changes
- unclear understanding of standards and requirements
- consumer data standards
- end-to-end digital traceability.

The study did not aim to provide solutions to the data challenges identified but instead outlines issues and their significance, priority, and opportunities based on ideas generated by industry.

Further work is now required by industry to determine the impacts of current new product introduction and product change processes so as to understand the issues which impact PMD integrity and alignment between trading partners and their systems, with the objective of delivering efficiency enhancements, business enablers and standards across the industry.

> "Managing data integrity and alignment between trading partners within the industry is not simple. As supply chain becomes more automated, more complex, consumers start demanding more information, alternate routes to market open up, and regulators become more demanding, the importance of trusted data will accelerate."
>
> *Stuart Poll, Procter and Gamble*

The value chain – why data matters

Stage	Data requirements
Grower	The ability to uniquely identify locations increases product traceability and enables more accurate and precise recalls, should they occur. Grower ID's are assigned and managed to identify locations including field, farm or pack house.
Manufacturer	At the creation of a new product, identification keys such as the Global Trade Item Number (GTIN) are fundamental and essential for data quality. They ensure identification of products, shipments and locations throughout the supply chain. They enable product ordering, tracking and invoicing.
Transport and logistics	As the new product leaves the factory, the journey commences, not only for the shipment but also for information about the new product line. If product data is incomplete, this could lead to errors such as poorly optimised transportation, where the trucks are not filled to full capacity, which is neither environmentally friendly, nor financially efficient. If transportation is not optimised, drivers run the risk of being issued penalties, e.g. due to overweight trucks caused by bad data about the product weights.
Warehouse / distribution centre	As the new product reaches the trading partner's warehouse, or distributor's warehouses, everyone involved depends on a steady and unbroken stream of information based on good data quality. Bad data quality can lead to problems in the warehouse due to information errors: fork lift truck operators may not be able to put pallets away because of incorrect measurements on the dimensions of pallets and cases, for example. With good quality data from the manufacturer related to the dimension of the products, cases and pallets, handling and storage at the distribution centre can be optimised.
Trading partner	When a new product line arrives at a retail store, any bad data associated with it can have significant consequences. Bad product data can lead retailers to reject new items at delivery because what is delivered is not what was ordered, resulting in delayed product launches and lost sales. The planogram information provided to a store could lead to the new product line not fitting the shelf correctly, e.g. overhanging the shelf or the product being smaller than the dimensions provided, leading to the trading partner not optimising the space allocated. New line introductions often suffer with errors in invoices due to incorrect pack quantity information. Also, due to increased online shopping; manufacturers are required to provide more product data to their consumers digitally to ensure a seamless shopping experience, online or onsite.
Consumer	When bad quality data is associated with the product, consumers will also suffer the consequences. If the net content is incorrect, the consumer will be unable to determine which product provides the best value for money. Secondly, all ingredients or possible traces of ingredients need to be listed; for example, to identify products as appropriate for vegans or for a kosher diet. This way the consumer can select the correct products that fit their lifestyle choices. Finally, people who have certain health conditions or allergies need to be able to check the label to ensure what they are consuming is safe. If the correct information is not available when shopping online, this could lead to serious risks to consumer safety – in some cases a matter of life or death.

Source: GS1

Acknowledgements

The six data themes and challenges

FMCG and retail supply chains are exposed to a number of challenges and opportunities. Through our industry engagement we have identified six supply chain data themes and challenges in the FMCG and retail industry.

Figure 1: Six data challenges for FMCG and Retail

External

Internal

1 Product master data	Product master data is a key enabler of transactions across the value chain. Recent studies have found that 34 percent of product master data is misaligned between trading partners.	
2 Customer (sales, inventory and consumer) data	Access to, and effective analysis of customer and consumer data is becoming a key business requirement to drive supply chain performance improvement.	
3 Empowered consumer	Empowered consumers are demanding increasing levels of data with regards to products and at the same time are expecting increasing levels of customisation in product and service.	
4 Government regulation and public responsibilities	The FMCG and retail sector operates in a complex regulatory environment which requires increasing levels of supply chain data.	
5 Data security	As supply chains become more complex and increasing levels of data are shared between partners the risk of data security breaches increases.	
6 Supply chain in a digital world	A number of technologies are currently or will revolutionise the FMCG and retail supply chains. These include Artificial Intelligence (AI), Blockchain, Machine Learning and the Internet of Things.	

Data challenges for FMCG and Retail

1 Product master data
2 Customer (sales, inventory and consumer) data
3 Empowered consumer
4 Government regulation and public responsibilities
5 Data security
6 Supply chain in a digital world

1 Product master data

Accurate and aligned PMD is a fundamental enabler of an efficient and safe supply chain.

Australian and New Zealand suppliers and retailers conduct millions of transactions and product shipments every week. It is critical that the supply chain or logistical data associated to each product, such as weight, height and width, is accurate and can flow in near real time across the value chain. This is referred to as PMD.

This information is used to plan store shelf layout, warehouse storage and transportation, to manage hazardous products and the health and safety of workers. It is critical to the value chain working effectively and efficiently.

As consumers demand more information about their products and online sales increase, there is also a need to link consumer information to each product. This information includes ingredients, country of origin, allergens information etc. For the purposes of this study we have included this consumer facing data in our definition of PDM.

In Australia and New Zealand, GS1, the industry standards organisation, provides a solution for the industry to capture, share and update this information. This is known as the National Product Catalogue (NPC), and suppliers and retailers can connect to it electronically to update or extract the product data they need.

Despite best efforts, the challenge is that the PMD in retailer systems do not always align with data in the supplier systems, and hence is inaccurate and misaligned. An audit from a large retailer in June 2017 found that a massive 34 percent of its PMD did not match the information from its suppliers.

This misaligned data has wide reaching financial, service and safety implications.

Figure 2: Data misalignment potential issues and themes

- Manual processes and work arounds
- Increased OH&S issues
- Poor product availabilty
- Product rejections at DC
- 34% of data is misaligned
- Difficulties in fully leveraging technology
- Difficult to optimise logistics (WH & transport)
- Slow product flow
- Missed Sales
- Inaccurate nutritional and allergen information
- Payment delays & increased claims
- Inaccurate & expensive product recalls

● Financial
● Service
● Safety

Source: Results from a large retail internal audit, June 2017 across all products

Many factors contribute to the inaccuracy and misalignment of data, including:

- existing new product introduction process that may result in the misalignment of data fields between retailers and suppliers
- product change processes that can create data inconsistencies between trading partners
- the interpretation of data standards leading to confusion in requirements
- the ability to utilise the electronic records for batch identification for efficient product recalls and withdrawals
- continual evolving and expanding consumer data expectations.

Why is accurate PMD so important?

- automated warehouses will rely on data for operational efficiency (including drones, shelf stocking robots, autonomous vehicles etc)
- provision of the right information to support and optimise planning, manufacturing, storage and transport
- consumer demand for product information including detail on provenance, allergens, origins, etc.
- delivering trust in brands, products and services

Given the impact PMD can have on the industry and how foundational it is to leveraging technology solutions, the TPF requested a deep-dive into the root cause and challenges associated with misaligned PMD. This is outlined later in this report.

"Where does the industry want to be? Accurate, validated and aligned product master data…

- **full visibility of data status and ownership across the value chain**
- **an effective industry standards body specialising in product and consumer master data**
- **simple and effective tools and systems to capture and share PMD**
- **PMD solutions are aligned to future value chain and consumer needs**
- **leverage Machine Learning, Big Data and Blockchain to improve PMD**
- **alignment with global standards"**

Source: Product Master Data Workshop, August 2017

2 Customer (sales, inventory and consumer) data

As value chains are required to be more agile and efficient, increasing levels of data needs to be shared with the entire value chain to drive business decisions, particularly forecasting and demand planning.

An ability to harness real time data, e.g. point of sales, stock on hand, and where possible access consumer data through new and emerging channels, is a key enabler of creating insightful forecasts and establishing a responsive demand driven supply chain.

Insightful forecasting in the FMCG environment has never been more critical or complex, and based on the study we just completed, we expect this to continue.

Some of the drivers behind the criticality and complexity are:

- increased product innovation leading to less stable demand

- focus on simplifying ranges at a retail level leading to high levels of SKU churn and less stable demand

- ongoing use of promotions leading to significant fluctuations in demand.

Through our industry engagement processes a gap in the level of operational and transactional data shared between supply chain participants was observed. A number of manufacturers indicated they do not always have access to required data from retailers to create meaningful and insightful forecasts.

Customer data is not yet being used to its full potential to drive business decisions.

Specific gaps identified include:

- Lack of visibility of stock-on-hand levels at retail and warehouse locations.

- Lack of freely available point of sale (POS) data. POS data is only available to be purchased through third parties resulting in high cost and delays. Often solutions are in place for large suppliers, but small suppliers still rely on manual spreadsheets and emails.

The Australian industry appears to be reluctant to share consumer level data with supply chain parties. This can result in increased response times, costs and inventory due to forecast inaccuracy. Retailers may face stock-outs, material shortages, lost sales and poor customer service. Manufacturers can experience obsolescence and inventory costs impacting margins.

Leading practices

There are a number of examples globally and domestically of the efficiency that can be gained through increased sharing of data between retailers and suppliers. For example:

- An Australian 3PL ran a Collaborative Planning, Forecasting and Replenishment program with a retailer and significantly reduced forecasting errors, improved availability and reduced costs.

- The effective demand-driven supply chains (DDSCs) leverage network-based models that allow all participants to work as one virtual organisation. They are also effective collaborators as they share big data across the network and respond quickly to changing customer demand signals.

- The benefits of Walmart's approach to sharing data are well known. Walmart shares sales data by item, store and day to all of its suppliers resulting in lower merchandising costs for Walmart. It saves suppliers time and expense in planning their production and distribution.

Whilst sharing operational data is not a new concept, the level of maturity in the Australian market appears low. Sixty-one percent of Australian CEOs (compared to 45 percent globally) say that their customer insight is hindered by a lack of quality customer data. (*KPMG CEO Outlook Survey*, 2017)

Role of technology

Once key operational and transactional data is shared, the industry would be in a better position to take the next step to harness big data and machine learning to drive operational decisions. There is much interest in how big data and machine learning could revolutionise demand management, enabling organisations to create smart, predictive forecasts and processes. However there was limited evidence of organisations harnessing these technologies to drive operational decisions.

Benefits of getting it right

An ability to more accurately forecast, sense and predict customer demand has numerous benefits, including:

- lower levels of inventory across supply chain partners

- improved transport and warehouse utilisation

- improved customer experience through improved availability.

3 Empowered consumer

Improved supply chain transparency, trust, customisation and agility enables organisations to deliver on customers' value levers.

Accelerating innovation and technology adoption have heightened consumer expectations. Today's consumers are connected, empowered, conscious, demanding and informed, with seemingly unlimited information sources and choices.

Consumers expect tailored and customised products and services and they are willing to pay a premium for products that have a positive impact on the local community, environment and their health. These expectations are putting pressure on supply chains to be transparent, agile and customisable.

Transparency

The first challenge for FMCG and retail value chains is keeping up with evolving consumer product data demands. Consumers want to understand the ingredients, provenance and sustainability of products, and select products that provide this information. A Nielsen's study suggests that 55 percent global online consumers across 60 countries are willing to pay more for products and services provided by companies that are committed to positive social and environmental impact.[1]

The second challenge is how to capture this information, share it, and integrate it into product labels or digital sales channels. Small suppliers can struggle (due to product complexity, capability and capacity) to provide it in the first instance.

Lastly, brand manufacturers need to work towards improving trust in their products and product claims. This will require commercial and operational teams to develop processes and procedures to standardise and verify data across the supply chain.

To meet this growing market demand, organisations need to provide transparency of product information throughout the supply chain. They need to have the capability to associate information with products and maintain that association through multiple tiers across the supply chain.

Consumer sentiment

Consumer expectations are becoming more specific and complex, for example a recent study by Oracle in 2017 found that:

• 41 percent want assurance the food they buy has been responsibly sourced

• 35 percent would shop more with retailers they think are ethical

• 23 percent of shoppers have abandoned a purchase due to the lack of information

• 50 percent of consumers are willing to pay up to 10 percent more for locally grown or produced foods and almost one in three are willing to by 25 percent more.[2]

Complexity / more unique requirements

As consumer's expectations increase, it puts pressure on retailers to provide more customising cartons and pallets, allowing them to more efficiently service store and online needs. This drives complexity for both suppliers and transport providers.

The data challenge is threefold:

1 Identifying and capturing the specific demand variations for each customer segment (including forecasting) – imagine a large supermarket with customised pallets per store and a weekly replenishment schedule.

2 Tracking the data associated to the carton or pallet, from 'stackability', purchase orders to PMD.

1   The Nielsen Global Survey on Corporate Social Responsibility 2014
2   Beyond Retail, Oracle, 2017

3   Flexibility in data management to cater for additional logistic units (for example, picking for online groceries may have different totes) and new routes and service levels (direct to consumer).

Consumers and retailers expect increasing levels of customisation of products to meet their specific requirements. Consumers want options that meet their ever-changing set of criteria for delivery of online purchases. This requires a step change in supply chain data capability management. In some instances, manual processes and disconnected systems are no longer fit for purpose.

Leading practices

- Perform regular demand and cost-to-serve analysis.

- Implement differentiated demand, inventory policies, customer replenishment and supplier replenishment programs by segmenting customers, channels and SKUs.

- Implement regular total-landed-cost sourcing analysis.

4 Government regulation and public responsibilities

Data is a key enabler to deliver on government policy objectives and conversely, government policy often requires new forms of supply chain data.

The FMCG and retail supply chain operates in a complex regulatory environment. There are a number of regulatory and policy areas which will affect the operation of FMCG and retail supply chains. Some of the key policy areas identified include the Food & Grocery Code of Conduct, food labelling, focus on food waste reduction and the container deposit scheme. We will highlight two challenges: waste and food labelling.

Waste, packaging and recycling

Australia[3]:

- The Government estimates food waste costs the Australian economy $20 billion each year.

- 4 million tonnes of food ends up as landfill, enough to fill 8,400 Olympic sized swimming pools.

- 35 percent of the average household bin is food waste.

New Zealand[4]:

- New Zealand households waste $872 million annually on food that is thrown away uneaten – equating to 122,547 tonnes of food waste, which is enough food to feed 262,917 people.

- The average New Zealand household sends the equivalent of three shopping trolleys of edible food to the landfill each year (about 79kg). For some that is around $560 worth of food going to waste, for others it is over $1,000.

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3   Data source: http://www.ozharvest.org/what-we-do/environment-facts/

4   Data source: http://www.scoop.co.nz/stories/PO1605/S00443/new-zealand-joins-the-global-fight-against-food-waste.htm

As the population expands, arable land decreases and growing conditions change, the focus on minimising food waste will continue in the Australian market. The Australian government has a stated objective to reduce food waste by 50 percent from 2018 levels in 5 years. And the New Zealand government joined the global fight against food waste with a 'Love Food Hate Waste' campaign in 2016.

As governments and consumers increasingly look to industry to help solve food waste issues, there will be an expectation that supply chain participants are doing more to combat the causes of food waste and propose innovative solutions.

Supply chain data will be a key enabler of identifying the cause and solving the issues. There are a number of opportunities to improve the sharing of data up and down the supply chain, to help identify the root cause and combat food waste. For example:

- **Primary production:** Using predictive smart sensing technology to identify the ideal harvesting time for key food crops, and working from farm through to retailers to influence demand from farm to consumer is becoming an increasing focus for primary producers.

- **Logistics:** Using IoT, blockchain and innovative packaging technologies to extend the shelf life of products.

- **Store operations:** Improving the process to accurately measure waste and identify root causes at a retail level.

- **Consumption:** Using big data to better understand consumer buying preferences and sharing this up and down the supply chain to better match supply to demand.

Food labelling and country of origin

On 1 July 2016, a new Information Standard under Australian Consumer Law commenced, which set out country of origin labelling requirements for food sold in Australia. The industry now has just less than 6 months to transition to the new arrangements and current stock in trade can see out its shelf life.

Retailers and suppliers are currently working on the supply chain data to implement this new standard. As an example of the product master data required, mozzarella cheese made in Australia from ingredients entirely imported from Italy (including milk) could be labelled 'Made in Australia from zero percent Australian ingredients'. However, imported Italian mozzarella cheese that is shredded and packaged in Australia for resale would have to make a 'Made in Italy' claim.

A further complication relates to the seasonal dynamics of food production. At a certain time of year tomatoes for tomato sauce will be sourced locally, and in the local off season they may be sourced internationally. Updating details on packaging information is complex and costly, however a mechanism for updating this information for online sales is yet to be resolved.

Consider that this data needs to be collected for every type of food product in scope, all of which needs to be managed, updated and shared across the value chain – and the scale and complexity is enormous.

Leading practice

An overall risk governance and management approach is critical to keeping on top of ethical sourcing risks.

5   Data security

80 percent of Australian CEOs rate cyber security as a top investment priority.

Supply chains have always presented data security risks, but with the digital age increasing the reach and number of linked businesses, a simple contract or a basic device like a radio-frequency identification (RFID) tag could now be a 'Trojan Horse' for potential cyber-security issues.

Eighty percent of Australian CEOs rate cyber security as a top investment priority and amongst the top five risk areas for their business. Less than half (45 percent) believe they are fully prepared for a cyber-threat. Some estimate up to 80 percent of security breaches occur through the supply chain. (SANS Institute Info Sec Combatting Cyber Risks in the Supply Chain).

If suppliers have poor IT security, there is greater potential for Intellectual Property, customer information or a business strategy to be exposed.
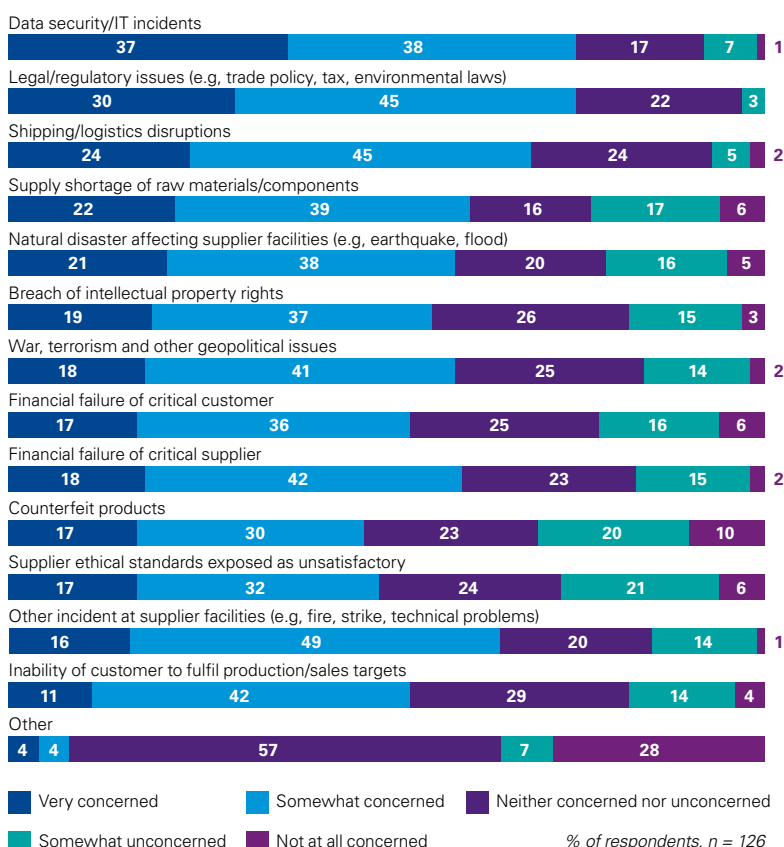
New tech, higher risk

The fundamental structure of supply chains presents multiple opportunities for data security breaches. Supply chains are increasingly enabled via a myriad of access points, sensors and scanners. These devices are often physically dispersed and are not top of mind for organisations' IT security design.[5]

"Take cybersecurity breaches very seriously: not only can they can lead to financial loss, but also data theft, infiltration of confidential information, erosion of IP and irreparable reputational damage."

Stan Gallo, Partner, KPMG Forensic

Figure 3: Top supply chain risks from a C-level view

Data security/IT incidents: 37 | 38 | 17 | 7 | 1

Legal/regulatory issues (e.g, trade policy, tax, environmental laws): 30 | 45 | 22 | 3

Shipping/logistics disruptions: 24 | 45 | 24 | 5 | 2

Supply shortage of raw materials/components: 22 | 39 | 16 | 17 | 6

Natural disaster affecting supplier facilities (e.g, earthquake, flood): 21 | 38 | 20 | 16 | 5

Breach of intellectual property rights: 19 | 37 | 26 | 15 | 3

War, terrorism and other geopolitical issues: 18 | 41 | 25 | 14 | 2

Financial failure of critical customer: 17 | 36 | 25 | 16 | 6

Financial failure of critical supplier: 18 | 42 | 23 | 15 | 2

Counterfeit products: 17 | 30 | 23 | 20 | 10

Supplier ethical standards exposed as unsatisfactory: 17 | 32 | 24 | 21 | 6

Other incident at supplier facilities (e.g, fire, strike, technical problems): 16 | 49 | 20 | 14 | 1

Inability of customer to fulfil production/sales targets: 11 | 42 | 29 | 14 | 4

Other: 4 | 4 | 57 | 7 | 28

Legend: Very concerned | Somewhat concerned | Neither concerned nor unconcerned | Somewhat unconcerned | Not at all concerned

% of respondents, n = 126

Source: SCM World Future of Supply Chain Survey 2016

5   https://www.forbes.com/sites/kevinomarah/2017/01/12/hacked-to-death-data-security-in-supply-chain/#28f65ca33c28

The onus is on organisations to manage the cyber risks in their supply chains, to prevent cyber-attack, costly fines or major reputational damage. It is a good idea to input mandatory expectations into contracts regarding security levels and assurance checks, and be clear about who owns what information.

There also need to be clear definitions of what every party will do if a technology breach occurs. For example, if a supplier's system fails, or if there is a dispute over money, do you still have access to your data? If a supplier's security is breached, what is the process around response and resilience? Where does the responsibility sit – with the business or the supplier?

Figure 4: Anatomy of a supply chain breach

Source: TBC

As these smart, interconnected networks increase in complexity, so too will the potential risks and impact of cyber-attacks. Organisations that understand and manage the breadth of their interconnected supply chains and their points of vulnerability and weaknesses are in a better position.

Case Studies

Cyber criminals and hackers are always looking for the easiest route into an organisation's systems and data – often through the 'weaker links' of a supply chain. For example:

1 In 2017, one of the world's largest shipping companies experienced large scale interruptions to its IT operations due to the 'Wannacry' crypto-locker. It impacted global operations, ranging from container shipping, gas and oil production and port operations.

2 In 2014, hackers, using a third-party vendor's user name and password, were able to gain access and deploy custom-built malware to the automated self-checkout POS machines at Home Depot's US and Canadian stores. Personal data from 56 million credit cards was collected.

3 Cyber-criminals were able to steal credit card and personal information of 110 million customers of a US retail chain by using the log-in credentials of an air-conditioning subcontractor, in 2013. It resulted in the CEO's resignation and cost the company $200 million.

4 The 'Zombie Zero' attack in 2013 was developed to target logistics and manufacturing firms and gather sensitive organisational and customer data. Malware was preloaded into proprietary scanners used by global shipping-and-logistic companies. The scanners collected information including origin, destination, contents, value, and shipper and recipient information. The scanner was updated with a second piece of malware that gathered the organisation's corporate financial, customer, shipping, and manifest information.

Leading practices

• Identifying risks, alerting directors and boards, and setting a risk appetite.

• Research suppliers, their reputation and linked organisations. Examine IT security, invoicing, contact methods, system logins and more with automated tracking systems.

• Input mandatory expectations into contracts regarding security levels and assurance checks. Be clear about 'who owns what' information.
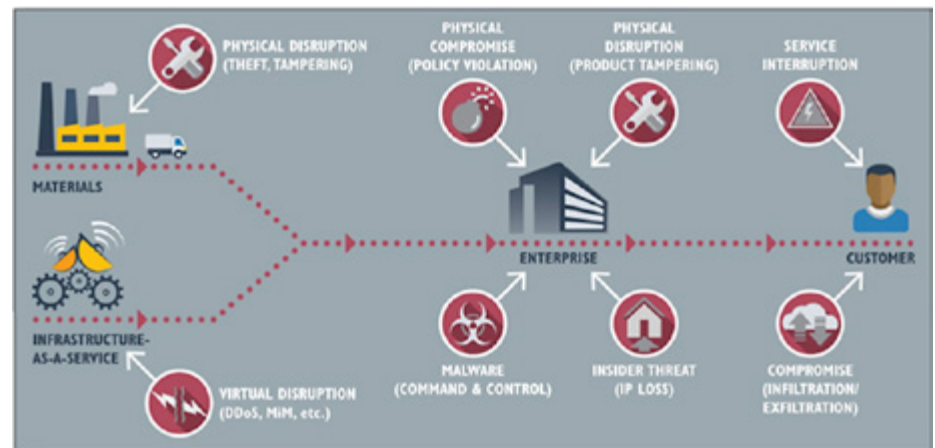
6 Supply chain in a digital world

Technology investments are driving the supply chain evolution from linear responsive flows to interconnected predictive smart networks, where customers are the core focus.

Organisations are making significant supply chain technology investments. In 2017 Gartner valued the supply chain technology market at $13 billion, up 11 percent on 2016, and on track to exceed $19 billion by 2021.

Technology investments are driving the supply chain evolution from linear responsive flows to interconnected predictive smart networks, where customers are the core focus.

A plethora of new technologies are enabling supply chain partners to sense, predict and respond more efficiently to consumer demand signals. Those that embrace these technologies are experiencing significant uplift in supply chain performance including:

- reduction in inventories
- improved transport flows and costs
- connected and shared data
- reduced volume of returns
- significantly improved overall customer experience.

Key opportunity areas

1 Artificial intelligence / machine learning

Machine learning was designed to handle forecasting models that can incorporate many kinds of data. Rather than following traditional programmed instructions, machine learning systems reduce demand variability by capturing and modelling all the relevant attributes that shape demand, while filtering out random and unpredictable demand fluctuations.

2 Blockchain

Blockchain will enable consumers to scan products and harness specific information to better understand its provenance and supply chain performance. For example, cold chain compliance or ethical and environmental factors.

Several start-ups are delivering solutions to real-world problems based on blockchain, and major countries and industry players are interested:

- AgriDigital uses applied blockchain technologies and smart contracts to simplify commodity management, revolutionise supply chain finance and bring traceability to agribusiness stakeholders.
- CBA and Wells Fargo collaborated with blockchain startup Skuchain to execute a trade finance transaction for a shipment of cotton between the US and China.
- The Singapore and Hong Kong Governments have both signalled intent to develop national trading platforms that will usher in an international trading environment, likely with blockchain.

3 Robotics

Chat bots are taking online customer service to the next level, enabling personalised and customised orders, returns and claim management. Examples include:

- Robotics optimised warehouses – major organisations such as Amazon run fully automated warehouses and dark stores, reducing labour and energy, and improving asset utilisation.

- Driverless vehicles, drones and on-board technology including GPS and track and trace devices are optimising transport routes to reduce congestion, and are enabling major efficiencies for the economics of last-mile delivery.

4 The Internet of Things

The growing impact of digital commerce will drive greater investment in supply chain analytics, and the lure of faster decision making and eradicating inefficiencies will drive investment in smart machines, IoT and the associated SCM software. IoT can provide real time telemetry data to reveal the details of production processes. With IoT, retailers could better synchronise pricing at various stages of the supply chain.

Deep dive: Challenges of product master data accuracy

The highest priority data theme to the TPF executive group is PMD misalignment and inaccuracy. To further analyse the issue a focus group workshop was held involving 20 participants from 10 suppliers and retailers from Australian and New Zealand.

After reviewing the initial study findings, the TPF requested a deep-dive analysis into the root causes of misaligned and inaccurate PMD. The study team worked with industry to identify and prioritise root causes for PMD misalignment and inaccuracy, and brainstorm potential ideas that may help improve the situation. This led to a workshop with three key objectives:

1 Identify and prioritise the root causes of misaligned and inaccurate PMD.

2 Quantify the impact of misaligned and inaccurate data.

3 Develop practical and 'blue sky' opportunities for improvement.

The group identified and prioritised five key causes of misaligned and inaccurate PMD:

Figure 5: Five key causes of misaligned PMD

1 **New product introduction**	The new product introduction (NPI) process often results in misaligned and inaccurate data across the supply chain and there is an imperative to focus on identifying and resolving the issues to drive master data improvements.	**High***
2 **Product changes**	Product changes create data inconsistencies and there are no feedback mechanisms to correct data.	**High***
3 **Unclear standards and requirements**	The master data standards and requirements can be ambiguous, unclear and somewhat open to interpretation.	**Medium***
4 **Consumer data standards**	Consumer data expectations continue to evolve and expand and existing standards must continue to keep pace. Currently they are managed separately to product master data.	**Medium***
5 **End-to-end digital traceability**	Improvements to product recalls and withdrawals could be affected with the introduction of electronic record of batch identification and best before date at retail level.	**Low***

*   Level of importance was determined at the Product Master Data workshop in August, participants voted (and prioritised) the root causes of product master data misalignment

1   New product introduction

The new product introduction (NPI) process often results in misaligned and inaccurate data across the supply chain and there is an imperative to focus on identifying and resolving the issues to drive master data improvements.

Problem	In the time between making a decision to stock a product and product launch, there can be changes to the products' master data. Current process and systems utilised by retailers and suppliers can result in misaligned and inaccurate data sets being used within their businesses and differences between the agreed and submitted data may not be evident until the actual product is received or causes problems in the supply chain.
Impact	• Retailers are unable to meet store layout designs and timeframes • Distribution and ranging is negatively impacted • Increase in redundant stock • Potential accidents and injury • Automated DC's increase rejection rates • Lost sales • Supplier payment and relationship issues
Root cause	• Timelines may not be communicated and agreed between retailer and supplier specifically for PMD • Lack of visibility of the product development or product launch process (progress, status, owners etc.) • Lack of process to identify and / or resolving misaligned master data

Case study

The below example was provided by a workshop participant to highlight both the causes and impact of misaligned and inaccurate data.

Figure 6: Causes and impact of misaligned and inaccurate data

Supplier creates new line with basic info:
• Product Code
• Default Ti Hi

Supplier Finalises Product
• Pallet Ti Hi not updated in NPC

Supplier picks, packs and ships product

Suppliers system may or may not have been updated

Retailer uses info to initiate initial new line activities

Retailer Orders Product

Product arrives with incorrect Ti Hi leading to:
• Manual intervention to correct information to enable product to be received
• Retailer system updated

2 Product changes and no feedback loop

Product changes create data inconsistencies and there are no feedback mechanisms to correct data.

Problem	Once a product is 'live' and on the shelves it can change over time at both a product and pack level. A product could be sold in a pack of four, and then changed to be sold as a pack of six. If PMD is not updated in a coordinated, timely fashion, it causes problems for the entire supply chain and consumer. In some instances suppliers do not update the information or updates are made too late.
Impact	• Retailer data becomes inaccurate • Consumers are provided incorrect information • Stock rejections or stock acceptance and then returns / complaints • Increased unavailability and lost sales • Increased claims between supplier and retailer
Root cause	• The product change rules and guidelines are confusing or not followed • There isn't an easy way to notify suppliers of data discrepancies • Change processes do not involve the appropriate stakeholders and are not streamlined • The end-to-end impact of getting it wrong is not well understood

A participant indicated that there can be up to seven individual's required to update PMD when an inaccuracy is identified.

3 Unclear standards and requirements

The master data standards and requirements from partners can be ambiguous, unclear and somewhat open to interpretation.

Problem	• There is inconsistent application of the industry standards in place to manage PMD • There is inconsistent use of terminology across the industry, causing confusion • Some suppliers (due to scale and maturity) are not aware of product master standards
Impact	• Results in significant rework • Causes delays in ranging • Increased amounts of redundant, aged stock • Wasted media spend
Root cause	• Standards and examples given are unclear, allowing for different interpretation • Standards are not continuously improved • Lack of training and guidance especially for new staff

Examples provided by workshop participants include:

• Nutritional information associated with serving size

• Details on when a product is a promoted, and whether this should impact the barcode.

4 Consumer data managed separately

Consumer data expectations continue to evolve and expand and existing standards must continue to keep pace. Currently they are managed separately to PMD.

Problem	• Consumer data such as nutrition, allergens, and ingredients are not consistently digitised and linked to PMD
	• What is presented online by retailers is often manually collated and separate to the data provided by suppliers
	• Increased use of digital channels is putting more pressure on accuracy of consumer facing data, as consumers are now expecting this information to be accurate
Impact	• Additional work to manage both sets of data linked to the product (product / supply chain and consumer facing data)
	• Product information inaccuracy could potentially be shown to consumers
	• Increase in complexity of systems required to connect, update and manage different sets of data across the industry
Root cause	• Supply chain and consumer facing data have been managed separately
	• Consumer information is not consistently requested as part of the NPI process
	• Demand for consumer facing information is increasing and systems need to address the changing and increasing demands
	• Solutions to manage images and video have been developed separately to supply chain PMD

Note: Through our industry engagement we have also been liaising with the US Grocery Manufactures Associations (GMA) who are currently investigating a combined solution for managing consumer and PMD.

5 End-to-end digital traceability

Improvements to product recalls and withdrawals could be affected with the introduction of electronic record of batch identification and best before date at retail level.

Problem	Retail organisations currently do not keep an electronic record of batch ID or best before dates, leading to manual product recalls with high levels of waste. Digitally capturing batch and best before date would improve inventory management process, particularly product recalls.
Impact	• Potential increase in the levels of waste due to an inability to electronically identify products best before date or batch ID
	• In some instances all SKUs are disposed of from retail locations (regardless of actual batch ID or best before date)
Root cause	• A misalignment between where the cost to create this capability will be incurred vs. the benefit of creating this capability

One supplier indicated that product recalls can cost up to $1 million per recall.

Solution ideas generated by the industry

Workshop attendees identified five areas to address the root causes of misaligned and inaccurate PMD. The TPF Executive Committee are reviewing the opportunity to deliver industry wide improvements to PMD and seeking to prioritise them.

Quick wins (within 1 year)	Outcomes
Flag PMD as incomplete Define, Refine and Utilise: Agree on a mechanism to create improved visibility between trading partners as to the level of completeness and accuracy of PMD.	• Clear definition of industry level requirements • Clear understanding of current process and gaps • Agree on process and systems to improve visibility • Implementation of changes
Alignment of process and timelines Define, Agree and Communicate: Trading partner level alignment relating to timing, KPIs accountability and visibility of master data creation and changes (NPI and product changes).	• Agreed to principles and ways of working (timings, KPIs, accountability, visibility etc.) • Agreed ownership and continuous improvement approach • Communication and change program (executed)
Industry user guides Refresh, Communicate and Educate: Industry guidelines relating to master data creation and maintenance.	• Updated guidelines to better reflect industry requirements • Communication of updated guidelines (training) • Defined continuous improvement approach
Consumer facing information Investigate, Design and Implement: Solution to improve the accuracy and alignment of consumer facing product information.	• Identification of current and future industry level requirements • Identification of potential solutions • Prioritised list of solutions
Digital best before and batch ID Research, Investigate and Validate: Options to create a digital record of best before and batch identification at a retail level.	• Cost benefit analysis of investing in technology capability to electronically capture best before batch ID.

Three more transformational solutions have been identified to address the root causes of misaligned PMD.

Transformational change (1 year plus)	Outcomes
One source of the truth Define, Design and Implement: Industry solution adopted by all partners that has capability for feedback, audit and data validation and provides visibility of work in progress.	• Future state operating model • Prioritised list of improvement initiatives
Technology 1 – Visibility Define Design and Test: Technology solution where PMD creation and changes are automatically synchronised across the value chain. Enabling: aligned, secure and controlled data.	• Requirements definition for future state technical solution • Identify technical solutions
Technology 2 – Traceability Define, Design and Test: Technology solution to provide end-to-end traceability in a secure and impartial manner.	• Identification of a technology solution to provide this information

Figure 7: Solution matrix for aligning PMD

Improvement initiatives

Root causes	Alignment of processes and timelines	Industry guidelines and standards	Consumer facing information	Best before and batch	One immutable source of the truth	Technology 1 – Visibility	Technology 1 – Traceability
1 New product introduction	✓				✓		
2 Product changes and no feedback loop	✓	✓			✓	✓	
3 Unclear standards and requirements		✓					
4 Consumer data managed separately		✓	✓				
5 End-to-end traceability				✓			✓

Conclusion

The supply chain continues to function and meet the needs of trading partners and consumer, however the demands for accurate, aligned and timely data are set to intensify.

As the industry becomes more complex data will become essential to the efficient delivery of products. Improving product master data and reducing the levels of inaccuracy and misalignment across the supply chain and between trading partners is an important part of delivering operational benefits. Additional demands from consumers, governments, regulators and pressure groups requiring more information is also driving the importance of accurate and aligned data sharing. PMD is considered an essential building block between trading partners across the supply chain and as the industry increasingly communicates directly with consumers an imperative.

Dedicated to helping the industry improve PMD the TPF is considering the role of new product introduction and product change processes in delivering trustworthy, accurate, aligned and timely information on products shared across the value chain. Once it is in place, data shared between trading partners can take on a new significance, a new reliability and a new consistency.

Further work is required by industry to recognise and determine the impacts of current new product introduction and product change processes so as to understand the issues which impact PMD integrity and alignment between trading partners and their systems, with the objective of delivering efficiency enhancements, business enablers and standards across the industry.

Study methodology

The study utilised interviews to understand current and future data requirements, and focus groups to develop potential industry initiatives. A conference gathered participants to review trends, validate findings and align on future projects.

Figure 8: PMD project group roles, responsibilities and methodology

Project groups and methods

Source: KPMG project documentation

Description

Executive Committee

1
- Steering group and ultimate owners for the study
- Ensures program of work aligns and meets the overall objectives
- Actively manages scope, risks and issues
- Review and sign-off of findings and reports

Sponsors

2
- Champion to study (topic and approach) to ensure active engagement
- Stay informed of progress and assist unblocking any major issues
- Acts as the bridge between project team and the Exec Committee
- Together with KPMG project team, provide updates to the Exec Comm on major findings and risks

KPMG project team

3
- Management of the study – data gathering, analysis and reporting development
- Provide insight on leading data / technology trends (global and local) – refer to slide 12 for more detail
- Identification and escalation of risks and issues
- Provides updates to sponsors and Exec Committee on a regular basis

Interviews

4
- Explore current data requirements, impacts, root causes (identify case studies)
- Understand dependencies on other actors, upstream / downstream
- Understand current data initiatives
- Understand commercially sensitive requirements

Workshop

5
- Presentation and discussion on data trends and issues
- Development of industry-wide alignment on data requirements
- Further detailing and validation of proposed initiatives
- Agreed report structure and tone

Secretariat

6
- Day-to-day support for the project team
- Coordination and facilitation of study stakeholders

KPMG contributors to this industry report include:

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A comprehensive and sector-based research approach to gain insights from the whole industry including:

- Primary producer
- Manufacturers
- Distribution
- Retailer
- Standards Organisation and other third parties
- KPMG subject matter experts

About

Trading Partner Forum

The meeting place for suppliers and retailers focusing on end-to-end value chain efficiency, the TPF emerged from the well regarded industry body 'Efficient Consumer Response Australasia' (ECRA), which stood to support the Australasian FMCG and Supermarket industry since 1999. The food and grocery industry is one of the most dynamic and fiercely competitive sectors of the Australasian economy. It is an industry facing an increasingly and rapidly changing environment where a strong and profitable future for Australian and New Zealand suppliers and retailers is dependent on increased efficiencies, optimised costs and added value for shoppers and consumers. The TPF's mission is to bring together FMCG suppliers and supermarket retailers in pursuit of business practices that contribute to driving growth, delivering efficiency and improving availability across the end-to-end value chain, benefiting suppliers, retailers and shoppers, without impeding competition law.

Visit http://www.tradingpartnerforum.com.au/

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