Transforming the Last Mile

Emerging innovations and solutions in the challenging world of customer-centric logistics

Executive summary

E-commerce is causing a tidal wave of change in how companies interact with shoppers and business customers. To meet growing customer expectations in today's omni-channel world, companies are transforming all aspects of their businesses. This is especially true for transport and logistics (T&L) processes that are impacted by the accelerating number of shipments, the shrinking size of orders and a growing list of preferences for delivery options. Large e-commerce companies and various start-ups have identified last-mile services as a key competitive differentiator.

With access to products from around the world, customers are making purchase decisions more frequently, and for smaller orders. This is driving a sharp rise in the number of deliveries needed, in the shortest amount of time. With the majority of deliveries (and returns) being made in urban, congested areas, the cost per delivery is skyrocketing.

Customer-centric logistics—or the "last mile"—is particularly impacted by these trends. Value chains are evolving into value networks with retail marketplaces emerging as the orchestrators. As a result, marketplaces and logistics service providers (LSPs) are expanding their logistics platforms to offer customers the convenience of ordering from a range of brands along with other services.

Open collaboration platforms are also developing and multiple shippers and carriers are coming together to bundle and optimise last-mile deliveries. These collaborative platforms and services are being driven more and more by web application programming interfaces (APIs) that connect multiple trading partners and help provide services like appointment scheduling.

As customers interact across multiple channels, vast amounts of data are being collected by omni-channel stakeholders. There is an opportunity (and a challenge) to turn this customer intelligence into actionable insights and visibility for improving how deliveries are made in the last mile.

Clearly, new T&L paradigms are needed to deal with the challenges of this new buying environment—where the power resides with customers. Luckily, new innovative models are emerging.

To aid interoperability, a standardised parcel transport label has been created to enable common ID amongst all stakeholders in the supply chain. Similar standardisation initiatives are being implemented in many jurisdictions, including Australia.

Urban consolidation centres are also emerging — impacting the flow of deliveries into cities and the flow of information between trading partners. By using a common set of data standards, all stakeholders can gain visibility into the delivery process and achieve a higher drop-density rate.

Parcel lockers are gaining popularity, helping to streamline the delivery of orders to multiple customers, and from multiple sellers. These lockers can provide significant cost savings and ease last-mile fulfilment challenges. Additional cross-border savings can be realised through special services that combine deliveries in the retailer's country for transport to the customer's country.

With the mix-move-match concept, delivery consignments are built close to customer delivery locations; and with collaborative routing centres, shipments are bundled by multiple shippers and carriers. This reduces the number of trucks required and provides relief from traffic congestion around customer locations. In fact, some stakeholders like manufacturers and LSPs are partnering to fully utilise space on each company's trucks for time and cost savings, and ultimately, greater customer satisfaction.

GS1 standards can enable efficiencies to these emerging services and innovations with the necessary and beneficial foundation of unique identification—of trading partners, locations, transport and logistics units, shipments and assets. When used by all trading partners, GS1 standards enable the seamless flow of physical deliveries along with the flow of information—propelling the transformation of the last mile for the benefit of all.

> Emerging innovative models are surfacing where trading partners are collaborating and sharing data to drive increased efficiencies in customer-centric logistics.

Introduction

For many decades, GS1 standards have served stakeholders in global supply chains exceptionally well, saving them billions of dollars while increasing the efficiency of processes, the quality of data and the safety of consumers. And as the world of commerce has evolved, so has the value of GS1 standards.

Consider retail and its dramatic transformation since 2010. The main reason: the rapid rise of e-commerce.

Euromonitor International forecasts that global retail e-commerce will be worth €1.8 trillion in 2021.[1]

This fast growth of e-commerce has shifted the power in retail completely to the consumer.

Shoppers can now choose from a wide range of buying and delivery options. Their high expectations regarding delivery are becoming as commonplace in business-to-business (B2B) as in business-to-consumer (B2C) environments. They expect the same (or better) services in their working lives than what they experience in their personal lives.

The importance of B2B e-commerce cannot be ignored or understated. Even today, the value of B2B e-commerce sales is more than three times larger than sales from B2C e-commerce.[2]

Global internet retail sales, €tn

Figure 1: Mobile commerce will account for more than half of online sales by 2021.

This is forcing all stakeholders in the omni-channel landscape to redefine their processes, making fundamental changes in how they interact with consumers and business customers.

One major area of change is in the Transport & Logistics (T&L) sector.

The number of shipments spurred by e-commerce is increasing rapidly and now far exceeds the number of shipments in traditional retail distribution. A similar rapid rise in small shipments is related to the reverse flow of goods caused by consumer returns.

Transportation and logistics costs are also sharply rising when compared to the value of an order or the purchased products. In 2017, Amazon spent approximately US $47 billion on shipping and fulfilment. Amazon's delivery costs represented 26.4 percent of the company's net sales, a 66 percent increase when compared to costs in 2009. And this percentage continues to rise.[3]

New strategies need to be developed that will help sellers deal with the challenges of the emerging buying environment, where the power ultimately resides with consumers and business customers.

In this white paper, we focus on customer-centric logistics by exploring the trends, business needs and emerging innovations and solutions that are re-shaping the last mile. We also show how GS1 standards have remained relevant and powerful in supporting everyone involved in this exciting, though challenging, time of transformation.
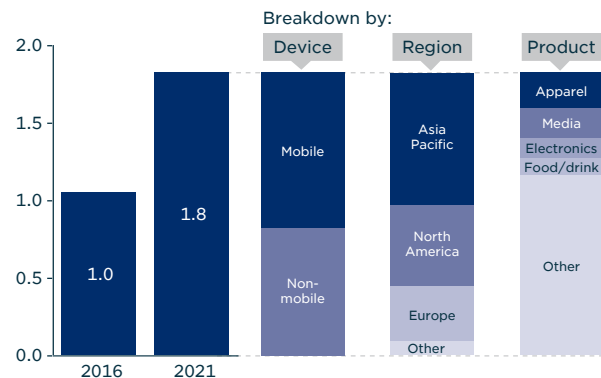
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1   "2017 IPC Global Postal Industry Report," International Postal Corporation.

2   "Global Ecommerce: Statistics and International Growth Trends," Shopify, 1 September 2017.

3   Richter, Felix, "The Growing Weight of Amazon's Logistics Costs," Statista, 13 February 2018.

Customer-driven trends

Companies are quickly realising that their current value chains and processes are not effectively addressing consumers' expectations in the omni-channel world. In this section, we examine some of the trends and areas of transformation in customer-centric logistics.

Omni-channel ecosystem

Value chains are evolving into value networks that can more easily respond to consumer demands. Marketplaces such as Amazon, Alibaba, Flipkart, bol.com and eBay have emerged as orchestrators of these networks where consumers can order products from many different manufacturers and retailers. Global marketplaces are expected to own nearly 40 percent of the online retail market by 2020.[4]

Road freight carriers will continue to be used in some customer-centric logistics processes for the delivery of large items and large orders. Yet, courier, express, parcel and postal (CEP) carriers are expected to become dominant players due to the dramatic upsurge in small deliveries from omni-channel commerce. In fact, many postal organisations have aggressively moved into the area of last-mile delivery due to revenue potential. The global parcel market reached almost US$ 350 billion in 2017.[5]

To best serve the consumer and business customer, last-mile business processes are now considered to be integral components of the omni-channel ecosystem. Three different platforms are emerging with the consumer in the centre. They include:

- **Marketplaces** are expanding with logistics services. An example is Amazon providing a dedicated set of logistics services via its platform for both its own goods and goods sold by other merchants.

- **Dedicated LSP platforms** are expanding with omni-channel services. An example is DHL's platform: allyouneed.com. It offers consumers the convenience of ordering products from a wide range of brands and manufacturers in the fast moving consumer goods (FMCG) and consumer packaged goods (CPG) markets.

- **Open collaboration platforms** are developing. France's Collaborative Routing Centre (CRC) is an example where multiple shippers and carriers collaborate to optimise transportation and logistics processes by bundling flows. These platforms are an attractive option for smaller online retailers that want to benefit from collaboration opportunities. Big brands may also use these platforms for slow-moving items that are not easily handled by their own transport networks.

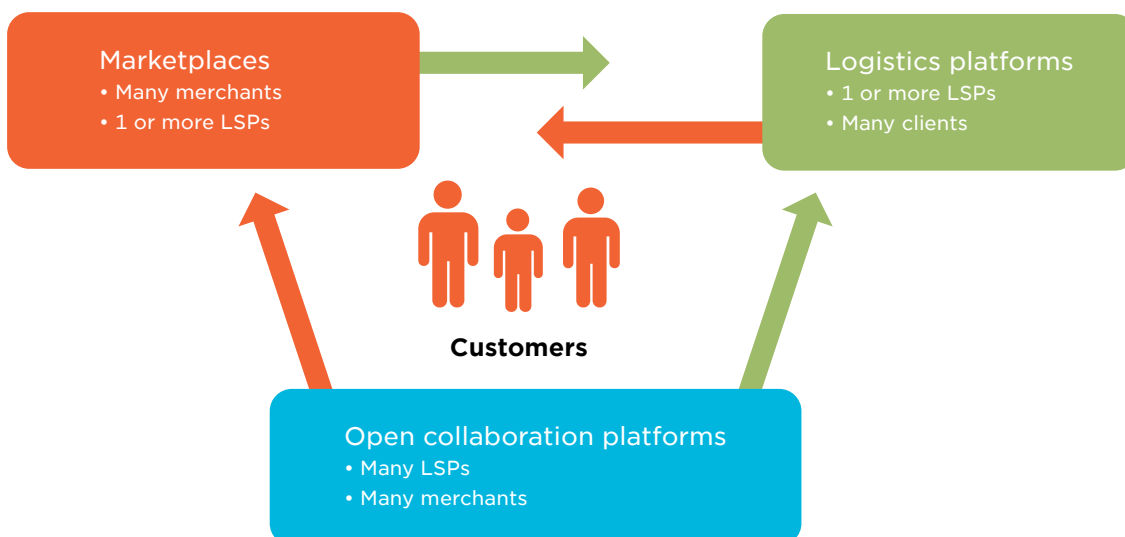## Ecosystem of developing value networks

Figure 2: Emerging platforms will offer different strategies to address the challenges of customer-centric logistics and customer needs.

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4   "The Rise of the Global Market Places," Research conducted by Ecommerce Foundation, Nyenrode Business University and several other partners.

5   "China's Express Firms Delivered 40 Billion Packages in 2017," Cargo Forwarder Global, 21 January 2018.

The physical internet

Another trend is the evolution of the physical internet. The "physical internet" is an open, global logistics system based on physical, digital and operational interconnectivity, made possible through encapsulation, interfaces and protocols. It's intended to replace current logistics models.

Here's how it is expected to work:

- Parcels will travel independently even when they belong to the same customer order. At or close to the final destination, the order will be "put back together" and delivered to the customer.

- The routing of the parcels through the network will be done dynamically at each node in the network. Nodes can be warehouses, terminals, (e.g., rail, maritime, ports, airports etc), cross-docks—or any location where goods may be received, sorted and re-shipped.

- As the parcel travels through the network, the nodes will make routing decisions based on business rules, including time, cost, utilisation and reliability, and up-to-the-minute information about the network.

The physical internet promises significant improvements in cost and reliability of the movement of goods from sources to destinations. To work seamlessly, it will need to rely heavily on standardisation and collaboration.

Distribution options

The consumer has had a major impact on the way products are distributed. Retailers offer home delivery and click-and-collect options. These were largely managed using retailer-owned distribution networks—their own carriers, stores and distribution centres (DCs)—and distribution units that include crates or cases with mixed content.

Yet another option has been added to the distribution mix—individual items delivered directly to the customer. This method has evolved to distributing any type of item, often involving parcel carrier networks. As a result, small parcels have become a dominant flow in last-mile distribution.

The value networks—from source to customer—now consists of many stages. Supply networks supporting these value networks are also comprised of many different stages and involve many different players, driving complexity and increased cost.

Customer intelligence

Data—and its real-time sharing between stakeholders—are critical to consumer-centric value networks, enabling all players across the network to leverage customer intelligence and insights. Customers provide vast amounts of data—or customer intelligence—when interacting with components of value networks.

All of this data creates new opportunities for omni-channel partners to drive efficiencies in processes and provide increasingly personalised service to customers. This customer intelligence can be converted into actionable insights that can significantly impact customer-centric logistics processes and drive efficiencies. This requires closer integration and collaboration between stakeholders in the value network.

Data is also required for real-time visibility of shipments and to dynamically manage their movements as they travel throughout value networks. Aggregated, historical data may be used to optimise value network configurations, improving how packages are delivered, even to individual customers.

Collaborative platforms and services

With a growing number of partners in value networks, a shift is happening from traditional data exchanges such as electronic data interchanges (EDI) to different types of data exchanges and information aggregators such as web application programming interfaces (APIs). These new models are expected to play a role in distribution systems that must rely on each other, but may not be connected by traditional EDI-exchange models.

Consider the new kinds of services and processes that can be driven by web APIs that either directly connect peer-to-peer players or connect multiple partners through collaborative platforms.

Collaborative platforms are being used in collaborative routing centres (CRCs).[6] Shippers can now send full truck loads over long distances from a central distribution centre to local DCs. At these centres, last-mile deliveries from multiple shippers are combined for consolidated deliveries to customers, often in fully loaded trucks.

Appointment scheduling and data retrieval for delivery locations are examples of services for all involved, based on standardised APIs. (See page 10.)

6   "Collaborative Routing Centres; Increasing shop delivery frequency while reducing number of deliveries," Presentation by GS1 France, 5 October 2016.

Customer-centric needs

In both B2C and B2B environments, customers are searching for and buying products online that can be from anywhere in the world. They are buying more frequently and using a growing number of information sources. Customer orders are becoming smaller and more frequent, with lead times for fulfilment getting significantly shorter.

In this section, we examine the growing needs of customers and the associated challenges for all stakeholders.

The optimal utilisation of vehicle space is no longer the major constraint—instead, it's the number of deliveries that a driver can make during the shift.

Carriers and LSPs

Today, most last-mile deliveries and returns are made in densely populated areas. Carriers are struggling to execute these deliveries in a cost-effective way and it's expected to get worse. The World Economic Forum projects that by 2050, approximately 66 percent of the population will live in cities and urbanised metropolitan areas and mega-cities.[7]

For logistics service providers, there is a sharp rise in the number of delivery locations—from thousands to millions—along with very small deliveries required in very short delivery times.

Customers have also created their own "personal supply chains," making use of multiple fulfilment options to suit their own wishes—in store, click-and-collect, delivery to home, delivery to a collection point and more. In turn, returns processes have become much more complex.

These challenges can be addressed when all stakeholders, including the customer, collaborate to create a transparent value network that supports the selection of the most appropriate fulfilment option. With visibility across the value network, massive increases in deliveries and returns can also be handled much more efficiently. Ultimately, this will result in higher performance levels, greater customer satisfaction and a significant reduction in order fulfilment costs.

Warehouses and stores

Traditional warehouses—even the most modern ones—are struggling to efficiently and effectively cope with the new business requirements of customer-centric logistics. Combining or re-combining inbound shipments coming from different sources is becoming more complicated: the number of shipments to be cross-docked is much higher than volumes formerly seen in the B2B environment and shipment sizes are correspondingly smaller.

Growth in warehouse automation is fundamental for improving productivity and driving more volume through the same warehouse capacity.

It is expected that brick-and-mortar stores will be increasingly used as stock-holding points in response to the need for expedited fulfilment.

In-store inventory is becoming part of the total inventory visible for shoppers online. The consumer can determine if their desired item is available in a store nearby for immediate delivery or for collection within the hour. Without a single view of inventory that spans all warehouses and all stores, omni-channel fulfilment options can remain limited or fail. An additional challenge for stores is the identification of SKUs, to ensure the right item is picked.

A warehouse routinely achieves 98 percent accuracy, which means that when looking for a product only 2 in 100 picks fail. In a store, 2 in 5 picks fail. The warehouse performs 20 times better than the brick-and-mortar store. In a modern warehouse using up-to-date technology and processes, fewer than 1 in 200 picks will fail—80 times better than in a store.

A standardised identification system used by partners in customer-centric logistics can help address the need for higher precision and speed when fulfiling orders in e-commerce.

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7   "Future of Urban Development and Services," World Economic Forum, 25 October 2017.

Customer preferences

The variety of delivery options and the perceived quality of the delivery services are major decision criteria for online customers, directly impacting a company's success in e-commerce.

With this in mind, all types of sellers are working hard to provide customers with the best buying experience possible, especially by improving delivery times and options.

However, there still seems to be little consensus about the kind of delivery services consumers actually desire and whether or not they are willing to pay for the added convenience.

Based on a McKinsey survey of more than 4,700 respondents in China, Germany and the U.S., a growing group of consumers advised they want faster home delivery, yet most, approximately 70 percent, are highly price sensitive.

Still, the significant percentage of consumers with same-day delivery preferences suggest that stakeholders should not neglect this segment, given that up to 27 percent of respondents claim that they prefer not to buy items online due to long delivery times.[8]

Customer preferences may also vary considerably by region and by country, according to a study done by the International Post Company.[9]

For example, delivery to a post office was highest in Russia, Iceland, Cyprus, Finland and Greece while an office or workplace location was commonly used in China and India. Parcel lockers are most popular in Finland, Denmark and China.

Whilst customer preferences are still unclear, companies are testing carrier agnostic parcel lockers in countries such as Denmark, Sweden, Poland, Finland and some in the Asia-Pacific region such as Australia and Hong Kong.

Australia Post launched a system in 2014 that gives customers the flexibility to choose which location suits them and to change it for every shop.[10]

The task for companies to offer the right delivery options is certainly a daunting one.

Furthermore, customers increasingly expect that each e-commerce player will meet their preferences and expectations for deliveries. This may be feasible in B2B environments where customers are often repeat buyers and willing to record and maintain their preferences with the seller, yet is much more of a challenge in the B2C environment where information about a consumer's preference is often lacking.

For example, knowing when shipments may be best delivered to a home address (including last minute changes) continues to cause a significant number of practical problems. Also, the consumer may want delivery made to the office Monday through Friday and at home the other days of the week.

E-commerce players may analyse huge quantities data collected as part their operations to predict an individual consumer's preference. Yet, many consumers are unhappy about the vast quantities of information that e-commerce players already collect about them and they may be unwilling to provide even more to accurately determine preferences.

To truly address consumer preferences, this information may need to reside and be maintained in repositories (other than those of retailers) with dynamic connections between retailers' systems and the repositories. This would require standardised APIs so that, when implemented, the systems and repositories would become a collaborative, interconnected platform.

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8 "Parcel delivery: The future of last mile," McKinsey & Company, September 2016.

9 "Delivery choice – Parcel lockers," International Post Corporation," March 2018.

10 "Delivery choice - Parcel Lockers", International Post Corporation, 2019 overview
   https://www.ipc.be/services/markets-and-regulations/e-commerce-market-insights/e-commerce-articles/2019_parcel-lockers

Cross-border regulations

As early as 2014, approximately 30 percent of online shoppers were buying goods internationally. Since then, consumer behaviour of shopping internationally has continued to grow. Projections are that as early as 2020, this number will increase toward 45 percent.[11]

	2014	2015	2016	2017	2018	2019	2020
Cross-border shoppers (billions)	0.309	0.361	0.451	0.571	0.715	0.848	0.943
Domestic online shoppers (billions)	1.006	1.101	1.150	1.183	1.193	1.185	1.171

■ **Cross-border shoppers (billions)** ■ **Domestic online shoppers (billions)**
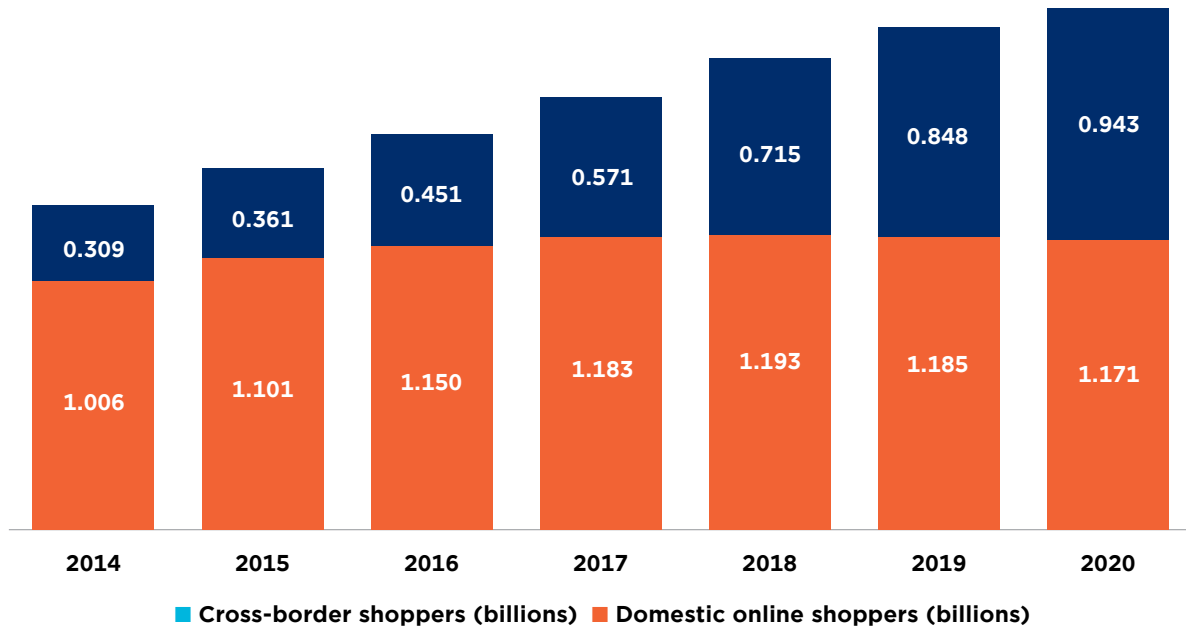
Figure 3: More than 900 million consumers (45% of all online shoppers) will purchase products internationally by 2020. (Source: Alizila 2015)

With this growing customer need, sellers are working to overcome the many challenges they face with cross-border trade. One major regulatory development to help EU companies is the European VAT e-commerce regulation.[12]

The EU recognised the explosive growth of e-commerce consignments imported into the EU. Based on current regulations regarding low-value consignments and having to pay VAT and duties, imports were having a significant negative impact on EU companies competing against foreign companies.

To counter this, the VAT e-commerce package states that every item imported into the EU must be declared and the applicable VAT (and duties) must be paid before entry of the goods into the EU. As of 1 January 2021, the new regulation will be effective throughout the EU. This will substantially impact the organisation and flow of shipments from outside the EU, into the EU.

It is expected that the new EU VAT regulations will require electronic advance data to be provided by operators responsible for these imports into the EU. Global marketplaces as well as global LSPs that serve them will experience significant changes in their cross-border operations.

Industry associations and government agencies in Australia* and China, for example, endorse the application of open, global standards. These local initiatives will have a significant impact on the way that supply chain stakeholders will design and operate their logistics networks.[13]

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11 "Report: Cross-border E-commerce to Reach $1 Trillion in 2020," Yahoo! Small Business.

12 "Digital Single Market – Modernising VAT for cross border e-Commerce," European Commission.

13 "ALC Board endorses adoption of global data standards," GS1, 21 August 2018 and "General Office of the Ministry of Commerce, General Office of the Ministry of Finance, on Carrying out Supply Chain System Construction," Department of Circulation Development, Ministry of Commerce, China.

* As referenced in the National Freight and Supply Chain Strategy, August 2019
https://www.freightaustralia.gov.au/sites/default/files/documents/national-freight-and-supply-chain-strategy.pdf

Emerging innovations and solutions

It's important to note that some of customer-centric logistics' challenges are being addressed by businesses and regulators. In this section, we outline some of these steps toward making customer-centric logistics a more transparent and interoperable environment.

Parcel identification

As part of its Digital Single Market Initiative,[14] the European Commission (EC) is working to make the European Union's "single market fit for the digital age—tearing down regulatory walls and moving from 28 national markets to a single one."

The EC issued a mandate to the European Standardisation Organisation (CEN) for the development of standards for cross-border parcels. In May 2017, CEN delivered the first part of that mandate with the technical specification (TS 17073) for *Postal Services – Interfaces for cross-border parcels*. This achievement was the result of a collaborative effort by representatives from postal organisations, online retailers, and courier, express and parcel service providers.

The ultimate goal is to transform cross-border parcel delivery services through the use of a single, harmonised parcel label that includes a common parcel identification code.

CEN designated the GS1 Serial Shipping Container Code (SSCC) to uniquely identify parcels and enable interoperability between all stakeholders in the parcel delivery network. By implementing the new CEN harmonised parcel label that uses open global standards, formerly closed networks can now be connected to create an end-to-end delivery network. Senders of parcels can use the same label for all parcels and all handlers of the parcel will be able to use its SSCC to more easily track the parcel's journey—from sender to customer and, if needed, back to the sender for a customer's return.
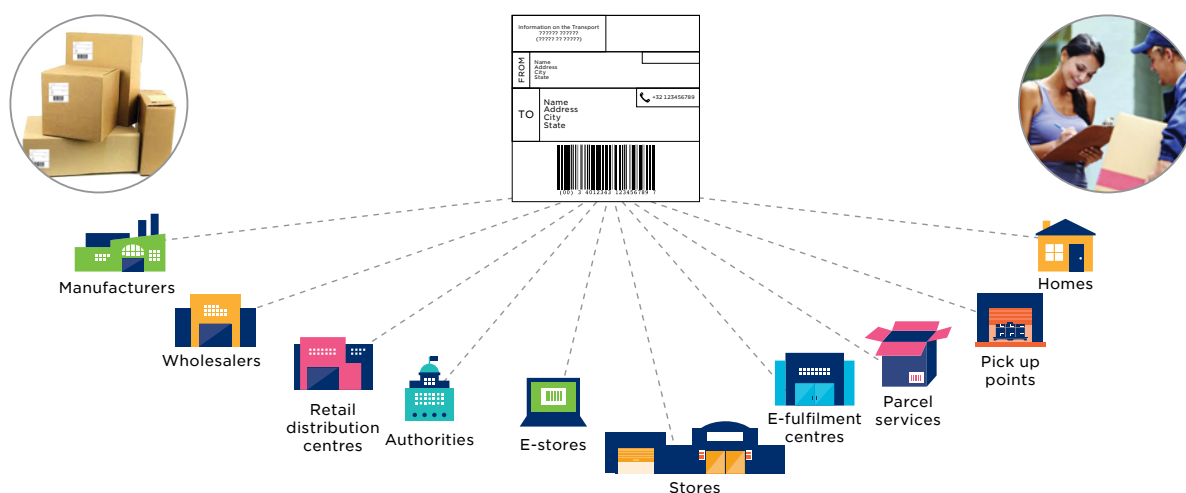
The harmonised parcel label

Figure 4: The vision of the harmonised parcel label—created and attached by the original shipper—is to be used by all players, from manufacturing to customer sites.

Local implementation guideline

As the leading peak body for supply chain in Australia, the Australian Logistics Council has endorsed the adoption of GS1 standards for how freight should be identified and labelled to improve interoperability of information flows across the transport process. A local guideline has been published.*

14 "Digital single market: bringing down barriers to unlock opportunities," European Commission.

*   "Australian Freight Labelling Guideline,"
     https://www.gs1au.org/download/GS1au-guideline-australian-freight-labelling.pdf/file

Urban deliveries

In urban areas, drivers spend a significant amount of time travelling, severely limiting the number of possible customer deliveries and making the cost per delivery very high when compared to the value of the goods. One root cause: None of the players have enough scheduled deliveries per area to make its deliveries cost-effective.

Urban consolidation centres and consolidated deliveries[15] have been successfully implemented in several cities around the world. The centres receive shipments from many different shippers that are delivered by many different carriers. However, they recombine shipments from multiple shippers into a single consolidated delivery to a recipient within the urban area.

While the physical flow of goods is re-arranged, so must the flow of information. Binnenstadservice, a Dutch urban consolidation centre, was the first organisation to implement the CEN harmonised parcel label into daily operations.

All carriers used by Binnenstadservice for city deliveries now use the CEN parcel labels. When making a delivery in the city, the driver simply scans the GS1 SSCC encoded in a barcode printed on the parcel label, that identifies all packages to be delivered to a customer. The scans are loaded into the Binnenstadservice system that also contains the original shipper for each of the packages delivered. As each package is delivered, the system triggers a "confirmation of delivery" for its original shipper.

Urban consolidation centres significantly reduce the number of deliveries transported into the city, thus reducing the environmental impact. They also help inner city carriers achieve a higher drop-density rate, making deliveries much more cost-effective. In addition, the use of common standards greatly improves the efficiency and effectiveness of information pertaining to urban deliveries.

Parcel lockers

For a consumer, it is often easier to have orders delivered or dropped off at a secure locker. The retailer delivers the parcel to the locker where the consumer can collect it, using a security code. These lockers may be dedicated to a single carrier network (e.g., Kiala of UPS, DHL Parcelshops, Australia Post and many more), requiring the consumer to go to the locker of the specific carrier chosen by the retailer. When ordering from different online retailers, the consumer would need to pick up orders from multiple locker locations.

Dedicated locker providers have emerged as well, allowing receipt of deliveries from multiple carriers such as MyPuP.nl. The consumer registers once with the locker provider, and when placing orders, instructs the retailer to deliver to the preferred locker location.

Figure 5: Inner city delivery vans today transport mostly air. Urban Consolidation Hubs help to fill the void in these vans.

15 Sådan virker Citylogistik (How does city logistics work?) video, YouTube, www.youtube.com/watch?v=lIB9vve66LI

Singapore has started a nationwide pilot with federated parcel lockers that will be shared by many carriers.[16] The lockers will be located in convenient, accessible areas such as public transport stations and common collection points close to residential blocks.

The system will allow users to pick-up parcels at a convenient point near their homes if they are not around to receive them regardless of which carrier delivers the parcel into the federated locker station. It will provide cost savings and efficiencies to retailers and logistics service providers by easing last-mile fulfilment challenges.

Figure 6: Singapore federated parcel lockers will provide users with a convenient pick up point for parcels.

Import consolidation

When customers place orders with international online retailers, the delivery charges may be significant due to cross-border shipping costs.

Special services are emerging that help reduce these costs for the customer by consolidating deliveries in the country where the online retailer is located. This consolidated delivery is then transported to the customer's country of residence.

Charges for delivery by the retailer to the consolidation point are at domestic rates, which are much lower than the international rates—and since the subsequent international transport is consolidated, significant savings can be achieved.

Examples of this service are ParcelMotel in Ireland, EShopWeDrop in several countries in Europe, DimBuy in Hong Kong and OYM-PTS in China.

Mix-move-match

With the mix-move-match[17] concept, customer deliveries are built as close as possible to the customer's delivery location. Logistics units can be mixed together to optimise utilisation over the long haul.

Furthermore, when building the customer delivery, any and all logistic units that are available at the location where the delivery is built, can be consolidated into a single customer delivery. Logistics units consolidated into the customer delivery may come from many different locations and they may also originate from different shippers.

To be effective, the mix-move-match process requires the unique identification of the logistic units like the use of the GS1 SSCC, regardless of shipper, and a consolidation point close to the delivery point.

The mix-move-match process has been implemented by 3M across its supply chain and a dozen LSPs that serve 3M. Several of these LSPs have implemented the mix-move-match process for other clients.

Due to the increased efficiencies, 3M has achieved an overall reduction in logistics costs in excess of 35 percent, and more than doubled the average vehicle utilisation.

In the 3M mix-move-match implementation, GS1 standards are used for identifying each logistics unit, shipment and consignment. The GS1 SSCC is encoded in a barcode on a Logistic Label attached to each logistics unit—from the smallest parcel to the largest pallet. 3M also uses a set of GS1 message standards for transport execution.

16 "Common parcel locker system to start pilot in Bukit Panjang and Punggol," *The Straits Times*, 21 May 2018.

17 Mix, Move, Match video, YouTube. www.youtube.com/watch?v=nxAkfTsAM9k

Collaborative routing centres

As mentioned earlier, another emerging best practice is the concept of collaborative routing centres (CRCs). In France, multiple shippers and multiple carriers are collaborating to optimise customer-centric logistics by bundling shipments, where appropriate.

Shippers can now send full truck loads over long distances from a central distribution centre to the local CRC. At the CRC, last-mile deliveries from multiple shippers are combined for consolidated deliveries to the customers, often in fully loaded trucks.

The use of CRCs has resulted in significant reductions in the number of trucks required for deliveries to customers, leading to reduced traffic congestion. CRC processes work seamlessly, thanks to a collaborative platform that was developed for data sharing amongst trading partners. Equally important is the shared-use of cross-docks through which last-mile deliveries are executed.

A similar approach can be used in any logistics centre that receives, sorts and recombines shipments of parcels from multiple shippers to be transported to their next destination. In fact, the hubs in mix-move-match networks operate in this way.

Rethinking utilisation

The concept of utilisation in T&L is generally defined based on one of four constraints, to include:

- Number of pallet places available

- Volume available in the transport vehicle or equipment

- Maximum weight the vehicle or equipment can carry

- Time available to execute deliveries and collections of goods and cargo—a result of customer-centric logistics

Shippers and LSPs alike are usually satisfied when just one of these utilisation rates is achieved. However, some shippers have started combining the volumetric utilisation with weight utilisation.

P&G and Tupperware found they moved goods between many of the same locations in Belgium and Greece. P&G was moving fully utilised vehicles based on weight, and Tupperware was moving fully utilised vehicles based on volume.

The companies decided to combine their shipments, filling the open space above the P&G pallets. In effect, they have achieved full utilisation in terms of both volume and weight constraints.

By combining shipments, P&G and Tupperware have achieved much better utilisation of their respective vehicles. They have been able to take advantage of using lower cost transport options such as rail, and have increased the frequency of transporting goods over this lane.

The companies estimate a 17 percent collaborative savings on lane costs.[18] Tupperware, has also reduced the average lead time between orders placed in Greece and their deliveries.

Figure 7: P&G and Tupperware now consolidate their shipments in a Belgium hub, building full-height pallets. These are then loaded for their journey to customers in Greece.

The P&G and Tupperware utilisation process is made possible by their use of the GS1 SSCC that uniquely identifies the mix of boxes on each pallet, encoded in barcodes on GS1 Logistic Labels.

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18 Deketele, Lieven, "Horizontal collaboration at P&G: experiences and challenges" presentation.

Implementation blueprint

GS1 offers T&L stakeholders a wide range of standards to help them build a necessary foundation of unique identification for transparent—and efficient—last mile processes. Here is an example of how GS1 standards enable deliveries through urban consolidation centres. One key standard, the GS1 SSCC as the common parcel identifier, is critical to this new model's success. (See Figure 8.)

1. The shipper generates the GS1 SSCC that links to information about the specific products—identified via Global Trade Item Numbers or GTINs—and the quantities that are included in the shipment. The SSCC is encoded in a barcode on a harmonised parcel label.

    The product and quantity information is also linked to reference data like customer order numbers and the GS1 Global Shipment Identification Number (GSIN) that identifies the shipment or group of parcels that make up the customer order.

2. The shipper hands off all parcels to a carrier for delivery in a city centre. The carrier scans the barcodes on all parcels, each containing an SSCC, to manage their transport from the shipper's location to the urban consolidation centre.

3. The carrier transports the shipment of parcels to the urban consolidation centre that confirms receipt of each individual parcel based on its SSCC. The consolidation centre also receives parcels from other shippers in need of inner city deliveries.

4. The consolidation centre has received the delivery location and other relevant information about each parcel from each shipper in advance of their receipt. Since the shippers have used identifier—Global Location Numbers (GLNs)—for the delivery locations, the consolidation centre can easily consolidate all parcels for delivery to the same customer location. Shipment information provided by the GSIN may be used to validate that all parcels making up the customer order have arrived.

5. The delivery of the entire shipment can be made. The final delivery consignment identified by the GS1 Global Identification Number for Consignment (GINC) and information about the specific parcels to be delivered are linked.

6. The consolidation centre hands off the final delivery consignments to a carrier for the delivery location in the inner city. These carriers confirm the SSCC of each parcel.

7. The carrier delivers the shipment of parcels to the customer who confirms receipt by uploading SSCC-level confirmations into the consolidation centre system. The centre can validate that the carrier has made all deliveries and make payment for the deliveries, using the GS1 GINC for each as a reference.

8. The consolidation centre can also confirm to shippers that the parcels have been delivered successfully, using the parcels' SSCCs. The consolidation centre can now charge the shipper or the receiver for its services.
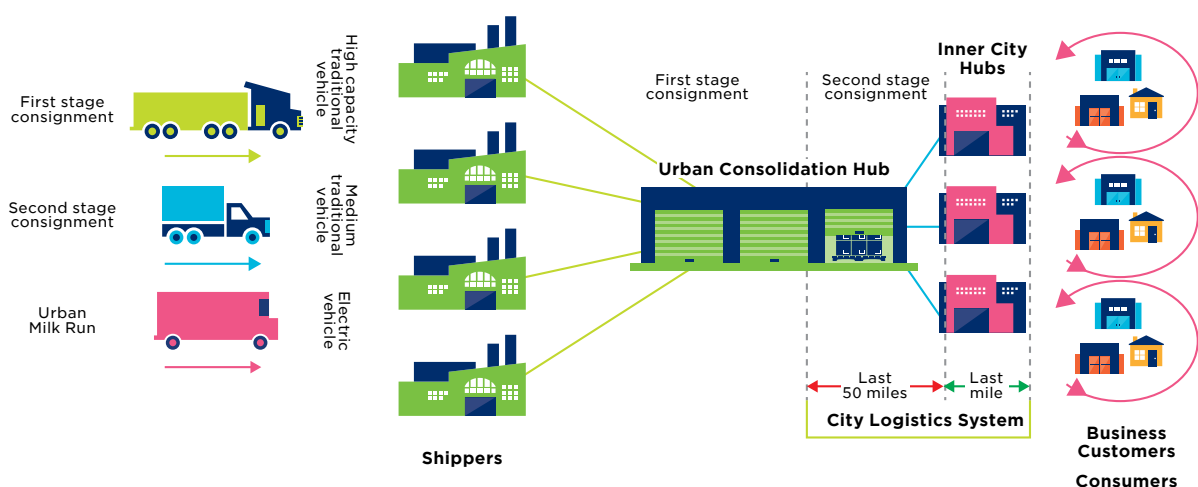
Urban consolidation hubs

Figure 8: Urban consolidation hubs in the supply chain have a positive environmental impact since they reduce the number of deliveries into cities.

Opportunities in the last mile

For 45 years, GS1 standards have been used in a variety of industries across the globe, especially throughout Transport & Logistics. They have helped improve efficiencies in transport and delivery management, in warehousing and asset management, and to speed cross-border shipments through customs organisations—with proven results.

As emerging innovations help to solve some of the toughest challenges in T&L, GS1 standards remain relevant today—especially in customer-centric logistics.

GS1 standards can help lay the foundation needed for T&L companies as they digitally transform and adapt to the changing world—both in the long haul and in the last mile.

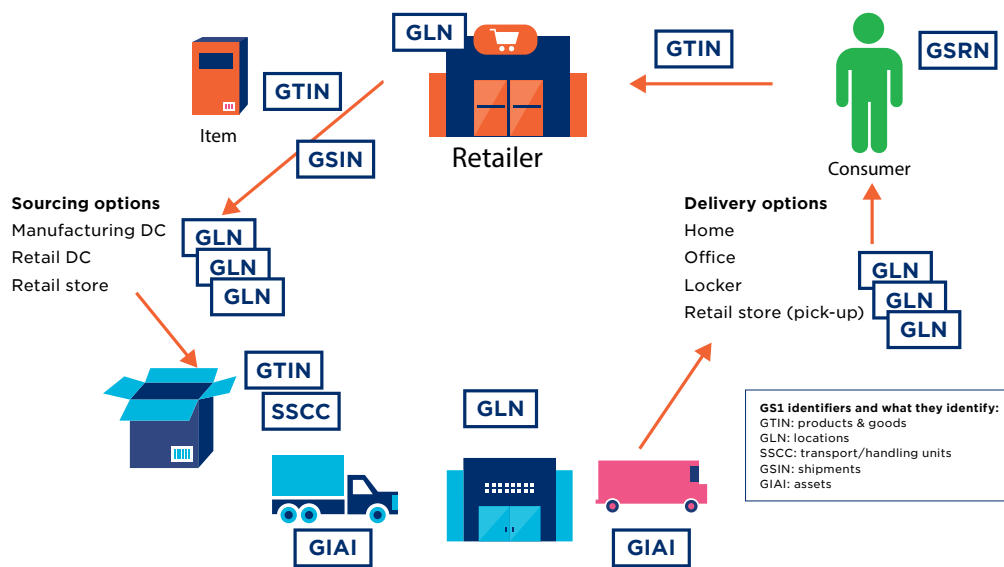### GS1 identifiers in customer-centric logistics

Figure 9: GS1 identifiers in customer-centric logistics provide the needed foundation for traditional and emerging last-mile solutions.

Take the opportunity to explore how GS1 and its portfolio of global data standards can help your company transform its customer-centric logistics processes. Contact GS1 Australia at freight.logistics@gs1au.org

GS1 standards recognised by ISO and other standard bodies

GLN - ISO/IEC 6523 (Global Location Number)

SSCC - ISO/IEC 15459-1 (Serial Shipping Container Code)

GSIN - ISO/IEC 15459-6 (Global Shipping Identification Number)

GINC - ISO/IEC 15418 (Global Identification Number for Consignments)

GTIN - ISO/IEC 15459-6 (Global Trade Item Number)

Learn more

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About GS1 Australia

GS1 is a neutral, not-for-profit organisation that develops and maintains the most widely used global standards for efficient business communication. We are best known for the barcode, named by the BBC as one of "the 50 things that made the world economy". GS1 standards and services improve the efficiency, safety and visibility of supply chains across physical and digital channels in 25 sectors.

With local Member Organisations in 112 countries, 1.5 million user companies and 6 billion transactions every day, GS1 standards create a common language that supports systems and processes across the globe.

For more information visit the GS1 Australia website **www.gs1au.org**

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