GLOBAL STANDARDS IN SUPPLY CHAIN MANAGEMENT. BEST PRACTICES IN CONSUMER GOODS AND RETAIL INDUSTRY

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Abstract: The Global Commerce Initiative (GCI) established the Global Upstream Supply Initiative (GUSI) in order to provide a standard framework for consumer goods manufacturers and their suppliers of ingredients, raw materials and packaging to better integrate across a number of supply chain processes.

Without Internal Data Alignment, for example, Global Data Synchronization (GDS) will definitely not improve business performance and will, in fact, magnify the negative impact of poor quality data. What's more, collaborative initiatives such as those included in Efficient Consumer Response (ECR) and Collaborative Planning, Forecasting and Replenishment (CPFR) will not be economically deployable on a wide scale without the consistently accurate and available information that will result from an Internal Data Alignment program.

GDS is based on a global network of data pools, or electronic catalogues, which are all inter-operable and compliant with the same business requirements and standards. Interoperability means that a manufacturer can publish a product and partner data on one single Data Pool without having to worry about the fact that customers may select different Data Pools to access the data.

Integrated Suppliers is a concept for improving the part of supply chain between manufacturers and the tiers of suppliers of ingredients, raw materials and packaging. By sharing information both parties are able to exercise judgment on costs, quantities and timing of deliveries and productions in order to stream line the production flow and to move to a collaborative relationship.

Key words: Global Standards, Information Alignment, Consumer Goods, GLN (Global Location Numbering), GTIN (Global Trade Items Numbering), GDS (Global Data Synchronization), Integrated Suppliers, UIM (Upstream Integration Model), GUSI (Global Upstream Supply Initiative)

JEL Codes: L81, L60

Overview of Global Data Synchronization (GDS)

Information sharing in the supply chain

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Information sharing can address three key areas in a product life cycle: Greater sharing of information about consumer trends and market trends between trading partners can lead to greater insights into consumer behavior, enabling both partners to better serve the consumer. Sharing information about real demand between two trading partners can enable the development of products that better meet consumers' needs. Sharing of accurate, real-time operational information between the two trading partners can lead to better use of assets in the supply chain. This can improve product availability and consumer satisfaction at the point of purchase. Accurate information is the basis of any commercial enterprise. This is particularly true in the fast-moving, quick-response world of manufacturing and retail. As the pace of change continues to quicken, the following questions asked in our industry require greater levels of collaboration between vertical partners in the supply chain to meet the needs of consumers better: - Product development: What do consumers think of my new product concept? How will consumers use my new product?

- Marketing: What are the new consumer trends? What is my current share of the market? Are people shopping in a store or via the Internet?
- Manufacturing: How much do I need to make of my new product? Have I got the raw materials and packaging that I need? Is what I am doing going to meet my financial targets?
- Logistics: How much product do I have? Where is it? How much do I need? Where do I need it? What are the benefits of this proposition for my retail partner? What is the best way to merchandise this product to drive purchase at the point of sale? What is the best promotion with which to drive a trial?
- Buying: What impact is this product going to have on my category sales, margin? How attractive is this for our shoppers? Will it grow incremental sales, or just cannibalize what I already sell?
- Store managing: Are my shelves full? What deliveries am I expecting? Have I got enough staff to cope with peak traffic? Am I meeting my financial targets? By building a better way of sharing information over the entire supply chain, these questions can be addressed more easily and all parties in the value chain can improve their ability to serve the consumer. Ask yourself, "How good are we at answering these questions?" [1]

New Ways of Working Together is about developing new ways for vertical trading partners to work together – including sustainable changes in culture, collaborative business planning and new measures and rewards. For a bilateral trading partner relationship, it offers an integrated roadmap for getting alignment and commitment on four key strategic choices in the collaboration of trading partners, which can ultimately lead to more satisfied shoppers and the elimination of waste, both of which should, in the end, produce better business results.

The ability to share data determines how effectively we are able to work together. Many companies still tend to keep their information within silos, unavailable not just to external bodies, but also to different departments within the same organization. While corporate-wide implementation of Enterprise Resource Planning (ERP) systems is slowly helping to improve the availability of information, there is still a long way to go. Some companies see information as a revenue source and are reluctant to share it, while there is a lack of general agreement among the members of the value chain about which data is collaborative and which competitive (obviously respecting antitrust guidelines) [1].

Some of the changes that need to be made with regard to information sharing will affect the whole industry; others will be bilateral arrangements between individual trading partners, as each company finds out "what works for us". The reforms needed are in systems, in practice and in philosophy, and cover, for example, a common vision of the value to be created by sharing information across participants in the value chain or changing the way data is exchanged. A GCI group worked on the development of data flows linked to the process of new product introduction, identifying what the information needs would be in 2016, as well as possible solutions, like a POS data sharing platform. The group analyzed the current situation and outlined the action needed to move the industry forward. A number of group members are now working to establish pilots on information sharing across several steps of the new product introduction process [2].

Global Commerce Initiative vision for Global Data Synchronization (GDS)

Data synchronization is the process of sharing master data between trading partners (details of materials for sale within a market). GDS is based on a global network of data pools, or electronic catalogues, which are all inter-operable and compliant with the same business requirements and standards. Interoperability means that a manufacturer can publish a product and partner data on one single Data Pool without having to worry about the fact that customers may select different Data Pools to access the data. A Global Registry controls the flow of information within the network. Obviously , perfect alignment of Master Data is a necessity to support advanced collaborative practices, but the effort of undertaking such a project is worth it : exchange of master data through data pools is the most efficient and reliable method to implement modern collaborative practices.

Strategic Direction

To support and implement the GCI vision for GDS is the strategic direction for many multinational companies. Under the Global Commerce Initiative was developed the first truly global approach to Data Synchronization.

GCI lives and operates through various Global Working Groups. Its backbone is the GCI Executive Board. A small group of key members of the Executive Board form the Global Steering Group, which develops policy recommendations and oversees the day-to-day work of GCI.

The participation of these companies in GCI board reflects the commitment to influence a standard approach to GDS in the corresponding industry sectors and to help removing the identified barriers to implementations.

A known best practice in the area is always to collaborate with customers or suppliers with confirmed GDS commitment while aligning internally to create the readiness for efficient and effective large scale implementation of GDS, in terms of organization, processes, data and systems.

Buyers and sellers would be able to focus on building sales rather than on correcting misaligned information. When a new product is launched the data will be exchanged in a seamless and streamlined way through the supply chain, allowing the right amount of goods to become available at the right place and at the right time – and faster!

This is the vision that GDS enables through providing the fundamental infrastructure for the seamless flow of product information through the supply chain (within and across borders).

This GDS vision is delivered by the GDS Network. The network (Figure 1) consists of:

- Interoperable, certified Data Pool
- A Global Registry; provided by GS1
- A set of EAN.UCC Standards, ensuring that all supply chain partners use common product descriptions and classification and the same message structures to exchange the data.

These elements of the GDS Network collectively support the synchronization of product data between trading partners.

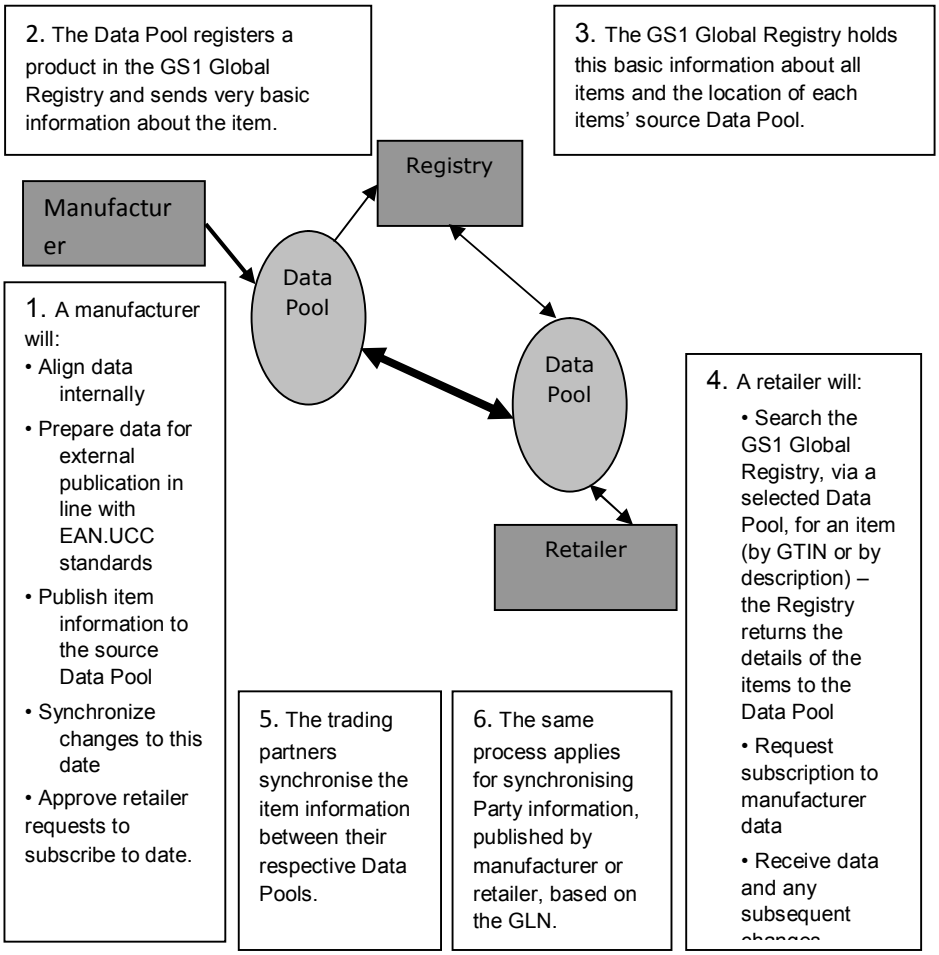

Figure 1: GCI vision for GDS

Source: An integrated view of the Global Data Synchronization network on the Electronic Product Code Network, GCI and IBM, 2004 [3]

The GS1 Global Registry and the interoperable Data Pools are at the heart of the GDS process. Their roles and functions are distinct but complementary. The key role of the GS1 Global Registry is to ensure that original data is registered

once, at one place. Data Pools provide for the publication of certified standard data and subscription to this data.

The Network works with the following principles:

- The GS1 Global Registry and the Data Pools will be EAN.UCC certified
- There is interoperability among all Data Pools and the GS1 Global Registry
- One single point of entry into the Network by all participants
- Only the Data Pools will communicate with the GS1 Global Registry
- Only GDS EAN.UCC Business Messages will be used within the Network.

Compliance with GCI – GDS Business Principles

Any data pool to be certified GCI compliant must support:

- Each trade item is identified by a valid EAN / UCC Global Trade Item Number (GTIN)
- Each party / location is identified by a valid EAN / UCC Global Location Number (GLN)
- The flow of information between Trading Partners is based on Master Data Definition in the GCI – Global Data Dictionary (GCI – GDD)
- Global, Global / Local, Local Master Data GCI – GDD Concept
- Item hierarchy GCI – GDD definition – i.e. for each given item hierarchy level, identified by a GTIN, the next lower level, identified by a GTIN, is specified with the related quantity (use of link transaction).
- The selected / recommended GCI – Product Classification
- Data required by Target Market
- Full respect of the Data Ownership

Compliance with GCI – GDS Functionality

The role of a Data Pool is to ensure that:

- A Data Source Publishes consistent Master Data
- Any item / party published is first registered with the Global Registry
- Master Data published is consistently distributed to the target Markets / Data Recipients
- The Master Data published is updated, accessed, viewed, searched only by authorised parties

In the GCI – GDS Inter-Operable Network:

- Data Pools access the Global Registry in one defined and standardised way
- Data Pools inter-operate through standardised information flow
- A Data Pool cannot take over the functionality of the Global Registry (and vice versa, the
- Global Registry cannot delegate its functionality to any data pool).
- Data Pools must ensure that they do not pass on information on items and / or parties that have not been registered.
- Data Pools must be capable of receiving, from the network, and forwarding standard GCI XML messages. [8]

Role and function of the Registry

The Registry of the GCI Global Data Synchronisation Network is a Global Service available to all GCI certified Data Pools. Logically, it is a single entity within the network, providing a function, which is distinct from that supplied by the data pools.

This functional distinction between registry and data pools means that, wherever it resides, and however it is organised, the registry remains distinct from the data pools that it serves. The data pools cannot take over the function of the registry, and the registration process will, by definition, remain the responsibility of the registry and not of any other entity within the network. This report will form the basis for invitations for proposals to provide the registry service and it is, therefore, focussed on the definition of what the registry should do and what performance criteria it should meet. This report does not specify the design or organisation of the registry, which will be the responsibility of the organisations proposing to run it.

The selection of the organisation (or organisations) to run the registry, the governance of the registry and its technical certification will be the responsibility of a neutral governing body. The registry will be accessible from any GCI certified data pool and not in any other way and the data flows between the registry and the data pools will be based on GCI certified XML messages. The development of these messages is expected to result following the acceptance of this document.

The registry plays a key role in the operation of the Global Data Synchronisation Network, as well as in maintaining its integrity:

- The Global Registry maintains a register of items and parties involved in the global supply chain to ensure that each item and each party has exactly one authoritative record in the GCI GDS network.
- The Registry ensures the uniqueness of the information linked to the primary database key for each item and party. This allows multiple parties - e.g.

manufacturers and distributors - to supply information relating to an individual GTIN.

- The process of registration consists of:
  - Receiving a request for registration of validated data from a GCI compliant data pool
  - Checking that the information provided complies with GCI rules
  - Validating the uniqueness of the GTIN or GLN to be registered against the primary key.
  - Storing data for valid, unique GTINs / GLNS
  - Rejecting data for invalid / Non unique GTINs / GLNs
  - Confirming registration or rejection to the submitting data pool with an appropriate message

- The Registry holds a pointer to the data pool where detailed information regarding an item or party is physically stored. The Data Pool where an item or party is entered is called the Source Data Pool. It is the only entity authorised by the information supplier to update the registry for that item or party and it is the location in the GDS Network that maintains the complete record of data for it. This is in contrast to the Home Data Pool of an organisation, which is the preferred entry point for that organisation to the network but may not be the only place in which it has entered item or party data. For the set of data that it hosts, the Registry is continually synchronised with Data Pools and vice versa. The design of the registry should ensure that all requests for registration are processed in sequence, by GTIN, at the time they are received.
- The Registry provides a basic search facility to the Data Pools. On demand, the Registry supplies the address of the Source Data Pool for an Item or Party to the Data Pool that asked for it
- The control of distributor authorisation is a complex manual process, which should not be prioritised ahead of the implementation of a simple GDS network. The validation of parties authorised to supply information for particular GLNs or GTINs is therefore outside the scope of the current report but may be addressed in a subsequent phase.

Data Pools and the Registry

The diagram shown on Figure 1 illustrates the GCI – Global Data Synchronisation Network where Data Pools and Registry inter-operate. A B2B exchange is part of the Global Data Synchronisation Network (GDSN) when it offers (or hosts) a GCI compliant data pool service The GDS Network is bounded by the security and authentication provided by the data pools. The other services compliant with GCI standards (e.g. CPFR) that an Exchange may offer are not certified as part of the GDS Network.

The success of the GCI Global Data Synchronisation Network will depend on the efficiency with which Data Pools inter-operate with each other and with the Registry. The service provided by the Registry is critically important and no Data Pool can be handicapped by receiving less than the best that is possible. This makes it necessary to ensure that the Registry is not operated selectively to provide a competitive advantage to any data pool and that the Registry does not compete with the Data Pools.

- To ensure that this does not happen, two fundamental rules will be applied in the selection and operation of the registry service:
- The operation of the registry function must not generate a competitive advantage for any particular data pool
- All data pools must communicate in the same way with the Registry
- Business and contractual arrangements must clearly distinguish between registr and data pool services.

The GDS Network will be synchronised using standardised XML messages for all information flows. Standard XML messages will also be used for communication between Data Pools. Data Pools will also need to support these messages in communicating with data sources and final data recipients although the standard XML interface between the Data Sources and the GDSN and the interface between the Final Data Recipient and the GDSN is not mandatory.

To ensure a standard implementation of the Network, all Data Pools and the Registry will be certified compliant to GCI approved standards. Standards will be defined for the Registry and the Data Pools and for the functions they perform. Any public or private organisation - including, inter alias, industry bodies, companies operating in the supply chain and B2B Exchanges - will be entitled to apply for certification of their data pool functions.[9]

Data

Master data synchronisation (or alignment) through data pools is recognised as the most efficient way to support the master data sharing between trading partners (ECR Europe newsletter, September 1998). The benefit of data pools is that the use of their services mandates the adoption of standards. The development of most national data pools in the world are claimed to be based on EAN / UCC standards such as the Global Trade Item Number (GTIN) for the unique identification of items, EANCOM messages such as PRICAT and PARTIN, etc. Although many data pools support EAN /UCC standards, their development appears having been mainly focused on national requirements. This has led to the implementation of different structures and designs. In order for global data

synchronisation to be viable, data pool inter-connection and inter-operability is essential.

Key business components and requirements of the global data synchronisation process are:

- Leveraging data pools in order to benefit from the potential they offer
- The registration of all items and locations to facilitate sharing of master data
- The implementation of standardised information flow to support the data registration and synchronisation

In order to meet these requirements, the following is needed:

- Implementation of a Global Registry to control the registration of items and locations,
- Amendment and further development of data pools in order to comply with the GCI specifications (master data dictionary (GCI / Data dictionary), rules, principles, synchronisation process, etc.)
- Development and implementation of standardised messages between data pools and the Global Registry
- Development and implementation of standardised messages between data pools and users (companies) based on the GCI / Data dictionary.
- Establishment of a Neutral Body for the governance and certification of the Global Registry

Establishment of a Neutral Body for the Technical Certification of data pools.

The initial implementation of the GDS vision is focused around Master Data for 'Item' with 'Location' intended to follow soon after. Master Data is the set of data describing the specifications and structure of each Product (or Item) and Location (or Party) involved in Supply Chain Processes, based on the key identifiers, the Global Trade Item Number (GTIN) and the Global Location Number (GLN).

The Master Data is an Information Alignment that can be divided into Neutral and Relationship Dependent Data.

Neutral Data is that which is generally shared between multiple parties and which is Relationship Independent. This can be split into three categories:

- Core Product Data – Core Data Attributes that apply to all instances of any product (e.g. description, brand name, packaging, dimensions, etc)

- Category Specific Data – Data Attributes that only apply to specific product categories (e.g. the color, grape and strength of a bottle of wine)

- Target Market Data – Data Attributes that are specific to product in a particular market (e.g. packaging indicators in a specific country).

Relationship Dependent Data – Data Attributes that concern all terms bilaterally agreed and communicated between trading partners such as marketing conditions, price information and discounts, logistics agreements and more [3].

Global Upstream Supply Initiative (GUSI)

The Global Upstream Supply Initiative (GUSI) was formed to define a common way for manufacturers of consumer products and their suppliers to provide tighter integration of their supply chains, without the need for costly and time-consuming IT integration projects with every customer or supplier. The UIM (Upstream Integration Model) developed by GUSI comprises a set of agreed business processes and information flows supported by electronic message exchange based on GS1 standards.

The Global Commerce Initiative (GCI) established the Global Upstream Supply Initiative (GUSI) in order to provide a global standards framework for consumer goods manufacturers and their suppliers of ingredients, raw materials and packaging to better integrate across a number of supply chain processes.

The GUSI Working Group first established an Upstream Integration Model (UIM), which defined a number of standard business processes and information flows for different scenarios. These scenarios covered different situations where consignment stock was or was not involved and covered the case where the manufacturer initiated the order (Traditional Order Management) or where the supplier initiated the order (Supplier Managed Inventory).

In both cases, greater supply chain integration is achieved by improving visibility of both inventory and demand throughout the supply chain.

The GUSI Working Group decided to adopt the GS1 XML message standards to exchange information between the trading partners in support of these supply chain processes.

It is important to highlight that each business case must be tailored to the actual situation depending on the individual supplier and manufacturer, the industry, the products, etc. The starting point for the companies will also be different. The business case for companies that have already invested in

collaborative supply chain solutions will focus on the cost to adopt the GUSI model vs. the benefits gained from extending their collaboration community, while the case for a company introducing collaborative solutions for the first time will focus on the initial investment vs. the benefits gained from collaboration based on the GUSI model.

- The potential benefits can be categorized as:
- Hard benefits (tangible)
- Likely benefits (quantified) (tangible)
- Qualitative benefits (non-tangible)
- Stretched benefits (non-tangible)

Tangible benefits are those associated with a monetary saving, e.g. from collaboration which can give reduced inventory, material cost reduction, reduced errors, optimized production planning, reduced paper handling (e.g. e-billing) etc.

Non-tangible benefits refer to all those that cannot directly be put into monetary terms, e.g. improved data quality, increased flexibility and reliability towards customers. Although difficult to quantify, intangible benefits can be significant and add weight to an ROI study [4].

Business Rationale

The current situation in the upstream supply chain of the CG industry is that all manufacturers and suppliers are faced with different business processes and data interchanges when they move into more integrated relationships. Different business processes and approaches create a barrier to the scalability of integration efforts whilst also imposing many costs: the time and money spent making transactions; the delays caused by the need for corrections; plus inevitable information gaps and misunderstandings. Both parties should obtain benefits from integration, among them improved visibility of demand and demand changes and reduced inventory. Today, to access these benefits, each program between manufacturer and supplier has to establish its own framework for process definitions, item and location coding and in many cases message content. This is both a wasteful process and in itself presents a significant barrier for scaled adoption. For example, integrated suppliers consists in the challenge to integrate with multiple manufacturers, each one with its own definition of the above factors. The existence of a framework based on industry standards overcomes the described barriers and:

- Creates a common definition of the business processes involved in upstream integration and how they link together. This creates a “common language” that

can be used in all electronic communications by all parties. It also goes beyond the existing standards that are mainly focused on data interchange definitions;
- Supports and strengthens relationships between integrated manufacturers and suppliers through one common standard and reduced complexity;
- Increases efficiency through better visibility of planning, forecasts, production, reduced inventory, reduced re-work and waste;
- Provides a foundation to enable business programs to be implemented in a common way thereby:
    - Reducing complexity
    - Reducing implementation costs (including IT costs)
    - Accelerating adoption and implementation (by enabling the scalability)
- Enables solution providers to build solutions that can be used by all parties;
- Provides a basis for reviewing and adopting internal processes – while still allowing keeping the internal processes as-is and "translating" them into the common language proposed in the UIM model [5].

The working group has taken into account existing standards and work undertaken by previous projects. In particular it has built on work sponsored by ECR Europe (The concepts of "Integrated Suppliers" of Ingredients, Raw Materials and Packaging report as published in March 2002 by ECR Europe and Fraunhofer Applications Centre for Transport Logistics and Communications Technology) [6].

The ECR "Integrated Suppliers" report summarized the concept of 'Integrated Suppliers' as follows: *"Integrated Suppliers is a concept for improving the part of the supply chain between manufacturers and the tiers of suppliers of ingredients, raw materials and packaging. By sharing information both parties are able to exercise judgment on costs, quantities and timing of deliveries and production in order to stream line the production flow and to move to a collaborative relationship."* Where the ECR report was about the 'supplier driven' continuous replenishment processes, (supplier recommends the order to the manufacturer) it did not include 'manufacturer driven' ordering processes. The UIM covers both aspects and covers more elements that can be improved in the manufacturer/supplier relationship - for example, next generation electronic data exchange based on exception management [6].

Case for using existing GS1 item and location coding standards

A significant change proposed is that manufacturers and their suppliers should adopt the GS1 standards for item and location coding to create a common coding system across the supply chain - downstream as well as upstream. It is felt that the time is right for this move given that:

- There is strong manufacturer commitment to the GS1 standards;

- There is an increased manufacturer momentum to build automated solutions that will scale;
- There is increasing supplier awareness of the inefficiencies of the existing methods;
- There are new technologies expected over the next few years that will be based on existing GS1 standards. By adopting the existing standards, suppliers will be able to migrate to these new technologies. An example is the emerging use of Radio Frequency Identification (RFID). To use RFID companies will need to adopt the new GS1 Electronic Product Code (EPC) Network being developed. The EPC will provide a coding structure for radio frequency tags enabling individual items or groups of products to be tracked across the supply chain. The existing GS1 item-coding standards are embedded in the new EPC structure. It therefore provides a good first step towards new RFID-based solutions [5].

The main GS1 standards that suppliers and manufacturers should use are the:

- "*Global Trade Item Number"(GTIN):* a unique and international EAN.UCC number is assigned to each trade item or to a standard grouping of trade items. This number is known as the GTIN. Each GTIN data structure is represented by a bar code symbol. This allow for the identification numbers to be scanned for automated data capture and electronic data processing.
- *Global Location Number (GLN).* Location numbers are a key concept in supply chain management. A location number is a numeric code that identifies any legal, functional or physical entity within a business or organization. The identification of locations is required to enable an efficient flow of goods and information between trading partners through electronic messages to identify the parties involved in a transaction (e.g. buyer, supplier, place of delivery, place of departure).

The Upstream Integration Model (UIM)

The UIM and Information Alignment offer common business processes and data interchanges to support upstream interoperability between manufacturers and suppliers. By engaging in such an integration effort, business partners wish to:

- Create value in the supply chain for mutual benefit;
- Apply practical solutions fitting the nature of their business;
- Share and synchronize data and processes;
- Co-manage the materials lifecycle through the definition of business rules;
- Apply industry standards;
- Push the concepts through the whole supply chain.

It has been designed to meet the major electronic communication needs in the following business areas:

- Procurement;
- Material forecasting;
- Inventory management;
- Dispatch, Receipt & Consumption of Materials;
- Financial Settlement.

By adopting this model manufacturers and suppliers will have a common language for the processes and data interchanges within their electronic integration relationships. To achieve this, the model contains very specific definitions of process terms, data exchanges and their content. Adopting the model allows companies to translate their internal processes and approaches into a common language that all other parties will be using. The UIM structure creates a common set of definitions that all parties can use, whilst still allowing them to use their own internal definitions and processes, possibly with a requirement to translate internal information into the standard structure of the UIM.

The concept of the model is based on six building blocks, structured as per Figure 2 below:

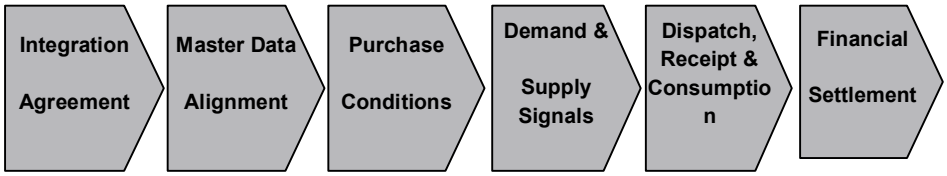

Figure 2: UIM Building Blocks

Source: GUSI working group [5]

The UIM offers a collaborative approach to both supplier- and manufacturer- initiated ordering processes and addresses the most common variants of them based on either a manufacturer or supplier driven scenario [5].

The "manufacturer driven" scenario describes a situation when orders are initiated by the manufacturer and sent to the supplier. This scenario is also known as "Traditional Order Management (TOM)". TOM is specifically appropriate:

- when the supplier and the manufacturer operate synchronised planning (with low stocks on both sides)

- when the demand forecast accuracy is low (horizon = manufacturing lead-time) or where thereare irregular, seasonal or promoitetimonsa; l phase-in/phase-out stage of the product life cycle.

In the "supplier driven" scenario the supplier recommends or establishes the order to the manufacturer based on the manufacturer inventory data and/or consumption forecast. This last one is widely known as "Supplier Managed Inventory (SMI)". The UIM can be used by trading partners starting from scratch or by those who have implemented the integration of some of the building blocks in the past. In the last scenario, companies might need to adjust some of the processes or information interchanges in order to accommodate differences of the UIM building blocks.

In the implementation of the UIM it is important to specify that the implementation costs of the UIM will vary widely from one company to another, depending on factors such as its current IT landscape, its current usage of standards and the ambition level of the implementation.

The data interchanges are based upon GS1 e-commerce standards that enable communication between companies world-wide. Converting the output of each company's ERP system to the GS1 standards will allow a reduction in the implementation effort needed to integrate with many business partners.

Guiding principles for processes and messages

When defining the processes and messages will have to be respected on the following guiding principles:

- Application of GS1 standards (e.g. usage of GLN and GTIN)
- Processes and messages have been developed on a logical level, i.e. from ontent point of view. The technical requirements of processes and messages technical message design and technical acknowledgements of messages) have not been taken into consideration, as it is understood to be covered in the next standardisation phase.
- The objective of the UIM is to have a standardised approach to integrate among business partners, enabling an efficient scalability. However, it is understood that the scenarios recommended and the usage of the messages within these scenarios might need to be modified depending on the business scenario applied, i.e. a message might need to be exchanged despite the fact that it is not illustrated in the basic scenario (e.g. communication of manufacturer inventory in a TOM-consignment business scenario) or messages not adding value to the overall process might not be exchanged even though they are reflected in the basic scenario.

The flexibility of the messages needs to be ensured in order to allow an industry-wide and global applicability; as a consequence, messages should allow to be organised in the following ways:

- By plant across items/materials
- By item/material across plants
- By plant and item/material. This has been ensured by including specific content fields on Header and on Detail level in the message. These fields might be optional in both levels or might need to be filled in either one of both. Depending on whether the Header or Detail field of the message is filled, the message will be organised by plant/item/material etc.

Remarks to message structure:

- Header: this section is valid for all categories (items, locations, etc.) mentioned in the detail level
- Detail: this section can specify multiple categories (items, locations, etc.) grouped under the header information.

The messages describe the logical data elements per data interchange based on EANCOM or XML. Specific details on the semantics are not included as they are not part of the scope of this report.

More than EANCOM (based on Edifact), XML (the GS1 XML standard based on ebXML) offers the opportunity to become the one single global standard for business process data interchange. XML is also a move to next generation data interchange that is characterised by:

- The move to more real-time data exchange instead of the batch-oriented exchanges of the past
- The focus on exceptions rather than sending and confirming whole batches of data. At the same time it is understood that some messages need to be exchanged with full detail level in order to comply with legal or internal process or system requirements.
- The tight link to the actual business process and integrated data interchanges e.g. one data interchange for the Replenishment Forecast which includes material forecast and inventory data per item instead of two separate data exchanges for material forecast and inventory.[5]

Nestle company best practices

Overview of a typical Landscape:

Best Practice: nowadays the ERP systems like SAP most probably will not offer the full range of attributes needed to GDS; therefore companies like IBM have developed special products to "fill this gap". It is very important to have in mind the scale of the GDS implementation before acquiring such a product like WPC-GDS, the installation and configuration costs for such solutions could be considerable. Also is important to notice that, despite 1SYNC cannot be "connected" to the ERP system, massive uploads can be done using the web interface of the system.

In the example above the ERP system of the company is SAP R/3. The solution provided by IBM (WPC-GDS) is implemented. WPC-GDS is periodically updated to meet the full attributes set of 1SYNC. Also will be noticed that 1SYNC is offering Pre-Prod and Prod environments, therefore the necessary testing and simulations can be conducted.

Cutover Steps (testing scenario)

The 7 points below are a testing scenario for the environment mentioned earlier:

1. Review of material from Data Quality point of view: GTINs inconsistency, completeness.
2. Replication from SAP to WPC
3. Enrichment (at least at mandatory in WPC fields level: GPC Description/Code, Start Availability Date, GTIN name)
4. Approval (an intermediary step in WPC, specially designed as a quality gate)
5. Add Item (Items are moved from WPC to 1SYNC)
6. Add Links (GTINs linked between them)
7. Publish

A typical landscape of a GDS implementation in a large company will look as follows:

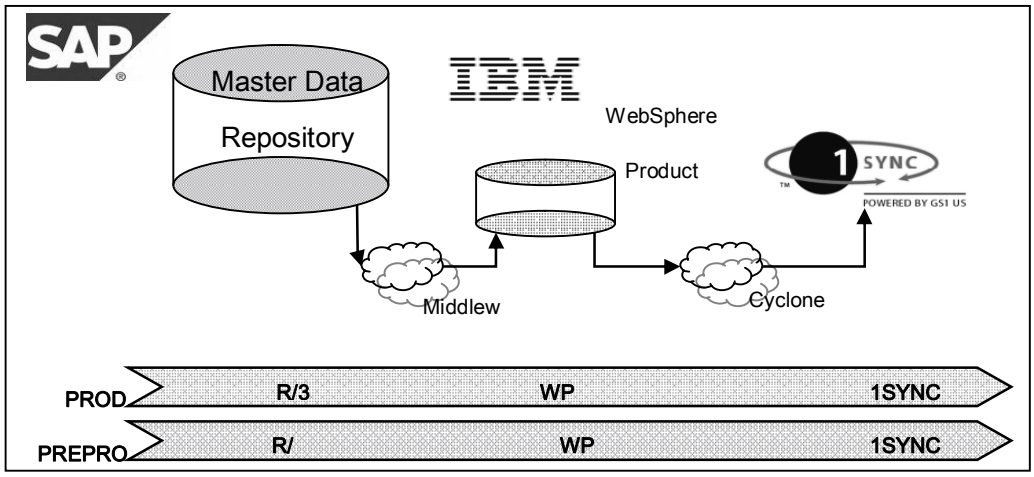

Figure 3: Typical Environment for GDS

Best Practice: to perform full reconciliation after each step above

The goal of conducting such a test is to check the end-to-end process of moving the data from SAP R/3 to 1SYNC. Based on the results of this test the massive publication of items can be carried out (remember: an item 1SYNC can be deleted only by 1SYNC clerk).

Details for each step:

Review of material from Data Quality point of view: GTINs inconsistency, completeness.

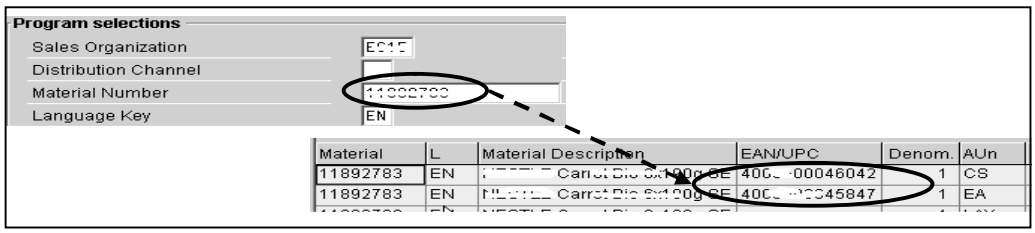

Figure 4: The check of material member (EAN/UPC)

In the example from Figure 4 a material will be published from SAP system. The material has 2 GTINs – one for CS (case) and another for (each), therefore resulting in a publication of 2 GTINs linked to each other

Obviously, a check should be conducted in both WPC and 1SYNC to make sure that these GTINs don't exist already.

During testing the materials will be reviewed "manually", but for big amounts of data applications such as Athanor from Similarity Systems can be successfully used to make sure the data in the master data repository is cleansed and compliant with the standards.

Best Practice: Another is a recommended tool not only for GDS implementations. Due to its capacity to maintain data quality it can be at the core of data cleansing activities in general. Before taking the decision to use Athanor a correct estimation should be done taking in account the costs of the Athanor implementation *per se* and developments needed to have Athanor effectively checking the data. At this step is also good to notice that some retailers have developed own guides to easy synchronization through 1SYNC. For example Carrefour has developed a "1SYNC-Carrefour Implementation Guide" which, once again, underlines the crucial importance of a good coordination between producer and retailer during the implementation phases. The purpose of the guide mentioned above is to give 1SYNC manufacturer users instructions needed to synchronize their item data with Carrefour using 1SYNC Item manager. It is intended to highlight any specific processes, attributes or validations that are in addition to the standard 1SYNC GDSN synchronization process.

Best Practice: once again the link with the GDS partner is proved to be very important. It is important to notice that some of the partners participating in GCI have special instructions to be taken in consideration

Basically, a very important part of the project will be solving on the points below:

1. Data Cleansing:
    1. Another implementation and training (recommended, specially in case of big volumes of data);
    2. Cleansing.
2. GDS Data Standards adoption:
    1. Understand Data Standards;
    2. Prepare all values;
    3. Implement in WPC or/and ERP (SAP R/3).
3. Attribute analysis:
    1. Mapping between 1SYNC , WPC and the ERP system (SAP R/3);
    2. Agree fields (attributes) with the partner.

Replication from SAP to WPC

An IDOC is generated from SAP system once the GDS flag activated and the information for the selected material is transmitted. The key for this transmission is GTIN – GLN – TM (Global Trade Item Number – Global Location Number – Target Market). The IDOC will contain the information of the parent and child GTINs.

SAP R/3:

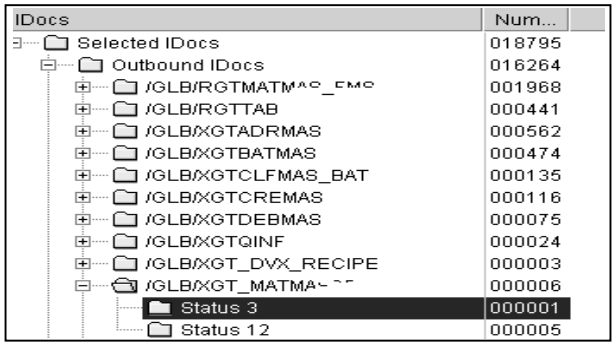

Figure 5: The Outbound Idocs in SAP R/3 (Status 3)

In Figure 5 can be seen the Outbound Idocs in SAP and the corresponding XML Message in WPC Process Monitor. In the XML message can be seen information on both GTINs and the corresponding hierarchy organization for this GTINs.

WPC:

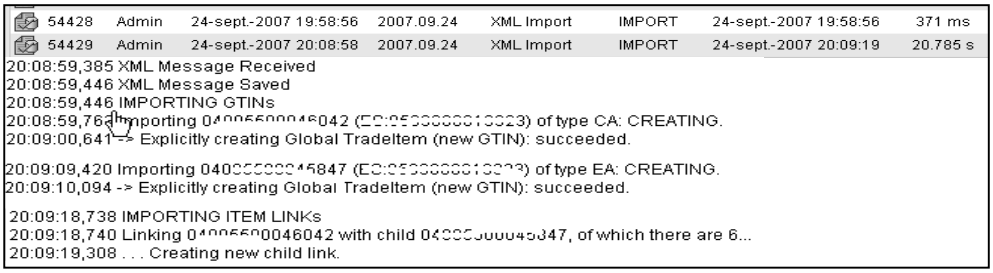

Figure 6: The corresponding XML Message in WPC Process Monitor (the link at SAP R/5 to WPC - GDS)

Best Practice: at this point it is important to notice the time needed for this replication, which for bigger volumes will be taken in consideration. If this replication is successful the technical work of linking SAP R/3 to WPC-GDS is

completed, therefore the idols generated and the XML message in WPC-GDS will be checked for any discrepancies very carefully.

Enrichment (at least for mandatory in WPC fields, for example: GPC Description/Code, Start Availability Date, GTIN name).

During tests this enrichment can be done manually directly in WPC. During a cutover this enrichment will be done using built-in mass uploads WPC facilities.

Best Practice: both manual and mass uploads enrichment will be tested. For mass uploads development work in WPC-GDS will be required. Is important to notice that, every time a new attribute is added in GDS these developments (for upload), will need to be adapted. Also is known that, when 1SYNC implements a new attribute, IBM-WPC-GDS is not always up to date. A "waiting time" for a new attribute in WPC is to be taken in consideration.

The status in WPC at arrival of the items will be "Draft with Variant" for Global attributes and "Edited" for Local attributes (note that the statuses can be different, depending on WPC configuration). The enrichment with supplementary attributes, not stored in the ERP system will happen uploading flat files having structures aligned with the way the upload facilities were designed in WPC. Below can be seen the flat file and the successful loading (results).

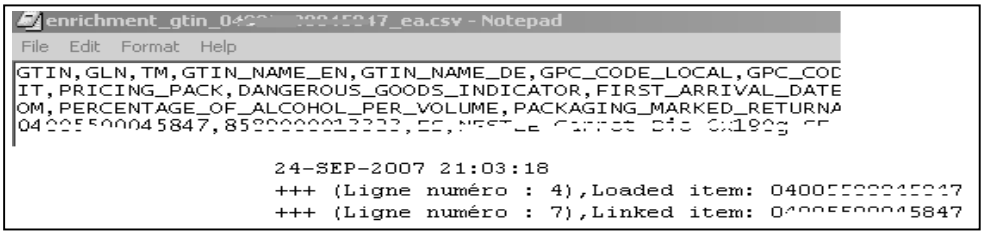

Figure 7: The uploading of flat files designed in WPC

After such operation the status of the items will change in WPC to "Draft with Variant" for Global attributes and "Compliant" for Local attributes of the GTINs.

Approval (an intermediary step in WPC, specially designed as a quality gate)

Best Practice: the approver will be usually a separate user.

During cutover the approval step will be "automated" using the uploading facilities of WPC:

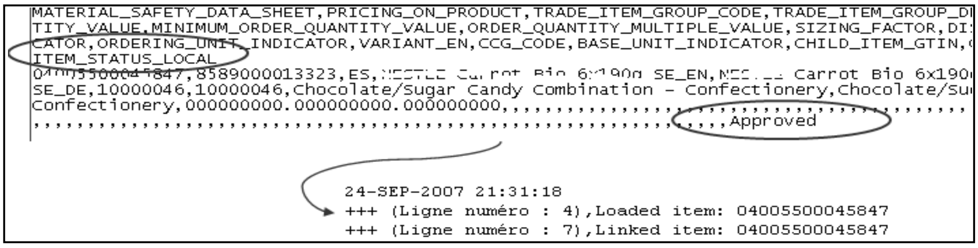

Figure 8: The approval step, using the uploading facilities of WPC (Approved)

The status will change to "Approved" for local attributes:

WPC:

Figure 9: The approval step for local attributes (Approved)

Add Item (Items are moved from WPC to 1SYNC)

WPC:

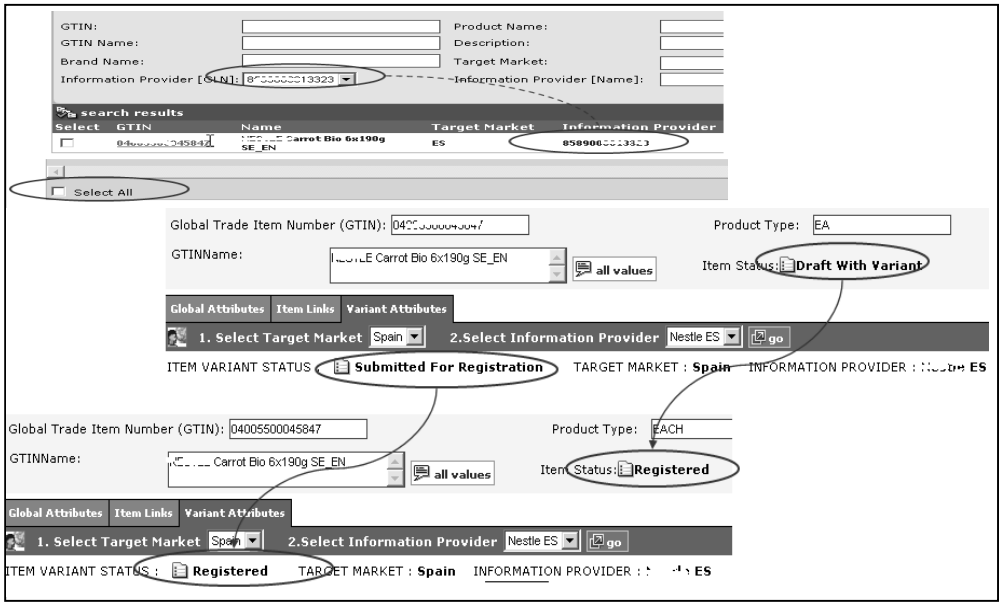

Figure 10: The global information alignment – adding the Item to 1Sync (Registered)

Adding the Item to 1SYNC will take place from inside WPC. The status of the items will change from "Approved" for Local attributes to "Submitted for Registration" and after receiving the confirmation from 1SYNC to "Registered" (Figure 10).

At this stage the items can be finally viewed in 1SYNC (both GTINs and the corresponding link ready for creation):

1SYNC:

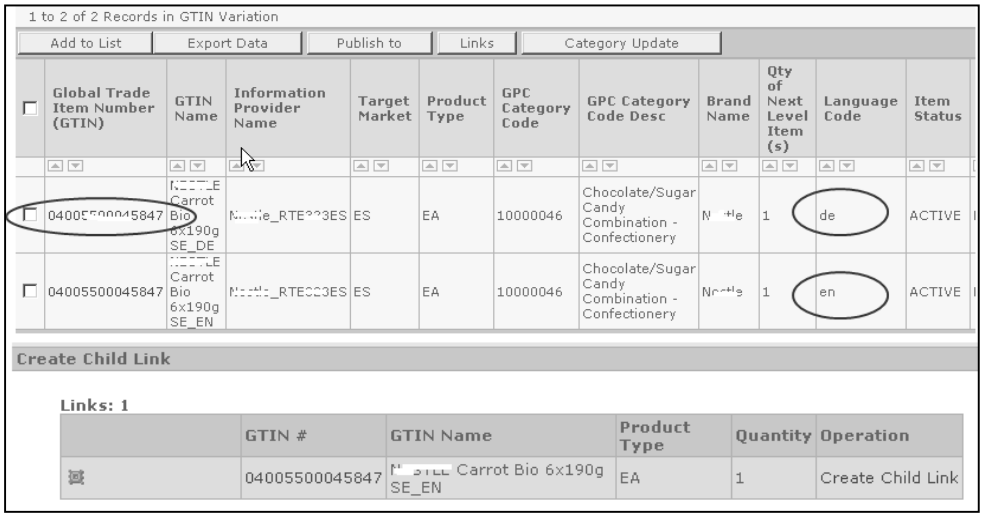

Figure 11: Final checking – the chain/link SAP R/3 – WPC – GDS - 1SYNC WORKS

The success of this step proves that the "chain" SAP R/3 – WPC-GDS – 1SYNC works correctl

Both "Add Links" and "Publish" steps are done from WPC.

Best Practice: it is important to involve the partner at this stage- to check that he can "see" correctly what was published. Attention to correct GLNs and TMs.

Conclusions

Master data sharing between trading partners (e.g. buyer / seller) is one of the most important supply chain processes since master data is fundamental to all business systems. The integrity and timeliness of master data is critical for the uninterrupted flow of goods throughout the Supply Chain. Sharing data effectively and efficiently is reliant on access to precise data definitions by all partners, data accuracy and agreement on the process used to support the exchange of data between trading partners. Such data sharing is commonly called Master Data Alignment or Master Data Synchronization. The master data exchanged is defined and agreed in the context of a common understanding of the business requirements between trading partners.

Since 1990, increased awareness of the *importance of master data synchronization has triggered the launch of national (public) initiatives.*

- A primary objective of these initiatives was to offer trading partners efficient "tools" to support master data synchronization between national trading partners, namely the implementation of National Data Pools;
- Currently, there are many data pools around the world, most of who are affiliated with EAN / UCC organizations.

With the emergence of free trade regions, *global and international commerce, increasing use of e-commerce, master data synchronization has rapidly become an international concern*. In March 1999, the report of the ECR Master Data Group (Inter-Operability of EAN Compliant Data Pools, IODP) highlighted the diversity of the existing data pools. This diversity prevents proper global master data synchronization and, makes the harmonization of the national data pools a necessity in order to support the global business needs [7].

Best practices at Nestle confirm the Global Standards of Global Data Synchronization (GDS), launched by Global Commerce Initiative (GCI), now renamed Global Consumer Forum (GCF)

Companies are working together, both retailers and producers, to overcome the technical and organizational difficulties of GDS implementations. In this environment is important for each company to understand GDS implementation in terms of its own particularities (from technical, organizational and financial point of views) and to adopt the most suitable solution to meet the standardized criteria recommended by entities like GCI, which are supported by most of the industry players. Above we have given a couple of advices to take in consideration when defining the way the company data will be linked to a data pool like 1SYNC. This decision is crucial as it can make the difference between waste and efficiency in times when budget for projects are not what they used to be.

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GLOBALNE STANDARDY W ZARZĄDZANIU ŁAŃCUCHEM DOSTAW. NAJLEPSZE PRAKTYKI W TOWARACH KONSUPMCYJNYCH I SPRZEDAŻY DETALICZNEJ

Abstrakt: Global Commerce Initative (GCI) stworzyła Global Upstream Supply Initative (GUSI) aby utworzyć standardowe ramy dla producentów dóbr konsumpcyjnych i ich dostawców surowców, materiałów i opakowań, w celu lepszej integracji procesów zachodzących w łańcuchu dostaw.

Bez wewnętrznego dopasowania danych, Globalna Synchronizacja Danych (GSD) nie przyczyni się do poprawy wydajności firmy, w rzeczywistości zwiększy negatywny wpływ informacji charakteryzujących się złą jakością. Co więcej, wspólne inicjatywy takie jak Efficient Consumer Response (ECR) czy Collaborative Planning, Forecasting and Replenishment (CPFR) nie będą miały przełożenia ekonomicznego, gdyż wpływ na to będzie miał brak dokładnych i dostępnych informacji które są uzyskiwane z programu wewnętrznego dopasowania danych.

Program wewnętrznego dopasowania danych opiera się globalnej sieci danych, katalogach elektronicznych, które są w szczególności Interoperacyjne i działają zgodnie z tymi samymi

wymaganiami i standardami biznesu. Interoperacyjność oznacza że producent może opublikować informacje o produkcie wraz z partnerami w jednej puli danych, bez konieczności martwienia się tym że klienci mogą wybrać inną pulę danych aby uzyskać dostęp do tych informacji.

Koncepcja zintegrowanych dostawców dotyczy poprawy części łańcucha dostaw między producentami i ich dostawcami surowców, materiałów i opakowań. Dzięki dzieleniu się informacjami, obie strony są w stanie wyegzekwować postanowienia w sprawie cen, ilości, terminów dostaw i produkcji w celu uzyskania strumieniowego przepływu produkcji i nawiązać relacje współpracy.

在供應鏈管理的全球標準。
消費品和零售行業的最佳做法

摘要：全球商務倡議（GCI）建立了全球上游供應倡議（GUSI），以提供標準框架，為消費品製造商和其供應商的成分，原料和包裝，以更好地整合整個供應鏈流程。
沒有對準內部的數據，例如，全球數據同步（GDS）**將**絕對不會提高經營業績，事實上，將放大的數據質量較差的負面影響。更重要的是，合作的舉措，如包括在高效消費者響應（ECR），**並協同規劃，預測與補貨（CPFR）會不會是在更大範圍**內的經濟部署沒有的一貫準確和提供信息，將導致從**1對準**內部數據方案。
GDS**是基於對全球網絡的數據池，或電子目錄，這些都是可互操作的和具有相同業務要求和標準兼容。互操作性意味著製造商可以發布一個單個數據池的**產品和合作夥伴的數據，而不必擔心一個事實，即客戶可以選擇不同的數據池訪問數據。
綜合供應商的概念是為提高製造商和供應商的成分，原料和包裝層之間的供應鏈的一部分。通過信息共享，雙方都能夠行使成本，交貨和生產的數量和時間上的判斷，以流線的生產流程，並轉移到了協作關係