ORIGINAL PAPER

GLN STANDARD AS A FACILITATOR OF PHYSICAL LOCATION IDENTIFICATION WITHIN PROCESS OF DISTRIBUTION

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ABSTRACT. **Background**: Distribution, from the business point of view, is a set of decisions and actions that will provide the right products at the right time and place, in line with customer expectations. It is a process that generates significant cost, but also effectively implemented, significantly affects the positive perception of the company. Institute of Logistics and Warehousing (IliM), based on the research results related to the optimization of the distribution network and consulting projects for companies, indicates the high importance of the correct description of the physical location within the supply chains in order to make transport processes more effective. Individual companies work on their own geocoding of warehouse locations and location of their business partners (suppliers, customers), but the lack of standardization in this area causes delays related to delivery problems with reaching the right destination. Furthermore, the cooperating companies do not have a precise indication of the operating conditions of each location, e.g. Time windows of the plant, logistic units accepted at parties, supported transport etc. Lack of this information generates additional costs associated with re-operation and the costs of lost benefits for the lack of goods on time. The solution to this problem seems to be a wide-scale implementation of GS1 standard which is the Global Location Number (GLN), that, thanks to a broad base of information will assist the distribution processes.

Material and methods: The results of survey conducted among Polish companies in the second half of 2016 indicate an unsatisfactory degree of implementation of the transport processes, resulting from incorrect or inaccurate description of the location, and thus, a significant number of errors in deliveries. Accordingly, authors studied literature and examined case studies indicating the possibility of using GLN standard to identify the physical location and to show the perspective of its implementation in the TSL industry.

Results: Result of the work is an analysis of the current situation and problems associated with an identification of physical locations in the distribution process and the description of the information needs of the TSL industry. Shows strengths and weaknesses of the GLN standard and opportunities and threats arising from its implementation in logistics. In addition, authors developed a business model that main aspect is the value proposition and benefits for stakeholders in the processes of distribution.

Conclusions: The ability to implement GS1 standards in logistics, despite numerous references to literature and the real needs of business, it is still ambiguously defined. Therefore, in this article authors focus on the concept of using GLN standard to improve an identification and unification of description of physical location. This study resulted in the development of tool implementing founded functionality (in the context of providing information about the physical location) in business practice.

Key words: GS1 standards, GLN, distribution process, identification of the physical location.

INTRODUCTION

Constantly changing market conditions and the competitiveness of enterprises force the management staff to seek new ventures in order to optimize process of customer service.

For this reason, one of the most important factors determining the competitiveness of companies, is effective and reactive decision-making process in a short time and based on current data. The process of making managerial decisions is directly dependent on the efficiency of information flow in

the company. Effectively developed flow of information is intended to assist decision-making process, which directly affects the speed and accuracy of decisions. To this end, developed information systems in enterprises, which together with the development of information and communication technologies and globalization, are supported by tools and systems for enterprise management.

Analysis of the effectiveness of the flow of information is not a simple issue mainly due to the imperfections of the concept definition of efficiency. The result is not only a scientific problem, but also a problem in practice. With the help come tools supporting enterprise management and supply chain, but the effectiveness of the application depends on the process approach when creating the enterprise information system. Integration of information in the supply chain generates a number of additional issues related to the provision of reliable data along the chain in real time [Bottani, et.al., 2010, Liu, et.al., 2016a], which has a direct impact on the implementation of logistics processes [Silva, Carvalho, 2013, Maiga, et.al., 2015]. One of the key information problems is integration of the production and logistics system with partners in the supply chain [Golinska, et. al., 2011, Adamczak, et. al., 2016], considering also the aspect of a sustainable supply chain [Cyplik, et. al. 2014].

Table 1. Basic functions necessary for a comprehensive analysis of the efficiency of logistics processes
Tabela 1. Podstawowe funkcje potrzebne do wszechstronnej analizy efektywności procesów logistycznych

Functions	Percentage
computerization of the efficiency of processes analysis	92,76%
data acquisition in real time	79,61%
monitoring of implementation proces	87,50%
the use of mobile technology for process control	72,37%
comparing the current data with historical data	98,03%
other	10,53%

Source: Own research [Bigaj, Koliński, 2017]

These findings support the study conducted by the authors inter alia identify the key functionality necessary for a comprehensive

analysis of the efficiency of logistics processes [Bigaj, Koliński, 2017]. Table 1 shows the percentage of identified key functionalities of a comprehensive analysis of the logistics processes efficiency.
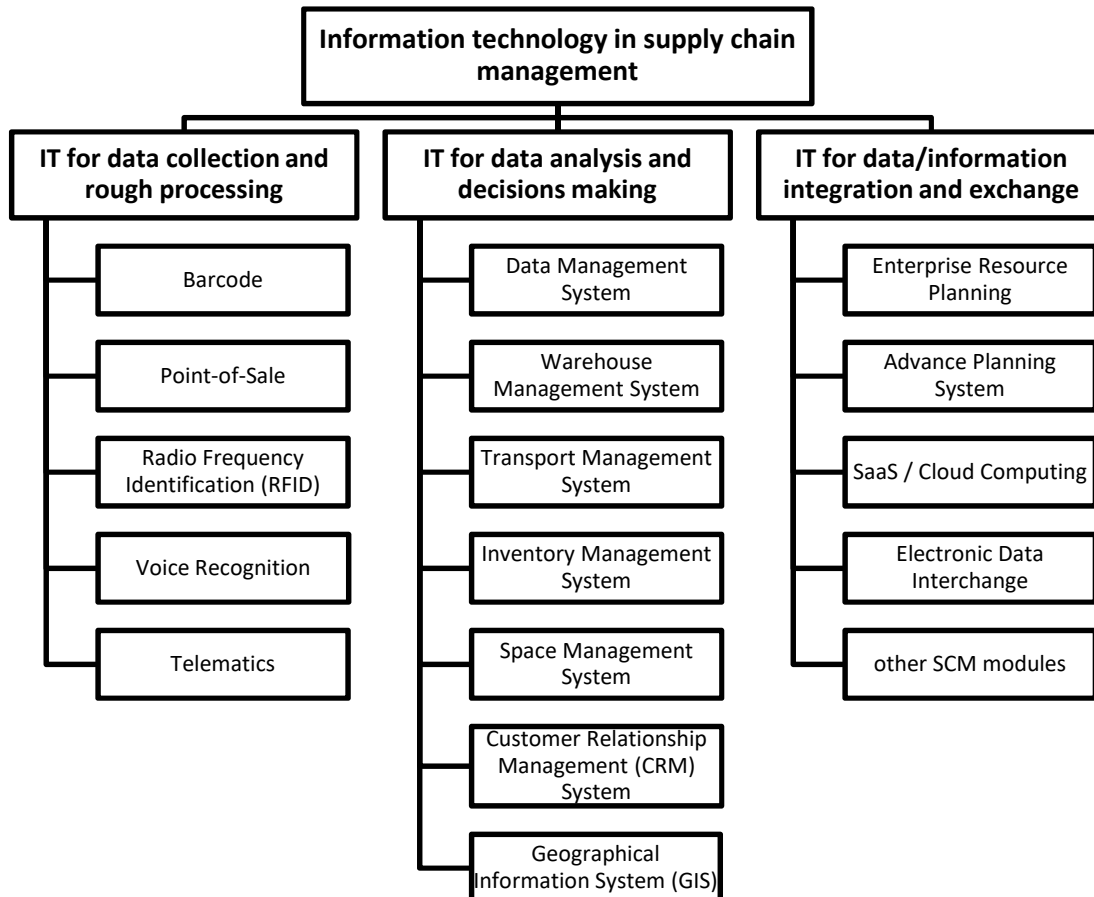
It should be noted that over 70% of all surveyed companies have decided that all proposed functions should be included in the comprehensive analysis of the efficiency of logistics processes. One of the key factors of effective management of logistics processes in the supply chain is a collection of data in real time, on both products and services, as well as monitoring of the implementation process. These two factors are the basis for the integration of information flow, not only in companies but also in the entire supply chain [Liu, et. al., 2016b, Wong, et. al., 2015].

Through the years, information technology (IT) has proven its significance for development of distribution, then logistics and finally supply chain activities by fulfilling different roles in distribution channel and supply chain [Rushton, Croucher, Baker, 2006, Bowersox, Closs, Cooper, 2010, Shi, Chan, 2007]. Its position in supply chain is still constantly becoming more important. Various approaches have been used in classification of IT in supply chain management. IT can be classified according to their areas of application and technological systems in their hierarchical structures [Ross, 2011], according to stages of development and application of information systems and IT in SCM [Shi, Chan, 2007], or according to its main purpose [Shapiro, 2007, Shi, Chan, 2007, Dujak et al, 2011]. Figure 1 represents classification of IT in supply chain management activities according to Dujak et al. [2011], where based on purpose criteria, IT in supply chain management are divided in three main groups.

IT for data collection and rough processing are responsible for accurate transforming of different kinds of supply chain data into digital, much more exploitable form. Any successful decision making should be based on useful information, and IT for data analysis and decision making are responsible for all analysis that transform rough data into useful information and alternatives for all levels of distribution and supply chain managers.

Finally, core purpose of supply chain management - improvement of flow through collaboration of supply chain members - could not be reached without IT for integration and exchange of information and knowledge.


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            │  Information technology in supply    │
            │          chain management            │
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IT for data collection and rough processing	IT for data analysis and decisions making	IT for data/information integration and exchange
Barcode	Data Management System	Enterprise Resource Planning
Point-of-Sale	Warehouse Management System	Advance Planning System
Radio Frequency Identification (RFID)	Transport Management System	SaaS / Cloud Computing
Voice Recognition	Inventory Management System	Electronic Data Interchange
Telematics	Space Management System	other SCM modules
	Customer Relationship Management (CRM) System	
	Geographical Information System (GIS)	

Source: Dujak et al., 2011

Fig. 1. Information technology in supply chain management
Rys. 1. Technologia informacyjny w zarządzaniu łańcuchem dostaw

The most widespread IT for data collection and rough processing is barcode technology. Barcoding in distribution enables exchanging data between products (all other materials, vehicles, or equipment), computers and people in affordable, easily standardize and relatively fast way by transforming product data to digital form. The subject of this paper – Global Location Number (GLN) – is mostly used and exchanged through barcode technology, but also through RFID technology. By utilization of best characteristics of these auto identification technologies, GLN significantly improves flows and processes in distribution and supply chain as a whole.

These considerations, and cited results of the authors tend to conduct in-depth research related to the possibility of integration of information in the supply chain through the implementation of a large-scale GS1 standard that is the Global Location Number (GLN), which thanks to a broad database will support distribution processes.

CHARACTERISTICS OF GLN STANDARD

All organizations exchange information in business processes, both internally and externally. Global Location Number (GLN)

uniquely identifies these entities and their positions [Nakatani, Chuang, Zhou, 2006]. GLN is a globally unique number that can be used to gain access to basic data about the physical location of the objects (example on Fig. 2).

Source: http://www.gs1.se/en/our-standards/Identify/gln/
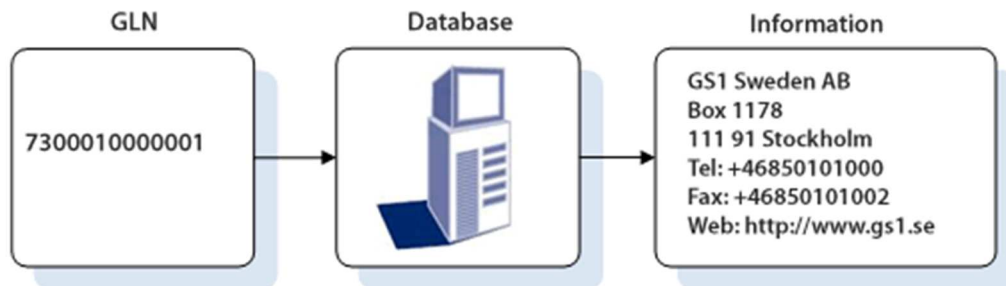
Fig. 2. Example of information that can now be retrieved from the database using the GLN identifier
Rys. 2. Przykład informacji, która może być obecnie otrzymana z bazy danych przy użyciu identyfikatora GLN

GLN is a key identification tool (according to GS1 standards) used to identify any location (physical, digital, functional or legal), which must be defined for the needs of processes in the supply chain.

GLN standard and its value for the customer

The primary use of GLN is to identify the company in business transactions, such as sending orders and invoices. If the company has buildings in different locations, it may need to assign the GLN to each object. This is especially important in the loading and delivery process to factories, warehouses, distribution centers and stores.

GLN enables companies to efficiently perform various operations and implementation processes without the need to repeatedly transmit the address or other location data [Śliwczyński, Hajdul, Golińska, 2012]. Supply chain can efficiently perform transactions, knowing that the information associated with each of the sites is accurate, so you will direct the flow of goods and services in the right place. GLN identifies not only particular area, but also information about the locations and its additional attributes that may be used in the process of distribution. Usage of GLN positively affects the precision and accuracy in communicating and sharing information about the location of the transaction. In addition, all the data is stored in a central database, which reduces the effort needed to maintain and transfer of information between the stakeholders both nationally and globally.

Global Location Number can be used to identify the various organizational units. Under the principle of allocation GLN is distinguished by its 4 main types:
− physical location: the place (area, object or group of objects)
− legal entity, every company, government body, department, charitable organization, person or institution having the ability to enter into agreements or contracts,
− function: the organizational department of the company in separate structures on the basis of specific tasks / functions
− digital location: the location represents the digital electronic address (not physical) used for communication between computer systems of individuals

GLN assigned to the company tells us "who?". GLN assigned to the physical location tells us "where?" The ability to determine "who" and "where" in business processes makes the GLN an essential key to tracking the flow of products and information in the supply chain, and to increase the visibility and location authentication.

Structure of GLN

GLN is a 13-digit code consisting of the Company Prefix by GS1, a reference to

a specific location and a check digit (structure is shown on Fig. 3).

Source: http://www.gs1.se/en/our-standards/Identify/gln/

Fig. 3. GLN Structure
Rys. 3. Struktura GLN

− GS1 Company Prefix - awarded by the state organization GS1 user / subscriber
− Localization Number - assigned by the company to a specific object
− Check digit - calculated according to a standard algorithm helps ensure the integrity of the system.

GLNs are recognized by the Center for the United Nations as a tool for the implementation of improvements in trade and electronic commerce (UN / CEFACT).

The extension component is optional - it is the attribute data of 20 characters used to identify physical internal locations in the object specified in the GLN (for example: shops, factories, buildings). Companies can assign unique GLNs to accurately identify the internal locations of a specific area, e.g. rooms in buildings or slots in warehouses.

Using the GLN bar codes and RFID applications

Like all GS1 identifiers, GLNs can be presented in the form of a barcode or EPC / RFID for efficient data collection (Ramos, Lazaro, Girbau, Villarino, 2016; Nam, Yeom, 2011). The three most popular use:
− Marking a physical location - GLN encoded in the carrier data, such as a bar code to identify the physical location, a ramp or shelf storage,

− Logistic label by GS1 standard - GLN specifying the place of delivery of encoded carrier data on the label,
− Label with a trade - GLN encoded in the carrier data in order to determine the trading party on the label.

Regardless on its presentation form, GLN could be used in different situation of data exchange process – some are shown on Fig. 4.

Electronic Data Interchange (EDI) ideally uses Global Location Numbers (GLN) to identify trading partners and their physical locations. EDI mailbox and network addresses can also be identified with GLN. EDI standards promoted by the GS1 System (EANCOM GS1 XML) use GLN to simplify the message in the course of trade.

GLNs are a key concept in EDI. They represent a unique global identification standard needed to secure exchange of business information in the Internet, as well as uniquely identify all legal, physical and functional entities described in the working documents.

GLNs provide efficient communication and processing of data as names, addresses and other information about the individual locations / entities that do not have to be transferred in each transaction. The necessary data is transmitted only once, stored in the

system (e.g. ERP) and then recovered by reference to the globally unique GLN (Fig. 5).
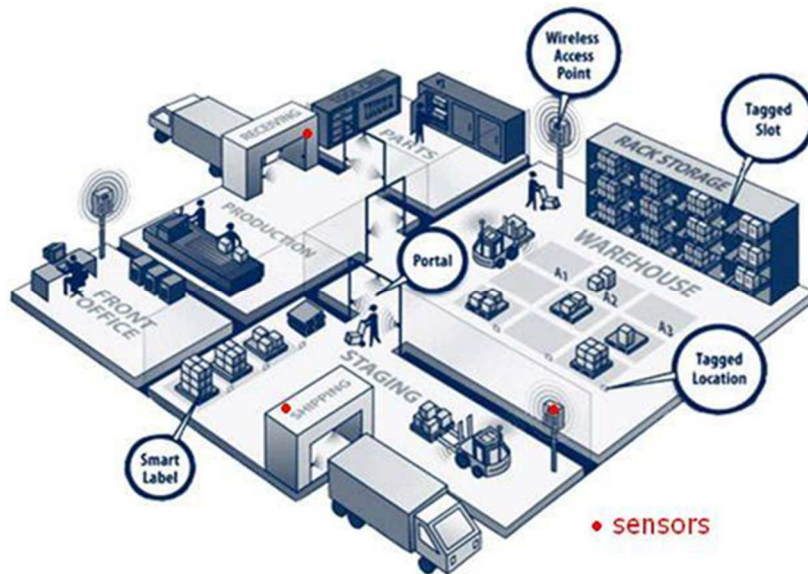
Source: Own elaboration by ILiM

Fig. 4. Use of GLN in the process of data exchange
Rys. 4. Stosowanie GLN w procesie wymiany danych

Source: Own elaboration by ILiM

Fig. 5. Use of GLN standard
Rys. 5. Zastosowanie standardu GLN

## RESEARCH METHODOLOGIES EXPLORING THE GLN STANDARD IMPLEMENTATION

Research into the use of the GLN standard is based on the methodology outlined in Figure 6.

Developed methodology enables the case study method to be repeatedly applied as an effective research method, allowing multi-criterion analysis of the problem. The case study is designed to show the relationship between phenomena occurring in the described processes. Quantitative methods based on a statistically representative sample do not allow such analyzes. Taking into account the specifics of the GLN standard usage, the authors have studied a multiple cases in order to compare variant features in a larger case. Case-by-case review is considered to be more reliable than a single case study [Eisenhardt, Grabner, 2007], as it enables a description of the differences and similarities between the analyzed variants to identify general trends. In the literature on the subject of the ability

to verify models through case studies, you can find different views on the number of variants to be analyzed so that the conclusions of the study are scientific in nature. The dominant view suggests to conduct four to ten case studies [Eisenhardt, Grabner, 2007, Yin, 2009]. The verification of the use of GLN in practice was based on 8 case studies that allow authors to create the general trends.
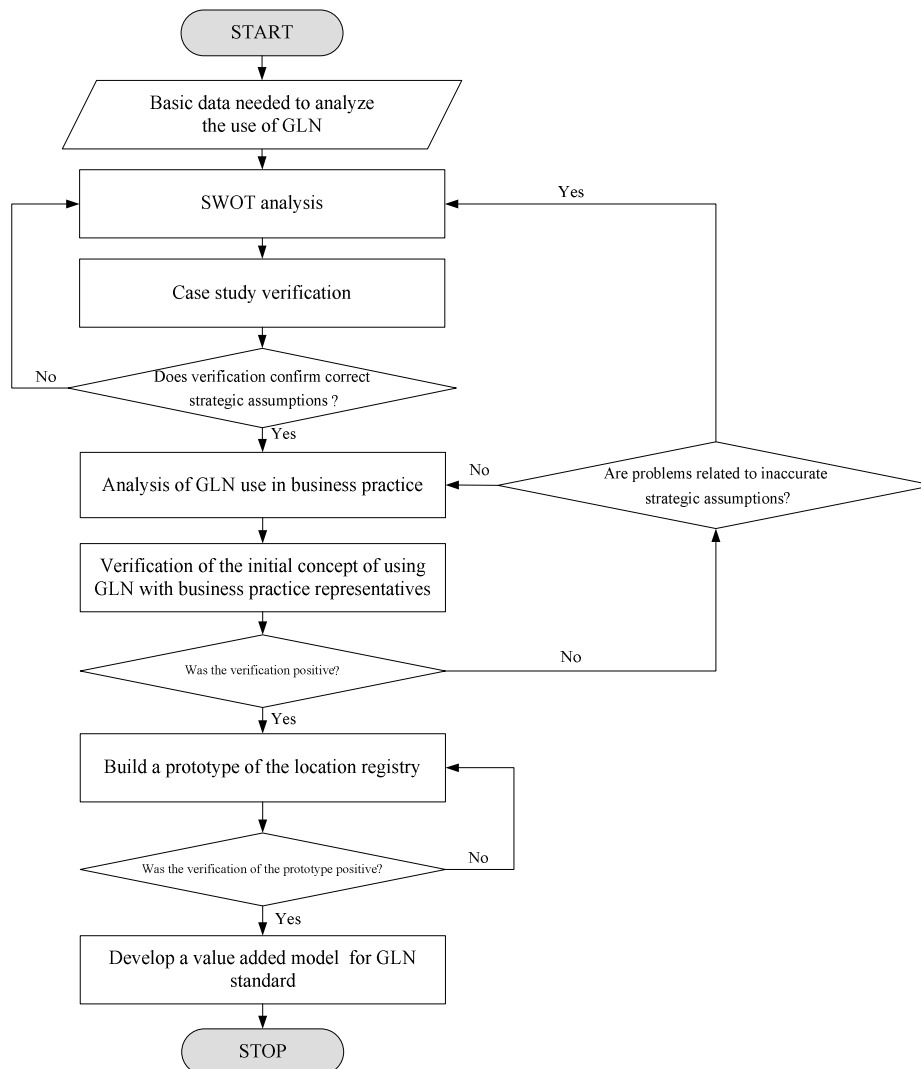
Source: own elaboration

Fig. 6. Methodology of GLN application analysis in information flow efficiency
Rys. 6. Metodologia analizy aplikacji GLN w efektywności przepływu informacji

Presented methodology also uses observations and consultations on the degree and conditions of using GLN in the leading logistics companies, which increases the reliability of conducted research in this field.

The next part of the paper presents the steps of the research carried out in accordance with the presented methodology.

GLN STANDARD SWOT ANALYSIS

In order to explore scientifically the possibility of GLN standard authors conducted SWOT analysis based on secondary research: literature, materials available on the enterprises and existing case studies described in research and optimization projects.

Table 2. SWOT analysis
Tabela 2. Analiza SWOT

S – Strengths	W – Weaknesses
- All the benefits of GS1 standards: global, international, simple structure, coding in various forms (EAN, RFID / EPC) - Data protection - you cannot directly identify the location of the object - Ability to use different angles: legal, physical, functional - Allows reduction of returns due to incorrect address information delivery - The ability to extend the range of information related to the GLN (i.e. Geolocation, driving directions, characteristic of delivery places) - Precise uniform nomenclature (the problem of many towns of the same name) – errors exclusion / duplication of company names, cities, - Numbers can be given by the independent body (e.g. Public administration) - The ability to extend the GLN (GLN extension component) to address internal location - The ability to easily "connect" local routes planning of the register (API) - Benefits of the registry: - unified way to collect and store information - single point of access to data	- To be given GLN you must be a member of GS1, - Currently GLN in Poland applies only to businesses - no application for the couriers industry services for private customers - No description of good practices to use GLN in Poland - A large flexibility in assigning numbers within prefix, lack of mechanisms to control (except for providing unique number) of the information contained under no clear structure (everyone can construct any name, description) - Locations with no classification (flat floor, loading gate) - Descriptions are created based on the knowledge not on the needs - Lack of a public database / registry in Poland - Lack of knowledge - necessary education among current and potential users
O – Opportunities	T – Threats
- Ability to use in public administration - Existing use cases - the ability to take advantage of the experience - Ability to top-down / administrative updates (e.g. Change zip codes, street names, etc.). - Low margin (every penny spared counts) - environmental savings through better route planning and avoiding mistakes - Trend for the digitization and standardization - digital exchange of information - The trend to globalization - a very useful especially in international transport, - Physical Internet - distribution planning, accounting, data protection - The notion of large entities (companies - e.g. Retail chains (case codes requirements GTIN), offices - case number NIP, REGON) will result in avalanche expansion of the system.	- GLN topic did not came out from the potential users but from the supplier (GS1) - Lack of GS1 Global coordination (Global Location Register) on local activities - The high cost of reaching the stage when the GLN and the register will be widespread and benefits will be tangible / incentives of joining / using the system - Expected "resistance of the stakeholders" if it is not tangible

Source: Own study by ILiM

USE OF GLN STANDARD – CASE STUDIES

New Zealand - New Zealand Business Number (NZBN)

The New Zealand Government has established a number of Business New Zealand equivalent of GLN (NZBN) to ensure a comprehensive register of all companies. ID NZBN is based on GS1 standards and developed in cooperation with GS1 NZ. This allowed the identification of more than 1.2 million companies. Number is used to improve the efficiency of distribution processes, sending transport orders, purchase orders and invoicing.

Austrian Economic Chambers

450 thousand companies associated in the framework of the Austrian Chamber

of Commerce registered in the database GLN to improve collaboration and B2B electronic communication with government institutions and administrative sites.

GS1 Croatia and Retailers

GS1 Croatia is institution with more than 2500 members that is the exclusive bearer of GS1 license in the Republic of Croatia (https://www.gs1hr.org/en/gs1-croatia). Main drivers of usage of GLN in Croatia are retailers. This is mostly connected with transformation of their distribution system from direct-to-store system to centralized distribution system, which requires increased information exchange and integration. Many Croatian retailers publish GLN numbers of all their stores publicly - e.g. Konzum, INA, DM, Kaufland.

International Trade Center & GS1 Global

GS1 Global in cooperation with the International Trade Centre implemented the registration of 500 thousand farms in order to increase the transparency of grown products information and improve traceability.

GS1 Canada

Canada has created a registration database of the name - ECCnet location, based on needs identified in the logistics sector. The main purpose of the database is to facilitate the distribution through a wide, open access to the full details of individual commercial business partners.

Unilever Global

Unilever decided to implement GS1 standards on a global scale focusing mainly on the distribution process. The aim of this implementation was to improve cooperation with customers and carriers, both in terms of information exchange EDI and physical flows (GLN).

Netherlands

GS1 Netherlands implements registration numbers GLN in the fresh production and flowers. The main objective of these activities was to increase the possibilities for easy identification of the origin of products, traceability and product recall.

England

NHS (National Health Service) implemented the GLN registration database designed to support hospitals in England. GLN allows identification of the location of warehouses, hospital buildings, as well as the individual departments, where drugs and other medical materials need to be delivered to. Implementation of GLN in the industry helped to improve the logistics of medical units.

RESEARCH ON USE OF THE GLN STANDARD IN ENTERPRISES

Despite several satisfactory implementations of GLN standard in Europe, this topic is not very popular in Poland, and the content of the national database still leaves much to be desired.

The results of surveys among the leading Polish enterprises in the TSL conducted in the second half of 2016 indicate an unsatisfactory degree of implementation of the transport processes, resulting from incorrect or inaccurate description of the location, and thus, a significant number of errors in deliveries.

Lack of details about location generates enormous costs on both the supplier and the customer site. Therefore, the efficient retrieval of information regarding the location and including elements such as time windows, time of unloading, conditions for unloading etc. would allow the optimization of the distribution process and delivery within the prescribed period (no need to re-supply, eliminating the cost to the operator).

One of the solutions to avoid supply problems is to implement register of locations using GLN numbers. Such a register in addition to the address data identifying specific company would have information about the characteristics of the location such

as unloading conditions, opening hours, time windows, ramps, etc.

Accordingly, the literature and examined case studies indicate the possibility of using GLN standard to identify the physical location and to show the perspective of its implementation in the TSL industry. In the next section, authors present materials that were collected during the meeting on the current problems of enterprises in the location identification. The meetings were characterized by the Delphi study using the method of network thinking.

Conclusions from the research studies:
− Companies create their own address database with relevant logistics information and individualized information regarding the location - this is due to the lack of unified market standards of such data collection and lack of access to an open database,
− Customers of contract logistics, even though many of them are members of the GS1 organization, do not fully benefit from the opportunities offered by the GLN, that makes it difficult to work with logistics operators,
− Problem of who will be responsible for updating the database. The essence of the registry is preserved only when it is valid and reliable,
− An important player for a greater popularization of the use of GLN are retail chain stores – they may force their suppliers and logistic operators to participate in the GS1 System,
− The problem is the low level of awareness and knowledge among entrepreneurs about the benefits that entails the use of a GLN standard.

VERIFICATION OF THE LOCATION REGISTER PROTOTYPE

In each meeting, the participants verified or added the data fields to the location register prototype. The most common needs for additional location information:
− Categories of materials stored (e.g. Food, chemicals...),
− Accepted logistic units (e.g. Pallets, containers, roles...),
− Ability to accept the goods with temperature control - frozen or fresh goods,
− Storage Temperature,
− The possibility of storing ADR materials (e.g. Gas, explosive substances and articles, flammable liquids...),
− Supported transport (e.g. TIR, tanker, tilt, cold ...),
− The landing surface,
− Types of ramps (e.g. A simple, gear, stepped ...),
− Equipment of the ramps (e.g. Crane, lift, loading bridges ...),
− Technical conditions of the ramps (e.g. Turning radius, maximum load, height ...),
− Technical delivery conditions (e.g. Pallets arranged by narrow side, the wide side, stackable acceptable...).

Because of the strictly defined information structure for GLN standard and its large number and requirement for a relatively quick access to the on-line data, it is proposed to use a relational database in conjunction with a Web site allowing interactive access to the base in order to view, add, edit and delete records.

DEVELOPING THE PROPOSAL VALUE MODEL FOR USE THE GLN STANDARD

In the second half of 2016 at the headquarters of ILiM authors organized a meeting, which the main aim was to develop a business model and determine the unique value proposition, which entails the use of a GLN standard in the TSL.

One of the most popular concepts in defining business models is the Business Model Canvas by Alexander Osterwalder. This model accurately describes how organizations create and deliver value to its customers. The model is presented by 9 elements that represent different aspects of the enterprise.

Description of individual parts should start from the most important of them, that is, customer segmentation (1). It is the basic

model. It defines different groups of recipients, which receive the added value produced by the company. Customer segments identified for GLN are mainly companies from the TSL industry, retailers and producers with an extensive distribution network.

Another key aspect is the value proposition (2), which is to satisfy the specific needs or solving customer problems. In other words, the value proposition is a set of perks that the company offers to its customers. Authors defined the following advantages within GLN standard:
− reduction of costs associated with re-handling the point and the cost of lost benefits due to the lack of goods on time,
− discount on transport companies for use GLN (win-win situation),
− easy update of data visible to everyone in the database,
− access to full location information in one place,
− reduction of delays and increase of on-time deliveries,
− reduction of errors in the delivery,
− a positive impact on Customer Service rates,
− guidance on the selection of the vehicle by the carrier,
− the appointment of load (e.g. Stacking pallets in AMAZON),
− guidance for on time delivery and advising,
− directions, coordinates.

Channels (3) is an element that describes how the company communicates and gets to customers segment to provide added value and knowledge about the product. In its activities, the organization GS1 may use the database of GS1 members to promote GLN content (e.g. trainings, webinars, brochures, newsletters) to disseminate knowledge about the GLN through partners (e.g. The Ministry, ILiM), contact with the associations of producers / clusters / Chamber of Commerce, share information in magazines and at industry conferences (eg. ECR Forum) and publication of good practices on web sides of GS1 and partners.

The element named customer relationships (4) describes the type of interaction that the company establishes with separate customer segments. As part of the implementation of the GLN, GS1 will build a personal relationship with the customer (consultants for individual support to replenish and register GLN - the co-value) and the open access to the database - automatic assignment to the self-service platform.

Structure of revenues (5) describes the way the company generates profits of individual customer segments. In the case of GLN standard income will come from fees for granting the pool of numbers and the fee for participation in the GS1 System.

Key resources (6) are necessary to generate added value and reaching out to segments of customers through distribution channels. The main resources identified for GLN:
− GLN hotline supports clients in completing the data,
− database of registered numbers GLN - ICT infrastructure,
− Internet platform with access for the user,
− technical consultants (human resources),
− financial resources to carry out the educational and promotional activities,
− intellectual resources related to the brand and the rights to the GS1 GLN standard,
− database errors, problems, additional costs created by the industry TSL, which allows to calculate the potential savings from the use of GLN and thus, the basis for the promotion of the standard.

Key actions (7), the most important tasks that the company needs to do to provide added value, establish a relationship with customers and generate revenues. The creation of a fully functioning registry GLN is associated with:
− the introduction of customer support services for the creation and configuration of the base,
− filling and update the database and quality check of the information entered by the customer,
− increasing awareness of members of the GS1 and their need to use GLN - trainings, webinars,
− creation of case studies with examples and implementation of pilot actions,

- analysis of data from the database of interference - to calculate the costs of errors by logistics operators,
- joint projects with operators, retailers and manufacturers in order to complete GLN registry in cooperation with retail chains,
- consultations with the public administration (e.g. Ministry of Development, Ministry of Digitization).

The concept of key partners (8) describes a network of suppliers and contractors who make the service implementable. In case of GS1 we are talking about state administration (e.g. Ministry of Development, Ministry of Digitization), large logistic operators (eg. Dachser, Raben, Schenker, etc.), Institute of Logistics and Warehousing, large retail chains (e.g. Jeronimo Martins) and producers who are members of the GS1 system (eg. Kompania Piwowarska, Colian, Zywiec Group, etc.).

The last element is the cost structure (9) - all the expenses, which are generated by the business model i.e. creating and delivering value, maintaining customer relationships and generating revenue. As part of the implementation of GS1 standards, we have to deal with the cost of creating the GLN register (the conception and information technology), the cost of data collection and individual customer support in rectifying the base and the cost of promotional activities and education.

CONCLUSIONS

In this article, authors presented the case of the efficiency of the flow of information in enterprises and supply chains, using the Global Location Number (GLN). Both theoretical considerations, supported by expertise in creating SWOT analysis of the discussed issues, as well as research conducted by the Institute of Logistics and Warehousing, on the use of standard GLN to improve the identification of physical and unification descriptions of locations, indicate the potential for new opportunities for the use of GS1 standards in the integration of information flow in economic practice within supply chains.

Based on the results of work carried out in the framework of the study authors can draw the following conclusions:
- there is a market need for both research and design work associated with the construction of GLN location register in the practice of economic enterprises,
- effective implementation and popularization of location register requires not only the support of major players in the market, or industry leaders, but also scientific support for the conceptual work,
- strong interest in economic practice in the construction of GLN location register is proof of the need to propose business solutions, allowing their practical application, but also the existence of the possibility of continuing further research in this area.

Presented, in this article, case studies, regarding the specifics of distribution processes, were based on research and observations carried out in the leading logistics companies in Poland. The test results are only a basis for further studies in the use of GLN in the flow of information throughout the supply chain.

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STANDARD GLN USPRAWNIAJĄCY IDENTYFIKOWANIE FIZYCZNEJ LOKALIZACJI W PROCESACH DYSTRYBUCYJNYCH

STRESZCZENIE. **Wstęp:** Dystrybucja z punktu widzenia przedsiębiorstwa jest to taki zespół decyzji i czynności, który pozwoli na dostarczenie właściwych produktów, w odpowiednim miejscu i czasie, zgodnie z oczekiwaniami klientów. Jest to proces, który generuje znaczne koszty, ale równocześnie sprawnie realizowany w dużej mierze wpływa na pozytywne postrzeganie firmy. W trakcie realizacji przez ILiM, prac badawczych związanych z optymalizacją sieci dystrybucji oraz projektów doradczych dla przedsiębiorstw w tym zakresie, zdiagnozowano wysokie znaczenie prawidłowego znakowania fizycznych lokalizacji, stanowiących ogniwa łańcuchów dostaw dla optymalizacji procesów transportowych. Poszczególne przedsiębiorstwa we własnym zakresie dokonują geokodowania lokalizacji magazynów własnych oraz lokalizacji swoich kontrahentów (dostawców, klientów), jednakże brak standaryzacji w tym zakresie powoduje opóźnienia w realizacji dostaw związane z problemami dotarcia do właściwych destynacji. Co więcej, współpracujące przedsiębiorstwa nie mają precyzyjnej wskazówki o warunkach funkcjonowania poszczególnych lokalizacji np. okna czasowe działania obiektu, akceptowane jednostki logistyczne w przyjęciach, obsługiwane środki transportu etc. Brak tych informacji generuje dodatkowe koszty związane z ponowną obsługą danego punktu, jak również koszty utraconej korzyści za brak towaru na czas. Rozwiązaniem tego problemu zdaje się być wdrożenie na szeroką skalę standardu GS1 jakim jest Globalny Numer Lokalizacji (GLN), który dzięki szerokiej bazie informacji będzie wspomagać procesy dystrybucyjne.
Metody: Wyniki ankiet wśród polskich przedsiębiorstw przeprowadzonych w II półroczu 2016 roku, świadczą o niezadowalającym stopniu realizacji procesów transportowych, wynikających z nieprawidłowego lub nieścisłego opisu lokalizacji, a co za tym idzie, znacznej ilości błędów w dostawach. W związku z tym przeprowadzono badania literaturowe oraz przeanalizowano studia przypadków wskazujące na możliwość wykorzystania standardu GLN w celu identyfikowania fizycznej lokalizacji i wykazania perspektywy wdrożenia go w branży TSL.
Wyniki: Wynikiem prac jest analiza obecnej sytuacji i problemów związanych z identyfikacją fizycznych lokalizacji w procesie dystrybucji oraz opis potrzeb informacyjnych dla branży TSL. Przedstawiono silne i słabe strony standardu GLN oraz możliwości i zagrożenia wynikające z jego wdrożenia w logistyce. Dodatkowo opracowano model biznesowy, którego głównym aspektem jest propozycja wartości i korzyści płynących dla interesariuszy w procesach dystrybucyjnych.
Wnioski: Możliwość wdrożenia standardu GS1 w logistyce, pomimo licznych odniesień literaturowych i realnych potrzeb biznesu, wciąż jest niejednoznacznie zdefiniowana. W związku z tym w niniejszym artykule skoncentrowano się na prezentacji koncepcji wykorzystania standardu GLN w celu poprawy identyfikacji fizycznej oraz unifikacji opisów lokalizacji. Poniższe opracowanie skutkowało stworzeniem narzędzia, realizującego założone funkcjonalności (w kontekście dostarczania informacji o fizycznej lokalizacji) w praktyce biznesowej.

Słowa kluczowe: standardy GS1, GLN, proces dystrybucji, identyfikacja fizycznej lokalizacji

DER GLN-STANDARD ZUR VERVOLLKOMMNUNG DER VERFOLGUNG PHYSISCHER LOKALISATIONEN IN DISTRIBUTIONSPROZESSEN

ZUSAMMENFASSUNG. Einleitung: Die Distribution unter dem Gesichtspunkt eines Unternehmens ist zu verstehen als eine Gruppe von Entscheidungen und Tätigkeiten, die eine Anlieferung von richtigen Produkten, zum richtigen Ort und Zeitpunkt und gemäß Kundenerwartungen erlauben. Es ist ein Prozess, der wesentliche Kosten generiert, wenn er aber leistungsfähig ausgeführt ist, dann kann er weitgehend einen Einfluss auf eine positive Wahrnehmung des Unternehmens ausüben. Während der vom Institut für Logistik und Lagerwirtschaft in Poznań für ausgewählte Unternehmen durchgeführten, mit der Optimierung von Distributionsnetzen verbundenen Forschungsarbeiten und Beratungsprojekte wurde eine große Bedeutung der richtigen Ermittlung von physischen Lokalisationen, die als Glieder von bestimmten Lieferketten zu verstehen sind, für die Optimierung von Transportprozessen festgelegt. Die einzelnen Unternehmen führen eigenhändig eine Geokodierung von Standorten ihrer eigenen Lager und der Standorte ihrer Kontrahenten (Lieferanten, Kunden) aus, wobei der Mangel von betreffenden Standards gewisse Verspätungen bei der

Ausführung von Lieferaufträgen verursacht, die mit Problemen mit dem Finden von richtigen Zielpunkten verbunden sind. Demzufolge verfügen die kooperierenden Unternehmen über keine Hinweise auf die Betriebsdaten bei den einzelnen Standorten z.B. bezüglich deren Betriebs-Zeitfenster, der von ihnen am Eingang akzeptierten logistischen Ladungseinheiten, ferner der von ihnen bedienten Transportmittel etc. Das Ausbleiben dieser Informationen generiert zusätzliche, mit der zu wiederholenden Bedienung des betreffenden Standortes verbundenen Kosten, sowie die Kosten des verlorengegangenen Nutzens wegen des Zeitverzuges bei der Warenanlieferung. Eine Lösung des Problems vermag eine breite Einführung des GS1-Standardes in Form der Globalen Lokalisierungsnummer (GLN), die dank der ausführlichen Informationsbank die Distributionsprozesse unterstützt, zu sein.

Methoden: Die Ergebnisse der in polnischen Unternehmen im 2. Halbjahr 2016 durchgeführten Fragebögen bezeugen den nicht zufriedenstellenden Grad der Ausführung von Transportprozessen, die auf eine falsche oder nicht genug präzise Standort-Beschreibung und demzufolge auf eine beträchtliche Quote von fehlerhaften Anlieferungen zurückzuführen sind. Im Zusammenhang damit wurden Literaturforschungen durchgeführt und Studienfälle analysiert, die auf die Möglichkeit einer Inanspruchnahme des GLN-Standards zwecks der Erfassung der Standort-Lokalisierung und dessen Einführung in die TSL-Branche hinweisen.

Ergebnisse: Das Ergebnis der Arbeiten beläuft sich auf die Analyse der gegenwärtigen Situation und der mit der Lokalisierung von Standorten im Distributionsprozess verbundenen Probleme und auf die Ermittlung des Informationsbedarfes für die TSL-Branche. Es wurden dabei Vor-und Nachteile des GLN-Standards sowie die sich aus dessen Einführung in die Logistik ergebenden Möglichkeiten und Gefahren projiziert. Zusätzlich wurde ein Business-Modell, dessen Hauptaspekt auf dem Vorschlag der Wertschöpfung und der für die Interessenten in Distributionsprozessen sich bietenden Nutzen beruht, ausgearbeitet.

Fazit: Die Möglichkeit der Einführung des GS1-Standards in die Logistik, trotz der zahlreichen Literaturbezüge und realen Business-Bedürfnisse, bleibt immer noch nicht eindeutig definiert. Im Zusammenhang damit konzentrierte man sich auf die Projizierung des Konzeptes der Inanspruchnahme des GLN-Standards zwecks einer besseren Lokalisierung und Vereinheitlichung der Standort-Beschreibung. Die vorliegende Abhandlung hatte die Beschaffung eines Tools, das die angenommenen Funktionalitäten (im Kontext der Ermittlung von Lokalisierungsinformationen) in der Wirtschaftspraxis realisiert, zur Folge.

Codewörter: GS1-Standard, GLN-Standard, Distributionsprozess, Lokalisierung von physischen Standorten

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