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Location profiling to enable more efficient logistics processes

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I Introduction

In an increasingly digitalized and globally networked world, location data is becoming more and more important. Particularly in the areas of logistics, supply chain management and production planning, precise and reliable information is essential to ensure efficient processes, optimize costs and make strategically sound decisions. Companies that are able to systematically record, manage and intelligently use their location data gain a decisive competitive advantage.

Despite the obvious relevance of this data, many companies face major challenges in managing and using their location information. A lack of standardization, inconsistent or outdated data, media disruptions, difficulties with integration into existing systems as well as legal and security issues make it difficult to use location data as a strategic resource. This is where modern technologies and data-driven approaches come in to help companies not only manage their data more efficiently, but also tap into new potential for process optimization and value creation.

This white paper examines the importance of location master data for companies, particularly in the areas of logistics and production, but also beyond. It shows the challenges involved in collecting and using this data and how innovative solutions - including those from progressive Swiss start-ups - can help to improve transparency and efficiency throughout the economic cycle. Specific use cases and practical examples will illustrate the added value that the strategic use of location data can have for companies. The term "location profiling" describes precisely this technological possibility and also includes various use cases.

I.1 General introduction

The modern business world is characterized by constantly increasing networking, automation and data dependency. Companies are increasingly reliant on using precise location information in order to optimally manage their logistics processes, supply chains and production sites. Location master data includes a wide range of relevant information - from geographical coordinates to infrastructural conditions, operational key figures, information relevant to the logistics process and much more. A 360-degree view of all relevant locations in the supply chain.

The growing importance of location data or "location profiling"

In recent years, the way in which companies collect and use location data has changed fundamentally. Whereas in the past, location information was mostly recorded statically and only updated to a limited extent, usually not at all, today's digital transformation enables dynamic, continuous and automated updating of this data. Thanks to the increasing availability of IoT sensors, GPS tracking, satellite images and AI-supported analysis tools, location information can now be processed in real time and used for a wide range of applications.¹

¹ Hopkins & Hawking (2018)

Relevance for logistics

Precise location profiles are essential, particularly in the logistics sector and the business areas and sectors that border on it. They enable efficient route planning with the reduction of time losses (e.g., due to second deliveries)², optimized warehouse management, more precise delivery forecasts and overall better control of the value chain. Companies that have access to up-to-date and well-maintained location data benefit from greater predictability, lower costs and better service for customers and business partners. The effects of poor-quality or non-existent data can be felt far beyond the borders of transportation, as the systems (e.g., ERP, TMS, etc.) are networked with each other and therefore also affect other players along the supply chain. High-quality location profiles are also essential with regard to the future vision of autonomous logistics.

Target group of location profiling

Location profiling is aimed at a wide range of stakeholders who rely on precise location data to optimize operational and strategic decisions. A distinction is made between users who work directly with the data and customers who integrate the technology into their business processes. Drivers are also a relevant player in the supply chain and benefit from the right data or suffer from poor data.

Users are primarily the operational staff within companies who rely on location information on a daily basis in order to perform their tasks efficiently. This includes employees who are responsible for planning, controlling and monitoring movement and logistics processes. They use location data to make operational decisions, coordinate processes and react flexibly to current circumstances. Precise location information makes their daily work easier and increases efficiency.

Customers, on the other hand, are companies and organizations from various industries that integrate location profiling into their strategic processes. For them, the focus is on the added value that holistic location data management offers - be it through more efficient processes, a sound basis for decision-making or improved transparency along the entire value chain. Customers benefit from the opportunity to optimize their processes based on data and thus achieve long-term competitive advantages.

1.2 Definition and delimitation

The "**location**" in logistics usually includes basic information such as street, house number and zip code, which together define the physical "location". This basic data is necessary to geographically locate a site and enables elementary processes in logistics, such as route planning or the delivery of goods. However, this basic information is often not enough in today's increasingly complex logistics world. Companies need a more comprehensive understanding of the respective location in order to design processes efficiently and react flexibly to unexpected

² For logistics service providers (LTL transports), approx. 5 - 15% of first deliveries fail

challenges. A location is not just a ramp, but a comprehensive configuration that includes access route, waiting area, registration contact, sanitary facilities and much more.

This complexity is where **location profiling** comes in. In contrast to the location data described above, location profiling includes a comprehensive profile of a location that goes far beyond the mere geographical location. This profile collects and organizes a wide range of additional information that is of great importance for logistics processes - there are practically no limits to the imagination here: opening hours of the location, type and nature of access routes (e.g., truck-compatible routes), information on loading and unloading ramps, loading zones or specific delivery times, emergency and regular contacts, relevant details such as access restrictions (e.g., height restrictions or environmental zones) or information on preferred delivery times can be integrated. Location profiling also takes into account relevant points of interest (POIs) in the vicinity of the location.

In addition to these comprehensive location profiles, the "digital twin" approach can be used to create an even more detailed and dynamic digital representation of the physical location. A digital twin of a logistics location can be updated in real time to reflect changes immediately and enable accurate simulations and analysis.³ This technology extends the concept of location profiling by enabling ongoing synchronization and analysis of condition data, which can be critical for optimizing operations and maintenance processes.

While the pure "location" only describes the physical point on the map, "location profiling" provides a complete profile of a location, in both electronic and physical form.

This can be released and distributed accordingly depending on the stakeholder relationship. This means that the relevant stakeholders only ever receive the information from the profile that is relevant and useful.

The benefits of location profiling are particularly evident in complex logistics networks, such as those found in large companies with numerous locations. A single company location can comprise several different profiles - for example, different zones with various entrances, loading zones or internal storage areas.

Delimitation and data quality/up-to-datedness

In contrast to traditional location data, so-called location profiling is to be used in a standardized manner worldwide - logistics relationships no longer run between location A and location B, but between location profile A and location profile B. Accordingly, this is more of a location profile network. This network can be updated in real time and the new information can be shared with the relevant stakeholders.⁴

³ Jafari et al. (2023)

⁴ Manngård et al. (2020)

Location profiling is the structured collection and processing of extended location information that goes beyond geographical location, is kept up to date by intelligent data processing and is provided selectively in physical or electronic form depending on the stakeholder.

Location	Geographical location of a site
Profiles	Structured description or presentation of specific information
Location Profile	Detailed data record of a location with all relevant information for specific use cases
Location profiling	Holistic process for collecting, processing and updating comprehensive location information

1.3 Procedure and methodology

Procedure

This white paper aims to shed light on the concept of "location profiling" from a scientific perspective. It not only examines what "location profiling" means, how it differs from traditional location data and what potential it offers, but also focuses on practical use cases in various industries in order to increase efficiency in logistics and operational processes.

Chapter 2 analyzes the current handling of location data. Section 2.1 describes the status quo of location data in companies, while section 2.2 highlights key challenges and barriers in practice. Section 2.3 presents innovative solutions, including a "toolbox" of technologies, approaches and providers that support companies in setting up effective location profiling.

Chapter 3 examines existing and potential areas of application for location profiling. It analyzes the industries and processes in which location data is used today - for example in the area of real-time tracking - and what new opportunities will open up in the future thanks to more comprehensive location profiles.

Chapter 4 presents application-oriented use cases that highlight current challenges and show which tools can offer solutions. Each case is evaluated in terms of its potential.

Chapter 5 is aimed at decision-makers and highlights the strategic and operational implications of location profiling. It provides specific recommendations for managers on how companies can make effective use of the potential and future-proof their processes.

Methodology:

A mixed-methods approach has been chosen for the creation of this white paper to ensure a sound and practical analysis of location profiling. This approach combines quantitative data analysis, qualitative interviews⁵ and case studies to develop a comprehensive understanding of the topic. The interviewees come from various industries and business areas with a supply chain or technology and innovation focus. In the interviews and the subsequent analysis, a cross-reference between different industries and their dynamics can be established.⁶

The analysis begins with an evaluation of existing information on location data and its use in companies (explicitly in logistics) in order to identify current pressure points and optimization potential. In addition, selected case studies are used to shed light on the use of location profiling in practice (see chapter 4). Some of these are based on real company data and show specific examples of applications and tools used. In parallel, qualitative interviews were conducted with experts and practitioners in order to gain deeper insights into success factors, barriers and future developments.

⁵ An (anonymized) list of the interview partners can be found in the appendix.

⁶ Johnson and Onwuegbuzie (2004)



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2 Location data and location profiling in practice

2.1 Location data in logistics - status quo

Location data is an essential component of modern logistics processes and plays a central role in communication and coordination between shippers, forwarders and recipients. This data enables the precise planning and execution of transportation and is crucial for ensuring that goods arrive at the right time, in the right place, in the right quantity and quality, at the right cost and for the right customer - principles that are known in logistics as the "7Rs" (right product, right quantity, right quality, right place, right time, right cost, right customer).⁷ Location data is therefore the key to efficient supply chain management and compliance with these fundamental logistics objectives, making it an enabler for autonomous logistics processes.

The logistics process usually begins with the shipper's invitation to tender for a transport order. At this early stage, the basic requirements of the transport are first defined - for example, the type and quantity of goods, desired time windows for collection and delivery as well as special requirements such as temperature control or dangerous goods regulations. At this stage, detailed location data is often not yet the focus of planning. The focus is primarily on the selection process of suitable transport companies that can take on the job.

Once the order has been placed with a suitable shipper, detailed transport planning begins. Only now is the relevant location data of the loading and unloading points entered into the corresponding systems – typically a transport management system (TMS). This location data initially includes basic information such as address, zip code and, if applicable, geographical coordinates of the loading and unloading points. In a few cases, additional information is stored, such as opening hours, special access routes or instructions on the registration process at the location.

Accurate location data is essential for the recipient to make the appropriate preparations for the arrival of the delivery, such as coordinating warehouse staff, providing necessary equipment and ensuring that unloading can take place quickly and safely. Efficient communication and precise location data help to minimize delays and optimize the receiving process.

As soon as the order is created in the TMS, the information is transmitted to the driver. Depending on the degree of digitization, this is done either electronically - for example via a driver terminal or a mobile app - but usually still in the traditional way via printed freight documents. The information provided should give the driver all the necessary details to carry out the loading and unloading process efficiently.

Before starting the journey, the dispatcher usually plans the route taking various parameters into account. The location data from the TMS is either transferred directly to the navigation system

⁷ Swamidass (2000)

or entered manually by the driver. The aim is to reach the loading location at the right time - ideally within the planned time window to ensure that the rest of the process runs smoothly. During the journey, location data plays a key role in navigation. The systems guide the driver to the intended charging point, taking geographical conditions into account. The aim is to choose the route so that the driver arrives safely and on time - avoiding traffic jams, road closures or other potential obstacles. After arriving at the loading location, the operational part of the process begins. The driver follows the sign-in instructions and is directed to the designated ramp or loading zone. After loading, the route to the unloading location is planned, again based on the location data provided. The unloading process follows a similar procedure: The driver uses the scanner and smartphone as information carriers, navigates to the unloading point, logs in and follows the instructions on site to unload the goods. Here too, precise location information is crucial to ensure smooth and efficient processing.

During the entire transportation process, location data is not only relevant for the driver, but also for the dispatcher and other parties involved in the supply chain. Telematics systems or GPS tracking are used to monitor the vehicle's location in real time. In order to make this monitoring efficient, accurate "geofences" of the respective locations are required, which are often not available. This leads to suboptimal performance of the monitoring systems.

2.2 Current challenges in practice

The use of location data in logistics is essential to ensure smooth processes and fulfill the well-known "7Rs" of logistics. Nevertheless, there are numerous challenges that affect and manipulate the process.

General challenges in the use of location data

A central problem is the **inconsistency and obsolescence** of data. In many companies, location data is stored in fragmented systems that are not synchronized with each other. This results in inconsistencies, as data is entered manually and rarely updated centrally. Outdated information can lead to transports being incorrectly planned or incorrect addresses being used. At the same time, there are 10-20% failed delivery attempts.⁸ Another challenge is the **lack of standardization** of location data. Different companies use different formats and structures to store their location information. For example, address data can be structured differently or there is a lack of standardized designations for individual data points. The exchange of data between the parties involved often leads to misunderstandings and errors in the interpretation of the data. Incompatible data formats therefore prevent the smooth integration of data into the various company systems. Even if companies have extensive location information, this often remains unused because it is not directly integrated into the relevant systems. Instead, information often has to be transferred manually, which is not only time-consuming but also increases the risk of transfer errors.

⁸ Boysen et. al (2021)

Organizational barriers also play a significant role in the emergence of these challenges. In some companies, there are no clear responsibilities for maintaining and updating location data, and responsibilities are not clearly defined, leading to so-called "information silos" in which data is stored in isolation and not shared with other departments. In practice, it often happens that business partners are held responsible for certain tasks, but also for errors and problems. In the case of shippers in particular, the entire transportation process is transferred to an external party, meaning that there is little or no know-how. In addition, the use and storage of location data is subject to strict **data protection regulations**. In Europe, for example, the General Data Protection Regulation (GDPR) applies, which sets out clear guidelines on how personal data – which may also include certain location data - may be processed. Probably the biggest problem is the inadequate quality of location data, which is often inaccurate, incomplete or outdated.

In addition, there are often **language barriers** in the logistics industry. Many drivers come from other countries and do not always speak the national language of the region in which they work. If location data is insufficient or misleading, this leads to communication problems in combination with language barriers. In logistics, relevant knowledge is often stored in the heads of the actors involved and not documented in a structured and standardized way on a platform. This so-called "tacit knowledge" includes, among other things, knowledge about local challenges and specific characteristics of the frequently visited locations. This type of implicit knowledge is crucial for the efficient execution of transports, as experienced truck drivers know exactly how to reach certain locations and which local peculiarities need to be taken into account. However, the lack of documentation of this knowledge leads to significant disadvantages, especially when it comes to the transfer of knowledge and experience within a company. Important information is not available to new or less experienced employees, which can increase the training period and reduce efficiency. In addition, valuable experience is lost when employees retire or leave the company. This poses a significant challenge, as undocumented knowledge cannot be easily recovered, which can jeopardize the continuity and quality of logistics processes.

Implications for logistics processes

The general challenges described above have a direct impact on the logistics process as described in chapter 2.1: This is a type of scenario that is entirely conceivable in practice:

Incorrect location data can cause problems as early as the **tendering phase** of a transport order. If the shipper enters inaccurate or incomplete address data into the system, this incorrect data is used throughout the entire process. As a result, the shipper may receive an incorrect address or important information about loading zones or opening hours may be missing. These errors often remain undetected until the driver arrives on site and realizes that the information is incorrect - in practice, the errors are rarely reported.

In the **order and planning phase**, location data usually has to be transferred manually from the transport management system (TMS) to the driver's navigation system. During the **journey**, the driver is dependent on the location data provided being correct. Large logistics areas with several loading zones and ramps are not precisely stored in the navigation systems. The driver then has to ask around on site to find the right starting point. Missing or unclear signage on the site adds to the challenge. Construction sites, road closures or local traffic restrictions make navigation even more difficult.

Numerous problems also potentially arise on **arrival** at the site. If the driver has unclear or incomplete information, he often does not know where to register or unload the goods. The driver then has to "ask his way through", which costs time and is frustrating for everyone involved. Language barriers between drivers and the staff on site exacerbate the situation. In some cases, the driver discovers on arrival that the opening hours do not match the planned time slot. He then either has to wait or start again, which causes additional time and costs, as well as avoidable greenhouse gas emissions. A general problem arises when the driver has to drive to a location that he does not know. While experienced drivers often know which access roads and loading zones to use, new or less experienced drivers lack this knowledge. In the event of vacation replacements, illness or even natural fluctuation, there is an almost complete loss of experience and thus a loss of time in logistics operations. As a result, secondary problems and damage (e.g., reputation) also arise for the players involved, as time and energy are invested in identifying and prosecuting the guilty parties.

Consequences of the challenges for the players involved:

The challenges and errors in handling location data described above have significant and measurable consequences for the entire logistics process:

One of the most obvious consequences is the **loss of time**. Unclear, incomplete or outdated location data leads to drivers traveling longer distances, getting lost or losing valuable time on site because they cannot find the right loading or unloading point. Practice shows that drivers with a lot of experience and local knowledge make significantly more stops than inexperienced drivers.⁹ What's more: It is not uncommon for a second delivery to be made because the first delivery attempt fails. 5-15% of consignments cannot be delivered on the first attempt.¹⁰

Delayed arrival times are a direct consequence of this loss of time. In logistics, deliveries are often tied to strict time slots. If these time slots are missed due to inaccurate location data or unexpected obstacles, the driver may have to accept longer waiting times or plan a new journey. This can disrupt the entire supply chain, especially when it comes to time-critical goods. In some industries, such as the automotive or food industry, a late delivery can cause significant financial losses - as these industries are designed for "just-in-time" and often imply contractual penalties for deviations.

The economic impact of these challenges is considerable. Time losses and inefficient processes lead to higher operating costs, as more fuel is consumed and personnel resources are used inefficiently. In addition, late deliveries often result in contractual penalties or fines for the shipper. These additional costs can have a significant impact on the logistics service provider's margin.

Another critical factor is the **psychological stress** to which drivers are exposed. Studies on occupational psychology show that the search for the right location and interaction on site in particular represent a high stress factor. Drivers regularly report frustration and time pressure when they receive unclear instructions or have to find their way around unfamiliar locations. Studies measuring brain waves have shown that these situations cause significant stress, which can affect drivers' job satisfaction and health in the long term. Staff at loading and unloading points are also affected by these challenges. If drivers arrive without clear instructions and have to ask their way around on site, this leads to delays in operations and increases stress for everyone involved.

One particularly long-term problem is the loss of **experience**. Experienced drivers often know exactly what special features certain locations have - which access routes are best or even suitable, where there are bottlenecks or which registration procedures are necessary. If this information is not systematically documented, it is lost when these drivers leave the company.¹¹

⁹ Information from the general cargo cooperation VTL

¹⁰ Shao (2025)

¹¹ Droege & Hoobler, J. M. (2003)

These challenges and their consequences are not just theoretical. In the later chapters of this white paper, specific use cases are presented (see chapter 4), which illustrate these problems using real examples and attempt to quantify the effects.

2.3 Innovative solutions

LogBook - An innovative platform for location profiling

One company that has taken on the challenges of location master data management is LogBook AG. The innovative start-up based in Zurich was founded by experts who have worked in the logistics industry for many years and have experienced location data-specific challenges first-hand. With the aim of solving location data problems efficiently and sustainably, they developed the LogBook platform – a specialized solution for the management and exchange of location profiles.



LogBook offers a digital platform that covers the entire location profiling process – from the creation and maintenance to the exchange of location profiles between different stakeholders. The platform acts as a central database for location information, in which companies can maintain their own locations and at the same time gain access to profiles of other locations – naturally in compliance with strictly defined access rights.

Core functions of LogBook

- **Creation and management of location profiles:** Companies can create and manage detailed profiles of their own locations on the platform. In addition to basic information, this includes a kind of 360-degree view of the location.
- **Centralized data storage and decentralized maintenance:** All data is stored centrally in the platform and updated regularly. AI algorithms are used to automatically generate suggestions for updates - based on public sources or satellite images, for example - and present them to users for confirmation.
- **Data exchange with access management:** A finely tuned rights management system allows companies to decide for themselves which data they share with which partners. This ensures that sensitive information is only accessible to authorized parties.
- **Integration into existing systems:** The platform offers standardized interfaces (APIs) that can be used to integrate location data directly into existing ERP, TMS or WMS systems. This ensures that all relevant information is available where it is needed. In practice, data is usually entered and forwarded manually, sometimes "already" via Excel exchange. Despite API integration and artificial intelligence, the human resource remains indispensable, even in the future.

The LogBook toolbox



To enable the functions described above and to meet the complex requirements of logistics, LogBook provides a comprehensive toolbox. This contains a variety of technologies and tools that enable users to efficiently manage, update and use location data.

Geofencing



With the help of geofencing technology, users can define virtual boundaries around their locations. The system offers the possibility to create, maintain and distribute geofences to enable further applications and solutions.

Artificial intelligence



Artificial intelligence is used to enrich existing location data. New information is automatically added or existing data updated by comparing it with public sources such as websites, maps and satellite images.

Validation and data quality



The platform offers various mechanisms for validating the location data entered. Automated checks ensure that data formats are correct and critical information is complete. In addition, AI-supported suggestions for data correction are made, which the user can confirm or adjust.

Management of user rights



Comprehensive authorization management is a central element of the platform. Companies can precisely control which information is shared with which partners. This ensures that sensitive data remains protected and that only authorized users have access to specific information.

System interfaces



Interfaces form the basis for data exchange between the LogBook platform and the user's existing systems (e.g., TMS, ERP or WMS). Location data can be automatically imported into the respective systems via these interfaces without the need for manual intervention. The interfaces are designed to support various data formats and enable simple integration. The data itself is often available, but is separated by various systems and not standardized - ultimately meaning that it cannot be fully used.

User interface



The platform offers an intuitive and user-friendly interface through which users can manage their location data. The UI makes it easy to create and edit location profiles and configure access rights. Visualizations such as map views help users to precisely manage their locations and identify optimization potential. The UI is important in that the human user must also create and maintain data points themselves (decentralized).



Use of public data sources (Public Sources)

LogBook draws on a variety of public data sources to supplement location data and keep it up to date. Terminals, seaports, airports and freight villages, for example, provide a wealth of basic information that can be used accordingly. LogBook acts as a consolidator and preparer of the data.

The LogBook toolbox is designed in such a way that it can be flexibly adapted to the needs of different companies and industries. It not only enables the creation and maintenance of location data, but also its intelligent use along the entire supply chain. In addition, this toolbox forms the basis for specific use cases, which are presented in detail in the following chapters. These use cases show how companies can efficiently manage their location data with the help of LogBook and thereby achieve concrete benefits – including time savings, more efficient processes, less frustration, a higher first-time delivery rate and greater customer satisfaction. The LogBook solution is a comprehensive solution and therefore serves as a reference point.

3 Current and future areas of application

Imagine a world in which locations are no longer just recorded as static address details - consisting of street, house number, zip code and town – but rather as dynamic location profiles that provide a comprehensive, contextualized data basis. In this concept, a location is not merely regarded as a fixed point in a geographical coordinate system, but as a **multidimensional source of information** that integrates infrastructural, operational, administrative and technical specifications in addition to classic location features.

This type of data-based location management would create a new quality of information availability. By standardizing and continuously updating location information, logistics and decision-making processes could not only be made significantly more efficient, but logistical and operational processes could also be optimized. The digitalization and networking of this information would also lead to increased information density and transparency, enabling companies and organizations to deploy their resources in a more targeted manner and manage their processes more intelligently.

The consistent application of such a comprehensive location profile opens up a broad spectrum of potential areas of application. The following chapters outline key sectors and subject areas in which precise location profiles play a decisive role and can serve as the basis for innovative business models and efficiency improvements.

3.1 Network planning - designing logistics structures more intelligently

The strategic planning and design of logistics networks is one of the key challenges in corporate management, especially for industrial companies with global operations. Traditionally, the selection of new locations is based on macroeconomic factors such as infrastructural conditions, transportation costs or market accessibility. However, the level of detail in the location analysis is often limited in practice, as many key parameters are not systematically recorded or updated.

By using location profiling, network planning can be made considerably more precise. In addition to classic location factors, detailed parameters can be included, e.g.,

- Traffic and infrastructure parameters, such as the availability of access roads, parking and loading zones or restrictions due to environmental zones and driving bans
- Dynamic capacity data, including loading and unloading times, waiting times and availability of resources
- Regulatory framework conditions, such as specific safety regulations, permits or operating hours

By integrating this data into existing planning models, the efficiency of transportation relations can be increased and a more precise location assessment can be made.

3.2 Dispatching - location data as the basis for reliable route planning

Scheduling is a central function in the management of supply chains and involves the short-term allocation of transportation, storage capacity and logistics resources. Traditionally, scheduling is based on historical data, empirical values and rudimentary location information, which sometimes results in inefficient route configurations, imprecise time windows or incorrect destination control.

Data-driven scheduling based on location profiling can not only optimize logistics processes, but also improve the added-value behind the primary service. The key added values include...

- Adaptation of delivery processes in real time, based on current location data, traffic situation and availability.
- Efficient control of loading zones by using specific location parameters such as access restrictions or priorities for loading and unloading.
- Automated control of arrival and departure times to minimize waiting times and synchronize operational processes.

By integrating these parameters into scheduling systems, operational efficiency can be significantly increased and the potential for errors in planning reduced at the same time.

3.3 Real estate management in logistics - location profiles for efficient space management

Due to their size and complexity, the management and optimization of logistics properties requires precise knowledge of the respective infrastructure. Logistics centers often consist of several hundred thousand square meters of space with different usage zones and infrastructure components, floors and sub-areas.

The use of location profiling (e.g., computer-aided facility management) enables real estate operators and logistics companies to create detailed location profiles which, among other things:

- Digital site plans with exact geo-references for logistical activities, e.g., loading zones or emergency routes

- Asset management, including automated maintenance and servicing logs containing all relevant service providers and service partners for logistics infrastructure and other infrastructural equipment.

Increased transparency along the logistics locations, combined with location data, creates better operational transparency along the supply chain and can reduce downtime.

3.4 Autonomous driving - location profiles as the basis for digital traffic control

The development of autonomous vehicles requires precise, seamless digital mapping of the physical environment. Although conventional navigation systems provide road and traffic information in real time, the quality of the mapping is far from sufficient for the widespread use of autonomous vehicles.

Location profiling can act as a digital twin of the physical world and provide basic functional information for autonomous driving, initially on the locations:

- Precise mapping of site infrastructure elements, including exact dimensions of loading and unloading areas, locations and specifications of safety equipment, and detailed access arrangements that are critical for autonomous vehicles.
- Integration of site-specific dynamics, such as monitoring and adapting to changes in operating times or temporary restrictions that directly influence the planning and operation of autonomous vehicles.

This enhanced location intelligence could make autonomous driving considerably safer and more efficient and at the same time form the basis for future smart industry locations. Ultimately, a digital twin with the greatest possible accuracy is needed to provide a platform for autonomous vehicles.

3.5 Preserving the tacit knowledge of truck drivers and dispatchers

In the transport and logistics industry, the "tacit knowledge" of truck drivers and dispatchers plays a key role in the smooth running of everyday processes. Drivers know important details such as the best access to loading ramps, special features of the approach to construction sites or who to contact at the reception of a factory site – information that is not in any official database. This knowledge is often passed on verbally and remains tied to the experience of individuals. If a driver leaves the company or is absent for a longer period of time, this valuable knowledge is often lost, leading to delays, incorrect journeys and additional coordination work.

Without this specialized knowledge, the use of replacement drivers often results in significant productivity losses of up to 30%.

This tacit knowledge can be systematically preserved with structured, digital recording and maintenance of such location-based information. This not only makes it accessible to everyone involved, but also forms the basis for more sustainable, efficient and increasingly automated logistics. In this way, companies reduce their dependency on individuals, increase service quality and strengthen their resilience to staff turnover in the long term.



4 Use cases for practical application

4.1 Case I - Cross-actor data transparency

In logistics, the transparency and availability of location and operational data plays a crucial role, especially in the light of cross-company collaboration. Companies must be able to access reliable information in real time to plan and optimize processes in order to achieve maximum efficiency. In a complex ecosystem with different players – manufacturers, suppliers, logistics service providers and customers – the smooth exchange of data poses a challenge, often due to delayed or incorrect data transmissions across stakeholder boundaries.

Problem: The lack of availability and standardization of location and operational data leads to inefficiencies along the logistics chain:

- Outdated or incomplete location data, leading to delivery delays and increased costs.
- Manual data maintenance, which is time-consuming and error-prone.
- Data silos that hinder the exchange of information between different players.
- As a result, incomplete or delayed data inputs from third-party providers.
- Lack of real-time capability in communication between players.
- Lack of location data standardization.

In practice, these challenges lead to incorrect planning and therefore waiting times, unnecessary costs and inefficient use of resources. If, for example, pick-up or delivery addresses are transmitted incorrectly, this can lead to inefficiencies in transport planning, meaning that delivery windows are missed, for example, resulting in waiting times or locations having to be visited again. Repeated trips to pick-up or delivery addresses lead to increased and avoidable CO₂ emissions.

Solution approach: A data-driven platform model for the centralized management and real-time exchange of location data can significantly improve transparency and collaboration in supply chains. LogBook provides a platform that centralizes and updates location master data, significantly improving transparency in the logistics industry:

- Consolidation of internal systems: Instead of managing data by multiple users on multiple systems such as SAP and manually maintained Excel lists, the system landscape can be minimized to one data source by introducing a single master location platform.
- Central overview with decentralized management: Companies can manage and maintain all relevant location data in one platform.
- Location data standardization: Definition of a standardized data model for logistics locations.
- Platform for data exchange: Implementation of a digital solution that bundles real-time location information and enables exchange between stakeholders.
- Data enrichment: Automatic supplementation of location data with publicly available information provided by users.
- Integration: Seamless integration into existing systems and supply chain management software to facilitate the exchange of location master data.

Potentials:

- **Cost savings:** By reducing manual processes and avoiding errors, operational costs can be lowered.
- **Increased efficiency:** up-to-date and precise location data enables optimized route planning and shortens delivery times.
- **Sustainability:** more efficient logistics processes help to reduce CO₂ emissions.
- **Scalability:** The modular approach allows easy integration of and expansion to different players in the logistics industry.

Through platform-based, centralized management of location master data, companies can effectively manage their location data, leading to increased transparency and efficiency throughout the supply chain.

4.2 Case 2 - Decentralized data management using the example of an OEM

The inclusion of third-party services for customers is often an integral part of the business model of many companies. Car manufacturers not only sell vehicles, but also offer workshop services. In the transport sector, for example, it is essential for haulage companies to have reliable service partners in order to minimize the downtime of trucks or trailers in the event of damage. A German OEM relies on external service partners to maintain a dense service network. The full service offered by the customer means that haulage companies rely on the manufacturer itself for the quality of workshop services. However, they are faced with the challenge of not having direct access to the data of these third parties, as essential data is missing or only available with a delay. In order to provide customers with a reliable overview of the service network, including opening hours and service profiles, considerable personnel effort is required to keep the data up to date across several hundred locations. This dependence on external data sources leads to inefficiencies, as working time is directly linked to costs.

Problem: The insufficient availability and standardization of data caused by third parties:

- Lack of standardization of location and profile data.
- Dependence on external players, resulting in planning uncertainties.
- High costs for OEMs with external service networks due to inefficient processes and lack of automation.
- Delays due to manual queries and inconsistent data formats.

Solution approach: Thanks to its decentralized approach, LogBook enables efficient and secure use of third-party data. The advantage for the OEM is that its service partners as third parties are enabled to maintain their own location profiles themselves so that updates are automatically applied. The AI-supported, automated collection of publicly available data (e.g., opening hours) enables users to spend less time filling in empty location masks. This results in two advantages:

- **Workflow optimization:** Process automation to simplify collaboration between the players. Haulage companies can rely on the up-to-datedness and accuracy of, for example, opening hours and address data, while the OEM itself is relieved of administrative work.
- **Secure and decentralized data management:** use of modern technologies to ensure data integrity and permanent availability

Potentials:

- **Greater data accuracy:** Third-party providers maintain and update their own data directly, minimizing errors and outdated information.
- **Administrative relief for the OEM:** Companies no longer have to check and update data manually, but can rely on reliable information maintained by third parties.
- **Cost savings:** Reduction of administrative effort through automated data updating and real-time synchronization.
- **Improved planning reliability:** Reliable real-time data access reduces uncertainties and enables more efficient decision-making processes.

4.3 Case 3 - Efficient tender and tender management

Tenders in the transport and logistics sector are complex processes with large amounts of data that require high data quality and standardized formats. Tenders are usually processed in teams due to the high processing effort involved. Data is often exchanged via Excel spreadsheets, which are problematic due to different templates and error sources, as they are prone to errors. Address and geodata in particular contain inaccuracies or language barriers, which leads to incorrect or inaccurate tender calculations. Although LogBook does not provide its own tendering platform, it does provide support by providing precise location data and their profiles. This enables efficient data transmission and improves the quality of tendering processes. In addition, visualizations of logistics networks can create transparency and make tenders easier to understand.

Problem: A key success factor in tenders is the quality and consistency of the data provided. In practice, however, problems arise that complicate the tendering process and lead to inaccurate calculations:

- Different templates and manual errors in Excel make data exchange difficult.
- Incorrect or erroneous address and geodata (e.g., zip codes, coordinates).
- No knowledge of the conditions on site.
- Language barriers and inconsistent data formats lead to misunderstandings.
- Inaccurate or incorrect tender calculations that cause costs and planning uncertainties.

Solution approach:

- **Standardization of data:** Uniform profiles for locations and companies from a "single source of truth" without media disruptions.
- **Provision of precise location data:** Ensuring data quality and avoiding errors in the tendering process.
- **Visualization of logistics networks:** Support for tender participants through an improved display of locations and their connections.

- Real-time data synchronization: Improved basis for decision-making thanks to up-to-date and validated data.

Potentials:

- Reduction of error sources: Automatic data validation reduces inaccuracies.
- Relief for both tendering parties: No manual checking and correction of location data necessary.
- More efficient processing of tenders: Faster processes thanks to clear data structures and visualizations.

4.4 Case 4 - Real estate and asset management

In the real estate and logistics industry, precise master data and metadata on locations are essential to ensure efficient processes and smooth collaboration between owners, tenants and logistics service providers. Missing or inaccurate data on floor load, building height, restrictions or ramps are particularly problematic for large industrial and commercial campuses with multiple users. Transparency of this data is often limited as different stakeholders – owners, landlords, tenants and transportation service providers – each use their own systems and processes. Updating this data is often unstructured or not planned at all, which leads to misunderstandings, inefficient processes and planning errors.

Problems: The exchange and maintenance of location and property data is often inadequately organized, leading to inefficient operating processes and planning errors. Large multi-user logistics centers in particular lack uniform standards, resulting in misunderstandings between owners, tenants and logistics service providers:

- Lack of transparency regarding master data and metadata such as floor load, building height, restrictions and infrastructure (e.g., ramps).
- Highly relevant for large multi-user campuses with several tenants and logistics service providers.
- Different data sources and responsibilities between owners, landlords and users make updating difficult.
- Lack of a standardized platform for structured maintenance and use of this data

Solution: To improve transparency and data quality, LogBook offers a central platform for location and real estate data. This ensures that all relevant stakeholders always have access to up-to-date and reliable information:

- Central database: Standardized location profile with all important master data that can be continuously updated.
- Add-ons for extended management: functions for contract management, ESG data integration and additional master data to meet the requirements of different user groups.
- Transparent data updating: A standardized process ensures that owners, landlords and tenants can maintain relevant data in a structured manner and update it in real time.

Potentials:

- Increased planning and operational efficiency: Precise location data enables logistics processes to be better planned and implemented.
- Optimization of the construction phase: Trades can be better coordinated during the construction phase (construction site logistics).
- Breaking down silos between departments: Facilitating collaboration between real estate management and logistics.
- Legal security: Consideration of mandatory notifications on site equipment

4.5 Practical case - Optimization of internal company location management

A global leader in the energy sector with around 100,000 employees manages a complex network of over 400 of its own sites. These include production sites, smaller plants, temporary and permanent warehouses for projects and power plants, service sites for repairs, offices and packaging sites. The management of these diverse locations was based on manual processes and the use of Excel spreadsheets, which were previously available locally and partly distributed throughout the company via file sharing systems. This approach led to several challenges:

- Data timeliness and accuracy: Manual maintenance of tables was error-prone and required considerable effort to ensure that the information was up-to-date and accurate.
- Internal and external communication: Precise location data was required for quotations and customer inquiries. Manual data management led to delays and potential inaccuracies.
- Resource commitment: Employees had to spend considerable time updating and checking data, which tied up resources and reduced efficiency.
- Lack of supplier integration: There was potential to integrate suppliers for a more comprehensive overview of goods flows, but this was not feasible with the existing systems.

Solution approach

To meet these challenges, the energy technology company decided to implement the LogBook platform, which enables decentralized data management. This was introduced as a tool and offers around 500 internal users the following functions:

- Central database: All location-related information, including coordinates, address data, opening hours, contact persons, equipment and internal codes, is stored in a central, cloud-based database.
- Decentralized data maintenance: Location managers can update their data independently, reducing the need for centralized data maintenance.
- Comprehensive rights management system: A detailed authorization system ensures that only authorized persons have access to certain data, which increases data security.
- User-friendly interface: The platform offers an intuitive user interface that makes it easy to access and maintain data.
- Integration of suppliers: The platform makes it possible to integrate suppliers in order to obtain a comprehensive overview of the flow of goods.

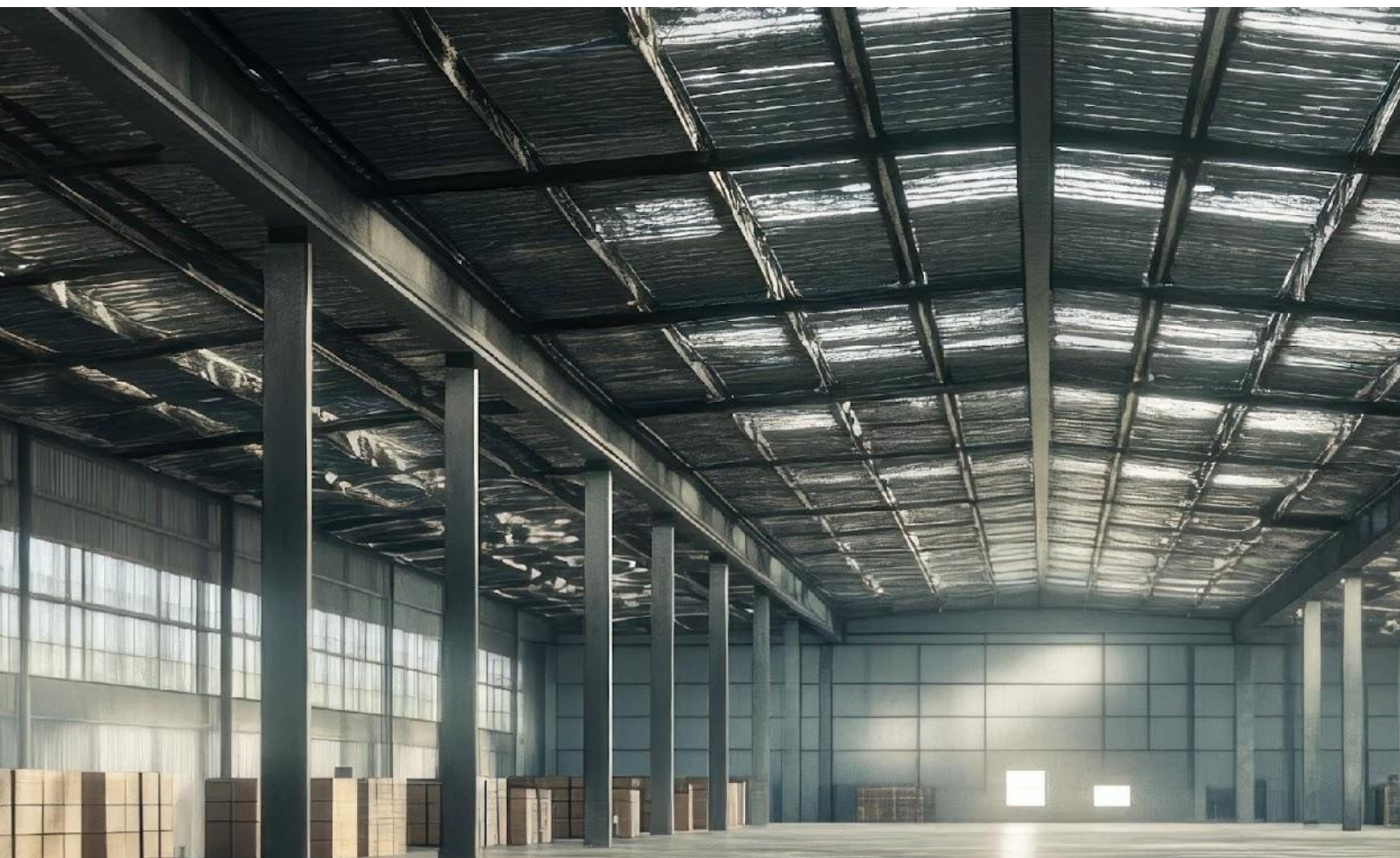
- Flexibility in data use through export and further processing in Excel, Power BI and Co. possible.

Realized added value

The implementation of the LogBook platform brought the company the following added value:

- Increased efficiency: The centralized storage and decentralized maintenance of data has significantly reduced the effort required for data management, while at the same time increasing data quality. Employees can concentrate on value-adding activities as the effort required for data maintenance has been minimized.
- Reduction of redundancies: Centralized data storage prevents duplicate data maintenance and inconsistencies thanks to the platform as a "single source of truth".
- Improved communication: up-to-date and accurate location data is available both internally and externally, which facilitates customer communication and the preparation of quotations.
- Geofencing and value-added services: Future extensions such as geofencing and additional services, for example for tenders, are made possible.
- High user acceptance: The positive feedback from users underlines the successful implementation and practical benefits of the platform.

In addition, the platform opens up opportunities for risk assessment, for example by providing codes of conduct and protective equipment for construction sites, as well as for integrating contract data for optimized network configuration. Overall, the introduction of the platform at the energy technology company has led to a significant optimization of site management, made processes more efficient and created the basis for future digital expansions.



5 Implications for practice

Why deal with the topic of "location profiling"?

In an increasingly digitalized and networked business world, the ability to record, manage and intelligently use precise and dynamic "locations" holistically is becoming a decisive competitive factor. Companies that have reliable location profiles can manage their logistics processes more efficiently, minimize time losses and reduce incorrect deliveries. The resulting increase in efficiency not only cuts costs, but also improves the quality of service provided to customers and partners along the entire value chain.

In addition, well-structured location profiles help to minimize risks - for example, by predicting delivery times more precisely or optimizing the use of resources. With regard to long-term strategies such as autonomous driving, smart industry or automated construction site logistics, digitized location profiles are even essential. Those who address the topic at an early stage create the necessary database for future technological developments and remain connected in a rapidly changing market environment.

How to deal with the topic?

Companies should no longer view "locations" as static information, but as a living asset that needs to be continuously maintained and used strategically. The first step is to centrally bundle all relevant data sources in a structured, uniformly maintained format. In addition, clearly defined processes are needed for data maintenance and updating – ideally decentralized, but according to common standards and with clear responsibilities.

Technologically, the focus should be on systems that support modern interfaces (APIs), data visualization, geofences, rights management and AI-supported enrichment functions. Creating a cross-organizational understanding of the value of precise location profiles is just as important as the willingness to cooperate with external partners – especially in networked supply chains.

What help do digital platform solutions offer?

Technology platforms for location profiling enable the scalable and secure collection, management and use of location profiles. They offer central databases with standardized formats, enable integration into ERP, TMS or facility systems and facilitate company-wide collaboration through modular distribution of rights and roles. Platforms that offer automated data validation and enrichment using publicly available sources and AI-based tools are particularly powerful.

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Interview partners

Company size	Industry	Function
Large companies	Consumer goods	Global Logistics Network & Transfers Manager
Large companies	Pharmaceuticals	Division Head of Global Warehouse & Transport
Large companies	Industry	Global Logistics Operations Center
SMES	Consulting	Independent consultant / previously: Senior Vice President Global Customer Solutions
SMES	Logistics service provider	Managing Director
SMES	Logistics service provider	Managing Director
Large companies	Logistics service provider	Lead City Logistics Cluster
SMES	Logistics service provider	Managing Director
SMES	Real Estate	Managing Director
SMES	Logistics service provider	Head of ICT / Transportation
Start-up	Technology	Investor / Logistics
Start-up	Automation	Managing Director
Large companies	Agricultural machinery construction	Project Manager Supply Chain
Large companies	Energy technology	Global Logistics Network Manager