Smart Logistics Platforms for Industry 4.0

Abstract

In the context of Artificial Intelligence, Cloud, IoT and Blockchain, the objective of this technical White Paper is to illustrate the value of the Smart Logistics system developed by ZIRAK in the REDtag project. The platform supports various businesses to gain more control, visibility and accessibility over their supply chain data. Furthermore, it provides insights into how these operations can be optimized to reduce logistics costs and establish trust between the different supply chain players.

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This white paper was produced by:

João Amaral	-	Technical Project Manager
Davide Mazzucchi	-	Embedded Department Manager

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1 Introduction

1.1 Supply Chains and Industry 4.0

In recent years the rise of automation, the usage of intelligent systems, machine-to-machine communication and large-scale communication networks between sensor devices (IoT networks) has had a tremendous impact on all branches of industry.

The ongoing paradigm shift into **Industry 4.0** has led companies to acknowledge the value of quality information systems and has promoted investment in these systems.

One area of industry where the adaptation of these technologies can bring several advantages is the interaction between different entities, each with different characteristics, with the goal of supplying a consumer with a service or a product.

These **supply chains** have tremendous impacts on the overall quality and viability of a business and still present challenges to many companies. In most cases, the interaction between entities can be summarized as the interactions between a producer and all transportation entities, where there may not be a strict trust relationship between them.

1.2 Market View and Needs

Lack of traceability, capability of supervision and overall transparency in supply chains can lead to several problems, such as:

- **Ownership**: inability to have accountability for low-quality, damaged or missing products;
- **Efficiency**: lack of optimization in the distribution and overall logistics process;
- **Visibility**: lack of transparency that entities have with one another when problematic situations may appear which may impact trust.

In order to have a clear image of the impacts that package events have in terms of the efficiency of the supply chain, costs and delays, several real-world working environments have been studied.

When analyzing the data gathered from these studies, it became clear that one of the most negatively impactful events that can happen in a supply chain is having a package reach its destination in a damaged state.

In addition to the obvious costs of having to return the broken product and ship out another one, the trust that the client or partner had in each other may suffer, leading to problems in preserving clients' and partners' relationships.

Overall analysis shows that taking into account products that travel through a supply chain of any kind and have some sort of problem, **20%** of products are damaged during shipping and **40%** of these products are then returned.
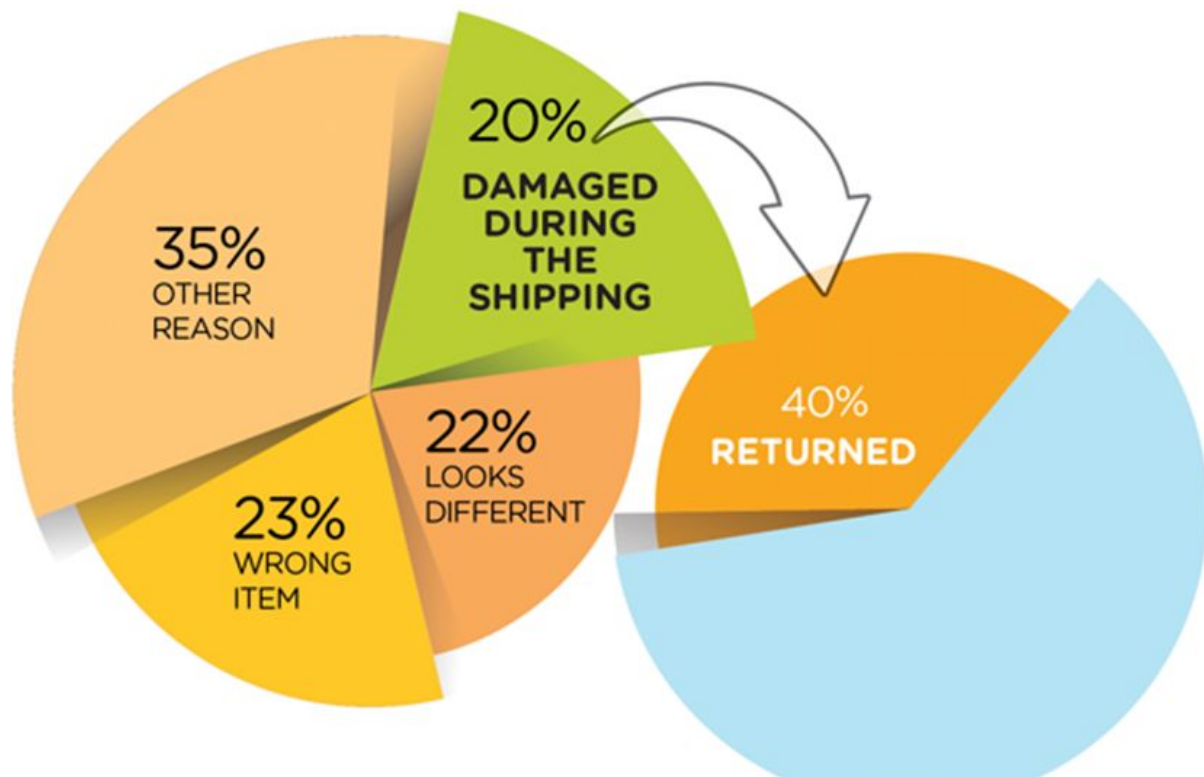

Figure 1 Chart showing the overall distribution of product-related problems and return rate of damaged goods during shipping.

Businesses need clear and simple ways to access product information while it progresses throughout the supply chain so that any events that the goods may experience can be stored and communicated transparently, promoting trust, ownership and accountability.

Any possible improvements in efficiency of the supply chain also translate into **lower transportation time and cost and minimize the costs associated with breakage or deterioration of products during shipping**.

In addition, there are also a number of metrics related to the progress of products throughout a supply chain that are currently not leveraged in order to have clearer insights into how the operation can be optimized.
The effective usage of these metrics can enable real-time predictions of product condition based on sensor data and suggestions of which routes have proven to have less incidence of damage, which package is best suited, which day / hours are best for the goods transportation, based on historical data.

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