Living Lab 8: Ordering and payment systems

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1 Background and Introduction

1.1 Background

Europe is considered as one of the global leaders in the logistics sector. Eight EU Member States are ranked among the top 10 countries in terms of logistics performance for the year 2018[i], while the market size of the logistics sector in Europe was estimated as being equal to €878bn in 2012[ii].

However, in various sectors, logistics costs remain a significant part of total supply chain costs. These logistics costs represent 12% of total cost in the manufacturing sector and more than 20% in the retail sector[iii]. Moreover, logistics efficiency could be improved. Statistics have shown that 24% of all vehicle movements per kilometre in the EU are not carrying goods, while the average load factor for vehicles is estimated as being 57%[iv].

To enhance efficiency in the EU logistics sector, increased collaboration could improve the current situation. More efficient synchronized networks and a decrease in operational costs are the main

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benefits for the companies involved in cooperation schemes[v], as it has been estimated that cost savings and efficiency gains of 6-10%, according to Transport Intelligence[vi], or a reduction of 9-30% in distribution costs, could be expected[vii].

1.2 SELIS (Shared European Logistics Intelligent Information Space)

However, a key barrier to collaboration is doubts around secure data exchange, and this is the barrier that SELIS aims to remove. The Shared European Logistics Intelligent Information Space (SELIS) project is a €17 million European Union Horizon 2020 Research and Innovation Programme, running from September 2016 to August 2019. The project has built a scalable and replicable platform for pan-European logistics applications, at every level allowing a standardized exchange of core data between any number of registered users.

The SELIS project combined strategies for innovative, efficient and green logistics with leading edge open source information technology techniques that support collaborative logistics, through building applications and testing them in real world use cases.

1.3 Living labs

Living Labs have been used by SELIS as the testing and proving environment by using current commercial and operational scenarios to test and refine the SELIS developed technical solutions. Some solutions incorporated opensource systems integrated into the overall platform.

The SELIS Living Lab activities have included the stress-testing of the solutions developed for building the basis for a safe, secure, reliable and robust data-sharing platform.

- Each living lab involved business partners willing to support the development and piloting of these applications.
- Each of these living labs tested one or more applications, with each pilot containing one or more trials, or use cases, which allowed the testing of developed solutions in a number of different scenarios, with different groups of collaboration partners, each effectively conducting a stand-alone experiment which generated a set of real-world results which can then be compared with the expected and anticipated benefits.
- Each real-world pilot and use case trial created insight on implementation, and the enablers and barriers to success.

1.4 The Concept of SELIS Community Nodes

SELIS has developed the concept of a network of logistic communities, each created as localized shared intelligent logistics information spaces, each adaptive, configurable and providing the privacy that collaboration requires. These communities are termed as SELIS Community Nodes (SCNs). The aim is to stimulate the growth of a network of these SCN, that will create a distributed common communication and navigation platform for transport and logistics, a platform that through multiplication can be extended and expanded to support Pan-European logistics applications, adaption and collaboration.

Each SCN is a secure domain where supply chain partners share data (e.g. raw data, analytics predictions, inventory, routing decisions etc.) in a secure and governed manner that, in turn, enables the implementation of a specific collaborative logistics model.

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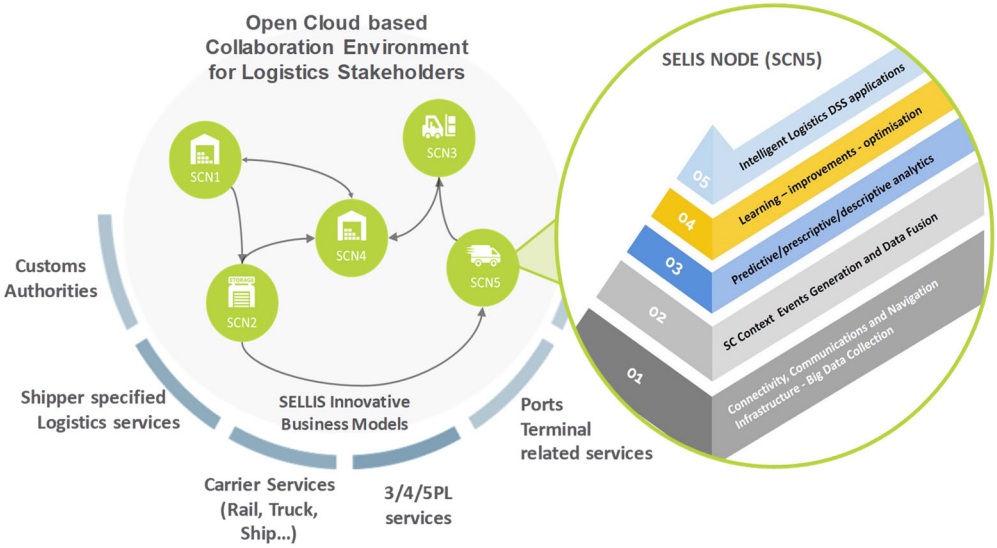

Figure 1: SELIS SCN concept

Inside each SCN is the necessary architecture to allow users to:

1 - connect to multiple data sources;
2 - translate, reformat and standardize data;
3 - share data securely, enabling collaboration;
4 - make use of machine learning that allows for self-learning and improving capabilities, such as continuous improvement in forecasting based on the ongoing and rea-time use of accumulated data.
5 - adapt and deliver the capability as required by a specific industry or sector

If appropriate, an SCN could communicate with other SCNs through an open and cloud-based architecture to create a network of SCNs; this would allow any operator to connect with another, such as a single port SCN, which could share appropriate data with an inland 3PL (Third party Logistics provider) or rail SCN.

2 Living lab 8 - Ordering and payment systems

2.1 Background to grocery supply chain and financial system applications

Living Lab 8 involved two parallel case studies designed to test similar problems experienced in inventory management and finance flows at ELGEKA and DIAKINISIS, an FMCG supplier and the largest LSP (Logistics Service Provider) in Greece. At ELGEKA, the SELIS solutions targeted supply chain visibility through and data integration, plus a second application to better manage trade financing and factoring. At SONAE, a Portuguese retailer, similar collaborative planning and optimization problems were addressed, and the second application was focused around revenue management through dynamic forecasting and discounting of demand and retail pricing. Both the ELGEKA and SONAE cases were designed to enhance supply chain visibility and supply chain financing.

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2.2 ELGEKA/EGerlLink problem - supply chain gaps and finance chain risks

ELGEKA manages 170,000 Stock Keeping Units (SKUs), 170,000 m^2 of warehousing space, and 1.2 million deliveries per year, delivered at a frequency of over 260 delivery routes each day. Despite the EDI (Electronic Data Interchange) based integration of orders from retailers, collaborative planning and automated routing of delivery and proof of delivery, all typical for the grocery sector, there was limited visibility on the delivery status of the orders within the supply chain; once orders were placed by retailers, there was little information on the supply chain progress of those orders including delays. As a consequence, estimated time of arrival data was not updated. This lack of visibility increased the risk of retailer overordering and excess stock held by supplier as a buffer to maintain continuity of supply. Working capital represents sunk investment, and cost of capital was high, a situation exacerbated by the economic crisis which impacted the Greek economy particularly severely, which also contributed to the high risk of uncollectable transactions.

SELIS facilitated visibility reduces risks for third party finance companies providing factoring services, both through reduction of working capital cost overall which must be underwritten, and through increased focus on on-time in full delivery. The factoring companies buy receivables, charge a service fee and cost of interest, and then pay the supplier the invoiced amount to the supplier upfront, ahead of the delay in payment from retailer. There are two risks for the factoring provider; risk of non-payment due to lack of liquidity, and risk of non-payment on time due to the supplier has not delivered the invoiced quality on time and in full. The SELIS solution applied was directed at reducing the second risk (the credit risk being managed through credit insurance by the factoring company).

2.2.1 SELIS solutions for ELGEKA

Three solutions were deployed through SELIS applications.

- Supply chain visibility and collaboration tool for use by the entire supply chain, automated tracking of order fulfilment.
- A tool to generate supply chain excellence scores, using supply chain visibility to assess the financial risk related to delivery reliability of each supplier
- A supply chain financing solution to facilitate the sale of supplier receivables to factoring investors.

The legacy system architecture and SELIS solution for supply chain visibility is shown in figure 2, and the factoring support tool legacy and new solution is shown in figure 3.

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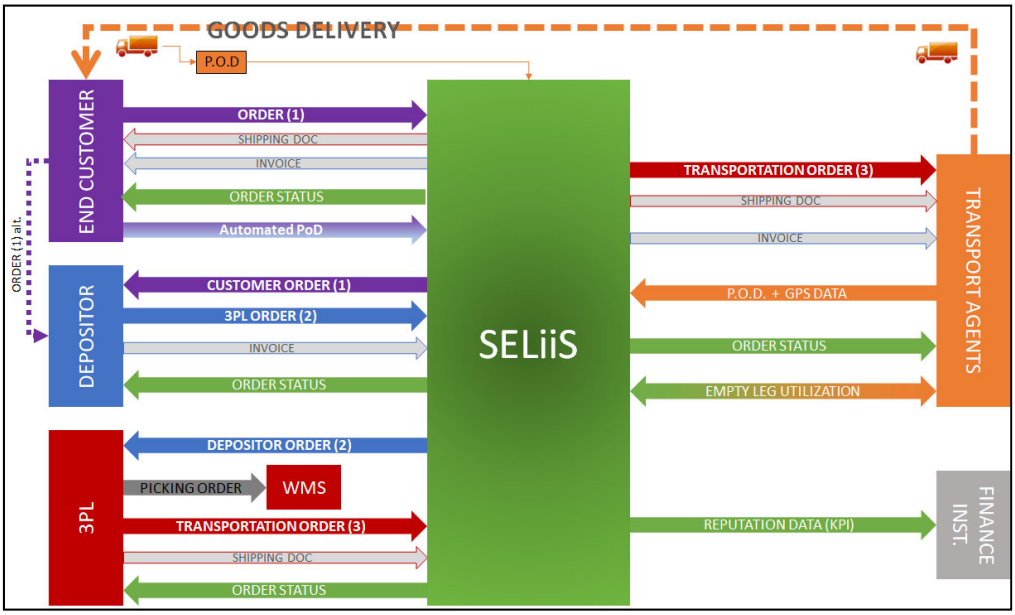

Figure 1. ELGEKA supply chain visibility: existing legacy systems and required SELIS components (Source: D7.1)

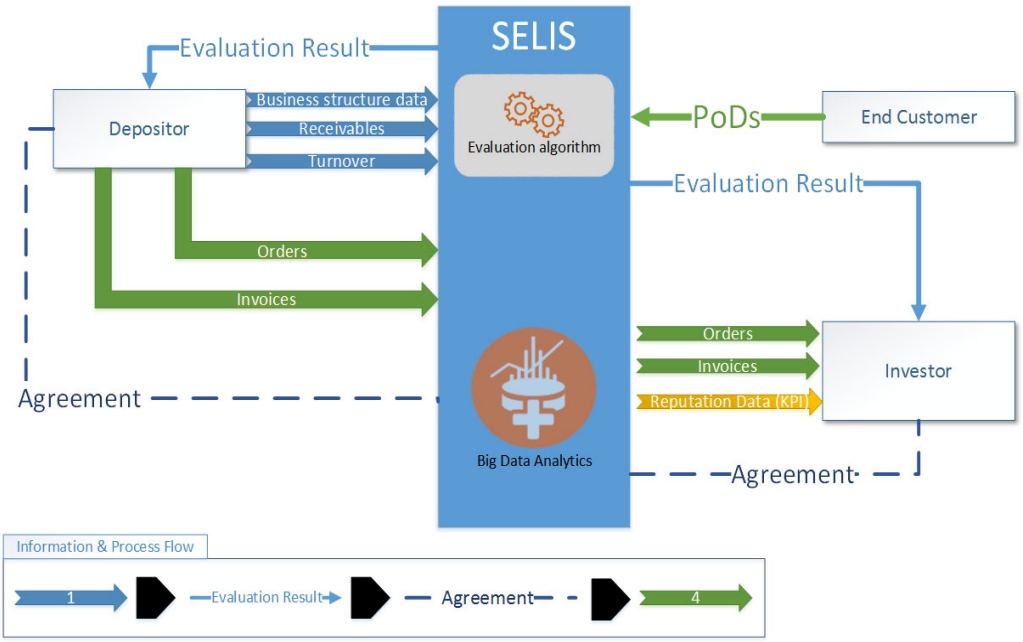

Figure 2. ELGEKA supply chain factoring support- existing legacy systems and required SELIS components. (Source: D7.1)

2.2.2 Successful ELGEKA deployment

The SELIS solution successfully implemented digitised receipt of delivery notes, creating automated proof of delivery and data that fed into the supplier risk assessment tool. This supply chain visibility data was used by big data analytics too generate scoring on delivery performance and so provide an 'excellence' score. The Advisory Board played a role in facilitating the development of this solution, including guidance on what excellence would look like. The less risk of supply chain failure resulting in rejected goods the lower the discount rate for factoring the supplier invoices. If that discount rate is less than the prevailing interest rate or it provides a source of finance not available to some suppliers, then this actively helps the fluidity of the supplier chain. EGerlLink was awarded a patent for the development of this tool, which was also demonstrated to the financial institutions as potential users who provided positive feedback.

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2.2.3 ELGEKA Business Impact

The increased visibility for ELGEKA reduced lead times, stock outs, and operational costs of exchange. The operational supply chain solutions increased reliability also had a positive impact on CO2 emissions, which were estimated to have been cut by between 15 to 30% as a result of more agile, consolidated and lower cost transport.

The factoring solution built for this project demonstrated the ability to reduce working capital costs for ELGEKA and reduce the cost of money through better credit rating. Perhaps the most important benefit was a reported improvement in ELGEKA's relationships with retailers as a result of the efforts to improve delivery chain visibility and risk management.

Over the period of the project, despite a reduction in the overall Greek market cost of capital with interest rates falling from 5.2 % to 3.6 %, it was demonstrated that the SELIS applications could bring the cost of capital closer to the 1.6% enjoyed by German companies, which would have delivered an estimated recurring annual reduction in the cost of capital of at least €600,000. These gains are theoretical because at present the current European Financial monitoring policy does not support cross border purchase of receivables.

2.3 The problem - SONAE challenges in managing integration with SME suppliers

The retailer SONAE manages over €1 billion of orders per year, managing over 50,000 SKU and 10,000 suppliers, many of them SMEs. Whilst supply chain integration is relatively mature in the grocery sector, much of the good practice is limited to the larger suppliers and retailers. Smaller suppliers tend to be less integrated and collaborate less closely with retailers and their first-tier suppliers. These gaps in visibility undermine attempts to optimize supply chains, and the uncertainty inevitably leads to overordering and excess stock buffers. The management of buying and pricing is made problematic with the smaller SMES due to a lack of open-book business processes.

The aim of the SELIS intervention was to enhance visibility with suppliers, enabling collaboration for efficient optimization of production and inventory through demand levelling, increased sales through better promotional planning, improved reliability and costs of delivery, and improvements to product quality (through the supply of fresher product) and environmental impact (through the minimization of food waste).

2.3.1 SELIS solutions for SONAE

The SELIS solution involved the creation of an independent third-party platform, facilitating data sharing between SONAE and suppliers. Inventory management algorithms were implemented to forecast and avoid stock outs and excess stock. SONAE data on stock levels and sales forecasts were fed into the collaborative inventory management tool, along with supplier production plans, stock and lead times and agreements and constraints relevant to each supplier. The automated ordering tool facilitated improved collaboration and decision making between SONAE and smaller suppliers, optimising production, promotion management and waste reduction. The implemented order forecast tool is shown below in figure 4.

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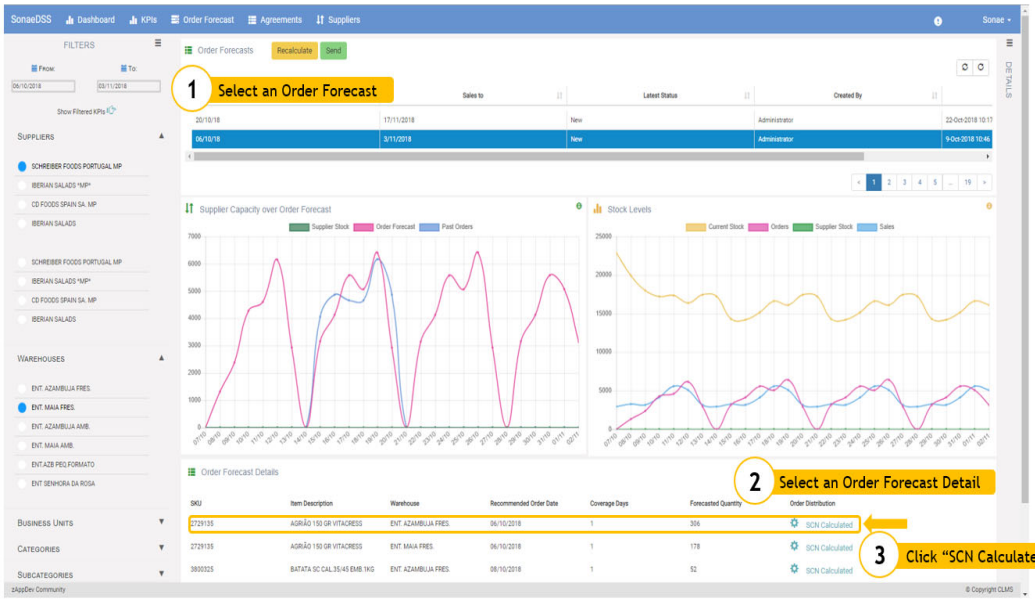

Figure 4: SONAE order forecast

The collaboration tool created an iterative workflow (illustrated in figure 5), that acts as a central focus for supply chain collaboration between SME suppliers and SONAE. The shared platform generates network scale economies that SME suppliers are unable to generate on their own.

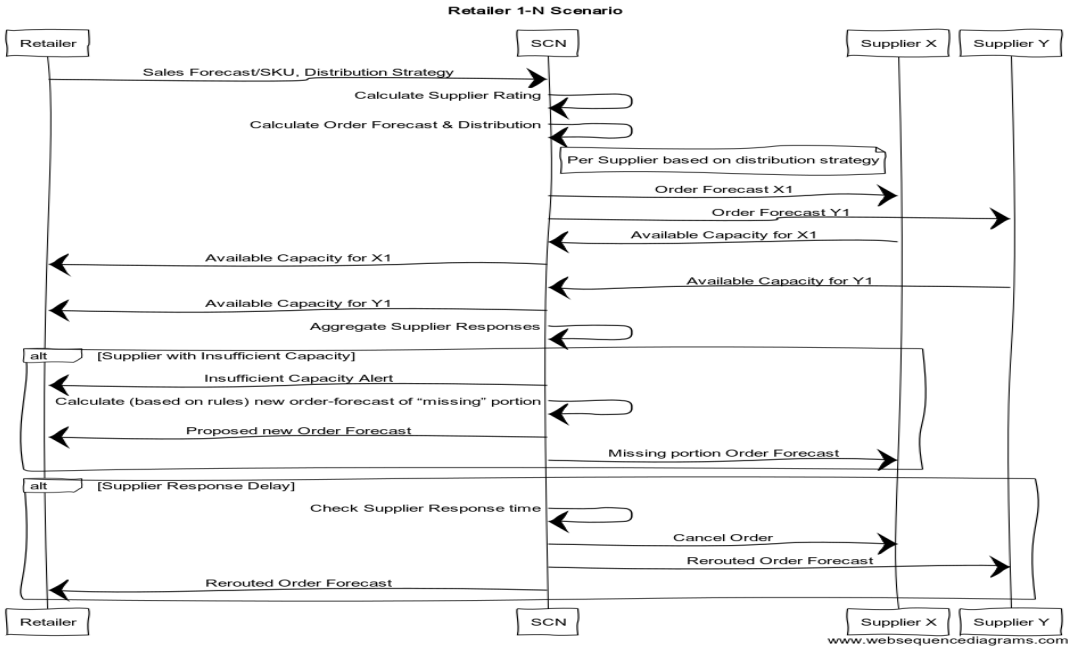

Figure 5: Collaborative planning process supporting retailer interaction with SMEs

2.3.2 Results of SONAE deployment

The Advisory Board played a role in the development of the data flows for this solution. The platform development for SONAE facilitated closer working relationships with SMEs, (Small and Medium Sized Enterprises), around stock availability and collaborative order planning and fulfilment. Functionality of the solution was enhanced through a dashboard that allowed each SME to interact

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with SONAE in a secure environment with standardized operational workflows for the retailer. The tools also allowed for buying support through simulation of alternative demand positions.

The SONAE supplier performance ratings were improved through the platform implementation by 5% on average, ratings incorporated within service level agreements including trust, response times, and order fulfilment. Supplier order fulfilment in particular improved by 2.5%, and total inventory reduced by 2%. Food waste was cut by 2%, and the use of promotions in response to supply and demand opportunities increased by at least 2%.

2.3.3 SONAE Business Impact

The implementation had the anticipated impact in stock outs, production costs and demand levelling, and the non-financial impacts included a greener supply chain and improved relationships between the retailer, suppliers and producers. The operational cost savings are expected to be significant when applied to the overall product range, and the full supply chain benefits to be in the region of 0.5% of total operating costs.

3 Conclusions

3.1 Lessons learnt for future development and implementation

The most innovative development within Living Lab 8 was the creation with ELGEKA of a risk management tool for factoring based on supply chain data. If this patented innovation were applied elsewhere, the reduction of working capital of 1 to 3% would have a transformative impact on a wide range of supply chains, markets and sectors. The tool was developed to be compliant with European financial legislation governing investors who are factoring companies registered and governed by European central banks.

3.2 Any further next steps and recommendations

3.2.1 ELGEKA eGerlink

At present, the use of the factoring application developed with ELGEKA is limited by EU legislation to supporting factoring providers with debtors in their home markets, but the European Commission intends to address this limitation in factoring through reform of regulation and guidelines governing "cross-border transactions in claims and securities"[viiiix]

3.2.2 SONAE

The SME focused platform developed for SONAE also represents a tool that could be used to expand established good practice and tools in supply chain collaboration so that they are within reach and budget of smaller suppliers. The solution will be improved on an ongoing basis, refining the data analytics, stock management, and the creation of a benefits calculation tool that can be used to share the revenue and cost improvements between supplier and retailer.

In both deployments within living lab 8, the stakeholder engagement was high, which undoubtably contributed to the successful implementation, delivery of clear operational improvements and positive qualitative feedback.

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4 Further questions

If you wish to ask further questions of the teams involved in this project, please contact Stephen Rinsler (steverinsler@elupeg.com), or Beatriz Royo (broyo@zlc.edu.es).

The SELIS website is https://www.selisproject.eu/

5 References

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