Smart Logistics in the Netherlands

IA Special
Netherlands office for Science and Technology

Focus on international business and cooperation
Dear reader,

Hereby, The Netherlands Office for Science and Technology (NOST), presents you a Special Report about innovative developments in The Netherlands regarding Smart Logistics.

The NOST Network is part of the Dutch Ministry of Economic Affairs. The NOST Network is part of the Dutch Embassies in 16 highly innovative countries. We support Dutch innovative companies, knowledge institutes and government by informing them about the state-of-the-art developments in foreign countries and by introducing them to relevant foreign parties with the aim of stimulating international scientific and technological cooperation. Doing so, we create new (business or scientific) opportunities for Dutch industry and academia... and possibly for you as well!

We are convinced that this Special Report, will inspire you through the scientific and innovative developments it presents. It highlights the relevant Dutch players (companies, research institutes), public-private R&D partnerships and our governmental policy towards Smart Logistics. The article is written by Liesbeth Staps, international officer of Dinalog.

Dinalog is an excellent example of a Dutch public-private partnership that is focused on Smart Logistics.

If you would like to receive more information, or would like to be introduced to relevant Dutch parties, then please do not hesitate to contact us. You will find our contact details at the end of this Special Report; alternatively you can contact your local Science and Technology Attaché.

Kind Regards,

Bart Sattler
Coordinator, Netherlands Offices for Science & Technology

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The Netherlands is logistics

Summary
The Netherlands has been playing a significant role in world trade for many centuries and has gained extensive experience when it comes to transport and logistics. In addition to its favourable geographical position on the coast of Western Europe, the country has an excellent infrastructure with ports and corresponding transport links, efficient customs authorities and world-class logistic service providers. On the World Bank’s worldwide Logistics Performance Index, the Netherlands ranks 5th. This makes the Netherlands the Gateway to Europe and gives the country an internationally recognised top spot when it comes to the processing of physical goods.

The Port of Rotterdam is the largest European port in terms of the transhipment of goods. Rotterdam is the largest European port when it comes to container transport and is still expanding. Moreover, the Port of Amsterdam takes 5th place in the European rankings and is, for example, the largest cocoa port in the world. Schiphol airport is number three in Europe for processing air freight.

Dutch logistics play a vital role in terms of surrounding countries. The Netherlands has more distribution centres than anywhere else in Europe, encompassing a vast range of value added activities. Dutch road transport companies carry about 24% of all international freight transport through Europe. Other modalities are also highly developed; an increasing percentage of the goods are transported to the European hinterland via inland waterways and railways.

Dutch knowledge institutes have an excellent scientific reputation in terms of logistics and information systems: the Netherlands ranks 6th in global rankings on the basis of publications and citations.

The Netherlands plays a leading role in the import of goods from all around the world into Europe, with huge throughput of goods flows, and in the export of products to global destinations. Logistics is therefore a key enabler for the success of other sectors, such as hightech, agriculture, agro-food, chemicals and energy. Good logistics are vital for companies in these sectors in order to achieve punctuality and delivery reliability and to reinforce their (international) market positions.

Logistics is of huge importance to the Dutch economy, providing increasing added value to the GDP of €55 billion (10%) and contributing towards employment, with around 813,000 jobs. Logistics is thus a top priority for the Dutch government and industry for international competitiveness. The Dutch government focuses its economic and infrastructure-related policy on the logistics sector.

Smart logistics
The Dutch position as a logistics hub is challenged by worldwide logistics developments. There has been huge growth in the global goods flows, which are accommodated within the small and densely populated area that makes up the Netherlands. Globalisation is changing the worldwide locations of production and sales with substantial consequences for supply chains. New production techniques, such as 3D printing, change supply chains in terms of raw materials versus products. Digitisation provides many ICT applications for processing large quantities of information and also corresponds with an increase in e-commerce and associated, specific logistical requirements. Social challenges such as congestion, urbanisation, environmental emissions and a lack of qualified personnel as a result of an ageing population require modernisation of logistics processes.
In 2008, the Laarhoven Committee examined whether and how innovations in the supply chain could reinforce Dutch competitiveness. [4] In order to break through regularities such as modal split or transport kilometres, innovation in logistics and supply chain management is vital; this is known as ‘smart logistics’. The intelligent timing and combination of goods flows lead to an effective selection of modality options. This, in turn, leads to more efficient use of and reconciliation between the various modalities as well as improved harmonisation between parties in and across supply chains. Subsequently, unnecessary kilometres and waiting times are reduced and reversed logistics are facilitated. Strengthening the supply chain control, with reference to physical, information and financial flows, can lead to the creation of services firmly rooted in the Dutch economy.

Dutch ambition and international collaboration

The Netherlands stimulates the knowledge development and innovation via the top-sector policy. For the top sector Logistics, Dutch industry, knowledge institutes and government, as represented in the Strategic Logistics Platform, aspire to be the European market leader in the control and coordination of transnational goods by 2020. The contribution to Gross Domestic Product of the management of goods flows and other, related logistics activities will triple from € 3 billion in 2007 to a minimum of € 10 billion in 2020. The Netherlands aims to continue to lead in goods flows and other, related logistics activities of foreign companies to the Netherlands, including logistics control activities for flows of goods that do not necessarily flow through the Netherlands (like Flora Holland).

1. More logistics activities of foreign companies to the Netherlands,
2. More transport flows via the Netherlands
3. Export of logistics knowledge and knowhow

The Netherlands is working on collaboration in the ‘golden triangle’, i.e. industry, centres of expertise and government, in order to realise its ambitions.

In order to achieve this, international collaboration is of huge importance. International technological collaboration and knowledge exchange are instruments for stimulating innovation and ensuring that the level of expertise in the Netherlands is on a par with the best in the world. Logistic challenges naturally require an international approach and collaboration in order to connect important trading corridors and surrounding areas. As well as focussing on knowledge development, the Netherlands is concentrating on the valorisation of this knowledge and influencing policy in Europe. For example, the sector has created the European Technology Platform ALICE (Alliance for Logistics Innovation through Collaboration in Europe), in order to develop a strategy for research, innovation and market implementation for the European research programme Horizon 2020 [8].

Knowledge infrastructure

The Netherlands has a strong knowledge infrastructure when it comes to logistics. In the Netherlands there are 37 Senior Secondary Vocational Education Institutes that offer programmes in transport and logistics. In addition, there are 11 Universities of Applied Sciences with over 150 lecturers and teachers who specialise in logistics and supply chain management. There are also 8 research universities that specialise in logistics and supply chain management, with over 50 professors and their respective research groups. (i) These universities carry out fundamental and applied research with the industry itself. A number of universities also collaborate in the TRAIL research school in the field of transport, infrastructure and logistics and in the BETA research school in the field of operations management and logistics. (ii, iii) In order to realise these ambitions, the Netherlands embraces public-private collaboration in the ‘golden triangle’, i.e. industry, knowledge institutes and government. From the government, the Ministries of Infrastructure and the Environment and of Economic Affairs are closely involved from the perspectives of infrastructure network and business environment, entrepreneurship and innovation. Furthermore, government authorities regarding e.g. customs and inspection also significantly contribute to the Dutch innovation infrastructure. An example of a public/private partnership is Connekt, an independent network of business and government authorities that links different organisations to improve sustainable mobility in the Netherlands. In pre-competitive collaboration, Connekt mainly focuses on Intelligent Transport Systems (ITS) and logistics. (iv)

The Netherlands Organisation for Scientific Research (NWO) is the national research council and funds scientific research at Dutch universities and institutes within the field of logistics. (v) The Netherlands Organisation for Applied Scientific Research (TNO) conducts applied research into developments in transport and logistics within its research area of Mobility. (vi) In order to accommodate the
In order to realise Dutch logistics ambitions, human capital is of crucial importance. The right people with the right expertise are required to create smart logistics. The Human Capital Agenda Logistics [9] encompasses strategy and action lines that will ensure sufficient numbers of logistics personnel are trained to have the appropriate, high quality expertise. Human capital development targets professionals, teachers and (post-doctoral) students and anchors the knowledge of the innovation programme within education. The sector also reinforces the existing knowledge infrastructure via Regional Knowledge Distribution Centres. Here, exchanges between education, research and industry strengthens innovation, expertise and human capital in the region. For example, in the Venlo region, universities of applied sciences, industry and the public-private partnership Greenport Venlo focus on the areas of agro-logistics and customs. Around Amsterdam, there is an active logistics cluster that focuses on the unique logistics main-port proposition with Schiphol Airport, the Port of Amsterdam and Greenport Aalsmeer including the flower auction Floraholland together with the Amsterdam University of Applied Science. (ix)

### National Innovation Agenda Logistics

In the Netherlands, the top-sector policy for logistics has led to a National Innovation Programme for Logistics [10]. This programme ensures the cohesion and focus in the chain of fundamental research, applied research and valorisation. This involves collaboration between governments, intermediary organisations and educational and research institutions such as universities, innovation and expertise platforms, sector organisations, companies involved in R&D projects and demonstration and pilot projects. The programme comprises six innovation roadmaps that are identified as vital to realise the ambitions:

1. **Neutral Logistics Information Platform (NLIP)**
2. **Synchronomodality**
3. **Trade facilitation**
4. **Cross Chain Control Centers (4C)**
5. **Service Logistics**
6. **Supply Chain Finance (SCF)**

#### 1. Neutral Logistics Information Platform (NLIP)

NLIP involves the development of an open ICT platform facilitating the optimum availability and efficient (re)use of information for and by businesses and government. (x) The ICT platform is made up of an open market platform, built on the basis of existing investments such as the port community systems Portbase (seaports) and Cargonaut (airports) and the single window trade and transport (SWH&T) from government (Digipoort). (xi, xii, xiii)

#### 2. Synchronomodality

Synchronomodality is the efficient use of the various modalities in one, integrated transport solution. Synchronomodality is possible on corridors and in regions where there is sufficient freight supply so high-frequency transport via (all) modalities can take place on the basis of ad-hoc planning. Shippers are served by logistic service providers on the basis of a-modal performance criteria by which it is possible to flexibly switch between the various modalities so that the infrastructure is utilised in the most efficient way possible. This leads to lower costs and increased flexibility, sustainability, reliability and speed. Within this innovation roadmap, new business models and ICT applications are developed. Market parties such as the port authorities of Rotterdam and Amsterdam, Schiphol Airport, terminal operators ECT, APM, Combi Terminal Twente and Brabant Intermodal are closely involved with innovations within this roadmap. (xiv, xv)
In the Dinalog project Ultimate (Efficient Multimodal Hinterland Networks), parties in the port of Rotterdam and the hinterland collaborate on the development of an Extended Gate. Here, the transport to locations in the hinterland is managed efficiently and with a minimum of paper documentation. The connection consists of frequent and reliable transport between sea terminals and hinterland terminals. The Extended Gate principle is developed for use in the hinterland, where multi-modal choices can be made. The project ties in well with the demands of worldwide supply chains, optimizes the use of the available information and releases the operational and administrative bottlenecks in sea ports.

3. Trade facilitation
The innovation roadmap trade facilitation focuses on the expansion of the leading position of Dutch customs via streamlining and simplifying the unique collaboration between customs and industry. Work is focussing on: 1) relocating customs and inspection activities to less-disruptive network nodes in the logistics supply chain, 2) reducing inspections by the efficient use of existing information in the chain, in order to avoid duplication in terms of information requests and physical checks, and 3) aligning inspection services for ‘coordinated border management’.

4. Cross Chain Control Centres (4C)
A Cross Chain Control Centre (4C) is a control centre from where multiple supply chains are collectively coordinated and managed with help from the most up-to-date technology, advanced software concepts and supply chain professionals. This not only involves the bundling and control of physical goods flows, but also the management of information and financial flows such as ‘forecasting’, ‘financial engineering’ and ‘data management’. 4C exists in order to collectively coordinate and regulate decision-making and the management of extremely complex international supply chains, or local urban distribution or e-commerce supply chains across multiple organisations or business sectors. This orchestration leads to savings in supply chain costs, new business, increased employment opportunities and attractiveness of the Netherlands to foreign investment. This innovation roadmap focuses on the development of unique capabilities and tools (ICT, finance, planning, management, governance and service provision) for the collective coordination of multiple supply chains that are anchored in the Netherlands. Many market parties are involved in innovation projects, varying from innovative logistic service providers such as Nabuurs, Den Hartogh Logistics, Kuehne+Nagel, TNT, DHL Global Forwarding and PostNL, software developers such as Ortec, Quintiq, TomTom and retail chains such as Ahold, Coolcat, De Bijenkorf and Blokker to shippers such as Unilever, SCA, Dow Benelux, Shell Chemical Europe, SABIC Petrochemicals and Floraholland. (xvi)
In order to realise Dutch ambitions in relation to logistics, human capital is of crucial importance. The right people with the right expertise are required in order to create smart logistics.

5. Service Logistics
Service logistics is all about the logistics activities that are necessary in order to ensure that capital-intensive systems operate efficiently and without disruption for their entire lifecycle (up to and including any out-of-order moments and/or reuse). This involves supply chain control and configuration from the ‘after-sales service’ of a product up to the end of the lifecycle. Service logistics is characterised by a ‘just-in-case’ principle, with small transport volumes and low stock turnover. The innovation roadmap focuses on the development of specific logistic management solutions and ICT systems with new services and collaboration in terms of maintenance, repair and reuse from return flows. Companies that are working on these innovations include ASML, DAF Trucks, Fokker Services, Gordian Logistic Experts, IBM, Océ Technologies, Marel Stork Poultry Processing, Thales, Vanderlande Industries, NedTrain and Alstom Transport. The Royal Dutch Navy, the Dutch Defence Academy and companies such as Damen Shipyards, Imtech, Boskalis and Fugro are developing innovative concepts in order to improve the predictability of the demand for, maintenance and service logistics for maritime supply chains. (xvii, xviii)

6. Supply Chain Finance (SCF)
SCF concerns the optimisation of financing of the total supply chain and the integration of financial processes between shippers, suppliers, logistic service providers and financial partners in order to create value for all participating companies. The SCF roadmap develops new
financing concepts that could contribute towards lowering the working capital and the financing costs for goods flows. These also provide benefits for operational decisions. In doing so, the position of Dutch companies in the supply chain is strengthened and subsequently their competitive position is increased, by which more added value can be created. Market parties that work together with knowledge institutes for innovation in Supply Chain Finance include Philips, ASML, Heineken, Friesland Campina, Cass Europe, Clifford Chance, Involvation Interactive and also logistic service providers such as Jan de Rijk Logistiek, DSV, Hacas Transport and DHL. They are working on the introduction of reverse factoring in the logistics sector and models and tools that facilitate collaborative short and long term financing prior to transport. (xix, xx)

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- Summary of lecturers and professors in logistics and supply chain management http://www.dinalog.nl/en/science_and_education/overview_logistic_and_supply_chain_science_and_education_in_the_netherlands/
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