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Report

META: Final report on project results

Author(s)
Marit Kjøsnes Natvig

SINTEF ICT
Software Engineering, Safety and Security
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SINTEF IKT
SINTEF ICT

Address:
Postboks 4760 Sluppen
NO-7465 Trondheim
NORWAY

Telephone:+47 73593000
Telefax:+47 73594302

postmottak.IKT@sintef.no
www.sintef.no
Enterprise /VAT No:
NO 948 007 029 MVA

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AUTHOR(S)
Marit Kjøsnes Natvig

CLIENT(S)
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ABSTRACT
The META project started in 2010 and ended in September 2013. The work in the project has focused on

1 How the Norwegian Public Road Administration (NPRA) can provide better services to the transport industry, in this case by means of more efficient heavy vehicle controls that also benefit reliable transport companies.
2 Standardised information flows in supply chains, and how such standards can support the future needs in transport logistics.

This report provides a summary of the main results from the project with references to more detailed deliverables and related work. The intention is to provide an overview of what is achieved by the project and to support those who are interested in the results to find the relevant information.

PREPARED BY
Marit Kjøsnes Natvig
SIGNATURE

CHECKED BY
Audun Vennesland
SIGNATURE

APPROVED BY
Eldfrid Øvstedal
SIGNATURE

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1 Introduction

The META project started in 2010 and ended in September 2013. The work in the project has been twofold with focus on.

1. How the Norwegian Public Road Administration (NPRA) can provide better services to the transport industry, in this case by means of more efficient heavy vehicle controls that also benefit reliable transport companies.
2. Standardised information flows in supply chains, and how such standards can support the future needs in transport logistics.

This report provides a summary of the main results from the project with references to more detailed deliverables and related work. The intention is to provide an overview of what is achieved and to support those who are interested in the results to find the relevant information.

The project was funded by the Research Council of Norway and by the participants. The participants were ITS Norway, the TakeCargo transport portal, the logistic department of the consumer's cooperative society Coop, Short Sea Promotion Centre, the Norwegian Public Road Administration, the software company Timpex, the forwarder Tollpost Globe and the research institute SINTEF. ITS Norway was the project owner and the project was managed by SINTEF.

2 Future solutions for heavy vehicle controls

Current control routines of heavy goods vehicles are based on a kind of first-come-first-served approach supported by the inspection operator's experience and intuition. META has established a specification of the future automatic vehicle control system. A decision support system supports the selection of vehicles for manual inspections. The strategy is twofold: 1) Information about the vehicle is automatically acquired from available registries and by sensors in and along the road network while the vehicles are in motion and processed further to detect possible regulation violations. 2) The control history of vehicles and transport companies are used in the selection of control candidates; thus, vehicles and transport companies with a bad reputation are more likely to be stopped for control than law-abiding vehicles and transport companies.

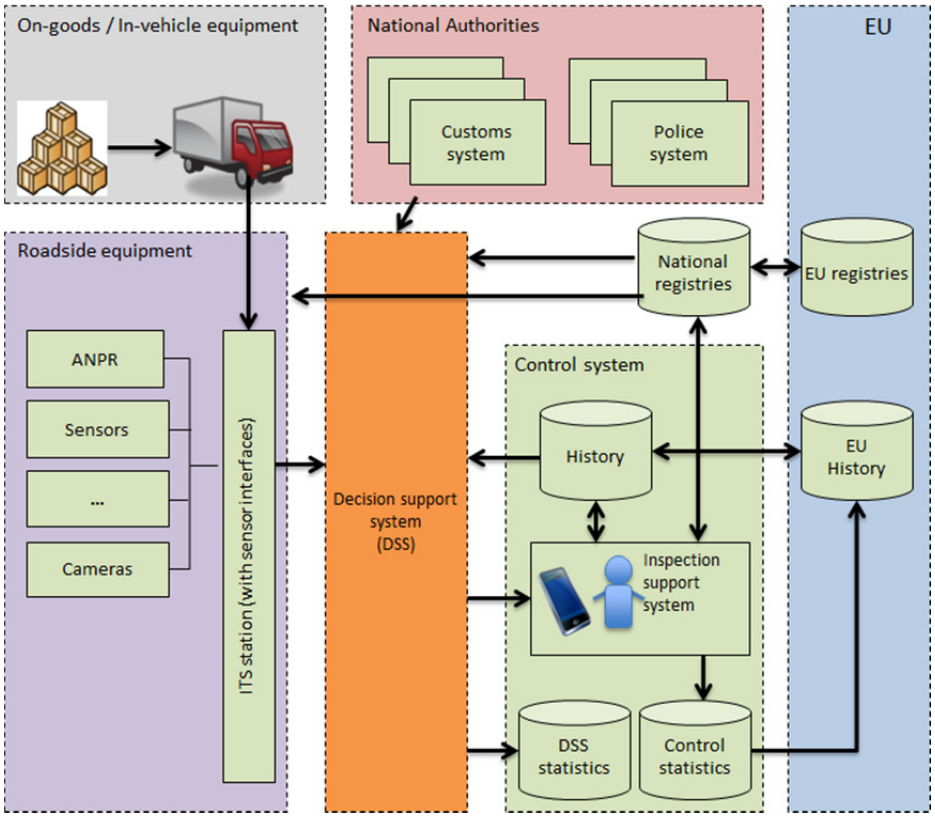

Figure 1: System overview

The solution is specified by means of the ARKTRANS framework, a specification methodology and a conceptual model of the transport sector. The roles of the stakeholders, their need for functionality, processes that are carried out and required information exchanges in these processes are described in a top down approach.

The Public Road Administration has realised a pilot and they carried out trials where they captured data about the vehicles by means of sensors (among others brake information by means of thermic cameras) to see how the decision support could be supported. The specification established by META is taken further to the NonStop project where a decision support pilot will be developed.

Work carried out by: SINTEF and Norwegian Public Road Administration.

Relevant references:

- ARKTRANS: Natvig, M. K., Westerheim, H. et al. (2009). *ARKTRANS. The multimodal ITS framework architecture, version 6*, SINTEF A12001.
- **META deliverable - SVV pilot:** http://www.nrk.no/nyheter/norge/1.8018278
- **META deliverable:** Natvig, M. K., Moseng, T. K. (2013). *META – Specification of Automated Vehicle Control*, SINTEF A24920, ISBN 978-82-14-05330-2

3 Evaluation of the ARKTRANS framework

The ARKTRANS framework is in META used for the specification of the heavy vehicle solution (see chapter 2). However, ARKTRANS is also the basis for the European Common Framework for ICT in Transport and Logistics (in short Common Framework). The latter is used in several European projects within the logistics domain, among others e-Freight and iCargo. The Common Framework builds upon the mind-set of ARKTRANS, and the content also partly overlaps with the content of ARKTRANS.

To be able to do an evaluation of the use of frameworks such as ARKTRANS and the Common Framework, META has collaborated with the European iCargo project. The evaluation methodology and results are described by a scientific paper that is accepted for the 32nd International Conference on Conceptual Modeling (ER 2013) in Hong Kong in November 2013. The abstract of the paper is as follows:

> Today, many companies design and maintain a vast amount of conceptual models. It has been also observed that such large model collections exhibit serious quality issues in industry practice. A number of quality frameworks have been proposed in the literature, but the practice is that practitioners continue to evaluate conceptual models in an ad-hoc and subjective way, based on common sense and experience. Therefore, there is a lack of empirical works in the evaluation of conceptual frameworks. This paper reports an empirical qualitative study on the evaluation of the quality of a conceptual framework in the domain of transport logistics, using existent quality evaluation frameworks. The results show how the users perceive the ease of understanding, the usefulness, the perceived semantic quality and satisfaction with the models included in the conceptual framework. The results also provided their view on advantages, challenges and improvements to be performed in the framework.

The results of the evaluation provide valuable input to further work on AERKTRANS and the Common Framework.

Work carried out by: SINTEF

Relevant reference:

- ARKTRANS: Natvig, M. K., Westerheim, H. et al. (2009). *ARKTRANS. The multimodal ITS framework architecture*, version 6, SINTEF A12001.
- Common Framework: http://www.its.sintef9013.com/CF/v01
- iCargo: http://www.i-cargo.eu/
- e-Freight: http://www.efreightproject.eu/
- **META deliverable (in collaboration with iCargo):** Cruzes, D. S., Vennesland, A., Natvig, M. K., Empirical *Evaluation of the Quality of Conceptual Models based on user perceptions: a case study in the transport domain*, accepted for 32nd International Conference on Conceptual Modeling (ER 2013), Hong Kong, November 2013

4 Standards for information exchange in supply chains

The work in META is based upon ARKTRANS and via ARKTRANS also the messages defined by the European e-Freight project and the European Common Framework initiative. These messages are standardized. The e-Freight project has been the main coordinator of the standardisation work towards OASIS UBL and GS1, but META has also provided input to standardization of messages in UBL and GS1 – as illustrated by the figure, namely the TSD, TEP, TS, TI and TSN messages. META has identified the needs of the stakeholders participating in META, evaluated the preliminary messages towards these needs and provides requirements with respect to changes and additions that have to be done to the messages. META has also selected some of the messages (TSD, TI and TSN) for more detailed studies, establishment of implementation guides (see chapter 5) and pilot implementations (see chapter 6).

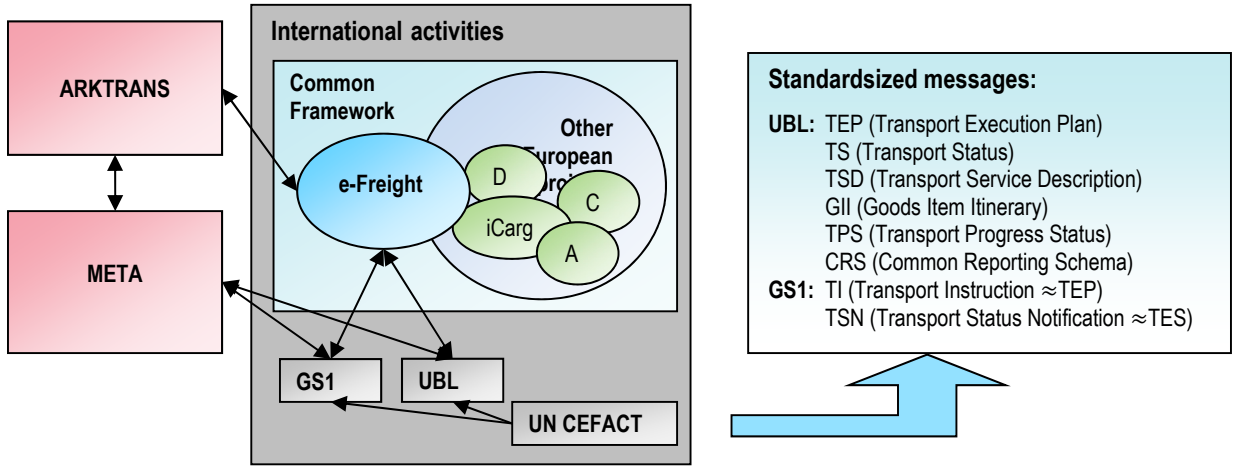

Figure 2 Input to standardisation initiatives from META

The standardized messages are crucial for the implementation of efficient and flexible supply chains. The standards support all transport modes and all cargo types and they arrange for future development in the transport and logistics sector (e.g. intelligent goods). To ensure these aspects META has in addition to the standardisation work

- Verified that the standards arrange for transparency in supply chain. This is done through work on the detailed scenarios where the identification of cargo and load units is followed though many transport legs with consolidations and de-consolidations. These scenarios are included in the implementation guides.
- Studied the concept of intelligent goods and how it can be implemented and how standards can support such an implementation.

Work carried out by: SINTEF, TakeCargo, Coop, Shortsea Promotion Centre, Tollpost, Timpex, Norwegian Public Road Administration.

Relevant reference:

- UBL message standards TEP, TS, TSD and GII: OASIS UBL. *Universal Business Language Version 2.1*. 2013; Available from: http://docs.oasis-open.org/ubl/prd3-UBL-2.1/UBL-2.1.html.
- GS1 eCom Logistics message standards: Transport Instruction and Response; and Transport Status Request and Notification: http://www.gs1.org/gsmp/kc/ecom/xml/xml_v_3
- **META deliverable (in collaboration with INTRANS):** Natvig, M. K.; Vennesland, A. Information architecture for intelligent goods in transport systems. In: *Intelligent goods in transport system*. Akademika forlag 2012 ISBN 978-82-321-0204-4. p. 261-276 SINTEF
- **META deliverable:** Vennesland, A.; Natvig, M. K. Standardising the intelligent goods concept. In: *Intelligent goods in transport system*. Akademika forlag 2012 ISBN 978-82-321-0204-4. p. 303-316 SINTEF
- **META deliverables:** Implementation guides – see Chapter 5

5 Implementation guides

To support the implementation of standardized information exchange in supply chains, META has established implementation guides for some of the standards mentioned in chapter 4:

- Transport Service Description (TSD) from UBL. The standard support announcements of transport services. The Logistics Service Provider can by means of the TSD provide information about available services and capacities so that the Logistics Service Client can find relevant services.
- Transport Instruction and Response (TI) form GS1. The standard support call-offs of transport service bookings and defines the messages that are to be used in the communication between the Logistics Service Clients and the Logistics Service Providers.
- Transport Status Request and Notification (TSN) from GS1. The standard support Status reporting from the Logistics Service Provider to the Logistics Service Client.

The implementation guides have a technical and a logical part.

- In the technical part the structures and the content of the messages are defined, and the code lists to be used are identified. For TI and TSD profiles that arrange for the implementation of sub-sets of the messages are also defined to ease the implementation for actors that do not need all available options.
- In the logical part a scenario illustrates how the messages are to be used, and for TI and TSN answers to frequent asked questions are provide together with message content examples.

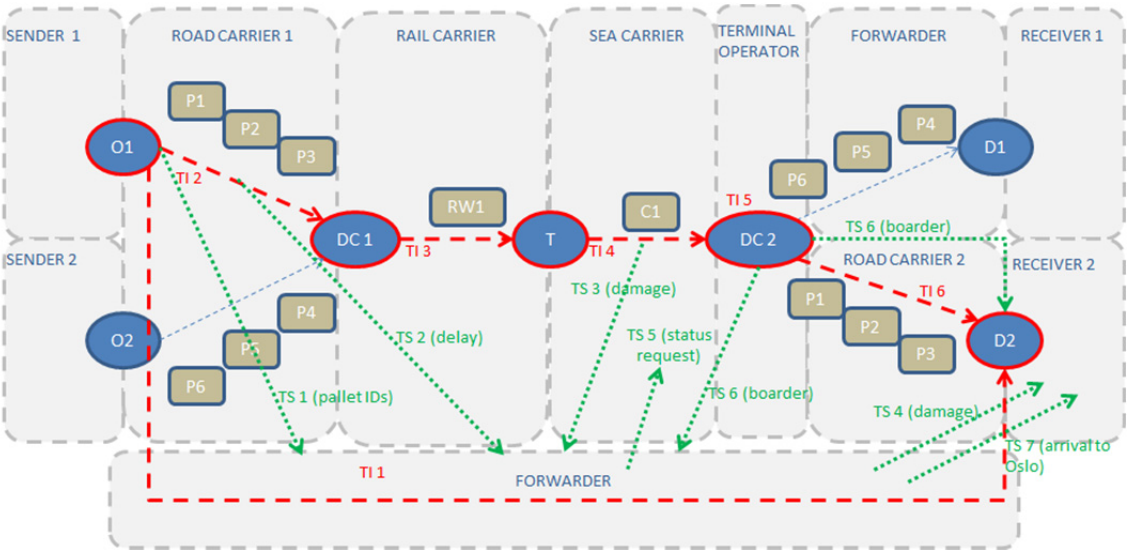

Figure 3 Supply chain scenario with Transport Instructions (TIs) and Transport Statuses (TSs)

Work carried out by: SINTEF, TakeCargo and Coop

Relevant reference:

- UBL message standards TEP, TS, TSD and GII: OASIS UBL. *Universal Business Language Version 2.1*. 2013; Available from: http://docs.oasis-open.org/ubl/prd3-UBL-2.1/UBL-2.1.html.
- GS1 eCom Logistics message standards: Transport Instruction and Response; and Transport Status Request and Notification: http://www.gs1.org/gsmp/kc/ecom/xml/xml_v_3
- **META deliverable:** Natvig, M. K., Vennesland, A. (2013). *META: Transport Instruction and Response implementation guide,* SINTEF A24918, ISBN 978-82-14-05328-9
- **META deliverable:** Natvig, M. K., Vennesland, A. (2013). *META: Transport Status Request and Notification implementation guide,* SINTEF A24919, ISBN 978-82-14-05329-6
- **META deliverable:** Vennesland, A., Natvig, M. K. (2013). *META: Transport Service Description implementation guide,* SINTEF A24916, ISBN 978-82-14-05327-2

6 Implementation of standardized information exchange

Some of the messages that META has contributed to (see chapter 4) have been implemented in pilots.

- The Transport Instruction (TI) is implemented between Coop Handel and their logistics Service Provider DFDS Logistics. Call-offs of transport service bookings are now done as automated business-to-business interactions instead of fax. The implementation was carried out by the two parties early summer 2013 and is now in operation.
- The Transport Service Description (TSD) is implemented by Shortsea Promotion Centre (SPC). Shortsea transport services are defined according to the TSD standards. Transport Service Clients can enter their requests for transport and the services that can fulfil the needs are presented.
- The TakeCargo portal has arranged for the implementation of the Transport Instruction (TI) and the Transport Status Notification (TSN). Their databases and systems have taken the data elements of the standards into account, and as soon as any of the users of the TakeCargo portal request standardized information exchange, TakeCargo can provide such services.

The usefulness of the information exchange standards was considered by means of an evaluation of the pilot realizations of the standards done by the pilots, and a verification of the usefulness of standardized information exchange from a business model perspective.

The evaluation of the pilot realizations was done by means of interviews with the stakeholders involved (supported by a questionnaire in Annex A). The evaluation showed that a realization is doable without many problems and that it is supported by the examples in the implementation guides. The evaluation also provided useful input improvements to the implementation guides, among others new profiles for the TSD.

The verification of the usefulness from a business model perspective was done through establishment of generic business models for retailers and logistics portals and an evaluation of how the entries in the model are supported by standardized information exchange. The content of the business models was defined by the Business Model Canvas template initially proposed by Alexander Osterwalder (see Annex B). The template was filled in based on knowledge on successful transport management, among others from a survey carried out by the Aberdeen Group. It was verified that standardized information exchange is a crucial aspect with respect to successful transport management.

Work carried out by: Coop, Shortsea Promotion Cenre, TakeCargo and SINTEF

Relevant reference:

- UBL message standards TEP, TS, TSD and GII: OASIS UBL. *Universal Business Language Version 2.1*. 2013; Available from: http://docs.oasis-open.org/ubl/prd3-UBL-2.1/UBL-2.1.html.
- GS1 eCom Logistics message standards: Transport Instruction and Response; and Transport Status Request and Notification: http://www.gs1.org/gsmp/kc/ecom/xml/xml_v_3
- Alexander Osterwalder. *Business Model Canvas*. [cited 2013 16 August]; Available from: http://www.businessmodelgeneration.com/downloads/business_model_canvas_poster.pdf.
- Business Model Canvas description - see Annex C
- Aberdeen Group, The Transportation Management Benchmark Report. The New Spotlight on Transpoertation Management and How Best in Class Companies Are Responding. 2006.
- **META deliverable:** Pilot implementing the Transport Instruction and Response standard
- **META deliverable:** Pilot implementing the Transport Service Description standard
- **META deliverable:** Portal prepared for the realisation of standardized information flows
- **META deliverable:** Results from evaluation of realizations - see Annex C
- **META deliverable:** Results from evaluation of business models– see Annex D.

Annex A Questionnaire for realization of standards

Realization

1.1 Were there challenges during the realisation? Which?
1.2 How many resources were used during the realisation?
1.3 Has the implementation guide reduced the use of resources or could it have reduced the use of resources it had been used?

XSD schemas

2.1. Is the use of profiles useful (i.e. subsets of the XSD schema)?
2.2 How was the size and extent of the XSD schema compared to the need?
2.3 Were there any mandatory elements that could not be filled in/was not relevant?
2.4 Is it useful with XSD schemas for the different profiles or will this make it more complicated?
2.5 Were any elements missing in the XSD schema?

Code lists

3.1 Was it simple to find the relevant elements in the code lists?
3.2 Was there overlapping elements in the code lists?
3.3 Were any elements missing in the code lists?
3.4 Should mode code lists be added?
3.5 How were the code lists implemented? (In UBL Genericode is used for the linkage between XML and the code lists. For GS1 there is nothing like this.)

Data types

4.1 Do the use of attributes (meta data) in data types complicate the realization?

Implementation guides

5.1 How well does the information from GS1 support the realization?
5.2 What is good by the implementation guides established by META? Does it support the difficult issues?
5.3 What can be improved in the implementation guides established by META?
5.4 Is the use of a scenario useful as it is done in the implementation guides established by META?
5.5 Are the "How-to" sections useful?
5.6 Are the specifications of the profiles OK?
5.7 Do you have other comments to the implementation guides established by META?

Business processes

6.1 Are the messages in line with the existing information needs and business processes?
6.2 Do the messages affect the business processes?
6.3 If "Yes" on 6.2, what does this mean in the long terms?
6.4 Do you wish to realize the messages in the interactions towards other business partner as well?

Other issues

7.1 Do you have other comments?

Annex B The Business Model Canvas template

Osterwalder consider a business model as a blueprint of how a company does business, and his Business Model Canvas template[1] is composed of a set of elements for description of the different aspects of the business model, as depicted in Figure 4.

The elements defining the overall business properties are:

- Key Activities: These are the most important activities that contribute to value proposition. They may be related to distribution channels, customer relationships and revenue streams.
- Key Resources: These are the most important resources required by the value propositions. They may be related to distribution channels, customer relationships and revenue streams. The resources could be human, financial, physical and intellectual.
- Key Partners: These are the partners that contribute to optimized operations and reduced risks. The resources they provide and the key activities they perform should be identified.

The element describing the business offerings is:

- Value Proposition: A company's value proposition is what distinguishes itself from its competitors. The value propositions may be quantitative (price and efficiency) and qualitative (overall customer experience and outcome). The products and services and bundles of products and services offered to meet the need of the customer should be identified as well as the customer's problems solved. Elements such as newness, performance, customization, "getting the job done", design, brand/status, price, cost reduction, risk reduction, accessibility, and convenience/usability should be considered.

The elements defining the customers of the business are:

- Customer Segments: The customers segments to be served are identified. This may be the mass market (i.e. no specific segmentation); niche market (i.e. based on specialized needs and characteristics of clients); segmented (i.e. additional segmentation of clients); diversify (i.e. multiple customer segments with different needs and characteristics); or multi-sided (i.e. mutually dependent customer segment).
- Channels: The channels used to deliver the value proposition to the targeted customers are identified. This can be own channels (store front), partner channels (major distributors), or a combination of both. The channels should be fast, efficient and cost effective, and the integration with the customer routines should be considered.
- Customer Relationship: The types of relationships wanted towards the customer segments are identified. This may be personal assistance (employee-customer interaction during sales, after sales, and/or both); dedicated personal assistance (representatives are assigned to handle specific clients); self-service (tools needed for easily and effectively relationships are provided to the customers), automated services: (individual customers and their preferences are identified and the relationship is supported by a system); communities (direct interaction among different clients and the company and knowledge can be shared and problems are solved); and co-creation (customer provides direct input in the final products/services).

The elements defining the finances of the business are:

- Cost Structure: The most important monetary consequences while operating under different business models are identified. There may be different classes of business structures such as cost-driven (focusing in on minimizing all costs and having no frills); or value-driven (focusing on creating value for their products and services. There may also be different characteristics of cost structures such as fixed costs (costs are unchanged across different applications - i.e. salary, rent); variable costs (costs vary depending on the amount of production); economies of scale (costs go down as the amount of good are ordered or

[1] Alexander Osterwalder. *Business Model Canvas*. [cited 2013 16 August]; Available from: http://www.businessmodelgeneration.com/downloads/business_model_canvas_poster.pdf.

produced); and economies of scope (costs go down due to incorporating other businesses which have a direct relation to the original product).

- Revenue Streams: This is how to makes income from each customer segmentand may be asset sale (selling ownership rights to a physical good); usage fee (money generated from the use of a particular service); subscription fees (revenue generated by selling a continuous service); lending/leasing/renting (giving exclusive right to an asset for a particular period of time); licensing (revenue generated from charging for the use of a protected intellectual property); brokerage fees (revenue generated from an intermediate service between parties); and advertising (revenue generated from charging fees for product advertising).

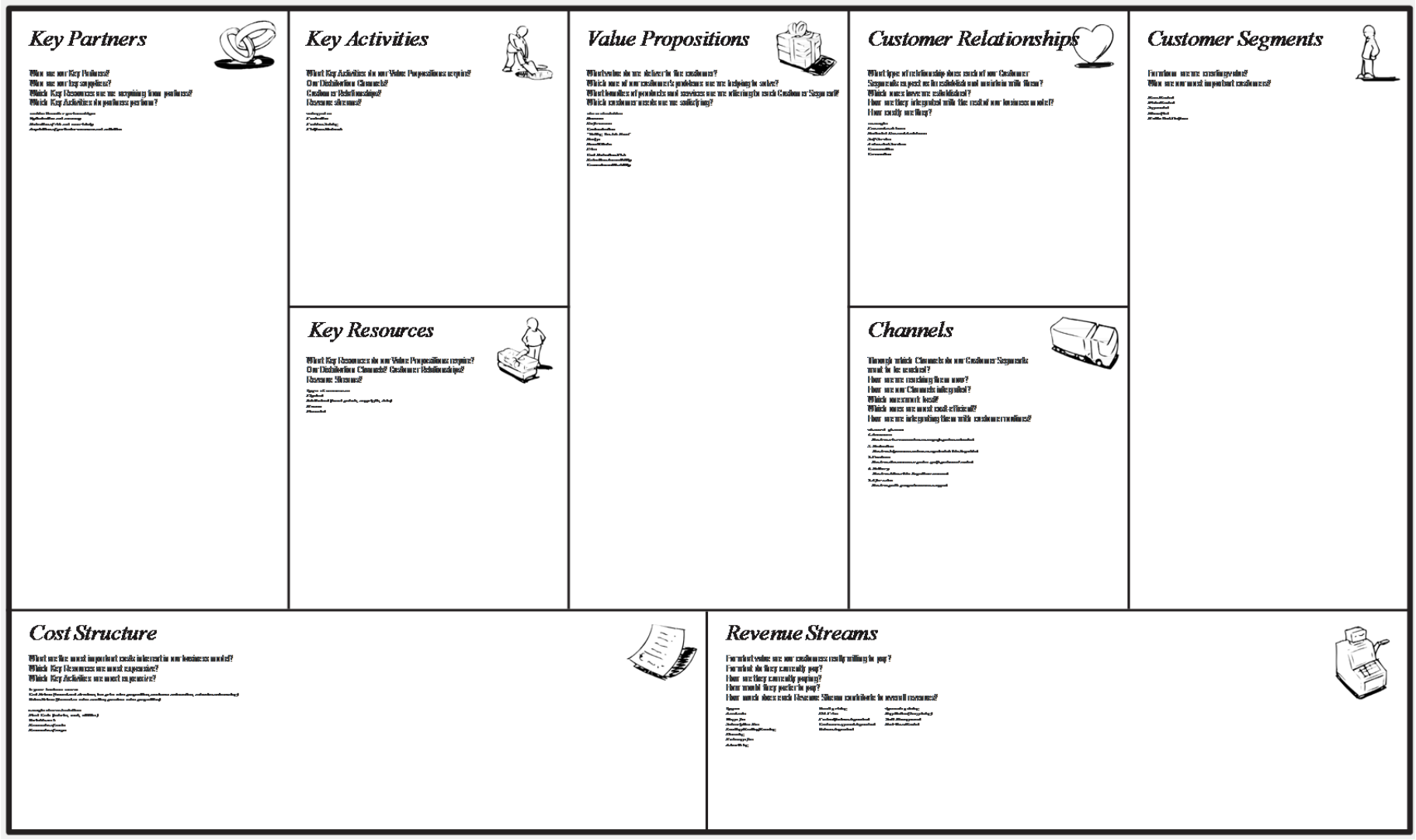

Figure 4 Osterwalder's Business Model Canvas template

Annex C Evaluation of pilot realizations of standards

Due to delays in the project and lack of resources the evaluations were carried out in a semi-scientific way.

- The questionnaire in Annex A was provided to the interviewees
- The interviewees could select whether they preferred to fill in the questionnaire or to be interviewed. Both options were used.
- The interview was recorded, but not transcribed. The recording was however done by the AudioNote tool that support a tagging of the audio by keywords that support the further processing.

The following pilot implementations were evaluated:

- The implementation of the TSD message done by Shortsea Promotion Centre
- The implementation of the TI message between Coop Handel and DFDS Logistics
- The update of the TakeCargo systems - to prepare for the realisation of the standards.

Results

Realization
1.1 Were there challenges during the realisation? Which? For the TI there were no big challenges except for allocation of people for the work. There were 3-4 meetings with the carrier who should receive the messages to agree on how to do it, and several emails and telephone meetings. The XSD was very large, and much of it was not used. There were some discussions on how to realize the number of pallet spaces. The realization did not use any response messages. Thus the choreography did not cause any problems. They did also know some of the GS1 specific elements in the message from earlier work. They also took the liberty to interpret the use of the elements when they were not sure about how to use them. They did not use the GS1 identifiers, but the alternative representation with zeros. For the TSD it was a challenge to • How the messages are to be used • Choose the elements of the message to be used (the extent of the sub-set to be used). • Decide how to request a service – either to describe the specific cargo to be transported or to request for generic information about available routes (which can be described as a from-to matrix or as a list of arrivals/departures). In the pilot we specified the cargo and a from-to matrix.
1.2 How many resources were used during the realisation? The amount of resources used varied from 110 – 210 hours. In the case of 110 hours they had an existing message that could be used as a starting point. In the case of 210 hours the planning and specifications was done in 45 hours and the programming in 130 hours. In addition minor adjustments took 35 hours.
1.3 Has the implementation guide reduced the use of resources or could it have reduced the use of resources it had been used? The implementation guide was used to find the relevant code lists. Examples are useful if they are directly related to the issues to be implemented. Apart from this it was quite simple to understand the messages from the examples provided by SINTEF.
Realization - Conclusion • The realization of a message will require 110 – 210 hours. • In most cases just a subset of the message will be used • Choreographies with response messages etc. are not tested, so this may complicate the implementation. • The implementation guides supported the use of code lists, and XMLs are useful

XSD schemas
2.2. Is the use of profiles useful (i.e. subsets of the XSD schema)? For the realization of the TI the profiles were not considered. Instead they used the example files provided by SINTEF. For the TSD the profiles were useful, and there may also be other profiles than those already defined. • A main route profile may be useful for routes that are repeated many times with scheduled arrivals and departures. • A journey profile may be useful for a specific departure. • A route matrix profile may be used when all departures and arrivals are to be defined. • An Offered transports may be a profile for transport alternatives according to specific requirements.
2.2 How was the size and extent of the XSD schema compared to the need? For the TI realization the XSD was much larger than what was needed. This was not a problem. The examples made it easy to find the right elements. For the pilot implementation of the TSD just a minor part of the XSD was used.
2.3 Were there any mandatory elements that could not be filled in/was not relevant? No
2.4 Is it useful with XSD schemas for the different profiles or will this make it more complicated? The use of namespaces (required in the case of XSD schemas for the profiles) will complicate the implementation. It is better to import the total XSD and to choose the elements that are needed. Separate XSD schemas are not required. It is however useful with example XMLs for the different profiles.
2.5 Were any elements missing in the XSD schema? No
XSD schema - Conclusion • Profiles are useful • It is not recommended to have an XSD schema for each profile • There should be example XMLs for the profiles • Some more profiles should be considered for the XSD

Code lists
3.1 Was it simple to find the relevant elements in the code lists? For the TI pilot: Yes. SINTEF provided help to find the right code lists and codes. For the TSD pilot: Yes
3.2 Was there overlapping elements in the code lists? For the TSD pilot: No
3.3 Were any elements missing in the code lists? For the TI: No. First they thought that the number of pallet spaces was missing, but they found a way to do it by means of the existing elements. For the TSD pilot: No
3.4 Should additional code lists be added? From earlier experience it is known that there may be a need for code lists on different trailer types.
3.5 How were the code lists implemented? (In UBL Genericode is used for the linkage between XML and

the code lists. For GS1 there is nothing like this.)

In the TI pilot the code lists were implemented in a file with a key and a value.

In the TSD pilot the code lists were not implemented in this way:
<cbc:TransportModeCode>1</cbc:TransportModeCode>
(do not know anything about Genericode)

Code lists – Conclusion

- A code list for trailer types should be considered

Data types

4.1 **Does the use of attributes (meta data) in data types complicate the realization?**

For the TI pilot: Do not know.

For the TSD pilot: Not relevant.

Data type – Conclusion

- No issues

Implementation guides

5.1 How well does the information from GS1 support the realization?

For the TI pilot: Looked through the documents, but mostly they relied on the input from SINTEF.
For the TSD pilot: Not relevant

5.2 What is good by the implementation guides established by META? Does it support the difficult issues?

For the TI pilot: A scenario is useful.

For the TSD pilot: Everything was simple to implement.

5.3 What can be improved in the implementation guides established by META?

For the TSD pilot: More specific examples and example XML with descriptions.

5.4 Is the use of a scenario useful as it is done in the implementation guides established by META?

For the TSD pilot: Yes

5.5 Are the "How-to" sections useful?

In general it is useful to have examples.

5.6 Are the specifications of the profiles OK?

For the TSD pilot: Yes

5.7 Do you have other comments to the implementation guides established by META?

No

Implementation guides – Conclusion

- The implementation guides are in general useful
- For the TSD implementation guide more examples with descriptions may be useful

Business processes

6.1 Are the messages in line with the existing information needs and business processes?

For the TI: the message elements are in line with the needs.

For the TSD: There are some elements missing that may be needed for sea transport.
For the TakeCargo portal: The messages can be used for booking and follow up of multimodal transport. TakeCargo has implemented route plan and booking of multi segments and multimodal transport. In addition track and trace functionality can be supported by the status message.

6.2 Does the messages affect the business processes?

For the TI: Yes – it affects the sending of the transport booking. Before email was used, and the new solution is a big advantage for the carrier. The carrier receives the information as a message and can enter the data into his systems automatically. Before he had to enter the data manually from an email. This is the first step. Later the response will simplify the process of the client too.
For the TSD: Yes, to a large extent.

- The processes related to service requests and service offering are simplified.
- It will also become much easier to distribute route information to portals, customers and partners.

For the TakeCargo portal: Electronic integration towards all the actor in the transport chain, international actors included, is supported. The standards will be implemented as soon as one of the customers to the portal requests such an implementation. The implementation will probably be easy and is supported by the experiences from META and the implementation guides developed by META.

6.3 If "Yes" on 6.2, what does this mean in the long terms?

For the TI pilot: the booking process can be more automatic. This means a simplification of the booking pocess.
For the TSD pilot: This will give

- Reduced administration costs for the buyers of transport services
- Reduced marketing costs for the providers of transport services.
- Easier procedures related to both the sending and processing of queries.
- Mote attention on transport needs and less on administrative and marketing issues.

For the TakeCargo portal: TakeCargo can be an international actor. Support for the GS1 standards are important since the customers are from the grocer's business.

6.4 Do you wish to realize the messages in the interactions towards other business partner as well?

For the TI: Yes. This will be much easier since the main part of the work is done.
For the TSD: Yes. If the standard becomes popular.

Business processes – Conclusion

- There may be some elements missing that may be needed for sea transport
- The TSD will simplify the processes for both the logistics services client and the logistics service provider
- It is important that the standards are broadly used
- The standards are useful to transport portals

Other issues

7.1 Do you have other comments?

Other issues – Conclusion

- None

Annex D Verification of usefulness related to business models

This annex addresses how the standardisation information exchange addressed by META support important business aspects for retailers (logistics service clients) and logistics portals supporting logistics service clients. This is done by means of generic business models (not for specific actors, but for a group of actors – namely retailers and portals). The structure of the business models was according to the Business Model Canvas template[2] described in Annex B. This canvas was filled in based on knowledge on success criteria related to transport management, trends among leading actors in the logistics sector and policy statements, among others defined by:

1) The Transportation Management Benchmark Report established by the Aberdeen Group[3]. The benchmark is based on a survey among 173 manufacturers, distribution organizations and retailers, and the best practises for transport management are identified.
2) Position papers of the European CO3 which aims to encourage a structural breakthrough in the competitiveness and sustainability of European logistics by stimulating to new collaboration models. The project emphasizes the need for more flexible supply chains[4][5].
3) Statements from leading stakeholders within logistics. They state that today's logistics operations are relatively static and the interactions between stakeholders are guided by long-term agreements. Future operations need to be more dynamic and flexible. Such statements were for example made at the eMaritime conference in November 2012 (by a representative from SAP)[6] and at the iCargo workshop in Munich in June 2013 by representatives from DHL and Unilever[7].
4) Policy statements on transport, among others the national transport plan. This is in short more efficient, safe and environmental transport.

D.1. Business model for retailers

The table below provides in the left column elements according to the Business Model Canvas (see Annex B). In the right column the motivations for the entries in the left column are described by means of references to the four sources listed above, and when relevant it is discussed how the business model entries can be supported by the standardized information flow addressed by META.

Key Activities:	Motivation and discussion
Establishment of inbound freight management strategy – decide when to take control of inbound freight Successful enterprises in general control most of the inbound freight themselves, but this has to be considered for each supply chain. In some cases it may be better to let the supplier handle the transport.	Motivated by 1). Discussion: • Standardized information exchange can be used in either case, and will also be beneficial if the strategy is changed.
Efficient logistics	Motivated by 1), 2), 3) and 4) – see bullet points below

[2] Alexander Osterwalder. *Business Model Canvas*. [cited 2013 16 August]; Available from: http://www.businessmodelgeneration.com/downloads/business_model_canvas_poster.pdf.

[3] Aberdeen Group, The Transportation Management Benchmark Report. The New Spotlight on Transpoertation Management and How Best in Class Companies Are Responding. 2006.

[4] Cruijssen, F., Horizontal collaboration: A CO3 Position Paper. 2012.

[5] Rossi, S., CO3 Position Paper: Challenges of Co-Modality in a Collaboration Environment. 2012.

[6] T. Dengel, "Using ICT for logistics: key challenges and opportunities", eMaritime Conference 2012, http://www.emaritime.eu/conference2012/

[7] http://www.i-cargo.eu/content/icargo-workshop-transport-logistics-trade-fair-munich

• Dynamic planning of the use of services and routes. This implicates flexibility with respect to selection of logistics services and chains.	Motivated by 1), 2) and 3). Discussion: • TSDs support the identification of relevant services, and the TI and the TSN support the exchange of transport instructions and status notifications.
• Frequently/daily measurements of transport issues (KPIs), e.g. miles, rates, emissions and metrics on "expected ship date from vendors", and estimation of future freight costs	Motivated by 1). Discussion: • TI provides exact figures for a planned transport. • GII provides exact figures for a transport that is executed. • TSN provides actual schedules and other status information.
• Efficient exchange of transport information with business partners	Motivated by 1) and 2). Discussion: • TSD provides generic information on schedules, costs, emissions, etc. • TI provides exact figures for a planned transport. • GII provides exact figures for a transport that is executed. • TSN provides actual schedules, other status information, tracking and tracing of cargo across different transport legs and service providers. • GS1 is working on a Capacity Plan interaction for exchange of capacity forecasts. • .
• Use of shared shipping schedules when this is efficient.	Motivated by 1). Discussion: • TSDs support the identification of relevant services, information on emissions included.
• Green logistics through increased load factors and ability to use all transport modes	Motivated by 4). Discussion: • TSD provides generic information on schedules, capacity, emissions, etc. • TI supports the use of all transport modes.
Carrier collaboration to become an easier customer, among others exchange of tactical information like forecasts on capacity needs.	Motivated by 1). Discussion: • Likely to be more important in the future. GS1 has prepared a Capacity Planning standard (not addressed by META).
A continuous focus on establishment of new and improved solutions	Motivated by 1) and 4). Discussion: • May include the implementation of standardised information exchange towards business partners. It is important that the standards are broadly accepted and implemented by the transport industry, and that

	they also agree on standardised services for the exchange of the information.
Involvement in interests groups to support horizontal collaboration.	Motivated by 2) and 3). Discussion: • May mean involvement in standardization activities or just making sure that the standards are followed. • May support agreements on the use of standards, among others the use of identifies on cargo and equipment, on procedures at pick-ups and deliveries, etc. to support vertical and horizontal collaboration.
Key Resources:	**Motivation and discussion**
Logistics knowledge	Motivation: Crucial for finding good solutions
Logistics portals	Motivation: Transport management tasks may be outsourced to such portals
Efficient transport management systems supporting • The total transport logistics of the company (to support optimisation across all needs). • Agile and streamlined processes • Transparency within own organization to support internal processes, among others sharing of real-time information from transport operations • Communication with business partners	Motivated by 1). Discussion: • TI and TSN contain information required by different processes within the organization. • The standardised messages support the communication with the business partners.
Interest groups for logistics service users	Motivated by 2) and 3). Discussion: • May include standardization groups for logistics procedures, labelling, etc. that can facilitate harmonized solutions for improved efficiency
Key Partners:	**Motivation and discussion**
Logistics portals.	Motivation: Tasks may be outsourced to such portals and they may provide value added services
Interests groups	Motivated by 2) and 3). Discussion: • May include standardization groups that can facilitate harmonized solutions for cargo and equipment identification (IDs, use of RFID, etc.), and common procedures - can facilitate new services and more efficient interoperability with suppliers and service providers and more efficient handling at pick-ups and drop offs
Logistics Service Providers (carriers/forwarders)	
Value Proposition:	**Motivation and discussion**
Low transport costs Low transport management costs Environmental sustainability Transparency in own organization – transport costs, ...	Motivated by 1), 2), 3) and 4). Discussion: • Standardised information exchange with business partner will in the long term arrange for the listed

Transparency for customers and other business partners (among others traceability of transport and documentation of green transport).	values propositions. Many of the tasks related to transport management and information provision can be automated.
Customer Segments:	**Motivation and discussion**
Organization units and processes within the organization of the retailer (warehouses, distribution centres, stores, management, ...) that are to be supported by the logistics processes.	
Channels:	**Motivation and discussion**
Applications and services providing transparency in own organization.	Motivated by 1). Discussion: • TSD, TI and TSN can provide required information.
Applications and services (also automated services) • For interactions with business partners. • Providing transparency for business partners. The retailer may share tactical information with their carriers (e.g. capacity needs forecasts)	Motivated by 1), 2) and 3). Discussion: • TSD, TI and TSN support required interactions. • GS1 is working on a Capacity Plan interaction for exchange of capacity forecasts.
Business Partner Relationship:	**Motivation and discussion**
Customer relations is outside the scope of this business model – it is handled by the transport management system. The relationships with the business partners are by means of automated services	Motivated by 2) and 3). Discussion: • The standardised messages (TSD, TI, TSN) facilitate the implementation of automated services.
Cost Structure:	**Motivation and discussion**
Value driven with respect to the total value for the enterprise. Should also consider environmental issues, execution of logistics processes, etc.	

Costs are among others related to
• Development of systems
• Operation of the systems
• Improvement of systems to fulfil new requirements
	Discussion:
	• Should include implementation of new functionality and standardized information exchange.
	• Use of standardized information exchange will in long terms have the following consequences:
	  ○ The solutions and updates are quality assured and based on a broad verification of needs in standard committees
	  ○ More attractive to new customers that use the standards or plan using them.
	  ○ Cheaper to connect to new partners that have implemented the standards.
	  ○ Easier and cheaper to implement new services that requires interoperability across the whole supply chain.

Revenue Streams:	**Motivation and discussion**
Not relevant since the logistics processes are internal to the enterprise.	

D.2. Business model for logistics portals supporting Logistics Service Clients

The table below provides in the left column elements according to the Business Model Canvas (see Annex B). In the right column the motivations for the entries in the left column are described by means of references to the four sources listed above, and when relevant it is discussed how the business model entries can be supported by the standardized information flow addressed by META.

Key Activities:	**Motivation and discussion**
Marketplace for transport services	Discussion: • TSD supports service announcements
Support efficient logistics (on behalf of the Logistics Service Client)	Discussion: • Standardized information exchange that support efficient logistics will be a part of this
• Support dynamic planning of the use of services and routes. This implicates flexibility with respect to selection of logistics services and chains in order to optimize with respect to costs, load factors, environmental sustainability (e.g. use all transport modes), etc..	Motivated by success criteria for service clients according to 1), 2) and 3). Discussion: • TSDs support the identification of relevant services, and TI and TSN support the exchange of transport instructions and status notifications.
• Transport service call-offs/booking	Discussion: • TI supports information exchange
• Transport operation follow up and status reporting	Discussion: • TSN supports information exchange

• Value added services
  ○ Provision of KPI data for transport issues (miles, rates, emissions and metrics on "expected ship date from vendors")
  ○ Support exchange of tactical information like forecasts on capacity needs
  ○ Invoicing services
	Motivated by success criteria for service clients according to 1).
	Discussion:
	• TSD may provide generic information on schedules, costs, emissions, etc.
	• TI may provide exact figures for a planned transport.
	• GII may provide exact figures for a transport that is executed.
	• TSN provides actual schedules, other status information, tracking and tracing of cargo across different transport legs and service providers.
	• GS1 is working on a Capacity Plan interaction for exchange of capacity forecasts.

Efficient communication with business partners	Motivated by success criteria for service clients according to 1), 2) and 3). Discussion: • TSD, TI and TSN support such interactions.
A continuous focus on establishment of new and improved services, e.g. promote use of standardized information exchange	Motivated by success criteria for service clients according to 1). Discussion: • Implementation of standardised information exchange towards all business partners is a part of

	this. It is important that the standards are broadly accepted and implemented by the transport industry, and that they also agree on standardised services for the exchange of the information.
Key Resources:	**Motivation and discussion**
Logistics knowledge Market knowledge Software development knowledge Information exchange formats and standards	Motivation: Crucial for finding good solutions
Efficient transport management systems supporting • Communication with business partners • Management of information on transport services • Management of transport related information • Transparency - among others on real-time information from transport operations • Agile and streamlined processes • Management of information on business relations (contracts, etc.) • Management of invoice information	Motivated by success criteria for service clients according to 1). Discussion: • The standardised messages support the communication with the business partners. • TSD may provide generic information on schedules, costs, emissions, etc. • TI may provide exact figures for a planned transport. • GII may provide exact figures for a transport that is executed. • TSN may provide actual schedules and other status information.
Key Partners:	**Motivation and discussion**
Logistics Service Clients outsourcing transport management to the portal	
Logistics Service Providers (carriers and forwarders)	
Value Proposition:	**Motivation and discussion**
With respect to Logistics Service Clients • Outsourcing of transport management • Optimization of transport (with respect to costs, environmental sustainability, etc.) • Value added services (transparency of transport execution and costs, provision of KPI data, etc.)	Motivated by success criteria for service clients according to 1). Discussion: • Supported by standardised information exchange. • TSD may provide generic information on schedules, costs, emissions, etc. • TI may provide exact figures for a planned transport. • GII may provide exact figures for a transport that is executed. • TSN provides actual schedules, other status information, tracking and tracing of cargo across different transport legs and service providers.
With respect to Logistics Service Providers • Marketplace for announcement of services • One common interface for interaction with customers • Outsourcing of communication with logistics service clients related to call-offs/booking of transport services, status reporting to logistics service clients, etc. • Misc. services (provision of contact information, etc.)	
Customer Segments:	**Motivation and discussion**

Segmented (Logistics Service Clients and Logistics Service Providers)	
Channels:	**Motivation and discussion**
Web applications where customers can access general information	Discussion: • The channels must be efficient, and the standardised information exchanged addressed by META is well fitted for use by all channels mentioned.
Web applications where customers can provide and access information on targeted transports of tailor made for the customer	
Integrated solutions based on electronic information exchange with customers	
Customer Relationship	**Motivation and discussion**
Automated services	Discussion: • The standardised messages (TSD, TI, TSN) facilitate the implementation of automated services.
Cost Structure:	**Motivation and discussion**
Cost driven – cost structure details must be decided by the enterprise	

Costs are among others related to
• Development of systems
• Operation of the systems
• Improvement of systems to fulfil new requirements
• Marketing and administration
	Discussion:
	• Should include the implementation of standardized information exchange. This will in long terms have the following consequences:
	  ○ The solutions and updates are quality assured and based on a broad verification of needs in standard committees
	  ○ More attractive to new customers that use the standards or plan using them.
	  ○ Cheaper to connect to new partners that have implemented the standards.
	  ○ Easier and cheaper to implement new services that requires interoperability across the whole supply chain.

Revenue Streams:	**Motivation and discussion**
Must in general be decided by the enterprise.	

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