Capgemini Consulting

Transportation Management Report 2011

Latest insights into business drivers for transportation processes and software

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Preface

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The last time Capgemini published a report on transportation management was in 2007. The years since then have been challenging ones. The financial and economic crisis hit all industries hard but nowhere more so than the transportation industry. Logistic service providers, carriers and technology vendors all have had to deal with the harsh reality of difficult market conditions. Besides these macroeconomic factors these companies are also dealing with an increased demand from stakeholders for sustainable business models and innovative solutions at the same time that technological capabilities are increasing and evolving at what might be considered by some to be a bewildering pace.

All of these factors led us to believe that the time for an update to our transportation management study was at hand. The approach we chose for this report is very similar to the previous edition. In the first part, Capgemini supply chain and technology professionals from different countries share their experiences and insights with you in articles that focus on both business and technology. The articles cover topics like distribution network optimization, sustainability in transportation, planning, (out) sourcing and IT governance challenges.

The second part of the report analyzes the Transportation Management Systems (TMS) market. As part of the vendor analysis, a questionnaire was sent to those vendors who handle standard, off-the-shelf transportation management software. Survey topics included questions about competition, product development, and market trends. The editors of the study compiled all the responses in easy-to-read tables and then added their observations in the text. To facilitate comparisons among the often diverse and sometimes even confusing solutions in the marketplace, we developed an improved transportation reference model. Participating vendors were asked to use this model to indicate the areas covered by their solutions. The result is an interesting and helpful overview for anyone in the industry and especially for those who might be looking for a TMS solution.

Hopefully, the business insights in the report will lead you to think about or perhaps rethink how to organize transportation. And after reading about the latest developments in software solutions, maybe you'll want to consider updating your existing IT solutions. Whatever your next move might be, the consultants at Capgemini will be more than happy to discuss the study with you in detail and to explore how we can be of further assistance in helping you develop world-class transportation management.

Executive Summary

This report has two sections. In the first part, Business Insights, Capgemini logistics professionals provide their opinion on different aspects of managing transportation in the context of the current challenges facing the transportation industry.

The second part of the report, Transportation Management Systems, gives an overview of the software solutions that are available to support transportation management.

Business Insights

The Business Insights articles cover the following topics:

- The recent economic downturn has led to cost-cutting programs in many sectors. But minimizing costs has always been one of the top priorities for transportation and logistics managers worldwide. So, what choices do they have when facing this new economic climate, with even more focus on minimizing cost of distribution? Shrinking business volumes call for changes in the distribution setup, while still maintaining focus on customer needs. Kristoffer Arvidsson and Lina Aronsson discuss different options they see for cost cutting in distribution.

- There can be many reasons that a distribution network no longer has the best configuration in relationship to desired service level targets. But the net result could be missed opportunities for cost reductions. Leanny Pizzolante, Ramón Fiol García and Pedro Provedo provide insight into different aspects of a distribution network optimization project.

- The focus on efficient planning has grown over the last few decades. But with the economic crisis and increased uncertainty in the supply chain, many shippers and logistic service providers have learned that their planning and decision making process has weaknesses. Jasper van der Schaar and Erik Bootsma discuss trends in transport planning and provide recommendations for planning in these turbulent times.

- Outsourcing logistics services has become common practice and transport execution is one of the most outsourced business processes. When companies outsource their logistics it is tempting for them to think that their 'logistics problems' are outsourced as well. Although some problems may become the Logistics Service Provider's (LSP) responsibility, shippers will still be responsible for managing their LSP. "How to Manage Your LSP" is the subject of an article by Hugo Haarman.

- Currently, the transport sector is responsible for a quarter of Europe's total CO_2 emissions. Along with plans to include the transport sector in the Emissions Trading Scheme by 2020 will come an urge for companies to start looking for more CO_2-friendly transportation alternatives. Shifting to rail transport brings direct and significant results. In their article "Reducing CO_2 by a Modal Shift to Rail Transportation", Vicky Verbeek and Joël van Gogh discuss how rail can assist the transport sector as well as global society in their quest to reduce CO_2 emissions.

- The article "Driving Compliance and Efficiency with a Freight Control Tower" outlines the magnitude of the challenge ahead for companies operating internationally and examines different approaches to ensuring that the supply chain can not only cope with tighter trade laws but actually thrive. Chris Brown and Adrian Paton explain the Freight Control Tower business

model and its ability to effectively reduce logistics costs and improve customer service in the current global economic climate.

- Many companies are using home grown software to support their transport function, especially for areas like rating, operational planning, and operational accounting that are difficult to support using standard off-the-shelf software. A lot of these legacy transport systems were first installed in the early eighties and have been extended since then. From a technological point of view, legacy systems are fast approaching the end of their lifecycle. In "The TMS Legacy Dilemma" Annemarie van Meesche goes into different strategies for making changes in these environments.

- The constraints that apply when introducing a modern TMS solution have tightened. Now, in addition to an extremely complex and inflexible application landscape comes the added burden of investment budgets being cut significantly. Logistics specialists are therefore looking for a migration strategy that not only reduces the business and technology risks, but also takes into account the current constraints in respect to investment budget and cash flow/ROI. An incremental/phased approach seems like the obvious solution to dealing with these constraints. Today's methods, tools, applications, and integration technology provide us with a new dimension of flexibility that is crucial for a phased transition. But

often when a company chooses an "off-the-shelf" (i.e., package-based) TMS solution, they lack the expertise and resources to ensure the necessary flexibility. In the article "Response to the Crisis: Phased Introduction of a TMS", Jan Lindhaus and Olaf-Rüdiger Hasse illustrate how Capgemini's Service Oriented Package-Based Solutions (SOPS) methodology can help you bridge this gap.

Transportation Management Systems

Part II of the report provides an overview of the available applications that support Transportation Management. Twenty eight vendors were surveyed and provided input to the inventory of products presented. Capgemini editors have added clarifications and views to the text accompanying the vendor information tables. Some highlights:

- It is important to recognize that there are different groups of TMS users: carrier, logistics service provider, and shipper. Although they have some requirements in common, their differences are important when selecting a solution.

- Advanced Planning & Scheduling, Route Optimization, Parcel Shipping, and Global Trade Management functionality are areas that can be part of a comprehensive TMS. These parts are also available as stand-alone solutions, while some vendors offer these third-party components as options to their own solution.

- Connectivity and visibility are basic components that enable the multi-party collaboration of shippers, LSPs, carriers, and authorities (customs, for example). An interesting development is offering solutions that leverage networks where many of the major players are already connected to a platform. This potentially minimizes the effort and money involved in setting up communication with these parties.

- A major trend is offering TMS solutions as a shared software service over the Internet, for which payment takes place prorated to usage. Software as a Service (SaaS) is considered one of the most important changes in the TMS market. Although smaller companies can particularly benefit from this, larger companies are also showing an interest in this business model because it can mean less of an upfront investment.

- The market still has many small, local vendors. They remain an interesting option for certain users. For the larger, truly global companies, the continuing consolidation of TMS providers is an important development. The takeover of i2 by JDA, who had earlier acquired Manugistics, is an example of a significant concentration. The on-going investment in the TMS market by major ERP vendors like Oracle and SAP shows a commitment to this important segment of the supply chain software market.

- Supply chain integration, sustainability and SaaS are major developments that will continue to shape the market in the years to come.

The report ends with a transportation reference model for the TMS market. It is a model that should be helpful when formulating requirements for transportation-related IT solutions. The model is very comprehensive. Many users may need to use a variety of providers to fulfill all their IT application needs, although some providers do cover a wide range of services. Integration will remain a key challenge and careful design of IT architecture a critical success factor. What we have seen in comparison to previous market analysis and is also supported by our practical involvement in implementing solutions, is that over time the possibility to cover more (functionality) with less (different vendors) does exist and is indeed increasing. However, in a market where a considerable number of the players still work with legacy solutions that were built or customized in-house over the course of several decades, the step to a standard off-the-shelf solution is certainly not to be underestimated.

Part I: Business Insights

Cost Cutting in Distribution

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The recent economic downturn has led to cost-cutting programs in many sectors. But minimizing costs has always been one of the top priorities for transportation and logistics managers worldwide. So what choices do they have when facing this new economic climate, with even more focus on minimizing the cost of distribution? Shrinking business volumes call for changes in the distribution set up, while still maintaining focus on customer needs.

Factors to investigate in order to cut significant cost in distribution are centralization of logistics functions, distribution network set up and planning, outsourcing of logistics activities, and transport mode and 3PL selection. All of this while continuing to provide the right service levels to customers.

The customer service dimension
Logistics managers always have to strike the right balance between customer service levels and operating costs. But do companies have to serve all customers at the same, high service level or is it better to offer different service levels and let the customers choose between them and their corresponding cost levels? Companies should make sure to offer the service levels needed but shouldn't hesitate to have a dialogue with the customers around opportunities to change service levels in order to cut costs.

Logistics options in the economic downturn

- Optimizing service levels
  - ➤ More flexibility in speed and pick-up/delivery times
- Centralization of logitics planning and execution
  - ➤ Logistics Shared Service Centers
- Distribution network optimization
  - ➤ Input from changing supplier and production location
  - ➤ Collaboration with uppliers and customers
- Selecting the appropriate mode of transport
  - ➤ Trade speed for cost
- Outsourcing of logistics activities
  - ➤ Make fixed assets variable
- Renegotiation with 3PLs

Ultimately, many companies must ask themselves if the cost of speed is worth the price and are their customers willing to pay for it. Moving production closer to the consumer may offering a "greener", slower, and cheaper transportation solution that could both attract positive consumer attention and minimize distribution costs.

Another way of reducing costs is to even the flow of goods over the course of a day or a week to minimize peaks. A steady flow makes it easier to plan for personnel, trucks, distribution centers and so on and, ultimately, uses fewer resources. Expanding the usage of a truck through morning pickup or evening delivery not only let's a company use its fleet in a more efficient way but also makes it possible to reduce congestion in peak hours and thereby reduce driving times and emissions.

As an example, DSV Road in Sweden is now offering a "green" transportation solution that is also cheaper than the regular solution. If the customer chooses this cheaper product, they must accept a flexible loading day which makes it easier for the transportation company to maximize utilization of the trucks and travel shorter distances.

These types of initiatives call for changes in the service agreements with the customers and must ultimately be decided in collaboration with the customer. If all parties in the value chain can benefit, it is certainly worth the effort to look for new ways of working together.

Reduce costs with centralized planning and execution of logistics activities

Companies typically have their logistics functions spread over several different locations, often tied to their factories or warehouses. Centralizing logistics functions to a shared service center is a way to leverage economy of scale and reduce headcount across business units while maintaining or even increasing service. Shared service centers make it easier to standardize processes, implement best practices, and focus on key activities. Companies that have implemented shared service centers often report savings of 20-40% compared with a more decentralized structure.

In a logistics shared service center, distribution activities such as route planning, transport order management, and customer contacts could be centralized without losing any control over the transportation process. It's also easier to minimize sub optimization in the distribution network if one unit is doing the planning instead of several geographically spread units.

Distribution network planning

The cheapest and most environmentally-friendly transport is the one never carried out! This might seem obvious but in light of the amount of goods that are transported back and forth in a supply chain because of poor planning it is a truth that is worth mentioning frequently. In order to minimize distribution costs, the focus must always be on maximizing utilization and minimizing distances travelled.

Because the form and shape of a company's value chain alters almost daily, short- and mid-term logistics planning becomes very important. The planning of the optimal distribution network is an ongoing process that needs constant attention. Many networks are set up by tradition and over time may need to be changed in order to fit a more current situation. Distribution network analysis makes sure that warehouses and hubs are placed in optimal locations and the use of advanced software tools for daily route planning helps shorten the distances travelled to the customers. Where to locate a split point or the strategy behind FTL/LTL decisions will influence distribution costs and must be constantly monitored to make sure they match the current needs of the supply chain.

Consolidation of shipments is one of the easiest ways to increase utilization of trucks and lower emissions. Keeping track of orders to suppliers and consolidating customers' orders will reduce transportation costs significantly over time. Transportation and warehousing activities must be in sync in order to consolidate shipments and reduce inventory levels. Therefore both transportation and warehousing activities should be aligned through common planning processes.

The effects of careful logistics planning will be even more powerful if the planning is carried out together with suppliers and customers. This type of collaboration will make sure that every part of the value chain knows when to do what. The result is a more visible and flexible supply chain that is easier to manage.

A leading consumer electronics producer introduced Collaborative Planning, Forecasting and Replenishment programs with several customers, which increased forecast accuracy to above 80% and reduced stock levels in their distribution network by more than 30%.

Selecting the appropriate mode of transport

'Going green' often makes the costs for transportation decrease. Choosing sea transport from Asia instead of air freight, or trading road transport for railway or short sea can, in many cases, lower the cost of transportation significantly. Of course, in the case of trading air freight for the much slower sea alternative, it will affect the amount of safety stock you need to carry but maybe, in this time of cost pressure and focus on green issues, this should be part of the consideration. The total logistics cost is, of course, the thing to keep in mind. By increasing competition among suppliers and decreasing their air volumes from 60% of total freight volumes to 30% and shipping the difference by sea, Ericsson, the telecom company, expects to see a 40% reduction in their international distribution costs.

Railway and intermodal transport can help minimize the environmental impact of transportation and can cut costs if the distance is long enough and reloading can be kept to a minimum. Volvo Cars has implemented a train solution for their transportation of goods from Germany to Sweden and have lowered their transportation costs in this area by 15% with just slightly longer lead times.

Trucks are still the most flexible mode of transport in today's environment. Using the right type of truck for different tasks and routes is key to minimizing distribution costs. Eco-driving programs are also a quick way to lower both costs and the environmental impact of distribution. Swedish farm cooperative, Lantmännen, expects to reduced their transportation fuel costs by 10% with a heavy eco-driving program.

Outsourcing

Outsourcing of distribution and logistics activities is a way frequently used by companies to reduce cost and make fixed costs variable - especially important with the current focus on capital efficiency. In Capgemini's 2010 Third-Party Logistics Study, customers reported a 15% decrease in logistics costs as a result of outsourcing logistics activities.

Many companies find that owning their own fleet of trucks is not as cost effective as having a 3PL handle their distribution network solution. Typically, 3PLs can create transportation networks with higher utilization, wider coverage, and better service while still offering competitive prices. This is often also the case for warehousing activities, which makes these processes even more interesting for companies where warehousing is not considered a core competency. Apart from transportation and warehousing services, more and more noncore services are being outsourced, e.g. invoicing, logistics, IT, and so on.

3PL agreements

One way to cut cost in the short term is to renegotiate freight tariffs with a 3PL. A good understanding of the logic behind the tariffs is necessary and, of course, compliance is absolutely essential in order to avoid using the wrong product or incurring penalties (for example, faulty shipment information or delay times at loading or unloading). But typically a transportation sourcing project identifies saving potentials of 10% just by renegotiating tariffs or changing the supplier.

As mentioned before, it is also important to use the proper solution for specific transport issues when it comes to speed, flexibility, and other value added services. If it is possible to choose regular transport instead of express this is of course always cheaper.

Where to start cutting

Each company should consider how the topics discussed fit with their specific conditions and then go for the quick wins. Be careful not to outsource processes that are out of control or to implement IT solutions hoping to solve process or organizational problems.

Also remember not to reduce the capabilities of your distribution network too much. There will be good times again and the setup of the company must be ready for growth. This is also a reason to work together with suppliers and customers in any logistics cost cutting program. It is easier to realize cost benefits now if everyone knows that the cooperation will continue in the good times ahead.

Considerations for Distribution Network Optimization

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Due to continuous changes in the global economy and markets, as well as environmental issues, your distribution network may no longer have the best configuration in relationship to desired service level targets. As a result, you may be missing opportunities for cost reductions.

Because supply chain networks are not static, it can be very beneficial to regularly conduct a distribution network optimization project so that the location and number of facilities (suppliers, production, warehouses, etc.) within your network can be revised and optimized.

Some possible reasons to implement network optimization:

- External: market changes in volume or product mix due to economic context; change in the proportion of distribution channels; competition (new entrants, mergers, and closure of companies) and regulations (such as limits in CO_2 emissions).

- Internal: new strategies (regarding customer services, development of new product lines, etc.); manufacturing changes (increase in production capacity, new production lines, changes in packaging); sourcing changes (import/export ratio, providers base) or even supply chain changes (ownership/outsourcing of activities); 3PL or 4PL contract changes; new capacity requirements and new IT or logistics equipment.

The goal of a distribution network optimization project is to find the least costly distribution network, given specific target service levels and possible network configurations. It is not just about choosing the right balance between service levels and costs; it is about re-engineering the network and moving the cost-service curve (Figure 1).

Figure 1: Cost-service curve
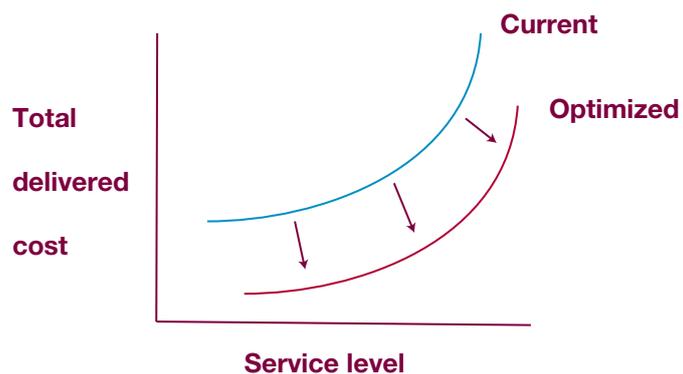
In order to reduce logistics costs (with no reductions in service levels) and become more flexible to changing situations, we recommend first an assessment of the current distribution network and then conducting simulation configurations that might work in a new environment.

Obtaining the best network configuration for a company in a specific market is not an easy task because each network is unique and should respond to the specific needs of clients as well as comply with commercial conditions. As a result, a multinational company cannot apply the same network design parameters to different countries (for instance, number of regional warehouses by sales volume) because the markets, customer needs, and even commercial conditions could be different.

In Spain, distribution networks for consumer goods are highly affected by the proportion of clients and sales volume in the HORECA distribution channel, due to the high number of points of sales in this channel (approximately 400,000). The low drop size and high number of stops for distribution vehicles makes direct distribution from the warehouse very expensive. Most manufactures rely on wholesalers or distributors, who can consolidate volumes and distribute more efficiently, but this still remains the most expensive part of total transportation costs.

Therefore, a global company that wants to distribute its products in Spain should look for a different approach - perhaps one that includes
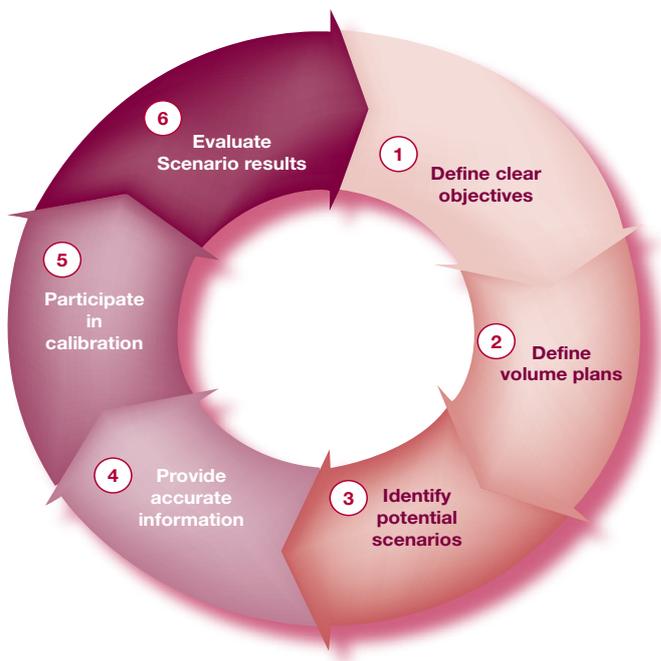
locating warehouses closer to clients, changing Service Level Agreements (SLAs) with customers, negotiating special services with 3PLs, or increasing the number of wholesalers who are close to the market.

The only way to combine all the complex and different factors that affect total network costs is to use specialized simulation software tools. These will help determine and balance all the costs, including the optimal operational costs and help with more recent considerations, like a minimal carbon footprint configuration.

When undertaking a network optimization project, we have found that there are key factors our clients should bear in mind (Figure 2):

- Define clear objectives: Management needs to understand the expected results of the project, such as cost reductions, carbon footprint reduction, and adapting the network to external changes or location of new facilities (new plants or product lines or warehouses). Gaining importance is network design software that allows companies to plan green supply chains by giving them the ability to understand the environmental impact on each of the evaluated scenarios by calculating CO_2 emissions from factory, warehouse, and transportation activities.

- Define volume plans: When designing or redesigning the network, it should be dimensioned based on future volume plans, both medium and long term. It is important that the business plan reflects the future context.

- Identify potential scenarios: Management should prepare a list of possible scenarios that might be evaluated during the simulation, for instance: centralizing warehouses, opening, closing or moving facilities, changing DCs or warehouse locations (mainly if they are not owned), implementing cross-docking, changing commercial conditions that affect lead times, outsourcing warehousing or transportation activities, and so on. This is the most creative and interesting part of the analysis. It allows managers to ask and answer "What if" questions and should ideally involve other parts of the company, like marketing and manufacturing.

- Provide accurate information: In order to simulate all the scenarios, a lot of detailed information is required and should either be on hand or be accurately estimated. The main information requirements are: fixed and variable costs for facilities, transportation rates or costs (even from non-existent departure facilities), lead times, and service levels.

- Participate in calibration: Previous to modelling scenarios, a calibration phase should guarantee that actual costs match those provided by the model. Managers should provide information on costs in order to calibrate the model and help in identifying any extra costs that should be analyzed outside the model. The more accurately the model simulates real costs (less than 5% difference would be the objective), the more accurate the scenario of total costs will be.

Figure 2: Distribution Network Optimization considerations

functional areas, such as marketing and sales in the scenario definition and evaluation process.

Besides obtaining the most cost-efficient network configuration, we have found that analyzing network costs can lead to the identification of specific needs for implementing TMS software, such as load design, route planning, or carrier selection. And it can also identify potential areas where cost reductions and savings might be available in the short term, for instance:

- Optimization of inventory management
- Lower transportation costs by consolidation of LTL shipments
- Reduction of lead times
- Lower transportation costs by changes in rates, frequency, and elimination of errors and non value-added services

In summary, there are both internal and external variables (such as economic context and market changes) that could make your distribution network inflexible and expensive. A distribution network optimization project, using advanced simulation software, can lead to important cost reductions for a company and allow them to incorporate green planning into their network design. When a company wants to undertake such a project, both general and supply chain management should be clear on the objectives pursued, the premises and possible scenarios to be evaluated, and should participate in the evaluation of solutions presented by the software, in order to select the best network configuration.

- Evaluate scenario results: Each scenario needs to be judged by its relationship to total operational costs and the savings generated compared to the current situation. What is important for your managers in this phase is to analyse the impact of those scenarios on other aspects of the organization, such as human resources, legal (regulations, taxes), contracts with 3PLs and other logistics providers, transportation availability, total investment required, and potential risks. Considering all these issues will allow you to select the scenario that best suits the objectives for cost and carbon footprint and, ultimately, satisfies all stakeholders' needs.

The best results for the project will be obtained if managers know exactly what to ask, what information to consider, and the impact of changes on the organization as a whole.

In a demand-driven supply chain, distribution networks are usually designed to satisfy commercial conditions such as client agreements, service levels, delivery frequency, direct shipments, and lead times. These conditions become design parameters. We recommend organizations also consider what impact changing these variables will have on cost savings. In addition to having general management sponsorship, we strongly recommend, involving other

Beating the Crisis by Better Planning

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Transportation planning in an economic downturn

Introduction

Transportation planning has become more and more important in the past 15 years. With increased pressure due to price, higher fuel costs, and shortage of drivers, the focus on efficient planning has grown. Then, in the last quarter of 2008, the financial crisis started and as a result, transport volumes dropped. Transport companies were suddenly faced with overcapacity.

This article discusses the question: "How did this sudden drop in volume affect planning?" Did the crisis expose weaknesses in transportation planning? Did it change the way decisions were being made? And, if so, how was that reflected in the planner's job? Or maybe the planner's job was not affected at all, for instance, if there was more than enough capacity to allocate the shipments.

This paper starts by looking at transportation trends observed over the past few decades, which will give us an understanding of how the job of transportation planning has evolved. Then we will consider the current level of planning, with its consequences and weaknesses. The paper ends with recommendations for improvements in transportation planning.

Trends in transportation planning

Transportation companies have to deal with a lot of variables that impact transportation planning. During the last decades the number of variables has grown rapidly, making it more and more difficult for the planner to create a feasible plan. To indicate the complexity of transportation planning, we will take a look at these variables using the following three dimensions:

Transport: The transport dimension represents all the variables directly related to the planning of individual shipments. Typical planning variables are the selection of the right vehicle type considering the dimensions and characteristics of the shipment, selection of the right vehicle and driver, based upon availability and location, and variables like driving regulations, knowledge, and capabilities of the driver.

Company: On a company level, transportation planning is influenced by variables such as the size of the company (number of resources), regions served by the company, and types of services offered (e.g., chemical, containers, express, air). Also, the planning process within the company (planning by service area, customer, central, local) has impact on transportation planning.

Economy: The third relevant dimension for planning is the economic situation that the company is operating in. An upward trend in demand versus supply will require a different focus for the planner than a trend that is the other way around.

Figure 3: Transport planning complexity – past
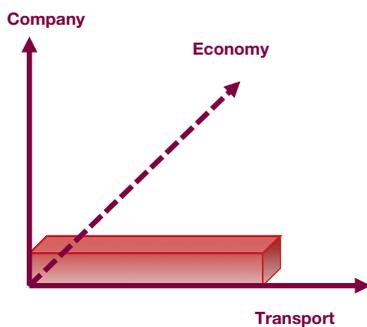
When plotting the trends in transportation planning against these three dimensions, the complexity of the planning is indicated by the total area covered in each of the three accompanying graphics.

In the next paragraphs we look at these dimensions by plotting them against three axes.

Past (through the mid 90's)

Complexity of transportation planning was restricted to relatively easy to manage variables like: availability of the driver, right vehicle for transportation, and the complexity of the actual transportation (Figure 3).

Transportation companies were relatively small, operating in a local market against local competitors.

Focus of the planner was on optimization of short-term planning and execution. Most companies supported their planners with low tech tools, like whiteboards, plan boards, or spreadsheets.

Present

Transportation has become increasingly more complex. Planners have to deal with rigidly enforced laws on driving time and emission regulations for trucks driving into cities as well as higher customer expectation regarding time-windows and flexibility in service (Figure 4).

Figure 4: Transport planning complexity – present

On the company level we see an increase in mergers, resulting in more resources (drivers, vehicles) that need to be planned.

In these consolidated companies there are often multiple planning departments, each covering its own area, like: container transport, liquid bulk, (palletized) general cargo, etc. In addition, planning departments often have a decentralized structure. Targets for the planning departments and planners are focused on local goals.

As an example, a large French transport company with branches throughout Europe manages each of the by profit/loss responsibility at the branch level. Each branch also manages its own drivers and vehicles. As a result of such a structure, branches and planners are only interested in allocating their own resources, regardless of the effect on overall company efficiency. This "camembert method", as they call it themselves, is not the best choice.

Availability of information in the logistic supply chain has increased dramatically in recent years thanks to the Internet and information technology. This increase also makes the planner's job more difficult since it means there are more variables to manage. Tools like ERP, Transportation Management Systems (TMS) and sometimes even Advanced Planning and Scheduling (APS) applications are available to assist planning.

Figure 5: Transport planning complexity – future
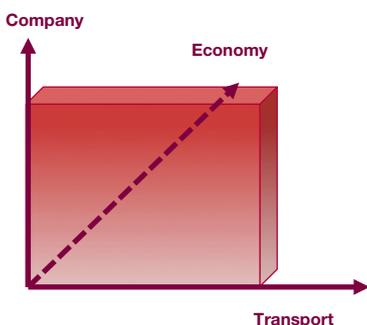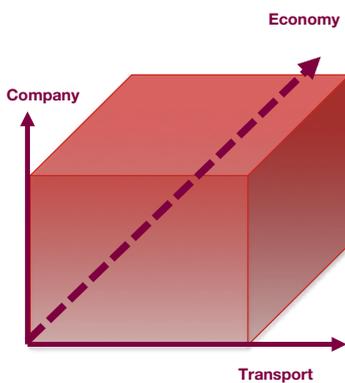

Future

Up to the present, planning was mainly determined by the "transport" and "company" dimensions. There have always been changing economic conditions as well but we think the speed and (geographical) size of expansion are increasing due to the faster exchange of information and growing transparency. From a planning perspective, this correlates to increased complexity, as clearly seen by the economic crisis of 2008/2009. Total world trade experienced one of the steepest declines in history. The planner has had to deal with a swift transition from planning in a situation of under capacity to planning in a situation of over capacity (Figure 5).

Should the planner just sit back and relax, given all this excessive capacity on hand?

Planning through the crisis

We wouldn't recommend it. There are lots of questions that need to be answered, especially with profits under considerable pressure: Is the market still offering enough potential? Do we need to change our position regarding environmental sustainability? Where should the capacity be positioned? What is the right balance between owned fleet and chartered vehicles? What is the optimal frequency and size of the line hauls?

In an ideal world these planning questions would be answered at separate moments in time, by specific people, supported by unique tools. On a day-to-day basis all a planner really wants to

know is which resources (trucks, drivers) are available and which orders need to be planned. He is not that concerned with mid-term planning decisions, like the optimal network capacity (e.g., line haul schedule). The support needed is a planning solution that takes into account all the detailed individual client requirements and resource characteristics. The operational planning solution should therefore be of a highly configurable type. In the transportation market we see that the "best in class" companies use Advanced Planning and Scheduling (APS) solutions.

But, there are many decisions regarding capacity that need to be made in a mid-term, weeks ahead, timeframe. These questions are not related to aligning actual shipments to specific resources, but are dealing with optimizing the network capacity for the forecasted shipment volumes. This type of planning is often done using "what-if" scenarios that are fed with expected operational trends and historical data. Results of this tactical planning could be a change in the line haul schedule, a regional resource capacity shift (reallocation of capacity to regions), or changing the balance between charters/own resources (volume adjustment), which is often the result of a structural shift in demand. Often the planners who are making these kinds of decisions are not the same planners responsible for operational planning. However there should be a strong interaction and alignment between the two levels, something that is missing in many transportation companies, resulting in ad hoc decisions that don't take into account

the long-term consequences. In our opinion, it is important that these complex tactical decisions are also supported with the right tools. As the planning process and planning decisions are very company specific, we often see APS technology used on this level, though in some situations a more standardized solution will do.

Strategic, long-term decisions are made at the top level in the organization and cover topics like:

network optimization, market coverage, and resource pools (charters versus own). These decisions have impact on every planning level and are based on both operational and tactical information and market analysis. These decisions have to be made periodically (depending on the dynamics in your industry). Typical tools are network optimization tools and spreadsheets.

Figure 6 summarizes the interaction between the planning levels.

Figure 6: Integrated planning levels

Process/timeline	Goals/characteristics
Strategic planning — Yearly/Monthly — 2011 / 2012	• Optimization of the network design (number of DC's /hubs, location of hubs, etc..) • Planning horizon is typically 2 to 5 years • Planning frequency is typically yearly, but is increasing due to increased business dynamics • Scenario / simulation based tools
Tactical planning — Weeks ahead — wk 11 / wk 12	• Fixed route planning (line hauls, milk runs) • Fleet size and fleet configuration analysis • What-if analysis for introducing hubs • Planning horizon is typically Months to a year ahead. The frequency of planning is typically every 2 to 4 Months. • Tools used are ranging from Excel to APS
Operational planning and execution — Days/hours ahead — 9/3 / 10/3 / 11/3	• Complete assignment of resources and carriers to meet order demands and client requirements • Heavy constraint- rule based optimisation • Real-time scheduling and alerting • Revision management

From this typical planning model it becomes clear that there should be interaction between the different planning levels. Each level should be incorporated in the company's processes, measured against the right KPIs, and supported with the proper tools. When levels are disregarded in the company's normal processes, then a changing environment, like the current economic crisis, will force the company to react without being able to predict the consequences. Instead, one would like to anticipate and control potential situational changes.

We often see that not all planning levels are incorporated in a company's processes or that these levels are not adequately designed (wrong or no KPIs), nor supported by the proper information (systems).

Conclusion

The economic crisis has had a great impact on the transportation industry, which is currently struggling with overcapacity. The question that has been proposed is how this sudden drop in volume affects planning.

By looking back over time we see a shift from a planning job that is relatively straightforward to one that is more and more complex. This shift has been described in terms of three variables: transport, company and economy. From the mid 90's onwards, the complexity on a company level has increased due to growing company size and geographical spread. Recently the planning complexity on the economy level has been made even more complex by the large and sudden shift from excessive demand to excessive capacity.

Because of the rapidly changing environment companies operate in, there is a need to periodically adjust tactical and strategic planning to anticipate changes in demand and to anticipate and avoid over or under capacity. Only when information exchange between the planning levels is properly organized will the results be satisfactory. 'Properly organizing' also means that planning on all different levels needs to be supported with the right tools. In many situations that means using solutions based upon Advanced Planning and Scheduling technology.

If companies establish the links between all the planning levels and then support these levels by the right information and KPIs, operational planning can deliver, even in these turbulent times, satisfactory results and, more importantly, higher profits!

How to Manage Your LSP

Hugo Haarman
The Netherlands

Outsourcing of logistics services

Outsourcing logistics services has become common practice. Outsourcing of transport execution is one of the most outsourced business processes. In Europe, domestic and international transportation is outsourced by respectively 92% and 89% of the shippers. Associated business processes such as transportation management are outsourced by almost 40%.

When companies outsource their logistics it is tempting for them to think that their 'logistics problems' are outsourced as well. Although some problems may become the Logistics Service Provider's (LSP) responsibility, shippers will still be responsible for managing their LSP. How to effectively manage your LSP is the subject of this article. Using real life examples, we will explain why managing your LSP is such a challenging task and provide you with tips and tricks to do this more effectively. Selecting an LSP with the right IT capabilities is key and a first step to developing a more beneficial LSP relationship.

What goes wrong in your LSP relationship?

The purpose of outsourcing your logistics is to reduce costs while improving service levels and flexibility. Is this really what has happened or could your LSP relationship be more beneficial?

We think it can. Every year Capgemini researches the experience of LSP users across the globe. The 2009 edition of the Third-Party Logistics Study shows that shippers are not completely satisfied with LSP performance and report areas where LSPs can improve. The most frequently reported problems are not realizing service levels, lack of continuous ongoing improvements and not realizing cost reductions (Figure 7).

Figure 7: Problems with LSPs

TOP Seven Continuing Problems	Percentages Reported By:	
	Shippers	3PLs
Lack of continuous, ongoing improvements and achievements in offerings	46%	19%
Service level commitments not realized	46%	31%
Information technology capabilities not sufficient	43%	31%
Cost reductions not realized	36%	34%
Lack of project management skills	35%	17%
Unsatisfactory transition during implementation stage	31%	25%
Lack of global capabilities	30%	21%

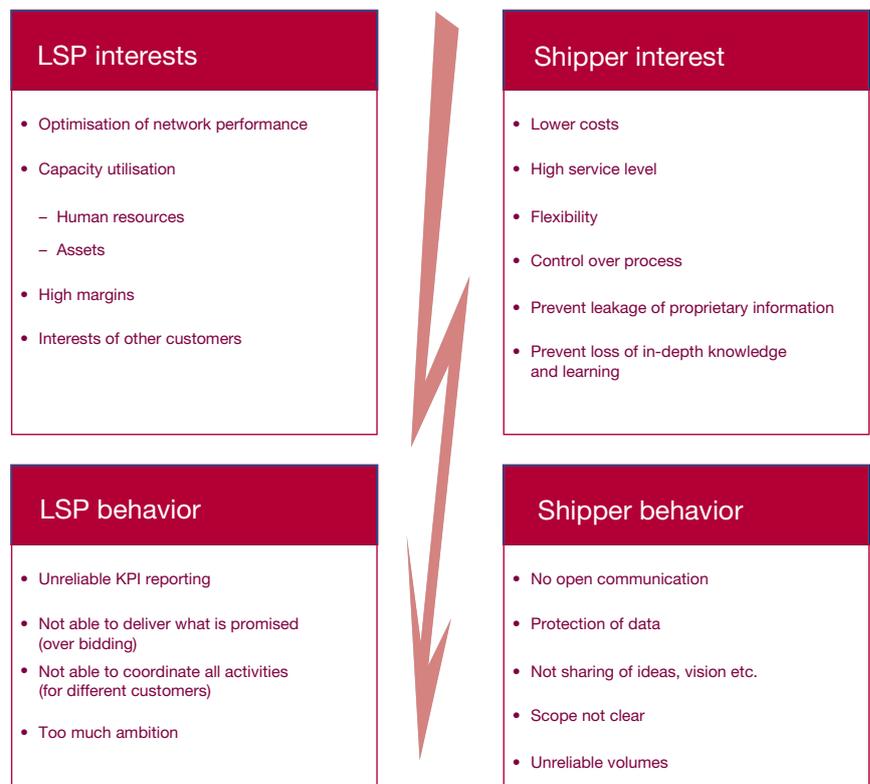Source: 2009 14th Annual Third-Party Logistics Study

Why LSP relationships cause headaches

Once you've signed your LSP contract, it usually gets filed away in a drawer. Then implementation starts and with it comes the first problems. Usually your LSP becomes less flexible and services aren't delivered as requested. This stressful implementation period eventually moves into a routine operations state. But you are left feeling as if you have lost control, your expectations have not been met, and performance improvements will be difficult to achieve or won't be achieved at all.

What causes these problems? We often see that once the contract is signed, behavior of both the shipper and the LSP change. Each party has its own goals and interests which result in conflicting and non-beneficial behavior (Figure 8).

Figure 8: Differences between LSP and shipper expectations and behaviors

LSP interests	Shipper interest

• Optimisation of network performance
 	
• Capacity utilisation
 	
  – Human resources
  – Assets
 	
• High margins
 	
• Interests of other customers
	• Lower costs
	
	• High service level
	
	• Flexibility
	
	• Control over process
	
	• Prevent leakage of proprietary information
	
	• Prevent loss of in-depth knowledge and learning

LSP behavior	Shipper behavior
• Unreliable KPI reporting • Not able to deliver what is promised (over bidding) • Not able to coordinate all activities (for different customers) • Too much ambition	• No open communication • Protection of data • Not sharing of ideas, vision etc. • Scope not clear • Unreliable volumes

- Not able to coordinate all activities (for different customers)
- Poor implementation of the contract due to limited project management capabilities and loss of focus
- Unreliable KPI reporting

The main interest of the shippers is lower costs while maintaining or improving service levels. Secondarily, they require flexibility, order status visibility, control, prevention of proprietary information leakage, and in-depth knowledge loss. These interests are reflected by the behavior of the shipper in an LSP relationship:

- Lack of open communication and protectiveness of data to ensure competitive advantages
- No sharing of ideas and vision on business and, supply chain developments and, more specifically, on requirements of the LSP contract
- Over specification, which limits the capabilities of the LSP to innovate or leverage best practices
- Sourcing logistics services without a clear outsourcing scope
- Providing unreliable volume forecasts to anticipate LSP behavior (e.g., forecasting higher volumes to guarantee capacity)

After looking at the different interests and resulting behaviors, it should come as no surprise that there is often dissatisfaction associated with an outsourcing project. The question is how to change your own and your counterpart's behavior so that these outsourcing problems can be solved and a more beneficial relationship can be created.

The main interests for an LSP are network optimization and capacity utilization of human resources and assets (warehouse/trucks) so that high profit margins can be achieved. They also need to keep an eye on other customers' interests. The LSP's main interests are reflected by their behavior in the relationship:

- Overpromising – a pitfall in every sourcing project – by the LSP who is eager to win the deal and so promises more than can be delivered

Creating a partnership improves performance

It takes two to tango, even in a logistics outsourcing relationship. Creating a closer relationship or strategic partnership with your LSP improves performance. You can't create a partnership by simply stating that your LSP is your partner from now on (it's been tried!). A true partnership should be defined as a tailor-made business relationship based on trust, openness, shared risks, and profits resulting in performance synergies.

Based on our experience we see the following characteristics in successful partnerships:

- A partnership should be based on shared interests and common goals. Working together to resolve bottlenecks can result in benefits for both parties. It strengthens the relationship and builds trust. Ideally this is combined with gain sharing. Gain sharing refers to sharing any profits that are achieved over the bottom-line targets. Over-performance of your LSP should be rewarded. Both parties have to invest and take risks (aka putting your money where your mouth is).
- Take time to develop your partnership and keep working on it over time. Trust between parties needs to be developed. This starts during the implementation phase and evolves through different stages of maturity. You can start with strict service-level agreements, jointly executed improvement projects, and a step-by step shift to a more strategic relationship.
- Focus on continuous improvements, not solely on costs. Key questions when selecting your partner are how will you cooperate once the contract is signed and does your LSP have proven abilities to execute continuous improvement programs. A way to collaborate on continuous improvements should be defined and be part of the entire sourcing process.
- Closely related to continuous improvement is developing a clear performance management process. This means creating an agreed upon cost process and KPI definition, cost, measurement, performance review, and follow-up.
- Define communication channels. Staff at every level of the two partnering organizations should be aligned, from CEOs to operational supervisors. It should be clear what issues are discussed at what level of the organization. At each level, partners should understand their counterpart's interests and drivers. Frequent review meetings and performance management processes can assist in achieving this. A true partnership approach consists of working in mixed teams to plan and manage your transport.
- Define conflict resolution and decision-making processes. You can't describe every possible event in a contract, but you can define how to handle them. Often conflicts escalate not because of the conflict itself, but because of the way it is handled (who is involved, what is reported and to whom, when is it reported, etc.).
- Share information about data (volume) uncertainty and stay tuned in on changing circumstances. Over time businesses change. Give your LSP the opportunity to react and develop contingency plans.
- Monitor and publish success. Track the delivered benefits by your LSP and joined projects. Success sells and feeds the partnership. It shows that your partner is acting as promised.

A successful LSP partnership needs IT support

A major reason for problems in an LSP relationship is the difference between shipper expectations and LSP IT capabilities. Problems with IT-based services have a direct impact on supply chain performance and costs and thus lead to distrust in a relationship. IT capabilities should be a key requirement when sourcing logistics services and selecting the right LSP.

The main IT requirements are:

• Tight and smooth integration of supply chain processes between LSP and shipper. Lack of integration can result in poor order visibility, shipment, and inventory status and inability to correctly invoice services. Tight and smooth integration is also an enabler to building trust between partners. Launching a steady state operation without supply chain performance issues is a first indicator of expected capabilities.

•KPI monitoring with an extensive management information dashboard. Logistics software should be able to support this by providing best practice KPIs. This helps the performance management process by focusing on continuous improvement. This capability is also required to communicate success and to indicate the bottlenecks in the supply chain.

•Provide end-to-end supply chain visibility. This enables both shippers and LSPs to react in a timely manner to events and unexpected circumstances.

•Ability to correctly invoice provided services and handle the complexity of different rate charts. Besides being an administrative burden, invoice checking and non-matching invoices feed distrust.

These criteria need to be an explicit element in your LSP selection process. Selecting the right partner with the right IT capabilities will not mean you can outsource all your logistics problems but it's a first step in the development of a relationship with the right LSP.
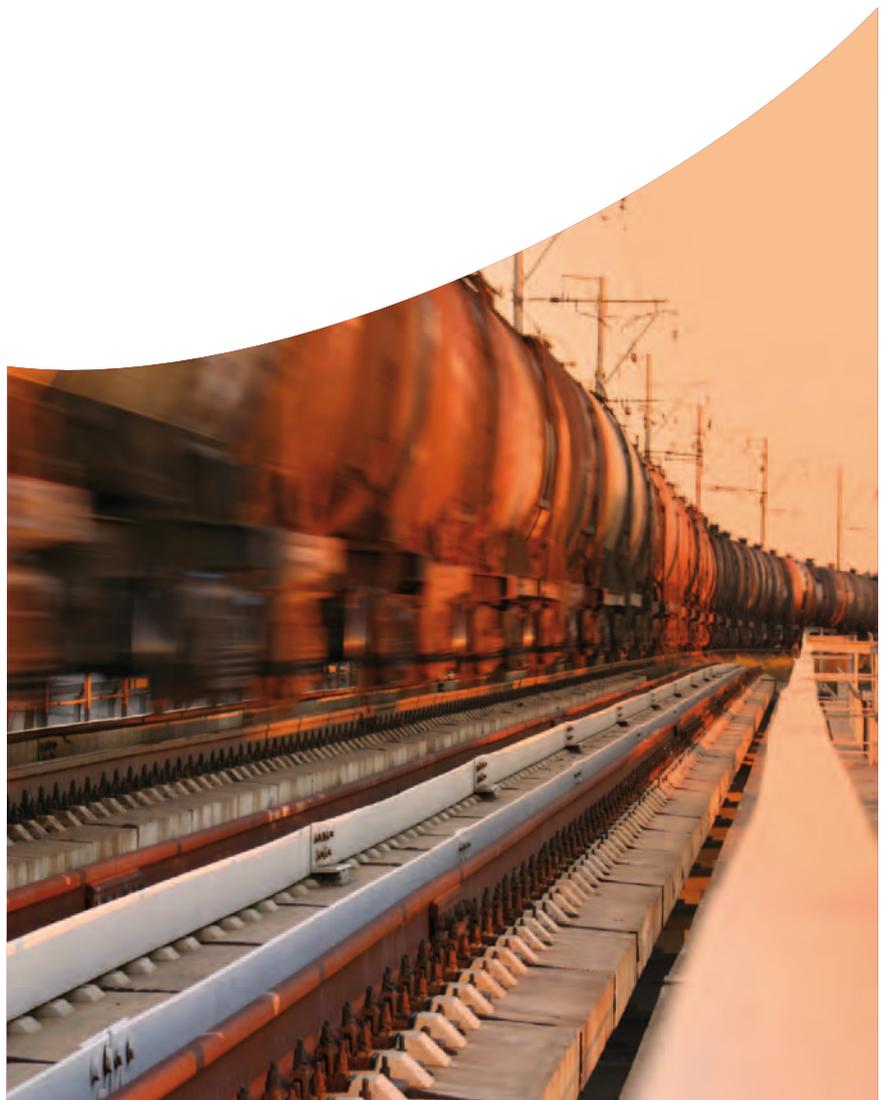
Reducing CO^2 by a Modal Shift to Rail Transportation

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Forecasts from the European Commission indicate further growth of the freight transport market by 2020, even as the transportation sector faces challenges to meet the environmental requirements being set by legislation and the market. Currently, the transport sector is responsible for a quarter of Europe's total CO^2 emissions. Companies have to start looking for more CO^2-friendly transportation alternatives. The number of companies working towards CO^2-neutral supply chains is rapidly growing. Shifting to rail transport brings direct and significant results. How can rail assist the transport sector as well as global society in their quest to reduce CO^2 emissions?
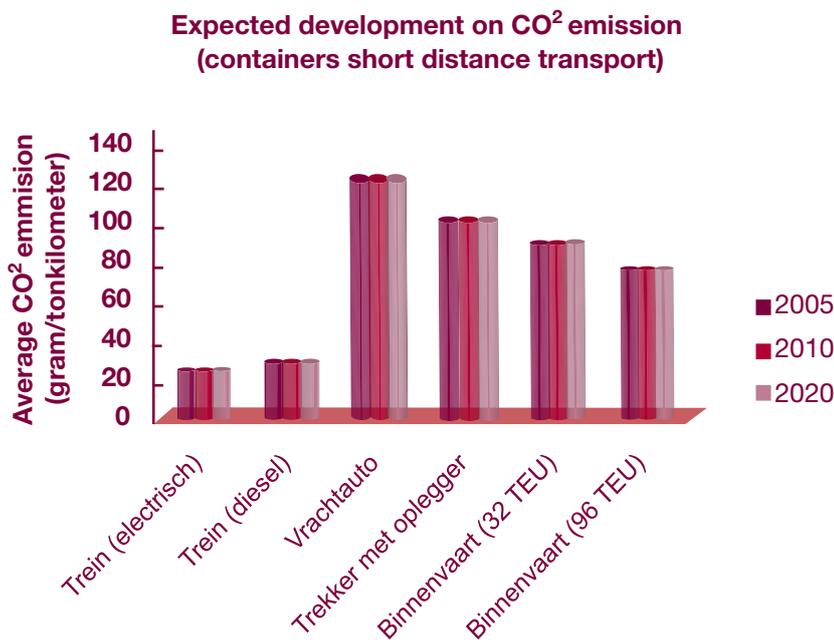
There are various reasons why the modal shift to rail has taken off at such a slow pace. First of all, the liberalization of the European Railway Network as the result of EU legislation in 2007 has been applied differently in every country. There is poor interconnectivity between the countries, both within the EU and surely between the EU and the non-EU countries. The countries which are most liberalized (UK, Germany, Sweden, the Netherlands) can offer higher modal share than those countries which are not yet sufficient liberalized. As a consequence, the whole European market is being held back. Secondly, the rail supply industry is not able to exploit economies of scale due to the lack of technical harmonization within their principal market – Europe. Thirdly, a lot of logistics hubs do not provide direct rail access, which results in

extra costs tied to the rail portion of total transport costs. The logistics landscape has to change in order for rail transport to fully expand.

A study conducted by CE Delft shows that rail offers a sustainable solution for the future (Figure 9). Railway transport is the mode of transport with the lowest CO^2 emissions. Compared to road transportation, rail emits three to five times less CO^2. Even considering technological developments in the different modes of transport over the next ten to twenty years, rail will continue to be the least polluting. Moreover, rail accounts for only 20 % of external costs (accidents, air, noise, climate, congestion) as compared to road. Every additional loaded freight train reduces road congestion. So it is safe to conclude that from both a socio-economic and an external cost perspective, rail is by far the most economical freight transport mode

The EU is planning to include the transport sector in the Emissions Trading Scheme by 2020. This will internalize external costs of CO^2 emission and thus change the environmental benefits of rail into financial benefits. Funds are available from the EU to support any initiatives that reduce CO^2 emissions. Additionally, the financial crisis has stimulated government spending on infrastructure. Including rail as part of your supply chain provides an excellent opportunity to gain strategic flexibility and bargaining power over transportation providers and to reduce your CO^2 emissions.

Figure 9: Expected development on CO² emisions

**Expected development on CO^2 emission
(containers short distance transport)**

Average CO^2 emmision (gram/tonkilometer)

Legend:
- 2005
- 2010
- 2020

Categories: Trein (electrisch), Trein (diesel), Vrachtauto, Trekker met oplegger, Binnenvaart (32 TEU), Binnenvaart (96 TEU)

Supply chain managers have to analyze if shipping goods by rail is a good option for their company. They need to develop a thorough understanding of the benefits/ weaknesses of rail. Rail's advantages are most obvious when shipping goods over longer distances (150 kilometer is a good standard), for large volumes, for heavy and standardized loads, and for non-perishable goods (as opposed to time-critical products). Rail is more independent of weather conditions and is generally considered a very reliable mode of transportation.

Over the past few years the railway logistics environment has been changing. More and more freight corridors are being created in Europe, allowing a continuous and swift flow of goods between Europe's main logistics and industrial centers. For lower volumes, the number of regularly combined transport services between main destinations is rapidly growing. Regarding tracking and tracing, the railway industry is slowly gaining ground on road transport. Container tracking gives much more control to the supply chain manager. Wagon tracking provides a second-best opportunity to monitor progress and manage delivery agreements.

For those companies that have built their supply chains entirely on road and waterways, the transition to rail will be a slow and complex process. Getting a connection to a rail network may be tedious and could take one to three years and require investments in handling facilities. Setting up processes and IT systems will require proper preparation. TMS solutions will need to foresee rail functionalities in order to show when rail is a better option.

It is said that modal shift is the most powerful enabler for CO² reduction in transport. If modal shift reduces CO² emissions then it makes sense that the higher the modal share is of rail transport the lower the CO² emission from transport. Rail transport can be considered as the most environmentally friendly mode of transport. In order to integrate rail into their supply chains, supply chain managers must carefully weigh the benefits of rail in today's landscape and take timely steps to set up their supply chain. The logistics manager will then reap the benefits and gain strategic and bargaining power while also reducing CO² emissions.

Driving Compliance and Efficiency with a Freight Control Tower

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Introduction

In response to the increasing focus on national security in a post-9/11 world, both the US Government and the EU nations have, over the last few years, passed more stringent trade laws, aimed at tightening the control of cross-border business transactions. Whilst these make perfect sense to the majority of citizens in these countries, the measures are set against the current backdrop of increasing financial insecurity across the world's markets, the seemingly never ending instability in commodities prices, and the looming specter of punitive carbon emission taxes. The consequences for the bottom lines of companies with a global reach have never been so acute.

Whilst the threat of punitive measures for those who find themselves non-compliant with these laws will send a shiver down the spines of many CEOs, there will be those who will treat these regulations as a real incentive to fix, once and for all, their cross-border supply-chain activities, firm up their core import and export processes and seek real competitive advantage through their approach to transportation management and global trade compliance.

Nowadays, there are scalable transportation management solutions that, in addition to the typical functionalities, have embedded in them capabilities for the management of global logistics operations. These systems are designed to give visibility of import and export processes; optimize and track international shipments; provide accurate landed-cost assessment; ensure accurate data management; and help avoid customs fines and penalties.

This article outlines the magnitude of the challenge ahead for companies operating internationally and examines different approaches to ensuring that the supply chain can not only cope in these conditions – but actually thrive.

External pressures: Terrorism and security requirements

The US has led the way in regulating the export and re-export of domestically-produced goods, technology, and software with the tightening of the Export Administration Regulations (EARs). In addition to the control of the movement of goods and services, EARs also seeks to control activities that can be performed by citizens and companies with countries of particular concern, which are classified into three categories:

- Generally Embargoed Countries (Iran, Cuba and Sudan)
- Export Banned Countries (Syria and North Korea)
- Highly Restricted Countries (Burma and Colombia)

The task of keeping on top of the current list of "countries non-grata" is a full-time job and any company that is affected by these measures will need to put some real thought

and resources into keeping abreast of global political machinations. One possible way forward would be to have in place, for example, streamlined business processes and technology solutions that monitor inbound and outbound shipments to determine whether there are restrictions on the country involved in cross-border logistics operations. If the application identifies a problem, it automatically takes appropriate actions and creates a record of the event, thereby enforcing compliance.

The most recent US initiative is the Customs – Trade Partnership Against Terrorism (C-TPAT), which was born with the clear intent of fortifying and expediting the process of importing goods into the US. Any company that chooses to join needs to comply with stringent US Customs requirements. As a result, compliant companies can benefit from a quicker import process with a much-reduced risk of incurring non-compliance penalties.

In Europe, the Authorized Economic Operator (AEO) system, which came into effect on 1st January 2008, is similar to C-TPAT. It gives businesses an opportunity to benefit from simplifications in security and safety by undertaking an accreditation program.

Internal pressures: Standardization, export & import documentations

As organizations expand across international borders, either through organic growth or acquisition, they may use different systems or processes and as a result, find them more complex to manage,

often resulting in: limited supply chain visibility; varied document management processes; and, ultimately, a non-compliant import/export process.

Common issues include:

- Non-standardization and proliferation of systems (process and technology), which can make it difficult to see what is happening, adversely affecting control of the order process.
- Document management, product categorization, customs valuation and duty calculation, and difficulty in working collaboratively with government authorities.

As a way forward, implementing a Freight Control Tower business model, underpinned by technology, is an effective way to reduce logistics costs and improve customer service in the current global economic climate.

Solution: Freight Control Towers

A Freight Control Tower (FCT) can be defined as a small organization focused on freight management strategy rather than execution. Its mission is to facilitate freight management of global movements. In practice, it can be implemented as a central organization - responsible for import and export - with local presence in regions, depending on the needs of the firm.

Typically, it involves outsourcing strategic freight management activities to a 4PL or managing it in-house by a center of excellence responsible for dealing with 4PLs.

The span of control for a typical FCT includes:

- Global trade compliance
- Freight negotiation and tariff agreement
- Procedural design and compliance

By defining procedures to ensure global trade compliance, an FCT can facilitate the implementation of global initiatives such as C-TPAT and AEO in order to allow companies to obtain a trusted business status and enjoy a quicker, low-cost customs clearance.

By owning the relationships with strategic freight providers, the FCT can be instrumental in supporting the procurement function when negotiating optimal Total Landed Cost (TLC) with freight forwarders, carriers and customs brokers. TLC can also be used as the basis for inter-company freight tariffs. The FCT is also able to effectively support major dispute resolution with customs and carriers by its central position with TMS-enabled visibility.

Finally, the FCT owns the design of new export-related procedures and communication to the network in order to adapt to changes in legislation and embrace new supporting systems.

Conclusion

Despite the challenges related to the ever-increasing requirements to comply with trading and security regulations (e.g., EARs, C-TPAT and AEO), complexity, and cost related to the extension of the supply chain internationally, there are also a number of cost reduction and revenue enhancements that come with a robust and integrated approach to Global Trade Management.

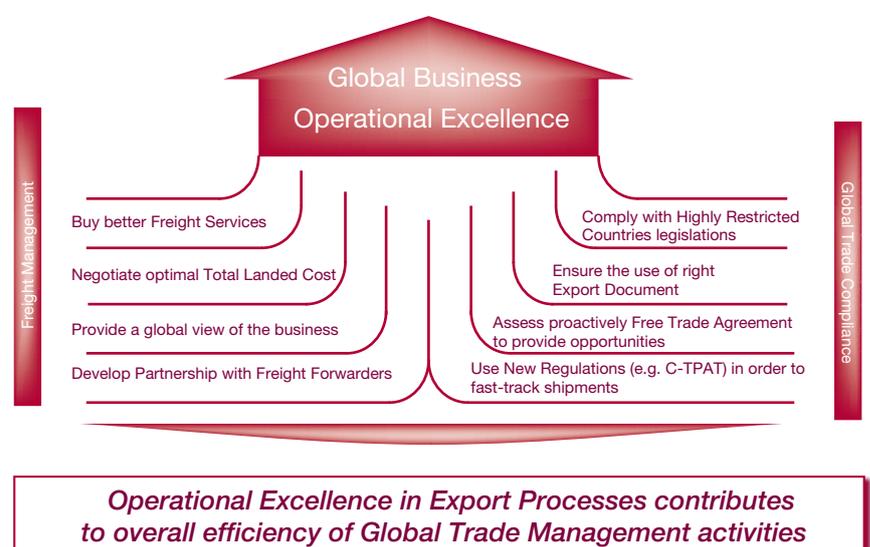**Figure 10: Benefits of successful Freight Control Tower implementation**

Global Business
Operational Excellence

Freight Management

- Buy better Freight Services
- Negotiate optimal Total Landed Cost
- Provide a global view of the business
- Develop Partnership with Freight Forwarders

Global Trade Compliance

- Comply with Highly Restricted Countries legislation
- Ensure the use of right Export Document
- Assess proactively Free Trade Agreement to provide opportunities
- Use New Regulations (e.g. C-TPAT) in order to fast-track shipments

Operational Excellence in Export Processes contributes to overall efficiency of Global Trade Management activities

Figure 11: Freight Control Tower functional footprint

Centralizing supply chain processes and introducing a Freight Control Tower is a proven way to ensure that companies can achieve competitive advantage.

As illustrated in Figure 10, a successful implementation of FCT can provide the following benefits:

- End-to-end ownership of the export and import activities
- Optimization of the use of Free Trade Agreements and other global compliance agreements in a way that minimizes cost
- Increased speed to market and reduced order-to-cash cycle, which improves response time and overall service
- Repeatable processes create dependable service, decreased risk of error, loss or damage caused by unmanaged players

- Less unnecessary handling, labor, and equipment, and overall logistics costs when managing networks smarter
- Complete online tracking, using freight forwarders' capabilities, for proactive management and greater control

For the FCT to deliver the above benefits, the centralization of supply chain processes should be supported by a Transportation Management System whose functional footprint is similar to the one shown in Figure 11:

- Freight Procurement – e.g., manage online rate/capacity bidding, and carrier contract management; integrates awarded contracts to planning/payment functions.
- Collaborative Capacity Management – e.g., align transportation forecasts with demand/supply; enables carrier collaboration.

- Freight Order Management - e.g., provide real-time/centralized tracking of entire inbound delivery process.
- Load Planning - e.g., multi-site, inbound, outbound and backhaul load planning; carrier selection/ load optimization.
- Shipment Execution - e.g., manage both the customer and carrier side of any move; provides multi-modal shipment execution capabilities.
- Event Management and Visibility – e.g., tracking of orders and shipments to the SKU level; initiate situation alerts based on customer specific business rules.
- Freight Payment, Audit and Customer Billing - e.g., perform audits on carrier freight bills and validate bills; freight bills can be processed electronically from the carrier, entered manually, or entered via the Web.
- Global Trade Compliance – e.g., import/export document screening; embargo checks; handle export licenses, securities, and restitution recipes.

Clearly, the FCT, enabled by the right technology solutions, is an approach that can help companies involved in cross-border transactions change the current economic downturn into an opportunity to gain a competitive advantage by reducing logistics costs, improving customer services, and positively impacting the company bottom-line.

The TMS Legacy Dilemma

Annemarie van Meesche
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Many companies are using home grown software to support their transport function, especially for areas like rating, operational planning and operational accounting that were difficult to support by standard off-the-shelf software. A lot of the legacy transport systems were first installed in the early eighties and have been extended since then.

The user community feels comfortable with this legacy software and the systems functionality is satisfactory since it was built completely to their specifications.

But from a technological point of view, legacy systems are fast approaching the end of their lifecycle. The effort involved to maintain the system and to keep it available and reliable is increasing and new technologies are hard to incorporate, since there are no standardized connections available to the old technology.

IT departments are faced with business departments that want to buy their own external IT services, since they can't get what they want within their own company.

Figure 12: IT functionality and technology matrix
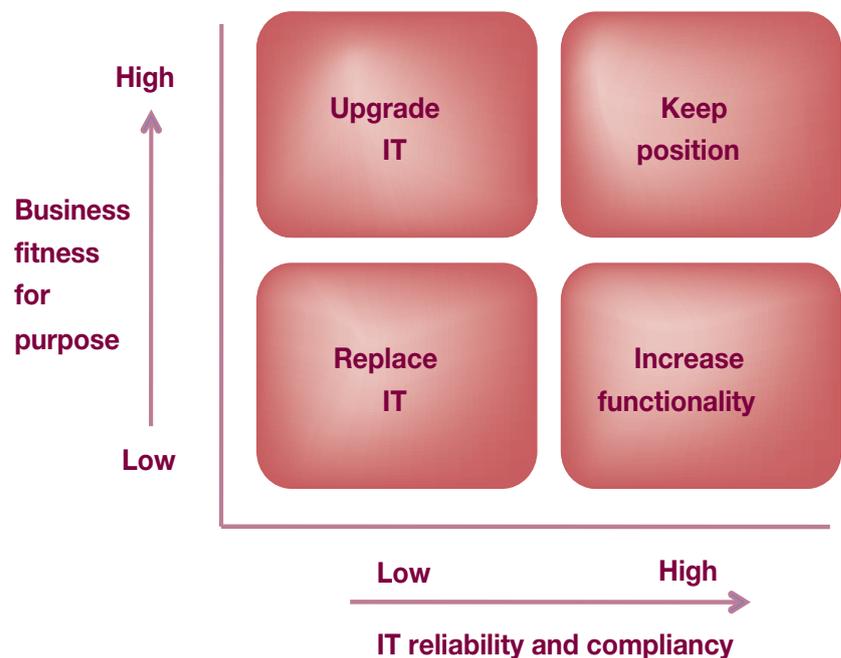
Let's take a closer look at the current situation before defining a route to the future.

In Figure 12, a newly delivered IT solution should be in the upper right quadrant. But immediately after go-live (or sometimes even during development) IT quality and business fitness will start to decrease. New releases and additional hardware and software help to slow down or even turn around this process.

Strategy for change

But what if your IT solution is no longer positioned in the upper right quadrant? The strategy to choose depends on the status of your current IT solution.

Scenario 1: Change IT solution

If both technology and functionality are under average, the best way forward is to replace the IT solution. This allows for a relatively fast turnaround, a single integrated architecture, and support for all current and future scenarios. The downsides are potentially high investment and disruption of ongoing business. Migration planning should be very thorough and focused on minimal impact on the business. Although it means going with a completely new IT solution, it could still be the best way to migrate.

Scenario 2: Upgrade IT

If technology is under average, but the functionality is still supporting your business, the way forward is to upgrade the IT.

The main question in this scenario is always: How do you build a business case for an IT upgrade if there is no business urgency, especially in times of economic downturn?

The first step is to assess the business continuity risks. At what point in time will IT cause business risks that are no longer acceptable? How long can your business do without order management or track and trace, for example? For an hour? For a day?

When business continuity is assessed and if it turns out to be at risk, the next phase is to define which components of the IT solution are critical, from a business perspective. These should be prioritized and may require custom built software.

In this scenario, migration planning should be focused on business priorities - which functions can you not afford to lose or are differentiators for the company's customers.

Scenario 3: Upgrade functionality

If functionality is under average but the technology of the IT solution is in good shape, impact is limited and a sound platform can handle the addition of services. In this scenario it is normally easiest to create a business case and compare IT investment with business benefits. Even when the capacity of the IT department is limited, a sound business case could justify the use of external resources.

Standardization versus differentiation

For all three scenarios the changes suggested should only be done if they add value to the business. Value, in this case, can be either cost reduction or additional revenue or both.

This implies that even an IT upgrade should be planned from a business perspective. Old technology is not by definition bad for business. So only if your IT causes business risk or is blocking additional revenue is it time for a change.

Business perspective, however, should always be related to the strategy of the company and the ultimate IT solution should be a fit for purpose, not only a fit for use.

When moving from home-grown software to standard services, it is not just a system change. It is a mind shift as well.

Part of this shift is the realization that there is no value in a unique IT system for a non-differentiating business process. Why have custom built invoice systems if your invoicing process is not something that distinguishes you from your competitor? Better to spend your scarce IT budget supporting business processes that make customers choose you or processes that support your internal excellence.

Response to the Crisis: Phased Introduction of a TMS

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In the current economic climate, companies must think even harder about what the best implementation strategy might be for a major investment, like a central Transportation Management System.

The constraints that apply when introducing a modern TMS solution have tightened. Now, in addition to an extremely complex and inflexible application landscape is the added burden of investment budgets being cut significantly, except where a business case can be made for a short-run fix. Changing your run budget to a change budget is the key. But you'll still need to deal with the increasing pressure to find rapid solutions to today's problems, such as cost transparency and elimination of inefficient sub-processes.

Logistics specialists are therefore looking for a migration strategy that not only reduces the business and technology risks, but also takes into account the current constraints in respect to investment budget and cash flow/ROI.

An incremental approach seems like the obvious solution to dealing with these constraints. Some of the benefits of a phased introduction would be:

• Flexible structuring of the necessary investment and the resulting cash flow
• Reduction of the risks associated with the deployment
• Gradual enablement of the staff
• A short-term ROI

Today's methods, tools, applications, and integration technology provide us with a new dimension of flexibility that is crucial for such a phased transition. But often when a company chooses an "off-the-shelf" (i.e., package-based) TMS solution, they lack the expertise and resources to ensure the necessary flexibility. We will illustrate how Capgemini's Service Oriented Package-Based Solutions (SOPS) methodology can help you to bridge this gap.

Situation

Let us assume that the decision to introduce a standardized TMS has been made. The functionality provided by a modern, package-based TMS is compelling. End-to-end order management, intelligent optimization of routing and resources, real-time control, and, not least of all, efficient and robust invoicing based on harmonized and centralized master data, are benefits that speak for themselves.

A solid transformation approach requires a well-defined target scenario. To construct this scenario, the following questions must be asked:

a) Business: Designing the target functional architecture
• What business capabilities do I require to realize my business strategy?
• How must I structure my target organization and process model to deliver these capabilities?
• Which of my business capabilities do I understand as commodities and which do I see as differentiating factors?
• In what functional areas do I expect or plan innovations or dynamic developments?
• What model should I apply to get this structuring and evaluation right?

b) Technical: Designing the target technical architecture

- What business capabilities should be supported by standard components? What capabilities should be supported by existing functionality and which by new, custom components?

- How do I decouple the business functionality from my legacy applications that are still needed (that can be re-use) intelligently, efficiently and with as little risk as possible?

- How do I design the integration of the components?

c) Migration Approach: Planning the incremental transformation

- How can I avoid a high-risk, big-bang introduction?

- How can I ensure that the investment for my legacy applications can be secured?

- Implementation roadmap: How do I optimize the sequence of business and technical transformation steps to gain leverage as quickly as possible?

- What internal and external dependencies apply? What impact do they have and how can I manage these?

- What restrictions does my investment budget impose (over time)?

Solution approach

Capgemini has developed a methodology that helps companies to get the "best of both worlds": Our Service Oriented Package-Based Solutions (SOPS) methodology enables the development of a flexible target architecture that brings together the benefits of tailored software with those of a standard software platform in a service-oriented manner. This allows IT together with business to support your operations precisely where it distinguishes you from the competition and provides cost-efficiency where standard procedures do apply.

In the next subchapters we outline the key steps for creating a sustainable transformation plan for a phased introduction of a TMS.

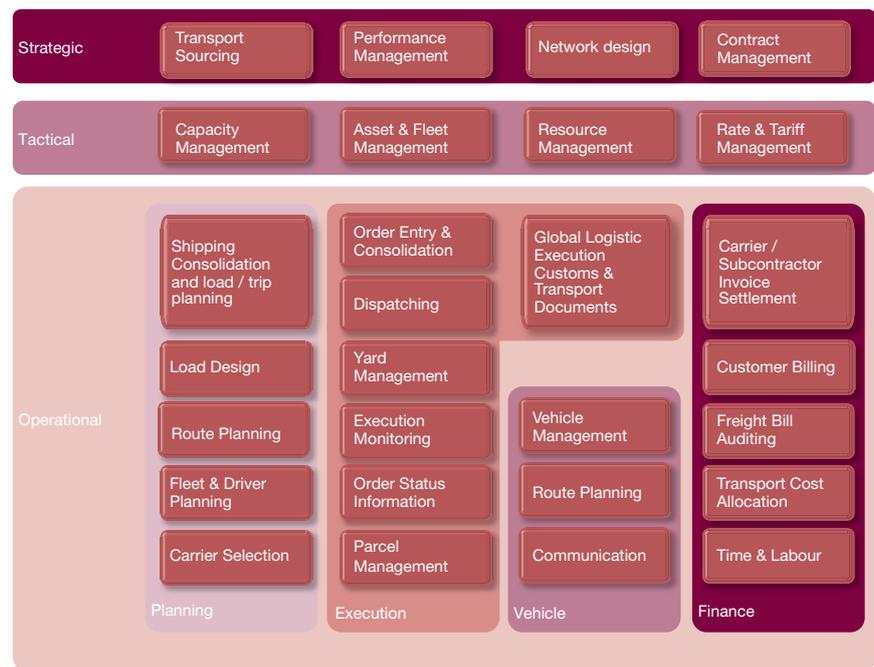### Designing the target functional architecture

The target application landscape will be constructed by combining specific building blocks. An intelligent design of these building blocks upfront provides us with the freedom to shape the ideal construction of the migration path later on.

The simplified approach to shaping these blocks can be outlined as follows:

- Define functionalities (so called "services") and the data objects they are using

- Cluster these services along functional domains and determine dependencies

- Decide which services to implement as standard "off the shelf" items (e.g., track and trace, customs handling) and which to build as individual custom elements (e.g., value-added services, exception handling)

Figure 13: TMS functional reference model and domains

Strategic	Transport Sourcing	Performance Management	Network design	Contract Management
Tactical	Capacity Management	Asset & Fleet Management	Resource Management	Rate & Tariff Management

Operational

Planning	Execution	Vehicle	Finance
Shipping Consolidation and load / trip planning	Order Entry & Consolidation	Global Logistic Execution Customs & Transport Documents	Carrier / Subcontractor Invoice Settlement
Load Design	Dispatching		Customer Billing
Route Planning	Yard Management	Vehicle Management	Freight Bill Auditing
Fleet & Driver Planning	Execution Monitoring	Route Planning	Transport Cost Allocation
Carrier Selection	Order Status Information	Communication	Time & Labour
	Parcel Management		

In order to achieve the best possible cost/benefit ratio when designing the functional architecture, it is recommended that you map the business processes using as many off-the-shelf standard services as possible. The number of customer individual services should be reduced to a minimum. The more business capabilities that can be supported by standard services the less budget will be required for individual service development and maintenance.

Another important factor to consider during this phase is the structure of the existing landscape. It needs to be segmented along the same principles as the target landscape so that you can already be considering options to transition functionalities towards the To-Be and optimize the target design accordingly.

Within the SOPS approach Capgemini uses industry specific reference models (process models, domain models) to accelerate the required categorization and mapping activities (Figure 13).

Designing the target technical architecture

A standard platform must meet certain requirements to allow the SOPS approach to be implemented. While a properly designed functional architecture is crucial for the solution, considerable weight must be given to the integration platform as well. The software platform must support the Service Oriented Architecture paradigm and therefore support a comprehensive approach for integration:

• Enable a flexible combination of standard services and tailored services

• Integrate data from other systems and components

• Be open for the future integration of additional services (e.g., new components, third-party products)

While vendors of packaged TMS solutions, like SAP or Oracle, do bring their own (preferred) integration platform, alternative options are available on the market.

Planning the incremental transformation

The objective of transformation planning is to shape and define the ideal transformation path, taking into account the individual constraints that have been identified.

Once the target business and technical architecture has been designed, the next step is to identify work packages that can deliver the desired outcome. The search for the ideal combination of these work packages is a complex exercise and has many influencing factors, like the as-is landscape, the target operating model of the organization, your strategic rollout approach, as well as the underlying business case and investment constraints you are facing (Figure 14).

When considering the best options to use, there are certain domain models that can be applied. In addition to time line, these usually are the organizational dimensions, the functional domains and the geographical coverage.

Figure 14: Key influencing factors for the TMS transformation planning
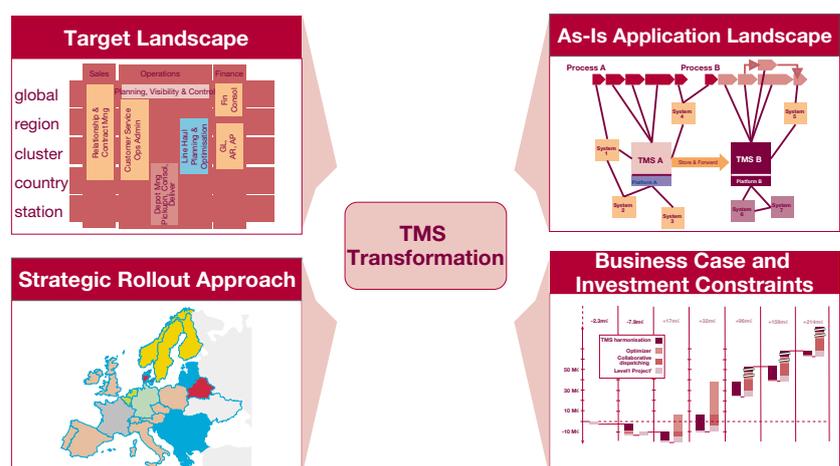
Organizational

The core processes or selected products of a company can be addressed one after another depending on the benefits and risks associated with them. An example for an air and ocean LSP might be to arrange their processes in ascending order of complexity, i.e:

- Air freight import
- Air freight export
- Sea freight import
- Sea freight export

A further level of segmentation could be introduced by considering product and services offerings. For example, commodity products could be targeted first, followed by more complex products in a subsequent phase.

Functional domains

The functional domains of TMS offer another degree of flexibility. In this context, it is possible to distinguish between core functionality and supporting functionality.

For instance, your TMS could initially be implemented for purchase order management purposes only. The transportation core functions would then be phased in at a later stage. A typical phased approach could look as follows:

- Phase 1: Master Data cleansing and Purchase Order Management functionality
- Phase 2: Resource Management
- Phase 3: Change Management, Subcontractor Management
- Phase 4: Core TMS functionality

Geographical coverage

Geographical coverage offers another option for giving the structure some flexibility. When selecting the target locations (regions, countries, sites), it is necessary to look for the right balance between risk mitigation, leverage of business benefits, and gaining rollout and transformation momentum within the company.

Optimizing the financial investment flow

To ensure that you can evaluate your migration options properly you need to determine the business benefits as well as the cost of implementation and migration on a work package level.

Varying the migration path within the given constraints allows you to consider individual options with respect to the required investment as well as the resulting business benefits over time. This allows you to achieve a cash-flow structure that meets the company's individual constraints.

Conclusion

Logistics specialists are faced with the problem of modernizing an inflexible application landscape while under considerable budget constraints.

Capgemini can support you with state-of-the-art methodology and long-term experience to define the right transformation approach for a phased introduction of a TMS by:

Maximizing the use of package-based sector-specific solutions and combining these with individual elements where required to create a cost-optimized solution

Using robust architecture and application components to ensure sustainability, flexibility, and a significantly reduced time to market when integrating future requirements.

Developing a thorough design that will ensure high flexibility in shaping the migration path and thus help in optimizing the investment flow/ROI to meet the company's requirements.

Part II : Transportation Management Systems

Profile of the Transportation Management Systems Market

Research approach

The data represented in the tables of this chapter were collected from written questionnaires sent to vendors. In the accompanying text Capgemini has provided comments and opinions, but the data in the tables is as provided by the participating vendors.

Participating vendors

The TMS vendor market is a vast one. It is also very diverse. That means that any report that provides an overview of the market will be incomplete and, due to the fast pace of changes, slightly outdated the moment it gets published.

Not discouraged by these challenges, we have put together what we consider a good overview of vendors in Europe and North America.

Traditionally, many vendors in the market have grown within their country of origin to become an important national player. Some have since grown into a player on a regional or global scale. These have been included in our overview along with smaller national and regional players, since they can also be an attractive choice, depending on the needs of the company looking for a TMS. Compared to other publications about the TMS market that tend to have a North American bias, a special effort was made to include a more representative sampling of European vendors.

In total, 28 vendors participated in the survey: from Europe (Austria, Belgium, France, Germany, Italy, The Netherlands, United Kingdom), Asia (India) and North America (USA). They are listed in Figure 15.

Transport Management Systems product types

It is difficult to use clearly defined terminology when discussing supply chain management software. The same word can mean very different things to different people. Vendors use words to describe their products in a way that will make them look all encompassing, integrated and state-of-the-art. This makes it difficult for potential buyers to determine what the real functionality of a product is. Our aim with this report is to establish some guidelines and gather some insights into this far-from-transparent market.

Knowing that no classification system can be free from interpretation and useful criteria will not be mutually exclusive, we think it is still possible to divide the market into meaningful categories or product types.

A way to start is to understand for which target group a TMS product was originally developed. Main categories here are carriers, logistics service providers (LSPs), and shippers. An important element of this distinction is the role the company plays in the supply chain, the activities performed internally, and those outsourced. The latter typically determines to what extent the optimization of own assets (for example, trucks) is relevant functionality.

Figure 15: Vendor, relevant TMS product, home market		
Vendor	Product	Home market
Transport Management Systems		
Centric Logistic Solutions	Plan&Go!	The Netherlands, Europe
ESPRITEC S.R.L.	GESPE TMS	Italy
Four Soft Limited	4S eTrans / 4S eTrans SME / 4S Infotips / 4S VisiLog	Asia Pacific
GreenCat	Cat4RoadHaulier / RoadRunner+	Benelux
i2 Technologies	i2 Transportation Bid Collaboration / i2 Transportation Managment Solution / i2 Supply Chain Visibility	Global
IBM Sterling Commerce	IBM Sterling Transportation Management System	North America
Imtech ICT Austria GmbH	cargoNET, LBASE TMS	Austria, France, Germany, Switzerland, UK
Informore	LogicLogistics L2 for Shippers	Europe
INTRIS Group	TRIS Logistics Application Suite / TRIS TMS	Belgium, The Netherlands
JDA Software Group	JDA Fleet Management / JDA Transportation Planning / JDA Shipment Execution	North America
Kewill	Kewill Forwarding / Kewill Logistics / Kewill Service Logistics	Europe
MP Objects	MPO Supply Chain Suite	Benelux
Oracle Nederland	Oracle Transportation Management (OTM)	Global
Precision Software - a division of QAD Inc.	PRECISION Global Trade Management / PRECISION Trade Compliance / PRECISION Transportation Management / QAD Supply Chain Portal	North America
Qurius	Q-TMS	The Netherlands
RedPrairie	Collaboration Portal / Fleet / Parcel / Transportation Manager	Global
SAP AG	SAP Transportation Management	Global
ShipitSmarter.com	ShipitSmarter.com / TrackitSmarter	The Netherlands, Germany
Tesi Spa	Net Mover	Italy
Transics	TAS / TX-CONNECT / TX-SOCIAL / TX-VISIO	Europe
Transplace	Transplace Transportation Management System	North America
Transporeon	TISYS	Germany
Wexlog Technologies	WexVS for Transportation and Logistics	Europe
Young & Partners	NaviTrans Forwarding / NaviTrans Transport	Belgium
Transport Planning Systems		
ORTEC	ORTEC Shortrec / ORTEC Loaddesigner / ORTEC Transport & Distribution (OTD)	Europe
PTV Nederland BV	INTERTOUR	Benelux
Quintiq	Quintiq	Europe
Roadnet Technologies Inc.	MobileCast / Roadnet / Territory Planner	North America

A TMS made for carriers typically is very focused on the planning and optimization of assets. In a lot of cases, this is completely centered on trucks, but some of the solutions do have multimodal capabilities or a focus on ship planning. Business administration is part of this kind of carrier TMS solution, as is communication with assets from a central control room/operation center. Products in this category are sometimes also referred to as Fleet Management Solutions. Examples of carrier-focused solutions included in this report are Centric's "Plan & Go", Transflow's "LBASE TMS", Young & Partners "NaviTrans", and GreenCat's "Cat4RoadHaulier".

Routing and Scheduling and Advanced Planning and Scheduling (APS) are also part of this functionality. Providers that specialize in APS often have advanced optimization capabilities that go beyond trip and route planning to things like load optimization and pallet building. Examples of this type of vendor included in this report are ORTEC, Quintiq and PTV.

In our classification system, logistics service providers are defined as parties that have an operation that is (partly) non-asset based (similar to most shippers). In these situations it becomes more important that a TMS provides capabilities to procure/ source the actual transportation and has options to audit and settle transport invoices. An additional capacity that an LSP could be interested in (different from a shipper) is support for the process of handling RFPs and reporting changes in carrier pricing to their clients. Both shippers and LSPs are interested in

having performance management as one of the more advanced components of their TMS. It is also likely that LSPs and shippers will have some own assets, in addition to their outsourced components. In cases like this, the functionality of the carrier TMS discussed above is relevant. TMS vendors sometimes use niche products as a partner product in their solution, while others choose to develop this functionality themselves as a fully integrated part of their TMS suite.

Examples of LSPs/shipper solution vendors in this report are Oracle, SAP, Red Prairie, Informore, and MP Objects. Examples of re-using niche solutions as part of a more comprehensive solution are: the use of ORTEC components as part of SAP, Informore, and GreenCat's solutions, and the wide use of PTV's Intertour route planning capabilities in several of the European TMS solutions.

There are many more ways to classify products based on functionality. The more comprehensive TMS solutions might include Global Trade Management or Global Logistics Execution, which support custom compliance and import/export activities. For this report vendors that focus specifically on this niche (like Tradebeam and Management Dynamics) have not been included, but the functionality is part of the inventory for the TMS products listed.

Some vendors started with multi-vendor parcel manifesting and management and have grown from that into wider coverage. Examples include ShipItSmarter and Precision Software. Sometimes vendors acquire former competitors or specific point solutions and as a result come up with different ways of aligning or integrating products. A particularly relevant example of this is Oracle, when it acquired G-Log (and several other companies, like JD Edwards and Peoplesoft). Also, JDA acquired Manugistics and recently expanded further with their acquisition of i2 Technologies, which gives them planning and scheduling and visibility capabilities beyond their traditional retail-focused solution, Freightmatrix.

Connectivity and visibility are important elements of a TMS solution. Therefore it is no surprise that some vendors have a background in this area. Examples are vendors like Sterling Commerce, Transporeon and Descartes. They provide applications that add value services to their network. Offering connectivity between shippers and a network of logistics service providers is becoming a more common TMS provider offering. We'll discuss this further in the section on extended collaboration.

Next, let's see what our TMS vendors had to say about their geographic reach and the size of their organization.

Figure 16: Number of implementations									
Vendor	Product	Home market	Total Home Market	Total Europe	Total North America	Total Central & South America	Total Asia / Pacific	Total Africa	Total (worldwide)
Transport Management Systems									
Centric Logistic Solutions	Locus In&Out / Plan&Go!	The Netherlands, Europe	100%	100%					180
ESPRITEC S.R.L.	GESPE TMS	Italy							140
Four Soft Limited	4S eTrans / 4S eTrans SME / 4S Infotips / 4S VisiLog	Asia Pacific							400+
GreenCat	Cat4RoadHaulier / RoadRunner+	Benelux	77%	100%					650
i2 Technologies	i2 Transportation Bid Collaboration / i2 Transportation Managment Solution / i2 Supply Chain Visibility	Global	100%	16%	67%	5%	10%	2%	190
IBM Sterling Commerce	IBM Sterling Transportation Management System	North America	100%		100%				130
Imtech ICT Austria GmbH	cargoNET, LBASE TMS	Austria, France, Germany, Switzerland, UK	84%	13%	1%	1%	1%		169
Informore	LogicLogistics L2	Europe	95%	95%	5%				«>250 shippers > 1000 transportation companies»
INTRIS Group	TRIS Logistics Application Suite / TRIS TMS	Belgium, Netherlands	100%	100%					31
JDA Software Group	JDA Fleet Management / JDA Transportation Planning / JDA Shipment Execution	North America	75%	13%	75%	3%	5%	1%	230
Kewill	Kewill Forwarding / Kewill Logistics / Kewill Service Logistics	Europe	92%	92%	2%		3%		143
MP Objects	MPO Supply Chain Suite	Benelux	50%	100%					12
Oracle Nederland	Oracle Transportation Management (OTM)	Global							150
Precision Software - a division of QAD Inc.	PRECISION Global Trade Management / PRECISION Trade Compliance / PRECISION Transportation Management / QAD Supply Chain Portal	North America	42%	49%	42%	2%	7%		247
Qurius	Q-TMS	The Netherlands		100%					190
RedPrairie	Collaboration Portal / Fleet / Parcel / Transportation Manager	Global	100%	2%	98%				150
SAP AG	SAP Transportation Management	Global							Not provided
ShipitSmarter.com	ShipitSmarter.com / TrackitSmarter	The Netherlands, Germany	70%	70%	15%		15%		347
Tesi Spa	Net Mover	Italy	81%	18%			1%		106
Transics	TAS / TX-CONNECT / TX-SOCIAL / TX-VISIO	Europe		100%					1000
Transplace	Transplace Transportation Management System	North America	45%	3%	45%		52%		31
Transporeon	TISYS	Germany		100%					350
Wexlog Technologies	WexVS for Transportation and Logistics	Europe	100%	100%					10
Young & Partners	NaviTrans Forwarding / NaviTrans Transport	Belgium	74%	100%					202
Transport Planning Systems									
ORTEC	ORTEC Transport & Distribution / ORTEC Shortrec / ORTEC Loaddesigner	Europe	36%	81%	9%	0%	1%	1%	476
PTV Nederland BV	INTERTOUR	Benelux	34%	96%	2%				1350
Quintiq	Quintiq	Europe	95%	95%	2%	1%	2%		455
Roadnet Technologies Inc.	MobileCast / Roadnet / Territory Planner	North America	59%	4%	67%	3%	1%	0%	3326

Classification by geographies served

Historically, the market for transportation software has been dominated by country-specific vendors that are key players in their country. This is changing. Transportation software is increasingly provided by multi-national enterprises, selling software across large continental regions, supported by professional implementation services in multiple countries.

Vendors were asked to indicate what they considered their home market and then to indicate how many implementations were done in their home market, with a further breakdown by continent. The results are captured in Figure 16.

Size of the vendors

The number of implementations and the geographical spread, as presented in the previous section, are good indicators of vendor size.

Another indicator is the number of employees. Some of the survey participants are solely focused on transportation software, whereas others (such as the ERP vendors) offer additional products and services. While a large portfolio and an associated large number of employees could be used as an indication of financial robustness,

it is not necessarily meaningful in determining expertise relevant to the TMS market. Similar to the number of implementations section, vendors were asked to list the number of employees by home market, and then broken down by Europe, North America, Central & South America, Asia/Pacific and Africa. The results are presented in Figure 17.

The TMS market is still modest in size when it is expressed in financial terms. The turnover of vendors in the transport software market is typically between 10 and 50 million Euro per year. Local players and new entries in the market have a lower turnover. The larger software firms and the big software houses certainly have higher revenues but the percentage of their total turnover generated by transportation management software is generally not ascertainable.

Of the vendors that disclosed information about their turnover and profit (> 20), all companies but one declared that they made a profit. This is in line with the findings from our last study (2007), where it was concluded that the transportation software market has become more profitable. Nevertheless, the economic downturn will, without a doubt, have its market impact here as well. A study by Capgemini identified that 30% of the initially planned TMS projects for 2009 were likely to be postponed.

Figure 17: Number of employees

Vendor	Product	Home Market	Europe	North American	Central & South American	Asia / Pacific	Africa	Total (worldwide)
Transport Management Systems								
Centric Logistic Solutions	Locus In&Out / Plan&Go!	8000	8000	1000				9000
ESPRITEC S.R.L.	GESPE TMS							10
Four Soft Limited	4S eTrans / 4S eTrans SME / 4S Infotips / 4S VisiLog	573	109	19		6		707
GreenCat	Cat4RoadHaulier / RoadRunner+	150	230					230
i2 Technologies	i2 Transportation Bid Collaboration / i2 Transportation Managment Solution / i2 Supply Chain Visibility	1200	150	450		150	450	1200
IBM Sterling Commerce	IBM Sterling Transportation Management System							2700
Imtech ICT Austria GmbH	cargoNET, LBASE TMS	1700	1300					3000
informore	LogicLogistics L2							Not provided
INTRIS Group	TRIS Logistics Application Suite / TRIS TMS	55	65					65
JDA Software Group	JDA Fleet Management / JDA Transportation Planning / JDA Shipment Execution	942	193	942	17	565		1717
Kewill	Kewill Forwarding / Kewill Logistics / Kewill Service Logistics	320	320	220		110		650
MP Objects	MPO Supply Chain Suite	14	14	1				15
Oracle Nederland	Oracle Transportation Management (OTM)							75000
Precision Software, a division of QAD Inc.	PRECISION Global Trade Management / PRECISION Trade Compliance / PRECISION Transportation Management / QAD Supply Chain Portal							1350
Qurius	Q-TMS		1150					1150
RedPrairie	Collaboration Portal / Fleet / Parcel / Transportation Manager	1600	430	1040		80		1600
SAP AG	SAP Transportation Management							51536
ShipitSmarter.com	ShipitSmarter.com / TrackitSmarter		18			4		22
Tesi Spa	Net Mover	144						177
Transics	TAS / TX-CONNECT / TX-SOCIAL / TX-VISIO		250					250
Transplace	Transplace Transportation Management System	520		520		1		521
Transporeon	TISYS	80	135					135
Wexlog Technologies	WexVS for Transportation and Logistics	20	20					20
Young & Partners	NaviTrans Forwarding / NaviTrans Transport	48	48					48
Transport Planning Systems								
ORTEC	ORTEC Transport & Distribution / ORTEC Shortrec / ORTEC Loaddesigner		670	30				700
PTV Nederland BV	INTERTOUR	40	620	55	10	25		750
Quintiq	Quintiq	145	145	15		90		250
Roadnet Technologies Inc.	MobileCast / Roadnet / Territory Planner	150		150	1	4		155

Mergers and acquisitions

Consolidation in the market for transportation software started a decade ago and in previous editions of this report we listed mergers and acquisitions that took place in the preceding period. Since our last edition in 2007, the following acquisitions have taken place:

- JDA Software completed the acquisition of i2 Technologies in January 2010. As the products are still marketed separate, the data for JDA and i2 have not been integrated in the tables.
- Kewill acquired Innovate-IT, a provider of service logistics solutions in 2007. In June 2010 Kewill announced the acquisition of Minihouse, a supplier of customs software.

- ORTEC acquired Brightrivers, Inovia and Team Support Systems in 2008. In 2010 BlueKaizen in France was bought.
- Qurius acquired Cabus, Ibitec, Wilhelm & Zeller and Cedilla in 2007. In June 2010 Qurius acquired Evidanza, a business Intelligence technology company based in Germany.
- RedPrairie acquired StorePerform and GEOCOMtms in 2007
- SAP acquired Business Objects in 2007 and became a shareholder in Crossgate "automated business exchange" in October 2008
- Sterling Commerce acquired Comergent in January 2007. In May 2010 IBM bought Sterling Commerce.
- Transics acquired Delta Industry Service (DIS) in 2007
- Transflow/ILS ICT group was acquired by Imtech ICT in the third quarter of 2008
- Transplace was bought by New York's CI Capital Partners LLC in December 2009

It is expected that mergers and acquisitions will continue. In particular, we see this as a way for vendors to offer different services to buyers. An example is the already increasing number of acquisitions where application providers start partnerships or take a share in providers of business to business (B2B) integration platforms. Oracle (in partnership with e2Open) and SAP (investment in Crossgate) have already taken the lead in this important development.
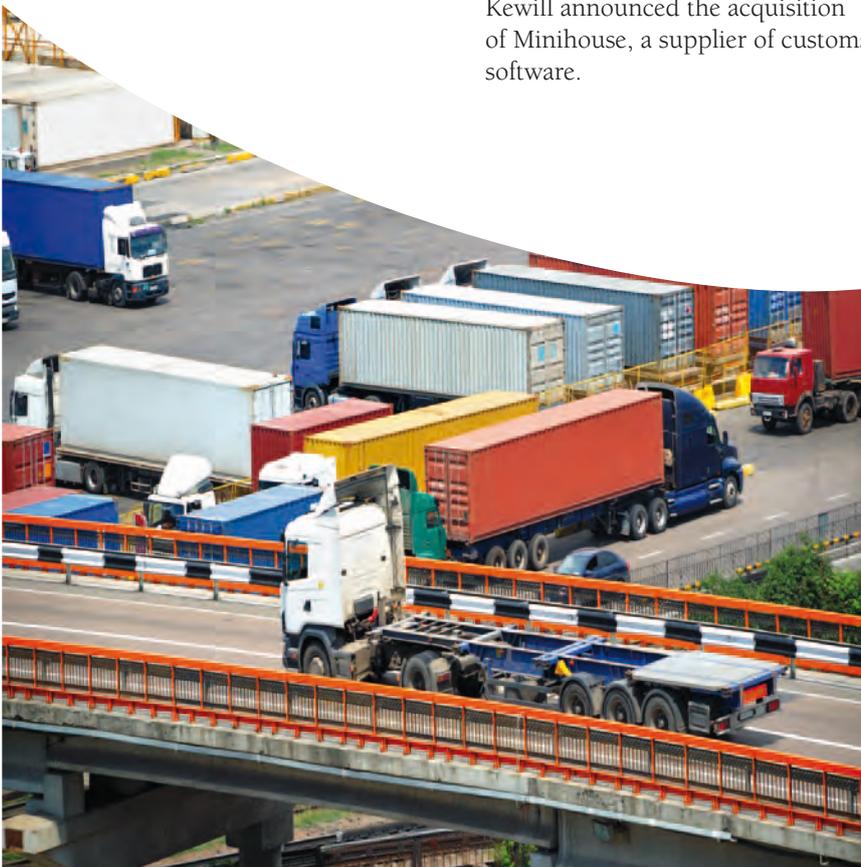
Figure 18: Most important market trends (mentioned at least two times)	
Trend	Number of times mentioned
Consolidation of competitors	23
Threat of market players with full range packages (ERP/CRM)	18
Threat of market players with niche packages (APS/WMS)	12
Threat of new entrants	10

Figure 19: Most important vendors (mentioned more than two times by their competitors)	
Vendor name	Number of times mentioned as competitor
Oracle	12
i2 Technologies	7
SAP	7
Kewill	6
Four Soft	3
GreenCat	3
LeanLogistics	3
Manhattan Associates	3
Transics	3

Figure 20: Implementations per industry	
Industry Type	Percentage
Food & Beverage	12%
Other Industries	6%
Industrial Products	3%
Consumer Electronics	2%
Automotive	1%
Life Science	1%
Engineering & Construction	1%
Chemicals	1%
Fashion	1%
Logistics - Carrier (land)	61%
Logistics - Third Party Logistics Provider	6%
Logistics - Freight Forwarder	4%
Logistics - Express / Courier Services	1%
Logistics - Carrier (sea)	~ 0%
Logistics - Postal	~ 0%
Logistics - Carrier (air)	~ 0%
Total	100%

Most important market developments

Participating vendors were asked what they saw as the most significant development in the TMS market. The category options were changes from within, by consolidation of the current players or from without, by entrance of new players.

The results are very similar to the 2007 report. It confirms that suppliers recognize consolidation as the most important development. It also reflects the importance of ERP vendors as they continue to extend their offers with mature transportation modules.

The threat of new entrants is perceived as the least important market trend (Figure 18).

Competitors/dominant players in the market

Vendors were asked who they considered their major competitors. Oracle, i2 Technologies, SAP and Kewill were mentioned most often as main players in the global market. There is a gap between these top 4 and the other players that were mentioned (Figure 19).

Industries served

Transportation is a considerable part of supply chain management costs. For product-oriented companies the costs are typically between 5 to 10% of revenue. For companies that provide logistics services, transportation is quite often part of their core business. Part of the survey investigated to which industries the vendors sell their TMS products. It does not come as a surprise that

logistics service providers are by far the largest group of users (for the purposes of this study, this does include the asset-based companies). Road transportation providers are the heaviest users of TMS products. From the industry segments, Food & Beverage, which includes major players in retail and fast moving consumer goods, have purchased the most TMS solutions.

Figure 20 shows the percentage of TMS implementations per industry.

Vendors that sell almost exclusively to the logistics industry are: Centric, Transflow, Young & Partners, Espiritec, Foursoft, GreenCat, Intris and Wexlog. Although also selling to other industries, Kewill and ShipitSmarter have the vast majority of their implementations in the logistics industry.

Vendors that have 50% or more of their customers in the manufacturing sector are:

• Transporeon   80%
• Tesi Spa   67%
• Sterling Commerce   63%
• JDA Software Group   50%

Vendors with a high percentage of their implementations in the retail industry are:

• JDA Software Group   40%
• Sterling Commerce   22%
• PTV Nederland BV   22%
• RedPrairie   15%

Vendor with a high percentage of their implementations in the wholesale industry are:

• Roadnet Technologies Inc.   94%
• Transporeon   16%
• PTV Nederland BV   15%

PTV is the only vendor that indicates that they have an equal spread of implementations over the different industry sectors.

Most important product developments

Vendors were asked what they see as the most important product developments in the TMS market.

Integration, web services and architecture were the areas mentioned most often. Integration with mobile solutions and on-board computers is also still frequently mentioned (Figure 21).

It is remarkable that while RFID/Tracking and tracing was in the top 4 in the 2007 survey, it was only mentioned three times in the current survey!

Supply chain integration

Transportation processes are best managed as part of an integrated supply chain and this points to an important trend to integrate transportation management software with the rest of the IT landscape.

Figure 21: Most important product development (mentioned at least two times)	
Product development	Number of times mentioned
Supply Chain integration	15
Software as a (web)service	14
Service Oriented Architecture (SOA)	14
Mobile solutions and board computers	13
Integration with ERP/CRM/WMS/APS software packages	8
Custom made integration with other packages	5
Regulatory and environmental aspects and concern	4
Carbon Footprint calculations	4
RFID / Tracking and tracing	3

Figure 22: Technical run options	
Technical run option	Number of times mentioned
Dedicated	22
SaaS	11
Both	23

When supplying solutions this can be done by:

• Extending ERP systems (e.g. Oracle, SAP) with transportation modules

• Integrating existing systems with ERP

• Offering standard interfaces to ERP: multiple vendors offer standard interfaces to ERP systems

• Using SOA in developing transportation software

• Integrating TMS with WMS

• Integrating different transport-related components like planning, execution management and global trade compliance

Collaboration in the industry will increase

Collaboration within industries will increase over the next few years as companies seek ways to not only lower costs but also reduce CO_2 emissions. A good example is collaborative warehouses situated outside big cities that collect shipments for those retailers using the site and then combine those shipments to create full truck loads. This type of arrangement requires manufacturers and 3PLs/4PLs to have a software integration that allows complete and visible information exchange with the warehouse systems.

Software as a Service

Software as a Service (SaaS) is a growing trend in the IT world. Maybe less known but also important is Integration as a Service (IaaS). These two developments are particularly relevant in the TMS market. Both concepts are based on leveraging Internet technologies where companies use a pay-for-services-delivered approach. It is an alternative to on-premises solutions.

What makes it particularly relevant for the TMS market is that TMS is by nature a solution that is based on a multi-enterprise business process of collaboration between shippers and carriers. In the TMS space, there are many examples of potential value from these multi-tenant network solutions, including:

Trade compliance information for cross-border trade transactions. Countries around the world are constantly changing their rules and regulations. The changes can be shared and updated very efficiently using SaaS solutions

Connectivity and visibility. SaaS and IaaS can offer the advantage of a large set of pre-onboarded carriers, which minimizes the costs for shippers and LSPs to connect to them. Other parties that most users need to connect to are customs, inland security and international statistics agencies. Offering standard connectivity to these organizations can provide major efficiency gains.

Recognized IaaS providers include companies like GXS, Crossgate (in which SAP has shares), and E2Open (which has a partnership with Oracle

Transport Management). Other relevant service providers include former EDI Value Added Network providers such as Descartes and Sterling Commerce (both active in TMS), and Global Trade Management providers like Kewill, GT-Nexus, Management Dynamics and TradeBeam.

Another aspect of SaaS is that the software is not installed at the client but is provided over the Internet, with payment depending on usage. It can be considered a modern version of the more traditional formats known as hosting, outsourcing or application managed services.

In our survey vendors were asked whether their TMS was installed on the premises or could be provided as an SaaS (the pragmatic simplification made was to consider this the same as a hosted solution). We see that most of the packages are offered both ways (Figure 22). It is expected that both SaaS applications and collaboration via a shared network will grow in the coming years.

Functional Insights

Transportation reference model

For functional comparison of the different solutions, we use the transportation reference model that is presented in the next figure. This is based on the reference model that was used in the 2005 and 2007 reports, but it has been extended and improved:

- New functional areas that are being offered or integrated with transportation management solutions more and more often have been added. Examples are network design, vehicle communication, navigation and fleet management.

- The transportation reference model used previously considered transport planning and transport execution as the two main functional areas. The 2011 model (Figure 23) differentiates these areas further, using three levels: Operational, Tactical and Strategic. In addition, the model is more precise in some functional areas (e.g. financial functionalities are now divided into different sub functionalities).

Each of the functional blocks of the reference model will be defined and described in more detail below.

Figure 23: TMS functional reference model and domains
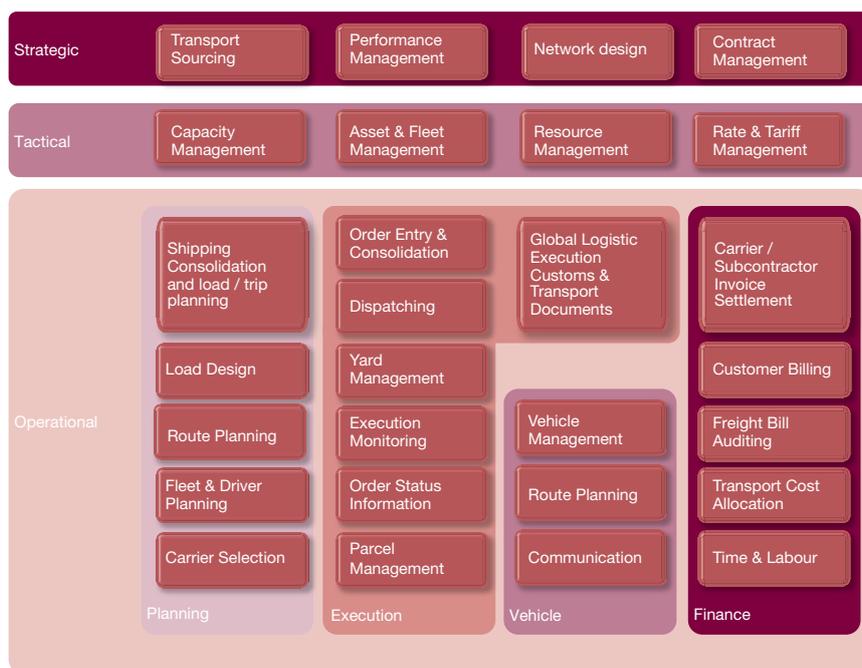
Strategic transportation functionality

Transport Sourcing: Functionality used to support the sourcing and procurement process of transportation. It reflects decisions made on outsourcing strategy and the resulting business rules that drive actual assignment of transport modes and carriers. It supports the tender process and the actual procurement process on Operational levels. This functionality enables the company to select the best carriers for the job, minimize administrative costs and reduce freight costs. Afterwards the actual spending and performance of the carriers can be analyzed, in combination with performance and contract management functionality.

Performance Management: Strategic activities to analyze and manage the performance of the total transportation process, also referred to as Business Intelligence Management (BIM). Based on captured historical data, the performance can be analyzed and used to manage the organization and supply chain partners.

Network Design: Strategic planning to optimize the distribution network of the organization. Based on the customer demand and vendor positioning the optimal network/supply chain can be modeled. This activity can be optimized by collaborating with other parties in the supply chain.

Carbon Footprint Calculations: An aspect of the design can be a carbon footprint calculation. This is the calculation of the CO^2 footprint of the distribution network, based on historical transport order information or new designed network setup(s).

Contract Management: Strategic activity to manage the (transportation) contracts between the organization and its suppliers. It involves the registration of contracts, terms and conditions and actual usage of these contracts.

Tactical transportation functionality

Capacity Management: The management of transportation capacity to ensure that enough capacity is available when needed. Based on forecasting of the future freight requirements and simulation runs, an organization can decide what capacity is necessary. This activity can be optimized by collaborating with other parties in the supply chain. Capacity objectives can be shared to optimize the planning process.

Asset and Fleet Management: Management activities to control the (transportation) assets that are owned or for which longer term use contracts imply a responsibility and liability for the organization. Fleet management can include a range of functions, such as vehicle financing, vehicle maintenance, vehicle telematics, fuel management, and health and safety management. It can include transportation units like trucks and trailers, railcars, ships, etc. Function can sometimes also be used for management of re-usable load units like containers or pallets.

Resource Management: The efficient and effective deployment of an organization's own employees and hired employees when they are needed. The output is a resource allocation for the select period of time.

Rate and Tariff Management: Registration of transportation rates for customers and (subcontracted) carriers. A tariff is a tax imposed on goods when they are moved across a political boundary. This functionality applies both to the registration of applicable rates and tariffs, and to the calculation of the specific rate and/or tariff for a shipment.

Operational transportation functionality: Planning

Shipping Consolidation and Load/Trip Planning: This is the planning of the physical loads for placement in a truck (or another transport unit, depending on the mode of transport). This planning assigns shipments (goods) to a truck, taking into account constraints like pickup and delivery time windows and allowed combination of goods. The trip planning is used to define the most optimal trip, based on geographical maps and plans. Combining both load and trip planning is necessary to create the most optimal transportation trip

Load Design: Plan how the goods will be stored in the truck (three dimensional). Design is done based on criteria such as sequence of loading and unloading and stackability of the products.

Functionality can include load design for pallets using alternative stacking patterns, driven by product, customer and transport unit data/constraints.

Route Planning: Based on the created trip, the actual route is determined at the street level, taking into consideration granular geographic information.

Fleet and Driver Planning: In case own equipment is used to execute the actual shipment, this functionality allocates vehicles and drivers to planned loads and routes. Constraints that typically can be taken into account are driving hours, the current location of drivers, equipment and the condition of the equipment.

Carrier Selection: This can include transport mode selection and even the selection of the actual carrier. In its most basic form the planner manually assigns a transport mode and/or carrier. The system might also support by providing decision matrices. This could be a fixed carrier for a particular lane (possibly with weight/transit time indications). Some systems will support more elaborate decision processes. It is also possible that carrier selection is supported by tendering of loads amongst contract carriers or via public tendering on the web.

Operational transportation functionality: Execution

Order Entry and Consolidation: Registration, validation and management of orders. The exact content differs considerably depending on the user role: either shippers, LSPs or carriers. For a shipper it is key to register the relation between the customer order and the transportation/orders/ deliveries that are being created as part of the fulfillment process. A logistics service provider (LSP) typically receives transportation orders from customers, either by phone, fax, email or electronically. Depending on the activities being outsourced and the IT solutions used, LSPs and carriers might only get a transportation order, possibly with a reference to a client customer order. This functionality may include (basic) consolidation of transport orders, but can also link to the more advanced planning and scheduling functions described above in the Planning section.

Dispatching: The carriers or own drivers need to be informed. Confirmation may need to be obtained, especially when subcontracted carriers are used. At this point additional information, such as license plate and driver information, might be part of the confirmation.

Order Status Information: The process used to record the information related to the pick-up/collection and delivery of shipments. This is also often referred to as the "visibility" or track and trace functionality. It is used to monitor the execution of the transport on every order. Information captured during this process might also be used for financial settlement later.

Global Logistic Execution/Customs and Transport Documents: Supporting international transportation with trade compliance for import and export. It provides compliance

information about rules and regulations and supports printing of specific import/export documents. It can also provide electronic connectivity to some of the authorities involved.

Yard Management: This deals with the management and administration of a company's yard and the dock doors of the distribution center. It enables the planning of the use of busy dock doors, providing slot times to carriers.

Parcel Management: A mode of transport that has specific requirements for the execution. Functionality supports the printing

of labels and manifesting for different (express) parcel carriers. It might also support the provision of up to date rate information for competing parcel operators and can support selection and settlement.

Execution Monitoring: The fulfillment of a transport order is monitored and corrective actions are supported. For example, if a shipment is (going to be) late and that information is identified as part of visibility or event management, then this function can trigger actions like informing the client and the re-planning of activities.
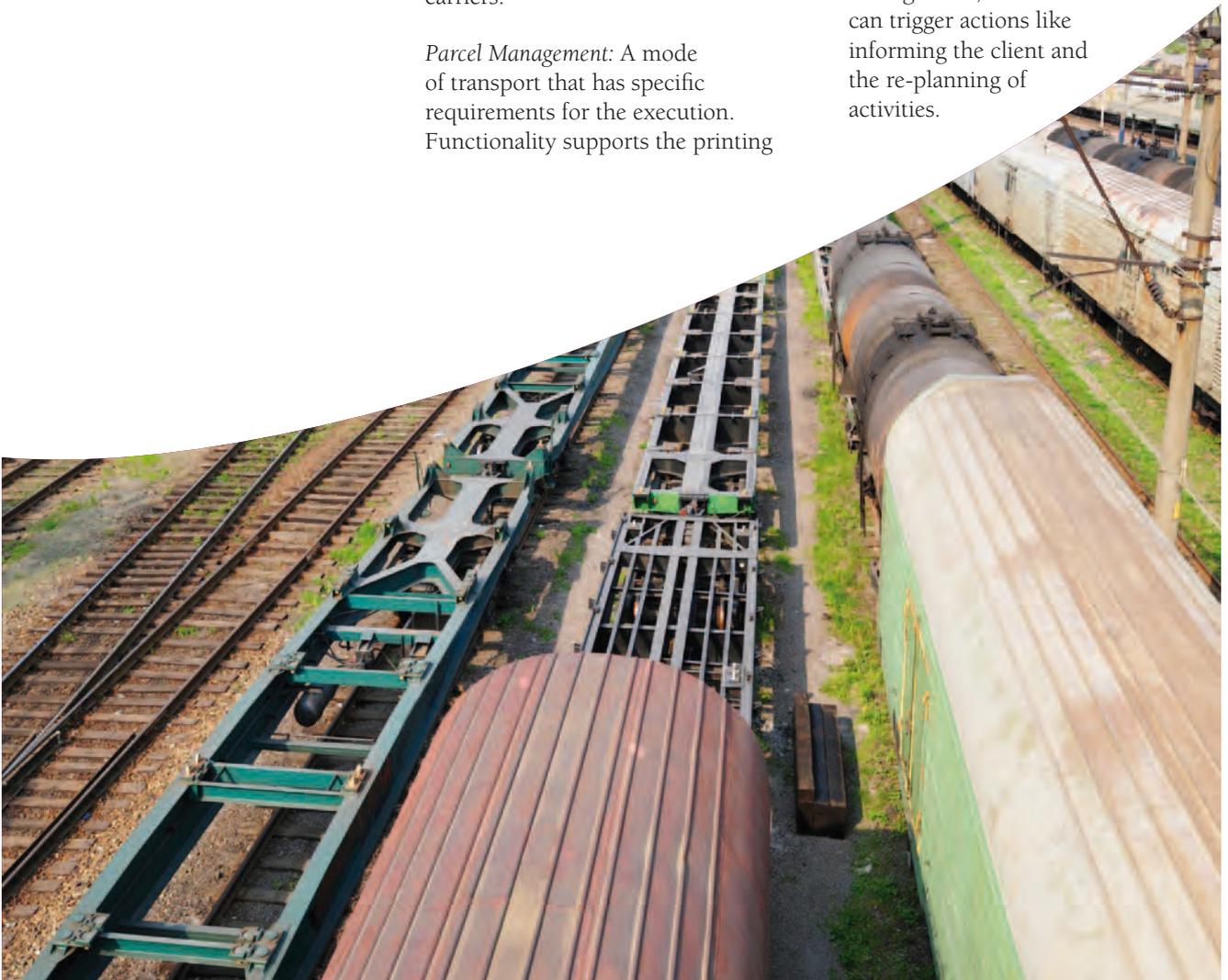
Operational transportation functionality: Vehicle

Vehicle Management: Vehicle management consists of two parts: the actual asset maintenance data of the vehicle, like motor management, and the registration of driving metrics (time, speed etc) of the vehicle and the driver.

Communications: Exchange of information between office and the driver/truck/trailer (also called telematics): new orders, status updates (information on delivery, delays). Communication with the truck: position (GPS), maintenance information. Communication with the trailer: container and/or goods, position (GPS) and condition of goods.

Route Planning: The route planning in the vehicle itself, to help the driver plan the journey.

Operational transportation functionality: Finance

Freight Auditing: Process of checking invoices against the transport orders in accordance with the contracts. Match of original transport order, information on actual execution and delivery, applicable rates and contracts against received invoice.

Transport Cost Allocation: Allocation of transport costs towards cost centers and cost objects, such as customers, shipments, regions and divisions.

Time and Labor: The registration of the actual time and labor that was spent on the transport order. This is used to calculate the actual transportation costs per order.

Carrier/Subcontractor Invoice Settlement: The invoice settlement with the carrier or the subcontractors.

Customer Billing: Based upon agreements made, like rates, fees, bonuses, and extra charges, the financial settlement of the transport order with customer is supported. This includes invoice creation and accounts receivable processing.

Mapping vendors' products to the reference model

To mitigate the effect of confusing and conflicting terminology used by different vendors, the reference model was used to get standardized answers from the vendors concerning the supported functionality.

Even using the reference model, there will still be interpretation differences by vendors when ranking the available functionality. This limitation notwithstanding, the following figure (Figure 24, Parts 1 and 2) gives a fair indication and comparison of the different functionalities covered by the products. It reflects the ratings of the vendors and not an assessment by Capgemini.

The figure also provides an indication of the transport modes that the product supports. There is also an indication whether the product supports multiple time zones (ability to show departure and arrival timings in local time but still able to calculate the correct transit time).

Figure 24: - Part 1: Functionality overview

Legend
- ![green] - Yes, supported by current version of the software
- ![dark red] - No, not supported
- ![blue] - Third Party software is used to support this functionality
- ![light blue] - Will be supported in the next release
- ![light] - No information provided

Columns: Centric Logistic Solutions | ESPRITEC S.R.L. | Four Soft Limited | GreenCat | i2 Technology | IBM Sterling Commerce | Imtech ICT Austria GmbH | Informore | INTRIS Group | JDA Software Group | Kewill | MP Objects | Oracle Nederland | ORTEC | Precision Software

General

Transport Mode supported:
- Transport Mode - Road
- Transport Mode - Sea
- Transport Mode - Inland waterway
- Transport Mode – Rail
- Transport Mode - Air
- Multiple Time Zones

Strategic transportation functionality:
- Transport Sourcing
- Performance Management
- Network Design
- Network Design Carbon Footprint Calculations
- Contract Management

Tactical transportation functionality:
- Capacity Management
- Asset & Fleet Management
- Resource Management
- Rate & Tariff Management

Operational planning transportation functionality:
- Shipping Consolidation & Load / Trip Planning
- Load Design
- Route Planning
- Fleet & Driver Planning
- Carrier Selection

Operational execution transportation functionality:
- Order Entry & Consolidation
- Dispatching
- Order Status Information
- Global Logistic Execution / Customs & Transport Doc.
- Yard Management
- Parcel Management
- Execution Monitoring

Operational vehicle transportation functionality:
- Vehicle Management
- Communications with Driver
- Communications with Truck
- Communication with Trailer / Load
- Route Planning

Operational finance transportation functionality:
- Freight Auditing
- Transport Cost Allocation
- Time & Labour
- Carrier / Subcontractor invoice Settlement
- Customer Billing

Figure 24: - Part 2: Functionality overview

Legend
- ■ - Yes, supported by current version of the software
- ■ - No, not supported
- ■ - Third Party software is used to support this functionality
- ■ - Will be supported in the next release
- ■ - No information provided

Column headers:
- Prometheus Informatics BV
- PTV Nederland BV
- Quintiq
- Qurius
- RedPrairie
- Roadway Technologies Inc.
- SAP AG
- ShipitSmarter.com
- Tesi Spa
- Transics
- Transplace
- Transporeon
- Wexlog Technologies
- Young & Partners

General

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- Execution Monitoring

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- Communications with Driver
- Communications with Truck
- Communication with Trailer / Load
- Route Planning

Operational finance transportation functionality:
- Freight Auditing
- Transport Cost Allocation
- Time & Labour
- Carrier / Subcontractor invoice Settlement
- Customer Billing

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