

# How new technology can bridge the gap between planning and execution

## Inventory Routing as the way forward

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Professionals in planning

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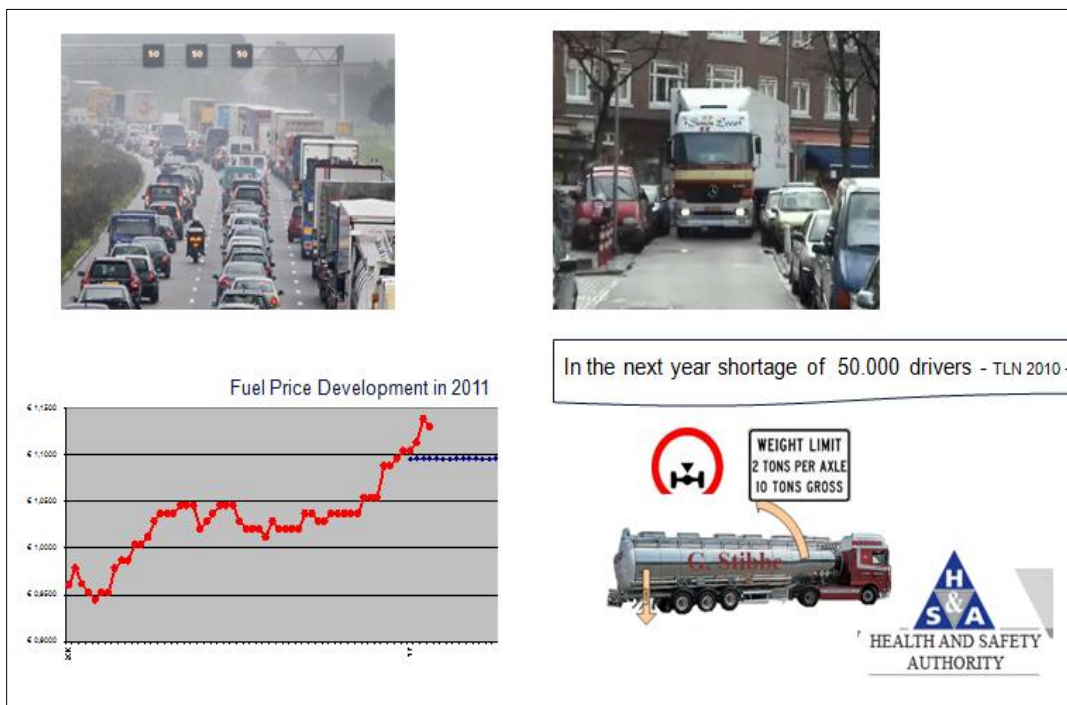
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## Introduction

### Transportation challenges and industry trends

The transportation industry, like most other industries, is beset with a number of ever-increasing challenges that are often complex and in need of dynamic solutions. Take the rise in traffic volume that has led to new levels of congestion on our roads. There is also the issue of qualified truck driver shortages, which, according to TLN (Dutch Employer's Association on Transport & Logistics) in 2010, will reach upwards of 50,000 in this year alone. And the exponential rise in fuel prices is increasing the overall transportation cost per km and affecting profit margins in companies across the globe. Furthermore, government health, safety and environmental legislation is becoming even more stringent and organizations are struggling to incorporate all the requirements into their planning.



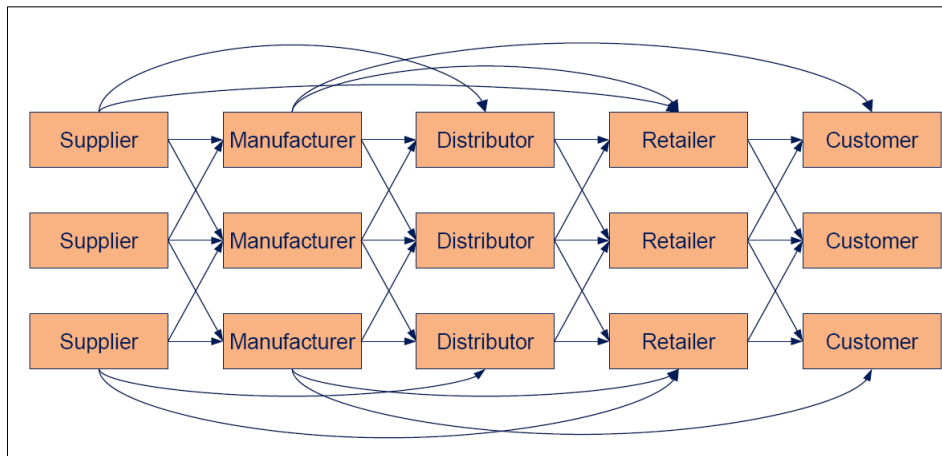
That is why businesses are seeking out new transportation concepts that will enable them to increase supply chain cooperation and deal with these challenges head on.

One such concept is vendor managed inventory (VMI), which will be discussed in more detail in the next chapter. But it is just as important for companies to examine their end-to-end processes and inter-departmental ways of working because it is here that significant benefits can also be made. And above all, organizations can optimize their value chain from source to customer by choosing to integrate their planning and execution functions. New technologies, including advanced demand forecasting, planning and optimization solutions, enable companies to deliver on their promise to the customer, while reducing costs, increasing efficiency and lowering their carbon footprint. In other words, this new technology can help organizations to bridge the gaps in their supply chain and between the different stages of planning and execution, delivering in some cases, almost staggering results.

This white paper will examine the current or 'traditional' ways of working in the areas of customer inventory management and fleet management. We will discuss why companies should perform both planning and execution and the importance of integrating these functions in a solution that is not only equipped to handle today's requirements but future developments as well. The customer case studies will demonstrate the wide array of tangible results that can be achieved by all kinds of companies. And finally, we will expound the value of effective change management programs in order to bring about the operational, technological and collaborative changes that organizations so desire.

## Vendor managed inventory

### Supply chain collaboration



Traditionally, companies have set up relatively static supply chains because they were unable to handle a more dynamic way of working. This, however, is changing due to the increasing level of transparency offered by new technologies. Supply chain collaboration refers to any type of horizontal cooperation between producers, logistic service providers and customers that is aimed at improving distribution efficiency. It can also refer to the collaboration between multiple logistics service providers in the area of intermodal transport or shared loads. Or it may even refer to collaboration between different producers in order to share assets, swap loads, exchange deals, or use each other's depots for loading activities. It is trends such as these, in addition to the need to reduce CO<sub>2</sub> emissions, that has led to an increase in programs designed to improve customer intimacy and align transportation with production activities. One of the best examples of this collaboration is Vendor Managed Inventory (VMI), whose definition is examined in more detail below.

#### What is vendor managed inventory?

Recently, AMR Research indicated that the global economic downturn and the need for improved inventory visibility and efficiency has led to a resurgence in vendor managed inventory programs. So what does the term 'vendor managed inventory' actually mean? At high level, it can be described as:

... a means of optimizing supply chain performance whereby the supplier is responsible for maintaining a customer's inventory levels. The supplier has access to the customer's inventory data and is responsible for generating replenishment orders.

The actual objective of a VMI program is to boost fill rate performance, e.g. increase delivery efficiency from supplier to end customer in order to lower customer replenishment costs. This concept is not to be confused with consignment stock, which is stock that is held at the customer site but owned by the supplier until such time as it is sold or used by the customer.

In actual fact, vendor managed inventory is more than just a logistics concept because it has an impact on and requires involvement from other non-logistical departments. Finance will need to be in the loop because the deliveries made will affect the customer's account balance. In addition, sales and customer service operations will need to change the way in which they communicate and interact with customers. If a company's VMI program is to be successful, these types of operational challenges must be addressed.

### **Benefits of switching to VMI**

Companies can reap huge benefits by switching to a vendor managed inventory relationship with their clients. For the customer, VMI results in increased profitability as a result of reduced inventory and administrative costs, fewer stock-outs or shortages, and increased sales (for distributors and retailers). For the supplier, VMI delivers increased profitability as a result of increased sales, reduced operating costs and stronger customer relationships. And for both parties, VMI provides better information for planning (e.g. demand visibility) and a closer, more effective working partnership.

And in exchange for their trust to deliver on time, companies can make quite significant reductions in transportation and inventory costs, although the amount saved will vary according to industry. In the retail sector, where inventory costs are about 12% of the overall costs, VMI savings will be lower than in the fuels sector where inventory costs are nearer 80%. Transportation savings can also be realized by switching to a more efficient VMI operation at the terminals and depots.

### **Vendor managed inventory in practice**

For vendor managed inventory to work in practice, organizations need to implement effective customer inventory management and fleet management processes. However, it is important to clarify what we mean by these terms and to distinguish the role that they play in the ultimate goal of boosting fill rate performance and increasing customer service.

### **What is customer inventory management?**

Customer inventory management is the process whereby the supplier takes on responsibility for managing a customer's inventory levels. For this process to work effectively, the customer must place a great deal of trust in the supplier to replenish the inventory before a stock-out occurs. The supplier, in turn, must exercise good judgment about when a stock-out is likely to occur and determine the optimal trade-off between delivery security and delivery efficiency. In general, the most efficient replenishment is achieved with either a full truck load or a full customer tank, although other factors may come into play, such as the cost of ownership, price fluctuations etc.

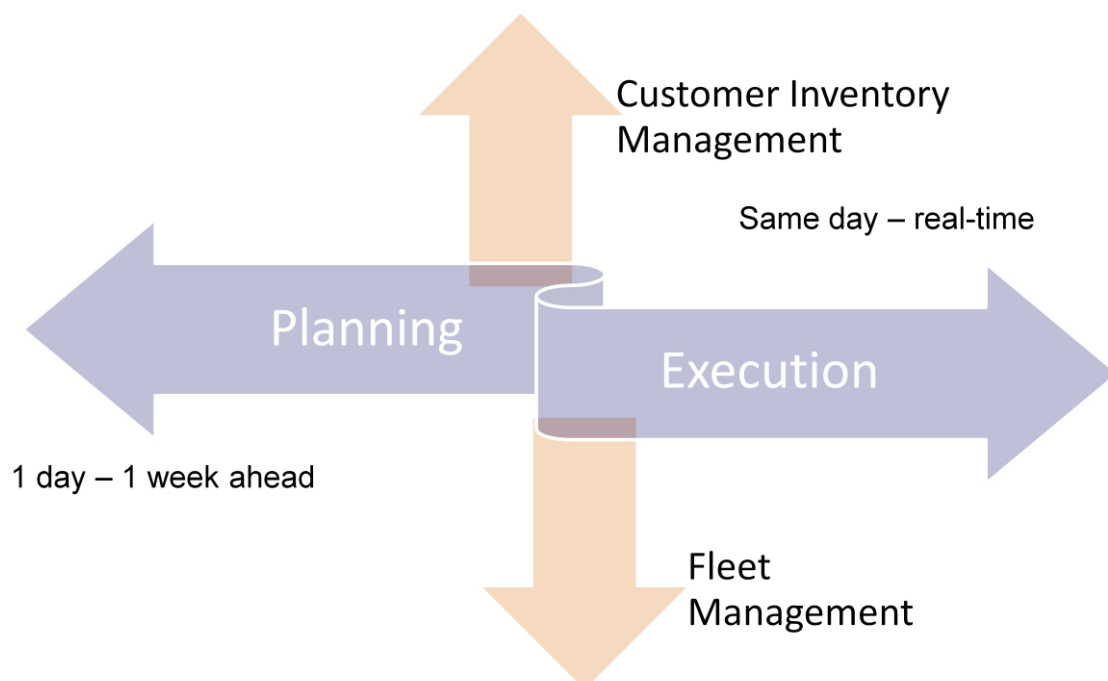
### **What is fleet management?**

Fleet management is the term used to describe the selection, management, allocation and routing of vehicles that are required to deliver goods to the customer. A number of important decisions regarding the fleet need to be made in order to ensure that customers receive the correct or adequate quantities on time. Decisions regarding: the number and type of vehicles required to fulfill all customer orders; the assignment of vehicle/driver to a specific delivery route; the optimal delivery route sequence. Even the source of vehicles need to be decided upon, e.g. own fleet versus hired fleet, because the added flexibility of hiring in vehicles will inevitably result in higher costs. Effective fleet management, therefore, is all about finding the ideal trade-off between flexibility and costs, while ensuring that resource assignment and vehicle routing are planned in the most optimal way.

## Integrating planning and execution

The previous chapter described collaborative vendor managed inventory and some of the high level benefits that can be achieved by handing over replenishment responsibility to the supplier. This section will now focus on two key supply chain silos - customer inventory management and fleet management - and the way in which companies choose to manage these processes, i.e. planning in advance or focusing on execution. We will discuss the advantages and disadvantages of the both methods before highlighting the merits of integration.

It is important to note that companies often differ in the way that they choose implement and operate their processes. Some organizations are very much focused on planning (one day to one week in advance), while other organizations prefer to focus solely on execution (next shift to almost real-time). It is quite rare to find companies that have fully integrated these two functions. Similarly, companies tend to set up separate customer inventory management and fleet management departments, which means that operational decisions about customer demand and the actual deliveries are made by different people. This can result in a lack of cohesion between the two, which we will learn more about later on in this section.



### **Customer inventory management: focus on planning**

Customer inventory management planning is typically concerned with fixed frequency deliveries and represents the traditional way of working for most companies that supply slow moving consumer goods. In the fast moving consumer goods industry, however, this type of planning is quite difficult to implement and therefore it is often left out altogether. Companies will generally perform demand planning at a strategic level in order to allocate supply on a monthly basis and on occasion, though somewhat rarer, inventory and demand planning will be done on a more operational level, i.e. weeks or days ahead.

In the case of slower moving products, customer inventory planning is all about delivering agreed volumes at a fixed frequency, based on predefined delivery strategies. In some cases, a company may use a simple forecasting algorithm to estimate delivery volumes, i.e. average usage per day. On a tactical level, they may create territories and assign fixed delivery days to them, but this tends to be the extent of their optimization efforts.

The advantage of this approach is that it provides a high degree of certainty for achieving on-time deliveries, which leads to enhanced customer service. The downside is that quite often the delivery volumes are small and therefore inefficient. But by switching from fixed frequency deliveries to forecasting estimated delivery dates, companies can actually increase their average delivery size by over 20%.

#### **Customer inventory management – planning**

Advantages	Delivery certainty, high levels of customer service
Disadvantages	Inefficient deliveries

### **Customer inventory management: focus on execution**

Companies that focus solely on execution for their inventory replenishment are typically concerned with delivery at safety stock. This method of working is traditionally used in the fast moving consumer goods industry, where customers call in their last-minute orders or telemetry is used to calculate the required delivery date. The benefit of this approach is that it enables companies to create just-in-time deliveries, with larger and more precise volumes.

However, this reliance on real-time information does carry a certain amount of risk. Firstly, there is the technical risk of interrupted data flows (where telemetry etc. is in use). Secondly, there is the operational risk associated with creating plans so close to execution. If multiple customers call in their orders at the same time (just before a weekend, prior to the holidays, before the onset of a cold spell etc.) then this will undoubtedly cause workload balancing issues. Without the foresight of advanced planning, additional resources will be required to make these deliveries on time and prevent customer stock-out situations. Furthermore, this planning approach lacks the flexibility to respond to changes in demand patterns.

#### **Customer inventory management – execution**

Advantages	On-time delivery, large quantities, exact volumes
Disadvantages	High risk of stock-outs, inefficient workload balancing

### **Customer inventory management: integrating planning and execution**

Previously, we examined how companies typically perform their customer inventory planning and we looked at the advantages and associated risks of each method. We will now investigate the benefits of integrating these two planning approaches, while also highlighting the potential risks of choosing not to integrate.

All companies need to anticipate and plan for peaks in product demand. But by solely focusing on execution, these same companies will be less equipped to handle any surges that may arise. Similarly, if a terminal is temporarily shut down this will also impact product availability, resulting in longer lead times and the need to ensure that other depots are covering the shortfall. Whether it is a supplier or production business, all departments need to be kept in the loop to ensure the correct delivery quantities can be met. If this process is not managed effectively and efficiently, there will be an increased risk of stock-outs at the terminal or depot. This in turn will adversely impact customer deliveries and customer service levels.

By integrating the planning and execution functions for customer inventory management, however, companies will be better prepared to deal with the extra workload should product demand increase. Furthermore, by uniting the people involved in the planning process, it will be possible to balance volume over days, weeks and regions and gain a better understanding of the required product levels for each site. This information can be used to provide valuable input for the production process, the purchasing department and the primary transportation group. Each function will be better prepared to anticipate demand and the dispatcher will be better equipped to deal with last minute changes, while being aware of the exact delivery volumes that are required for each customer at any specific point in time.

#### **Customer inventory management - integrating planning and execution**

Advantages	Volume balancing, advanced knowledge of stock requirements
Lack of integration	High risk of stock-outs, inability to deliver to customers

### **Fleet management: focus on planning**

Most companies tend to focus on route planning and optimization because this is where guaranteed efficiency improvements can be made. By implementing the right solution to create geographically clustered routes, companies can reduce kilometers and planning time by at least 10%. And this is perhaps the best way to simultaneously lower carbon emissions and reduce costs.

However, there are two distinct disadvantages of optimization software that is used to plan routes in advance. Firstly, the solutions only take into account and schedule unplanned 'must-go' orders, e.g. the orders that are actually due for delivery. They lack the concept of opportunistic 'may-go' orders, e.g. orders that may be delivered today or during the next few shifts but which do not actually have to be delivered until later. As a result, the software does not have the capability to significantly enhance the savings that can be made.

The second disadvantage of just focusing on route planning is that many of the actual routes are disrupted during execution due to emergencies, breakdowns, last-minute orders, traffic conditions, and other unforeseen events. And these ad hoc changes often result in sub-optimal plans, as the impact of the changes made can not be assessed. If these last minute changes could be incorporated in the route schedules, the planning would be more robust, more optimal and more cost effective.

#### **Fleet management – planning**

Advantages	Optimally clustered routes, reduced kilometers and transport costs
Disadvantages	Lacks concept of 'may-go' orders

### **Fleet Management: focus on execution**

Nowadays, track and trace programs are frequently used to assist companies in managing their route schedules during the execution phase. The increase in the use of onboard computers means that businesses can call up a wealth of information, such as: vehicle location, speed, the activities being performed, and the type of stock being transported. Furthermore, the dispatcher can view all vehicles on a digital map to assist in executing any planning actions. Not only does this help to improve overall performance but it also provides a huge boost for safety and compliance due to increased insight and transparency.

However, the main disadvantage of these types of programs is the lack of integration capabilities. A number of simple track and trace programs can be found online, but it is not possible to integrate them with the main planning system. As a result, any ad hoc route or delivery changes made during execution can be communicated via alerts, but the plans will not be automatically updated and certainly not re-optimized.

#### **Fleet management – execution**

Advantages	Greater insight & transparency, increased compliance & safety
Disadvantages	Lack of integration with planning system, impact assessment of ad-hoc changes

### **Fleet management: integrating planning and execution**

The trend towards integrating planning and execution for vehicle routing has been growing for a number of years. This growth is still ongoing and new developments are being released on a continual basis. For this reason, companies should maintain a great deal of foresight when selecting a planning solution and aim to choose a system that will be able to cover their current requirements as well as any potential future developments.

The most important benefit of an integrated system is that it enables the planner to stay within the target KPIs by handling real-time changes more effectively. By integrating the planning and execution functions for vehicle routing, companies will benefit from a continuous feedback loop that enables the planner to see the impact of any deviations from the current plan, e.g. in the event of a delay due to congestion, the system will determine if the remaining deliveries will still be on time and whether the driver is likely to exceed his maximum number of permitted working hours.

However, another benefit of integrating planning and execution can be found in a fairly recent development that is still ongoing: statistical congestion pattern data. This information provides congestion data per road segment, which is accurate to within a 15 minute time period. The system uses this information to create more optimal route sequences and starting times, and plans that more closely mirror the realities of execution.

But while statistical congestion pattern data has its benefits, the next step in future developments will be to integrate real-time traffic information in the planning system, i.e. the impact of adverse weather on the road network; road closures due to accidents; planned road works etc. Even though these latest developments have yet to be released, it is still important for companies to choose a planning solution that is flexible enough to incorporate these types of new enhancements in their product roadmap.

#### **Fleet management - integrating planning and execution**

Advantages	Continuous feedback loop, better handling of unforeseen changes
Lack of integration	Difficulty in managing KPIs effectively, inability to respond to last minute changes

## Integrating customer inventory management and fleet management

Nowadays, there are different opinions regarding the best way to integrate customer inventory management and fleet management. Some would argue that the most effective solution is to house all functional requirements within a single (ERP) system. But others expound the need for a robust, best of breed solution that meets the specific requirements of the business, while offering a high degree of user flexibility; and one that should include optimization capabilities and be able to process execution-related data. But one thing is certain, the integration of customer inventory management and fleet management will only work if it is fully integrated into an ERP system.

### Supplier results

We have already come across the benefits of integration in previous sections of this document. But to reiterate, one of the most valuable is workload balancing. Basically, this is all about maximizing delivery efficiency by means of just-in-time deliveries or pulled deliveries. By creating a more evenly balanced workload, companies can reduce the number of spot contracts (for vehicles and resources) that are needed to cover peaks in demand, which immediately translates into lower supply costs. Other benefits include improved forecast accuracy and improved customer service levels.

### Customer results

The customer is also set to reap numerous tangible benefits too: reduced ordering costs, increased fill rates, fewer stock-out situations, and lower inventory levels, which altogether leads to improvements in customer loyalty. By taking care of the client and saving them money, the supplier becomes more of a strategic partner in the client's business and this is a unilateral goal.

### Tangible results - case studies

#### US Petroleum distributor

This company implemented an integrated customer inventory planning and vehicle routing system with the following results: a 30% decrease in the number of deliveries; a 39% increase in the average delivery per customer; a 27% overall mileage reduction; and 99.5% delivery reliability. This translates into higher levels of customer service, a reduction in the number of vehicles required, a decrease in fuel consumption, and therefore lower carbon dioxide emissions.

#### European cylinder distributor

This company implemented forecasting and route optimization, including workload balancing, but excluding any integration with execution. They were still able to achieve the following results, despite the seasonal impact of the LPG cylinder industry and the lack of integration with execution: a 7% decrease in the number of deliveries and routes; a 6% increase in delivery volumes; a 10% reduction in planning time; a 26% decrease in km driven; and a whopping 43% rise in the average volume per km.

The main reason that the distributor chose not to integrate with execution was due to the difficulty of tracking stock on customer sites. Radio frequency identification (RFID) could be a potential solution to overcome this challenge but the actual implementation costs would limit the value of reducing these numbers any further. However, in a bulk environment telemetry devices are readily available and can be implemented at a reasonable cost.

### Other industries

In the animal feed industry, a number of companies have implemented integrated satellite measuring and vehicle routing and optimization, using the data to feed into the production planning systems at their mills.

Similar to LPG, the vending machine industry is also impacted by temperature fluctuations, e.g. in warm weather vending machine usage is higher, whereas home heating systems are used more during the cold weather. These industries could both benefit from focusing more on execution by moving away from fixed frequency deliveries.

And a final example is the waste industry where there is a growing trend of privatization. In place of fixed weekly rounds to collect waste from the roadside, councils now employ contract waste management providers to empty underground containers when they become full of rubbish. With this new trend, waste management companies can also benefit from the same systems that used in the LPG market, with only a few changes required to adapt vehicle capacities.

### What could be next?

Revenue management is another technique that can help companies to increase profitability and create a strategic, competitive advantage. It is used by a number of sectors but perhaps the most common is the airline industry, where ticket prices vary depending on class of travel (economy, business) and how soon in advance the ticket is purchased, etc. This is a very dynamic pricing strategy that is wholly based on forecasting demand.

A similar approach could also be used in other industries to influence the customer's purchasing decisions. Take for example large supermarket chains and the way they advertise and price their home delivery slots according to days of the week and times of day (evening or daytime). Other companies could adopt a similar approach for non-VMI customers in order to offer last minute deals, i.e. if a vehicle will be on route, in the vicinity, with spare capacity. You could even go a step further and proactively approach customers with deals so that they place their orders when it is more convenient for the supplier. These are just a few examples of new techniques in business that could help companies to continue to innovate and achieve the results they desire.

## Changing the way you work

### Why is there a need to change?

Despite the obvious benefits of integrating planning and execution, the majority of businesses are still continuing to work in traditional silos. Companies with a strong planning culture are not taking advantage of available real-time information and often lack flexibility when executing their plans. Conversely, companies with excellent execution capabilities need a change in philosophy to integrate a process that is, at its core, grounded in planning, and for this to work, the planning role needs to become more of a data analyst role.

### Effective change management

If organizations want to increase their financial and operational performance by integrating their processes, they need to tackle all areas of their business, which means: the management and organization of the company, the employees and its culture, products and work processes, and finally resources.

### Resources and systems

If we begin by looking at resources and systems, which is what most companies tend to focus on, we will see that it is important to build a strong foundation with the appropriate IT infrastructure and the right software solution(s). The system that is chosen should provide seamless integration, automated forecasting and planning, transparency, insight, more control, greater efficiency and a reduced number of errors. But systems are only part of the process and are not sufficient on their own to bring about the required change.

### Products and processes

A company's products and processes must also be examined. Make sure all relevant parties in the customer supply chain are involved in defining the logistics processes. Assess the level of customer satisfaction by engaging with the customers and any other relevant internal departments in order to build a true customer partnership, where the right product is delivered at the right time, at a lower cost to both the customer and the supplier. It is important to provide incentives for the customer to go along with the change and, more critically, for the supplier to deliver on the promised benefits.

### People and culture

When managing the change process, you should never underestimate the importance of people and culture. Company employees will need to adapt their ways of working, because ultimately, it's all about doing things differently by analyzing, communicating and increasing knowledge. In logistics companies, the dispatchers have been doing the job for many years and often started out as drivers or administrative staff. They possess a wealth of valuable information and are really good at what they do. But in order to bring about the change your company desires, they need to take a step back and look at customer demand management and vehicle routing from an more analytical point of view. And they need to drive the planning system to create plans that automatically overcome the routing and delivery challenges that they typically face on a day to day basis. And in doing so, this should result in greater customer service, higher employee satisfaction and reduced costs.

### Management and organization

Finally, management commitment and support is key to the success of any change program, but unfortunately its importance is often underestimated. It may well be cited as part of the critical success factors but as a change activity, it is almost always absent from the project plan. The management team needs to understand the reason for change, how

success will be defined and how they can contribute. Without their buy-in and support, it will be virtually impossible to bring about change in the lower echelons of the organization - that includes the drivers, the dispatchers, the customer service clerks, etc. Do all relevant parties understand why their processes are changing and how this fits into the bigger picture? What needs to happen to ensure that every single person in the organization is committed to change, irrespective of the role they play?

Management must answer these questions and then implement the relevant KPIs to ensure that they get the right results. There is no point in just focusing on truck utilization or on tons delivered per km driven, but rather focus must be given to the entire value chain, which should include customer satisfaction, no. of stock outs, supply costs etc. And if they get this right, the results will speak for themselves: increased management control; increased customer loyalty; and increased margins. Pivotal elements here are clear: management vision, continuous communication and an effective change management program.

## Conclusion

By way of conclusion, the process of switching to an integrated system for customer inventory management and vehicle routing is not without its challenges. However, by integrating these components into a multi-user, multi-site, real-time environment, companies can realize substantial benefits and create optimal value. And at a time when organizations across the globe need to carefully manage their expenses and strive for excellence, this is a project well worth the effort.

## Contact

Should you have any specific questions relating to the content of this paper, please speak to your ORTEC account manager. Alternatively, you can contact ORTEC directly by visiting our website at: [www.ortec.com](http://www.ortec.com) or telephoning: +31 (0)182 540 500. We would welcome the opportunity to assist you further.

## About ORTEC

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