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YEARS AHEAD

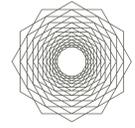


DEALING WITH CHANGING DEMAND

BEST PRACTICES IN THE HIGH-TECH INDUSTRY
ON SHORT TERM DEMAND CHANGES

AN EYEON WHITE PAPER

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1 DYNAMICS IN THE HIGH-TECH EQUIPMENT SUPPLY CHAIN

Equipment manufacturers in the high-tech industry face several planning challenges specific to the industry. The supply chains of equipment manufacturers, also referred to as “supply networks”, are generally complex. For instance, there are several layers of suppliers. These suppliers sometimes supply products and services to one another, involving hundreds of suppliers. Often the suppliers are highly specialized and critical to the final product, either due to intellectual property (IP), specific expertise or years of experience. Additionally, what makes equipment supply chains challenging is the nature of the product: the equipment they produce is highly specialized.

Characteristics of the equipment supply chain:

The high-tech equipment supply chain is characterized by:

- Life cycles
 - o Life cycles can be short due to new technologies
 - o Price erosion due to new technologies
 - o Demand can be volatile due to low volumes
 - o Strong demand growth when releasing new products
- Technology
 - o High rate of technological renewal
 - o New products entering the market
 - o Strong time to volume pressure, be the first with new technology

The make-to-order equipment supply chain

High-tech equipment is typically produced for a specific customer, i.e. products are produced make-to-order (MTO). Before production begins, a customer sale must take place. Often products are highly configurable and this brings additional complexity. This supply chain is generally low volume / high(er) value. Some examples are equipment for the semi-conductor industry, MRI-scanners and high-volume industry printers.

The make-to-stock equipment supply chain

In the make-to-stock (MTS) supply chain, items are produced to a certain stock level and then sold from stock. The MTS supply chain has similarities with consumer electronics products. However, products are still sold business-to-business (b2b), have significant value and are technologically advanced. MTS supply chains suffer from several challenges which also affect the MTO supply chain, mainly: managing life cycles and demanding customer orders. An MTS supply chain is commonly high volume / low(er) value. Some examples are high-tech observation cameras, network equipment, high-tech fire and smoke detection systems as well as access control systems.

Companies in the equipment supply chain

In the equipment supply chain, companies can be divided into three subgroups: component suppliers, module suppliers and integrators. Of course, the customer (the equipment buyer) is also part of the supply chain but this paper focusses solely on the supply side.

The integrator

The integrator customarily buys components and (sub-)assemblies and combines these into a product. The integrator typically assembles and sells the complete product, also called the system or equipment, often along with service contracts. The integrator owns the brand of the final product. It mainly develops new products and owns the majority of the intellectual property. The integrator launches new features and determines the production rate and mix.

The module supplier

The module supplier assembles components into modules which the integrator then assembles into a larger system. The module supplier can act as a contract manufacturer for more generic or even very specific modules, i.e. the supplier produces make-to-order according to the customer’s specification. For new and innovative products, the module supplier often plays a key role in (co-) development. The module supplier then becomes an integral part of the equipment supply chain. Both the supplier and integrator (i.e. customer) highly depend on one another: the supplier can only sell the module to this specific integrator and vice versa, while the integrator can often only purchase the module at this specific supplier. A module supplier also can supply sub-modules to other module suppliers. In this paper, sub-module and module suppliers are both called module supplier. This can become a complex network of suppliers in the high-tech supply chain where suppliers act as well as first, second and sometimes even as third tier supplier to the integrator.

The component supplier

All the way upstream in the supply chain is the component supplier. The component supplier is the furthest away from the final product, and mainly sells large volumes of components to a vast number of customers and often are highly professionalized logistic service providers. In this part of the supply chain, Minimum Order Quantities (MOQ) play an important role as well as flexibility agreements.

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SHORT-TERM DEMAND CHANGES

The past years, equipment companies have become good at managing their customer and supplier relations and needs. They have experience in predicting reasonably accurate long-term customer sales. The long-term sales plan is then translated into long-term capacity plans for their own resources, and to fulfil supplier requirements. However, especially when a large upscaling of the operation is forecasted, one cannot take for granted that the entire supply chain will and can adapt to capacity changes.

Managing short-term operations is one of the main challenges that equipment companies face. Whereas the long-term forecast rarely fluctuates, short-term planning is volatile. The heavy workload involved in short-term operational management is due to changing customer requirements, for example, changes in timing or configuration, in combination with a supply chain that is inherently difficult to manage. Ordinarily, a small army of material planners, product planners, supplier managers and customer service agents is required to firefight issues that arise.

Short-term demand changes

When moving from long-term to short-term planning, more details are required and become available, but they continue to change. For example:

- Which type of machine needs to be produced?
- How should it be configured?
- Are engineering changes needed?
- When is the delivery due?

To gather this information, often a lengthy (pre-)sales process is involved, customer requirements should be determined and all this should be translated into the required product.

The combination of all these factors make it complex for the supply chain to do the following:

- React to signals
- Identify the source of the changing demand signal
- Understand the importance of such signals

Drivers of demand changes are:

- Changing customer orders
- Planning parameter adjustments
- Changing production planning
- Changing engineering requirements

EyeOn carried out a survey among 16 equipment manufacturers about how these manufacturers cope with short-term demand changes. The results of this survey are presented below.

SURVEY BACKGROUND

The survey was performed by EyeOn during the winter in 2017 and consisted of a specially developed questionnaire concerning short-term demand changes in the high-tech equipment supply chain. 16 companies joined the survey and were visited by EyeOn consultants (Bram Vercammen, Emile van Geel and Joost Rongen).

The results are anonymously reported in this paper. In April 2017, the findings were reported during a meeting at Croy Castle among the participants and discussed in more detail. This paper shows the executive summary of the discussion and its findings.

Companies that participated in the study:

(Océ, Agfa, FEI, Philips Healthcare, ASML, Marel, Avnet, AGCO, Lely industries, Neways, NTS Group, VDL, NEC, UTC Fire & Security, Bosch, Xycarb Ceramics).



Figure 1: Companies that participated in the survey

Source of demand changes

In the high-tech supply chain, demand changes are not just caused by the end of the supply chain, in other words, the end customer. EyeOn research shows that throughout the supply chain various processes do influence the demand signal.

External and internal sources of change affect the demand signal the system integrator has to deal with. The external demand signal is related to end customers who want to change quantities, timing (earlier or later) or configuration (incl. type changes). The external end customer is responsible for 55% of the total demand changes that the system integrator experiences. The other 45% of the total demand changes affecting the system integrator are caused by the system integrator since these changes derive from the system integrator's own internal processes. Important internal sources that drive change are: Bill Of Material via engineering changes, MRP settings, purchase master data (end of life components), inventory management settings, service parts demand, material quality, portfolio, and finally, changes driven by sales target.

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SHORT-TERM DEMAND CHANGES

It is now also clear that an MRP signal change has many sources and that it is not easy to determine what the real source for a particular change is. For this reason, changes in demand signals are often not well understood and these signals become more distorted further upstream. The reason why the reliability of demand signals is often questioned.

The module supplier is affected by a demand signal that is largely changed by the system integrator. The module supplier also has its internal sources of demand changes. The demand changes the module supplier experiences are for 90% related to the system integrator's demand and for 10% derived from its own internal processes; in other words, is caused by its own internal processes. At the beginning of the supply chain, the component supplier is ultimately confronted with all the changes that have taken place, but is too far away from the source of change to comprehend what is going on.

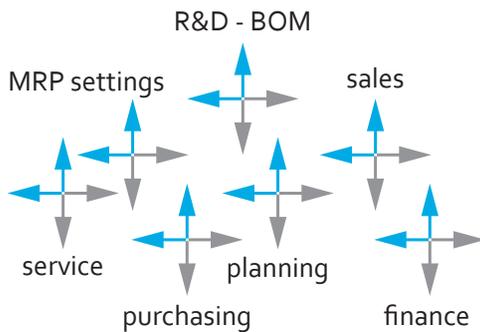


Figure 2: Sources of internal demand signal changes



Figure 3: internal vs external sources of demand signal changes

Where does it hurt most?

The demand changes having a significant impact mainly affect material availability, suppliers and production planning. This is true for both integrators and module builders.

Customers are rarely affected by changes caused by another customer order. The impact of costs is limited since flexibility agreements with suppliers often apply in this industry.

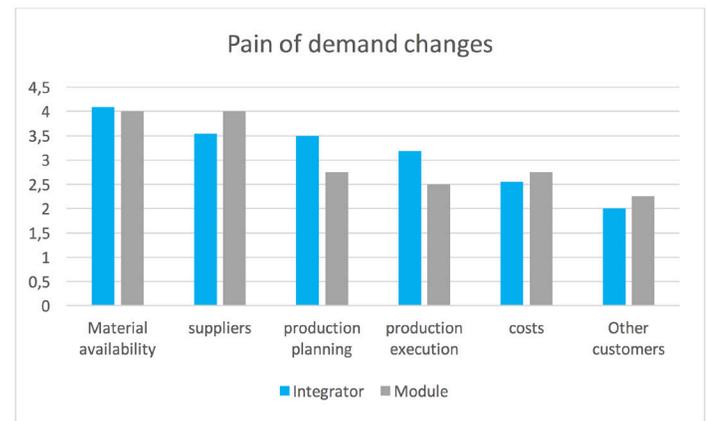


Figure 4: internal vs external sources of the demand signal changes

Best practices

Companies in the high-tech industry have found solutions when dealing with the reality of changing short-term demand. Some practices work well for one company, yet not for another, whereas others work for the entire industry. In the study EyeOn conducted, individual best practices were identified and evaluated by the entire group of high-tech companies participating in the study.

The results are shared below. A high group score on "I agree this is a best practice" means the practice is evaluated as a good practice that works or could work. The answer to the first question does not say anything about how widely the practice is applied. The answer to the second question does tell us how widely spread the practice is.

2 SHORT-TERM DEMAND CHANGES

PRACTICE 1

"Before accepting order changes the impact has to be quantified"



- Currently, most organizations do not or partly identify the costs of impact. The additional cost of e.g. material is always calculated. The additional effort (planner hours, handling hours, additional transportation costs etc.) are not always calculated.
- Having a fully quantified impact analysis requires enormous effort; a structured approach and aligned systems, and most companies do not have this fully in place. Which means companies respond to changes without completely understanding the impact. One practice that is widely viewed as a best practice is understanding the impact of change.

PRACTICE 2

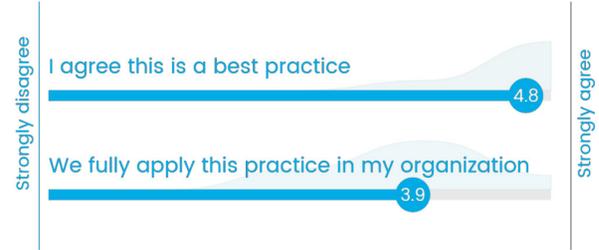
"We accept and confirm 100% of all demand changes"



- This is a point that is not seen as a best practice by most companies but is applied quite often.
- For companies, it's a challenge to handle all demand changes while separating the important ones from the signals that don't really matter. Also, because demand is constantly shifting, a pull-in one day may be neutralized by a push-out the next day.
- This approach is therefore a practice that is considered the best in some specific cases, for example, when a full understanding of the impact is not (yet) possible and it's clear that change should be executed one way or another. Little effort is made in analysing, while most of the effort is channelled into executing change.

PRACTICE 3

"We are aware of all critical resources in our supply chain"



- From a supply chain management point of view, understanding the critical resources is generally quite important. This requirement is widely supported in the industry.
- However, not all companies apply this practice, i.e. there is still room for improvement.

PRACTICE 4

"We firefight supplier issues with only operational people in the room"



- Some companies, in solving short-term issues, regard the non-involvement of commercial interests as a best practice.
- This approach is not recognized as a general best practice. Some companies do find that account management plays a functional role. They want to involve commercial contacts when supplier issues arise. According to some companies, when commercial staff is involved, the progress of solving short-term issues is hampered.

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SHORT-TERM DEMAND CHANGES

PRACTICE 5

"We structurally improve external supply processes through detailed process analysis (vsm)"



- Detailed process analysis is a good method to improve external supply processes. Value Stream Mapping (VSM) is not recognized as the one and only method to do so. The reason why this is not commonly practiced by most companies.
- Value Stream mapping (VSM) also puts employees off. Memories of long and exhausting workshops, brown-paper sessions, scribbling on post-its and flip-overs, all come to mind. Without added value as an obtainable result, it just doesn't seem worth it. Applying the right kind of improvement method, one which involves and motivates stakeholders is essential.

PRACTICE 7

"We keep track of all customer order and configuration changes for future analysis"



- Archiving order changes is seen by most companies as an important method for future analysis. Data analysis (Pareto) provides insights into recurring behaviour and trends over time.
- This best practice is not widely applied; and therefore, an opportunity for improvement. Also, although data is collected it is not always analysed using a structural method.

PRACTICE 6

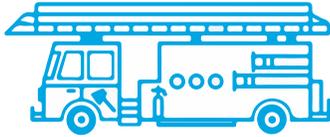
"We should maintain a close relationship between sales and operations"



- It is fully agreed that the relation between sales and operations needs to be close or at least well organized. Most companies have organized this to some extent, only a few have really organized this thoroughly.
- However, although sales and operations should remain in close contact, they should continue to focus on their own field of interest

3 TAKEAWAY

A summary of the main learnings on how to cope with short-term demand changes:



- Do not just reward firefighting capabilities, embrace a forward strategy that structurally resolves process challenges.



- Make critical resources visible: people, methods, machines or materials.



- When information is shared it should be reliable, relevant and within proper context. The receiver of information or supplier should be critical when analysing data, properly process the information and respond promptly.

ABOUT

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ABOUT EYEON

In striving for success, large companies have to continuously struggle against growing internal complexity. We help our clients manage this complexity by designing, implementing and executing excellent planning processes as a discriminating factor for this success. In order to achieve this, we develop and share knowledge about top level planning and forecasting, with constantly demonstrable return on investment for our clients.

ABOUT INDUSTRY PLANNING AND FORECASTING KNOWLEDGE NETWORKS

EyeOn has many years of experience in setting up and improving planning processes at large multinational organizations in different industries. We actively share this knowledge. EyeOn has specific knowledge networks in High-Tech, FMCG, Process, Life Science and Marine & Offshore

The networks allow you to share experiences and best practices concerning Planning and Forecasting with peer companies in your industry. Next to network events and benchmarking, EyeOn also organizes expert sessions and master classes in various specific domains of supply chain and financial planning

For more information: www.eyeon.nl.

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