Multi-tier Supply Chains

Definitions

- **Supply chain** = “A supply chain is the link connecting a set of facilities, companies, demand and supply points, and service providers. This chain links the upstream suppliers and downstream customers with the flows of products, services, finances and information from a source to a customer” (Sople, p. 6)[1]
- **Multi-tier supply chain** = Speaking about supply chains in procurement processes is mostly speaking about multi-tier supply chains. In usual industries the process to produce an end customer product or services goes over more than one step of manufacturers. Multi-tier supply chains are multiple single-tier collaborations, means multiple supplier-buyer-relations, within one supply chain. In practice it is said to have several suppliers but one customer from which’s point of view a supply chain is derived.

Supply chains of the manufacturing industry are mostly longer than 5-10 steps (Alicke p. 179)[2]. If a manufacturer takes all the steps into account you speak about a multi-tier supply chain:

[Supplier Tier n...] (relation) [Supplier Tier 2] (relation) [Supplier Tier 1] (relation) [Customer]

Build up a multi-tier supply chain

As it is not clear at the beginning, which supplier has to sell which components to which buyers to get a most effective and efficient way of collaboration, there are some processes to determine that. First of all it is defined, that some of the partners are suppliers and buyers at the same time. This means, such partner can receive order proposals from buyers (downstream) and supply proposals from suppliers (upstream) concurrently. These relations are splitted to single transactions what is called interface-to-interface planning process (Dudek, p. 113)[3]. If two partners agree on a solution, the buyer did ensure that it is possible to serve the demand from his buyer. So the whole supply chain can be build upstream. As one negotiation only affects the next one, which has to deal with given results before, it might be to get a very inefficient chain. A scenario technique overcomes this problem by not fixing the best solution in an agreement but determining what would bring with the x-best solution in the following supply chain steps. After that the agreement will be fixed by choosing the most efficient way.

Challenges of multi-tier supply chains

- **Time to synchronize**: If it needs two weeks to change the collaboration between each supplier and customer, it needs two and a half months in total to bring a changed demand through the whole supply chain of five suppliers.
- **Complexity**: Products get more and more complex. Manufacturers are focusing on core businesses more and more in the recent years. As result companies buy more complex and customer specific components from suppliers. These suppliers produce their components again by using complex materials from different suppliers. This brings long and complex relationships along the whole supply network.
Information sharing: Changing something anywhere in the long multi-tier supply chain leads to a lot of effort to inform all steps before and behind. 

Costs: Dealing not only with some direct suppliers but whole and complex multi-tier supply chain means to have a lot of effort, especially at the end of the chain.

Multi-tier supply chain management

In order to deal with the challenges of time for synchronization and complexity in information distribution a multi-tier supply chain management system can be established. It helps to steer the collaboration between all involved parties by establishing a central collaboration platform. Mostly this platform is initiated by the Original Equipment Manufacturer (OEM) and covers several suppliers in a partnership. One distinguished chain member has to drive the collaboration process and platform by defining processes, rules and standards (Stadler, Kilger, p.270). It helps to get transparency for all partners in the value chain about demands, capacities and stock data.

Usual procedure for a multi-tier collaboration platform

The OEM derives the own demands and publishes it on the multi-tier collaboration platform. All involved suppliers do have access there and can see the changes immediately. They derive their actual stocks, free capacities and schedules. This data will be published on the platform too. The material requirement program (MRP) can now calculate the whole demand planning. This is not binding data but helps the suppliers to steer their resources. The real relations (sourcing and purchasing) will be adjusted afterwards along the whole chain.

Conclusion

Multi-tier visibility and collaboration may bring a lot of benefits: fast and seamless product launches and changes, reduced planning cycles, higher supplier performance or less risk in supply chains (Becks, pars. 1). But it also costs a lot of effort for dealing with complexity. It needs a lot of skill and time to establish and it depends on the technical capabilities of suppliers. If any partner is not able to take part in the central multi-tier collaboration platform, the whole supply chain struggles (Sourcing Innovation, pars. 1). Manufacturers have to trade of the promised advantages against the needed efforts to build up and manage multi-tier supply chains.

Further Information

References
