Supply Chain Digitization - Are you ready for the digital journey?

How digitization is redefining the world of supply chain management
Jürgen Plate, Principal
Jürgen Plate has been at Barkawi Management Consultants since 2001. His knowledge is based on 30 years of experience in business process reengineering and the optimization of supply chain operations. His focuses are on the high tech and automotive industries.

Dr. Mario Winkelhaus, Consultant
Dr. Mario Winkelhaus has been a consultant in the fields of logistics and IT for five years, and has been at Barkawi Management Consultants since 2015. Dr. Winkelhaus took his PhD in Business Collaboration and his project focus is on supply chain digitization strategies and their implementation.

Service Parts Pricing 4.0:
‘Set the Price’ vs. ‘Get the Price’ as an all-encompassing overall concept
The perfect coordination and combination of ‘Set the Price’ and ‘Get the Price’ in an overall concept ensures forward-thinking companies much higher sales and profits than the customary procedures often based on rules of thumb, intuition or the extrapolation of data. Read here how a coherent overall concept secures the lasting success of a business.

After Sales Services:
The Quest for Faster Growth and Higher Margins
Developing the service business is a very attractive opportunity for most industrial goods companies – but one that remains largely underexploited. However, performance within this sector is impressive. Here you will find 52 pages jam-packed with information and activities that are necessary if you want to transform your company into a customer-oriented service champion.
Supply Chain Digitization – Are you ready for the digital journey?

1. Digitization is redefining the world of supply chain management

Supply chain leaders are embracing technology and driving customer expectations, which leads to them setting high-level delivery standards. Amazon has just implemented one-hour delivery for customers in Munich, thus redefining the expected standard time of deliveries. Customers can now see their consignment’s whereabouts on their smartphones in real time.

Giving customers the ability to track individual packages in real time, remotely monitor temperatures and tilt sensors, all in combination with enhanced automation and decision-support systems, will improve performance, but it will also enable supply chain managers to pick the best offer out of many. This brings two questions to the agenda:

1. What are the crucial opportunities for my company?
2. What are the prerequisites for a speedy implementation?

Closing the gap between the market expectation and the system performance is a never ending game of catch-up in supply chain management.

The new big thing in industry is the rapidly accelerating speed of innovation with which we are confronted. Focused service innovators across the whole supply chain are boosting customer expectations through new service offerings, and multiplying the required speed of adoption. Uber, for example, is putting the traditional taxi business under pressure by using technology to connect passengers with private drivers. Expensive overheads are no longer necessary. This innovation has triggered other players on the market like freight brokers to rethink their service offering and keep in touch with the market requirements.

KEY MESSAGE
Digital leaders are setting challenging delivery standards

Fast adoption of supply chain innovations is the key capability of tomorrow
2. Supply chain digitization – the challenge of multiple opportunities

The boost in digitization comes from rising technical maturity and the increasing use of standards and platform technologies that speed up adoption and implementation. Creating an agile and yet still efficient supply chain is not necessarily a conflict in terms anymore. Using this mindset, Amazon has built a system to serve their prime members in Munich within a freely selectable two-hour time window, at no extra charge. Amazon is using the opportunities of supply chain digitization to raise the level of customer service.

With the performance of such digital leaders in mind, supply chain managers are now confronted with the task of optimizing their delivery performance to keep pace with these exemplary benchmarks.

Concepts like scanning-point based tracking and tracing or computer aided tour planning are already

Figure 1: The goal of supply chain digitization

KEY MESSAGE
All supply chain functions are impacted simultaneously by the acceleration of innovation
everyday services today, so that there is a need to identify new optimization levers – but where and how can supply chain managers look for the opportunities that digitization offers?

Screening the internet, reading current papers and attending conferences only confronts managers with a vast cloud of unstructured buzzwords. Augmented reality, machine learning and m2m communication seem to be promising, but working through all of them and assessing the various opportunities within several business cases is nearly impossible.

In fact, all business functions of the supply chain are impacted simultaneously by the increase in innovation speed that digitization is driving. The first step toward assessing the opportunities they offer is to create awareness of the field that we are playing on:

1. Logistics 4.0...

focuses on pro-actively dealing with disruptive events in the supply chain and improved capacity utilization. It enables the supply chain planner to react to a late delivery and avoid a production stop in Germany even before the shipping vessel has left China. To make this possible, the company needs end2end supply chain transparency.

Bringing this to an even higher level of sophistication, transparency on idle capacity across all players will enable real time balancing and automatically finding the cheapest routing through the network.

This sounds futuristic, but at least a dozen companies are currently developing and promoting ‘smart trucking’, which copies the Uber idea to leverage decentralized freight forwarding optimization. To be competitive, companies must be prepared to leverage solutions of such service innovators. Digitization has the power to redefine the current market of logistics.

2. Production 4.0...

covers all topics and technologies that turn production into a cyber physical system characterized by self-organizing, autonomous manufacturing processes. The optimum lot size does not need to be calculated and is no longer fixed, it is done on the fly by the system. Supporting production through augmented reality and instruction-manual videos on mobile devices directly in the production line empowers people to conduct every step in the production line without making mistakes.

This means that the efficiency of Taylorism, which aims for maximum machine utilization, is transmitted to highly customized production, all the way down to a lot size of one. Customers get their customized product and the producer enjoys maximum efficiency. The fact that this vision is becoming reality has been shown at Bosch Rexroth in Homburg. Their system allowed them to reduce inventories by 30% while increasing output by 20%. Digitization technologies are making mass customization feasible.
3. Service 4.0...

aims to consistently integrate the customer and the installed base into the system, in order to provide highly efficient service solutions. If a fridge is broken, the owner no longer has to call a technician; the fridge calls for service before the breakdown occurs.

Big data and machine learning approaches enable such predictive maintenance processes. Alternatively, customers can even repair the fridge themselves using augmented reality glasses that show the steps required. Digitization is embedding the customer more and more in the processes of companies.

4. Planning 4.0...

leverages a fully real-time integration of internal and external information into synchronized planning processes along the whole supply chain. Looking at the Fast Moving Consumer Goods sector, machine learning algorithms will make the sharing of information far more powerful.

The information will be sent from the cash desk in the supermarket to all players in the supply chain. Errors will be minimized and drive automated plan adjustments. Forecasting and real-time information will enable suppliers to avoid the bullwhip effect and excess inventories.

All company functions are impacted by the digitization trend, which offers many opportunities for optimization – and this having to implement these optimizations is the challenge many companies are facing. Too many opportunities have to be assessed too quickly to come up with a solution for all given possibilities.

However, there is a way to handle this challenge. Similar to a navigation system, which does not calculate every possible route to find the best one, a heuristic method is used to find the most promising one. A similar approach is needed to find the right path to supply chain digitization.
Supply chain digitization in a nutshell
- Connected information on process and object
- New approaches for evaluation of mass data
- Automated decision (support)

Cyber security
Protection for internet-based manufacturing

Big Data
Analysis and usage of complexity

Internet of things
- Internet-to-object communication
- Real-time data assessment

Mass customization
- Customer intimacy
- Flexibility and productivity simultaneously
- On-demand manufacturing

Modern production
3D printing/Additive manufacturing

M2M communication, decentralized decision making

Cloud Computing

Production 4.0
Cyber physical systems

Logistic 4.0
- Fully integrated supply chain
- Real-time network balancing

Advanced materials
Improved features and smart connectivity

Advanced sensors
Monitoring and forecasting

Autonomous tools
Complete transparency and collaboration

Autonomous vehicles
Flow optimization and flexibility

Planning 4.0
- Fully integrated planning (int./ext.)
- Automated demand/supply balancing

Renewable resources
Alternative energy & raw materials

Service 4.0
- Fully integrated service offerings
- Networked systems
- Predictive maintenance

云计算
The key to embracing change in a digital enterprise is the level of integration. It is the starting point of the digital journey displayed below:

**Integrations**

Future winning companies will be characterized by a high level of data integration. Does a company just send or receive specific data like invoices via EDI or is there a bi-directional insight and exchange of all relevant planning and execution data in place? Digital linkage of departments, business units and supply chains trying to improve collaboration, coordination and transparency is still the major issue. Unstructured data in Excel spreadsheets are still a widespread phenomenon that needs to be eliminated. The standardization of (inter-)company interfaces and supply chain elements is the key to fast adoption.

**Technology focus: Analytics & automation**

When looking at the technology aspect, two key modules can be identified: analytics and automation. Sensors allow detailed information to be gathered at the machine and product levels, which is subsumed under the term ‘internet of things’. Data is gathered everywhere at any time with or without us noticing. Similarly to a car signaling a driver when its oil is low, entire production systems send data to a centralized computer, which analyzes the datasets and creates valuable information out of it by predicting when the machine will break down.

When breakdowns can be reliably predicted, a technician can be sent to the machine in advance, avoiding unexpected machine downtimes. This is called predictive maintenance.

If the machine orders the technician by itself, we are talking about automation. Automation is already in place in many flow productions for standardized product lines all over the world. The pharma industry, for example, makes its products without any human participation in the execution process.

The next big thing is to bring down this high level of automation to lot-size-one production. To enable this, machines have to be highly flexible, changeover times must tend toward zero and the planning process must be automated to allow system orchestration.

It sounds futuristic at this point, but ADIDAS has already implemented this visionary approach in its Speed Factory. It combines the design and development of sports products with a flexible, automated manufacturing process. This flexibility allows ADIDAS to be much closer to the market and meet customer demands faster than its competitors.
Process focus: Modularization & composition

Companies are concentrating on their core competencies – this is well known. But digitization will take this to a new level of sophistication. The pressure to innovate is increasing because specialized service innovators are boosting the standards in their area.

So, for example, how did Media-Saturn react to the fast delivery standard set by Amazon? Installing its own system would have taken too much time and risk. To enhance their service offerings to their customers they leveraged the startup tiramizoo, providing same-day delivery services for packages up to 55 kg.

The communication is organized through a mobile application that interfaces to the Media-Saturn webpage. Stories like this are popping up more and more. Big companies are leveraging smaller, innovative suppliers to boost their own level of innovation. But what is the crucial success factor when doing so?

Large companies must be able to implement services quickly. The next step in this development is to allow a supply chain to be built out of standardized ‘LEGO modules’, whereby the size or form of a module is not important, but the way they are interconnected has to be standardized.

This is the crucial success factor. Transferring this back to the supply chain, standard modules and their interfaces must be defined in order to allow a fast setup. The optimal value chain aims to meet customer needs within shortest timeframe.

In the future, companies will increasingly concentrate on their core business and fulfillment model using Supply Chain digitization. The goal is to keep companies lean and agile in order to pursue a permanent Greenfield approach. This implicates thinking and acting without unnecessary ballast.

Modules that companies need for order fulfillment are increasingly being adapted to the core business using standard interfaces. A company’s added value is moving away from organization and in the direction of coordination.
Figure 3: The modules to digitize the supply chain

**Business Model**

- **Composition**: Products and processes are clustered in modules. Steering occurs decentrally (e.g. partner portfolio optimization).

- **Integration**: Digital linkage of departments, business units, supply chains. Improved collaboration, coordination and transparency are the objectives (e.g. SC Control Tower).

- **Analytics (Big Data)**: Capturing and evaluating data about processes, quality, products, production means and employees (e.g. predictive maintenance).

- **Automation**: Data are analyzed automatically, the system reacts autonomously (e.g. robotics and sensors, M2M communication).

- **Modularization**: Enable agile adaptation of the supply chain to changing market requirements through integrated supply chain engineering (e.g. modular SCM).

**Technology Focus**

- **Logistics 4.0**
- **Production 4.0**
- **Planning 4.0**
- **Service 4.0**

**Process Focus**

- **Technology focus**: A = Technical maturity level, B = R&D
- **Process focus**: A = Technical maturity level, B = R&D

Source: Barkawi case study database
Supply chain integration is the key enabler towards achieving a digital supply chain. Keeping the other four modules (Analytics, Automation, Modularization and Composition) in mind, the question is still how to prioritize digitization opportunities and assess only the most promising of them.

At the end of the day, it is the end consumer that defines the requirements that a supply chain has to fulfill in order to drive the company’s success. The customer experience can be quantified using the perceived value. This measurement consists of the supply chain costs on the one hand and the service quality on the other. The following approach to prioritization leverages mindset:

**Step 1: Supply chain segmentation**

Current supply chains of global manufacturing companies have plenty of suppliers, production sites and distribution centers around the world. The immense variety of products, business partners, distribution channels and customer requirements ends in a loss of control, which is even magnified by new technologies and changing business models. As an example, customers buying standard make-to-stock products focus on fast delivery.

OEM customers of the automotive industry plan weeks in advance, but need their products just in time for production. Here, the focus lies more on the reliability of the delivery than the speed. The requirements vary greatly – a different supply chain setup up is needed to recapture control.

Big data analytics supports a more sophisticated segmentation through dynamic clustering. The analysis of demand patterns, for example, replaces simple ABC customer segmentation in terms of sales.

**Step 2: Identifying the segment’s critical success factor**

The success factors have to be identified for each defined segment: Why is the customer buying this product? Which role does the supply chain performance play in the customer’s choice? A clear understanding of the customer needs is required. In B2B, the time window for just-in-time supply is only four days; in B2C customers want to replace their broken TV screen immediately, so they can see the big game.

**Step 3: Find out the core lever that influences success**

What needs to be done to achieve the expected response time? What is the decisive lever that needs to be assessed? The answer is not necessarily given by fancy technologies but by the intelligent addressing of the core lever. In the example, one possibility for
achieving the requested response time is to steer the customer interface by limiting the freedom of choice. The system ensures that the customer can only place a feasible order in line with the standards. Flexibility through a highly automated warehouse or integration with a service platform like Uber would not be the key lever and therefore should not be addressed with highest priority. This would just be a factor to extend the standards.

**Step 4: Technology assessment**

Simplicity is the key. The company needs in-depth knowledge of where and how, in order to enable a casual user to execute tasks usually done by experts. Augmented reality for user self-help, the fridge ordering milk or a technician ordering spare drills via an app are examples of simplified user interfaces. These perceived values and the enablement of execution and real-time interaction with the partner drives the technology assessment. The app provides real time feedback on when the driver will arrive at the construction site to replace the broken drills.

**Step 5: Modularization**

Modularization enables companies to in and outsource modules quickly, depending on the changing customer requirements and the partnering opportunities on the market. The modularization limits the change impact and allows technology to be embedded quickly in the end2end supply chain. The mobile application leverages external maps to show the customer the driver’s location. These maps work on standard formats like *.kml.

**Step 6: Composition**

Likewise, in the world of LEGO, composition implicates finding the perfect fit for the defined modules, own capabilities and partners in order to set up a customer-centric company. The future supply chain is composed of experts, like invoice-clearing specialists, supplier-collaboration platforms, distributor-fulfillment partners and 4PL providers. This composition needs to be highly adaptable to cope with the challenges created by customers and service innovators.

**Step 7: Business case**

Although ‘lighthouse projects’ are used as a learning platform, the final evaluation and decision must be calculated within a business case. It is not about having fancy apps.

This seven step approach of concentrating on the key factors of success is paving the road to digital transformation. Similarly to the Theory of Constraints, you should not seek the bottleneck, but rather the sweet spot of technology impact. Using this approach, a specialized manufacturer of commercial vehicles increased spare parts availability by 15 percentage points, while reducing inventories. The technological enabler was monitoring the installed base while leveraging machine learning algorithms.
5. Digital Supply Chain Transformation – Revolution or High Speed Evolution?

The digital supply chain transformation is on its way – the time to wait and see is over. The digital supply chain transformation is coming and digital leaders are driving up customer expectations, which is leading to higher standards.

The intelligent leveraging of new technologies within layered modularized systems will decide which companies are successful in the future, and this will be expressed in having educated answers to the questions on the next side.

There is still a long way to go and a profound change and re-think is needed, which makes it an evolutionary process. The boost in technology and the fact that digital leaders are not thwarted by the moment of inertia are pushing the speed of innovation. To keep up with the pace of innovation of those digital leaders, or even become one of them, companies have to learn to see digital opportunities, prioritize opportunities and build up a quickly adaptable, modular system while working on the basis of a digital supply chain.

How intelligently companies leverage new technologies within layered modularized systems will decide which companies – or better, company networks – will be successful in future, and which ones will not.

KEY MESSAGE
Integration capabilities enable an evolutionary digital journey
Questions to be answered!

1. Do you track your customer satisfaction with regard to supply chain performance?

2. Does your company have full E2E supply chain visibility?

3. Do you break down your main service level KPIs into sub-KPIs across the entire supply chain?

4. Does your company regularly review its supply chain segmentation to maximize the perceived value?

5. Does your company run a segment-specific strategy for supply chain digitization?

6. Does your company leverage service innovators to boost innovation?

7. Is your company able to assess the impact of technology on performance and costs?
Barkawi Management Consultants was founded in 1994. Today it has more than 100 employees and offices in Munich (head office), Shanghai, Moscow, Atlanta and Vienna. The clients of Barkawi Management Consultants are global enterprises with capital-intensive and logistically complex business models, for instance 3M, BMW, Coca-Cola, Daimler, Fresenius, Siemens, Vodafone, etc.

Barkawi Management Consultants GmbH & Co. KG
Baierbrunner Str. 35
81379 Munich
Germany

Phone:  +49 89 749826-0
Fax:  +49 89 749826-739

info@barkawi.com
www.barkawi.com

Barkawi Management Consultants is part of the Barkawi Group. Carena and Karim Barkawi are CEOs of the holding.

Awards

Data contained in this document is not binding and serves information purposes only.

Barkawi Management Consultants GmbH does not accept any liability for material or intangible damage resulting from the use of this publication.

© 2016 Barkawi Management Consultants GmbH.
All rights reserved.

Image rights:
Shutterstock: Pages 1, 6, 9, 14, 16
Due to the performance of digital leaders like Amazon, Uber and other highly innovative and disruptive business models, supply chain managers are confronted with the task of optimizing their delivery performance to keep pace with these exemplary benchmarks. Concepts like scanning-point based tracking & tracing or computer aided tour planning are already everyday services today.

**Supply Chain Digitization - Are you ready for the digital journey?**

To keep up with the pace of innovation of the digital leaders, or even become one of them, companies have to learn to see digital opportunities, prioritize opportunities of the digital supply chain. How intelligently companies leverage new technologies within layered modularized systems will decide which companies – or better, company networks – will be successful in future, and which ones will not.

Take a trip to the world of digital supply chains and learn how to become a digital winner!