Digitizing the Value Chain
for High Performance
Every day, we experience the fast-paced digitization of consumer Information technology (IT), which is driven by smartphones, mobile access and apps. In addition, there is a new megatrend, which will permanently change the face of the German economy.

Industry 4.0 is currently on everyone's mind. It encompasses intelligent products manufactured in smart factories, products connected in intelligent networks, and new opportunities for Internet-based services created by connecting to customers. Huge opportunities for new services and extended business models have opened up for Germany’s industries. Intelligent products in intelligent networks will significantly influence Germany's industries in the future, whether in the field of traffic flow management, providing assistance to patients in the field of home care, optimization of energy efficiency in smart grids or improved productivity in manufacturing. German companies must harness this megatrend. IT-controlled products are no longer considered a novelty. However, the service-business models spawned by these intelligent products connected via the Internet are a new phenomenon.

Sooner or later, every company will have to deal with the impact of digitization on its business model. A digital vision is required to retain customers using intelligent products, digital supply chains and services. It is also needed to ensure that data in the company can yield the relevant information for decision-making and for new forms of cooperation in distributed, intelligent networks. While this offers great opportunities, it also presents great challenges. CEOs who delegate this task to the second or third level may not keep pace with the digital revolution. In the future, Industry 4.0 competence (and intelligent products in intelligent networks) will have to be accorded top priority by the head of any organization.
Imagine a future in which individuals and businesses can create products they need with the click of a mouse. A sports enthusiast prints a bicycle at home and heads off to the hills for a mountain-biking expedition. Or an aeronautics company produces the wing of an aircraft using a computer connected to a printer. What might seem like an implausible dream today might soon become reality, for consumers and industry alike.

The possibilities offered by digital technologies over the past two decades have been nothing short of remarkable. The pervasiveness of broadband, ubiquitous connectivity, cloud computing, the ‘Internet of Things’, social networking — all of them have transformed how we work, communicate, socialize, and do business.

These new digital technologies have brought many business opportunities. To fully embrace these digital technologies, you need to rethink your strategy. A great way to start is to focus on your company’s value chain and the digitization of all its parts.

In this Accenture point of view, we:
- Provide a framework to guide you in your thinking, and furnish examples of how companies have taken the first steps towards success in the digital age.
- Highlight six value chain activities typical for a product-oriented company: new product development; sourcing and direct procurement; manufacturing; marketing and sales; distribution; and after-sales service.
- Show how some of today’s pioneering digitization applications — from gamification and behavioural marketing to 3-D printing, eKanban and radio-frequency identification (RFID) — are currently being used across the value chain to help companies generate more value for their own organizations and the customers they serve.

Innovative digital solutions can reduce costs and add value at every stage of a product’s life-cycle, both within each stage of the value chain and across its entirety. While pockets of digitization highlight their potential, it is essential for businesses to harness the synergies of a fully integrated value chain — one that is based on and supported by digital technologies. When they are able to do so, we believe that digitization will truly pave the way for the next industrial revolution.

The fourth industrial revolution, which is often referred to as ‘Industry 4.0’, is a groundbreaking approach to manufacturing. It promises to turn the industrial world on its head by combining classic production techniques with cyber-physical production systems (CPPS), leading to the creation of an ‘Internet of Things, Data and Services’. These new types of production systems will also signal a shift from existing business models as revolutionary new applications are made available, new service providers emerge and new value chains become possible. This horizontal integration of intelligent products and networks in new (and potentially non-linear) value chains is likely to usher profound changes into product-oriented industries.
Digitization has a clear impact on how organizations and individuals manage their day-to-day activities. It enables businesses and governments to operate with greater transparency and efficiency. And it boosts individuals’ access to everything from innovative products to public services.

The benefits don’t stop there. By following a digital strategy and implementing digital technologies, you can enhance your business performance, provide new career opportunities for your employees, improve the quality of life for your customers, and even reduce your carbon footprint and become more sustainable.

Digitization can also drive down costs, while ramping up speed. Digital products, or key parts thereof, can be transported almost instantaneously around the globe.

Going digital not only provides opportunities to offer better services around existing products, but also sets the stage for a host of businesses that harness new technologies such as connected health.

The new digital landscape: rethink your strategy

In this always-on, always-connected world where the transfer of information is instantaneous, enterprises find themselves facing several unique challenges.

Radical and rapid shifts in customer behaviour, the pressure for personalized products and instant product and service availability, and the advent of new technologies and distribution channels are forcing companies to rethink their strategies. This means embracing and deploying digitization at the right time and in the right places, together with your business partners, along the entire value chain.

Reworking your value chain in the face of digitization

Not only do you need to come up with innovative products and services, but you also need to inject innovation into the way you conduct your business digitally. You need to create a culture of innovation by fostering out-of-the-box thinking and embracing emerging technologies. By establishing an open environment that welcomes ideas, collaboration, contribution and evaluation, you can reduce innovation cycles and maximize market impact. It is advisable to plan your data needs upfront and design your products and services in a manner that generates the data that is really required.

It is best to start with your value chain. That’s because innovative digital solutions can help you reduce costs and add value, both within each phase of the value chain and along its entirety.

Here, we provide a framework to help support your thinking and also highlight how successful companies have taken the first steps towards success in the digital age.
Digitizing the Value Chain

Digital innovations that drive future growth and change the way we do business

Value Activities

- Infrastructure, Indirect Procurement, Finance, Accounting, Information Technology, Human Resources
- New Product Development
- Sourcing & Direct Procurement
- Manufacturing
- Marketing
- Distribution
- After-Sales Service
- Further development of existing products & services
- Logistics

Selected Digital Techniques

- 3-D printing
- Gamification
- Plug and produce
- Virtualization/digital mock-up
- Digital factory
- Virtual prototyping
- Transponder RFID
- Behavioural marketing
- eKanban
- eSourcing
- eCustomer care
- MES

The digital applications highlighted above are just a representative sampling of the many applications currently available or under development. While some — such as eFreight or eMaintenance — are aligned to specific stages of the value chain, many can be applied individually or in a networked fashion to drive value in (and across) multiple stages. In fact, the fluidity and multi-stage relevance of these applications may lead to the emergence of non-linear value chains.

That's because the new digital solutions not only enable more complex modelling that blurs the lines between sequential phases of activity, but also allow business leaders to think about value in more holistic terms.

See detailed case studies of highlighted applications on page 6/7.
Described below are five pioneering digitization applications that cover the entire range of value chain functions — from new product development to sourcing and direct procurement, manufacturing, marketing and sales, distribution, and after-sales service.

1. Gamification: a key to user engagement

Imagine being able to harness the intensity that keeps Generation Y customers fixated on their screens and direct it toward fulfilling business outcomes. That’s the power of gamification in today’s increasingly digital marketplace. Many brands are integrating game mechanics in unique and compelling ways, all with the purpose of driving user engagement, increasing customer satisfaction and retention, and ultimately driving sales.

Gamification@Rossignol

The 100-year-old alpine equipment company Rossignol is developing gamification tools in a bid to move closer towards its customers. Tapping into the fact that skiers and snowboarders love to gather après ski and re-live their best runs, Rossignol’s mobile Ski Pursuit app helps track users’ daily and season-long performance. Ski Pursuit also enables skiers to share details of any statistics they are particularly proud of on Facebook and Twitter. As Rossignol states: ‘Before, it was only about product and specs and design. And it still is, but now our innovations have a pulse, a human desire, and a meaning.’

2. Behavioural Marketing: effective customer targeting

Behavioural marketing has helped online advertisers gauge the interests of readers and subsequently grab their attention with relevant offerings. Website publishers and online advertisers are using a range of sophisticated technologies and techniques to enhance the effectiveness of their campaigns by capturing data generated when users visit their websites and landing pages.

The benefits include increased sales opportunities, advertisements tailored to specific customer needs, increased relevance of product offers and promotions, as well as better opportunities for up- and cross-selling.

Interest-based Advertising@Google

In 2011, Google rolled out Interest-based Advertising to all its advertisers. Interest-based advertising enables advertisers to reach users based on their inferred interests and demographics — advertisers have the freedom to choose from over a thousand interest categories. The new feature is clearly working: Google cites one advertiser as increasing brand lift by 40 percent and another, a shoe retailer, driving 400 percent more conversions at a lower cost-per-sale.

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1 Rossignol.com, Ski Pursuit, The first Social Ski App!, Retrieved on April 10, 2013; and Brand Philosophy: the pure mountain company, Retrieved on April 17, 2013
2 Google, April 17, 2013
3. 3-D Printing: a revolution in manufacturing

It was important enough for the US President, Barack Obama, to mention in his 2013 State of the Union address. Hailed as one of five technology trends to watch by the Consumer Electronics Association in its 2013 report, 3-D printing has the potential to revolutionize the way product development and manufacturing is carried out and can disrupt an array of industries. 3-D printing can help optimize supply chains and reduce costs by enabling companies to print prototypes, end-consumer products or even spare parts on demand locally instead of centrally. The closer to the point of need that companies can print product, the more they can reduce their transportation costs and lead time.

3-D Printing@a mobile phone manufacturer

In a first of its kind, a leading mobile phone manufacturer is encouraging its customers to print their own phone cases using 3-D printing. The company recently unveiled mechanical drawings to help its customers create personalized versions of the casing for its phone models. This will aid the company’s efforts to interact directly with its customers, offering them customized services.

4. eKanban: enabling real-time visibility

A scheduling system for lean and just-in-time production, Kanban has been helping companies keep inventories low for several decades by ensuring that goods and equipment arrive shortly before a production run begins.

Currently, electronic Kanban (eKanban) uses the Internet as a method of routing messages to external suppliers to provide real-time visibility into the entire supply chain. It boasts a host of benefits, including lower inventory stock levels, less physical transportation, a reduction in working capital and increased liquidity.

eKanban@BMW

BMW implemented an eKanban system together with Lear Corporation, one of its car seat suppliers. Based on BMW’s daily demand and supported by an enterprise resource planning (ERP) interface, forecast delivery schedules are sent to Lear in real time, giving the supplier 300 minutes to produce and deliver the seats just-in-sequence directly to the assembly line. In its first year of operation, the eKanban system produced savings of more than €63 million (approximately US$82.6 million).³

5. Radio-frequency identification (RFID): forging connections

Often, the inability to locate a crucial component in the warehouse can jeopardize an entire assembly cycle. Now, by using RFID technology, these problems might just be a thing of the past.

Technologies such as RFID tags, the first building blocks for ‘The Internet of Things’, have also enabled organizations to transform their existing hybrid supply chain structures into more open, agile, flexible and collaborative digital models.

RFID technology@TAP Maintenance & Engineering

TAP Maintenance & Engineering (M&E) has introduced a state-of-the-art RFID technology into its daily engine-maintenance operations. As part of the new solution, passive RFID ultra-high frequency (UHF) labels are codified, printed and attached to the engine components undergoing maintenance. This process enables the TAP M&E engine-maintenance department to identify each component in all the subsequent processes. This ensures faster and faultless maintenance through increased transparency.⁴

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³ Integrierte Materialwirtschaft und Logistik: Beschaffung, Logistik, Materialwirtschaft und Produktion, Helmut Wannenwetsch, January 1, 2010
⁴ Tapportugal.com, RFID technology in full operation at TAP M&E, 27/1/2012-Retrieved April 10, 2013
What's next? Future digital applications along the value chain

A Digital Revolution in Production

Industry 4.0, a groundbreaking approach to production, promises to usher dramatic changes into the industrial world.

Billed as the fourth industrial revolution, Industry 4.0 is poised to combine classic production techniques with cyber-physical production systems (CPPS), leading to the creation of an ‘Internet of Things, Data and Services’. Industry 4.0 represents a tectonic shift from centralized to decentralized production. This means that industrial production machinery no longer simply ‘processes’ the product, but that the product communicates with the machinery to tell it exactly what to do.

Decentralized intelligence helps create intelligent object networking and independent process management; the interaction of the real and virtual worlds represents an entirely new way of approaching the manufacturing and production process. Industrial processes, for example, can be made more efficient by connecting them to the Internet in a ‘Smart Factory’.

A Digital Revolution in Services

Cyber-physical production systems also signal a paradigm shift from existing business models, as revolutionary new applications are developed, new service providers emerge, and new value chains become possible.

The new and intelligent products, embedded in intelligent networks, can potentially be harnessed to spin off a host of new business models. The horizontal integration of these intelligent products and networks can also help expand the value chain.

Companies can up the ante from merely producing intelligent devices to adding more value by coupling the product with a host of services brought about by the deep analysis of data. New ‘Big Data’ processing technologies allow the analysis of large amounts of data collected from digitized products and networked sensors. They can also help accelerate the entire data cycle from insight to action, enhancing the enterprise’s ability to deal with data velocity.

A symbiotic example

Trumpf connects the real and the virtual world, while creating a new market

In the field of manufacturing, Trumpf, a German producer of intelligent machine tools and industrial laser systems, is already taking the next step beyond efficiently manufacturing its machines. Instead, it is interested in mining the information provided by the machines, to gain deeper, actionable insights and to network machines in an intelligent way in order to create smart factories. There, they autonomously exchange information, trigger actions and control each other.

At Trumpf, networking has already advanced greatly. Apart from a cloud-based platform for remote diagnostics, there is the Trumpf software for production control. The software takes the inventories and the urgency of order processing into account and allows the production status to be remotely monitored via an app. Soon, even individual machines will be controlled using iPads, and laser lenses equipped with RFID chips will signal when they want to be cleaned. “All Industry 4.0 activities at Trumpf are aimed at further increasing the machines’ productivity, making better use of resources, and thereby ensuring that our customers remain at the top internationally.”

5 Trumpf, 17 April 2013
A number of existing or emerging digital solutions are poised to support the entire set of operations along the value chain in an integrated manner, adding value in the process.

Listed below are three examples:

**Next-Generation Corporate Optimization and Execution:**
Driving down costs

ERP systems already provide plenty of applications, from customer relationship management (CRM) to sourcing, manufacturing and forecasting. Future ERP systems will leverage in-memory computing, advanced Web portals and cloud computing, thereby offering all the entities along the supply chain access to real-time data and need-based data processing. This can yield benefits like lower capital expenditure, reduced costs and quicker implementation. By harnessing the cloud skillfully, companies can also enter completely new businesses or launch new products at short notice.

**Crowdsourcing:**
Leveraging the power of the social

Behavioural marketing and gamification are also getting a boost through crowdsourcing. As several successful innovators have learned, opening up the innovation process to the collective wisdom of the crowd can dramatically boost the odds of coming up with the next big idea before someone else does. While outsourcing currently encompasses activities such as sourcing, information technology and logistics, it is possible that the future will see entire parts of the supply chain outsourced to an undefined, anonymous crowd using technologies such as the Internet.

**Next-Generation 3-D Printing:**
Eliminating the supply chain

3-D printing is likely to be one of the leading technologies in the future that will significantly change the way products are developed, produced, delivered and serviced. Consumers may have the opportunity to design products on their own personal computers or co-design them with companies using the Internet, producing them within the confines of their own homes ('fab at home'). With further refinement in technology and a reduction in printing costs, 3-D printing could render an entire phase of traditional supply chains obsolete.
Almost all industry sectors are likely to be transformed by these new value chain models in the future. Examples like Connected Car in the automotive industry, Smart Grid or Smart Home in the energy economy, and Connected Learning in the education sector already point to the potential for new business models.

However, an end-to-end holistic digital mindset is crucial to identify the sweet spots for intelligent products and networks in these extended value chains.

In our view, only with such a mindset can you develop intelligent business models that give you a competitive edge and help you stay relevant to digitally empowered consumers around the world.

Go digital, go holistic
Are you ready to digitize your value chain?
Listed below are questions to help you assess the digital health of your company:

1. Is your company already pursuing a digital strategy or currently thinking of defining one?

2. While developing your digital strategy, what economic impact will digitization have on:
   - Your products: have you re-thought your products and the value they deliver to your customers, given the data they could potentially generate?
   - Your services: how do digitization and its possibilities affect both the services you provide and their delivery?
   - Your organization: what structures would you adapt to enable your organization to deliver more and/or different output faster and more cost-effectively?
   - Your processes: how can you use digitization to further refine, optimize and improve the flexibility of the processes used in your company?
   - Your end-to-end value chain: how can you optimize the entire value chain using digital applications, making it more robust and agile? What interfaces could you set up with each of the external stakeholders to increase the speed and/or effectiveness of communication and add value for your customers?

3. Is your company currently leveraging digital technologies such as gamification, behavioural marketing, crowdsourcing, 3-D printing, eKanban or RFID in:
   - Your products: do your products embody one or more of the technologies mentioned above? What data would enable you to deliver the most value for your customers, either directly in the product or as an ancillary service? Are you testing different offerings and approaches based on emerging digital technologies?
   - Your services: how do these technologies impact the services you deliver?
   - Your organization: which of the digital technologies mentioned above are currently in use in your organization?
   - Your processes: have you identified where one or more of these technologies are being used in your processes? What opportunities for process simplification and optimization do they open up?

4. Is digital thinking, using the technologies we have outlined, embedded into all parts of your value chain?
   - Your research and development?
   - Your marketing and sales?
   - Your sourcing and procurement?
   - Your production?
   - Your after-sales service?
   - Your upstream and downstream value chain processes?

5. What data do you require to fulfil the current and future needs of your customers and outpace competition?
   - What data is necessary to enable the opportunities that were revealed while answering the questions above?
   - How will your needs and those of your customers evolve?

6. Can this data be provided by:
   - Your organization, its processes and digital technologies?
   - Your external partners’ organizations, processes and digital technologies?
About Accenture

Accenture is a global management consulting, technology services and outsourcing company, with approximately 261,000 people serving clients in more than 120 countries. Combining unparalleled experience, comprehensive capabilities across all industries and business functions, and extensive research on the world’s most successful companies, Accenture collaborates with clients to help them become high-performance businesses and governments. The company generated net revenues of US$27.9 billion for the fiscal year ended Aug. 31, 2012. Its home page is www.accenture.com.

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