TOMORROW'S CHALLENGES

THREE KEY QUESTIONS YOU WILL NOT ESCAPE FOR INDUSTRY 4.0

CONSIDERING THE MANAGERIAL IMPLICATIONS OF TECHNOLOGICAL INNOVATIONS

By IMD Professor Ralf W. Seifert, with Richard Markoff

IMD
Chemin de Bellerive 23
PO Box 915,
CH-1001 Lausanne
Switzerland

Tel: +41 21 618 01 11
Fax: +41 21 618 07 07
info@imd.org
www.imd.org

A recent survey by IMD business school asked supply chain leaders across Europe to select from a diverse list of 20 hot topics what would be their biggest supply chain drivers in 2020. They were also asked to rank their company's readiness to exploit these drivers.

The top five supply chain drivers for which the implementation gap was the largest touched on Big Data, Digitalization, Internet of Things and Artificial Intelligence, all pillars of Industry 4.0 along with automation, 3D printing and other digital innovations. These are exciting new technologies, but the survey shows that the current reality of supply chains is that, notable exceptions aside, the majority of companies are still not ready to use them.

This is the true challenge of Industry 4.0: even as technological advances continue apace and early adopters reap the benefits of those technologies that fit their business context, executives at most companies are bewildered by the array of technologies and capabilities already available and do not always see an obvious entry point. Even after they have selected an innovation avenue, the business case is not easy to establish. And for those companies that do select an Industry 4.0 innovation justify the economic case and get to implementation, there are still unique barriers to change that must be overcome. Taken together, this is a three-part problem that companies looking to innovate through Industry 4.0 need to solve: How will companies build paths to (1) select, (2) justify and (3) leverage the functionalities available to them? Each of the challenges is worth a closer look.

1) Finding the right industry 4.0 fit

It isn't always clear for supply chain leaders which Industry 4.0 innovation initiatives to adopt. Industry 4.0 offers a host of exciting technologies, with a rich landscape of options and vendors attractive to senior management, but with high complexity risks for those closer to operations, who see a dizzying array of vendors and options. Adding to the puzzle, there are *'internal'* and *'external'* business drivers that might dictate which innovations have the greatest potential benefit and warrant prioritization.

The external market forces that pull supply chains towards Industry 4.0 solutions could be linked to mass customization, agility in the face of ever more variable demand, using Big Data to understand and predict consumer behavior, and cloud collaboration networks with suppliers and customers.

There are prominent examples that show the potential of Industry 4.0. One is the use of 3D printing to produce customized hearing aids within hours, leading the way to wider use of 3D printing in medical devices such as titanium knees or spinal prosthetics. The potential is high enough that the FDA just released guidance that establishes the path to regulatory approval for 3D printed medical devices. FMCG companies are now using predictive analytics fed by big data to understand how consumers may react to new product launches in order to better size demand plans.

These are exciting opportunities that extend beyond supply chain and must be part of an overall definition of business strategy led by the CEO, wherein supply chain is one of many important actors in the conversation but that Industry 4.0 helps make possible. For example, investing in cloud-based order management tools that make it possible to leverage stores, warehouses and even third-party stocks to optimally fulfil ecommerce orders is a task for supply chains to solve. Even decisions on the configuration of the physical network are now dependent on the ecommerce order fulfilment strategy. However, the decision to use stores to fulfil ecommerce orders, either with stock or via click-and-collect, is clearly part of an overall business strategy. The business strategy must position the priorities of ecommerce, store traffic and order lead time, and weigh staff training and complexity. Supply chains have a voice in the discussion to be sure, and the discussion must be had before rushing to implementation.

Going further upstream, deploying automation to increase the agility of line changeovers makes more sense if the business strategy is to have a larger product portfolio with smaller volumes and more promotional activity. The industrial strategy is a function of the business strategy, not the other way around. For example, Adidas is innovating in the shoe market by deploying 3D printing to support a strategy of offering customized insoles and limited edition models. Their competitor Nike has announced an automation program that is remaking their geographical production footprint and bringing increased agility to their supply chain.

In terms of internal business drivers, automation, transparent S&OP planning suites, connected production sensors, predictive maintenance and shop floor augmented reality can have immediate benefits for safety, quality and efficiency. These solutions are interesting because of internal performance ambitions, rather than external market influences, and they are more independent of the overall business strategy.

They may seem to lie purely within the domain of supply chain and operations, but in fact are often multidisciplinary. Even something like demand sensing, using Big Data and predictive analytics to 'sense' short-term trends in consumer demand, is best done with the collaboration of commercial and category management teams. Without their support, accessing, understanding and leveraging the data will be difficult for the supply chain to achieve.

Once the challenge of identifying and prioritizing the most compelling possibilities of Industry 4.0 has been addressed, the next step is justifying the economic business case.

2) Calculating a business case

Adopting an Industry 4.0 technology, be it in response to internal or external business drivers, requires a uniquely challenging economic justification, since it goes beyond straightforward return on investment scenarios.

This is partly because many Industry 4.0 technologies have not yet been widely deployed, and there may be reluctance to be the first adopter. New technology solutions are often met with skepticism, which can raise the bar for the return on investment as there are few demonstrable business cases available for comparison. When the proposed technology is truly cutting-edge, the risks of failure are higher and the economic case is held up to greater scrutiny. Not every company has leaders ready to champion and sponsor innovation in the face of uncertain or less tangible outcomes.

One FMCG company we spoke to was an early adopter of AGVs – automated guided vehicles that replace driver-piloted forklifts. The pilot project showed a best-case payback of five years – just long enough for the project to be halted in its tracks for lack of a compelling return. However, the head of operations pushed forward, seeing the less tangible but critical value that investing in AGVs would represent. This would send a clear message that the company placed importance on safety, cleanliness and innovation. Today AGVs are widely deployed worldwide and their contribution is not questioned. How many companies have similarly visionary leaders ready to take risks on Industry 4.0? Indeed, most of the Industry 4.0 success stories we have encountered reached implementation through management's conviction that their company had to be an innovation leader rather than an ironclad economic justification.

When Industry 4.0 solutions are due to external forces, this adds a layer of complexity. Supply chain managers are more used to justifying investments that provide efficiency or are required to meet a stated, projected demand. When the investments are part of a shift in business strategy, both the top and bottom lines in the economic model are moving, clouding the question even further. This is an opportunity for supply chain managers. They may now have a voice in shaping business strategy, rather than being uniquely a function of it.

An essential element to consider is scalability. A business case is more compelling when it is possible to pilot a new technology in a small, controlled environment before scaling up company-wide. Where possible, this can limit the size of the investment, but might discourage innovations that require high upfront fixed costs regardless of scale, such as a collaboration platform.

3) Overcoming barriers to implementation

Any technology deployment will inevitably encounter barriers to implementation. There are the usual hurdles of employee engagement, skepticism and fear of being unable to adapt that cannot be ignored. But Industry 4.0 entails other dimensions of implementation challenges.

The potential lack of a clear business case might undermine the motivation of key implementation actors, especially if the transverse nature of the transformation undermines their economic incentives (our research on this will be published in a forthcoming article in The European Business Review). For example, factory managers purely motivated around cost and efficiency may resist Industry 4.0 initiatives that promote connectivity, transparency and agility.

With so many companies looking to implement their Industry 4.0 strategy, finding qualified talent is becoming a problem. Similarly, the skill levels of current employees might not be adequate, raising the required training effort.

From a technology perspective, increased connectivity and cloud projects mean that issues like cybersecurity and data ownership must be addressed. Business continuity plans may no longer be suitable with the emergence of new risk points and overall system threats.

What's next?

Industry 4.0 advocates would do well to focus not only on the technology but also on the managerial implications. The technology is exciting and will undoubtedly change operations in the years to come. But for companies that are looking to participate in and benefit from Industry 4.0 must prioritize projects that are consistent with an external business strategy, identify what the true benefits are, and understand how ready they are to make the change happen.

Ralf Seifert is Professor of Operations Management at IMD. He directs IMD's Digital Supply Chain Management program, which addresses both traditional supply chain strategy and implementation issues as well as digitalization trends and new technologies.

Richard Markoff is a supply chain researcher, consultant, coach and lecturer. He has worked in supply chain for L'Oréal for 22 years, in Canada, the US and France, spanning the entire value chain from manufacturing to customer collaboration.