Lean Management on the Downstream (Demand Side)

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Progress is impossible without the ability to admit mistakes. Kaizen means ongoing improvement involving everybody, without spending much money. You can't do kaizen just once or twice and expect immediate results. You have to be in it for the long haul.

Masaaki Imai (1930-today)

11.1 Lean Management on Demand Side

In the present competitive market environment, it is important to apply lean tools across the supply chain. Lean concepts provide supply chain agility to produce and deliver products in a flexible, timely, and cost-effective manner with the highest quality standards (Helmold and Samara 2019).

11.1.1 Efficient Consumer Response (ECR)

ECR (Efficient Consumer Response) is a strategy to increase the level of services to consumers through close cooperation among retailers, wholesalers, and manufacturers. By aiming to improve the efficiency of a supply chain as a whole beyond the wall of retailers, wholesalers, and manufacturers, they can consequently gain larger profits than each of them pursuing their own business goals. Companies who compose the supply chain can reduce the opportunity loss, inventory level, and entire cost, as well as increase monetary profitability by sharing the purpose of "customer satisfaction". "ECR" is a strategic concept compiled by a consulting firm "Kurt Simon Associates" at the request of organizations concerning the US processed food distribution industry, aiming to recover the competitive strength for surviving the turbulent time of the industry when discounters emerged in the USA. For "ECR",

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reengineering such as eliminating or adding business operations is performed by checking all business operations of a supply chain of companies by a criterion of whether they contribute to providing higher values to consumers. This aims to provide better convenience, better products, better quality, and better selection of goods and build a "win-win" relationship among companies concerned (i.e. every company of a supply chain wins and gains profits). The first target of ECR is to reengineer business processes. To realize the reengineering, information technology such as EDI (Electronic Data Interchange) that is used for accurate and timely exchange of information between companies is necessary. Characteristic of ECR is that reengineering is performed considering final results given to consumers from unified business processes and that can be realized by information technology.

11.1.2 Vendor-Managed Inventory (VMI)

Vendor-managed inventory (VMI) is a concept and business models in which the customer of a product range discloses information in terms of production planning, forecasts, and demands to the suppliers (vendor) of those products in order to enable the supplier takes full responsibility for maintaining an agreed inventory quantity of the material, usually at the buyer's warehouse. In many industries, the VMI is managed for a number of suppliers. VMI will thus help suppliers to optimize material and production in line with customer tact and to deliver material in sequence to the assembly line on request.

11.1.3 Enterprise Resource Planning Integration (ERP)

Enterprise resource planning (ERP) is defined as the ability to deliver an integrated suite of business applications. ERP tools share a common process and data model, covering broad and deep operational end-to-end processes, such as those found in finance, HR, distribution, manufacturing, service, and the supply chain.

11.1.4 Quick Response (QR)

Quick response manufacturing (QRM) is an approach to manufacturing which emphasizes the beneficial effect of reducing internal and external lead times. Quick response manufacturing (QRM) idea aims at permanent restructuring of manufacturing processes and continuous adjustment of actions to interior and exterior changes. The quick response manufacturing conception is, in a way, a modification of previous systems. Moreover, QRM is apparently directed to compress time in all the action spheres and delivery chains of a company. Its implementation not only ensures effective time management inside a company but also strengthens cooperation between suppliers and recipients. Besides, it also ensures a flexible reaction to market signals and improves competitiveness of a company in the long term. During the last few years, many of the

US companies have implemented the QRM strategy, which has given astounding results (Suri and Krishnamurthy 2003). The typical results were shortening the lead time (80–95percent both in the stages of production and planning/administration), lowering product costs (15–50percent), quality improvement of delivery realization (40–98percent), as well as better exploitation of materials and a decreased number of corrections (80percent). QRM has achieved these results owing to detailed management rules, production methods, analysis techniques, and tools. Additionally, QRM takes an extra effort to shorten the time of launching the product into the market.

11.1.5 Incoterms 2020

The International Chamber of Commerce (ICC) in Paris has been issuing "International Rules for the Interpretation of Commercial Contract Formulas" known as Incoterms (International Commercial Terms) since 1923. The Incoterms rules have become an essential part of the daily language of international trade. They have been incorporated in contracts for the sale of goods worldwide and provide rules and guidance to importers, exporters, lawyers, transporters, insurers, and students of international trade. After ICC's creation in 1919, one of its first initiatives was to facilitate international trade activities. In the early 1920s, the world business organization set out to understand the commercial trade terms used by merchants. This was done through a study that was limited to 6 commonly used terms in just 13 countries. The findings were published in 1923, highlighting disparities in interpretation. To examine the discrepancies identified in the initial survey, a second study was carried out. This time, the scope was expanded to the interpretation of trade terms used in more than 30 countries in 1928. Based on the findings of the studies, the first version of the Incoterms rules was published as a global standard. The terms included FAS, FOB, C&F, CIF, Ex Ship, and Ex Quay. Due to World War II, supplementary revisions of the Incoterms rules were suspended and did not resume again until the 1950s. The first revision of the Incoterms rules was then issued in 1953. It debuted three new trade terms for non-maritime transport. The new rules comprised DCP (Delivered Costs Paid), FOR (Free on Rail), and FOT (Free on Truck). The ICC launched the third revision of the Incoterms rules, which dealt with misinterpretations of the previous version. Two trade terms were added to address delivery at frontier (DAF) and delivery at destination (DDP). The increased use of air transportation gave cause for another version of the popular trade terms. This edition included the new term FOB Airport (Free on Board Airport). This rule aimed to allay confusion around the term FOB (Free on Board) by signifying the exact "vessel" used. With the expansion of carriage of goods in containers and new documentation processes came the need for another revision. This edition introduced the trade term FRC (Free Carrier at Named Point), which provided for goods not actually received by the ship's side but at a reception point on shore, such as a container yard. The fifth revision simplified the Free Carrier term by deleting rules for specific modes of transport (i.e. FOR, Free on Rail; FOT, Free on Truck; and FOB Airport, Free on Board Airport). It was considered sufficient to

use the general term FCA (Free Carrier at Named Point) instead. Other provisions accounted for increased use of electronic messages. The "License, Authorizations and Formalities" section of FAS and DEQ Incoterms rules was modified to comply with the way most customs authorities address the issues of exporter and importer of record. The Incoterms 2020 is the most current edition of the rules to date. This version consolidated the D-family of rules, removing DAF (Delivered at Frontier), DES (Delivered Ex Ship), DEQ (Delivered Ex Quay), and DDU (Delivered Duty Unpaid) and adding DAT (Delivered at Terminal) and DAP (Delivered at Place). Other modifications included an increased obligation for buyer and seller to cooperate on information sharing and changes to accommodate "string sales". To keep pace with the ever-evolving global trade landscape, the latest update to the trade terms is currently in progress and is set to be unveiled in 2020. The Incoterms 2020 Drafting Group includes lawyers, traders, and company representatives from around the world. The overall process will take 2 years as practical input on what works and what could possibly be improved will be collected from a range of Incoterms rules users worldwide and studied (Table 11.1).

11.2 Case Study: Huawei Manufacturing Strategy 2025

Automation in factories isn't new. Today, though, the disruptive force of digital transformation is taking manufacturing far beyond automation. Industry 4.0, mass customization, and advances in tech like 3D printing and nanomaterials have placed humanity at the cusp of several game changers when it comes to this US$11.6-trillion industry (Maidment 2016). Automation began back in the 1800s with mechanized cotton spinners, steam power, and the arrival of the first industrial revolution. By the 1930s, the automotive industry was leading the second industrial revolution of mass production, paving the way for the digital control systems of the 1970s. In the 1980s, car makers became intensive adopters of industrial robots, at which point computers and automation were embodying the third industrial revolution.

Table 11.1 International commercial terms 2020 (incoterms)

Abbreviations	Description (English/German)
EXW	Ex Works/Ab Werk
FCA	Free Carrier/Frei Frachtführer
FAS	Free Alongside Ship/Frei Längsseite Schiff
FOB	Free on Board/Frei an Bord
CFR	Cost and Freight/Kosten und Fracht
CIF	Cost, Insurance, and Freight/Kosten, Versicherung und Fracht
CPT	Carriage Paid To/Frachtfrei
CIP	Carriage, Insurance Paid To/Frachtfrei versichert
DAP	Delivered at Place/Geliefert benannter Ort
DAT	Delivered at Terminal/Geliefert Terminal
DDP	Delivered Duty Paid/Geliefert verzollt

Source: Author's own table, adopted from Helmold and Terry (2016)

Jump forward to more recent milestones, Foxconn in China was running up to ten automated production lines in some of its factories by the end of 2016, in the second of its three-phase full automation plan. Also in 2016, Adidas unveiled its first fully robot-built sneaker, 1 of 500 planned prototypes for its new factory in Germany. Though we're not quite there yet, the arrival of lights-out manufacturing is a case of when, not if.

Automation is certainly not new, but digital transformation is so much more than robots assembling parts – it's destined to disrupt every link in the manufacturing value chain and virtually lead us into the fourth industrial revolution: the cyber-physical age. As data takes centre stage, connectivity and cloud, big data and IoT, and AI and virtualization will act in concert to create a new business paradigm.

But, there's a problem: manufacturing enterprises have been sluggish when it comes to embracing digitalization.

Germany's Industry 4.0 might still draw a blank-face response from some business leaders, but it represents the next phase in manufacturing in Europe. Equivalents are the Industrial Internet in the USA and Made in China 2025. All involve the convergence of a range of technological enablers and accelerators, the result of which will be connected, smart factories and smart manufacturing.

Smart manufacturing goes beyond computing and automation. It creates a cyber-physical system, or digital twin, as a virtual model of a process, product, or service. Underpinned by ubiquitous, low-latency connectivity in the shape of 5G, smart sensors transmit data to the cloud where it's processed and analysed to give contextual and predictive data.

Pairing a physical and virtual world has several advantages. GE Digital's Denzil Samuels explains one advantage using the example of a jet engine on which smart sensors constantly transmit enough data to build a cyber copy, "The engine that's now being simulated can take over the pain of major aircraft engine maintenance by replacing a single blade that's worn as soon as we know about it. Or better still, predicting when it'll get worn to the point when it needs replacing, so we can minimize the amount of time that the engine is actually out of commission".

Moreover, the connectivity afforded by smart manufacturing links all processes from R&D, sourcing materials, and production to QA, sales, distribution, and logistics.

Over the next decade, smart manufacturing will extend past individual factories to connect groups of factories and the manufacturing industry with other verticals.

The convergence of manufacturing and services will continue with the XaaS model based on IoT and data insights. Thus, the services that manufacturers will require and deliver based on the products they make will increase, many of which will be driven by data insights and consumer demand. In the B2C space, consumers in emerging economies will become a dominant market presence, while demand in developed countries will fragment. However, customization in products and after-sales services is likely to increase.

3D printing will evolve from prototyping to a viable means of mass production in the 2020s. Advances in raw materials will enhance parts' design, manufacturing processes, and printing technology. At the same time, the use of nanomaterials,

which we're seeing today in products like clothing, sports goods, and electronics, will expand into an industry worth US$170 billion a year. Coupled with improvements in robotics and AI, new areas of demand will emerge.

Back to 2017, and C-suite executives need to consider how maturing technologies like AI, virtualization, and 3D printing will shape the future, alongside the connected manufacturing ecosystem of Industry 4.0 plus changing market dynamics. Despite advances in technology, we live in uncertain times. Strategic investment in digital infrastructure, skilled staff, and partnerships are the tools to make things happen in the next decade of smart disruption.

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