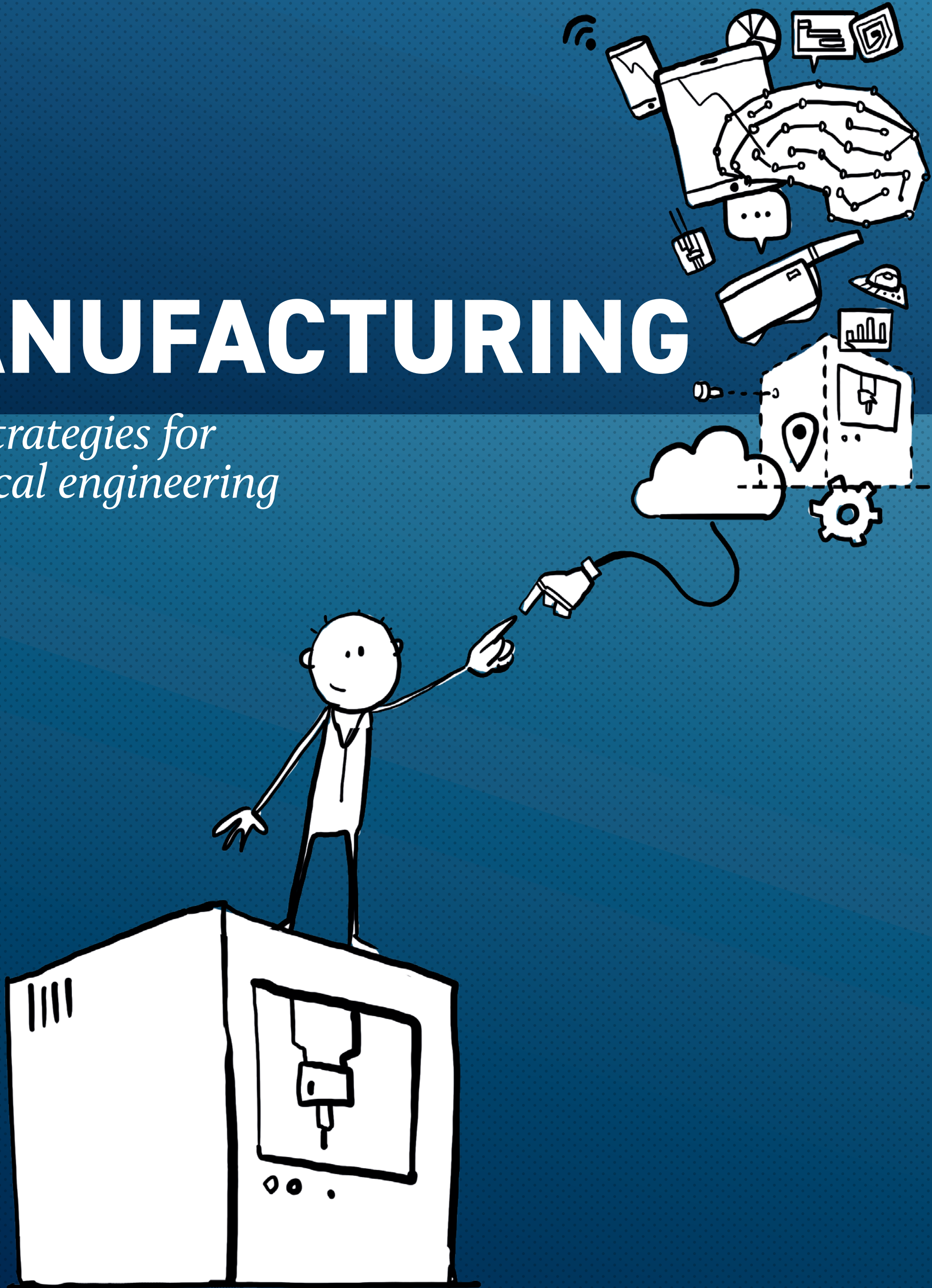
#57

ROI DIALOG

iMANUFACTURING

Digital strategies for mechanical engineering



ROI DIALOG ENGLISH EDITION 57_2018

ROI MANAGEMENT CONSULTANTS

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EDITION
#57

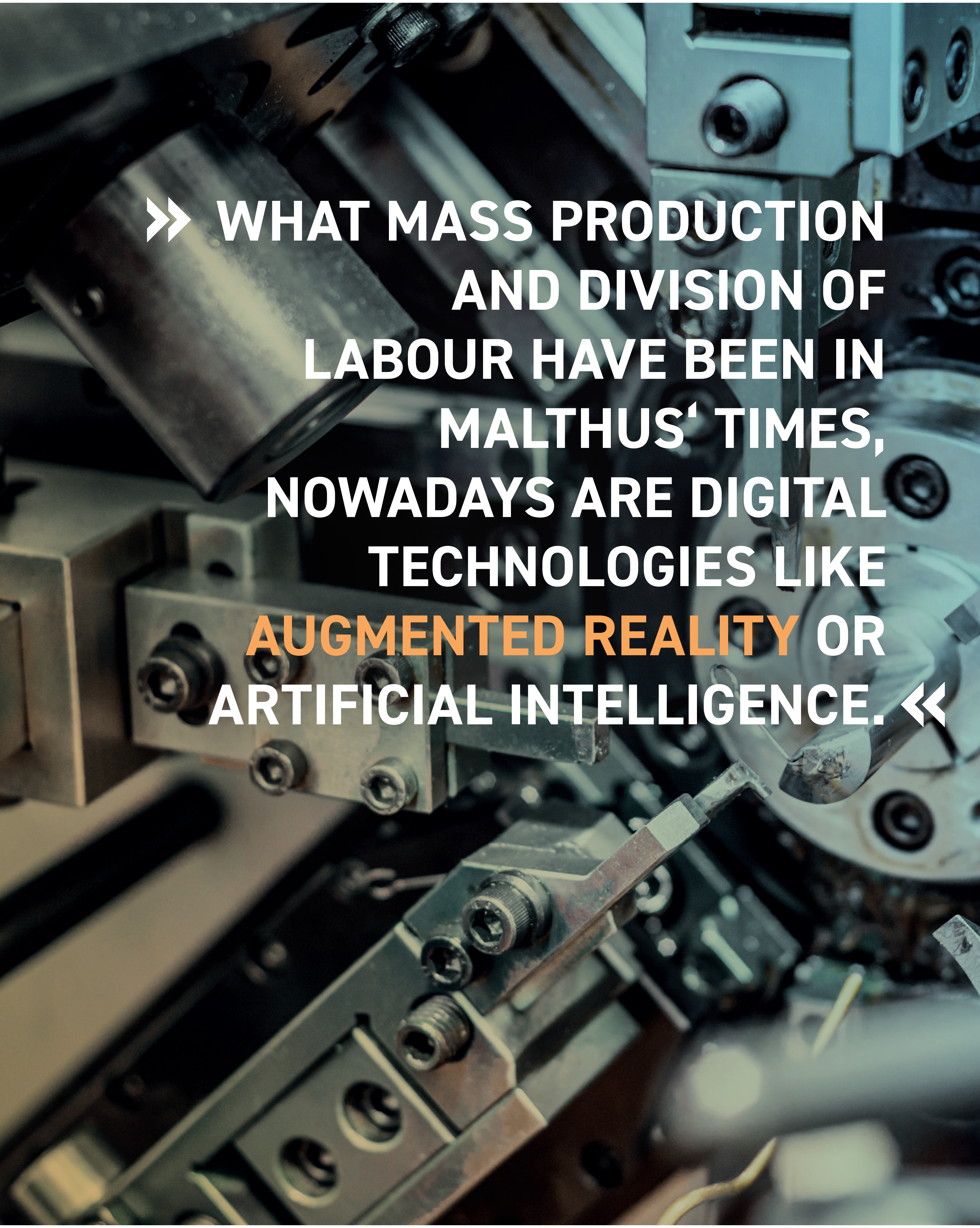
DESPITE RECORD SALES IN GERMAN SYSTEMS AND MECHANICAL ENGINEERING THE GROWTH PROSPECTS IN THE CORE BUSINESS ARE MODERATE. NEW SOLUTION APPROACHES ARE NEEDED TO COUNTERACT THIS TREND. With the development of an innovative, digital products and service business the growth limits can be shattered. A successful establishment of the digital business promises to be no less than the renaissance of systems and mechanical engineering.

By Hans-Georg Scheibe, Managing Partner

DIGITIZATION IN MECHANICAL ENGINEERING

BEYOND THE LIMITS OF GROWTH

It is the case with growth forecasts: The simpler the justification, the more suspicious one should be. For example, the British economist Thomas Malthus had this experience when he warned of wars and famines in Europe at the end of the 18th century. His reasoning: While the population was growing exponentially, food production was only experiencing linear growth. He quickly realised that this situation would sooner or later lead to a collapse, the so-called “Malthusian nightmare”. However, the catastrophe never came to pass because Malthus could not even begin to imagine the productivity gains that would eventually accelerate agriculture. From today’s point of view, Malthus presents a sad figure: a grumpy kill-joy who lacked imagination and optimism as well as belief in the innovative potential of humanity.



» WHAT MASS PRODUCTION AND DIVISION OF LABOUR HAVE BEEN IN MALTHUS‘ TIMES, NOWADAYS ARE DIGITAL TECHNOLOGIES LIKE AUGMENTED REALITY OR ARTIFICIAL INTELLIGENCE. «

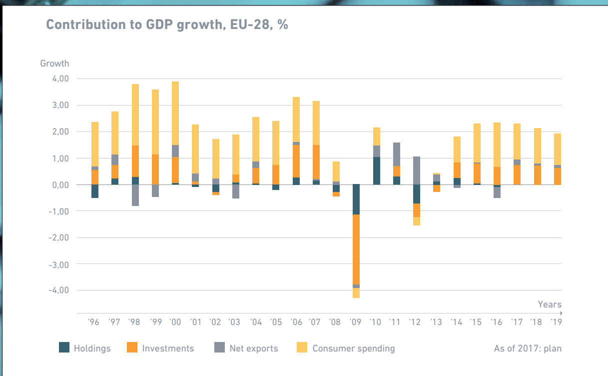


Fig. 1

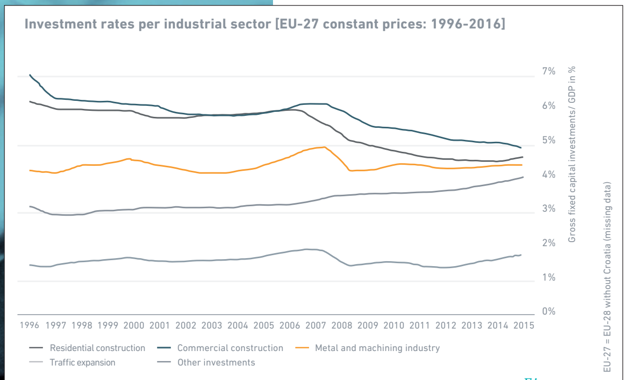


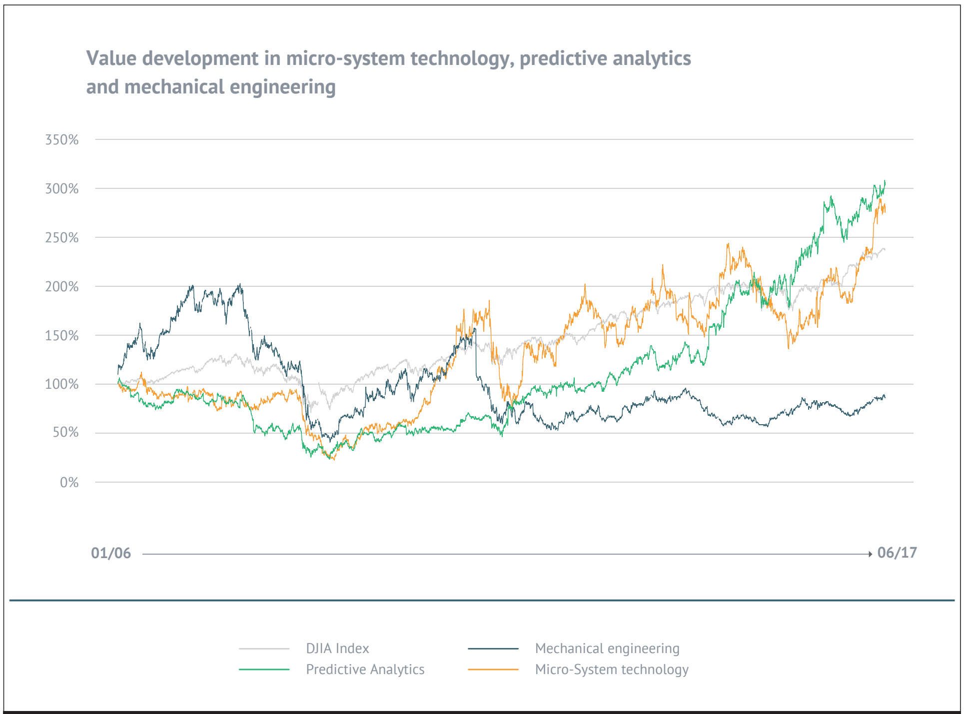
Fig. 2

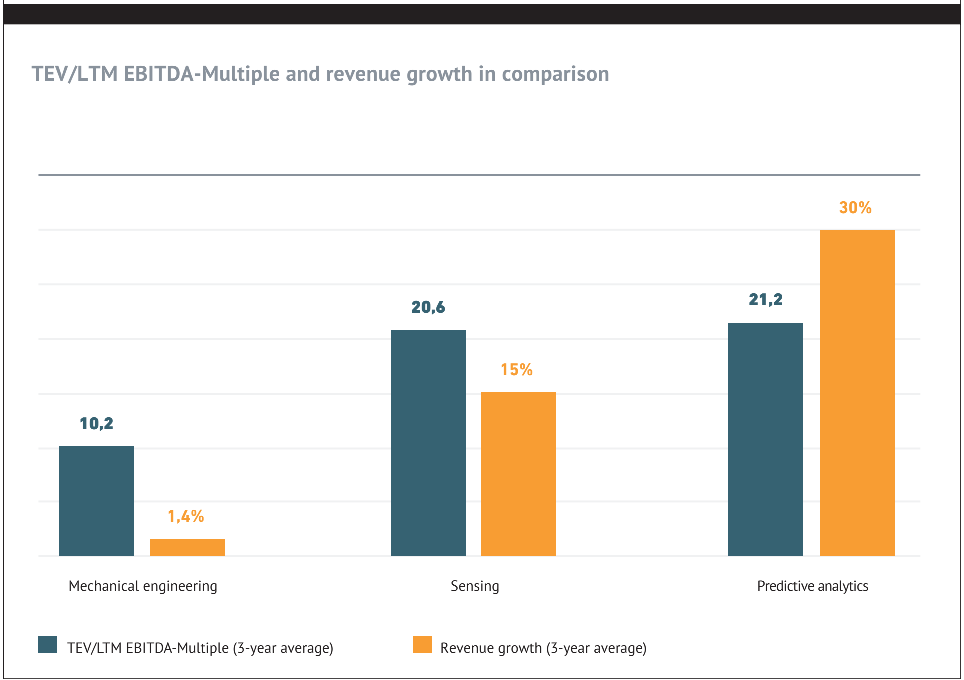
NO DYNAMIC GROWTH IN CORE BUSINESS IN SIGHT

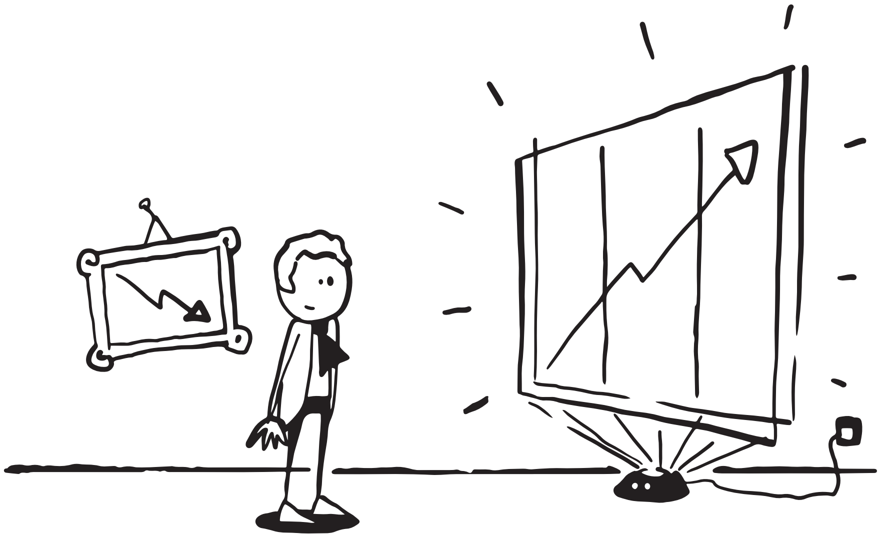
Actually, European mechanical and systems engineering is doing well. In recent years, the industry has achieved average growth of 1.4% in its core business in Europe. Even though growth has increased in 2017 and the forecast promises further growth in 2018, the momentum of the core business is low and a persisting investment rate is inhibiting growth prospects. Gloomy prophecies and anxious admonishers do not quite fit into the picture in the face of steady growth - nobody needs a new Malthus. However, one of the more complex truths is that this snapshot cannot hide the longer-term industry trends that are a cause for concern: For example, consumer spending has long been the driver of GDP growth rather than investment in Europe.
The latter have dropped off in the last decade and are still below the long-term average (cf. Fig. 1). In Europe, a decoupling of GDP growth from investment can be observed. Investment rates for mechanical engineering, on the other hand, show a steady decline over the years in terms of gross domestic product. Only the investment rate for intangible investments such as R&D and software (other investments) has grown steadily (cf. Fig. 2). These long-term developments led to moderate growth in the core business of 1.4% in recent years and no market indicator suggests a renaissance of the core business. The preliminary conclusion is thus: The higher growth in European mechanical engineering is nothing more than a snapshot. With low investment rates and no other growth impulses, there is no long-term prospect of any major growth in the core business. And that certainly dampens the mood of European mechanical and plant engineering. Against this background, looking for growth areas should be the order of the day.

THE MALTHUS EFFECT

In his day, Thomas Malthus made the mistake of dramatically underestimating the speed at which technical advances changed food production. Significant increases in productivity enabled significantly more people to be fed than what had previously been possible.
Today's parallel for Malthus' mass production and division of labour is digital technologies, such as augmented reality or artificial intelligence, on the basis of which new value-added digital products and services emerge that have the potential to generate new growth beyond the usual revenue mechanisms. The adoption of such technologies helps to more efficiently solve strategic challenges in the manufacturing industry that are beyond the reach of machine and plant manufacturers to physically optimise their products. These include short notice of customer requirements, which are difficult to plan for, short cycles, as well as rising labour costs or protectionist barriers in the formerly low-cost countries, and the increasing variety of products and their variants.
The fact that Malthus did not foresee the far-reaching effects of the onset of industrialisation on manufacturing systems can hardly be blamed on him. After all, there were no data or any reliable information from which to deduce the series of technological explosions in food production.


Value development in micro-system technology, predictive analytics and mechanical engineering
350%
300%
250%
200%
150%
100%
50%
0%
01/06
06/17
DJIA Index
Predictive Analytics
Mechanical engineering
Micro-System technology


TEV/LTM EBITDA-Multiple and revenue growth in comparison
10,2
1,4%
20,6
15%
21,2
30%
Mechanical engineering
Sensing
Predictive analytics
TEV/LTM EBITDA-Multiple (3-year average)
Revenue growth (3-year average)



DIGITIZATION MEANS: MOVING FROM THE NICHE MARKET TO THE MASS MARKET.

FINANCIAL MARKETS SHOW THE WAY

Today, the attractiveness of complementary technology segments can already be analysed on the basis of financial market data: While systems and mechanical engineering has underperformed in the Dow Jones Industrial Average Index since 2008, technology segments of Microsystems Technology and Predictive Analysis Systems have been growing dynamically. The increase in value over the past 3 years was 212% for Microsystems Technology and 132% for Predictive Analysis Systems, while only 129% was realised in plant and mechanical engineering. Systems and machine manufacturers can benefit from the high corporate value in establishing complementary digital technology business.

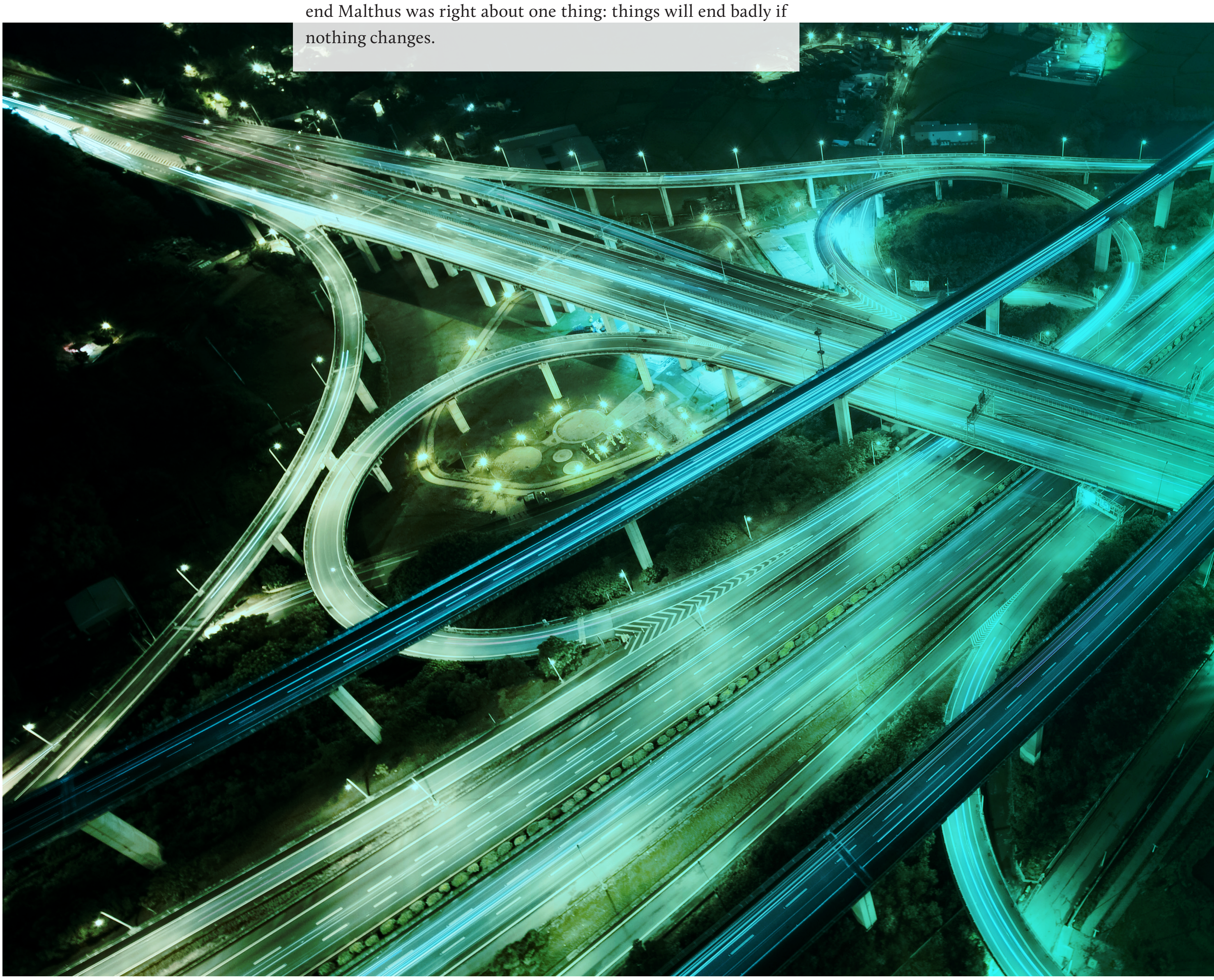
The Microsystems Technology technology segment includes manufacturers of sensor and actuator systems. Mechanical and systems engineering is one of five key market segments for the industry. The Microsystems Technology is characterised by a high innovation rate and the development moving towards cognitive sensors that allow a relief of the operator and the introduction of sensor-based assistance functions. Over the past three years, the analysed companies benefited from dynamic sales growth of 15% on average and a high valuation of 20.6 TEV/EBITDA multiple.

The Technology Segment Predictive Analysis Systems is based on Deep Technology Machine Learning (ML). Machine learning refers to the generation of knowledge from experience: artificial systems learn from examples and can generalise these after completion of the learning phase. Machine learning was first used in marketing optimisation (analysis of propensity to buy) and in the financial industry (fraud detection). In mechanical and plant engineering, machine learning is rapidly spreading in applications such as predictive maintenance and predictive quality. Over the past three years, the analysed companies benefited from dynamic sales growth of 30% on average and a high valuation. Compared to the two complementary dynamic technology segments, mechanical and plant engineering developed moderately: Over the past three years, the analysed companies generated sales growth of 1.4% on average and reached a high valuation of 10.2 TEV/EBITDA multiple. The business development in complementary technology segments increases the enterprise value and fuels the growth of machine and systems manufacturers. Most of these new digital playgrounds are still in an early growth phase, characterised by minimal market structures and an unclear pool of suppliers. The market segments are not yet distributed but there is great momentum in the segments. Anyone not content with observing the proceedings from the sidelines should quickly get down to business - whether alone or as part of a strong ecosystem.

GROWTH ACCORDING TO THE NEW RULES OF THE GAME

When the industrial revolution of the early nineteenth century encompassed all of Europe, it meant not only the end of Malthus' theory, but also a radical change in economic, manufacturing and labour forms.

Digitization is also characterised by market mechanisms that are quite radically different from the usual rules of the game in mechanical engineering. Resolutely entering the digital product and service business therefore means much more than mere expansion of the existing business model with its processes, structures and logic. While mechanical engineers have been successful with their products, above all with niche strategies in homogeneous market segments, thanks to rising economies of scale, a much broader customer target group can be addressed in the digital business. The price, however, is the need to compete against companies in the IT and high-tech environment, which are most well versed in this type of information-based market. To assert oneself against this competition is a considerable challenge for the current global leaders in niche markets but it is also the path to achieving long-term dynamic growth. In the end Malthus was right about one thing: things will end badly if nothing changes.



PARADIGM SHIFT

FROM REDUCING MARGINAL YIELDS	TO ECONOMIES OF SCALE
FROM OLIGOPOLISTIC MARKETS	TO WORLDS MARKETS
FROM INCREMENTAL INNOVATION	TO TRANSFORMATIVE AND DISRUPTIVE INNOVATION
FROM BUSINESS DEVELOPMENT IN NICHES	TO PLUG AND PLAY (VIA API)
FROM LIMITED ECONOMIES OF SCALE	TO USE OF ALL NETWORK EFFECTS AS DRIVER OF SCALING
FROM INDIVIDUAL CUSTOMER LOCK-IN	TO COLLECTIVE CUSTOMER LOCK-IN
FROM CLASSICAL PRODUCT DEVELOPMENT AND MARKET LAUNCH	TO LIFE-LONG PRODUCT DEVELOPMENT THROUGH VIRTUOUS DATA CYCLE

BEST PRACTICES

MAP OF DIGITAL PRODUCTS

FOR HIGHLY SPECIALISED COMPANIES IN THE MECHANICAL ENGINEERING SECTOR, BREAKING INTO THE DIGITAL PRODUCT AND SERVICE BUSINESS DOES NOT USUALLY LEAD DIRECTLY THROUGH RADICAL BUSINESS MODEL INNOVATION OR OPEN JOINT PLATFORMS, BUT THROUGH PRODUCT-RELATED SERVICES AND COMPLEMENTARY DIGITAL SOLUTIONS.

They expand the core functions of their machines with additional digital services, thereby enabling radical leaps in efficiency. The spectrum ranges from hardware-supported solutions to purely software-based services. Digital hardware, software and service solutions are usually characterised by a common „anatomy“. They ...

... extend the capabilities of physical products by taking advantage of undefined digital technology impulses, such as deep learning, cognitive systems or innovative microsystems technologies;

... are based on the provision, analysis and interpretation of real-time operating, status and environment data for the machine;

... support intelligent decision making through descriptive, predictive or suggestive analyses at the machine or process level or are directly embedded in autonomous, independently deciding systems;

... contribute to the hyper-efficiency of modern systems and machinery through a higher degree of automation, quality improvements and shorter downtimes.

DIGITAL OPERATOR SUPPORT

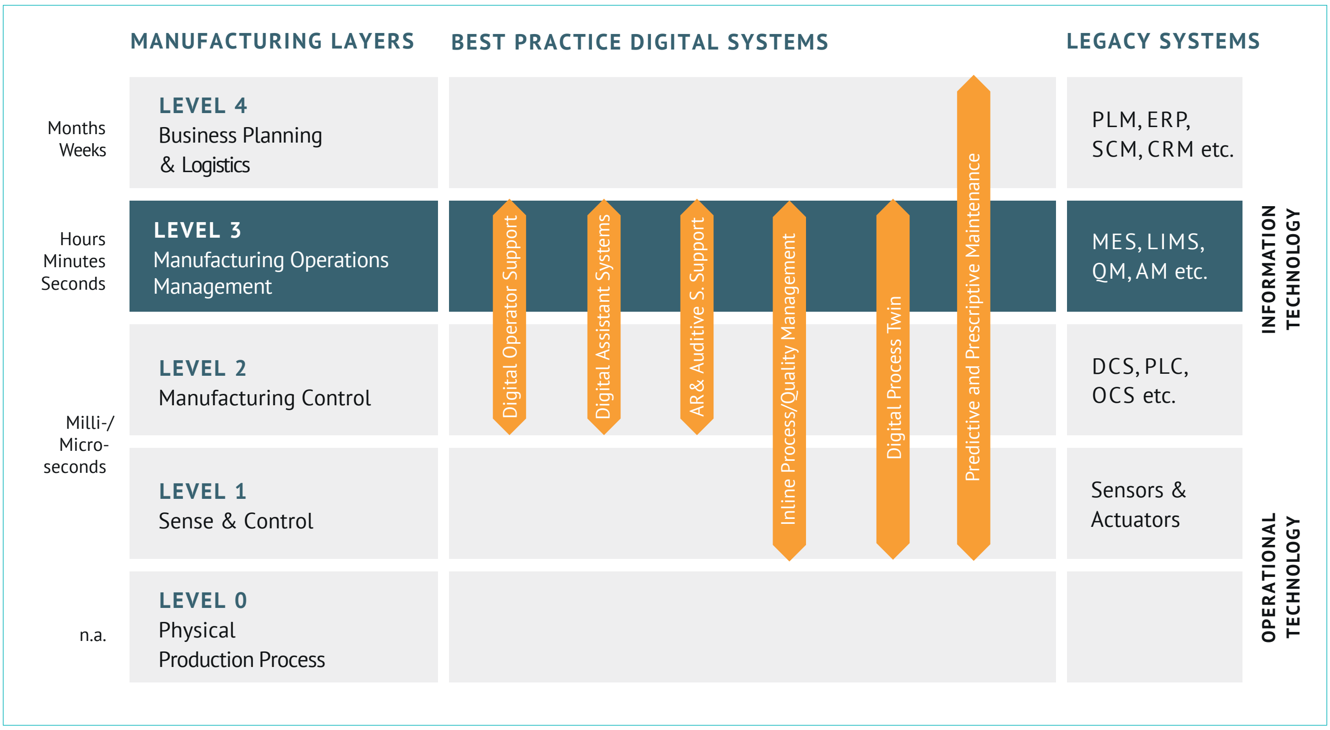
Digital operators assist plant operators network the data of the machines used with the manufacturer's knowledge databases and remote maintenance service. This way, incoming incidents are immediately categorised and solutions are proposed via an app, which system operators can implement independently or, in more complex cases, together with customer service via remote maintenance. This can reduce downtime and maintenance costs, and increase overall equipment efficiency (OEE).

BEST PRACTICE: ROBERT BOSCH GMBH

DIGITAL ASSISTANT SYSTEMS

Digital assistant systems enable unskilled workers to complete complex manual processes in rapid succession as well as the full documentation of completed activities in real time. They are thus the precursor to automation and are used where no tactile, sensitive or cognitive robotics skills are available today. This enables personnel and quality control costs to be reduced as well as working cycles to be increased.

BEST PRACTICES: AIRBUS, ROBERT BOSCH GMBH, AMAZON



Best practice digital systems for mechanical engineering systems cut across hierarchical manufacturing layers

SUPPLEMENTARY DIGITAL PRODUCTS AND SERVICES THAT INCREASE THE EFFICIENCY OF EXISTING PLANTS AND MACHINERY ARE ALREADY IN HIGH DEMAND ON THE MARKET TODAY.

Existing best practices can be located along a five-level manufacturing model (from top floor to shop floor), adding intelligent services at the production management level and layering systems. The following graphic provides an overview of currently available solutions and their respective best practices:

AUGMENTED REALITY SERVICE SUPPORT

AR applications and auditory wearables support the independent execution of system maintenance and repairs by the operator. As part of the Augmented Reality service support, individual machines and possible incidents are independently identified, visual and auditory work instructions are given, maintenance and repair processes are automatically documented as well as support/mentoring being provided. This reduces maintenance times, repair times and downtimes, reduces personnel costs and ensures improved employee safety. AR is also used in the simulation of plants or machines, as well as in the training of operating personnel.

BEST PRACTICES: **PALFINGER AG, ABB, KÖRBER AG**

PREDICTIVE & PRESCRIPTIVE MAINTENANCE

Predictive Analytics describes the predictive detection of potential incidents based on status and environment data. Machine-learning algorithms are used, which automatically identify critical data patterns on the basis of previously identified problems. In the framework of prescriptive maintenance, the machine independently provides recommendations for action and suggestions on how to prevent a predicted event. Downtimes, maintenance and spare parts costs can be reduced with simultaneous increases in uptimes and turnover.

BEST PRACTICES: **THYSSENKRUPP AUFZÜGE, GEA, KAPCO GLOBAL, AEROSPACE DISTRIBUTION**

IN-LINE PROCESS/QUALITY MANAGEMENT

In-line process or quality management optimises process parameters, taking into account the prevailing influencing factors in the respective process, thus enabling the generation of a precisely defined product. As a result, manufacturing processes can be reproduced in detail, throughput times can be reduced and quality control costs can be minimised.

BEST PRACTICE: **RHENUS LUBS**

DIGITAL PROCESS TWIN

The digital image of a real physical manufacturing process describes the characteristics and properties of a component along the entire process chain. Thus, its characteristics and properties can be defined for each step along the process chain and corrective action taken if there is a deviation. The same applies to tool installation. This can reduce quality control costs and throughput times and production investments can be validated more effectively.

BEST PRACTICES: **KLINGELNBERG GMBH, BILSING AUTOMATION GMBH, BIOHORT GMBH**

ROAD TO DIGITAL

ROADMAP FOR BUILDING A DIGITAL PRODUCT AND SERVICE BUSINESS IN MECHANICAL ENGINEERING AND SYSTEMS CONSTRUCTION

By Amseln Magel, Partner Digital,
ROI Management Consulting AG

PHASE 1

EXAMINATION TECHNOLOGY DRIVERS

- IDENTIFICATION OF RELEVANT UNDEFINED DRIVERS
- APPLICATION OF UNDEFINED TECHNOLOGY IMPULSES IN THE CUSTOMER ENVIRONMENT
- GENERATION OF POSSIBLE PRODUCT IDEAS
- SURVEYING LEAD USERS AS TO IMPLICIT AND EXPLICIT REQUIREMENTS
- ANALYSING REQUIRED SATISFACTION OF NEEDS/ PROBLEM SOLUTIONS

PHASE 2

DIGITAL STRATEGY SPRINTS

- STRATEGY SPRINT PER SATISFACTION OF NEEDS/ PROBLEM SOLUTION
- PREPARATION AND DEVELOPMENT OF MARKET UNDERSTANDING
- ANALYSIS OF THE MARKET SITUATION AND POTENTIAL DIGITAL IMPACT
- ELABORATION OF DIGITAL BUSINESS MODELS
- ANALYSIS OF THE POTENTIALS AND PRIORITISATION
- ELABORATION OF DIGITIZATION INITIATIVES

Procedure for strategic development of the digital product and service business for plant and machine constructors

The conditions for mechanical engineers and software manufacturers could hardly be more different when it comes to developing new products: On the one hand, up to 20,000 components per system, often fewer than 100 systems produced per year and a lifespan of more than 25 years on the market – on the other hand, a product that is often intangible, that can be multiplied at minimal marginal cost and that hardly follows fixed product cycles.

THE WINNER TAKES MOST

In order for mechanical engineers to successfully master the leap from hardware manufacturer to provider of digital or software-based products and services, the procedure for setting up new product fields must be resolutely adapted to the mechanisms of the new market. The key challenge is the speed of defining, developing and scaling the digital business. On the one hand, faster customer acquisition compared to the competition ensures that companies can benefit from economies of scale at an early stage, which can lead to a "winner takes most" position in the market. On the other hand, new digital businesses, especially in the platform economy, often require a critical mass of participants in order to generate added value. This requires a well-planned, phased approach, from the study of undefined digital technology drivers to the hyper-scaling of digital business models. The first two phases ("Investigation of Technology Drivers" and "Digital Strategy Sprints") are a key part of the strategy development and will be described in more detail below:

PHASE 3

ITERATIVE DEVELOPMENT

- DEFINITION OF THE DIGITAL ARCHITECTURE
- IDENTIFICATION OF ASSUMPTIONS FOR DIGITAL PRODUCTS AND SERVICES
- DEVELOPMENT AND TESTING OF MINIMUM VIABLE PRODUCTS
- PRODUCT REALISATION / FITNESS FOR MARKET
- IMPLEMENTATION OF A BUSINESS MODEL FOR CUSTOMER GROWTH
- CUSTOMER ACQUISITION
- DEVELOPMENT OF ECOSYSTEM

PHASE 4

HYPER SCALING

- CREATION OF A CUSTOMER BASE
- GENERATION OF TURNOVER
- BUILDING UP A COMPETENT ORGANISATION
- CONTINUAL DEVELOPMENT OF THE ECOSYSTEM

UNLIKE THE CONVENTIONAL HARDWARE BUSINESS, DIGITAL PRODUCTS AND SERVICES USUALLY DO NOT DEVELOP THROUGH FURTHER DEVELOPMENT AND OPTIMISATION OF ALREADY EXISTING TECHNOLOGIES, BUT INSTEAD BASED ON NEW, MOSTLY STILL UNDEVELOPED TECHNOLOGY FIELDS OR THOSE THAT ARE NOT YET USABLE FOR THEIR INDUSTRY SECTOR.

INTERNET PLATFORMS AS A TRENDSETTERS

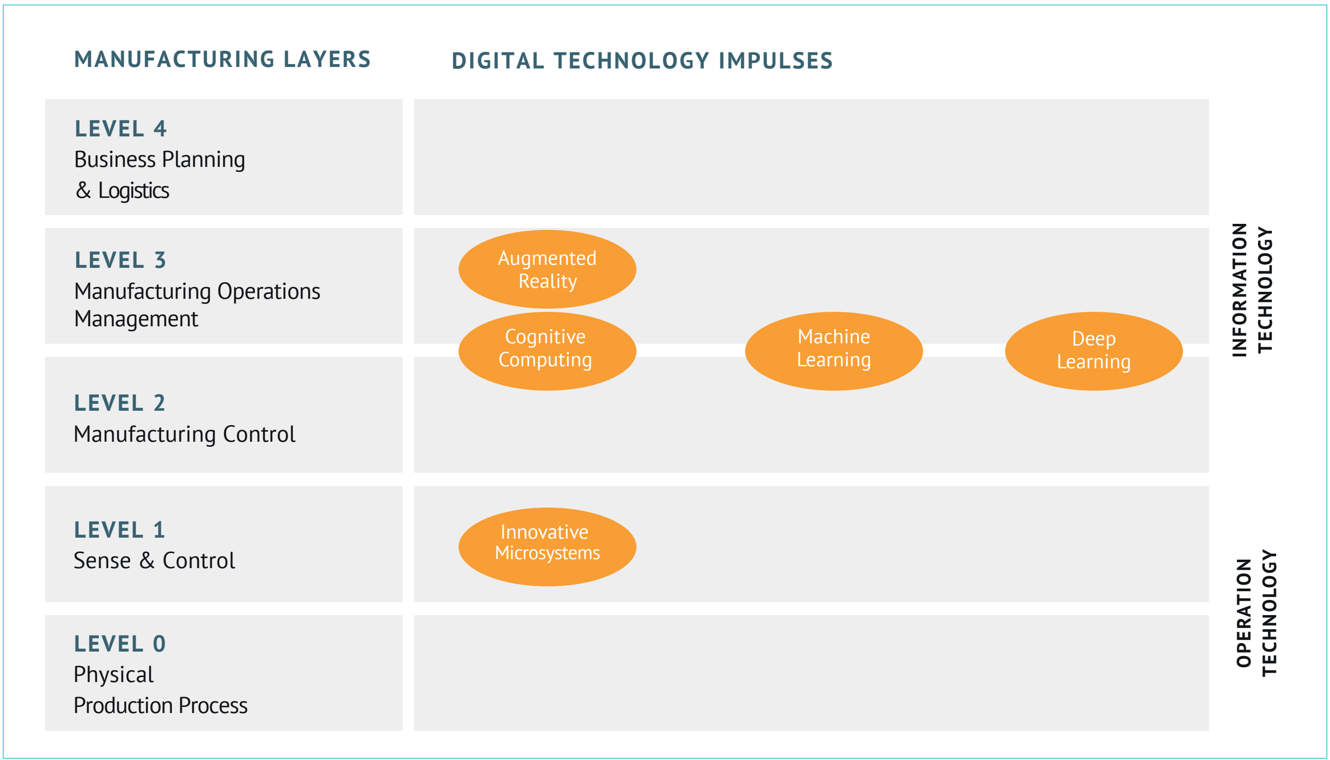
These so-called "undefined technology drivers" in mechanical and plant engineering can be found in information technology. In retrospect, the IT innovation wave of the past ten years has produced a successful business with digital platforms and apps. The transfer of these product forms and the underlying business models offers potential for new services and business models, for example, in apps such as Digital Operator Support. It remains to be seen to what extent platform business models of systems and machine manufacturers will prevail.

NEXT INNOVATION WAVE: DEEP TECHNOLOGY

Technology investors today are turning to radical new innovations, the so-called deep technologies. These are disruptive solutions based on unique, proprietary or scientific and technological advances that are hard to reproduce. The enterprise value of such providers is primarily generated by the development of new technical solutions. Already in 2017, innovation investments in Deep Technology in Europe exceeded those in vertical platforms (B2C).

DIFFERENT TECHNOLOGICAL MATURITY LEVELS

Deep technologies are mainly interesting as a basis for new digital products in mechanical engineering because they are harder to imitate and, unlike app or platform-based business models, they generally require fewer participant numbers. In addition, most technology impulses are still in an early growth phase, which also makes it possible for smaller providers to secure a relevant market share by quickly establishing their solution in each segment. The price for this is increased risk when entering new markets. The first step in developing a deep-tech based product or service provision is thus to systematise and analyse the possible technology impulses to assess their respective customer and application-specific potential. The following graphic shows examples of selected technology impulses:



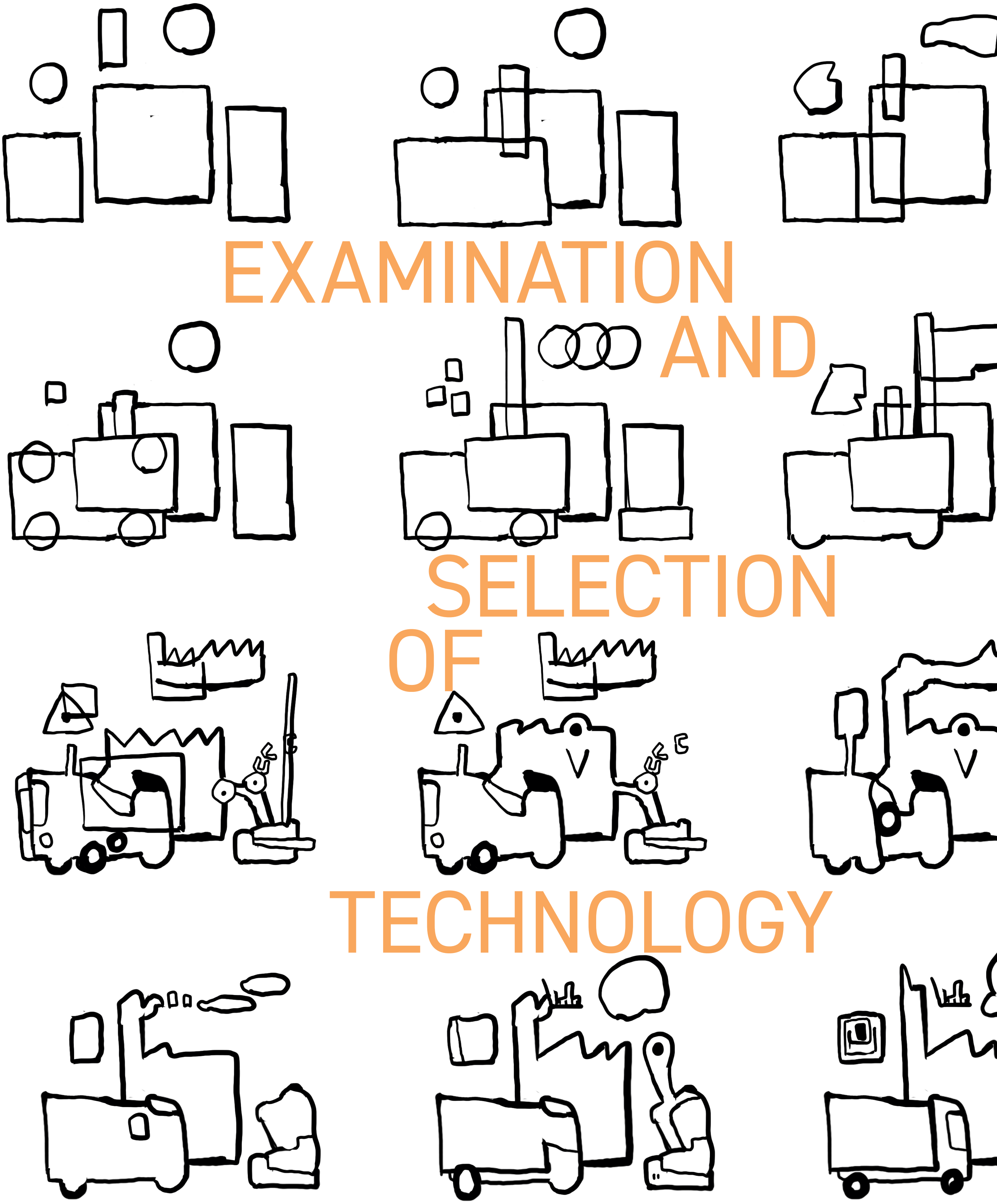
Example of undefined techlology impulses that drive value creating digital solutions in mechanical engineering

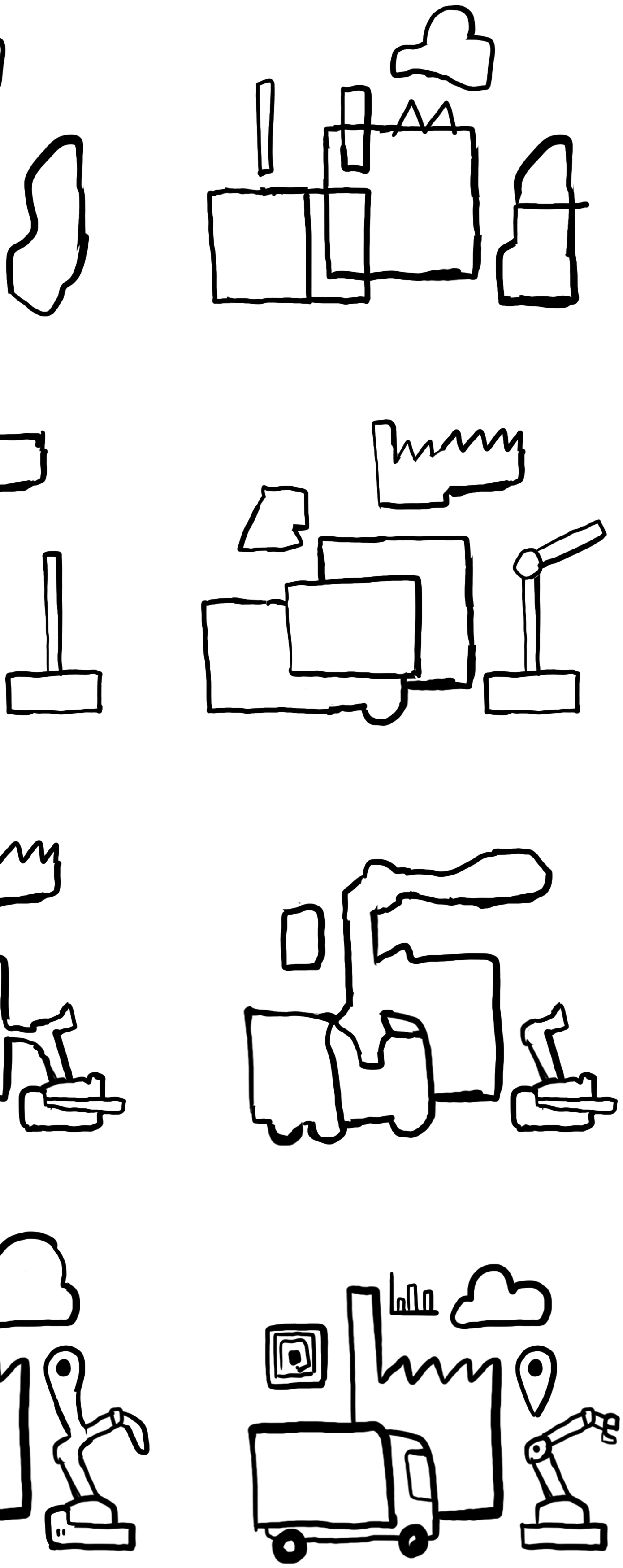
A LEAP INTO THE UNKNOWN

EXAMINATION & SELECTION OF TECHNOLOGY DRIVERS

By Amseln Magel, Partner Digital, ROI Management Consulting AG

EXAMINATION AND SELECTION OF TECHNOLOGY DRIVERS





AUGMENTED REALITY

Augmented Reality is understood as computer-aided extension of the perception of reality. The generated information can basically address all human sensory modalities but is usually just the visual and auditory representation, i.e. the supplementation of images or videos with computer-generated information or virtual objects by means of superimposition/overlay. AR is already successfully used in supervised machine repair and maintenance.

MACHINE LEARNING

Machine Learning describes the generation of knowledge from experience: artificial systems learn from examples and can generalise these after completion of the learning phase. In other words, it "recognises" patterns and consistencies in the learning data and can use this to generate forecasts, derive recommendations and evaluate unknown data (learning transfer). Machine learning is already successfully used in predictive and prescriptive maintenance today.

COGNITIVE COMPUTING

Cognitive System defines an approach to computer technology that attempts to make systems act autonomously like a human brain. With this form of artificial intelligence, the computer system is not programmed in advance for all possible solutions to problems but gradually learns independently. This makes it possible to master complex situations characterised by uncertainty and lack of clarity. Systems weigh up the potential for conflict, and propose the best solution. They make context calculable. CC systems are successfully employed in robotics, enabling the autonomous adaptation of machines.

DEEP LEARNING

Deep Learning is a form of machine learning that can handle a wider range of data resources. It requires less data pre-processing, and can often provide more accurate results than traditional machine learning approaches. Deep learning uses neural networks, which consist of interconnected software-based calculators, so-called neurons. A neural network can capture a large amount of input data, process it on the multiple inter-connected network layers, and thereby learn increasingly complex features of the processed data. It makes a determination about the data and learns if it is correct. This knowledge can then be applied to new data, for example in image classification. Deep learning is successfully employed in quality control and predictive maintenance.

INNOVATIVE MICRO-SYSTEMS TECHNOLOGY

In order to master the increasing technical complexity, the development of micro-systems technology is moving towards cognitive sensors, which relieves operators and allows for the introduction of sensor-based assistance functions. Various trends are emerging, such as functional integration and predictive autonomy of smart sensors, physical and chemical situation recognition, sensor co-operation and sensor self-monitoring, self-reconfiguration and self-adaptation in global networks.

ORIENTATION OF MARKET RESEARCH BY TYPE OF INNOVATION

	LEAD USER	
SURVEYS	EMPATHIC DESIGN	MARKET INTUITION
CONCEPT TESTING	CUSTOMER VISITS	FUTURE SCENARIOS
CONJOINT STUDIES	QUALITY FUNCTION DEPLOYMENT	BIO-MIMICRY
FOCUS GROUPS	PROTOTYPE TEST	

INCREMENTAL INVESTMENT
(Customer requirements known)

GROUND-BREAKING INNOVATION
(technical solution precedes requirement)

TRANSLATION OF TECHNOLOGY DRIVERS INTO INITIAL PRODUCT IDEAS

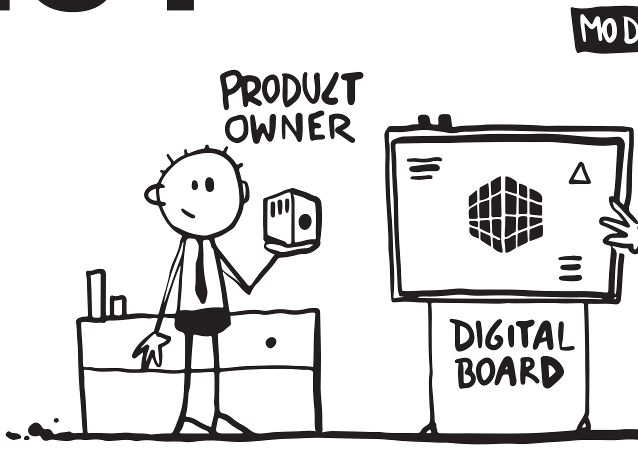
IF A SPECIFIC TECHNOLOGICAL IMPULSE IS REDEFINED AS A STRATEGIC DEVELOPMENT RESEARCH FIELD, THE GOAL IS TO TRANSFORM THE UNDEFINED TECHNOLOGY IMPULSES INTO CONCRETE PRODUCTS OR BUSINESS VALUE. THE FOLLOWING QUESTIONS ARE SPECIFICALLY IN FOCUS:

- **What superior solution can be developed with the new technology for the customer?**
- **Under what conditions is the use of this technology profitable?**
- **How large is the potential market for the new solution**

Various market research instruments can be used to answer these questions. Especially in smaller mechanical engineering and systems construction sectors, the lead-user method delivers particularly good results, as potential customers are purposefully involved in product development. This reduces the risk of developing new product solutions that are disconnected from the market or the potential customer. Lead users are defined as users whose needs are ahead of the requirements of the mass market and who derive great benefit from the innovation to be developed, and therefore benefit in particular from the early development of the solution. These can be existing customers of the company as well as customers of the competition or users in related industries, who often act as innovators themselves. If suitable lead users are identified, they can discuss the use of new technologies, generate superior solution ideas within the defined technology search field and analyse the portability of these solutions to potentially additional customers.

PROTECTED ACTIVE CELLS OF INNOVATION

DIGITAL STRATEGY LABS



The development of traditional industrial products follows very different approaches, time schedules and patterns to digital innovations or business models. The development of a comprehensive digital strategy as well as specific, value-adding digitization initiatives is therefore a new task for many plant and machine manufacturers. To counter this, the creation of a „Digital Focus Point“ in the company is suitable. Not only will the new digital business be developed but new required methods will be learned from management and staff.

BRINGING THE DIGITAL WORLD INTO THE COMPANY

The sustainable and successful development of a digital product and service business consists of three essential elements: On the one hand, it relates to the core task itself, i.e. the development of digital products and services; in addition, innovators need appropriate business models to monetise developments and grow the business. Finally, this business structure should be supported by organisational learning to develop this novel business with adequate methods and initiatives. The setup of a digital strategy lab is particularly suitable for this purpose.

THE LOCUS DIGITALIS OF INNOVATION

In a digital strategy laboratory, new technologies are examined as well as novel products and services developed; the digital business is shielded from the constraints of the core business and can be set up undisturbed. This “Digital Focus Point” is based on success strategies designed for IT markets and can be considered both a physical and organisational space. The enclosure of the “active cells” in the protected structure of the laboratory also ensures that cultural differences do not develop destructive effects, but are structured and moderated into a fruitful fusion of different ways of thinking. The effectiveness of the digital strategy lab depends on several factors. These include, in particular, clear governance principles and the personal contribution of the laboratory participants to the innovation result, independence from the core business and rules governing the interface to “core operations”, as well as cross-functional and cross-company lab teams with different fields of expertise.

DIGITAL SPRINTS IN THE STRATEGY LABORATORY AS METHOD TO BUILD UP YOUR DIGITAL BUSINESS

THE STRATEGY LABORATORY AS DIGITAL FOCUS POINT FOR THE NEW BUSINESS

- a location
- the active cells for the digital business
- a bundle of methodologies
- a space for creative learning
- new work methods for management decisions and business development

LABORATORY WORKING PRINCIPLES

- Thinking „from the outside in“ (customer-driven)
- Thinking „from right to left“ (vision-driven)
- 80/20 principle
- Sprint planning events
- Iterations in fixed time limits
- Tracking progress
- New planning in stand-up meetings
- High performance team

STRATEGY SPRINTS FOR DIGITIZATION

In the strategy lab, the strategy for digital products and service offers is developed in regular agile sprints. Based on the methods of agile software development, strategy sprints work with fixed time budgets. The sprint will build an understanding of the digital market segment, analyse the market situation, work out possible strategic directions with the product and service ideas and then select corresponding digital business models. Subsequently, sprint participants quantify market potential and select priority impact directions to be detailed for related digitization initiatives, including the completion of minimum viable products.

80/20 INSTEAD OF ZERO DEFECT

In many ways, the work principles in the strategy lab differ significantly from typical R&D or business development routines. Central to this is the thinking determined by customer requirements and a guiding vision, the agile control and re-design in stand-up meetings, the iterative high-performance work in fixed timelines and the consistent pursuit of progress. Last but not least, what happens in the digital lab also means a profound cultural break in terms of understanding quality and perfection. Zero-error thinking, which is currently characterised by highly specialised plant and machine manufacturers, is incompatible with digital logic and its 80/20 principle geared to maximum speed of delivery.

building industrial future

As an expert in R&D, Manufacturing and Industry 4.0, ROI helps industrial companies worldwide optimise their products, technologies and production networks as well as harness the power of digitization for more efficient processes and smart products. Operational excellence and quantitative, sustainable results are the goals by which ROI wants to be measured. ROI has won numerous major awards, such as the 'Best Consultant' award by 'brand eins' and the 'Best of Consulting' by 'WirtschaftsWoche' and earned top rankings in the study 'Hidden champions of the consulting market' of the WGMB.

In order to make the multi-faceted topic of Industry 4.0 tangible and effectively usable in corporate practice, ROI runs an Industry 4.0 learning factory in which the technological foundations and principles of digitization are combined with the lean production approach and conveyed in a practical way. As initiator and co-organizer of the Industry 4.0 Awards, which were first presented in 2013, and 2017 in China, ROI actively promotes the development of technological innovation in Germany. Established in Munich in 1999, the ROI Group employs more than 150 people worldwide in Munich, Stuttgart, Beijing, Prague, Vienna and Zurich. The spectrum of clients ranges from well-known, medium-sized companies to Dax-listed corporations.

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