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.

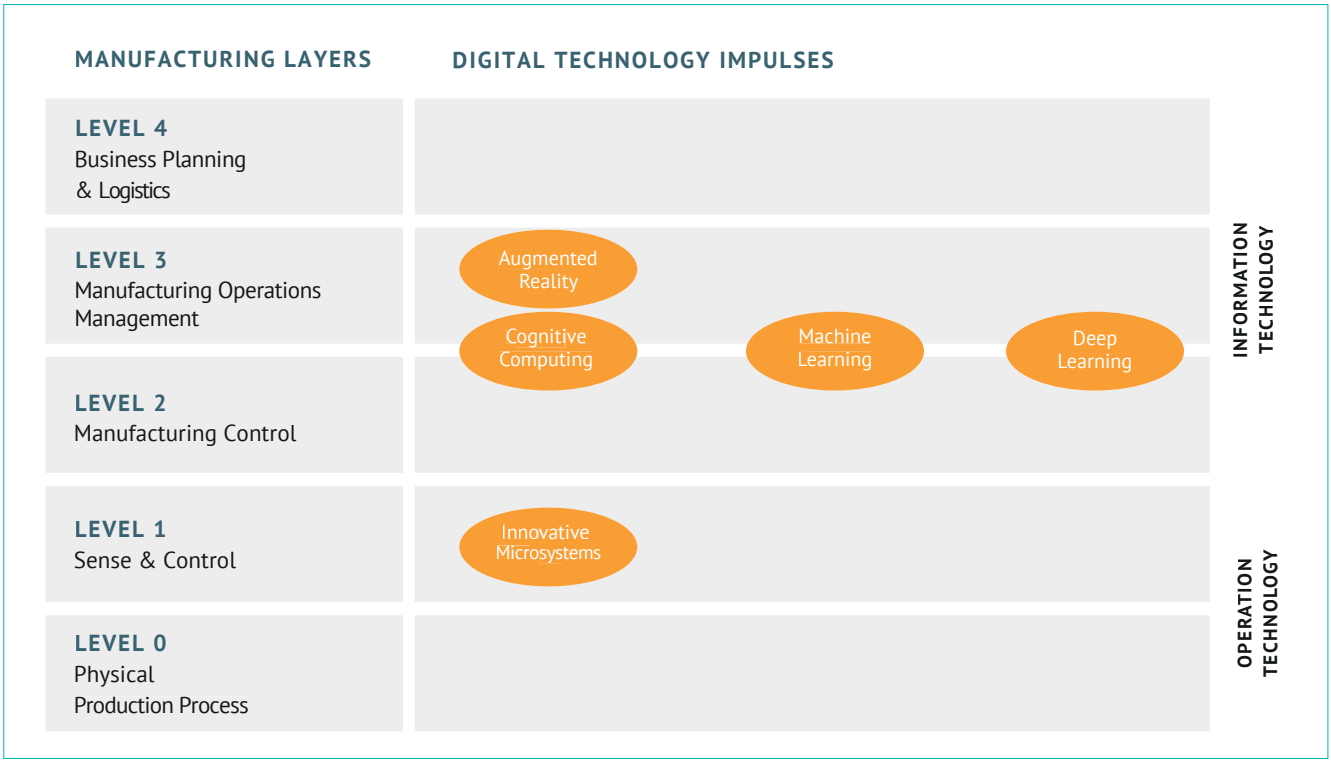
NEXT INNOVATION WAVE: DEEP TECHNOLOGY

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).

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.

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:

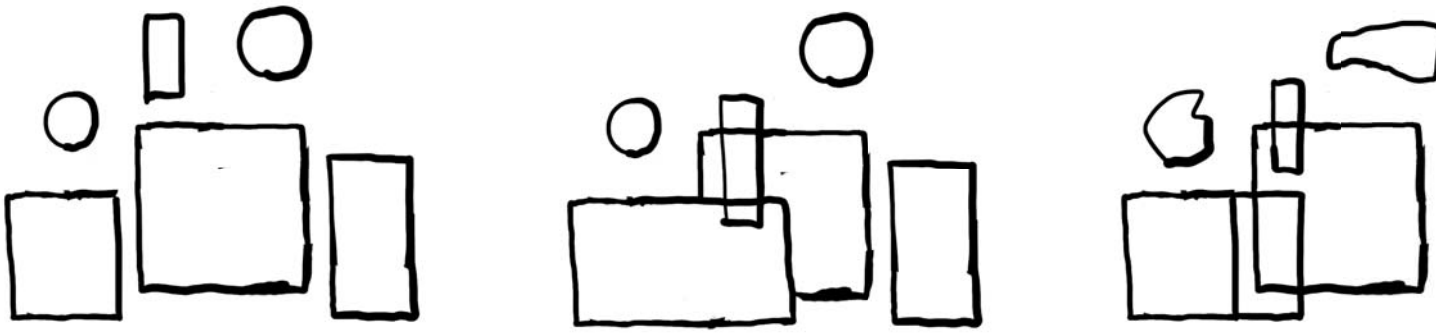


Example of undefined techlology impulses that drive value creating digital solutions in mechanical engineering

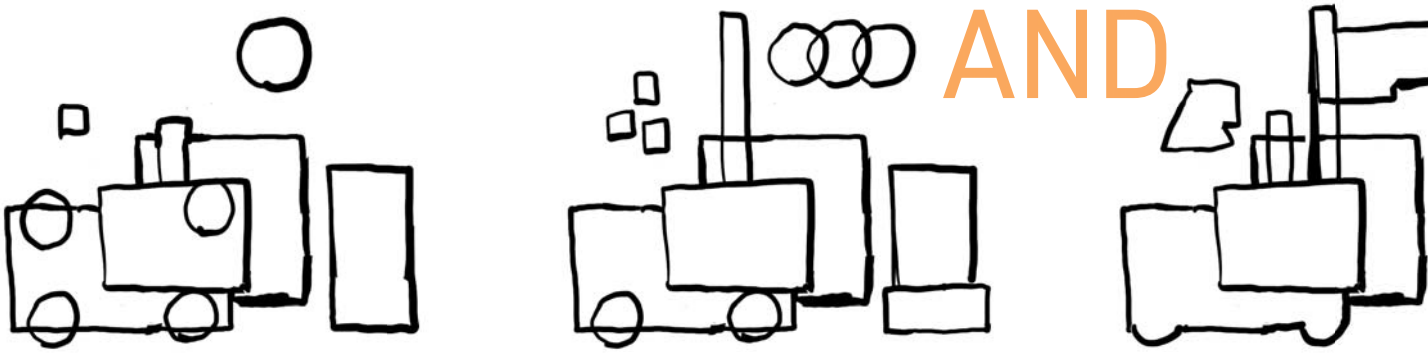
A LEAP INTO THE UNKNOWN

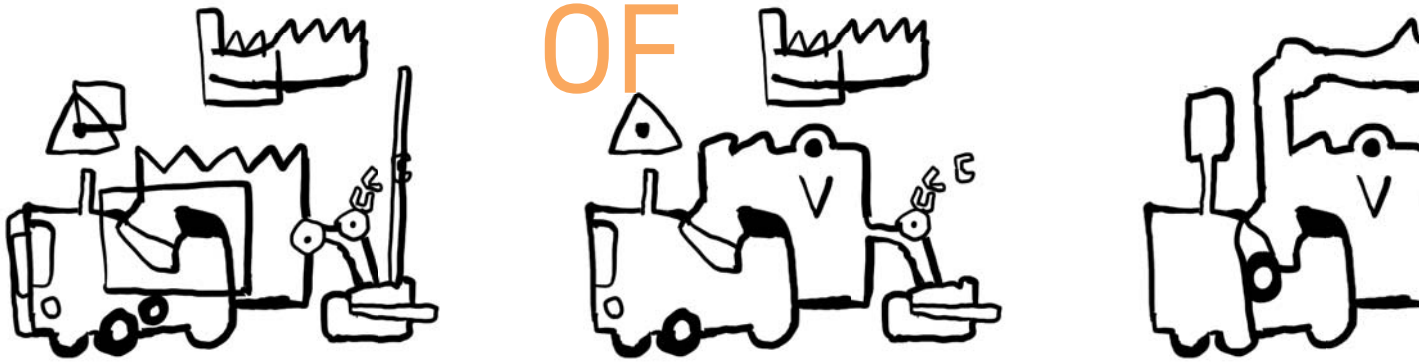
EXAMINATION & SELECTION OF TECHNOLOGY DRIVERS

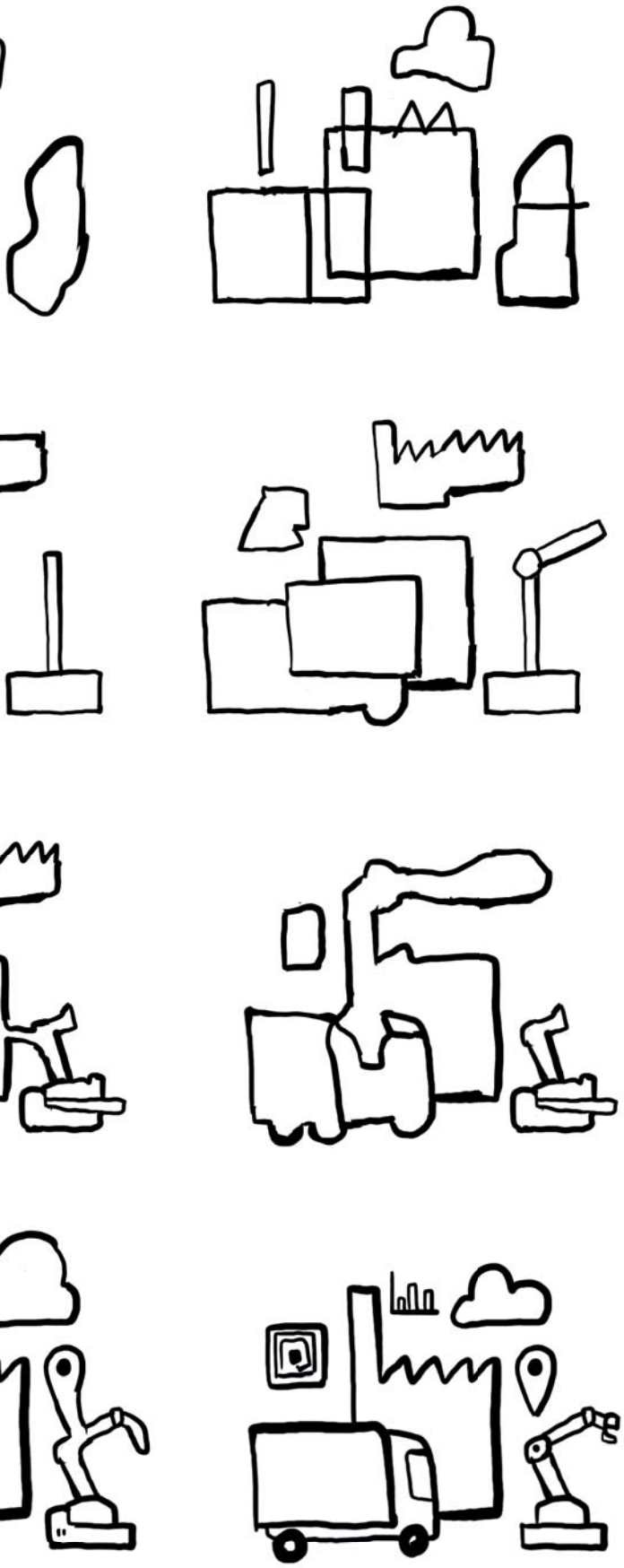
By Amseln Magel, Partner Digital, ROI Management Consulting AG



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.