Hannover Messe 2022 Preview

New paths to sustainability with Industry 4.0

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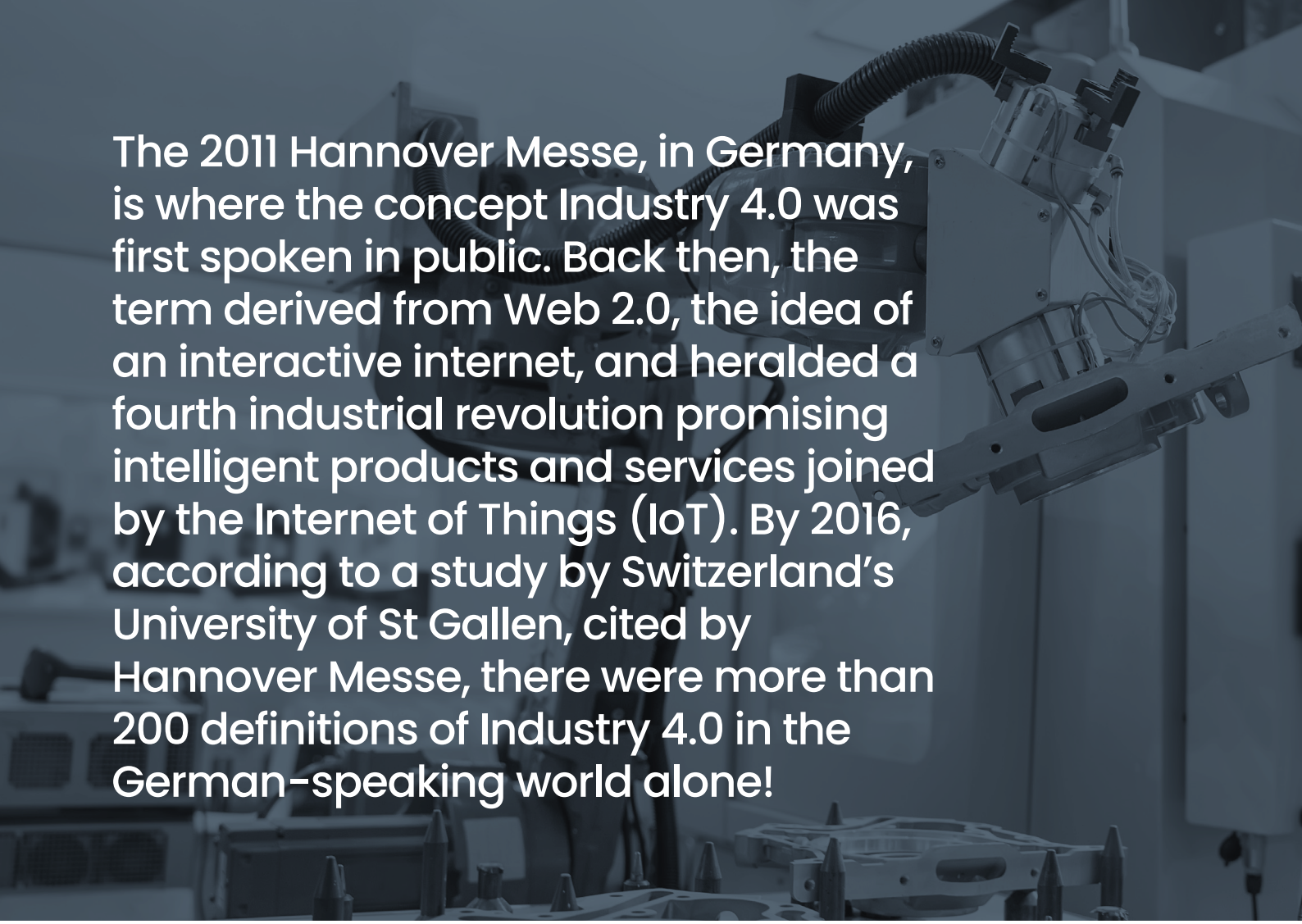


The 2011 Hannover Messe, in Germany, is where the concept Industry 4.0 was first spoken in public. Back then, the term derived from Web 2.0, the idea of an interactive internet, and heralded a fourth industrial revolution promising intelligent products and services joined by the Internet of Things (IoT). By 2016, according to a study by Switzerland's University of St Gallen, cited by Hannover Messe, there were more than 200 definitions of Industry 4.0 in the German-speaking world alone!

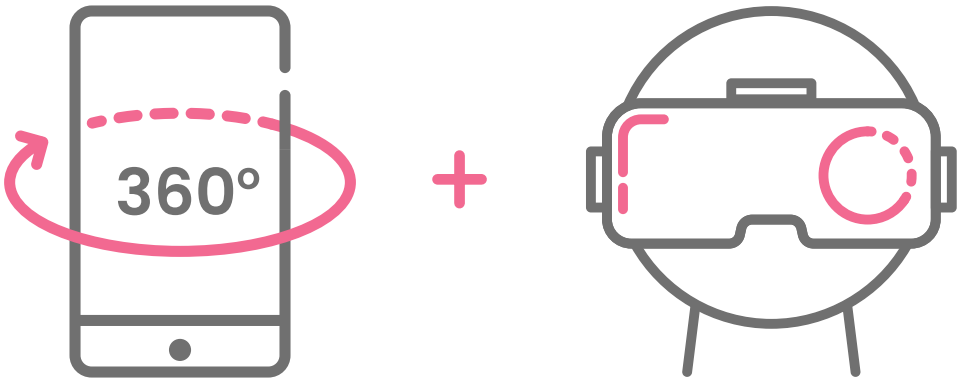
Any initial misgivings that Industry 4.0 was just a concept, and nothing more, have since given way to the tangible benefits of digitalisation. According to Pricewaterhouse Cooper (PwC)'s Digital Factories 2020 report, 91 per cent of industrial companies were "investing in creating digital factories in the heart of Europe." 90 per cent felt that digitisation offered more opportunities than risks, including efficiency benefits through digital technologies, like digitally-integrated manufacturing execution systems (MESs), predictive maintenance, augmented reality (AR) and more.

Clearly, Industry 4.0 has come a long way in the past decade. But, what developments can we expect to see next? In this guide, EU Automation offers an overview of what the 2022 fair — May 30 to June 2 — has in store. The guide highlights some of the biggest challenges of the manufacturing sector and presents some of cutting-edge solutions to be seen at Hannover Messe 2022.

The Netflix of AR/VR

Austria's Holo-Light is among companies bringing AR solutions to Hannover Messe 2022. Its XRnow platform brings together AR and virtual reality (VR) technologies into an all-encompassing AR Engineering Space to help engineers and designers collaborate on 3D CAD models, and speed-up and simplify product development. Holo-Light's platform is an example of Streaming-as-a-Service.

Visit Holo-Light at Hall 4, Stand E45



Sustainability

It is no surprise that "Digitalization and Sustainability" is the overall theme of 2022's Hannover Messe. Recent international pledges will rely on the IoT to work. Among these, are the Global Coal to Clean Power Transition statement signed by 46 nations at COP26, and European Commission President Ursula von der Leyen's announced plans for the European Union (EU) to "get rid of the dependency on Russian gas and go deep into the renewables". As a result, digitalised manufacturing will be at the forefront.

Yet, the notion of sustainable manufacturing is something of a paradox in 2022. World Economic Forum (WEF) reports that manufacturing is responsible for 23 per cent of carbon emissions in the United States, alone. How can manufacturers achieve better sustainability, while delivering products around the world at higher speeds and with minimal costs? Digitalisation, artificial intelligence (AI) and automation all hold the answer. Let's look at some examples.

OEE and the environment

More sustainable operations relate directly to a plant's maintenance strategy. Overall equipment effectiveness (OEE) can be translated into manufacturing sustainability, according to a study by the Technical University of Malaysia, Malacca (UTeM), published in Applied Mechanics and Materials. It states:

> "Any improvement made in the OEE factor (system availability, equipment performance, and production quality) will have an indirect and positive impact on environmental conservation, social efficiency, and economic vitality of the manufacturing firms," including, "elimination of consumed resources without compromising product or service quality, competitiveness and profitability."

In turn, Industry 4.0 sensors attached to plant equipment allows for fast and accurate data collecting at the device level. This data can be processed with software, generating valuable real-time insights to share with plant managers and engineers. Take the example of industrial motors. 3D vibrational analysis can be used to estimate the energy consumption and load a motor is carrying. In this scenario, OEE and sustainability are closely connected. It's also possible to analyse the forecasted deterioration of equipment and advise on predictive maintenance requirements. This can significantly reduce unplanned downtime and costs.

OEE monitoring for higher performance

ANT, based in Kraków, Poland, is a systems vendor specialising in Manufacturing Execution Software (MES) and will be exhibit its OEE Performance Monitoring at Hannover Messe 2022. The software interfaces with plants' enterprise resource planning (ERP) systems to help eliminate double production reporting and exchange production data. The software supports higher production volumes and increases the availability of machines through faster maintenance reaction times.

Visit ANT at Hall 4, Stand F78

Intelligent maintenance

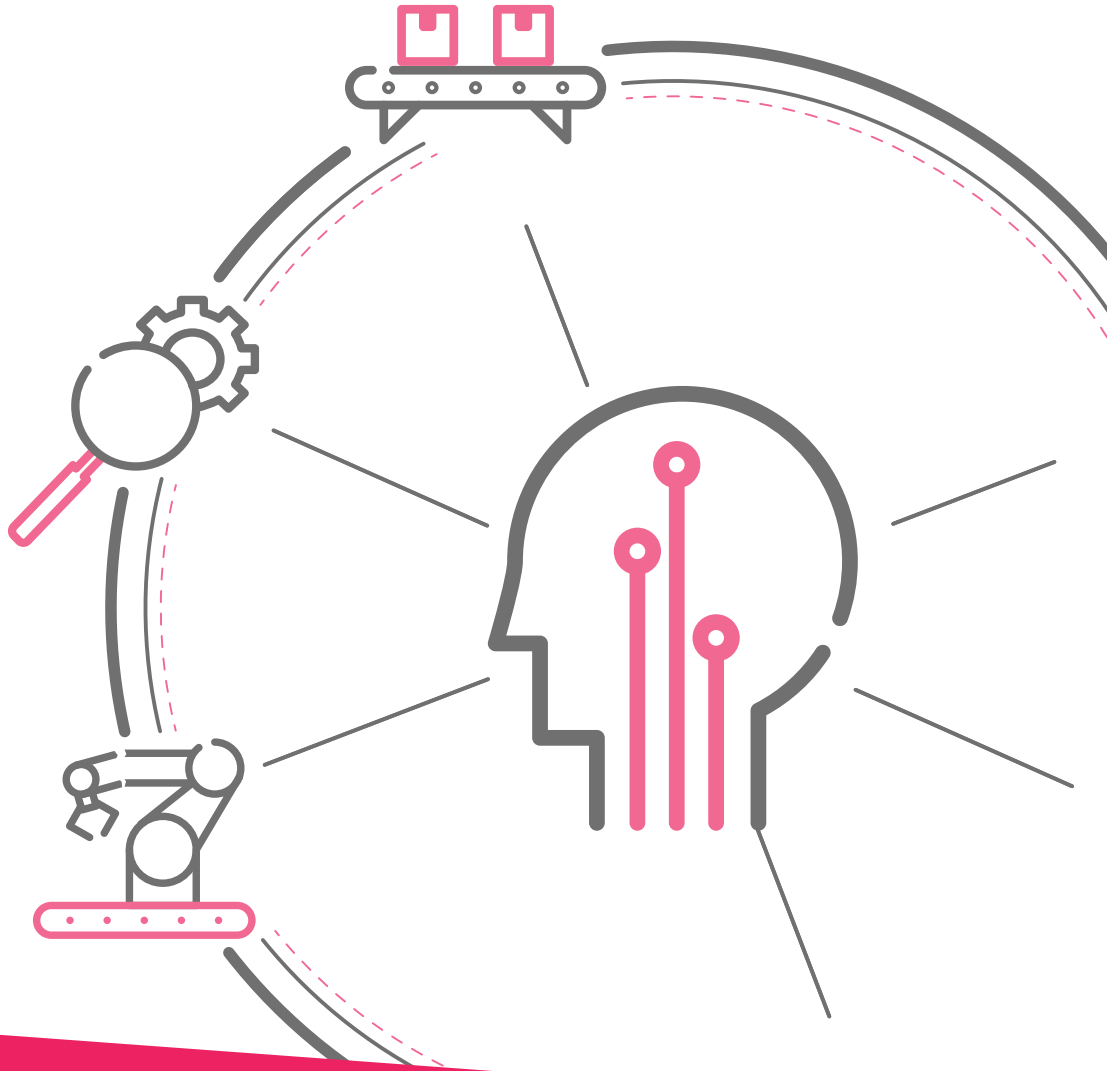
More sustainable operations relate directly to a plant's maintenance strategy, but a lot of manufacturers are falling-short in this regard. Three quarters of business leaders surveyed by OneServe said they outsourced their machine maintenance, which suggested their businesses run on a planned maintenance methodology. This means assets are maintained according to a predetermined schedule, rather than in real-time, which allows problems to get worse in-between maintenance checks. Other manufacturers rely on reactive maintenance, only repairing or replacing an asset when it has broken-down completely, leading to unplanned downtime that leads to wasted material and inefficient energy consumption.

How can maintenance strategies be improved? This is where artificial intelligence (AI) and machine learning (ML) are crucial. These Industry 4.0 technologies not only benefit machine uptime and OEE, but also make an important contribution to sustainability and the efficient use of resources by supporting optimum system availability.

ML for failure prediction

Dürr Systems of Stuttgart, Germany, will showcase its DXQanalyze product family at Hannover Messe. The system uses machine learning to identify anomalies such as quality defects on the product, or imminent wear on the equipment - doing so in real-time. The system uses aggregated data to spot patterns and draw conclusions about the operation of individual steps along the value chain. In the future, this information will be used to automatically adjust the process to counter changing conditions.

Visit Dürr Systems at Hall 4, Stand D54



Energy management

Manufacturers' sustainability goals will rely on better energy management – and there's room for improvement. For instance, the US Department of Energy reports that leaks are a significant source of wasted energy in industrial compressed air systems, wasting as much as 20 to 30 per cent of the compressor's output. Energy doesn't simply vanish; it powers machines to create either value or waste. So, better energy management is key to reducing machine downtime, energy consumption and costs.

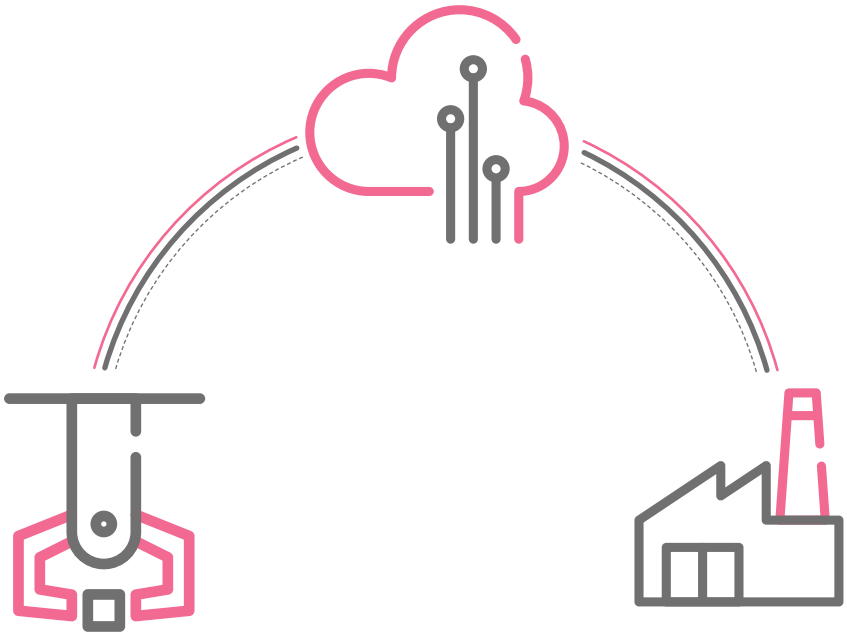
According to Emerson Automation Systems, issues arise because people are not aware of the optimum compressed air consumption for their manufacturing processes. This awareness can be achieved through software, which gathers historical recordings of the compressor's performance through sensors and relays this data to the plant's SCADA and MESs.

OEE improvements are then made based on efficiency analysis. For example, manufacturers can lower the pressure in the pneumatic system to reduce air throughput while maintaining cycle times. Emerson suggests this can eliminate the aforementioned 20 to 30 per cent energy losses and also cut CO2 emissions, as an example of how digitalisation can benefit plant efficiency and the environment.

Full data visibility for better energy management

Emerson Automation Systems of Hannover, Germany, will exhibit its Data Analysis Movicon.NExT™ industrial automation software platform at this year's Hannover Messe. Designed to work with Windows/Linux human machine interfaces (HMIs), SCADA supervisory systems and MESs, the software allows historical recording of all data managed by the server, using local or cloud databases in a transparent, open and independent way. In addition, specifically designed extension modules can be used to manage Plant Intelligence to improve productivity or energy efficiency.

Visit Emerson Automation Solutions at Hall 6, Stand C57



Better cybersecurity

It is often said that the three pillars of security are people, processes and technology. With these in mind, cybersecurity is also crucial for manufacturers' security goals. After all, cyber risks are the most clear and present threat to plants' OEE and financial stability - and they are becoming more common each year. According to Forbes, by October 2021 the number of data breaches publicly recorded had already exceeded the total for 2020. It is increasingly important that manufacturers implement good governance on cybersecurity, using appropriate tools and metrics.

Fortunately, automation and artificial intelligence (AI) mean better security for manufacturers. According to Statista, 47.3 per cent of companies in 2020 embraced automation from a security perspective, compared with 39 per cent in 2019. This figure is expected to rise in 2022, as IoT technologies like sensors become increasingly affordable. Manufacturers' cybersecurity strategies in 2022 are expected to lean more heavily on machine learning, too, thanks to its capability to predict outcomes more accurately without being explicitly programmed to do so. This will include the use of deep-learning networks that are programmed to discern massive amounts of data and then test for known kinds of scenarios, including cyberattacks.

Plug & play IoT security

Cyber Evolution of Italy specialises in hardware and software to digitalise technological infrastructures, including for small-medium-enterprise (SMEs) and public administration. The company will bring its LECs product to Hannover Messe. Described as “the first plug and play network security internet of things (IoT) device,” LECs is designed to integrate easily into environments where it is otherwise difficult to implement complex solutions and ecosystems for IT security. LECs protects any local area network LAN and cloud infrastructure from the most dangerous attacks and cyber threats.

Visit Cyber Evolution at Hall 3, Stand A20 (C34)

Conclusions

Not only has Industry 4.0 come a long way in the past decade — these technologies are also becoming more accessible for manufacturers each year, driven by advances in sensors and decreases in sensor costs. As a result, the global Industrial Automation Control market size is projected to reach $196,700 million by 2028, from $126,800 million in 2021, a compound annual growth rate (CAGR) or 6.4 per cent.

Sensors will be the key to gathering data from a variety of plant equipment, and integrating this data into MESs and other systems. Moreover, this tech will be crucial to benefitting manufacturers' preventative maintenance strategies and overall equipment effectiveness (OEE), and therefore manufacturing sustainability. Retrofitting assets with smart sensors will prove crucial, and this is where an automation spare parts supplier can lend a crucial hand. That's just one way in which manufacturers can explore new paths to sustainability through digitalisation.

The world is experiencing a turning point in international economic and energy policy after COP26, ahead the EU's move towards renewable energy and through other factors like rising energy prices and disrupted supply chains. Despite these challenges, industry will come together at Hannover Messe 2022 to see how global industrial production can keep ahead waith the latest Industry 4.0 solutions.

For more information about safely retrofitting smart sensors in your plant, visit

www.euautomation.com/en/knowledge-hub