SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

20 November 2020 – 25 January 2021

TOPICAL REPORT

ADVANCED MANUFACTURING

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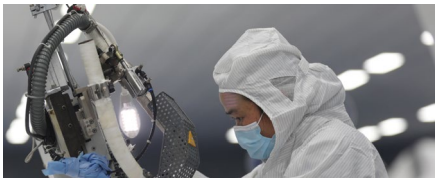
SMART MANUFACTURING



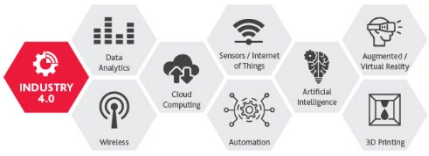
Smart Manufacturing: Why Digitizing Factories Is Critical Now

"Talk of smart manufacturing has reached a fever pitch in the past year, but recent market conditions shed light on where most manufacturers stand in their journeys to digitize the factory floor. Many manufacturers were caught "with their pants down" so to speak, perhaps with multimillion-dollar Industry 4.0 or IoT initiatives in the works, but without any results to show for their efforts."
Source: Forbes

Industry 4.0 and Smart Manufacturing: Leveraging the Power of Real-Time Data Visualization

"Today's manufacturers are under pressure to be more flexible, reduce downtime and costs and increase efficiencies. In addition to making new investments in production and technology, data-driven manufacturing companies are responding to these pressures by leveraging the capabilities of artificial intelligence (AI), the industrial internet of things, (IIoT), cloud computing technologies and innovations in smart measurement and quality data management systems—resulting in greater visibility into their operations."
Source: SME

ADVANCED MANUFACTURING



Gamified Virtual Reality Training Environment for the Manufacturing Industry

"The concept enables a learning speed which is adjustable to the users' pace and dynamics, while the evaluation system facilitates adaptive work sequences and allows employee-specific task fulfillment. The concept was implemented and analyzed in the Industry 4.0 model factory at FH Aachen for mechanical assembly jobs."
Source: IEEE

Energy management in sustainable smart manufacturing

"Industry 4.0 can offer many essential opportunities to advance energy efficiency and sustainability of manufacturing in smart factories. This paper investigates these benefits and suggests a novel and enabling architecture to measure and improve all technical dimensions of equipment sustainability. The architecture involves an integrated, intelligent and dynamic network based on Industry 4.0 and facilitates TES implementation."
Source: University of the west of scotland

INDUSTRY 4.0

MANUFACTURING

Data Excellence: Transforming manufacturing and supply systems

"This report examines the value unlocked by data and analytics applications. It defines six organizational and technological priorities of data excellence in manufacturing to help decision-makers capture value from these applications internally and within larger ecosystems. Finally, the paper proposes a path towards realizing a future of manufacturing that is digital and hyper-connected."
Source: World Economic Forum

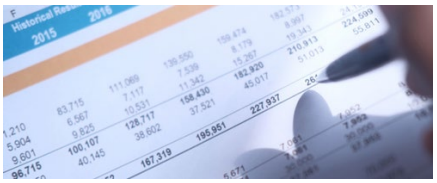
Reaping The Benefits Of Industry 4.0 Through Skills Development In Indonesia

"To better understand the implications of 4IR on the future of jobs and to assess the readiness of education and training institutions to prepare for future labor markets, ADB undertook a study that seeks to capture anticipated transformations on jobs, tasks, and skills and to outline policy directions to prepare the workforce for future jobs."
Source: Asian Development Bank

2021 technology industry outlook

"While cloud computing and artificial intelligence continue to dominate the technology industry, edge computing is also making headlines. Deloitte's

SMART FACTORIES



Factory 2030 – The 'Coming of Age' of The Smart Factory

"Factory 2030, is a Smart Factory, that is Industry 4.0 compliant whereby all machinery and equipment are connected allowing real-time monitoring to ultimately make decisions without human involvement. A combination of cyber-physical systems and the Industrial Internet of Things (IIoT) will make it all possible and make the Smart Factory a reality. One characteristic of the factory of the future is its ultimate flexibility whereby it will be able to mass produce products with a batch size of just one – allowing products to be fully customized to the customer needs – a far cry from the early days of 'cookie cutter' manufacturing operated Henry Ford."
Source: Metrology

Smart Factory Transformation: The Time Is Now

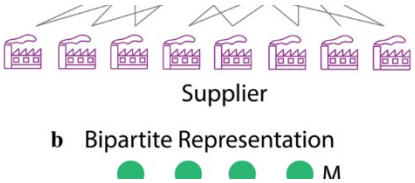
"Most manufacturers agree that this is where the future lies. But with the disruption and uncertainty brought about by the pandemic, moving ahead with the latest competitive trend may be taking a back seat for manufacturers. That would be a mistake—and not only because smart factories will be a key differentiating factor in the marketplace of the future. It may also very well be the key to weathering the kind of volatility and disruption we're experiencing right now. The following are key ideas to keep in mind as you consider a smart factory transformation."
Source: Forbes

Why smart factories are the future of supply chain resilience

"Smart factory investments have immense benefits operationally, fiscally and throughout the workplace. Productivity and efficiency, for example, have risen to the forefront and increasingly determine an organization's overall success in the marketplace."
Source: Supply Chain Dive

Becoming a smart factory

"Smart factory transformation requires integrating people, processes, and technology at the same time. Crean says there can be a tendency to over-focus only on technology. To avoid this, companies need outstanding people, leading-edge technology, and modern, flexible process



Adaptation of high-tech knowledge-intensive enterprises to the challenges of industry 4.0

"The proposed methodology for a comprehensive assessment of industrial enterprises' innovative potential as the degree of their adaptation to the challenges of Industry 4.0 was implemented at the high-tech knowledge-intensive enterprises "Shtorm" and "Tekhnotron". Both of them are well known for their innovative developments in the field of welding production. It was demonstrated that the proposed methodology allows not just assessing the degree of adaptation to the digital economy and the challenges of Industry 4.0, but also assessing the impact of planned activities on innovations and determine methods and means of responding to the changes in external and internal environment of enterprises."
Source: E3S Web Conf

Making smart manufacturing smarter – a survey on blockchain technology in Industry 4.0

"This paper presents a comprehensive survey on blockchain in Industry 4.0 – applications, architectures, techniques, and research challenges. We propose a blockchain reference architecture for smart manufacturing, which guides our discussions on applying the blockchain technology to various applications of the smart factory and smart supply chain."
Source: Enterprise Information Systems

Brief review of methods and techniques used in Learning Factories in the context of Industry 4.0

"This paper is an analysis of recent studies and seeks to briefly present the evolution of industrial production processes and systems and Industry 4.0 but also the concept of learning factory. The paper also presents a review of the main methods and techniques used in innovative industrial training, learning and production processes and systems. Finally, some conclusions related to the use of these methods and techniques are summarized."
Source: IOP Conference Series: Materials Science and Engineering

Virtual reality in the automotive field in industry 4.0

vice chairman and US technology sector leader, Paul Silverglate, shares his perspectives on the advantages of processing data locally and how partnerships will play a key role in accelerating growth in the technology industry in 2021."
Source: Deloitte

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Mapping TradeTech: Trade in the Fourth Industrial Revolution

"This report aims to shed light on the landscape of emerging trade technologies and consider the opportunities and challenges for each, ranging from AI to IoT to 3D printing."
Source: World Economic Forum

methods that deliver faster, establish competitive cost objectives, and target game-changing performance."
Source: Aerospace Manufacturing Design

A New Kind of Connected Factory

"Deloitte, together with the Manufacturer's Alliance for Productivity and Innovation (MAPI), recently published a report called "Accelerating Smart Manufacturing: The Value of an Ecosystem Approach," which indicates that long-term partnerships in the form of an ecosystem can accelerate digital initiatives and drive results. According to the report, while the manufacturing industry was already on a digital transformation journey, it has historically been complicated by the complexity of digitally connecting assets that, in some cases, are more than 50 years old."
Source: Automation World

INDUSTRY 4.0

The Opportunity Quadrant: Four Parts to Industry 4.0 Success

"forward-thinking manufacturers will likely find they need a collection of new technologies to support organizational initiatives. These new technologies will enable manufacturers to combine intelligent automation with robust, real-time decision-making capabilities, enabling a more productive and efficient manufacturing environment across their workforce, processes, assets, and customers."
Source: Manufacturing Global

Neo Factory: The State of Industry 4.0

"Industry 4.0 initiatives are transforming factories in a myriad of industries, from aerospace and health care to plastics and shipping. However, why do so many Industry 4.0 initiatives at today's factories fail to scale? Silicon UK asks what are the key challenges to deliver the promises made by Industry 4.0?"
Source: Silicon

Industry 4.0 and Its Benefits: 2021 Edition

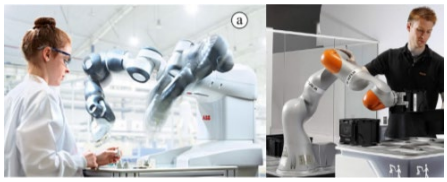
"Luckily, there's now a technological revolution in manufacturing, sometimes called Industry 4.0 or Smart Manufacturing, that has gained the

"The paper will present a state of art on the needs of the Virtual Reality and Augmented Reality devices used in the automotive field and two case studies related to some applications of Virtual Reality in the automotive field in Romania."
Source: MaterialsToday: Proceedings

NDE 4.0—A Design Thinking Perspective

"In this paper, the authors have taken a design thinking approach to spotlight proper objectives for research on this subject. It begins with qualitative research on twenty different perceptions of stakeholders and misconceptions around the current state of NDE. The interpretation is used to define ten value propositions or use cases under 'NDE for Industry 4.0' and 'Industry 4.0 for NDE' leading up to the clarity of purpose for NDE 4.0—enhanced safety and economic value for stakeholders. To pursue this worthy cause, the paper delves into some of the top adoption challenges, and proposes a journey of managed innovation, conscious skills development, and a new form of leadership required to succeed in the cyber-physical world."
Source: Journal of Nondestructive Evaluation

SMART FACTORY



Smart Factory: From Concepts To Operational Sustainable Outcomes Using Test-Beds

"The concept of "Smart Factory" is a new paradigm. Past studies in literature point out several conceptual understandings of Smart Factory and their classifications. This paper answers the following scientific questions, where does the Smart Factory stand? What are its core characteristics and capabilities? What are the operational outcomes of the currently developed system? How can these pieces of equipment be integrated into an R&D methodology?"
Source: Logforum

Design of Remote Management System for Smart Factory

"In this study, we have designed and implemented a real-time remote management system for smart factories, which is connected to an IoT sensor and gateway, for plastic manufacturing plants. By implementing the REST API in which an IoT sensor and smart gateway can

general public's attention. The science-fiction-like capability of the modern factory tends to get people excited."
Source: IoTforall

Industry 4.0 Isn't Just For Factories

"Central to that opportunity is the Industry 4.0 revolution, which has seen manufacturers and plant operators use digital technologies to create smarter, more interconnected workplaces. Using Internet of Things technologies, plant operators create digital virtual twins of every asset in their facility — from heavy machinery to mobile devices — and optimize operations in real time using advanced mobile software solutions."
Source: Forbes

MANUFACTURING TECHNOLOGY

2020 Manufacturing Technology Leader of the Year: Ford's Gary Johnson

"Johnson's role in strategically leveraging the technologies that guided the automaker's global manufacturing units throughout the pandemic response shines bright."
Source: Industry Week

Manufacturing reimagined: from improved productivity to profitable growth

"Global disruptions and instabilities, supply-chain breakdowns, and heightened customer demand for digital-first experiences are speeding the Fourth Industrial Revolution (4IR) forward. While the COVID-19 pandemic continues to drive significant uncertainty, manufacturers are revamping their growth strategies with a renewed appreciation for how operating models determine strategic outcomes."
Source: WEForum

Six Manufacturing Tech Trends To Look For In 2021

"In the early days of the pandemic, manufacturers were hit hard with forced shutdowns, production slowdowns and serious questions about whether companies could navigate the disruptions. Manufacturing indicators had shown early 2020 momentum, but US industrial production in March registered a month-over-month

communicate, the system enabled the data measured from the IoT sensor and equipment status data to the real-time monitoring system through the gateway. Also, a web-based management dashboard enabled remote monitoring and control of the equipment and raw material processing status."
Source: International Journal of Internet, Broadcasting and Communication

Future Factories: Safe Human-Robot Collaboration

"This project aims to develop a safe human-robot collaboration (HRC) system. The system will feature a robotic arm and advanced sensors, inter-networked in an edge computing framework. It will also make use of computer vision techniques, enabling a seamless and safe operation. Finally, the system operation will be verified on a set of prespecified manufacturing tasks, demonstrating adequate safety measures for effective collaboration."
Source: CoNEXT'20: Proceedings of the Student Workshop

Robotization in Industries: A Focus on SMEs

"In this chapter, "robots" refers to the industrial robots which are used to manufacture all types of products, although they are present in the automotive industry. After the analysis of the implementation of a packaging robot in this SME, the chapter draws lessons from this technological adventure, which is still in a state of flux, around the need for pragmatic and rigorous support. In this respect, the Robot Start PME program highlights the key factors of success of a technological change in the context of Industry 4.0, particularly in terms of methodological tools. As an illustration, the Robot Start PME program, launched at the end of 2013 and supported by the French public authorities, aimed to guide 250 SMEs in their robotization projects."
Source: Digital Transformations in the Challenge of Activity and Work: Understanding and Supporting Technological Changes, Volume 3

decline of 4.5%, followed by a deeper decline of 11.2% in April."
Source: Forbes