SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

1 February – 28 February 2020

TOPICAL REPORT

ADVANCED MANUFACTURING

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MANUFACTURING

Digital Transformation Will Change Manufacturing As We Know It

"The global manufacturing world seems to be travelling back in time. Large production plants and long assembly lines, where goods were mass produced in hundreds and thousands, may become a thing of the past. Instead we are witnessing a growing demand for products that are highly-customized to the needs of individual end customers. This is much like the years preceding the First Industrial Revolution when each product was painstakingly crafted by hand."
Source: Forbes

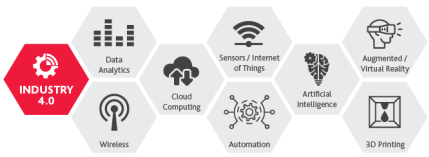
How Can Mixed Reality Fit into Production?

"Once viewed as purely futuristic, immersive technologies like virtual reality (VR), augmented reality (AR) and mixed reality (MR) are transforming manufacturing workflows as business leaders recognize the value of visualizing complex data dimensionally and supporting more information-rich experiences."
Source: Industry Week

How can manufacturers get the most out of their digital twin capabilities?

"DIGITAL solutions are growing in capacity and they will continue to

INDUSTRY 4.0



Internet of things in construction industry revolution 4.0: Recent trends and challenges in the Malaysian context

"This study uncovers, identifies and assesses the challenges of adopting IOT in construction projects. The challenges have been identified through the briefed literature review and a survey instrument from construction industries in Malaysia."
Source: Journal of Engineering, Design and Technology

Analyzing the Barriers to Industry 4.0 Through Best-Worst Method

"In this paper, an attempt has been made to identify, categorize, and prioritize the barriers in-front of present manufacturing industry in implementation of widely acclaimed Industry 4.0 practices. The ranking of the challenges/ barriers in adoption of this highly sophisticated manufacturing are identified and ranked categorically as well as across the categories with the help of a survey based empirical study. Such obtained ranking of barriers are optimized through Best-Worst Method. The results provide the insights of barriers, their prominence and priorities of our industries, mainly Indian, in adoption of this era of digital, intelligent and connected manufacturing."

INDUSTRY 4.0

The Fourth Industrial Revolution: At the intersection of readiness and responsibility

"Among this year's findings, nearly seven in 10 executives believe that long-term business success requires the integration of Industry 4.0 technologies into their operations. But even more—nine in 10—expect climate change to have a negative impact on their organizations. That's a reminder that the Fourth Industrial Revolution isn't the only huge challenge weighing on the minds of the world's business leaders—and those other looming concerns could radically alter how businesses adapt their strategies and activities going forward."
Source: Deloitte

Demystifying Industry 4.0

"Industry 4.0 (I4.0) is also known as the fourth industrial revolution. Its impact will be felt by individual companies and industry sectors in every country across the globe. As the revolution progresses, businesses that fully embrace the transformation will be in the best position to thrive, while those that have lagged behind their more agile competitors may struggle to survive"
Source: RMIT

MANUFACTURING

delight industry players with their wide range of business applications."
Source: Techwireasia

Special report: Robotics and automation in automotive manufacturing and supply chains

"The automotive industry is undergoing the most fundamental transformation in its history and, as this article suggests, a flexible approach to software development will become essential to companies that want to stay competitive."
Source: Robotics and Automation News

SMART FACTORIES

The future of smart manufacturing

"In a production environment, this means integrating operating technology with information technology, something that is accomplished by using embedded systems to monitor and control physical processes. Connecting all these sensor systems in networks to computing systems results in the emergence of what today is called the Internet of Things (IoT), in which enormous amounts of data are collected, analyzed and communicated. Intelligence is no longer centralized in one place, but is distributed across the entire system, to be accessed by machines, devices and users"
Source: Plastics Today

AUTOMATION

Automation and employment: How universities must respond to Industry 4.0

"Industry 4.0 is the result of the latest industrial revolution; first there was mechanisation, followed by mass production, computerisation, and now automation. It is a convergence of digital, biological and physical worlds into Cyber-Physical Systems resulting in the rise of automation."
Source: The Drum

INDUSTRIAL IOT

Source: International Journal of Performability Engineering

Essential Skills for Civil Engineering Graduates Towards Industry Revolution 4.0

"The Industry Revolution 4.0 was first being introduced in Malaysia on September 2018. The reaction from this introduction has initiated the Malaysian Government to promote Industry Revolution 4.0 in industrial manufacturing and construction system. This however, gives impact to the graduating student whom seeking for employment where specific skills were required by the industry. The gap of skills was identified in this study."
Source: IEEE

Breakthrough Innovations of Industry 4.0 as a Factor of Economic Growth

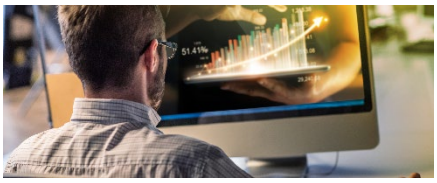
"The article discusses the conditions that create a favorable economic environment for the creation and widespread use of breakthrough innovations of Industry 4.0. Such innovations are able to unleash the potential of the socio-economic development of the country and transform its structure. Breakthrough innovations of Industry 4.0 are based on intellectual knowledge, which also covers artificial intelligence, allows you to create structures that serve the breakthrough economy."
Source: Advances in Economics, Business and Management Research

Improving the Systems for Increasing the Manufacturability of Products Under the Conditions of Industry 4.0

"Our analysis has revealed the advantages, difficulties and risks of introducing new systems for improving manufacturability using the example of a design organization and manufacturing enterprises in the production of electric machines for civil aviation. We have formulated proposals for organizing the process of digital transformation of the analyzed organizations in order to implement the process of "technological designing" of products using Industry 4.0 technologies."
Source: Advances in Economics, Business and Management Research

Root-Cause Problem Solving in an Industry 4.0 Context

"The study presents a case study of collaborative design, testing, and implementation of a product-specific solution to resolve quality control issues caused by a flawed component specification. The



Manufacturing Outlook Report 2020

"The production of our report, supported by the CBM provides a snapshot into the conditions impacting the manufacturing sector at a time of significant commercial and political change."
Source: Crowe

The time is now: How to manufacture your smart factory with Industrial IoT

"Manufacturers are already adopting the IoT to help improve quality control, achieve operational efficiency, transform the customer experience and more. Manufacturers using the IoT are seeing return on their investment in the form of improved product quality; greater operational efficiency and safety; better inventory tracking; and more accurate demand forecasting. Some companies are also using technology as a differentiator to enhance customer experience."
Source: IOT Tech News

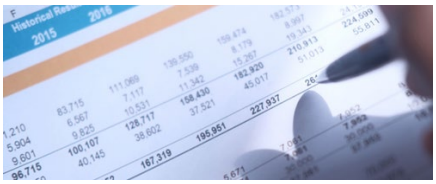
Machine Vision is Key to Industry 4.0 and IoT

"Machine vision joins machine learning in a set of tools that gives consumer- and commercial-level hardware unprecedented abilities to observe and interpret their environment. In an industrial setting, these technologies, plus automation and higher-speed networking, add up to a new industrial revolution — Industry 4.0. They also offer brand-new ways to conduct low-waste, high-efficiency industrial activities."
Source: Read Write

Future-proofing your factory with IoT

"For a smart factory to deliver maximum value, all the devices and equipment on the network need to have non-stop, perfect connectivity, be it short- or long-range. This way operators can operate the machinery from anywhere in the compound, remotely collaborate on tasks, and be alerted about problems in advance."
Source: TechNative

INDUSTRY 4.0



BMW Dingolfing developing industry 4.0 technology for logistics

"The BMW Group and three partner companies from the Bavarian region of Germany are expanding the use of industry 4.0 innovations in production logistics at the OEM's Dingolfing plant. The move comes as part of a three-year research project supported by provided case study details company's application of RCA. Once the problem is identified, we describe how the design and production teams collaborated to verify and validate the revised product design via 3D product simulations."
Source: IEEE Engineering Management Review

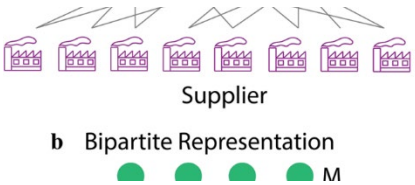
Digital Twin in Industry 4.0: Technologies, Applications and Challenges

"this paper surveys and discusses the digital twin concept in the context of the 4th industrial revolution, particularly focusing the concept and functionalities, the associated technologies, the industrial applications and the research challenges. The applicability of the digital concept is illustrated by the virtualisation of an UR3 collaborative robot which used the V-REP simulation environment and the Modbus communication protocol."
Source: 2019 IEEE 17th International Conference on Industrial Informatics

Concept, Challenges, and Learning Benefits Developing an Industry 4.0 Learning Factory with Student Projects

"The paper provides an overview of the developed learning factory, physical and digital structure, requirements, challenges, and learning benefits to build a learning factory with the aid of student projects. The paper concludes with a summary and ideas for future work."
Source: 2019 IEEE 17th International Conference on Industrial Informatics

SMART FACTORIES



Towards Identification of the Hierarchical Link between Industry 4.0, Smart Manufacturing and Smart Factory: Concept Cross-Comparison and Synthesis

"The purpose of the current research on one hand is to highlight the relation between I4.0, smart manufacturing and smart factory, and on the other hand to present a synthesis of Industry 4.0 national initiatives linked to the fourth industrial revolution worldwide."
Source: International Journal of Supply and Operations Management

IIoT Based Smart Factory 4.0 over the Cloud

"This work has used 'Controllino mega' which is a controller to control

the Bavarian Ministry of Economic Affairs, Regional Development and Energy."
Source: Automative Logistics

Where Industry 4.0 Is Delivering Results Now

"Manufacturers need to move forward with real-time integration between their CRM, ERP and PLM systems so their broader goals of Corporate Social Responsibility (CSR), sustainability and Configure, Price, Quote (CPQ) selling can be achieved"
Source: Forbes

The Workforce of the Future: Navigating Industry 4.0

"Tech innovation is prompting massive change—a transformation so significant it's referred to as a fourth industrial revolution, or Industry 4.0. From facial recognition software to voice-activated virtual assistants and self-driving delivery trucks, the lines between human and machine "work" continues to blur. Businesses who embrace these technological advances will reap the rewards of increased efficiency and, ultimately, boost their bottom lines."
Source: Chamber Business News

Industry 4.0 adoption in manufacturing: Where we are and the road ahead

"Digital has become the backbone of manufacturing as every organization, irrespective of the size, is looking to improve productivity. With revenue growth under pressure in the current economy, reducing cost has become a must win battle for every manufacturer. Industry 4.0 is not at all a buzz word now; in fact, it has become a reality for large enterprises and a vision for Small and Medium Enterprises as well. The adoption of digital technologies has seen significant growth in 2019, leading with automation and machines getting augmented with sensors, AI and IoT solutions."
Source: DQ India

Less than a third of manufacturing SMEs have Industry 4.0 strategy

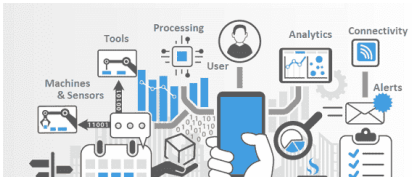
"Despite the much-publicised potential for automated, 'smart' and modern robotic technology to improve efficiency and productivity, 32% considered a strategy in the area but "decided it wasn't right", according to the annual Manufacturing and Engineering report from accountancy group MHA, produced in association with the IMechE."
Source: ImechE

the entire production as it has a cloud connectivity feature. It is an IoT Arduino compatible open source PLC device for industrial uses in automation and for controlling and monitoring. This will allow separate part of the production line to communicate to make the entire manufacturing process easier to control and monitor in real time. In this work, a lot of new features and functionalities have been incorporated, which will change the way, a factory used to look and be."
Source: 2019 International Conference on Computational Intelligence and Knowledge Economy

A review on the characteristics of cyber-physical systems for the future smart factories

"this paper reviews literature in order to distinguish between technological characteristics of CPSs and operations management characteristics to build future CPS-based smart factories. This paper remarks the need for research on operations management characteristics as these may be the ones actually leading operations managers to the concrete implementation of CPS-based factories in manufacturing."
Source: Journal of Manufacturing Systems

INDUSTRIAL IOT



Innovation in the Era of IoT and Industry 5.0: Absolute Innovation Management (AIM) Framework

"The present study has proposed a new innovation management framework labeled as "Absolute Innovation Management (AIM)" to make innovation more understandable, implementable, and part of the organization's everyday routine by synergizing the innovation ecosystem, design thinking, and corporate strategy to achieve competitive advantage and economic growth. The current study used an integrative literature review methodology to develop the "Absolute Innovation Management" framework."
Source: Information