SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

30 November 2019 – 2 January 2020

TOPICAL REPORT

ADVANCED MANUFACTURING

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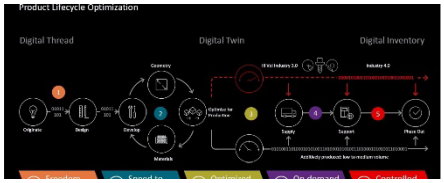
SMART MANUFACTURING



Volkswagen Is Accelerating One Of The World's Biggest Smart-Factory Projects

"Volkswagen is set to take a significant step forward with what Martin Hofmann, the German auto giant's group CIO, calls "one of the biggest industrial cloud projects in the Western hemisphere.""

Source: Forbes

Real-Time Data Is The Future Of Smart Manufacturing

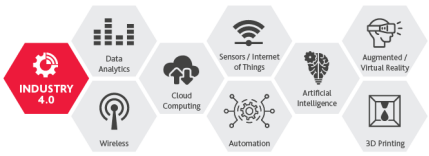
"Manufacturers are achieving only 40% of their potential because they're spending too much valuable time manually updating inventory control, production reporting, and pricing reports, when their competitors using real-time data are busy winning deals and planning next-generation real-time factories"

Source: Forbes

Uniqlo heads towards full warehouse automation with groundbreaking robot that can fold and box clothes

"The world's second-largest fashion retailer has been desperate to automate its warehouse and distribution systems, claiming a severe shortage of manual workers due to Japan's ageing population. Just over a year ago, it pledged to invest 100 billion yen (£700m) in the effort, including revamping the Tokyo warehouse."

INDUSTRY 4.0



Industry 4.0 and business process management

"The new technologies based on Internet of Things and Services, SMART solutions, and the concept Industry 4.0 are opening new possibilities of BPM implementation. This theoretical paper deals with a review of new trends in BPM and a presentation of the possibilities of core technologies for Industry 4.0 in phases of BPM applications."

Source: Tehnički Glasnik

Industry 4.0: Whose Revolution? The Digitalization of Manufacturing Work Processes

"this study investigates the extent to which digital tools are used and available to managers and operators in manufacturing who are experiencing digitalization due to Industry 4.0 movements. A cross-sectional study of production managers and operators (n = 417) was conducted among 10 Norwegian manufacturing companies."

Source: Nordic Journal of Working Life Studies

Axiomatic Design for Creativity, Sustainability, and Industry 4.0

"This paper discusses how to foster creativity and sustainability during Axiomatic Design processes, including Industry 4.0 as an example

INDUSTRY OUTLOOK

2020 manufacturing industry outlook

"This past year saw the decade-long expansion in the US economy become the longest in history, but in recent months the US manufacturing sector has seen signs of contraction. Deloitte's projections for GDP growth levels reflect recent trends, adjusting from 3.7percent down to 2.7percent for 2019, and 2percent down to 1.3percent for 2020. The industry is trying to regain its footing amidst the continued volatility in prices, policy decisions, and diminished productivity."

Source: Deloitte

Advanced Manufacturing Quarterly

"Welcome to the quarterly review of the top themes discussed by leaders of 27 advanced manufacturing (AM) sector companies (including those from the A&D, IP and chemical subsectors) during public earnings calls with analysts. This update tracks the movement of these themes from quarter to quarter to provide a perspective on shifts in the AM landscape."

Source: EY

Source: Telegraph

INDUSTRIAL IOT

The Security Challenges of Industrial IoT

"The Internet of Things (IoT) is fast turning into an intrinsic part of the digital transformation for industries such as utilities, transportation or manufacturing. The market is expected to reach a value of $922.62 billion by 2025, becoming one of the biggest catalysts for new emerging technologies."
Source: IoT For All

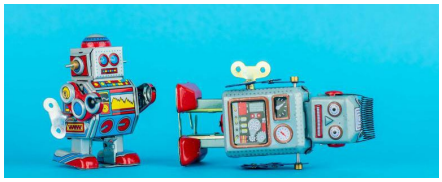
The 10 Hottest Industrial IoT Startups Of 2019

"While IoT is expected to touch many aspects of life and work, a substantial amount of the action is happening on the industrial side, where manufacturers, utilities and other heavy-hitters are making headway in connecting their assets to improve operations."
Source: CRN

The Challenge of Powering Industrial IoT Applications

"IoT is gaining a lot of momentum. The increasing demand of digital applications poses several challenges like miniaturization, low power consumption, size, safety and efficiency. The use of certified, reliable and long-term available electronic components"
Source: iEN

INDUSTRY 4.0



How Industry 4.0 is accelerating business

"The fourth industrial revolution promises the biggest structural change of the past 250 years. We asked Henrik von Scheel, best known as the originator of Industry 4.0, to share his thoughts on what this means for business"
Source: Technology Record

How Apple is already part of Industry 4.0

"Apple has entered manufacturing infrastructure with its products seeing wide deployment across Industry 4.0."
Source: Computer World

Trends for Industry 4.0 in 2020 and Beyond

application. Creativity is generating valuable, new ideas. Innovation is making new ideas viable. This paper explains how AD theory and methods can improve the selection process in evolution-inspired creativity for formulating functional requirements and generating and selecting design parameters. FR formulation is a key to creating value in design solutions. No design solution can be better than its FRs. The FRs must capture the true, underlying essence of customer needs."
Source: MATEC Web of Conferences

Supply chain management and Industry 4.0: conducting research in the digital age

"Industry 4.0 is happening now (Vogel-Heuser and Hess, 2016, Sprovieri, 2019) and describes the trend toward automation and data exchange in manufacturing technologies and processes which include among others cyber-physical systems (CPS), industrial Internet of Things (IIoT), cloud computing, cognitive computing and artificial intelligence (AI). Decision making is predominantly decentralized, and system elements (e.g. production plants or transport vehicles) make autonomous, targeted decisions. A digital manufacturing enterprise is not only interconnected, but also communicates, analyzes and uses information to further drive intelligent actions back into the physical world."
Source: International Journal of Physical Distribution & Logistics Management

Predictive Maintenance in the 4th Industrial Revolution: Benefits, Business Opportunities and Managerial Implications

"The emergence of Industry 4.0 enhances the capabilities of predictive maintenance and paves the way for efficient and optimized maintenance operations. Until now, the technical implications of adopting predictive maintenance solutions in Industry 4.0 environments have been reported in various studies. However, the business perspective is usually not considered, although there are significant managerial barriers towards the 4th industrial revolution. In this paper, we present the benefits, business opportunities and managerial implications of predictive maintenance based upon our experience in the design, implementation and deployment of related solutions."
Source: IEEE Engineering Management Review

SMART FACTORIES

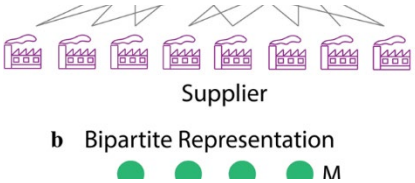
"Greater flexibility, virtual validation, industrial controllers, and edge computing are some of the hot topics and trends that will likely dominate Industry 4.0 going forward."
Source: Electronic Design

How AI Will Make Industry 4.0 Profitable

"The ability to move to Industry 4.0 depends on an organization's ability to scale its proofs of concept to a more industrialized level."
Source: RTInsights

Future-proofing for Industry 4.0: the role of AI, blockchain, and edge computing

"Industry 4.0 has come to represent the next step in industrial technology. As computers and other devices become increasingly connected to the IoT, further integrations with artificial intelligence (AI), blockchain, and edge computing can unlock additional functionality and value."
Source: The Sociable



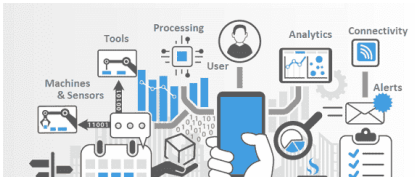
Cross-Network Fusion and Scheduling for Heterogeneous Networks in Smart Factory

"In this paper, a heterogeneous network architecture based on software-defined network (SDN) is proposed for realizing cross-network flexible forwarding of multi-source manufacturing data and optimized utilization of network resources. Subsequently, the mechanism of cross-network fusion and scheduling (CNFS) is analyzed from the perspective of high dynamic characteristics and different delay requirements of data flows."
Source: IEEE

Can smart factories bring environmental benefits to their products?: A case study of household refrigerators

"This article quantifies and verifies the theoretically predicted impacts of this smart factory on the individual processes. Though the overall differences in the two models are quite minor, we find that this smart factory can notably reduce the values of most impact categories associated with the parts and refrigerator production; the reduction in the value of climate change is 33%."
Source: Journal of Industrial Ecology

INDUSTRIAL DIGITALISATION



Adopting augmented reality in the age of industrial digitalisation

"This study identifies critical success factors and challenges for IAR implementation projects based on field experiments. The broadly used technology, organisation, environment (TOE) framework was used as a theoretical basis for the study, while 22 experiments were conducted for validation. It is found that, while technological aspects are of importance, organisational issues are more relevant for industry, which has not been reflected to the same extent in the literature."
Source: Computers in Industry

Driving transformation performance through

innovation and experience model

"This paper argues that the transformational performance is derived from business model innovation and focuses on customer experience. We use telecommunication firms as our unit analysis with sample of 195 Indonesian ICT firms out of 542 units. The analytical approach and solution technique that is used for analysis is Partial Least Square (PLS). The findings demonstrate that business model played significant role on supporting contribution of customer experience in driving transformational performance."

Source: Management Science Letters