

Industry 4.0 Integration with Industrial Engineering

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Abstract

Industry 4.0 which has no longer remained future of manufacturing world. It has started to root itself in manufacturing industry at varying level. One of the key aspects of its adoption is how it get integrated with tradition competencies. One such competency is Industrial Engineering which is here to stay as foundation of manufacturing. Smart factories can improve efficiency, profitability, compliance, and customer satisfaction by implementing components of Industry 4.0. During the Pandemic 67% of the Manufacturers have accelerated towards digital Projects and it is very much expected that digital manufacturing market to cross \$767 Billion by 2025. Industrial engineers will undoubtedly play a key role in Industry 4.0 environments, such as designing, implementing, and maintaining the enabling technologies of a fully automated smart factory.

Today there is less to refer on how Industry 4.0 can be integrated with Industrial Engineering. Some of the researchers have done great work to rethink on Industrial Engineering curriculum. IE Community has a huge scope for research and knowledge sharing for integration of actual applications of Industry 4.0 components in Industrial Engineering competency. All of Industry 4.0's connection - sensors, IoT, AI, and so on – is aimed at one thing: improving production processes. Automation allows factories to work more quickly, while data analytics enables leadership to make data-driven decisions to boost productivity. Industry 4.0 enables greater flexibility across the industrial operation, resulting in higher asset utilization and, as a result, the possibility for increased profitability.

This paper will discuss about such specific applications of different industry 4.0 components like Big Data, IIoT, Cloud Computing, Cybersecurity, Robotics, AR, Additive Manufacturing, Real Time Simulation etc. These technologies can contribute greatly to reach the full potential of manufacturing 4.0 movement. We will review the IE areas of application with Industry 4.0 components with their approach, advantages, benefits, and challenges. Some of the examples that we will discuss in this paper are Data Analytics of Standard time data and time study data, Analytic of standard time data for ergonomics improvement opportunities, IIoT for motion economy analysis, Machining Learning for predicating the time standards, Additive for developing efficient methods, collaborative robots to combine people and robots in manufacturing operations to increase efficiency and revenue, autonomous mobile robots (AMR) for efficient material handling.

Keywords

Industry 4.0, Industrial Engineering, Manufacturing, IoT, Simulation

Biography / Biographies

Krishan Garg is Industrial Engineering Professional with 9 years of experience in off highway industry. He has completed Bachelor of Engineering in Mechanical from Thapar University and Master of Technology in IE & OR from IIT Bombay. He has rich experience in process planning, standard data development using MTM Base and MTM UAS, manpower planning, capacity calculation, simulation, and optimization. His interest areas are process planning, line design, data analytics, simulation, and optimization.

Pravin Pawar is Industrial Engineering Professional with Experience 9.5 years of Experience in Deere and Company. His specialization is in the field of Industrial Engineering and Machining. Prior to Deere worked with SPACO Technology and Sandvik Asia for 2.5 years. He has significant experience of developing Industrial Engineering standard, tools, processes, procedures and deploying those globally at Deere factories. Also has good exposure in Machining Area.

Jagdish Gosavi is the Industrial Engineering Professional with 16 years of experience in Automotive and Off highway Industry. Currently He is Technical Leader at Deere & Company. He has significant experience of developing Industrial Engineering standard, tools, processes, procedures and deploying those globally at Deere factories. Jagdish has very good knowledge of MTM and MOST application. He also has good exposure to Simulation and Optimization Techniques. Jagdish has also led and contributed towards technology adoption and innovation projects for Industrial Engineering.

Nitin Sharan is Senior Engineer in John Deere India Pvt. Ltd., Pune, India. He did his Master's in Industrial Engineering and Management from National Institute of Technology Calicut in 2019. Prior to Masters he received his Bachelors of Technology in Mechanical Engineering from Indian Institute of Information Technology, Design and Manufacturing Jabalpur in 2015. His interests areas include Data Analytics, Optimization, Modelling and Simulation of Industrial Systems.

Jyoti More has total of 10+ years of experience in Automotive and Off highway Industry. She has vast experience on Shop Floor and much experienced of developing Simulation and Data Analytics Tool, Process and Procedures. She is Mechanical Engineer and completed Post Graduate Diploma in Business Management – Distance from NMIMS. Her area of interests includes Modeling and Simulation, Factory Operations, Industrial Engineering and Operations Research.