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WELCOME TO BEYOND SMART SUSTAINABLE MANUFACTURING - BSSM

ONLINE TRAINING

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07. CHALLENGES ASSOCIATED WITH SUSTAINABLE MANUFACTURING

SECTION - SMART SUSTAINABLE MANUFACTURING

Challenges associated with sustainable manufacturing

- The preceding sections examined "sustainable manufacturing" and the potential for smart and sustainable production.
- Most organizations have yet to integrate industry 4.0 technology, despite their advantages.
- Smart manufacturing implementation obstacles include system modeling, knowledge engineering, and human-machine symbiosis, according to a prior research.
- Smart, sustainable manufacturing's economic advantages are unclear, and change resistance must be overcome.
- Clarify and solve industry 4.0's sustainability problems to advance.
- Sustainable and smart manufacturing has the following issues.



Challenges associated with sustainable manufacturing +

- Firstly, challenges facing smart manufacturing include the following:
- implement a big-data-driven system, and industrial data must be acquired and managed with efficiency; achieve a better division of work between humans and intelligent machines; address the safety, privacy, and ethical issues that may be introduced by intelligent manufacturing networks;
- A detailed and comprehensive system should be constructed to link all aspects and data together in order to achieve a decentralized management system.
- A smart chain should be developed to link product knowledge, stakeholder data, and decision-making.
- A new skilled and trained workforce is needed to apply factory 4.0 concepts effectively.
- No clear solutions exist for the career sustainability issues arising from machines replacing humans; high capital investment is required to adopt factory 4.0 principles; the necessity of sophisticated and advanced technological devices for massive data storage, retrieving, processing, and analysis; human resistance to working with robots; and accepting that robots may perform higher intellectual tasks.
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Challenges associated with sustainable manufacturing +

- Secondly, the challenges facing sustainable manufacturing are as follows:
- no reliable definition for sustainable manufacturing practice exists in order to develop sustainability awareness between the suppliers and customers;
- a noticeable gap between industrial and academic research in areas of sustainable and smart manufacturing;
- building an effective model to define and assess all manufacturing elements and components and investigate the interactional effects between them;
- there is a need to construct a platform that includes design, manufacturing, distribution, use, and disposal elements in a single smart-integrated model;
- no optimization guideline is existing to determine the performance of all sustainable manufacturing elements accurately;
- no standard sustainability assessment metrics indicators are globally agreed upon.

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Challenges associated with sustainable manufacturing +

- Thirdly, challenges facing sustainable smart manufacturing integration include the following:
- the existing tools and methods are not enough to establish a reliable approach for "sustainable and smart manufacturing";
- there is a need to have data-driven smart algorithms for the design for sustainable manufacturing, design for sustainable supply chain, design for the sustainable end of life, and design for life cycle assessment;
- no clear and comprehensive analysis exists to define the relationship between three levels of sustainability and industry 4.0 elements;
- the added system complexity of smart sustainable manufacturing still needs to be economically justified;
- the difficulty of integrating the new smart sustainable system with existing systems in a compatible manner;
- human nature to resist and lack of courage to adopt new drastic changes (social acceptance).
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