Industry 3.5 for Sustainable Transition and Total Resource Management

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Leading nations have emphasized manufacturing with national competitive strategies such as Industry 4.0 and Advanced Manufacturing Partnership (AMP). The paradigm of global manufacturing networks is shifting, in which the increasing adoption of artificial intelligence, Internet of Things (IOT), data analytics, and robotics have empowered manufacturing intelligence and smart production. On the one hand, international enterprises are battling for dominant positions in this newly created arena via providing novel manufacturing platforms such as cyber-physical systems. On the other hand, new business models and manufacturing solutions will impact global resource utilization and the environment. However, little research has been done to address management and environmental implications of industrial transition. Furthermore, most of emerging countries may not ready for the transition to Industry 4.0 directly. Alternatively, "Industry 3.5" is proposed as a hybrid strategy, i.e., between Industry 3.0 and to-be Industry 4.0, to call for disruptive innovations to address the need to manage the potentially disruptive socio-economic impacts of such a transition, while taking into account total resource management for sustainability.

Indeed, novel solutions for a sustainable industrial transition have been developed for various industries to address the needs for smart production. For example, scheduling in traditional textile industry is increasingly complicated since product mix is complicating with more adoption of multi-functional textiles. Rather than changing the whole production facility, AI and big data technologies can be employed to empower intelligent manufacturing while reducing wastes due to frequent setup changes. For example, old wafer fab plants can also be enhanced via disruptive innovations for sustainable transition to meet new product demands, while managing all resources effectively to reduce cost and enhance green production.

Increasingly tight resource constraints and severe environmental pollution have made sustainable resource utilization and environmental protection worldwide. Sustainable resource utilization seeks to achieve both economic growth and environmental sustainability by catalyzing innovations that underpins sustainable development in high-tech

manufacturing. Prior studies are lacking to address flexible decisions and sustainable resource utilization before ready for Industry 4.0 transition.

This virtual special issue (VSI) aims to collect practical approaches for achieving concrete, measurable progress across economic and environmental pillars to ensure the sustainable resource utilization via novel studies for sustainable migration for Industry 3.5 and Industry 4.0. This VSI will guide future directions that will facilitate successful and sustainable migration of industrial revolutions.

Interested topics for the VSI include but not limited to:

- Resource and environmental implications/impacts of transitions to Industry 3.5;
- Frameworks for sustainable Industry 3.5 transition;
- Assessment of sustainable Industry 3.5 transition;
- Industry 3.5 and the Circular Economy;
- Novel theories and solutions for total resource management to realize the hybrid strategy of Industry 3.5.

Manuscript Preparation and Submission

A VSI is an online-only grouping of Special Issue articles traditionally assigned to a single Special Issue. The articles in a VSI will be assigned a unique identifier and published in a regular journal issue. The unique identifier allows to simultaneously adding the article to a VSI in ScienceDirect.com. Articles grouped together in a VSI retain their original citation details. A VSI speeds up the publication of individual articles as, unlike the publication process for conventional Special Issue articles, a VSI does not need to wait for the final article to be ready before publication.

Contributors are encouraged to communicate with the editors by e-mail: cfchien@mx.nthu.edu.tw (Prof. Chien, Chen-Fu).

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Important Dates

- Full paper submission deadline: December 31, 2019
- Final decision notification: May 31, 2020
- Publication: As soon as accepted (VSI)

Further Reading

Lopes de Sousa Jabbour, A.B., Jabbour, C.J.C., Godinho Filho, M., Roubaud, D., 2018. Industry 4.0 and the circular economy: a proposed research agenda and original roadmap for sustainable operations. Annals of Operations Research 270 (1), 273–286.

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