Introduction to the minitrack on Digital and Hyperconnected Supply Chain Systems

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Supply Chain Systems (SCSs), notably in public sector, now cope with a lot of uncertainties and variabilities. Additionally, their stakeholders are more and more intensely digitalized and interconnected on multiple layers, revealing new opportunities at anytime and anywhere. In such a context, managers, public and governmental authorities must rethink their decision support systems to remain competitive and sustainable globally.

In all domains, and particularly in public area, Digital and Hyperconnected SCSs will soon be the new normal. Collaborative networked systems such as public SCSs should be opportunity-oriented to build agreements on-the-fly and get exceptional results. Such systems are bound to gradually move from being driven by long-term strategic alliances, as it systematically exists in public sector, to being opportunity-driven goal-oriented networks. More recently, authors showed that these systems are more and more intensely interconnected on multiple layers, ultimately anytime and anywhere. The interconnectivity layers notably include digital, physical, operational, business, legal and personal layers. This new state is notably called "hyperconnectivity" in the "Physical Internet" framework. Such a state implies numerous new opportunities for managers, public and governmental authorities, particularly regarding the possibility for SCSs to become more flexible, dynamically driven and open instead of rigid, planned with static policies and dedicated. This allows considering a set of partners and infrastructures not limited to the known and active ones, opening avenues and degrees of freedom when aiming to catch opportunities on the fly as they occur. One of the serious challenges facing governments of the world relate to develop resilient, sustainable and efficient SCSs. Unfortunately, to date, very few practices and research works support this ambition. Consequently, managers, public and governmental authorities are looking for innovative systems and associated decision support systems designed to engineer, improve and manage their activities in this new typical environment.

Two papers have been selected that deal with the digitalized and hyperconnected SCS engineering and management, in public, private and humanitarian context, participating in the development of a more efficient, resilient and sustainable society. The first one suggests an innovative decision support system able to manage the hyperconnectivity in Supply Chain Systems while the second one focuses on potential application of Physical Internet paradigms to humanitarian systems.

1. Making Strategic Supply Chain Capacity Planning more Dynamic to cope with Hyperconnected and Uncertain Environments

Raphaël Oger, Frédérick Benaben, Matthieu Lauras, Benoit Montreuil

Public and private organizations cope with a lot of uncertainties when planning the future of their supply chains. Additionally, the network of stakeholders is now intensely interconnected and dynamic, revealing new collaboration opportunities at a tremendous pace. In such a context, organizations must rethink most of their supply chain planning decision support systems. This is the case regarding strategic supply chain capacity planning systems that should ensure that supply chains will have enough resources to profitably produce and deliver products on time, whatever hazards and disruptions. Unfortunately, most of the existing systems are unable to consider satisfactorily this new deal. To solve this issue, this paper develops a decision support system designed for making strategic supply chain capacity planning more dynamic to cope with hyperconnected and

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uncertain environments. To validate this decision support system, two industrial experiments have been conducted with two European pharmaceuticals and cosmetics companies.

2. Assessing Physical Internet potential for Humanitarian Supply Chains

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Nowadays, Humanitarian Supply Chain stakes are changing drastically, implying a need for new methods and tools. One of the most promising evolution is definitively "Physical Internet". The current research works investigates how to assess the potential benefits and limits of using Physical Internet paradigm within Humanitarian Supply Chains. Practically, the proposal provides (i) a system engineering oriented framework and (ii) a set of specific modeling features. This contribution will allow assessing efficiently and accurately, impacts of Physical Internet in Humanitarian context. Finally, the paper develops avenues for further research based on the proposal.