



## **Impacts of new technologies on Physical Internet and intelligent & sustainable logistics systems**

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### **Short presentation:**

An overall reconsideration of the logistics sector's organization was proposed by Professor Benoit Montreuil in 2011 via the Physical Internet (PI) concept ([www.physicalinternetinitiative.org](http://www.physicalinternetinitiative.org)). The idea is to set up an efficient and sustainable hyperconnected logistics system on all geographic levels. From the opened and distributed communication and information network which is Internet, the transposition of the concept to physical objects' transportation and overall logistics' activities enables a real logistics revolution. The Physical Internet is articulated as a global and open logistics system, exploiting transport and logistics networks interconnected via logistics facilities such as intermodal hubs, using collaborative protocols, standardized modular containers and smart standard interfaces. PI relies on connecting to the digital Internet the modular containers encapsulating the physical objects for monitoring, transactional, operational and security purposes, via the Internet of Things. Indeed, a physical object is at the same time 'a communication channel and a information storage medium'. Modular containers are expected to become intelligent and autonomous objects. The PI concept indeed suggests significant organizational evolutions.

Overall, the Physical Internet is a large-scale, massively open Cyber Physical System of Systems, affecting Supply Chains all around the world in numerous industries. Even though it may greatly simplify supply chain and logistics operations, it induces more intrinsic organizational and control complexity. It is therefore essential to set up systems: (i) with intelligible behaviours, (ii) that can face reality and interact with the environment, relying on ad hoc information systems and smart open digital platforms. For this, the coupling between the Physical Internet, the Internet of Things (IoT) and the Digital Internet as well as the organization of the decision-making according to different possible architectures provide a wide range of possibilities. The goal is to facilitate the interaction between the physical (real) and informational (virtual) worlds. New technologies are thus essential for the implementation of such systems.

This session aims to present organizational and decisional impacts of new technologies on (but not limited to):

- Modeling / control for Physical Internet and intelligent & sustainable logistics systems.
- Performance assessment of Physical Internet and intelligent & sustainable logistics systems (efficiency, service capability, agility, resilience, sustainability, etc.)
- Design of smart modular containers, notably able to support communicational and decisional activities via embedded or remote intelligence
- Traceability and tracking of modular containers and freight in Physical Internet enabled Logistics Web
- Conceptual framework for information management systems in Physical Internet
- IoT, blockchain, or ICT for interconnecting information systems or digital platforms
- Large-scale, complex, multi-party, multi-criteria and/or real-time optimization in Physical Internet
- Design of massively open collaborative rules or protocols in Physical Internet



**Keywords:** Physical Internet, Hyperconnected Logistics, Intelligent Logistics Systems, Sustainable Logistics Systems, Control, Holonic and Multi-Agent Systems, Cyber Physical Systems, Internet of Things, Urban Logistics

**Important dates:**

- Full paper submission: June 17
- Notification of acceptance: July 15
- Final, camera-ready paper submission: September 10
- Early registration and fee payment: September 15