Contribution of Physical Internet Containers to mitigate the risk of cargo theft

Yanyan Yang¹, Ph.D., Eric Ballot¹, Professor, Ph.D., and Miguel Gastón Cedillo-Campos², Ph.D.
1. Mines ParisTech, PSL, 2. Mexican Institute of Transportation

Context: Cargo Theft

Definition: Criminal taking of any cargo including, but not limited to, goods, chattels, money, or baggage that constitutes, in whole or in part of a commercial shipment of freight moving in commerce” (FBI).

Existing solutions (Burges 2012):
1) Enhance physical security, i.e., using hard protective cover trailers.
2) Enhance information security, i.e., using sensors and alarm system.
3) Insurances and law enforcement.

How innovative pooled goods encapsulation solutions mitigate cargo theft risks?
Physical Internet Containers (PICs) as an example

Major differences of using PICs
1. Modularity and Physical Protection
2. Mix of products in each shipment

Results Analysis & Conclusions

Average percentage savings per item delivered

CARGO THEFT BY EVENT TYPE

Source: TAPA Cargo Theft EMEA Report 2017

Expensive to apply
Long investment time
Crimes continuously rising

5 main levers for PICs

More secured distribution
Via:
✓ Interlocking property of modular boxes.
✓ Mixed and unknown cargoes reduce the effectiveness of illicit resale channel.
✓ Enhanced traceability with sensors
✓ Electronic seals

Improved cube utilisation
Via:
✓ Less space utilisation by modularity.
✓ Stackability
✓ Capability of containing different products

Efficient reverse logistics
Via:
✓ Reduced transportation costs by standardisation of boxes

High handling productivity
Via:
✓ Less non-value adding operations
✓ Efficient automatic picking system
✓ Shelf-ready delivery

Lower environmental footprint
Via:
✓ Reduced raw material consumption
✓ Less CO₂ emission by reduced transportation cost

2018 International Material Handling Research Colloquium
Savannah, Georgia USA, July 23-26, 2018