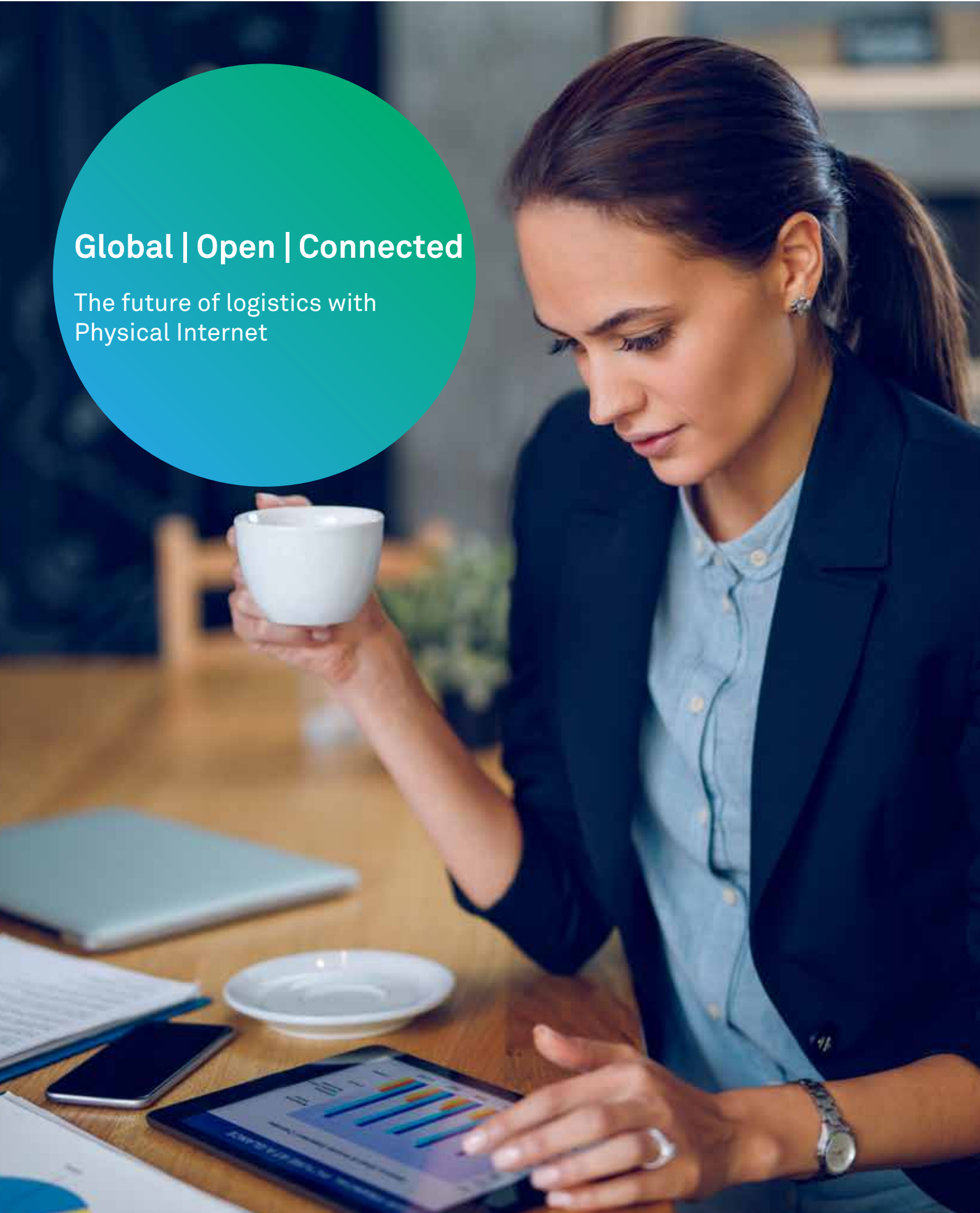# Global | Open | Connected

The future of logistics with
Physical Internet

The article discusses:

- Challenges with the current logistics systems
- How will Physical Internet affect logistics
- Block chain and IoT -building blocks are the Technologies of Physical Internet
- How logistics companies can prepare for the Physical Internet revolutiotn

Goods efficiently and seamlessly moving across borders in standard-sized, modular containers just like bytes of data…

This is the exciting premise of the Physical Internet, which involves application of the digital internet technologies and methodologies to the physical world. While the boundaries between the physical and digital world have been blurring for years, some barriers, such as logistics, remain. For instance, we can select, order, and pay within minutes but it still takes a good amount of time to receive the item.

This latency is what the logistics and supply chain industry hopes to minimize with the Physical Internet - the logistics system that is based on global physical, digital, and operational interconnectivity. Physical Internet has the potential to become the next frontier of evolution for the logistics and supply chain industry. Experts expect the Physical Internet to become mainstream by 2030[i].

Let's deep dive into this new logistics revolution – the Physical Internet – to understand how it is expected to pan out, what technologies will play a key role in its evolution, and how logistics companies can prepare for the upcoming disruption.

The driving force behind the revolution

Logistics serves as the invisible backbone, powering day-to-day tasks in our increasingly digitized lives. But forward looking organizations worry that the current logistics supply chains are unsustainable from an economic, environmental, and societal perspective. The way we currently transport, store, and handle freight is not only inefficient at every step, but also costly. Digest this - 40% of trucks on the road at any given time are empty, that is, deadheading to pick up their

next loads.[ii] Carriers generally operate with a deadhead rate of 15% of their total miles, which means driving 50-100 empty miles. For every ton mile driven, heavy vehicles emit 161.8 grams of carbon dioxide into the atmosphere. According to combined calculations from several data sources, nearly 67 million metric tons of carbon dioxide are emitted by empty trucks annually.[iii] To make matters worse – not just trucks, even vast distribution centers are underutilized for days or weeks on end. Clearly, making logistics operations sustainable requires companies to commit to integrating triple bottom line goals that include social goals, environmental goals, and economic goals.

Applying the principles of the internet to the physical world can help companies do just that. How? Let's look at an example to understand this. When an image is sent from one location to another over the internet, the data is disassembled into smaller packets that are automatically routed through the most efficient network pathways. When the individual data packets arrive at their destination, they are reassembled to present users with the original image. This process uses standardized protocols that are platform independent. Irrespective of the operating system (Mac, Linux, Microsoft Windows) that users leverage, or the device (smartphone or any other handheld device) they use, they will see the exact same image.

Now let's apply this principle to logistics. Standardized set of boxes (much like the standardized IP protocols) can be bundled together on a single shipment (ensuring greater space utilization) and the most efficient available mode of transport (rail/air/water) can be automatically set. Another attribute added to this is service level committed and charged suitably. If during the travel time, this shipment encounters an issue, the next available node can fill in and take over the process. The result: superior efficiencies, asset utilization, and reduced shipment time (through route and lag optimization).

It's easy to see that Physical Internet holds immense promise, but what are the key technologies that will drive it?

Blockchain and IoT: The building blocks of Physical Internet

Blockchain technology holds immense potential for the logistics industry. In 2019, over 20% of logistics providers tested out the technology while an equal percentage have already implemented it.[iv]

The potential of blockchain combined with the power of IoT will be the game changer – it will turn the entire supply chain into a global connected digital enterprise. Blockchain enables distributed ledgers that records all transaction details like proof of ownership, exchange of assets, and enables secure transfer. This will lead to enhanced efficiencies and value for all parties involved with reduced duplication of data, accelerated transaction time, and zero data errors. On the other hand, IoT sensors embedded in trucks, cargo packages, etc. will enable end-to-end visibility for all parties involved and facilitate real time route optimization, and communication between various disparate parts of the supply chain.

In essence, the Physical Internet leverages the powerful combination of blockchain and IoT technologies to enable:

Better oversight: Blockchain helps track data transactions taking place between multiple networks owned and administered by various organizations as physical goods pass between points in the supply chain. For all parties connected to the IoT network, blockchain records can reliably track any data leaks/theft, breakages in the network and so on, and help initiate remedial action.

Safer contract execution through smart contracts: Consider a Physical Internet powered supply chain wherein payments have to be made by one system only when all the conditions are met by other systems. In such a case, blockchain-enabled smart contracts can prove highly useful.

Greater security: Blockchains' robust encryption standards provide an additional layer of security to IoT data, making it difficult for any threat player to bypass.

How logistics players can prepare for the disruption

While the structure of the logistics marketplace in five or ten years from now is still open to debate, companies are realizing that increased collaboration is the way forward. Preparing for the Physical Internet revolution that is expected to become mainstream in just a decade from now requires collaboration on three key aspects:

- Shared standards for shipment sizes
- Protocols for modal connectivity
- Shared IT requirements across carriers

Though top logistics companies have been partnering with national postal companies and small local players for some years now, succeeding in the Physical Internet era will require them to do so far more extensively. This would mean doing away with standalone distribution centers as well as their owned fleet and resources. Everything will need to be shared and operated collaboratively – in a standardized manner. How then will companies compete?

The nature of market dynamics, especially the level of collaboration versus competition, will vary between the scenarios. For instance, when it comes to competing at scale, an established network may become a hindrance rather than an advantage, while locally a larger footprint may translate into better market dominance.

The future is here

The race to dominate the Physical Internet space has already begun with Amazon competing with logistics biggies such as UPS and FedEx.[v] The logistics giants are also prepping to thrive in the new Physical Internet era. DHL Express, for instance, has already started containerized last mile delivery to enable cost-efficient transfer of goods between terminals, motor vehicles and specialized last mile delivery vehicles.[vi]

The time to reimagine logistics is here. The Physical Internet with its ability to move boxes like bytes will usher in a new world of global connected logistics – one that will not only be highly efficient and quick but also transparent and secure. Definitely a clear win for both, companies as well as consumers!

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References

[i] PTV Group, Physical Internet: How Far Have We Come?,
http://compass.ptvgroup.com/2017/08/physical-internet-how-far-have-we-come/?lang=en

[ii] Truckinginfo, Application Promises Reduction in Deadhead Miles,
https://www.truckinginfo.com/318464/application-promises-reduction-in-deadhead-miles

[iii] Medium, Potential Carbon Savings of Trucking Deadhead Miles,
https://medium.com/@mbarlin_42335/potential-carbon-savings-of-trucking-deadhead-miles-eb09e230123b

[iv] Statista, How is your organization spending on blockchain?,
https://www.statista.com/statistics/827408/spending-blockchain-supply-chain/

[v] Forbes, The Battle for the Physical Internet,
https://www.forbes.com/sites/enriquedans/2019/05/17/the-battle-for-the-physical-internet/#651e862b3baa

[vi] Velove, DHL Express taking the next step in city logistics containerization,
https://www.velove.se/news/dhl-express-taking-the-next-step-in-city-logistics-containerisation

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