MAXIMIZING EFFICIENCY IN PHARMACEUTICAL LOGISTICS

a synergy of technology and human expertise

Speaker: Assil Mohebbi

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Executive Summary

The evolution of the industry, the uprising challenges & how to deal with them

Transport challenges & innovations

What's new?

Impact of AI

Benefit or Downfall

Strategies to maximize efficiency

Transport examples

Pharmaceutical logistics

Constant change!

Importance of real time tracking

Proven Cold Chain

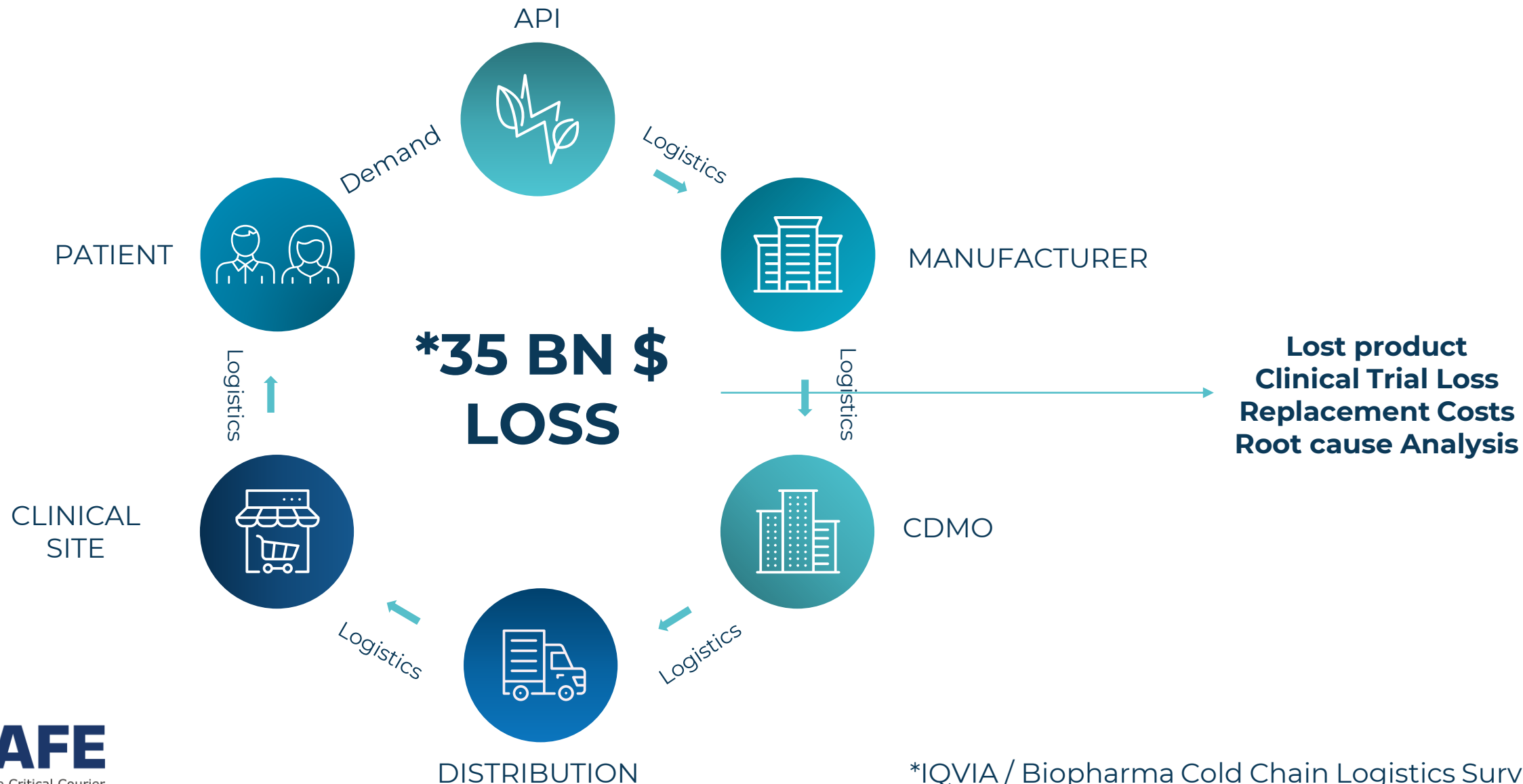**Human expertise & technology**

Improve your customer service

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Pharmaceutical Logistics

Each step requires different approaches, but every step is linked with **transportation**

API

Demand

Logistics

PATIENT

MANUFACTURER

*35 BN $ LOSS

Logistics

Logistics

**Lost product
Clinical Trial Loss
Replacement Costs
Root cause Analysis**

CLINICAL SITE

CDMO

Logistics

Logistics

Logistics

DISTRIBUTION

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*IQVIA / Biopharma Cold Chain Logistics Survey 2019

Pharmaceutical **Logistics**

Wide range of different temperatures creates the new challenges for the integrity of the products

+15°C to +25°C
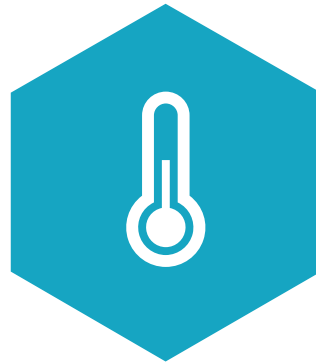
Room Temperature shipments

between +10°C and +30°C.

API
Tissue
Small synthetic molecules

+2°C to +8°C

Cool Shipments

between +2°C to +20°C

API
Vaccines
mABs
Protein products
Small molecules

-15°C to -25°C

Frozen shipments

between -15°C and -45°C

API
Vaccines
mABs
Protein products
Small molecules

-60°C to -80°C

Dry Ice Shipments

Between -60°C and -80°C

API
Master Cell Banks
Working Cell Banks
Vaccines
Gene Therapy
mABs

-180°C

Liquid Nitrogen shipments

Between -160°C and -180°C

Master Cell Banks
Working Cell Banks
Male Cells
Egg Cells
Biobank Materials

Transport Challenges

Daily challenges in pharmaceutical transports

Inadequate Documentation

False Documentation can lead to waiting time & custom declines. +1 day of preparation can save +X of delays

Irregularities and delays during transport

Not everything is controllable. Everything that is, should be prepared

Proven cold chain

Sustaining a proven cold chain must be ensured in temperature-controlled transports for every destination
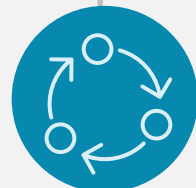
Lifespan of packaging

Usage of long validation is sometimes not enough depending on the destination

Infrastructure

Limitation of worldwide storage possibilities, wrong storage / human failure,

Real Time Updates

Delayed information flow, poor tracking, transparency

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Evolution of **Packaging**

Scan the market! Wide range of possibilities for various temperatures

Active Cooling Containers
PCM Containers
High Tech Solutions like LN2
Cost saving possibilities

Passive Packaging
PCM Technology ➔ Long validation
Available in smaller T° gaps
-67° C with NO dry ice
Rechargeable with correct storage

Combination of Packaging & Logger
Inside & Outside datalogger
Extended validation times

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Apps, Tools & New Technologies

Advanced Datalogging & AI technologies

LIVE information
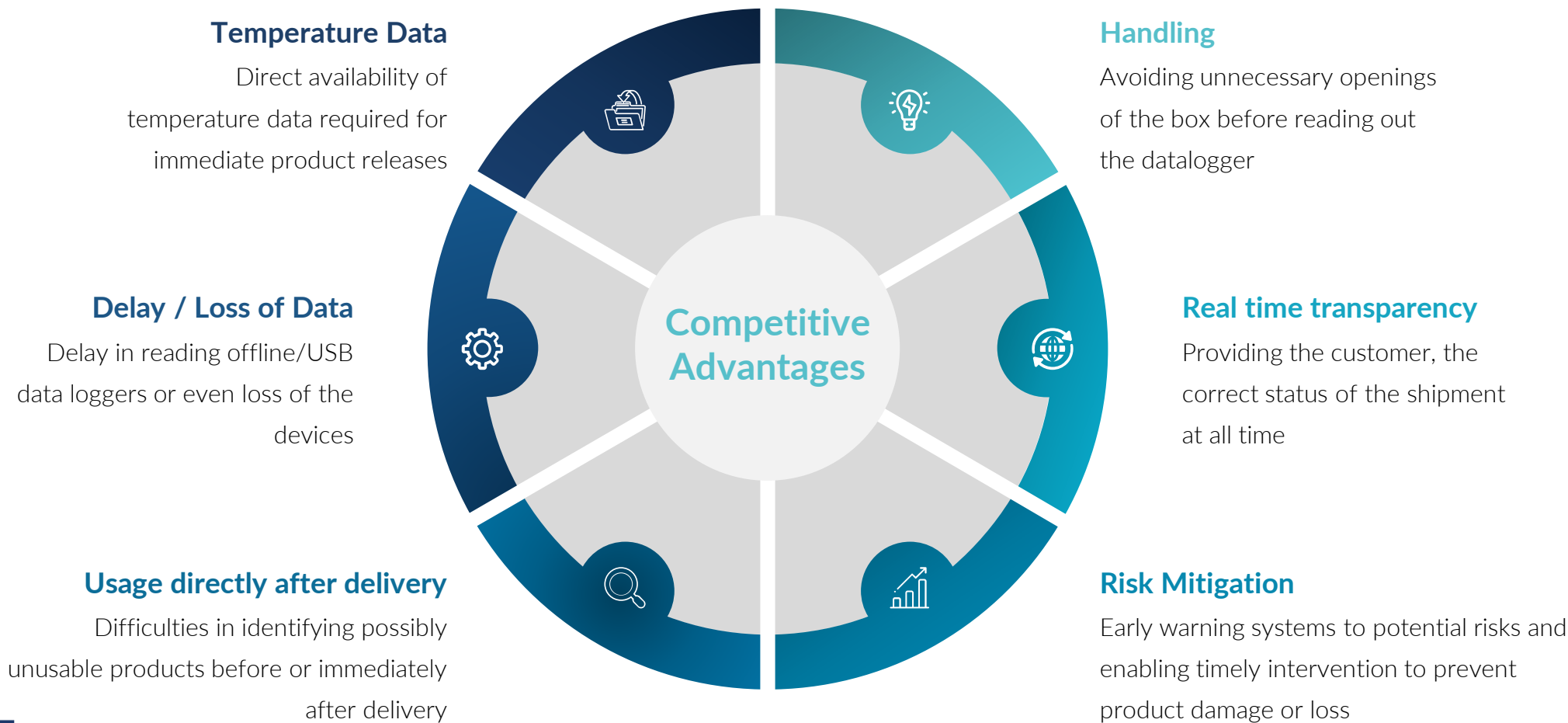Data Cloud & App
Logistics dashboard
Tracking Systems

Real-time tracking
Real-time supply-chain
visibility
Operating Worldwide

AI Tools
Predictive analytics
Dynamic routing

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Importance of real time tracking

Implement, Improve

»»»»»

Temperature Data
Direct availability of temperature data required for immediate product releases

Delay / Loss of Data
Delay in reading offline/USB data loggers or even loss of the devices

Usage directly after delivery
Difficulties in identifying possibly unusable products before or immediately after delivery

Competitive Advantages

Handling
Avoiding unnecessary openings of the box before reading out the datalogger

Real time transparency
Providing the customer, the correct status of the shipment at all time

Risk Mitigation
Early warning systems to potential risks and enabling timely intervention to prevent product damage or loss

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Impact of **AI**

How can it help?

Improved Efficiency

Optimize route planning and scheduling, analyzing as traffic patterns, weather conditions, and delivery schedules, AI systems can minimize transit times

Enhanced Monitoring and Control

Tracking of temperature and environmental conditions in live time. Proactive interventions, reducing the risk of product loss/deviation.

Inventory Management

Optimize stock levels and distribution networks by demand forecasting, storage requirements. AI algorithms can minimize waste and timely availability

Compliance and Quality Assurance

Continuous monitoring and documenting temperature conditions in the supply chain can demonstrate adherence to regulatory guidelines and maintain the integrity of their products.

Cost Reduction

Streamlining logistics processes, reducing waste, Minimizing risk. Lowering operational costs

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Impact of AI

Overreliance and Loss of Human Touch

Overreliance on Technology

Dependence on AI may lead to complacency among human operators. If systems fail or encounter errors, individuals may lack the skills or experience to handle situations manually

Data Privacy and Security Risks

AI systems rely heavily on data collection and analysis. In transportation, this involves gathering sensitive information about shipments, routes, and customers.

Unforeseen Errors and Biases

AI algorithms are prone to errors and biases, especially if the training data used to develop these algorithms are flawed or incomplete.

Loss of Human Touch

The transportation industry relies on human expertise and judgment to handle complex situations and provide personalized customer service

Job Displacement and Economic Impact

Automation and AI-driven technologies have the potential to replace certain job roles within the transportation industry, especially in the customer service area

Human Expertise

What can you do without technology?

>>>>>

01

Documentation Check

Check requirements per destination

Confirm import/export permits

Work with a **local** partner

02

Communication

Having more insight to the product is helpful. The more information, the better

03

Material & Packaging

Compilation of key data about material

Decision of correct packaging

Visualization for the customer

Usage of live data loggers

04

Route Check

Booking of storage points

Cooling possibilities at departure & arrival airport

Usage of temperature-controlled vehicles for assistance/last mile

05

Pro-active monitoring

Constant information flow

Real time transparency

06

Intervention

Detecting possible deviations due to constant monitoring of experts

Wrong storage, sudden peeks

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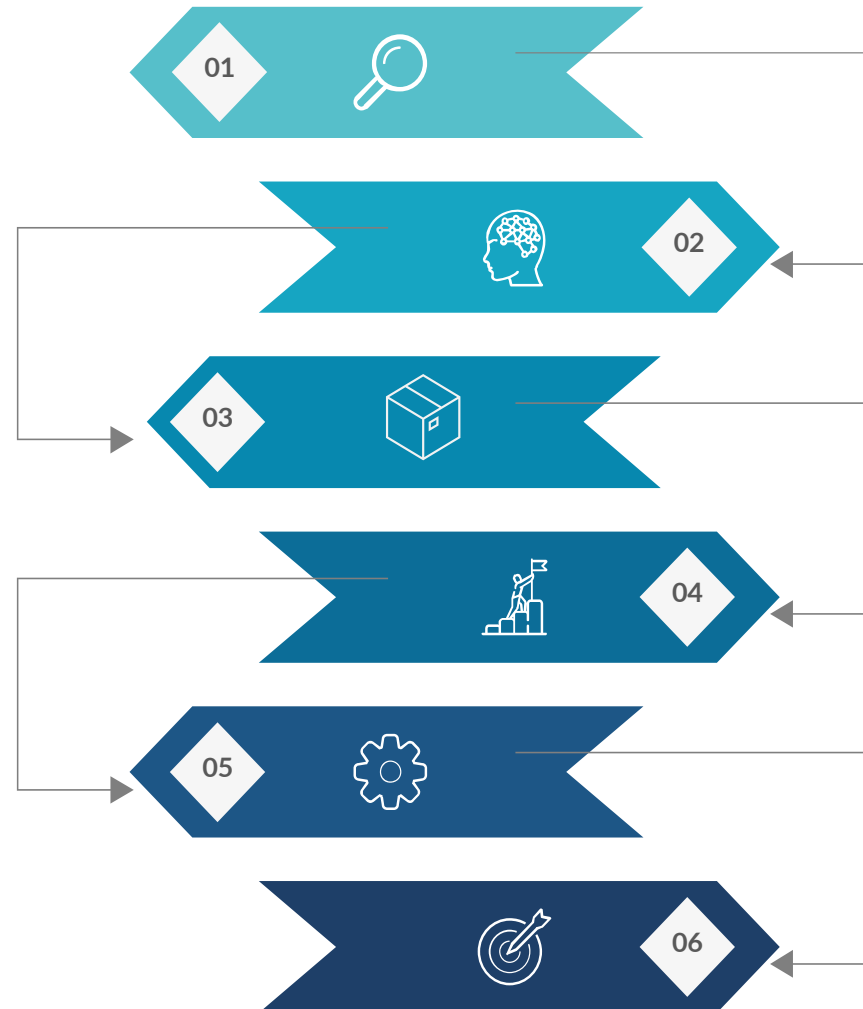
AI, Technology and Human

How we can improve with AI & technology

Cloud data devices	AI	Packaging	Human
Warehouse temperature	Predictive Analytics Platforms	Long Validation	Expertise
Temperature data before collection	Supply Chain Optimization Software	Various temperatures	Constant monitoring
Constant monitoring	Machine Learning Algorithms	Implemented Tracking devices	Customer service
Storage Checks	Risk Management Systems	Rechargeable due to storage	Intervening deviations
Validation Checks	Blockchain Technology	Cost efficient	Controlling
Instant data provision			

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Strategies to maximize Efficiency

It starts before the collection!
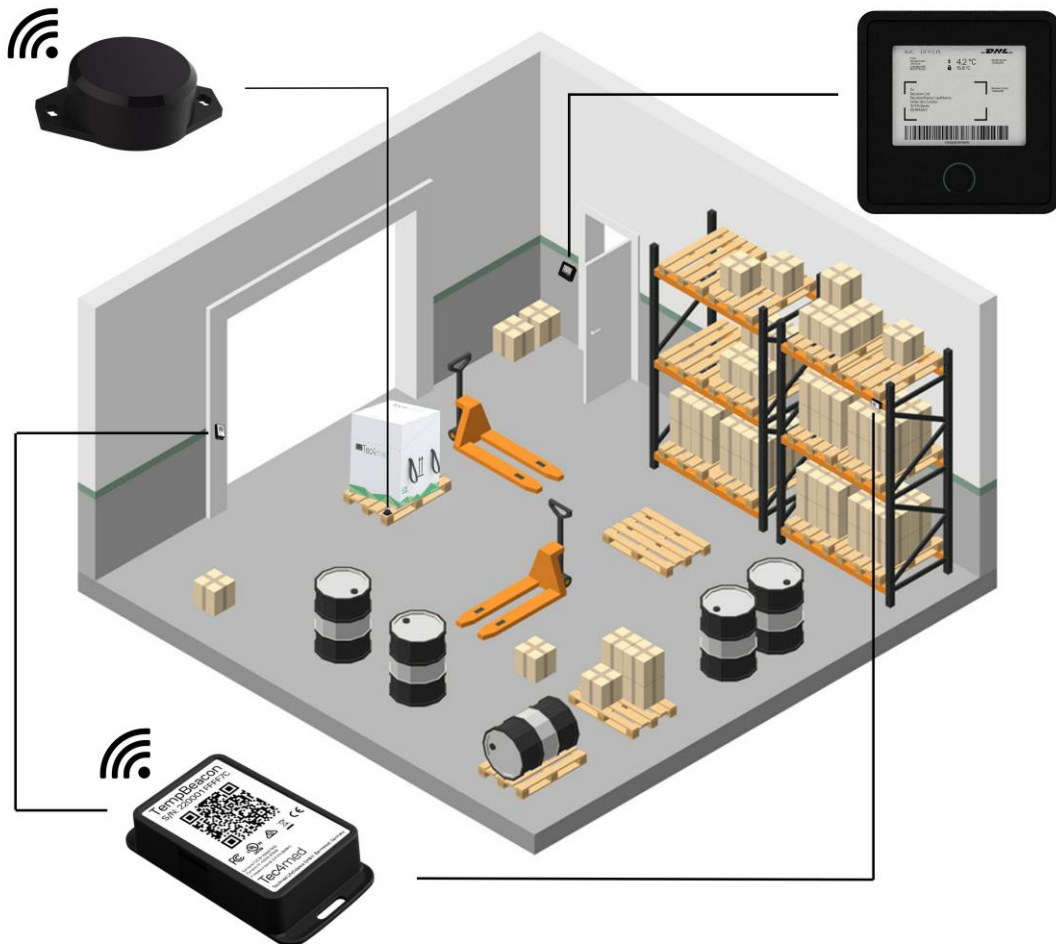
Transmitter Logger

Warehouse Monitoring

Implementation of Cloud devices to track warehouse temperatures

Correct calibration of refrigerators

Correct storage & conditioning of packaging

Pre-Check of our thermo boxes before sending for collection

Fleet Tracking

Overview of all temperature areas in the warehouse

Visibility without present controls

Automated alert settings in case of deviations

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Strategies to maximize Efficiency

Control the circle

Reusable packaging
Return transport
Validation check of thermos packaging

5. Consignee

Correct Temperature from shipper to Consignee
Immediate release
Temperature Data already in cloud

Cloud

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1. Warehouse Check

Controlling the conditioning areas

4. Airport Checks

Airport storage checks
Highly important for PCM packaging
→ Validation

2. Box Check

2-8°C

Controlling the inside temperature before the collection

3. Collection

Correct temperature during packing process

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Shipment **Example**

Algeria to Italy

Tools	AI	Human Expertise
PCM packaging Cloud Devices	Environmental conditions Optimized Routing	Green Light Process Confirming Storage Points Constant Monitoring

Shipment summary ✓

- High value shipment
- Poor infrastructure
- Lack of thermo packaging
- No direct routing
- Multiple failed attempts with different providers

Warehouse ✓

- Usage of PCM Packaging
- Validation for 96+ Hours & Extended with storage
- Conditioning of the packaging +2° colder

AI ✓

- Scanning of the environmental conditions
- Data analysis of past shipment to control valid storage points
- Most valuable routing including needed storage points

Human Expertise ✓

- Green Light process (pre-clearance)
- Manual confirmation of storage points including size
- Constant monitoring during the whole transport
- Preparation of secondary packaging / TCV last mile delivery

Shipment Example

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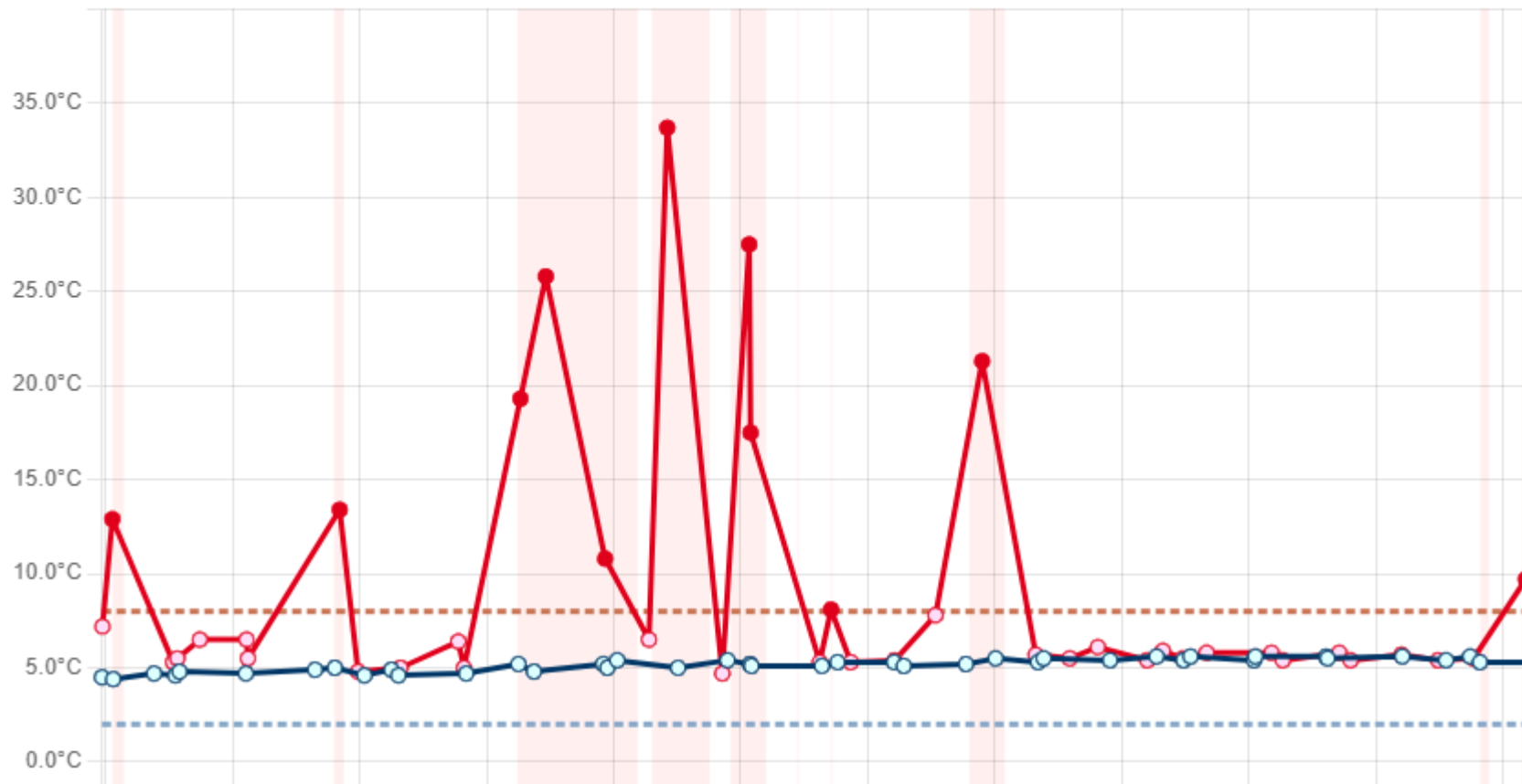
- Checking of inside and outside temperature
- Controlling storage points
- Validation timeline in sight
- Active problem-solving

Meet us at Booth #6

For any questions of more information, please visit us at our booth

Elif Akpinar

Key Account Manager

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Business Development

Patrick Rivera

General Manager

You are welcome to check the temperature of our champagne and enjoy a glas.. Or two ☺