

# Transforming E-Commerce Logistics with Wearable IIoT

Trendyol Success Story: From Manual Operations to Industry 5.0

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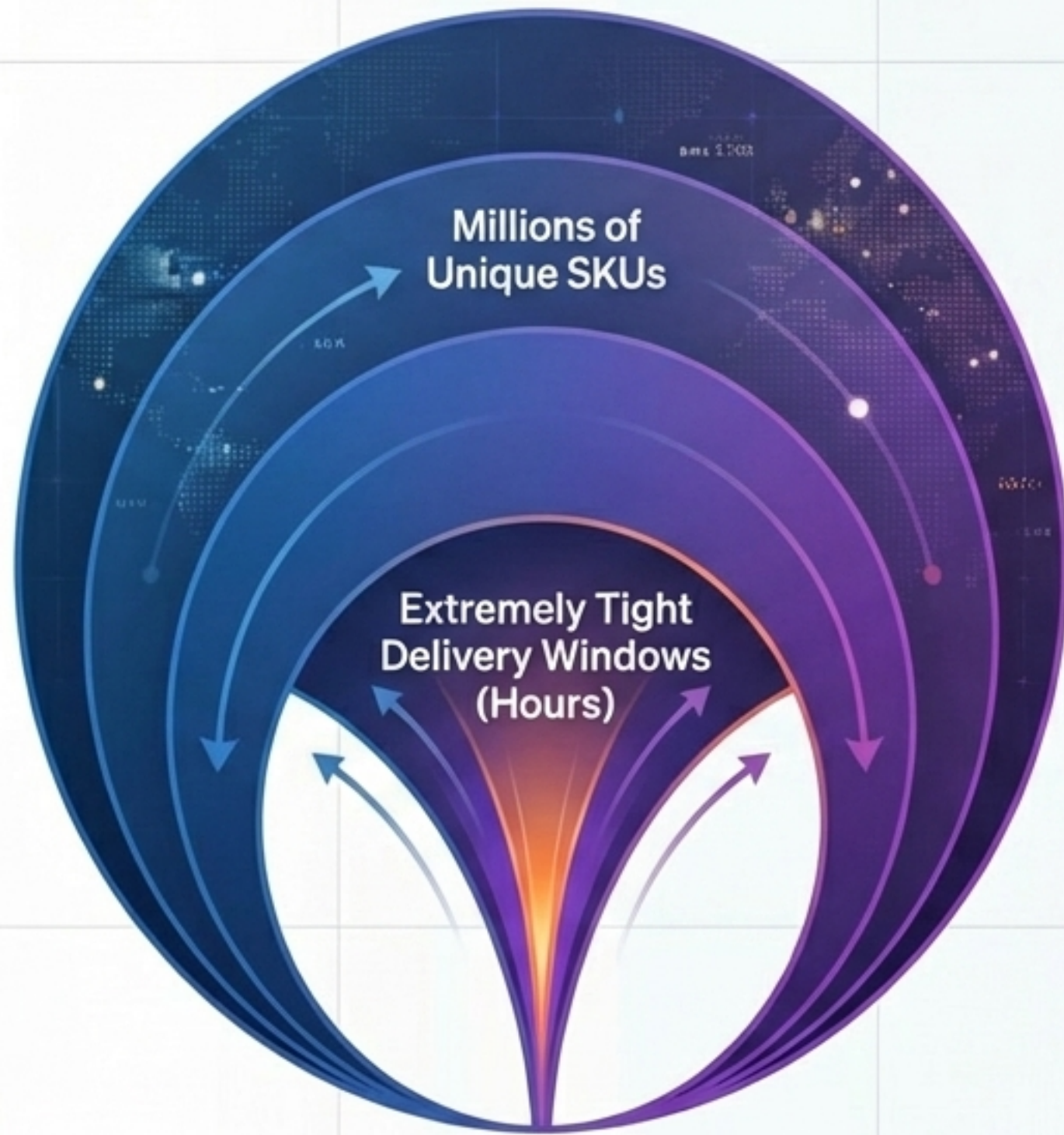
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## 01 INTRODUCTION

# The Architecture of Scale: Redefining the Speed of E-Commerce



### **Hyper-Dynamic Ecosystem**

Consumer expectations have shifted from days to hours. The logistics choreography from order drop to last-mile delivery requires flawless fluidity.

### **The Baseline of Excellence**

Trendyol's existing operations, utilizing conventional handheld terminals, were already highly optimized and recognized as an industry standard.

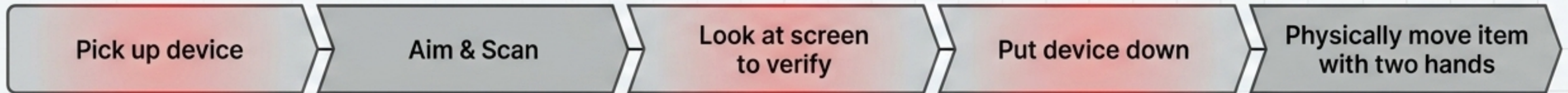
### **The Strategic Imperative**

Sustaining market leadership demands moving beyond merely adding physical capacity. It requires micro-optimizing human-machine interactions to achieve unprecedented agility.

# The Micro-Movement Tax and the Limits of Conventional Hardware

$$\left( \text{Micro-Interruptions} + \text{Cognitive Load} \right) \times \text{Millions of Orders} = \text{Massive Capacity Loss}$$

## Friction Timeline



### Ergonomic Strain

Cumulative musculoskeletal fatigue from repetitively lifting and setting down devices.



### Cognitive Load

Mental fatigue from constantly shifting focus between physical shelves and digital screens.



### Workflow Interruption

Physical process pauses that inherently limit total throughput speed.

# Ergonomic Revolution: Unlocking Hands-Free Efficiency



## 45-Gram Form Factor

Ultra-lightweight textile design eliminates musculoskeletal fatigue, securing top-tier occupational health and safety (OHS).

## Hands-Free Architecture

Operators retain full natural range of motion. No picking up or putting down devices—continuous operational readiness.

## Unrestricted Agility

Universal fit adapts flawlessly to different operators, securing comfort and speed throughout peak shifts.

Transforming the operator's natural movement into a digitized, data-generating workflow without introducing physical friction.

# Zero-Downtime Integration & Edge Intelligence

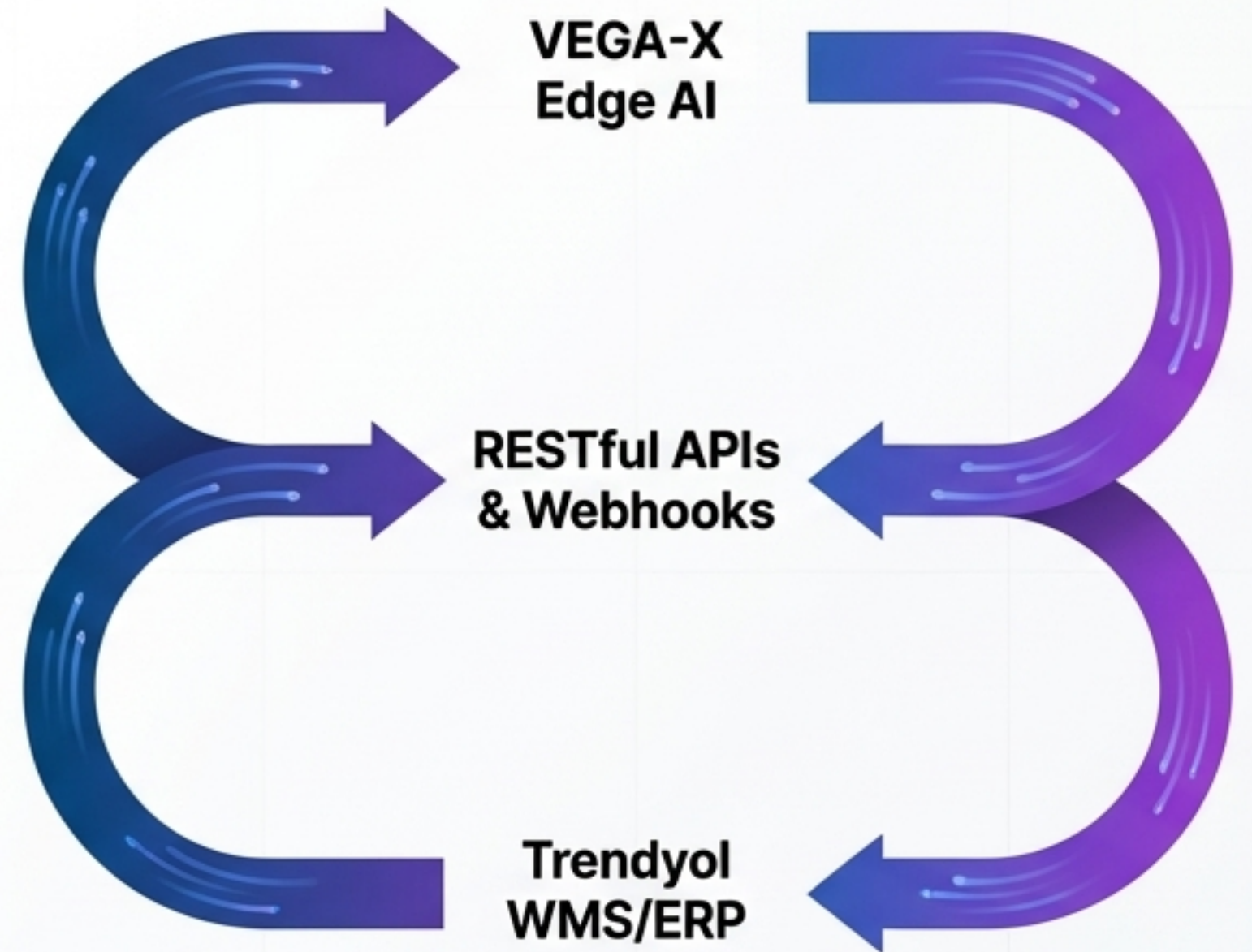


## Dynamic Machine Vision

AI-driven OCR and autonomous object validation beyond standard barcode scanning.

## Unlimited Power Loop

Hot-swappable battery architecture ensures **24/7 continuous runtime**, mathematically eliminating hardware downtime.



## Plug-and-Play Network

Direct integration via industrial **Wi-Fi & BLE** eliminates the need for complex intermediate gateways.

# Poka-Yoke: Multi-Sensory Mistake-Proofing at the Source



## Haptic (Tactile)

### Immediate Physical Vibration

Instantly alerts the operator of a mismatch via skin contact, bypassing visual delays and creating rapid muscle memory.



## Acoustic (Audio)

### Targeted Audio Cues

Emits specific frequency alerts that cut through ambient warehouse noise for immediate error recognition.



## Optic (Visual)

### Dynamic UI Indicators

Clear, color-coded visual confirmation on the wearable screen.



Quality Control is no longer a secondary verification step—it is autonomously integrated into the picking action itself, achieving Quality at the Source.

# Mathematical Proof of Operational Excellence

**~4 Seconds**

## Saved Per Transaction

Eliminating the pick-up/put-down micro-interruptions generated hundreds of extra man-hours of capacity per day without adding headcount.

**Up to 54%**

## Increase in Process Efficiency

Radical acceleration in high-volume picking workflows, maximizing the existing warehouse footprint.

**100%**

## Error Prevention (Zero-Defect)

Multi-sensory feedback physically blocked incorrect picks, effectively eliminating human-induced order errors.

# Elevating Traceability and Employee Experience



## End-to-End Traceability

Achieved absolute, unmanipulable visibility from the exact microsecond an item is picked from the shelf to the moment it reaches the packaging conveyor.



## Optimized Worker Wellbeing (OHS)

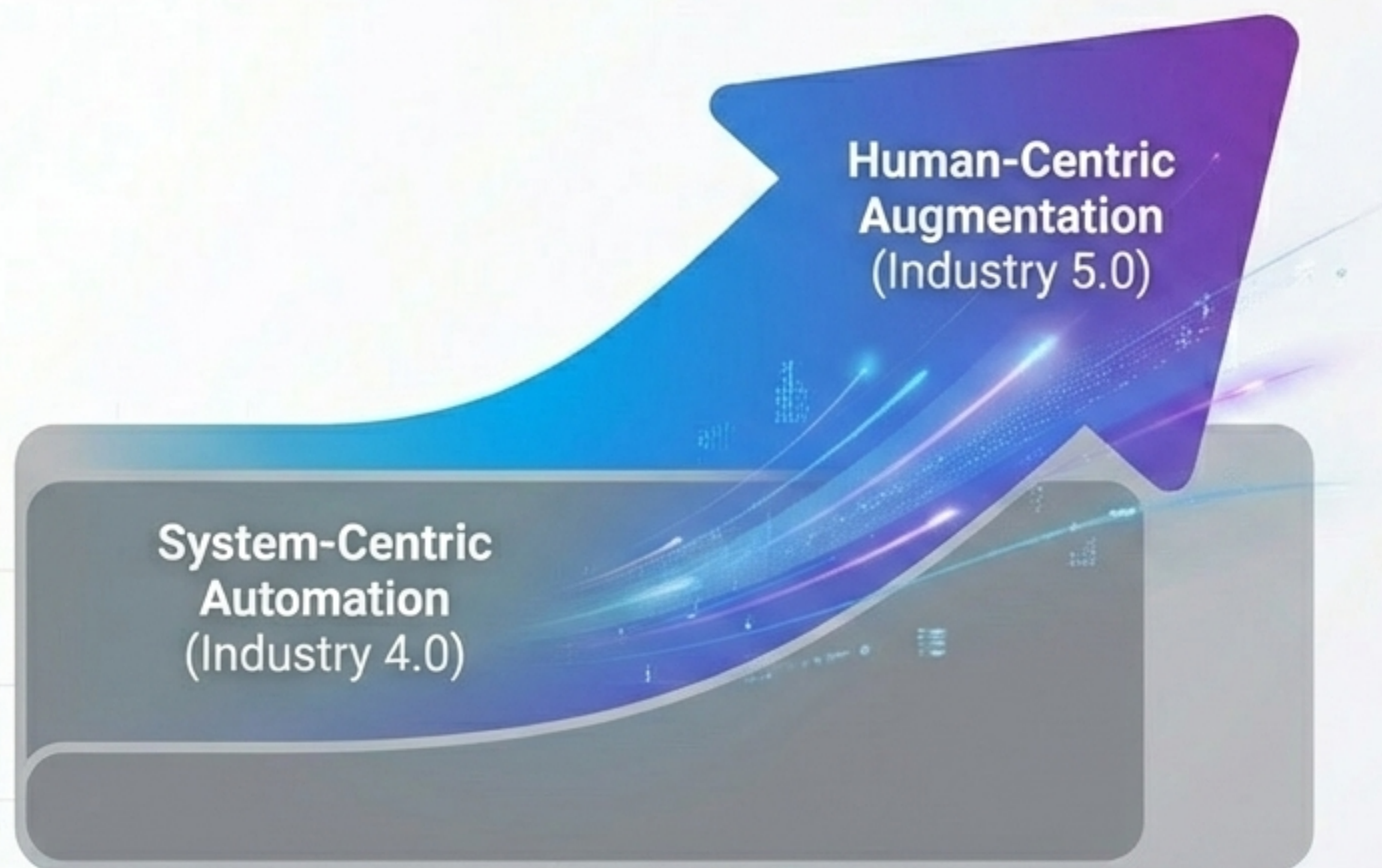
Replaced heavy, repetitive device lifting with a 45-gram wearable, eradicating cumulative ergonomic stress and dramatically improving employee morale.



## Accelerated Learning Curve

Intuitive, gamified usage naturally digitized human movement. New staff hit optimal productivity targets exponentially faster than with legacy interfaces.

# Leading the Paradigm Shift to Industry 5.0



## Beyond Automation

This deployment proves that the ultimate operational model does not remove the human; it empowers the human.

## A Future-Proof Ecosystem

By marrying world-class IIoT hardware with deep edge-AI capabilities, Trendyol has established an infinitely scalable, flawless logistics architecture.

## The New Global Standard

This synergy of ergonomic freedom and absolute digital precision sets an insurmountable benchmark for modern supply chain strategy.

The background features decorative elements including a blue line at the top left, a purple line at the top right, and a large purple 'U' shape at the bottom. Three blue sparkles are positioned in the center between the text and the purple 'U'.

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