



Whirlpool
CORPORATION

Lean, Productivity or Industry 4.0 ?



Whirlpool



Key Factory Figures 2022

AREA 70 000 sqm (120 000)

- **Factory floor space = abt 55 000 sqm**

PEOPLE = 1202

- **Manufacturing**
- **GPO (Industrial Design, Laundry, Laboratories, Electronics)**
- **Operations Excellence, European Tool Shop, Central QC Pillar Leader, and Central Supply Chain**
- **GSS/Procurement**

VOLUME = 1.9 M pcs.

CAPACITY UTILIZATION: 84%

SKUs = TOP 432 + FRONT 350

Managed codes 5000+



Factory Structure



PRIMARY PROCESS

- STAMPING & FORMING – 16 lines
- PAINTSHOP – powder painting
- DECORATION – silk-screening & tampon printing



LOGISTICS

- 46 vehicles (26x forklifts (9x receiving area, 7x warehouse, 5x line feeding, 5x primary processes), 14x tuggers, 2x battery change trolley, 4x el. stacker)
- Inbound 10 gates
- Outbound 7 gates



ASSY LINES (4x)

FRONT LOADER

- Code line
- Flex line

TOP LOADER

- High Range
- Low Range



SYSTEMS & DATA

- SAP Hana
- MES, MII, RTLS, DIG. TWIN
- Internally developed tools (Appsheet, ORS)



CUSTOMER

- 227 customers worldwide
- Tested at customer condition 60k pcs/year
- AVG cycle time 24 sec / WM
- Lead Time avg 27,4 hrs / WM

Our Portfolio



Whirlpool
CORPORATION

Hotpoint

Bauknecht

i INDESIT

privileg

WHY WE DO BUSINESS ?



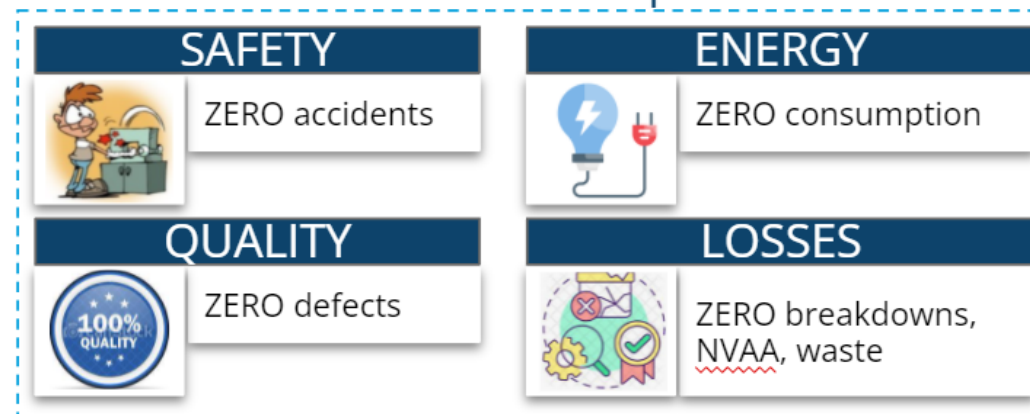
IPS Principles



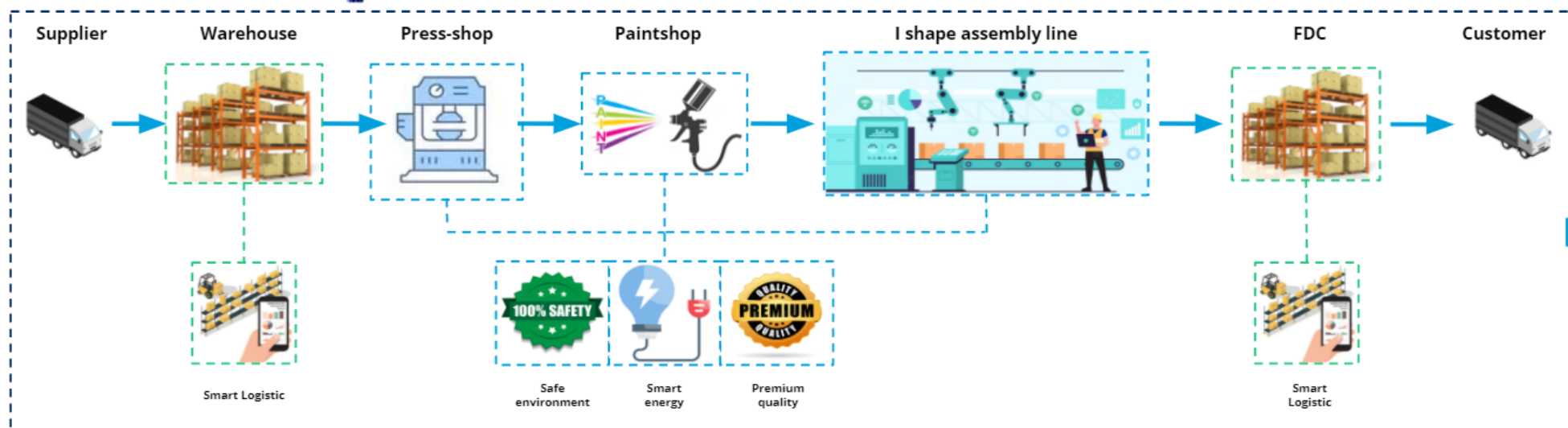
*"The ideal production system is a conceptual **BUILD-IN QUALITY**, with **MINIMAL COST** and **SHORTEST LEAD TIME**.*

*IPS is the deployment of strategies, methods and tools to achieve **ZERO**."*

ZERO concept



Ideal Factory



PERFECT PRODUCTION SYSTEM, CHALLENGING HIGH QUALITY PRODUCT WITH MINIMUM PROCESSING COST AND MINIMUM LEAD TIME

Business Strategy & Prioritisation



COMPANY STRATEGY

Why?
Our Vision: Be the best kitchen & laundry company, in constant pursuit of improving life at home.

What?
Our Mission: Earn trust and create demand for our brands in a digital world.

Strategic Imperatives

1

Deliver Product Leadership

2

Redefine Retail Presence

3

Win the Digital Consumer Journey

4

Reinvent the Value Chain

How?

Leadership Behaviors

- Passion for our consumers
- Straight talk
- Bias for action

Lead with Impact

- Accountability

Serve

- Listen
- Build
- Lead

Our Values: Integrity • Respect • Inclusion & Diversity • One Whirlpool • Spirit of Winning

Consumer driven, Synchronized, E2E

Future Fit Footprint
Fully leverage our global footprint aligned with global excellence strategy

Consumer driven E2E BC
Transform the value chain to support consumer end-to-end strategy, including nearshore to market

Synchronized & Agile BC
Achieve strong planning reliability in short-term and optimum support to mid-long term business decisions

Perfect Execution
WOM Deliver best service with ZERO INCIDENTS, ZERO DEFECTS, ZERO WASTE, striving to satisfy our needs

Intelligent & Automated BC
Leverage technology and capabilities where and when it makes sense

Our 2022 Operational Priorities

0 Managing health and safety of our employees

- Coping with the Covid waves in a responsible manner

1 Drive step function improvement in product availability

- <100K Lates

2 Deliver P4G across the business, despite inflation

- \$100M+ excluding materials

3 Defend and accelerate positive PMR impact

- 8%-7% net pricing, including carryover

Digital Transformation

Automation

CUSTOMER

COST BASE

PEOPLE

Drive Design Changes focusing on improving Product and Manufacturing Efficiency

Improve production performance through Data-driven Mindset and Big Data Strategy

Integrated Planning and Execution focusing on achieving a Flexible and Predictable Production

Enhance the benefits of immediate loss attack through the technologies of IIoT and Digital Transformation

Establishing the Digital Manufacturing Culture to creating and making the best use of knowledge

	2022	2023	2024	2025+		
Automation Initiatives	Increase Robot Density					
Artificial Intelligence	Benchmark & Data collection & Systems platform connections		Expand Execution of Technology			
Automation in Assembly Areas	Assembly Automation Development	Acceleration of Assembly Automation				
Logistics flow automation	Pilot projects introduction	Full logistics flow automation by Artificial Intelligence utilisation				
Key resources to execute projects	Manufacturing Resources to Develop and Execute Automation Projects - NEW ENGINEERS DEVELOPMENT					
Automation Benchmarking	BMW, Honeywell, Stanley Black and Decker	Ongoing Best Practices Analysis				
People development	Change management & organization further new tools & knowledge development					

STRENGTHS

WEAKNESSES

OPPORTUNITIES

THREATS

- Strong & motivated Team
- Thinking out of the box toward new tools application
- Customer strong orientation
- Full range of products LOW to HIGH

- Historically complex layout & high utilisation of space
- Reliability of supply base & capacity
- Other functions involvement into design for easy copy, dis, ass
- Low level of automation

- Colocation of suppliers (30%)
- Benchmark & Internal Whirlpool competition
- By high service level & Quality level increase demand

- Manpower availability & Quality of Manpower
- Heavy cost increasing & Inflation in all areas
- Seasonality in production up to 45%

Whirlpool Corporation Confidential

POPRAD STRATEGY 2022-2025

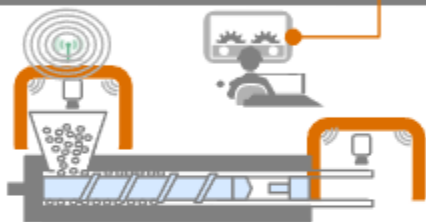
VNOT/SWOT analysis input	Factory focus	Actions
<ul style="list-style-type: none">CUSTOMER	<ul style="list-style-type: none">coping of demand volatility to assure products availability on timeflexibility in mix change towards demandimprovement of craftsmanship and design to improve customers quality perception	<ul style="list-style-type: none">automatic measurement systems & process stabilizationfast access to all data to speedup predictive actionsimprove visualisation to gain involvementreduction of response time to customer need & lead time reductionoptimise and automatise logistic flows (limit touch points)
<ul style="list-style-type: none">PEOPLE	<ul style="list-style-type: none">NET ZERO strategy 2030Safe place creation (Zero concept)New tools & methods implementationTalent development plan based on 5YCD need	<ul style="list-style-type: none">New engineers creation & developmentUtilisation of IDX as competitive advantageIncrease cross functional involvementClear logic for tools utilisation on all levels - continuous deployment of knowledge on the line levelSMART automation introduction
<ul style="list-style-type: none">COST BASE	<ul style="list-style-type: none">Data collection support immediate reaction to problem solving & loss attackBudgetary focus based on loss stratification to maximise B/C ratio	<ul style="list-style-type: none">Digital transformation and online data collection & evaluationAgile self learning system introduction to online loss stratification and immediate attackAutomation introduction to increase flexibility and process stability

Elements Factory of the Future - Poprad

1

Shop floor transparency

- Digital cockpit (process monit., connected assets)
- Intelligent production and logistics scheduling
- Process understanding / Cost deployment
- Energy consumption monitoring



2

Quality data visibility and analytics

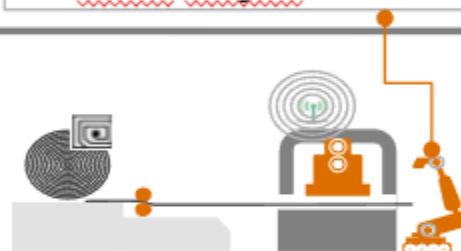
- Defect collection system
- Mobile devices with detailed work instructions
- Poka-yoke solution, human error avoidance



3

Automated material flow

- Robots, e.g. for loading/ unloading
- Routing of autonomous guided vehicles
- Artificial Intelligence



7

Test automation

- Vision systems for quality testing
- Automation of test parts



6

Predictive maintenance

- Conditions base maintenance
- Predictive maintenance



5

Automation

- Apply for quality/craftsmanship requirements
- Load/Unload line with components, e.g. maintain
- 60° zone for highest efficiency



4

Material flow transparency

- Traceability and visibility of workflow
- Call of system
- RTLS system



8

Workstation design

- 3D workstation design
- Advanced ergonomic analyses

9

Operators development

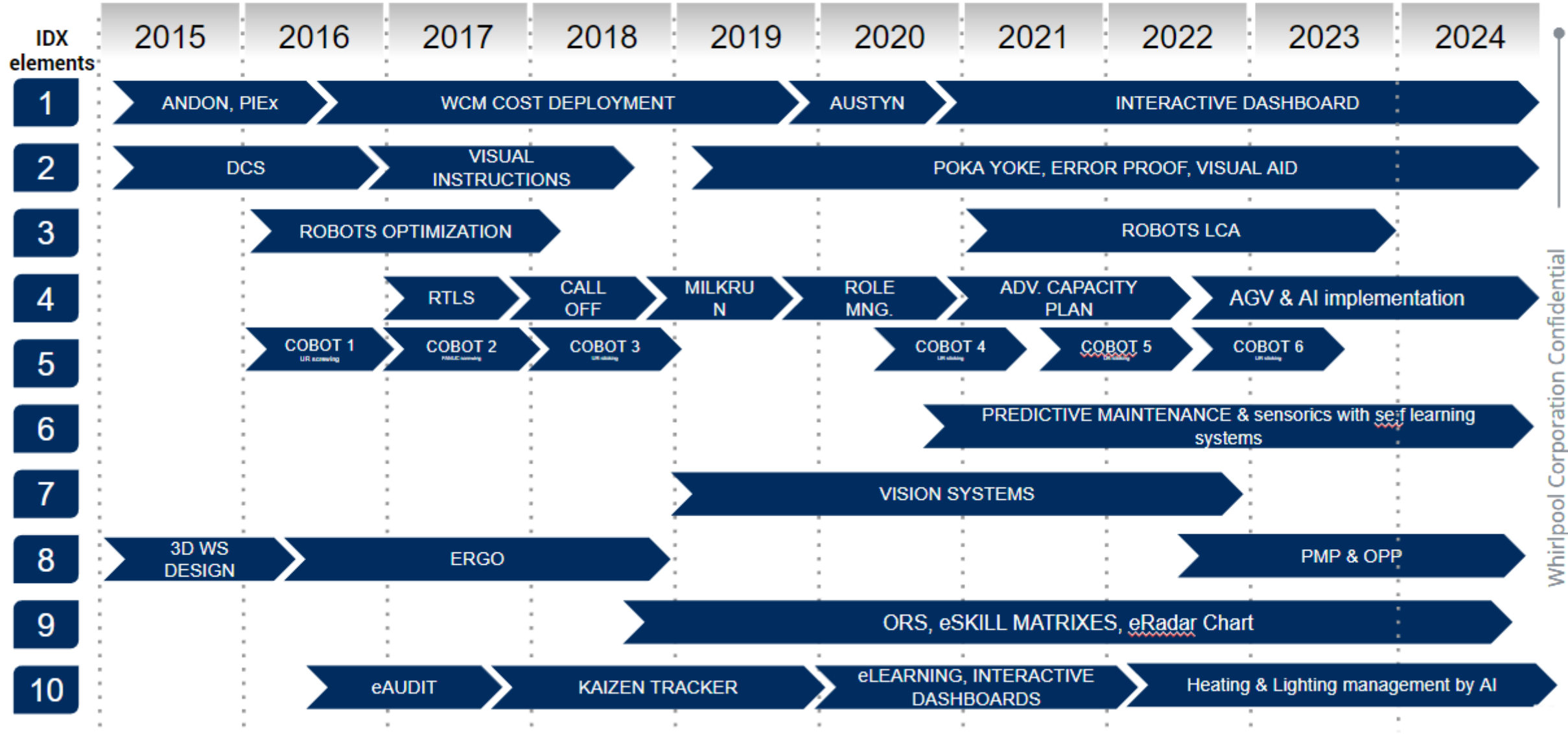
- Electronic skills matrix
- Mandatory job rotation

10

Lean administration

- eAudits
- eLearning
- Meetings and reporting

BUILDING ON GATHERED KNOWLEDGE



GROUPS OF IDX INTEREST

MAIN ATTRIBUTES FOR IMPLEMENTATION

LONG TERM SUSTAINABILITY

SPEED & PRODUCTIVITY

RESPONSIVENESS TO
DEMAND

Focus on Losses ---> definition use cases into 4M

MAN

- People management & development (skill matrix, trainings, certification, legal...)
- MTM 4.0 + Digital Operator
- Virtual & Augmented reality

MACHINE

- Collaborative automation
- Process & Product Parameters (monitoring, control, simulations)
- Visibility & Parameters (OEE, ...)

METHOD

- Vision systems - inspections
- Process Control (focus on quality & process stability)
- Derogation management

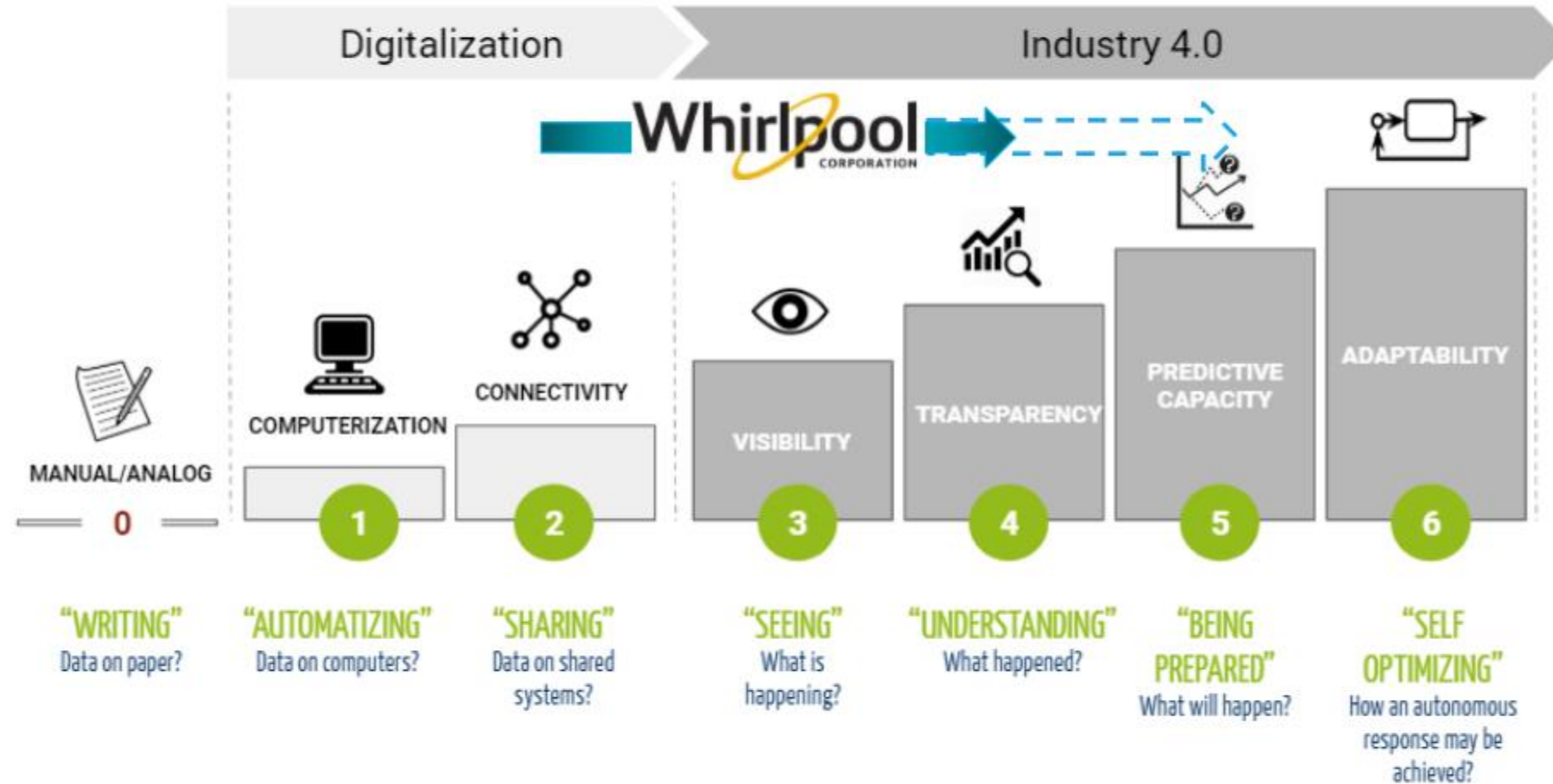
MATERIAL

- Automation in Logistics (material delivery, storing, ..)
- Smart warehousing solution (signal navigation)
- E-kanban & production leveling

Global IdX Ideal State| Acatech Reference Model

level 0: no computerization, manual activities

1. **Computerization:** isolated technologies
2. **Connectivity:** connecting technologies
3. **Visibility:** data collecting technologies
4. **Transparency:** data analysis technologies
5. **Predictive Capacity:** simulation of future scenarios
6. **Adaptability:** self-adjustment of the system, automation of the decisional process



Global IdX Core Strategy & North Star



Connectivity from the Plant Floor

Connect equipment and processes to provide real data

Track the Product & the Process

Data should be connected to specific products and process parameters

Visualize & Use the Data

Data needs to be captured and presented visually for easy consumption and use on the floor



Combine & Analyze Data

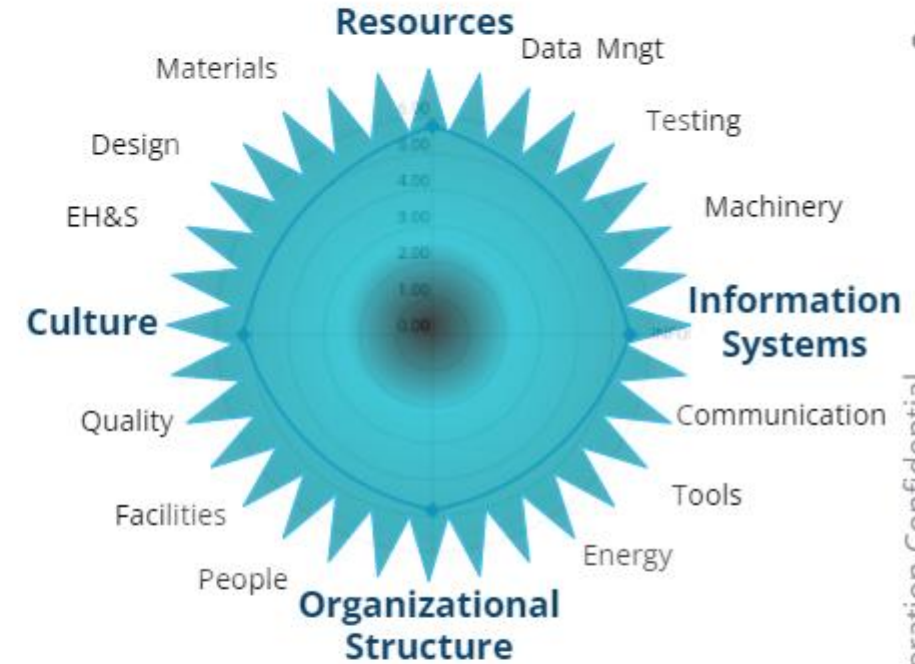
Data needs to be integrated from multiple sources and analyzed to provide insights and opportunities

Pursue the Opportunities

Regional priorities define what projects need to be implemented. Leverage new technologies to solve difficult problems.

Develop the Digital Culture

Upskilling the workforce, make systems user friendly, make the data easy to consume



IdX North Star is the ideal state of 84 different items across 27 areas of the enterprise

Adaptable & Agile systems

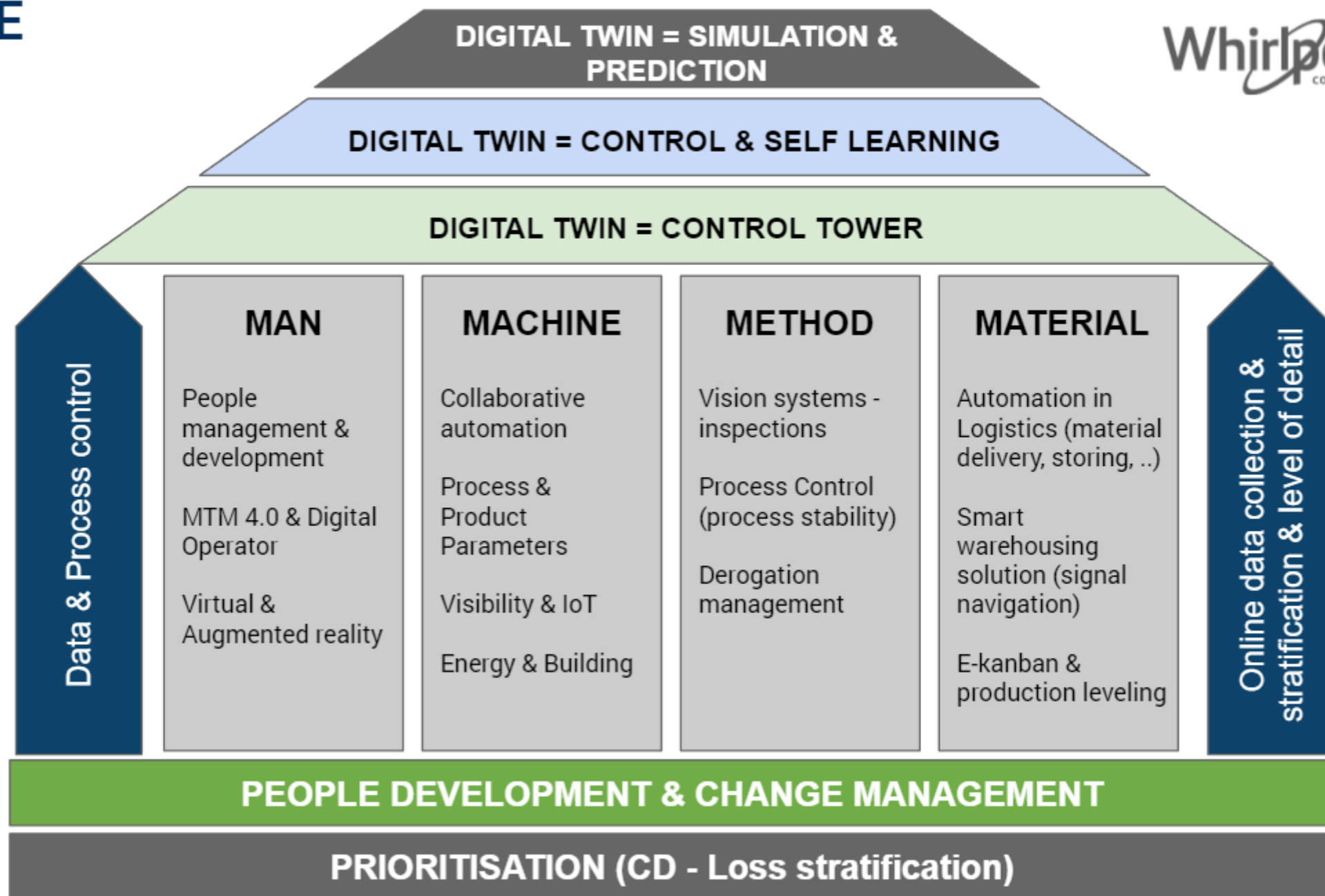
Predictive Capacity

Transparency

Visibility

Connectivity

Computerization



WHERE WE GO !?

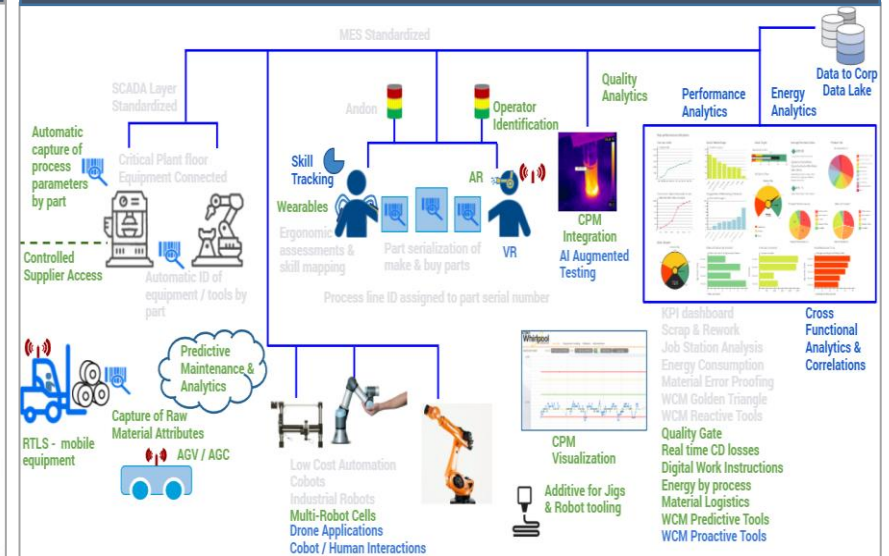
MANAGERIAL PROCESS UPDATE



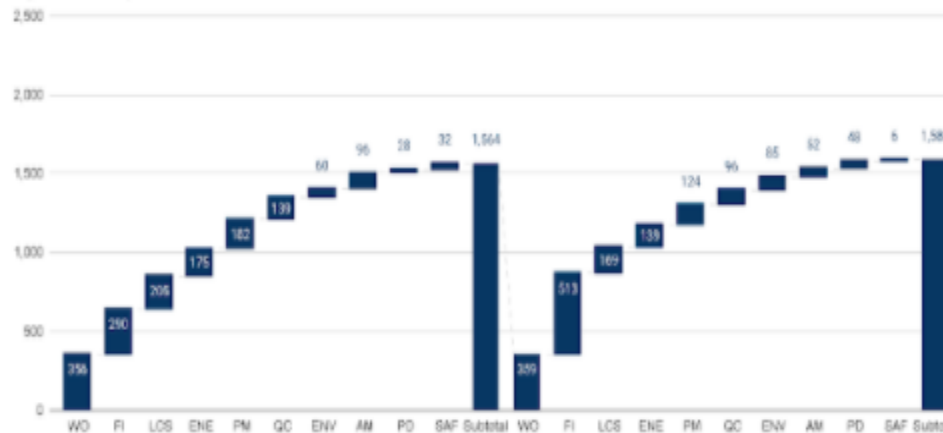
LEAN TRANSFORMATION EXPANSION



DATA COLLECTION & PROCESSING



WCM Saving Evolution per Pillar *2020 ACT*



2021 ACT



Current

2022 PP

2023



2024

LEAN

PRODUCTIVITY

or

INDUSTRY 4.0 ???



THANK YOU FOR YOUR ATTENTION

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