



## **A Twin Transformation Paradox**

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Slide 1 28 mei 2025 – Symposium Statistical Auditing







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Research focus: ESG Transformational approach, digital innovations, governance, impact on organisations

Research programmes:

- Digital innovation in an ESG context
- ESG research programme (long-term value creation)







### Agenda

- 1. ESG Strategy & Transformation
- 2. Digitalisation
- 3. Case study



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## Integrating Business and ESG goals result in a transformation



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Slide 5





## The sustainable market transformation model



Source: Simons and Nijhof 2021





## Van Wijnen initiated a successful business transformation

Mission: 'Building together for a better life'



1. Inception



3. Pre-competitive collaboration



2. Competitive advantage







# Redesigning sustainable supply chains (scope 3 focus)

#### Consumer demand for healthier and more sustainable Necessity of operational ESG performance products • How can current decarbonisation pathways for scope 1 & 2 be tracked and accelerated? Do you fully valorize your ESG efforts towards your customers and consumers? • Are the decarbonisation pathways for scope 3 defined? Do you leverage innovation to reduce waste? • How to achieve our ambition of 100% circularity and zero waste by 2030? Industrial use Transportation Processing, packaging & storage Consumption Sourcina Distribution **Consumer retail**

## Need for transformative vision on sustainable sourcing strategy

- Do you have a clear picture of the availability and costs of potential scarce natural resources on the medium and long term?
- Do you know what the impact of climate change (scenarios) and geopolitical developments on the availability of material resources are?

## Urgency for strong ESG governance & supply chain Due Diligence

- What is your (standardised) approach, framework towards reporting on your progress? Are you fully ESG compliant and prepared for (new) legislations?
- · Are you prepared for (social) Due Diligence of own operations and supply chain?



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## Digitalisation will affect the ESG transformation significantly



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Slide 10



## Limperg Institute between digitalisation and sustainability

Digital transformation enables Sustainability transformation



guides Digital transformation

(Source: Christmann et al, 2024; Plugge and Nikou, 2024)

Slide 11

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Primary goal of DT: Competitive advantage for profit

Primary goal of ST: Competitive advantage for sustainability

Paradox: how do companies deal with this tension?



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### Limperg Instituut ProRail's Twin Transformation paradox

ProRail is responsible to maintain the Dutch railway tracks (7000 km) including railway areas.

A physical inspection is time consuming, labour intensive and put pressure on sustainability goals (decarbonisation, energy consumption).

Main question: how do we decrease manual labour maintenance tasks and increase our sustainability effort?



#### Railway maintenance issues



### Limperg Instituut Example of visual maintenance issues

### 1. Golfslijtage

In hoeverre kunnen we golfslijtage meten/herkennen m.b.v. acceleration box accelerator (ABA) sensoren op reizigerstreinen (RAM / Camino) ? Data: ABA + microfoon + beeld

1. Bekende locatie met golfslijtage (Voorschoten) 2. Herkenning patroon in ABA data (Voorschoten)



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## Various experiments have been conducted in the past 3 years



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Slide 15



Limperg Instituut Sustainability goals (safety, maintenance, biodiversity)



*Slide 16* 28 mei 2025 - Symposium Statistical Auditing







Slide 17

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#### Limperg Instituut The solution is based on AI technology

Data is collected by a video train that is equipped with Internet of Things (IoT) sensors, video and photo cameras. The Condition Data team verifies the condition of the railway infrastructure (see right image), while the Configuration data team enriches the data to identify the quality of the railway components (see left image)

#### **Technical solution**

- Big Data Analytics Platform (Microsoft)
- Azure Datalake
- Azure Function Apps
- Service Bus
- SQL database

Remark: the solution must be 'explainable'.







# Outcomes of the AI image recognition solution

Lessons learned by using the Adaptive Structuration Theory\*:

- Both business departments and employees are very satisfied with the sustainability outcomes.
- The solution is insufficiently translated into primary business processes (embedding).
- Although the outcomes contribute to sustainability goals no specific SDG and KPI goals have been defined.
- The sustainability solutions requires a systemic approach due to interdependencies between departments.
- Al technology is reliable.
- The AI solution (platform, apps) is becoming 'green' (green programming, decrease energy consumption and CO2 emissions).





Governing the paradox: Al for Green & Green Al





## **Questions?**

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### References

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### The end



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