CWIEME BERLIN

3-5 JUNE 2025
MESSE BERLIN

A Hyve Event

HeSy Mobility
A new range of eco-designed, locally produced and high-efficiency eMotors for light mobility

Miša MILOSAVLjEVIĆ (misa.milosavljevic@ifpen.fr / +33 6 16 53 83 71)

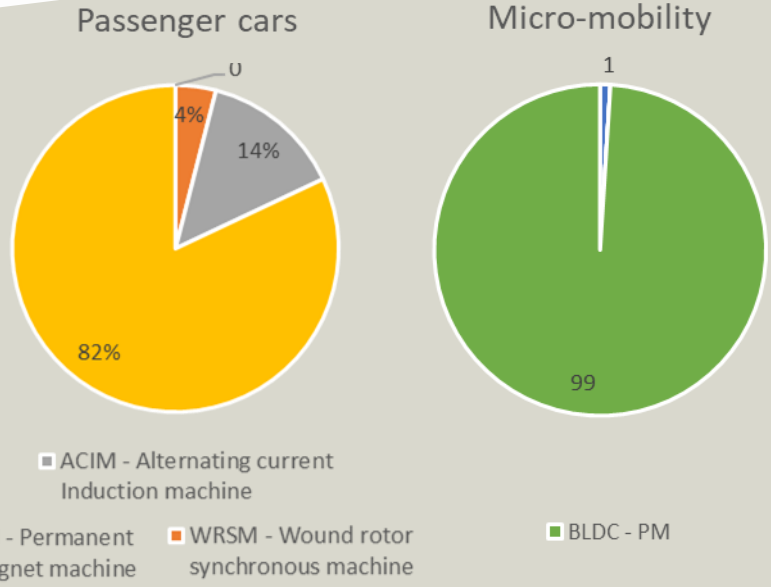
Vincent MALLARD (vincent.mallard@movntec.com)

Financé par GOUVERNEMENT Liberté Égalité Fraternité — FRANCE RELANCE — Financé par l'Union européenne NextGenerationEU

Rise of the microcar – why compact EVs are finally having their day and the ones to watch

News By Leon Poultney published May 12, 2024

Big, heavy electric SUVs are out – teeny mobility solutions are in



IFP Energies nouvelles (IFPEN)

Innovating for a low-carbon and sustainable world

1,531 employees

incl. **1,078** R&I engineers & technicians

Public sector **R&I** institution

Training center

Industrial Group

INTERNATIONAL SCOPE in the field of
ENERGY, MOBILITY and **THE ENVIRONMENT**

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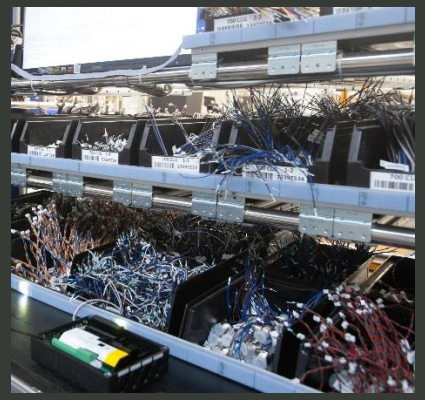
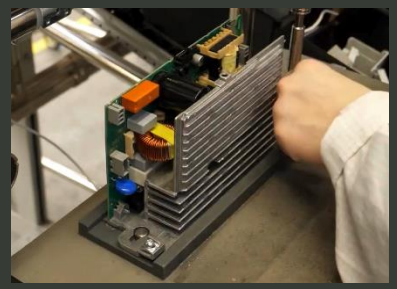
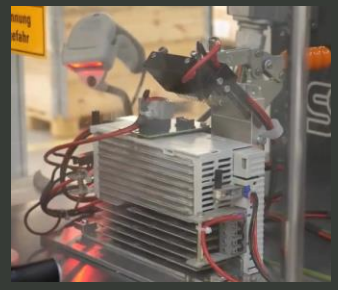
Know How | Motor, Gearbox and Inverter







Market and targeted market space

Quadricycles

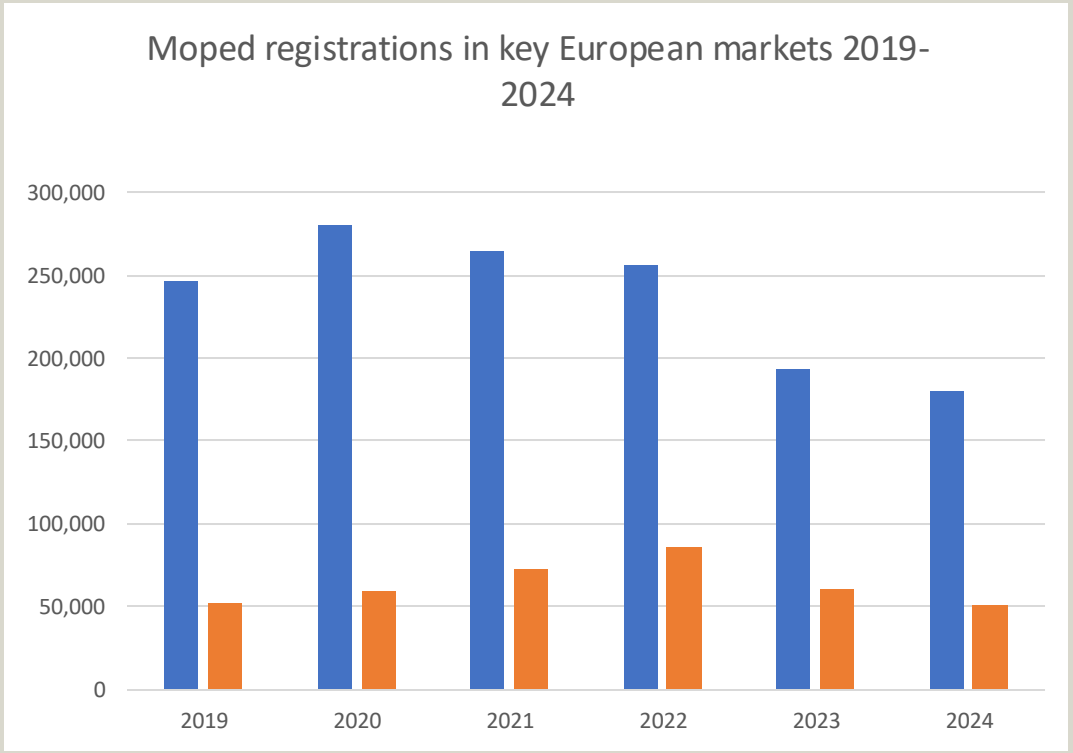
Tools for agricultural applications

Agricultural AGV

Motors for industry

Automated Guided Vehicles (AGV)

Two wheelers



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Two wheelers

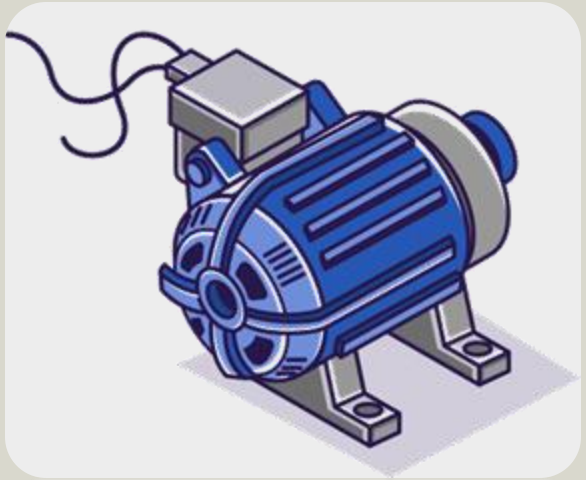
Current motors primarily use permanent magnets containing rare earth elements

- **Risk on the supply of critical materials**
- **Cost variability**
- **Balanced towards low cost rather than reliability**

Environmental impact not taken into account

→ Few or no alternatives for players targeting small and medium productions

Product requirements and objectives



>94% of efficiency
Zéro waste in production
Designed for in-life renovation and end-of-life recycling

Free from critical materials, promoting a local and European supply chain

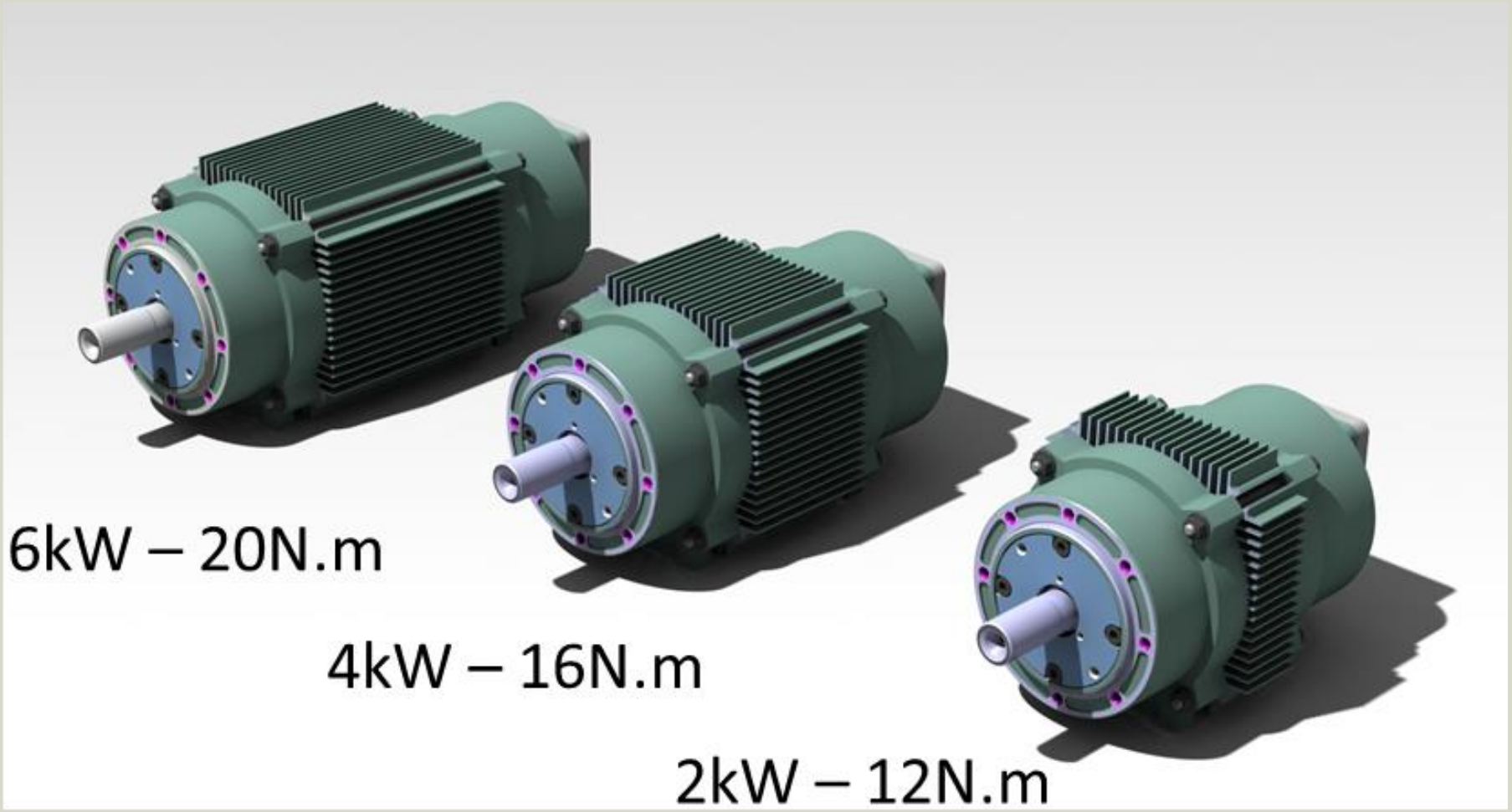
Competitive in cost

Mass and volume to be minimized

Technical requirements:

- Retarded differentiation for the motor range
- « One for X » integration into applications w/o modification
- Battery voltage : 48V nominal
- Reduced production tooling costs
- Air cooling (natural convection)
- Off-the-shelf inverter operation

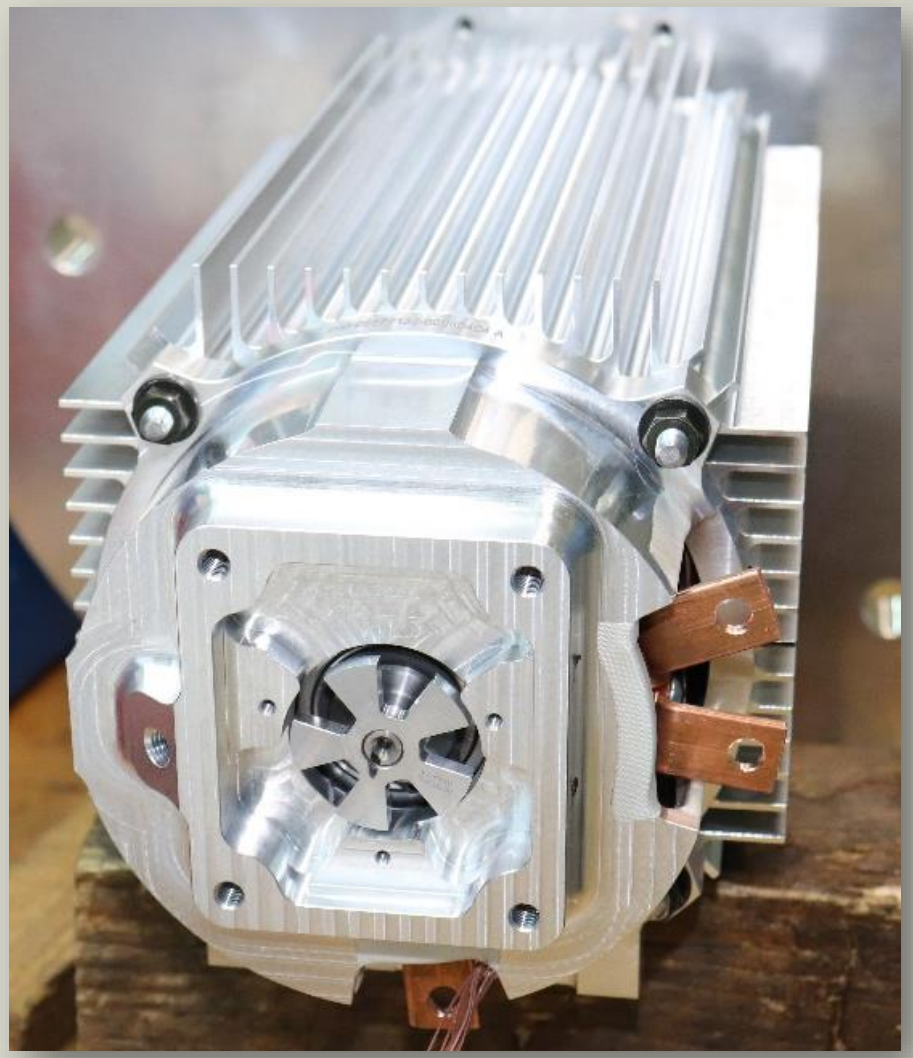
Developed low voltage motor range



Technological approach

A motor rage of 2, 4 et 6kW under 48V

According to the principle of technological family



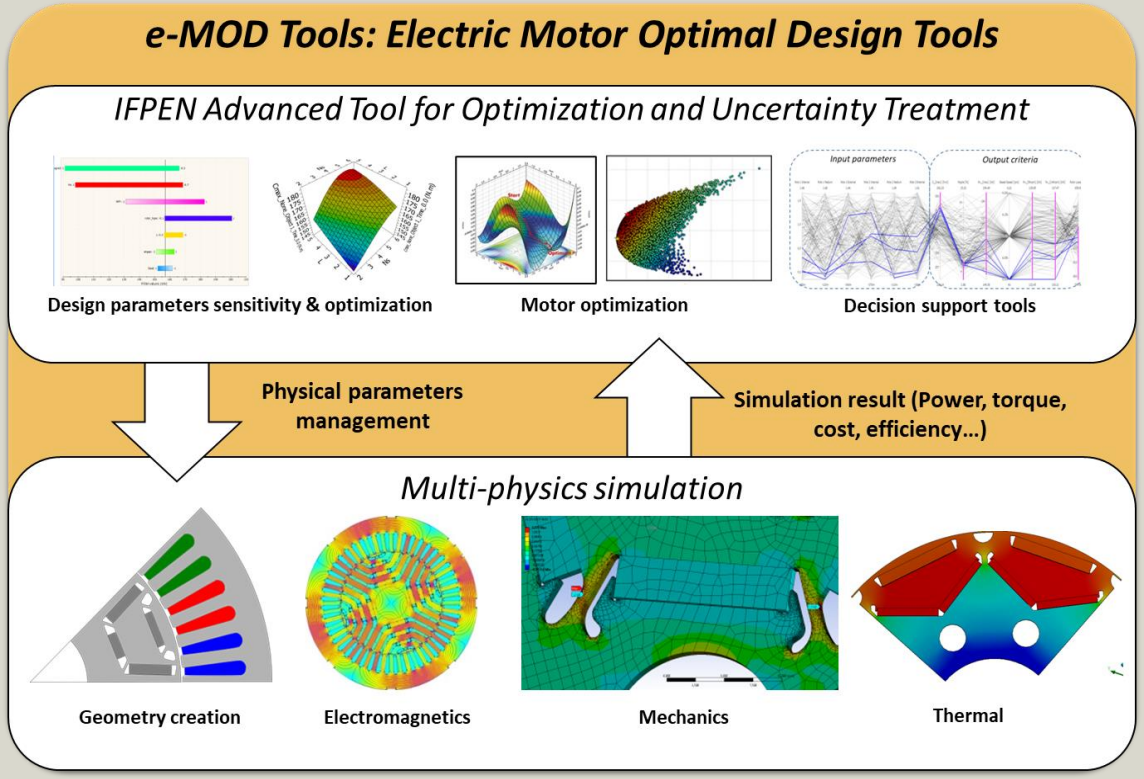
Technological approach

A motor rage of 2, 4 et 6kW under 48V

- **According to the principle of technological family**

Magnet-assisted synchro-reluctance technology

- **Torque generation relies primarily on electrical steel**
- **Ferrite magnets without strategic materials**
- **Optimized for efficiency: 95%**
- **Designed for the usual range of 2, 4 and 6kW inverters**



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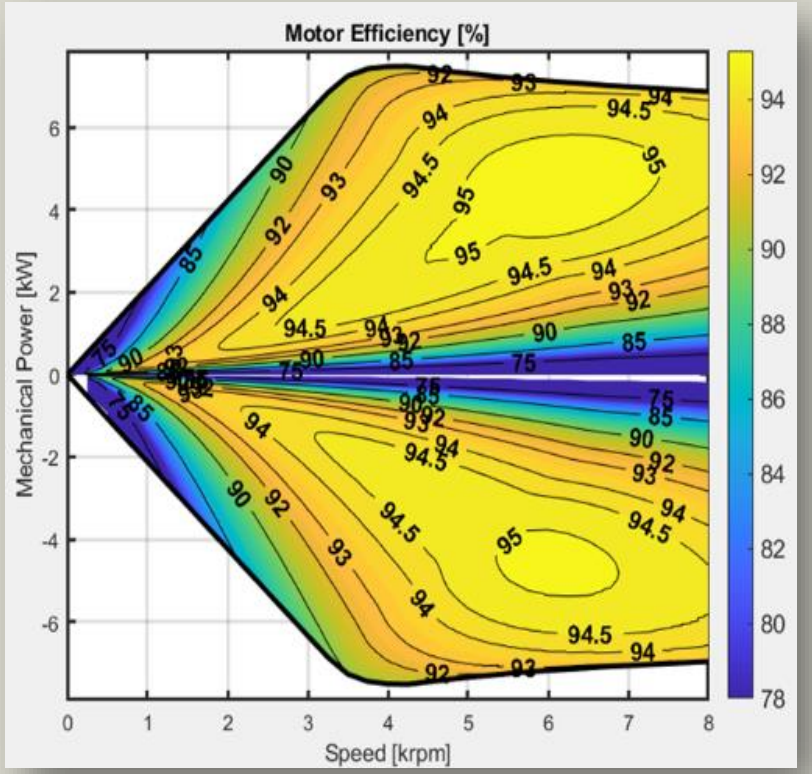

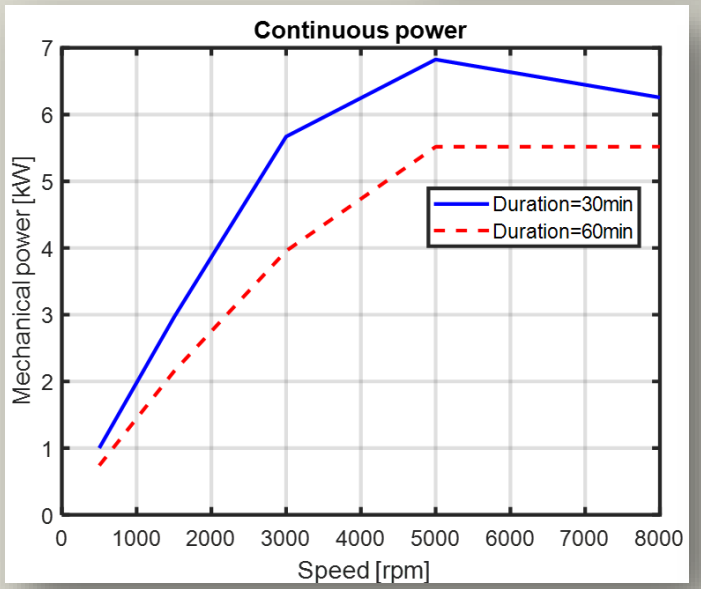

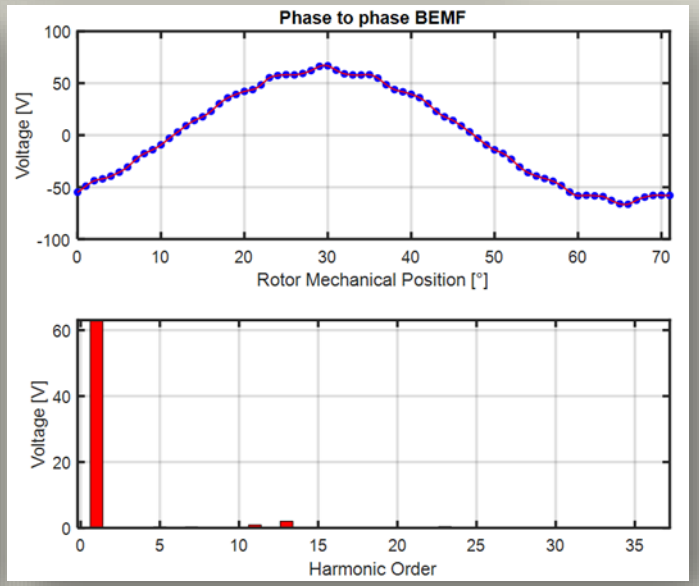

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Designed for low vehicle system impact

- No radiator: Natural convection cooling
- No soundproofing: Silent technology
- Modular gearbox interface
- Robust against demagnetization (extreme temperatures and faults)

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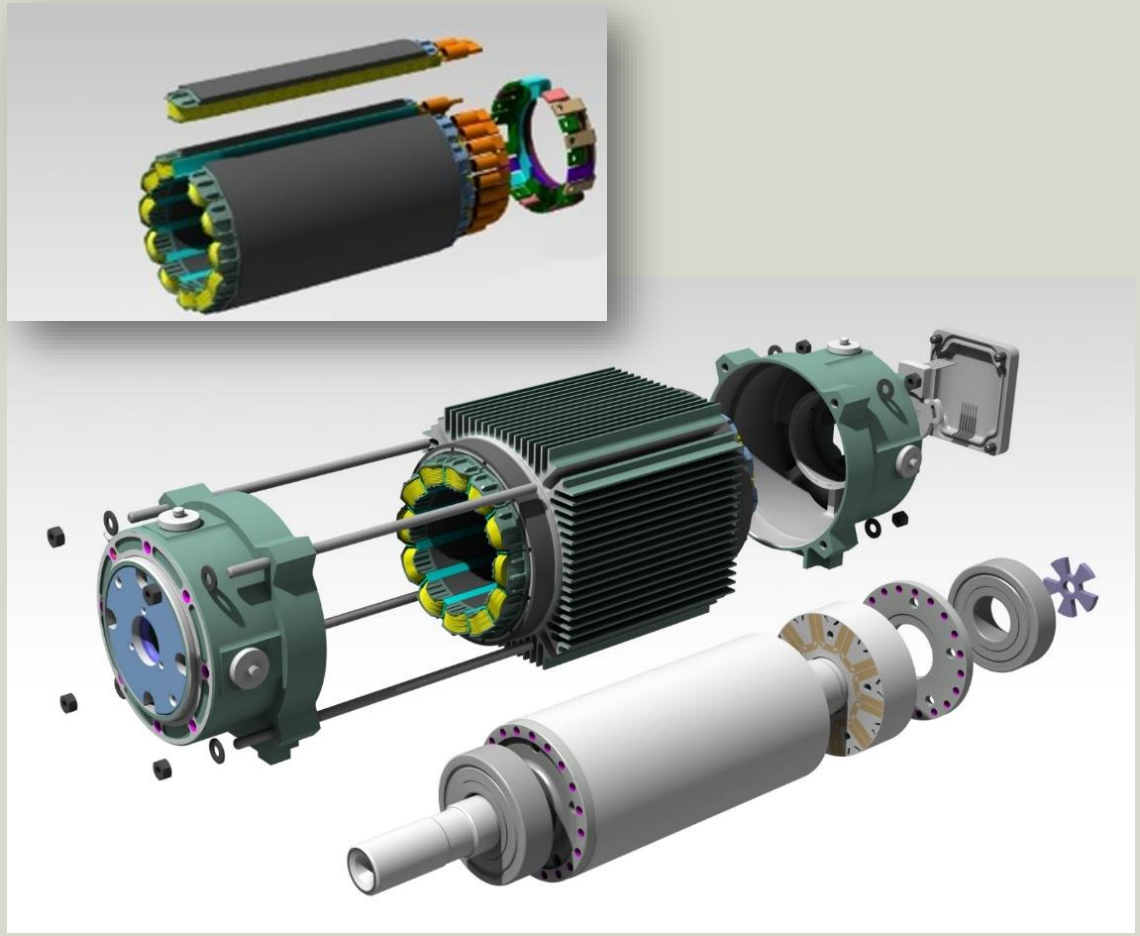
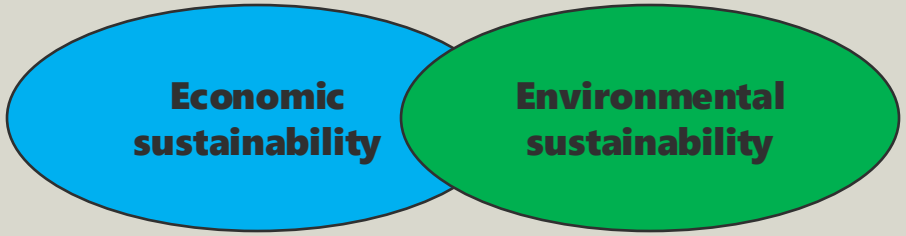


Designed to reduce manufacturing losses, enable refurbishment and increase recyclability

Industrialization approach
Operational decisions and sustainability



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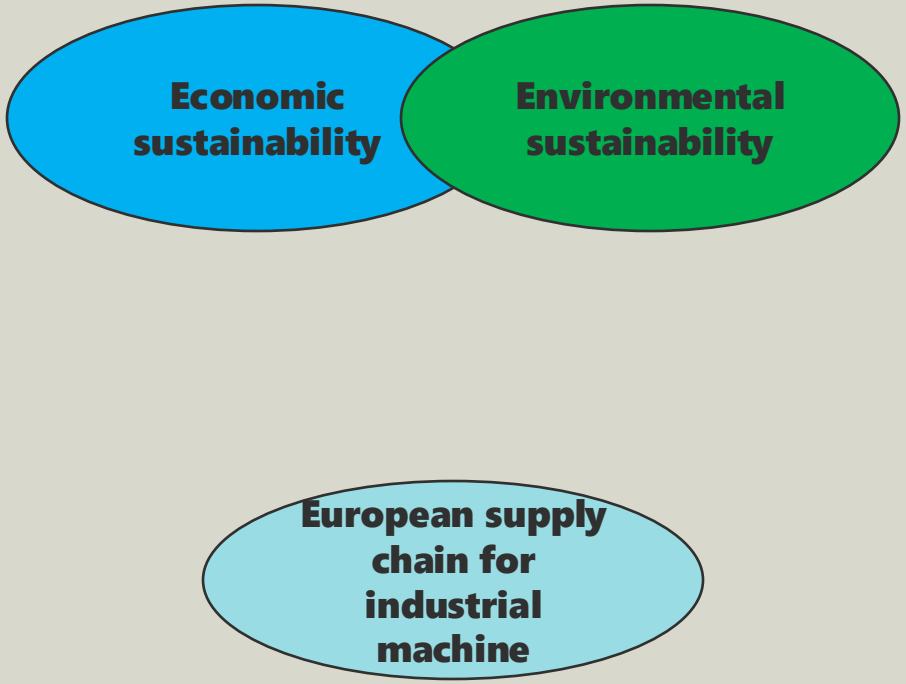

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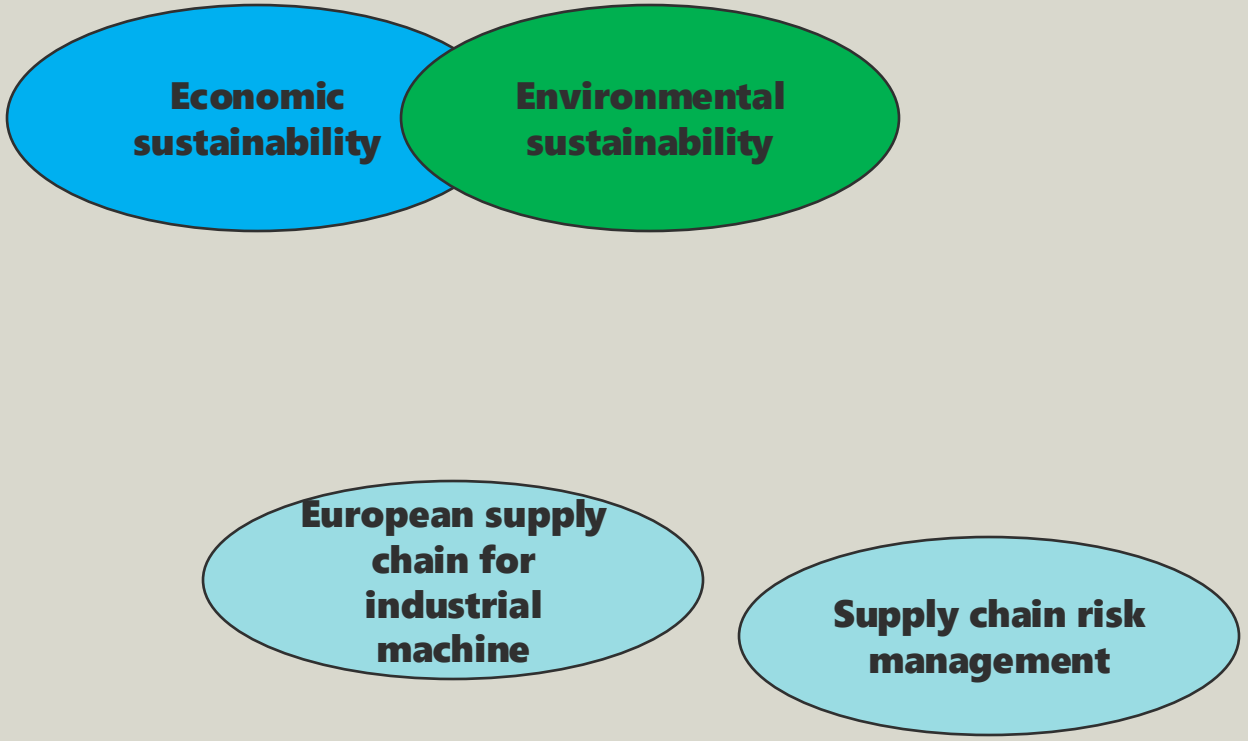

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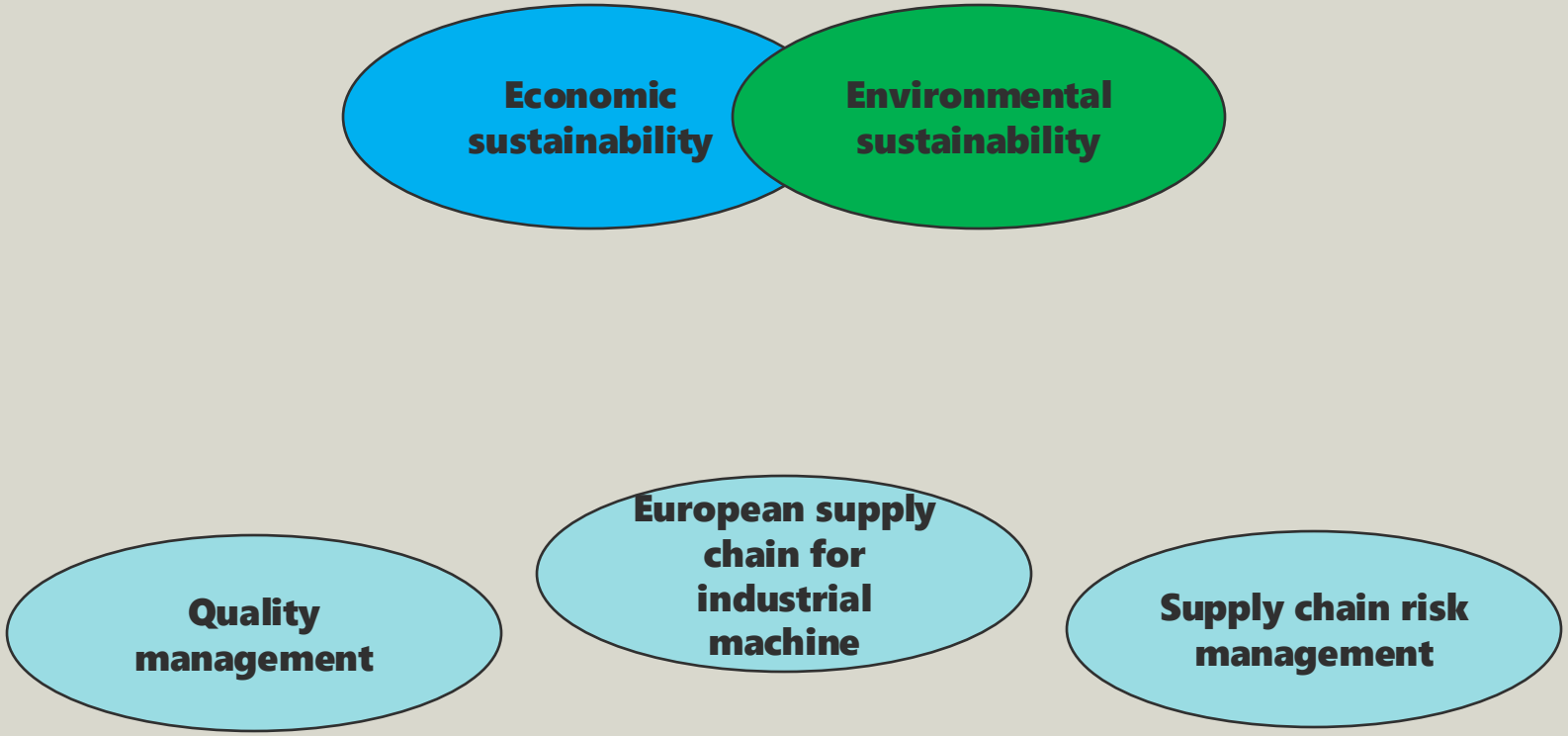

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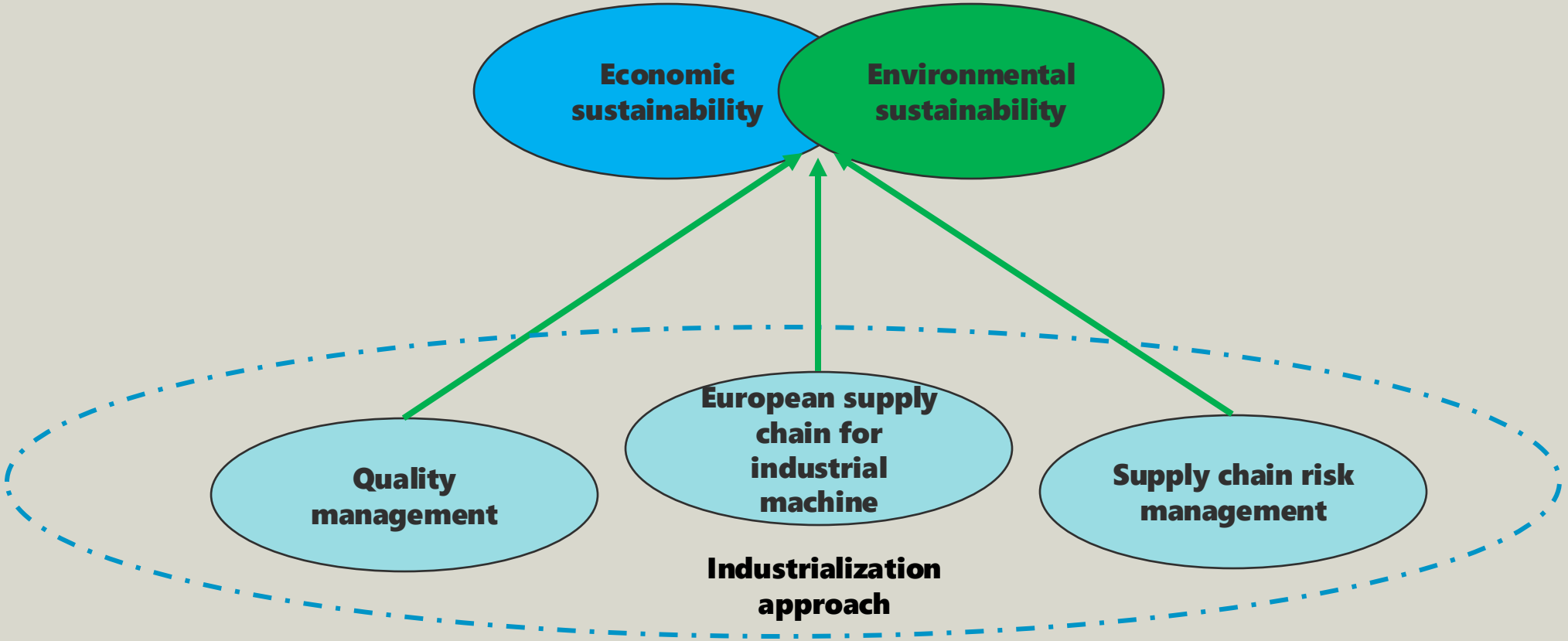

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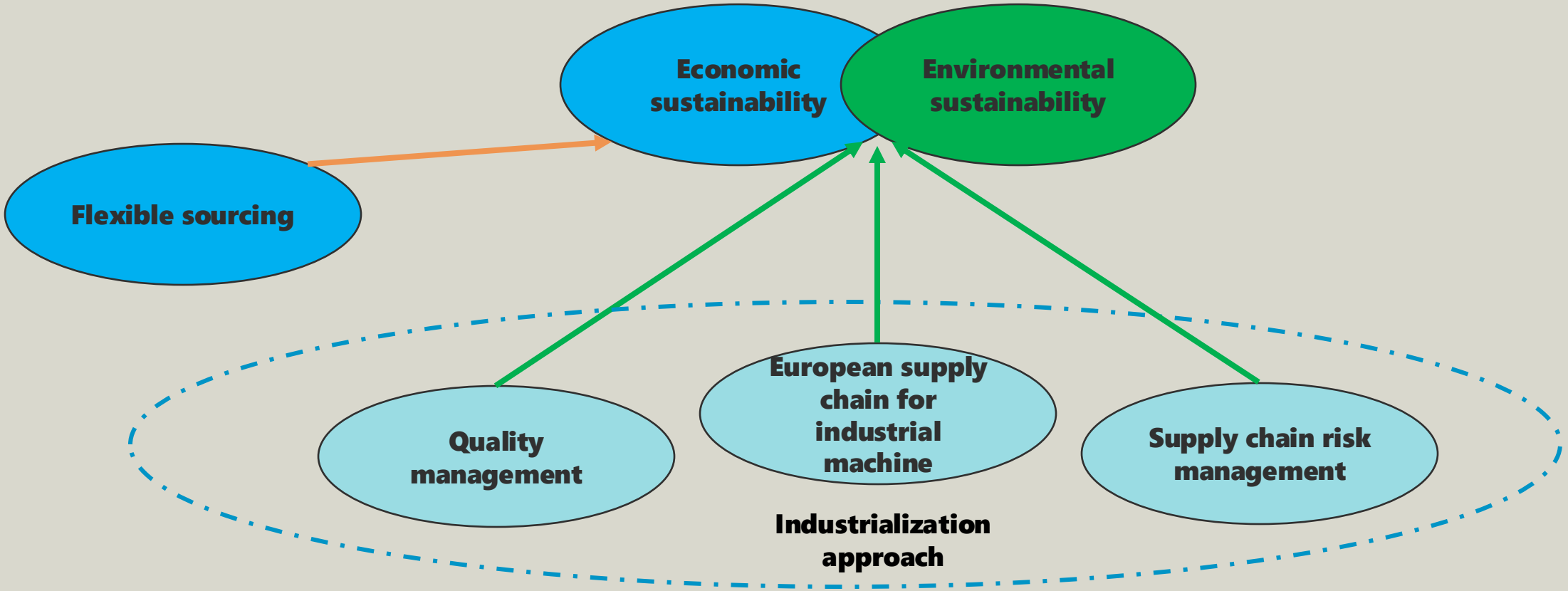

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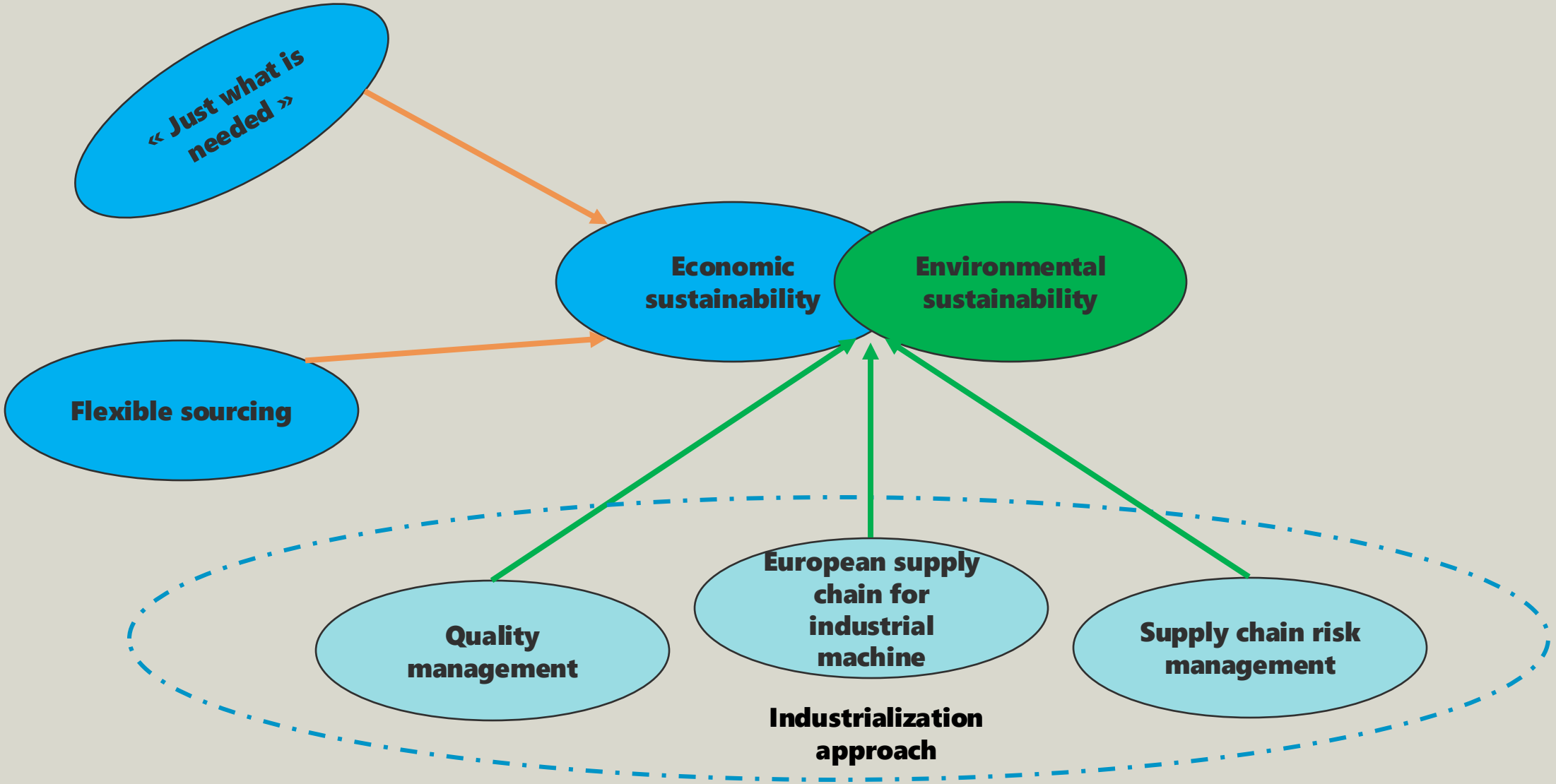

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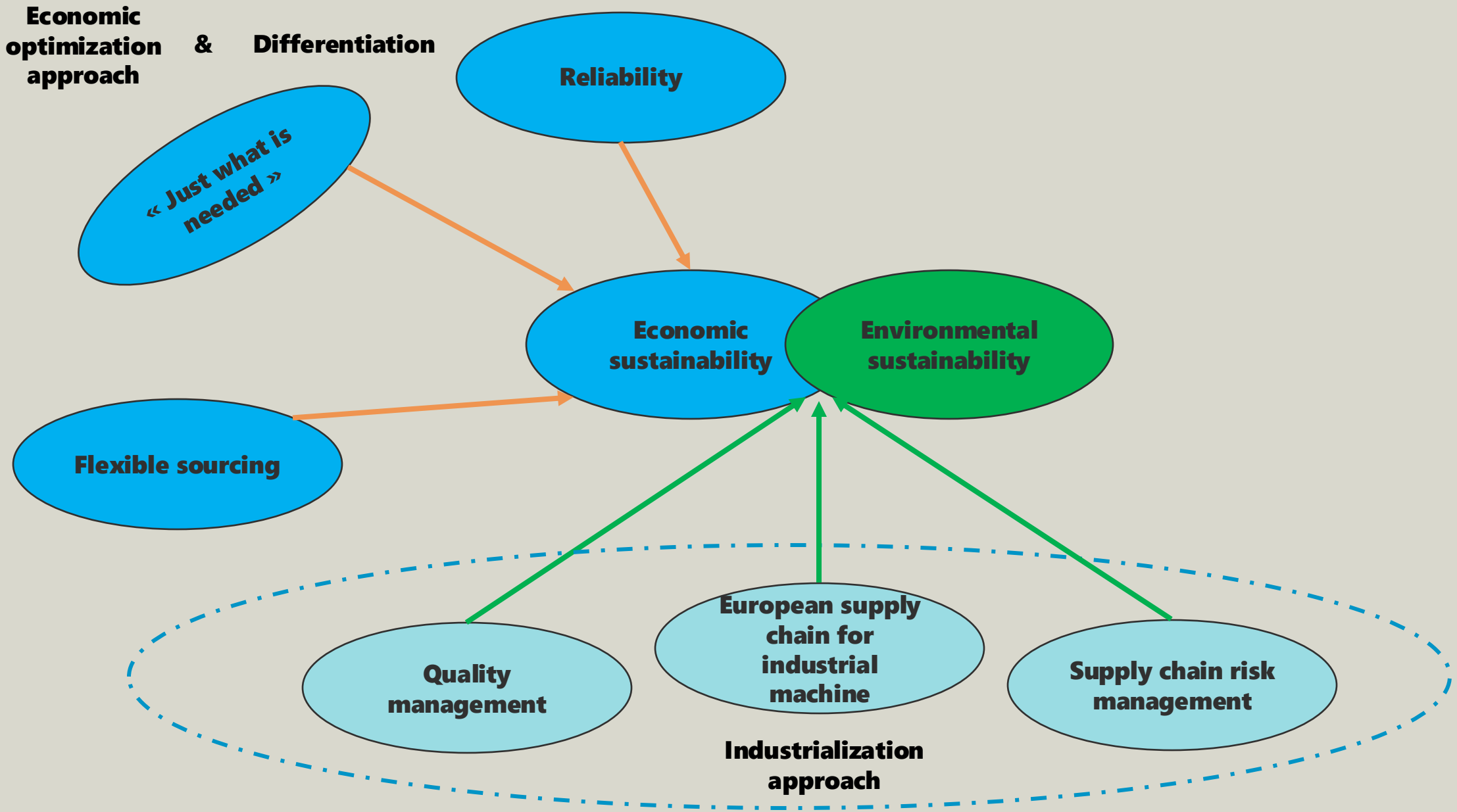

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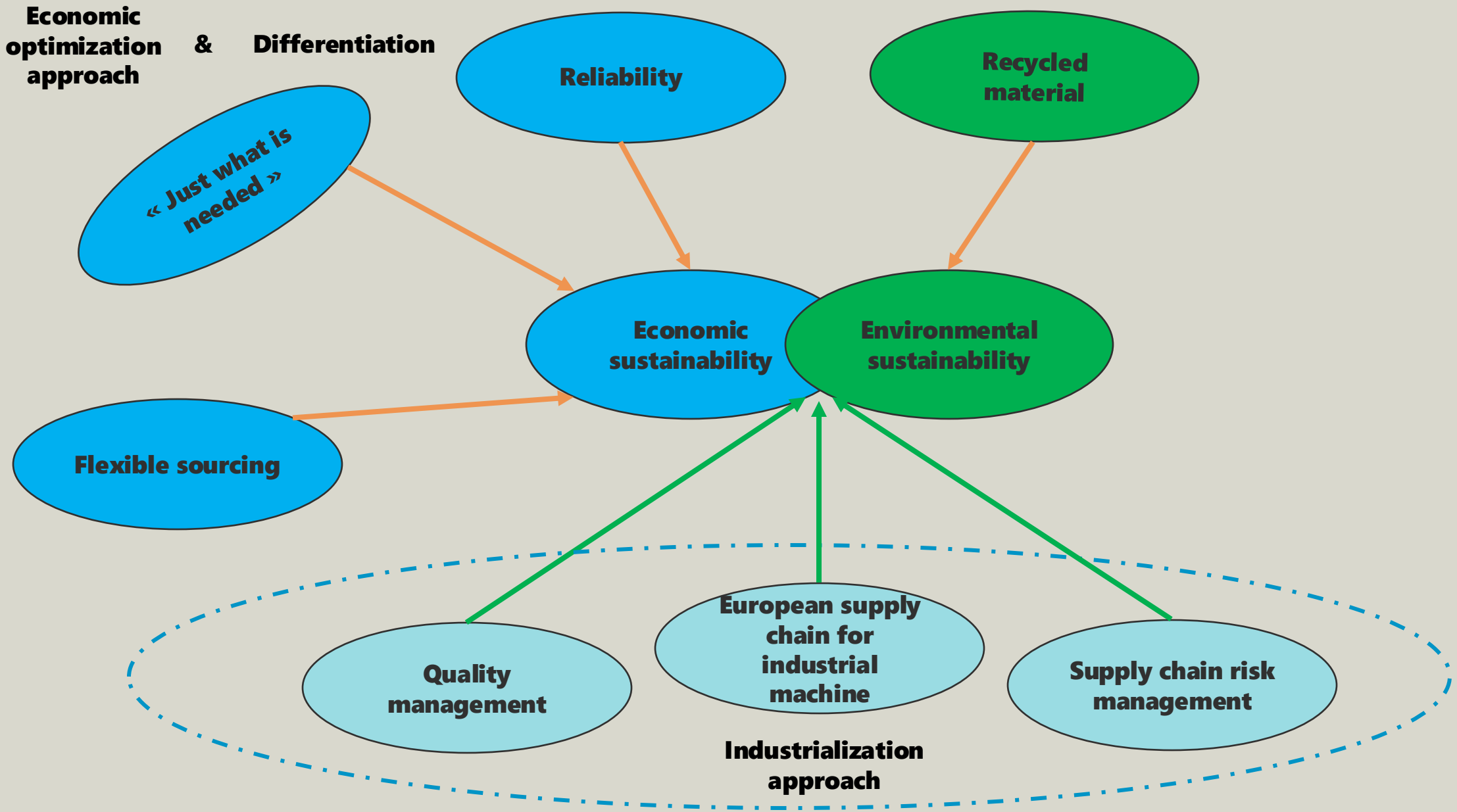

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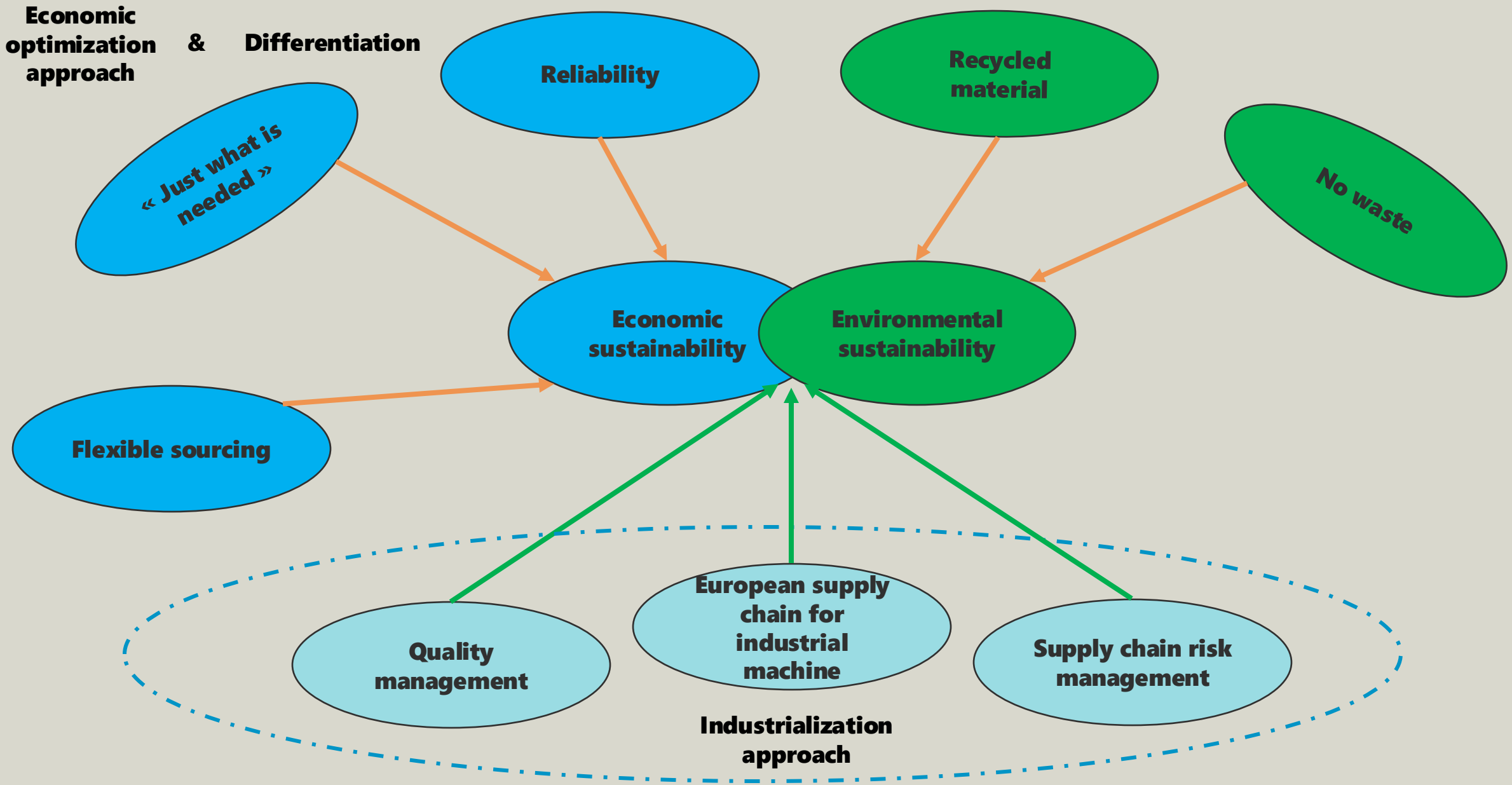

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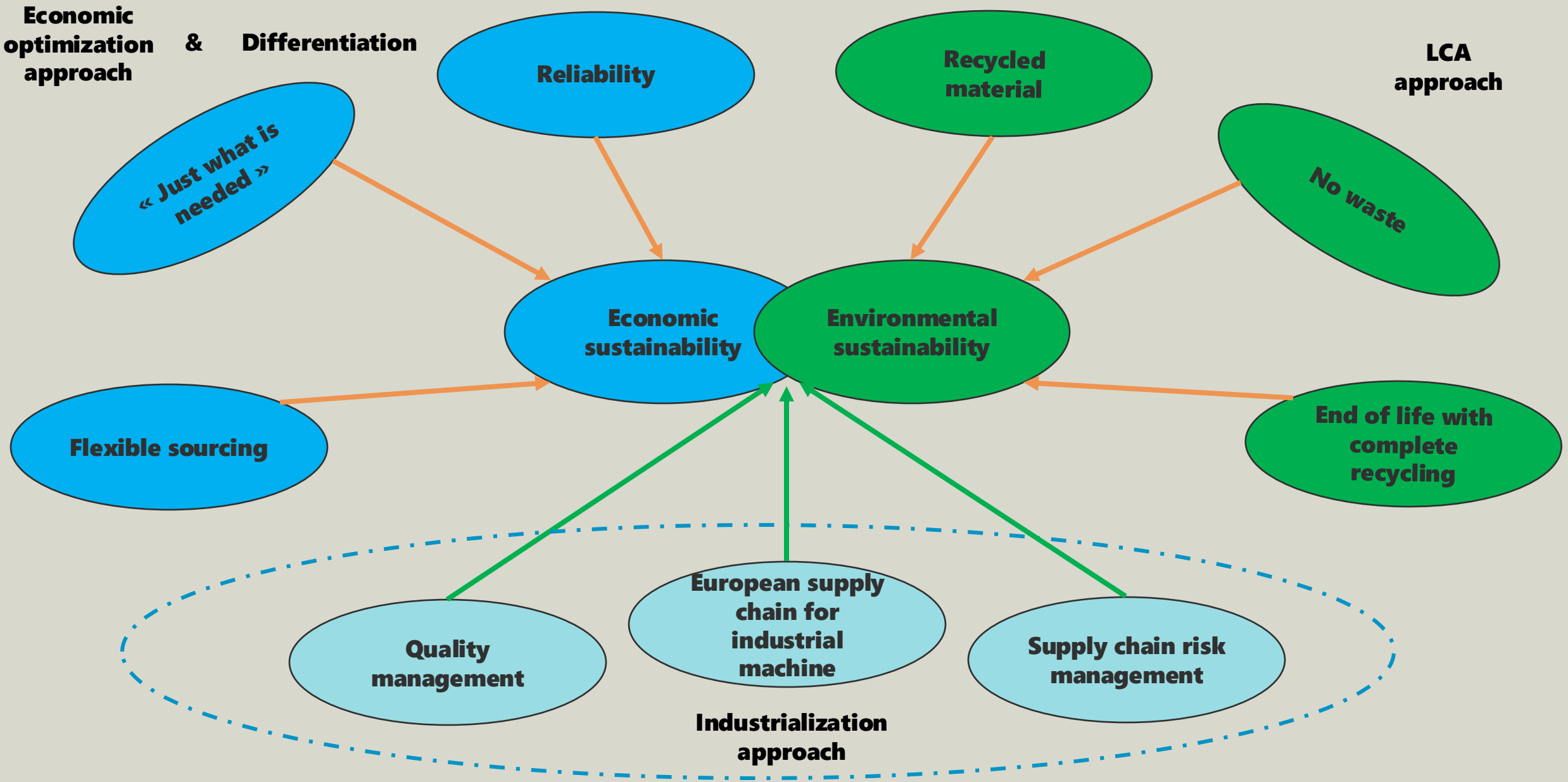
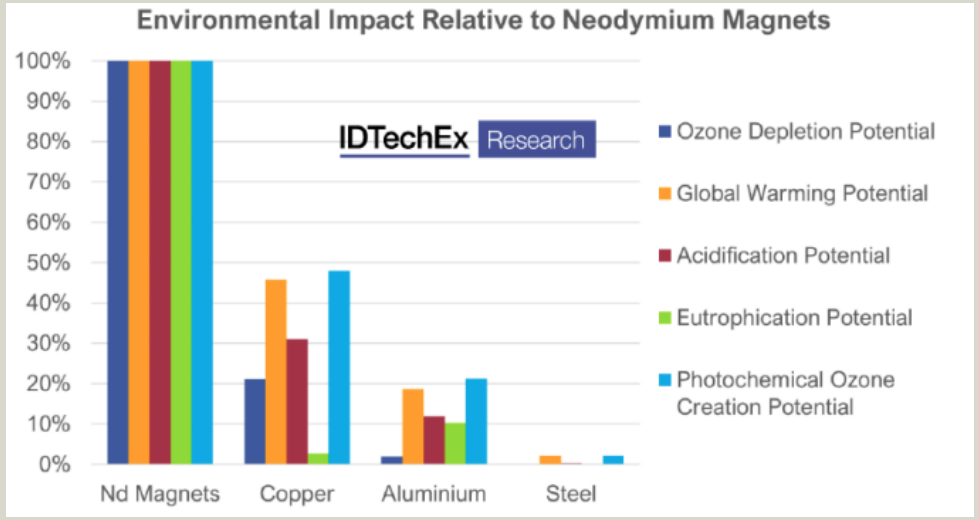
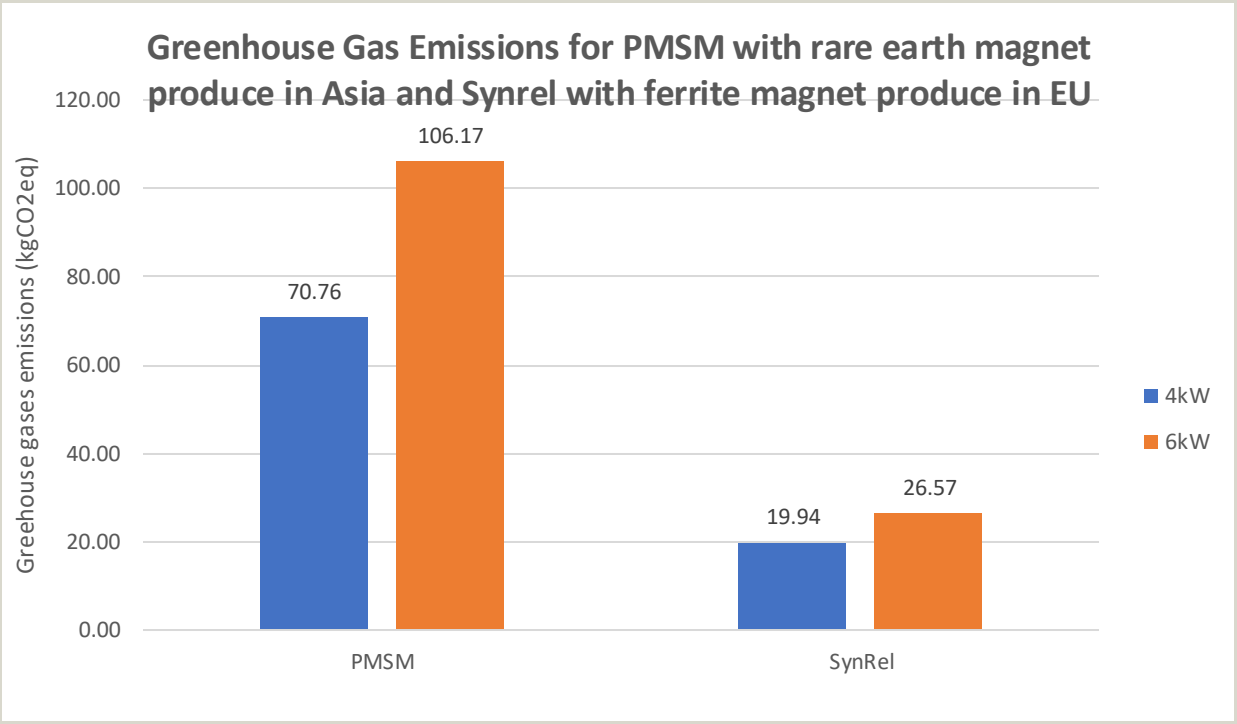


Life Cycle Assessment

Permanent Magnet technology



Magnet-assisted synchro-reluctance technology



Used ADEME data based for this LCA

Conclusions:

- **Save up to 75% of Green Gas Emissions with EU production vs Asia production**
- **Availabilities**
- **Competitiveness**

Next Step

2025

2026

Addition of new production machines & scheduling of the factory space for the new motor range to be added to current production

Techno-economical-environmental impact

Pre-production, production adjustment and optimization

Optimization

Motor range production

Life extension through reservicing

Expansion of the motor range

Expansion of the motor range « E-MOBI »

Economic benefits :

- **Value creation for the non-automotive electromobility sector in the Hauts-de-France region**
- **Expanding know-how in Innovation, Design, Manufacturing, Assembly, Repairing and Recycling**
- **Creation and development of new electromobility-related professions**
- **Shift of skills from combustion engines to electrification**

Expanding know-how

- **Environmental benefits:**
- **Elimination of the use of critical materials**
- **Increased recyclability**
- **Use of recycled materials**
- **Reduced transport of goods (local sourcing)**

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IFP Energies nouvelles

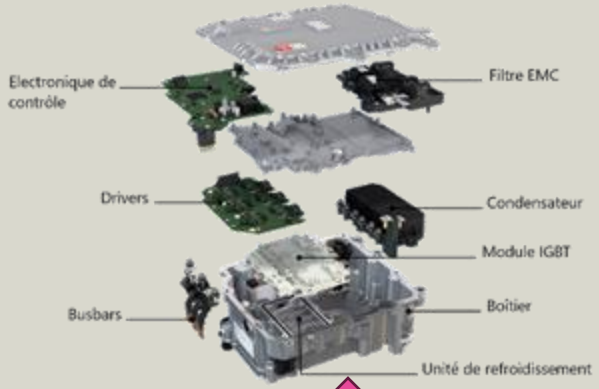
SkyAzur MATERIALIZE YOUR IDEAS

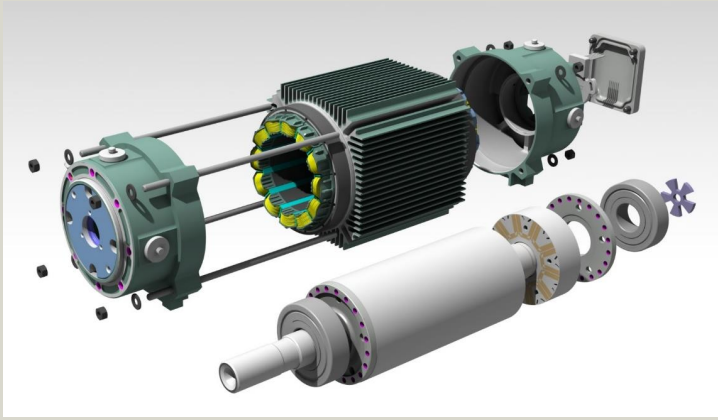
LAMIH UMR CNRS 8201

thyssenkrupp

LSEE

Tech 3E





EIFFAGE ÉNERGIE SYSTÈMES

ZAI

Région Hauts-de-France

Cofinancé par l'Union européenne

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Thanks for your attention !

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