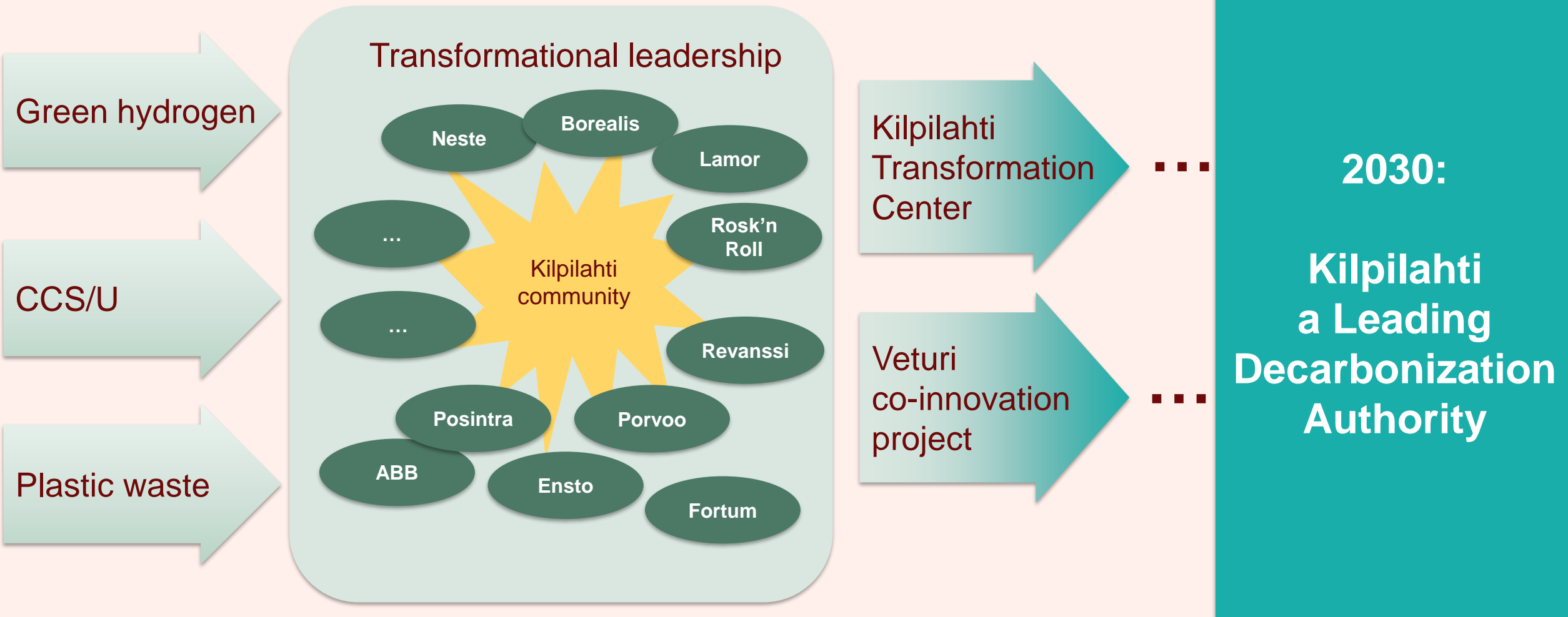# Kilpilahti – forerunner in decarbonization

Uudenmaan liitto; Maakunnan yhteistyöryhmä 20.1.2022

Fredrik Pressler, CEO, Posintra
Johan Wallin, Managing partner, Synocus

Green hydrogen

CCS/U

Plastic waste

Transformational leadership

Neste

Borealis

Lamor

...

Rosk'n Roll

Kilpilahti community

...

Revanssi

Posintra

Porvoo

ABB

Ensto

Fortum

Kilpilahti Transformation Center

Veturi co-innovation project

2030:

Kilpilahti a Leading Decarbonization Authority

Long term ambition clear: Forerunner in Decarbonization

Mobilizing engagement

- Immediate steps are pending on EU and national policy decisions as well as leading company stewardship.
- Gradually strengthening Kilpilahti identity, towards Kilpilahti as an internationally recognized innovation hub:
    - The Baltic Sea regional hydrogen gigahub
    - Leader in carbon utilization technologies'
    - Value from plastic waste ecosystem
    - Kilpilahti as transformation center

Making an impact

Completely changing production processes from being the single largest carbon emitting industrial site in Finland towards a carbon sink.

Evolving into a decarbonization thought leader by 2030. Three parallel development paths must be integrated:

- The establishing of a cost-competitive renewable energy infrastructure in Finland,
- Neste and Borealis proceeding towards carbon-neutral production by 2035, and
- Kilpilahti becoming an internationally recognized innovation hub focusing on the circular economy with plastic recycling as the first unifying development theme
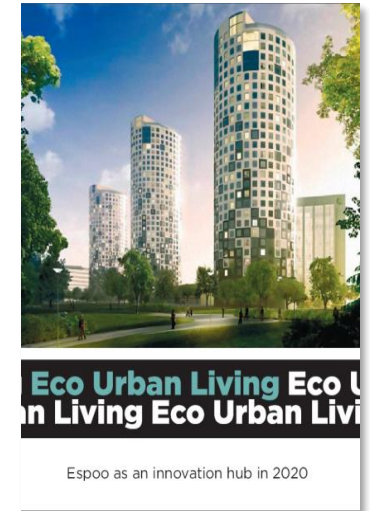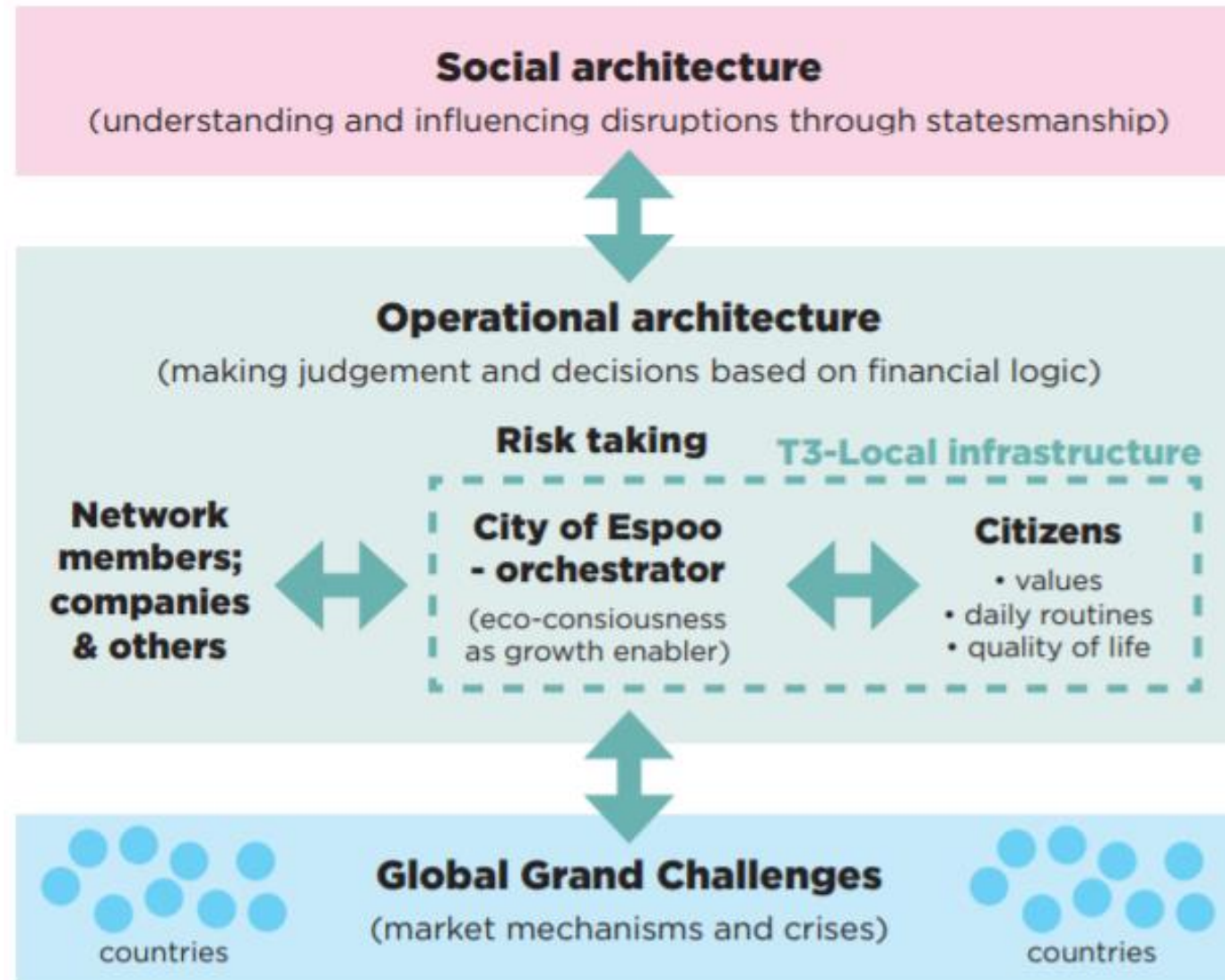
Appendix 1

Driving transformational collaboration

Synocus – building competences for collaboration

▪ The conceptual foundation of Synocus is based on profound research, which started already in the 1990s, and has resulted in both academic and popular publications as well as numerous research reports published by e.g. TEM and Tekes.

▪ Synocus's approach is a systemic view on the firm and its interaction with the surrounding environment, through which it must continuously build new capabilities to stay competitive (see Appendix 1a).

▪ The breakthrough project was Eco Urban Living starting in 2010, when Synocus engaged the city of Espoo, Valmet Automotive, Fortum, Nokia and Aalto University around the piloting of electric vehicles in Espoo.

▪ The most recent achievement is the co-innovation project Open Smart Manufacturing Ecosystem project, which was approved financial support by Business Finland in November 2021 (see Appendix 1b).

▪ The principles of transformative collaboration in urban planning is now guiding the preparation in the Nordic Superblocks as Decarbonization Catalysts initiative (see Appendix 1c).
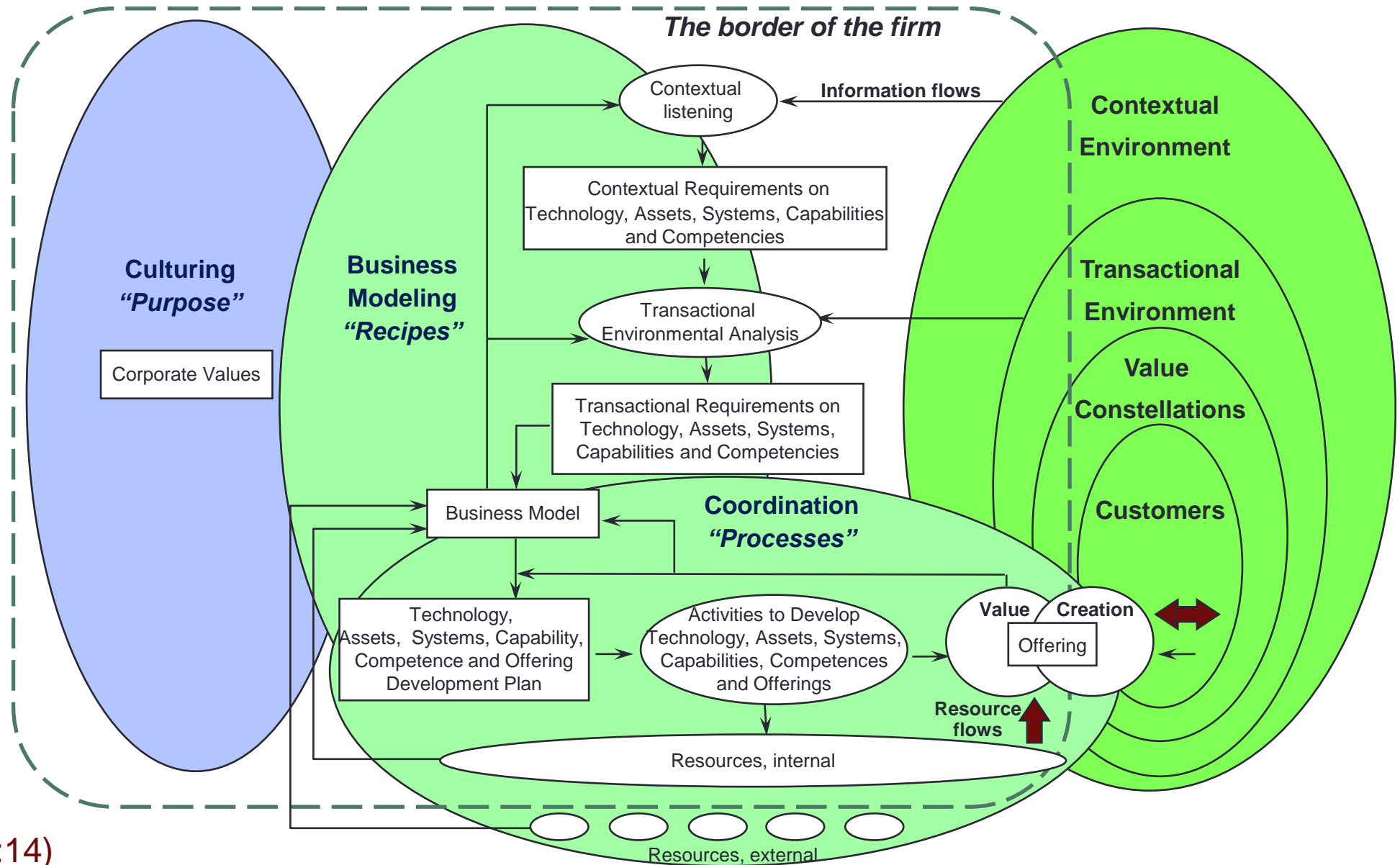
The Eco Urban Living view on urban development*

Social architecture
(understanding and influencing disruptions through statesmanship)

Operational architecture
(making judgement and decisions based on financial logic)

Risk taking **T3-Local infrastructure**

Network members; companies & others

City of Espoo - orchestrator
(eco-consiousness as growth enabler)

Citizens
• values
• daily routines
• quality of life

Global Grand Challenges
(market mechanisms and crises)

countries

countries

Eco Urban Living Eco U
an Living Eco Urban Livi

Espoo as an innovation hub in 2020

*Wallin (2011:85)

synocus

Appendix 1a

The open system foundation

The the firm as an open system*

*Wallin (2000:14)

The capability map*

CULTURING CAPABILITY
Socialization
Role modeling

COORDINATION CAPABILITY
Change management
Constellation management
Administrative control

BUSINESS MODELING CAPABILITY
Foresight
Conceptualizing
Timing

External

INTEGRATIVE CAPABILITY
- Internal integration
- External integration

RELATIONSHIP CAPABILITY
- Customer intelligence
- Customer linking

Resources ← → Markets

GENERATIVE CAPABILITY
- Creativity
- Execution

TRANSFORMATIVE CAPABILITY
- Offering design

Internal

*Wallin (2000:34)

The emergence of innovation capabilities in a region*

Attracting knowledge flows, institutionalization

Attracting knowledge flows, institutionalization

Phase 4: Institutionalized knowledge center

Knowledge stocks

Regional orchestration

Knowledge generation

Phase 3: Results from knowledge creation

Phase 2: Individuals attract individuals

Supporting infrastructure

Phase 2: Individuals attract individuals

Phase 1: Serendipity

Attracting knowledge flows, initialization

Attracting knowledge flows, initialization

*Wallin et al. (2012:17)

The Excellence Framework*

Capabilties:

Cultural capabilities

Dynamic capabilities

Offering capabilities

Generative capabilities

SOCIETAL EXCELLENCE

INNOVATION EXCELLENCE

OFFERING EXCELLENCE

PROCESS EXCELLENCE
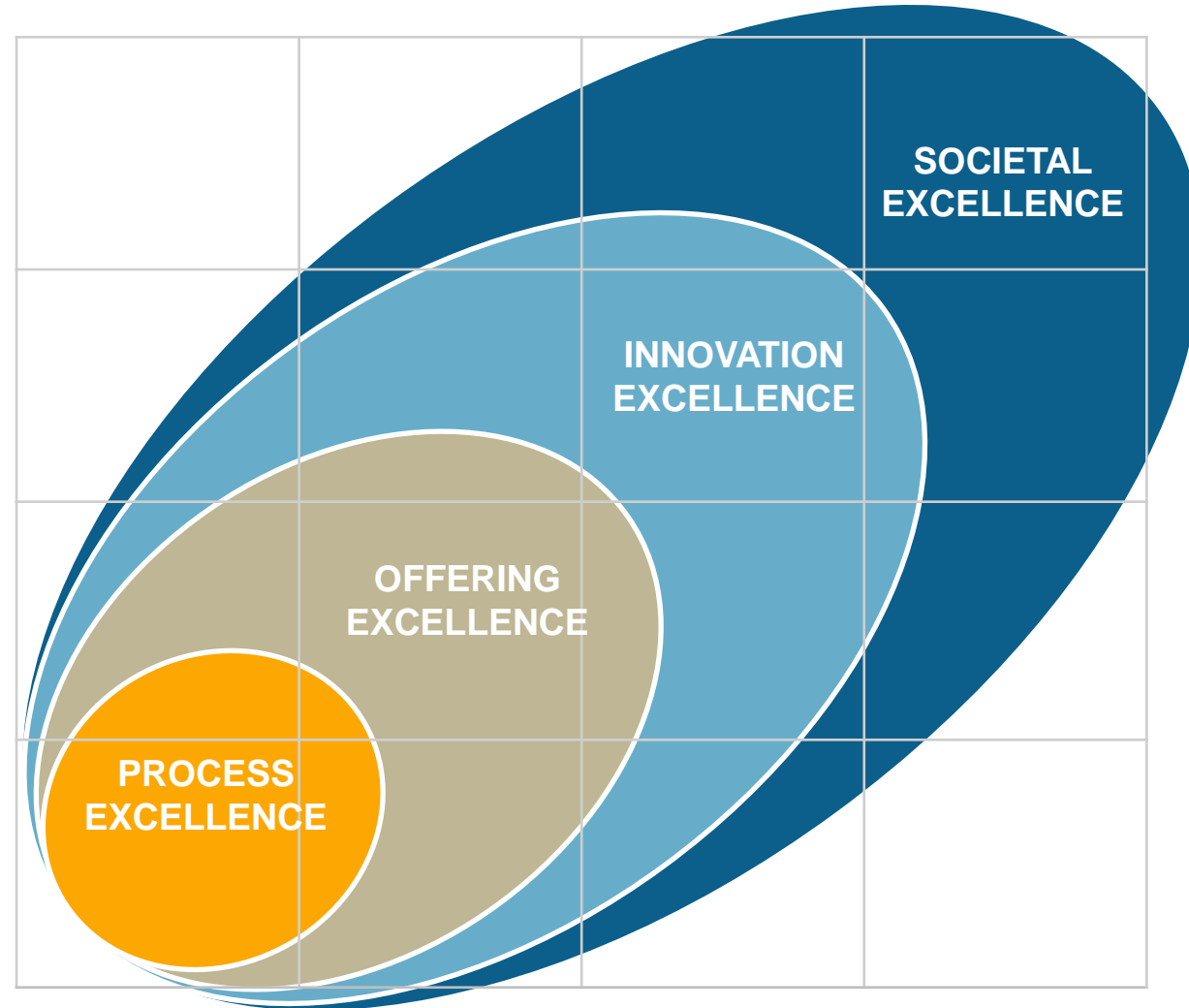
Performance: Efficiency   Effectiveness   Innovativeness   Righteousness

*based on Wallin et al. (2017:22)

Appendix 1b

The Open Smart Manufacturing Ecosystem

The OSME project

OSME - Reframing Manufacturing Collaboration

Today manufacturing faces a moment of unprecedented change. Lead times are getting shorter, and resilience is the new buzzword. Quality requirements are more stringent, and manufacturers have become responsible for traceability strengthening the ties between suppliers and principals. Due to climate change companies must comply with increasing environmental restrictions and there is an ongoing dialogue between manufacturers and policy makers on how to make manufacturing more sustainable. To be attractive to top talent manufacturing is forced to open up and engage in the broader issues relating to their purpose and mission. To address these challenges Open Smart Manufacturing Ecosystems, OSME, is a collaborative initiative that engages leading manufacturing companies to speed up the needed transformation.

OSME originates from Wärtsilä in Vaasa that recognized that when moving the factory from downtown to Vaskiluoto it could totally reframe its manufacturing concept. This created the idea of the Smart Technology Hub, which sees Wärtsilä as an extended enterprise. OSME engages, supports, and leverages upon the skills and strengths of its partners. OSME is able to adapt and learn based upon the insights evolving through the collaboration.

Open
In manufacturing openness means that we share with others what we want, not based on predefined rules that everything must be shared like in open-source software. As individuals we know that the most important thing in sharing is trust. And trust must be built over time. So the OSME members build their collaboration based on trust.

Manufacturing
Finland is one of the most manufacturing intensive countries in Europe. We build on this strength and want to drive the transformation of manufacturing towards improved sustainability and efficiency with the help of digitalization. OSME is supported by Business Finland, and through our strong cooperation with the MEX Finland network we expect to be around for years.

Smart
To be smart we focus on doing things and learning as we go. Activities and events shape how we proceed. This is what we mean by smartness in OSME. We live in a world that is constantly changing. Therefore OSME members must continuously consider alternative scenarios, evaluate new situations as they emerge and move forward with an open and learning mindset.

Ecosystems
We have learnt from Finnish ecosystems such as NMT, Linux and the Finnish gaming sector that success comes from committed individuals with a strong purpose beyond making money. In OSME we want to motivate and engage individuals for a broader responsibility than what they have in their own organizations. We want to be the world's most inspiring community for manufacturing professionals.

The OSME initiators

To address present challenges the OSME initiators are united by their ambition to make manufacturing both more creative and more productive. This will ask for a totally new way of working together that the OSME initiators will co-create and use both for their own benefits and to contribute to a more responsible and sustainable manufacturing paradigm. Each of the initiators brings a complementary capability to the collaboration.

Wärtsilä wants to develop an integrated smart manufacturing ecosystem where knowledge, capabilities, technology, systems, and solutions to common problems can be shared. This will result in a more resilient value chain based on distributed manufacturing as a differentiator. Wärtsilä and its partners will adapt and innovate to market needs and lead the decarbonization roadmap in the marine and energy industry.

VTT provides key enabling technologies in federated data spaces such as IDS to be taken into use in implementing the data architecture of OSME. The implementation of IDS components supports the implementation of OSME pilots and enables an open self-sustainable manufacturing ecosystem.

Roima Intelligence contributes to the Open Smart Manufacturing Ecosystems digital platform through the integration layer and additional proof of concepts. This will provide users with operational transparency, quality monitoring, and sustainability.
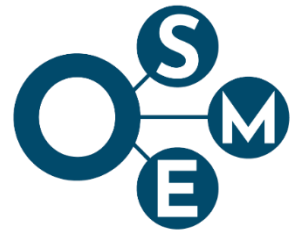
Fastems contributes to Open Smart Manufacturing Ecosystems by creating specifications and proof of concepts for factory level manufacturing cockpit solution integrating shop floor machinery to collect and share data. This will allow advanced and real-time management of production.

Tasowheel identifies the different types of resilience requirements of the participating companies (multi-site manufacturing models, alternative sourcing models, redundancies in bottlenecks etc.) to develop an actionable framework for manufacturing resilience.

Prohoc develops new support tools for human-centric operations. This will be done by building a model that enables inspired self-organization within the ecosystem and an environment where operators are seen as value creators.

Leinolat Group supports OSME with experience on how manufacturability and total-cost optimization should be considered already in the engineering, design phase and throughout the product lifecycle through digitalization and 3D design.

Synocus co-orchestrates the OSME community to strengthen the collaboration among the ecosystem members through continuous capability-building efforts improving quality, shortening throughput time, and supporting innovativeness to reduce costs and increase value for customers.

In addition to the initiators the OSME collaboration also comprises a growing number of Associate Partners that will provide additional strengths to the OSME network. The first Associate Partners are ABB, Fliq, Nimetech, Sandvik, Valmet Automotive, and the University of Vaasa.

OSME – Open Smart Manufacturing Ecosystems
Work streams

OSME work stream

			Description
WS1	Nurturing Collaboration	synocus	• Co-orchestrating the OSME community to strengthen the collaboration among the ecosystem members through continuous capability-building efforts improving quality, shortening throughput time, and supporting innovativeness to reduce costs and increase value for customers.
WS2	Extended Enterprise	WÄRTSILÄ	• Developing an integrated smart manufacturing ecosystem that can enable a production concept based on distributed manufacturing principles using generic traditional (widely used) process equipment.
WS3	IT Architecture	WÄRTSILÄ	• Creating an open ecosystem to tackle the digital divide of the supply chain and avoid becoming an "isolated digital island" by defining the principles for the new collaborative business practices and securing knowledge growth throughout the ecosystem to build shared capabilities and drive transformational innovation.
WS4	Sustainable Data Economy	VTT	• Providing key enabling technologies in federated data spaces such as IDS to be taken into use in implementing the data architecture of OSME. The implementation of IDS components supports the implementation of OSME pilots and enables an open self-sustainable manufacturing ecosystem.
WS5	Integrated Visibility	ROIMA	• Contributing to the OSME digital platform through the integration layer and additional proof of concepts. • This will provide users with operational transparency, quality monitoring, and sustainability.
WS6	Factory Cockpit	8760 Fastems	• Creating specifications and proof of concepts for factory level manufacturing cockpit solution integrating shop floor machinery to collect and share data. • This will allow advanced and real-time management of production.
WS7	Resilient Collaboration	TASOWHEEL	• Identifying the different types of resilience requirements of the participating companies (multi-site manufacturing models, alternative sourcing models, redundancies in bottlenecks etc.) to develop an actionable framework for manufacturing resilience.
WS8	Human Centric Operations	PROHOC EMPOWERING PROJECTS	• Developing new support tools for human-centric operations. • This will be done by building a model that enables inspired self-organization within the ecosystem and an environment where operators are seen as value creators.
WS9	Supporting the Collaboration	LEINOLAT GROUP	• Supporting OSME with experience on how manufacturability and total-cost optimization should be considered already in the engineering, design phase and throughout the product lifecycle through digitalization and 3D design.

Synocus's OSME WS1 Nurturing collaboration
Work packages

Work package		Description
WP1	**Conceptualization** 1. Engaging OSME members in the co-creation of the OSME framework 2. Clarifying the OSME framework through both practical and theoretical contributions 3. Validating the results	▪ Strengthening the anchors' efforts to establish a new type of intensified collaboration with suppliers in forming manufacturing ecosystems. ▪ Establishing a deep understanding of the integration of longer-term and shorter-term objectives. ▪ Maintaining and updating the roadmap for the innovation community.
WP2	**Capability building** 1. Capability building on extended enterprise level 2. Supporting capability on individual company level 3. Further developing the capability building tools and frameworks	▪ Integrating key suppliers into the continuous capability-building efforts with the anchors to improve quality, reduce throughput time, and support innovativeness. ▪ Managing of agile proof-of-concepts. ▪ Continuously generating new development initiatives.
WP3	**Communication** 1. Internal communication through direct interaction with OSME members 2. Ecosystem promotion and knowledge dissemination on national level 3. International promotion	▪ Securing continuous shared situational awareness within the ecosystem. ▪ Promoting the OSME ecosystem trough organized workshops, external communication, event participation, and the website (mexfinland.org). ▪ Identifying and connecting to relevant EU research and development initiatives.

Synocus's OSME WS1 Nurturing collaboration
Links to work streams

Work package

WP1 — Conceptualization
1. Engaging OSME members in the co-creation of the OSME framework
2. Clarifying the OSME framework through both practical and theoretical contributions
3. Validating the results

WP2 — Capability building
1. Capability building on extended enterprise level
2. Supporting capability on individual company level
3. Further developing the capability building tools and frameworks

WP3 — Communication
1. Internal communication through direct interaction with OSME members
2. Ecosystem promotion and knowledge dissemination on national level
3. International promotion
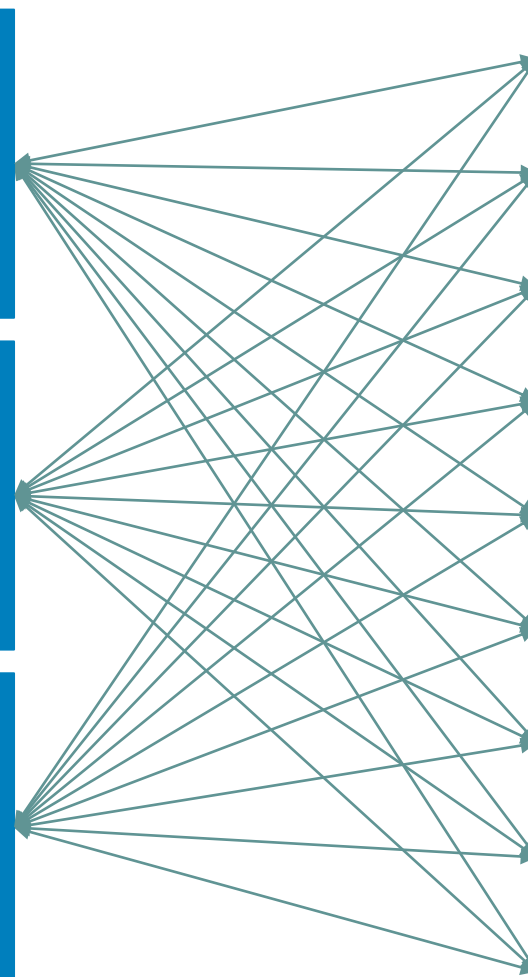
OSME work stream

WS1	Nurturing Collaboration	synocus
WS2	Extended Enterprise	WÄRTSILÄ
WS3	IT Architecture	WÄRTSILÄ
WS4	Sustainable Data Economy	VTT
WS5	Integrated Visibility	ROIMA
WS6	Factory Cockpit	8760 Fastems
WS7	Resilient Collaboration	TASOWHEEL
WS8	Human Centric Operations	PROHOC EMPOWERING PROJECTS
WS9	Supporting the Collaboration	LEINOLAT GROUP

Appendix 1c

Nordic Superblocks as Decarbonization Catalysts

Collaborative urban planning

Seamless cooperation from the outset that includes all stakeholders and authorities

- Analysis and design principles

- Structural design & urban principles

- Principles of Masterplan & Architectural Design

- Detailed local plan & instructions on construction methods

- Block-level plan

- Life cycle operations & improvements

Analysis → decision → Concept → Masterplan → Detailed local plan → Block → Life cycle

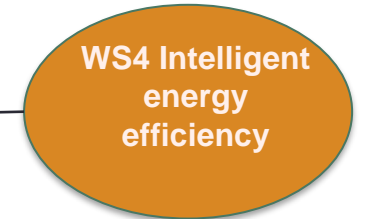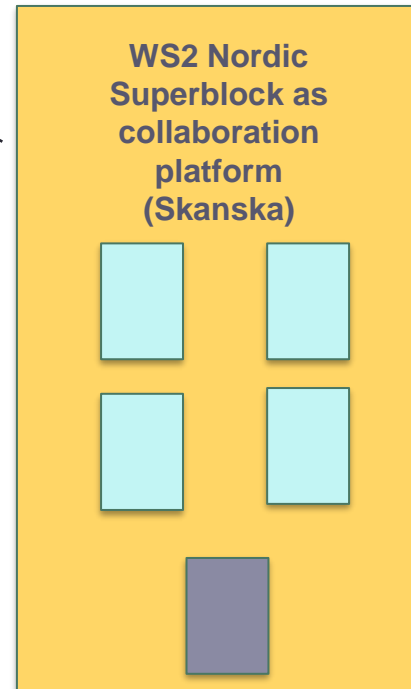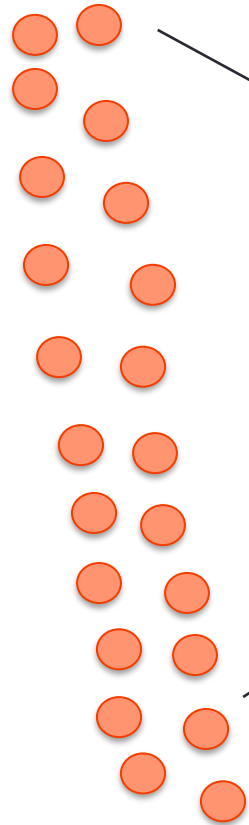# Nordic Superblocks as Decarbonization Catalysts

WS1 Collaboration transformation (Synocus)

City as driver of carbon neutral solutions

Residents to be engaged in co-creation
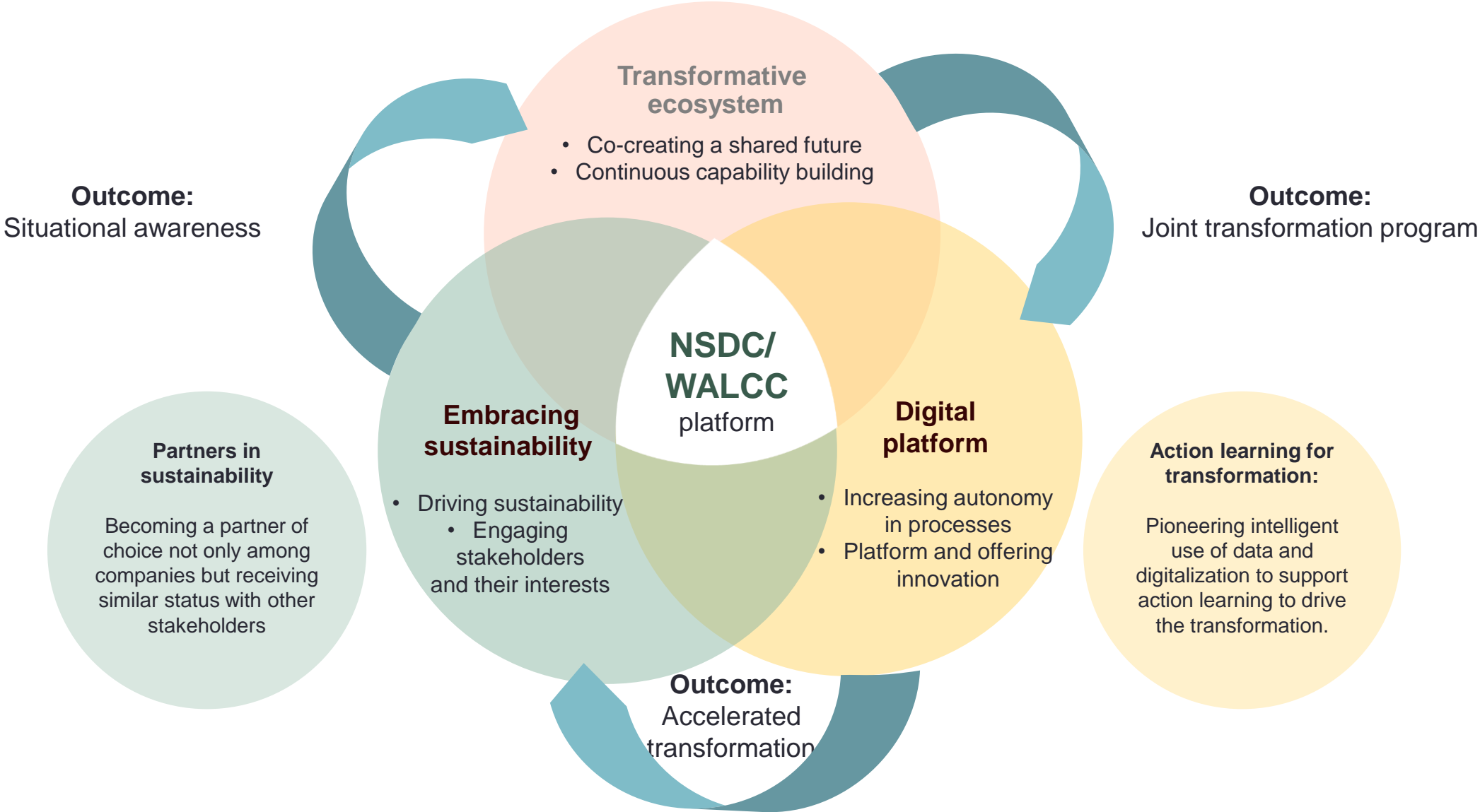
Smart buildings as innovation platforms

Proof-of-concepts for digital solutions enabling zero-carbon buildings and carbon-neutral living

WS2 Nordic Superblock as collaboration platform (Skanska)

WS3 Collaborative digital twins

WS4 Intelligent energy efficiency

WS5 Real estate monitoring

WS6 Resident engagement

WS7 Decarbonization co-creation (TUNI)

NSDC transformative collaboration

Transformative ecosystem
- Co-creating a shared future
- Continuous capability building

NSDC/ WALCC platform

Outcome: Situational awareness

Outcome: Joint transformation program

Partners in sustainability

Becoming a partner of choice not only among companies but receiving similar status with other stakeholders

Embracing sustainability
- Driving sustainability
- Engaging stakeholders and their interests

Digital platform
- Increasing autonomy in processes
- Platform and offering innovation

Action learning for transformation:

Pioneering intelligent use of data and digitalization to support action learning to drive the transformation.

Outcome: Accelerated transformation

Preparing for the WALCC May 2022 Lahti Forum

WALCC
Newsletter
Nov 2021

Towards the 10th WALCC anniversary in Lahti

10th – 11th May 2022

The World Alliance for Low Carbon Cities held its first bi-annual Forum in Europe in Espoo, Finland in 2012. This event provided the foundation for joining private and public interests under the umbrella of the World Alliance for Low Carbon Cities to bring low-carbon development forward on an international basis.

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