4th International Conference on Industry 4.0 and Smart Manufacturing - ISM 2022
Upper Austria University of Applied Sciences - Hagenberg Campus - Linz, Austria
Blended Conference | *2-4 November 2022*

Lessons-learnt on articulating and evaluating I4.0 developments at SME manufacturing companies

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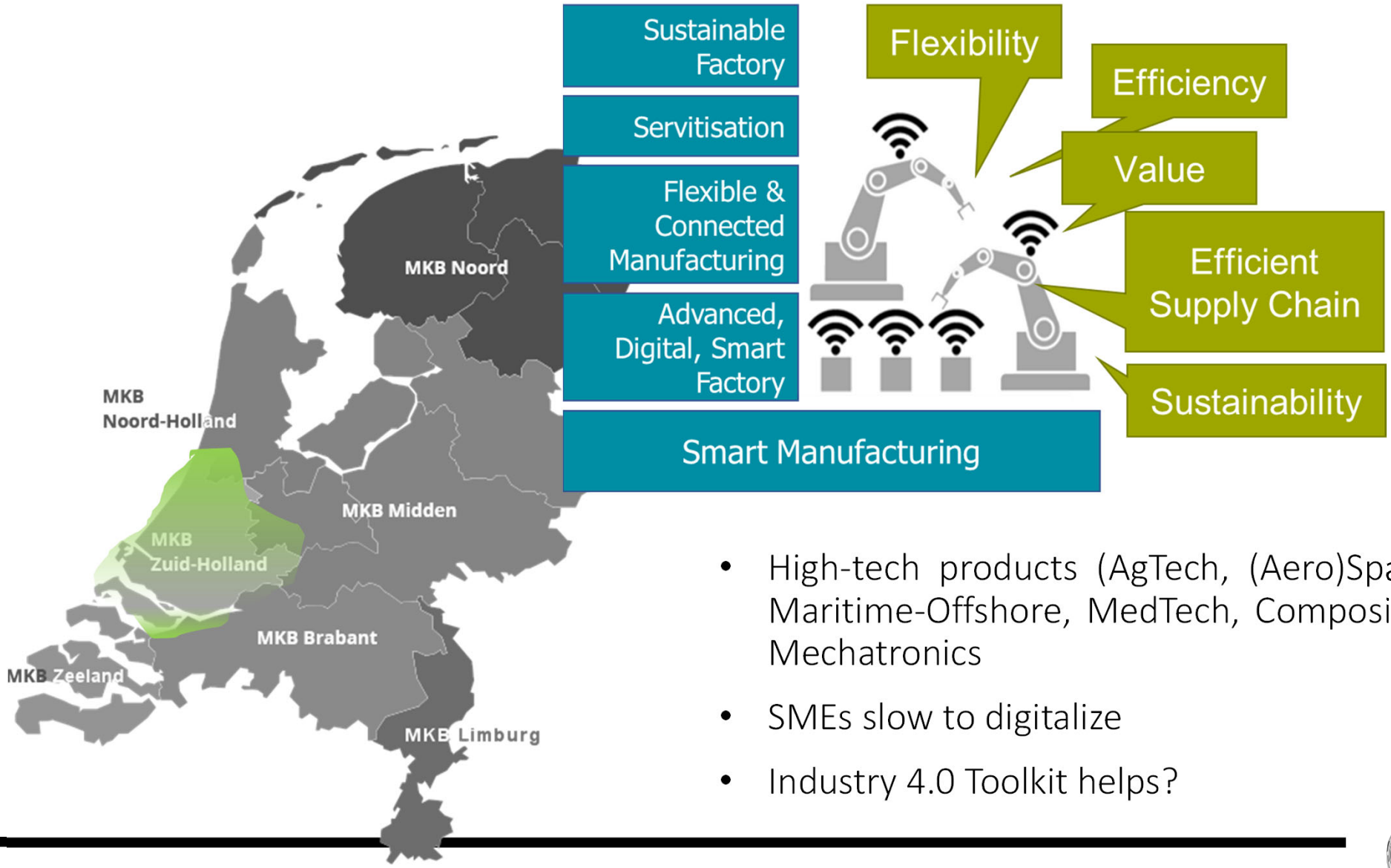
SMEs in South-Holland: Digitally Mature?



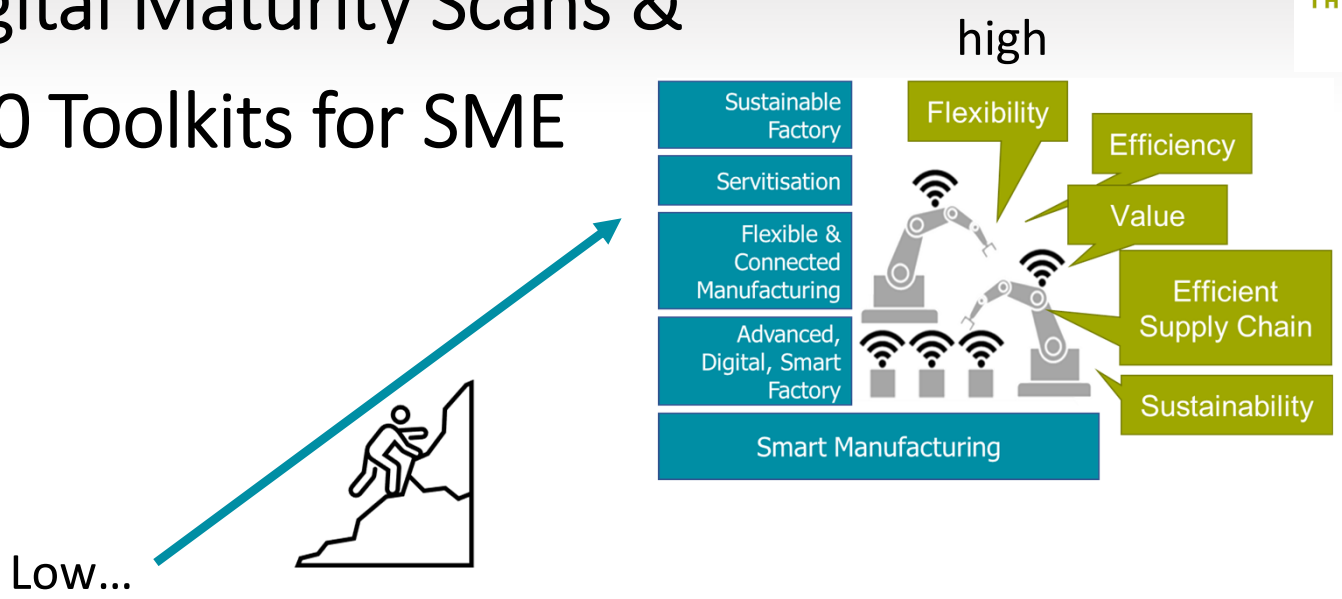
- High-tech products (AgTech, (Aero)Space, Maritime-Offshore, MedTech, Composites, Mechatronics
- SMEs slow to digitalize
- Industry 4.0 Toolkit helps?

Attempt [1] THUAS Scan

Too abstract.
Other needs…

- How to enhance digital maturity?
- What are most relevant transitions & technologies?
- How to develop tools suitable for various SMEs?

Digital Maturity Scans & I4.0 Toolkits for SME



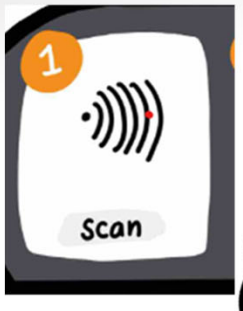
- Many good ‘scans’ exist
- General shortcomings for SMEs:
  - SMEs have low tech readiness & capabilities
  - Maturity Models considered complex, requires understanding I4.0
  - Doesn’t help to overcome first crucial change in mindset
  - Should offer tangible, step-wise suggestions that work in specific setting

Toolkit THUAS

- Looking for & Offering Best-Practices

Toolkit	Advanced Manufacturing	Digital Factory	Smart Working
Operations Manufacturing & Logistics	Tag & Trace	Digital Job cards	Problem & Context oriented display of information for operators
	Manufacturability Mapping & Assessment	Bottleneck identification	Digitized Work Instructions
Scheduling	Simulation	Real-time tracking of internal jobs	Real-time capacity monitoring resources

Scan [based on Akdil]



Problem

1

Status Quo?

Problems Perceived?

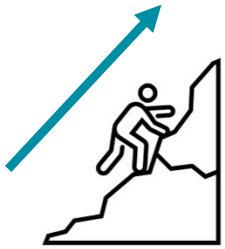
2

Ambitions

Best-Practices on offer? (digitalization, circularity, manufacturability?)

3

Possible Next Step?



Inspiration

PRODUCTION SYSTEM

TRACEABILITY

TRIGGERING

MANUFACTU-RABILITY

DASHBOARD

PRODUCT-CENTREDNESS

COMPUTER INTEGRATED MANUFACTURING

HORIZONTAL INTEGRATION

VERTICAL INTEGRATION

Toolkit

Advanced Manufacturing

Digital Factory

Smart Working

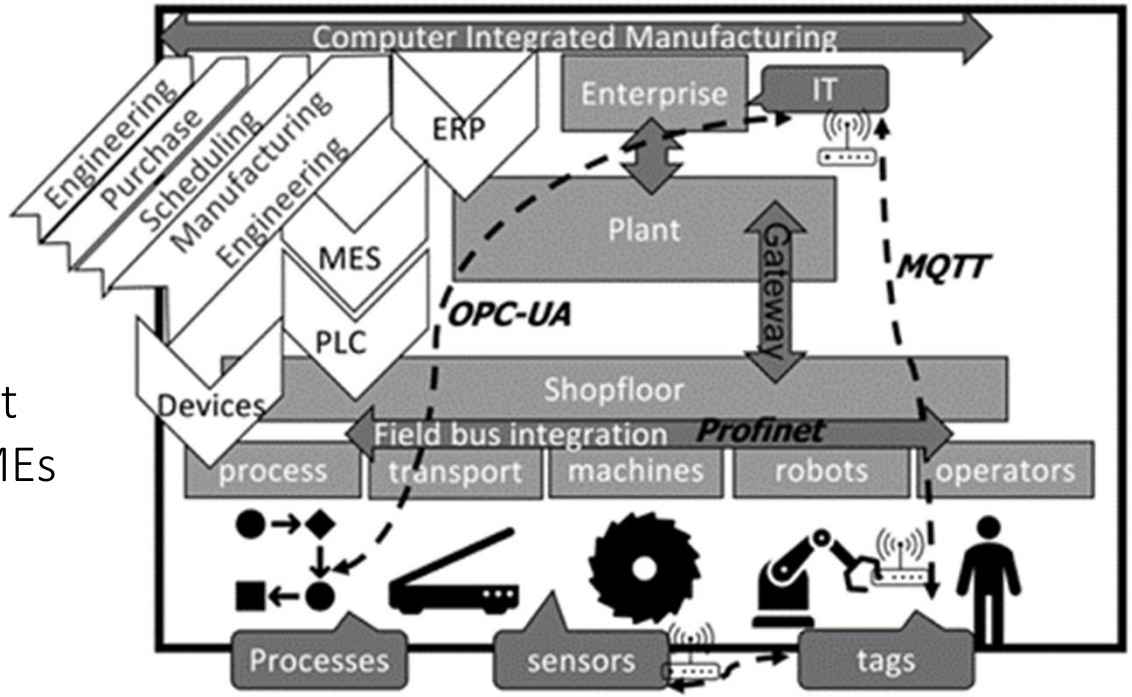
Improved Scan Results: Peer & Toolkit Learning

case	**2: MechTron**	**3: WoodCab**	**4: CareMan**
Company Description	*Metal and mechatronic assembly manufacturer*	*Wood component, assemblies and tiny houses manufacturer*	*Care support product manufacturer*
Vertical Integration	ERP and machines coupled through Microsoft Azure IOT, automatic registration machine data in ERP under development **[2-3]**	Digital architecture is being designed, no storage and product registration, CNC machines gets orders and CAD models via network connection **[1-2]**	Under exploration, no ERP system yet **[0]**
Product-centeredness	All products and tools have unique id, and can be scanned by barcode reader to find its digital specification(s) in ERP **[2-3].**	No product labelling yet, but under investigation. Products are very modular and designs are (partly) reused (CAD library). **[2-3]**	Every product considered as prototype **[0]**
Relevant Solution Area/Tool	Problem and context-oriented display of information for operators (incl schedule, job card, bottlenecks)	Simulation of tools and processes for virtual process planning (bottlenecks). Check Manufacturability.	Real time tracking of internal jobs (location, status); Digitized work instructions, photos and assembly procedures.

Conclusions & Discussion

Contribution:

- Solution areas for relevant I4.0 transitions and enhanced digital maturity for SME companies
- (yet another) Digital maturity scan suitable for students; less complete but more granular, in line with Toolkit
- Active SME Involvement



Limitations

Only few aspects of I4.0 covered yet

Challenges

How to abstract the cases (and toolkit implementations) of individual SMEs into more generally applicable template solutions.

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Thank you!

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