



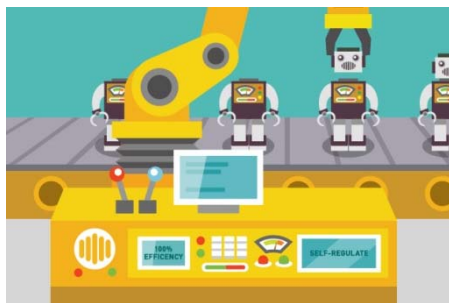
Work 4.0

A Smart Manufacturing Perspective

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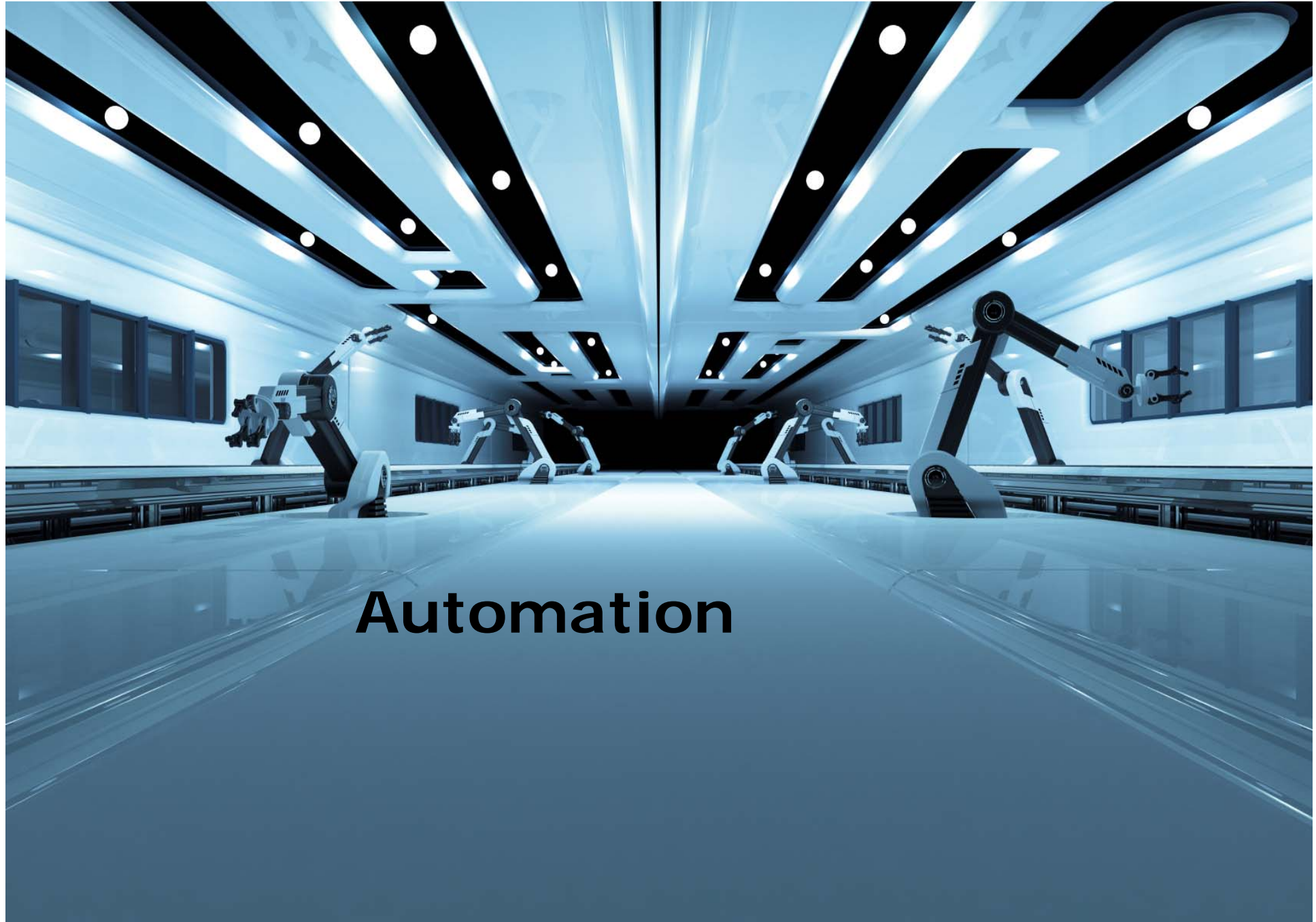


Content

- › Introduction & Scenarios
- › Design of Meaningful Work
- › PhD Project Focus
- › Fokker 4.0
- › Smart manufacturing and Work
- › Conclusion
- › Questions

Introduction & Scenarios

- › Absence of long term experiences with smart manufacturing
- › Research is highly explorative in nature
- › Smart manufacturing will radically reshape organizational processes
- › Lack of empirical insights on implications for the work-force
- › Different scenarios



Automation

Smart human-machine interaction

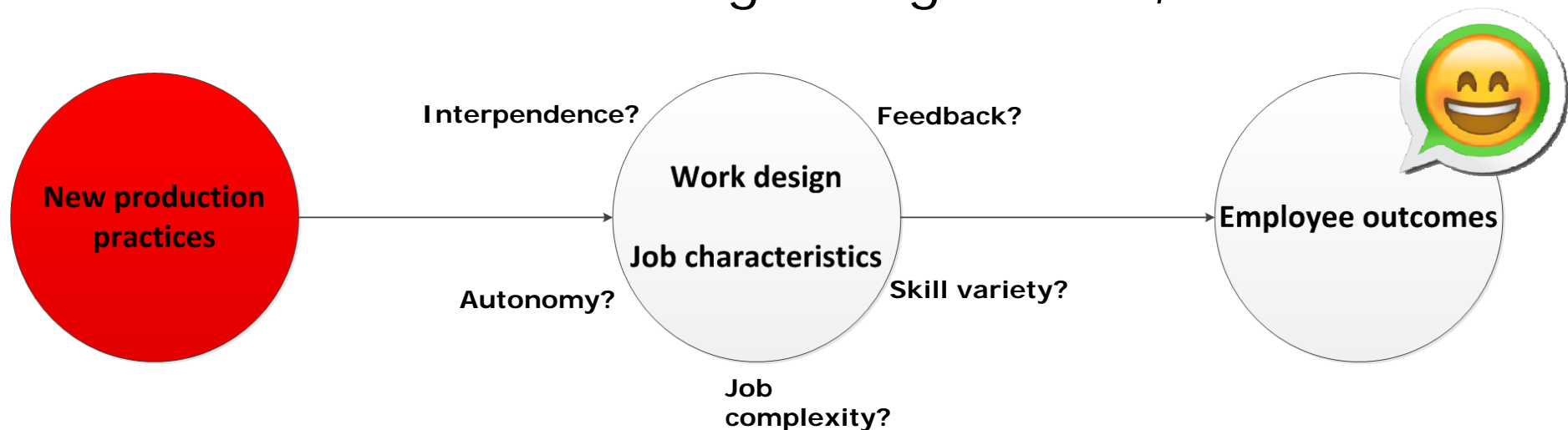


Role Shift: Decision Maker & Engineer



Meaningful Work

- › Technology-centred vs. human-centred design
- › New practices directly impact job characteristics
- › Presence of certain job characteristics to achieve enhanced employee outcomes
- › Success of a particular practice depends on effect on work
- › Smart manufacturing changes work, but how?



PhD Research Focus



-What are the changes?

-What is the structural transformation of job activities and the skill sets needed to perform the job?

-Includes all direct and indirect value-creating activities in operations
-Operative and executive levels to strategic levels of planning, regulation and monitoring and lower management

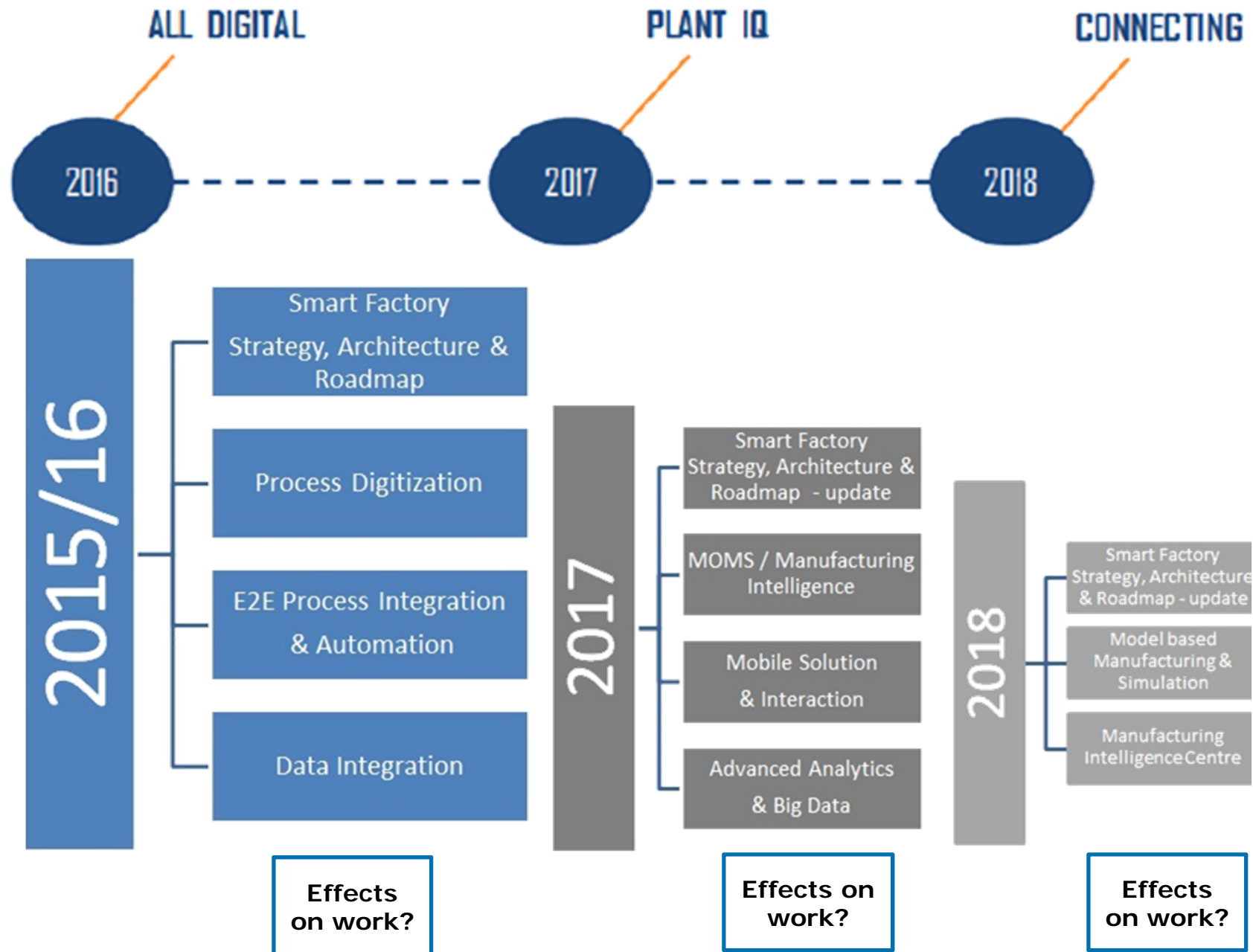
Longitudinal Study at Fokker Aerostructures in Hoogeveen





SAMEN WERKEN AAN INNOVATIE





Smart Manufacturing and Work

- › Characteristics of smart manufacturing
- › Predictions of changes
 - Manufacturing work

Smart Manufacturing Characteristics

- › Transparency
 - Digital technologies
 - Enhanced real-time visibility and control
 - Improved decision support
- › Business integration
 - Inter-departmental integration
- › Manufacturing intelligence
 - Autonomous and intelligent resources

 Effect on manufacturing work?

Effect on Manufacturing Work

- › Automation of routine, physically demanding, lowly skilled jobs
 - Deskilling from operational & execution activities
- › Skill-upgrading and enrichment of work
 - Decentralization of decision making, control and coordination tasks to shop-floor
 - Job complexity with new skill requirements
 - Integral and holistic view on production

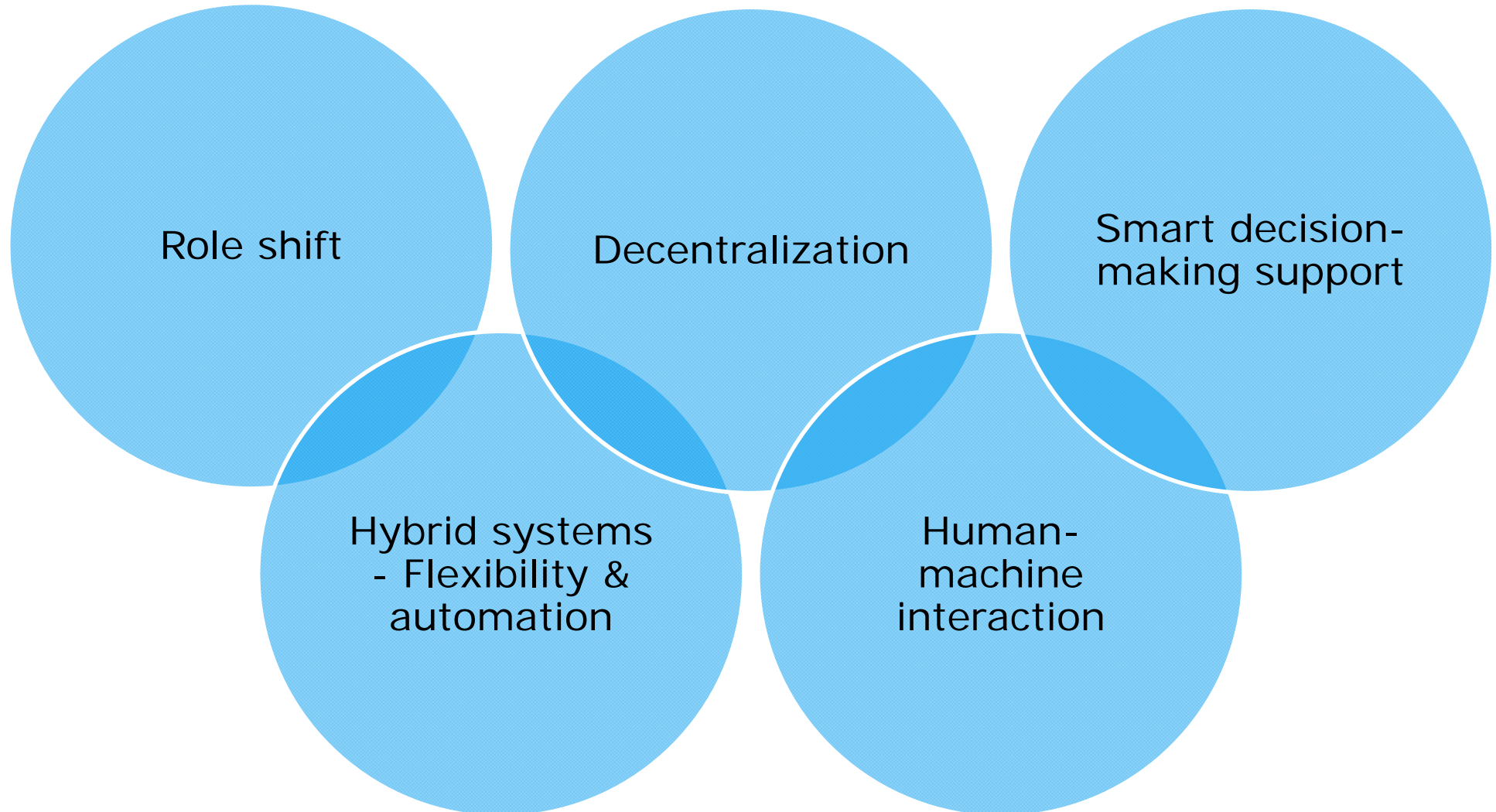
Effect on Manufacturing Work

- › Re-distribution of tasks between operational level and first-line management
- › Integration of tasks e.g. IT with production competencies

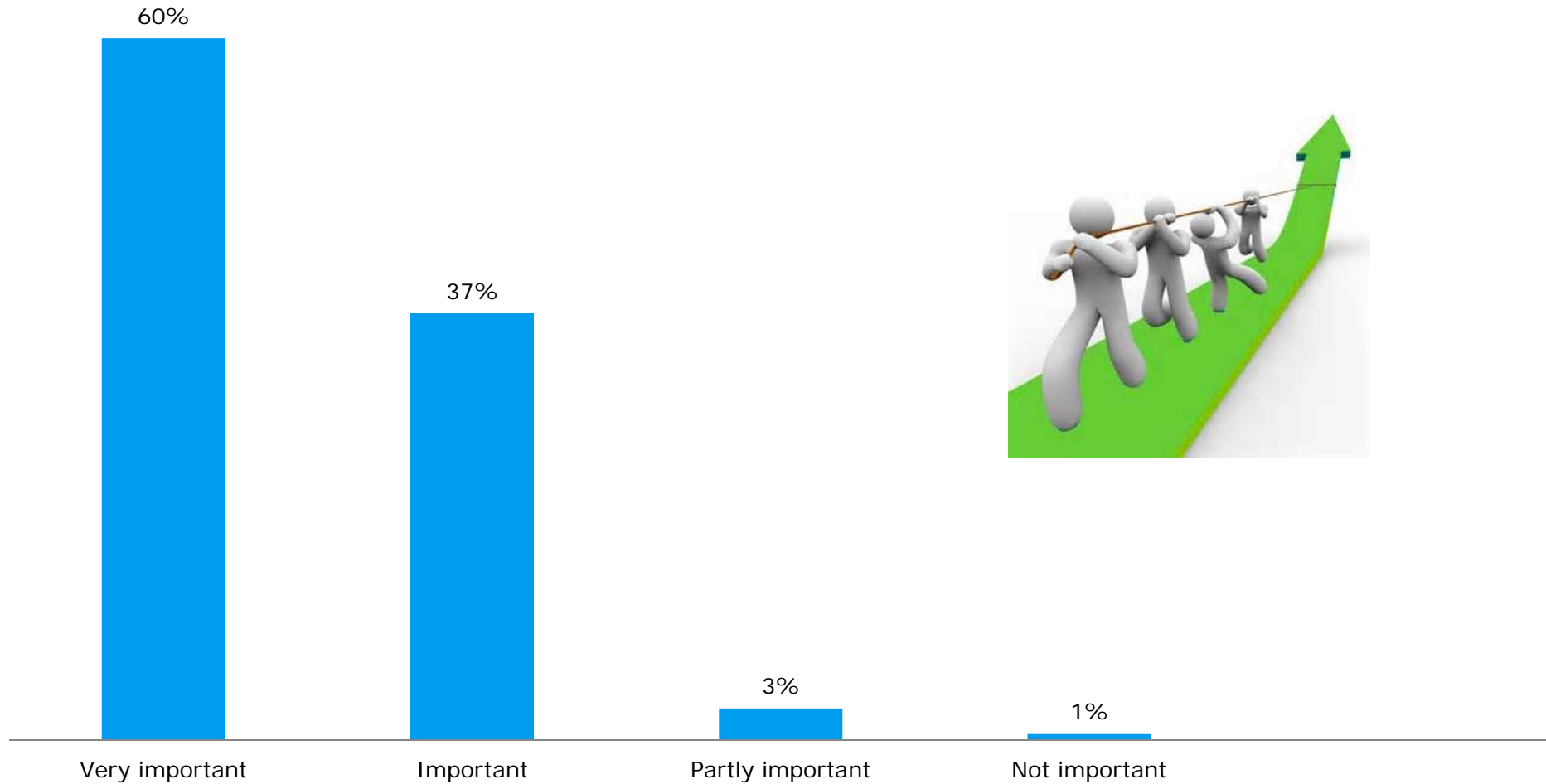
Work Design Perspectives

- › Human remains integral part of production
- › No one-best way of work design in smart manufacturing
- › Wide spectrum of different, diverging work designs
- › Two extreme perspectives: upgrading vs. polarization of qualifications
- › Dependend on system functions and application conditions

Human Work remains Key Factor



How important will human work (planning, coordination, control, execution) be in 5 years for your production?



Spath et al., 2015,
Frauenhofer IAO,

Conclusion

- › SM facilitates changes of work organisation, work content and skill requirements
 - Awareness of organizations
 - Implications for work
- › Human work remains key factor
 - Role shift
 - Redistribution of tasks and skills
- › No one-best way of work design in smart manufacturing
 - Wide spectrum of different, diverging work designs
- › Smart manufacturing design & work organization depend on:
 - Philosophy of work & vision
 - Industry and environmental demands

Questions?



References

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