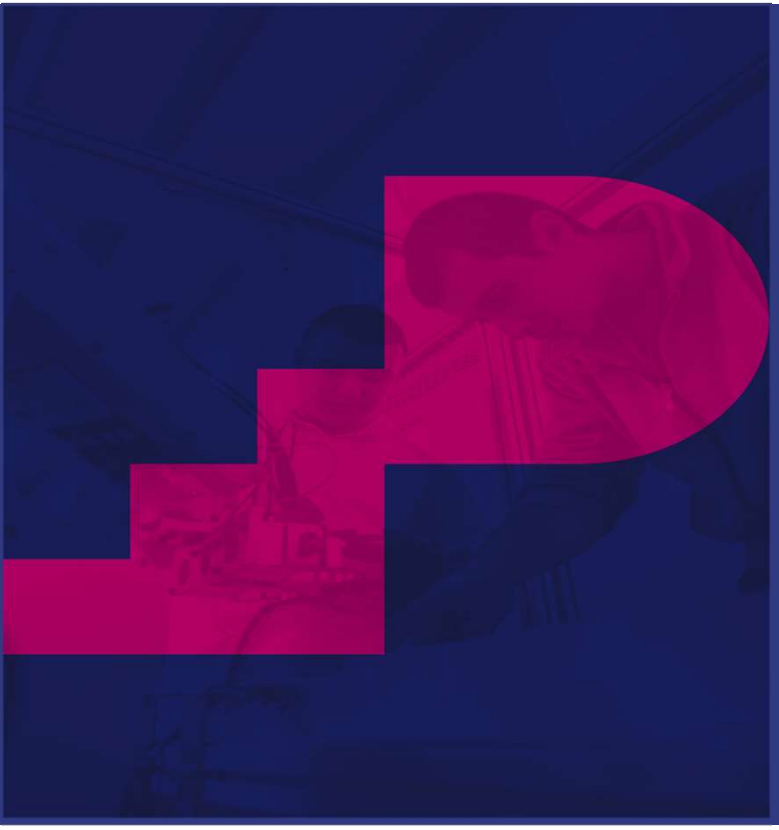
PARADIGMS 4.0

Research Foundation Flanders
Opening new horizons



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SBO Paradigms 4.0

Digitalisation versus organisation: reflections on workplace innovation

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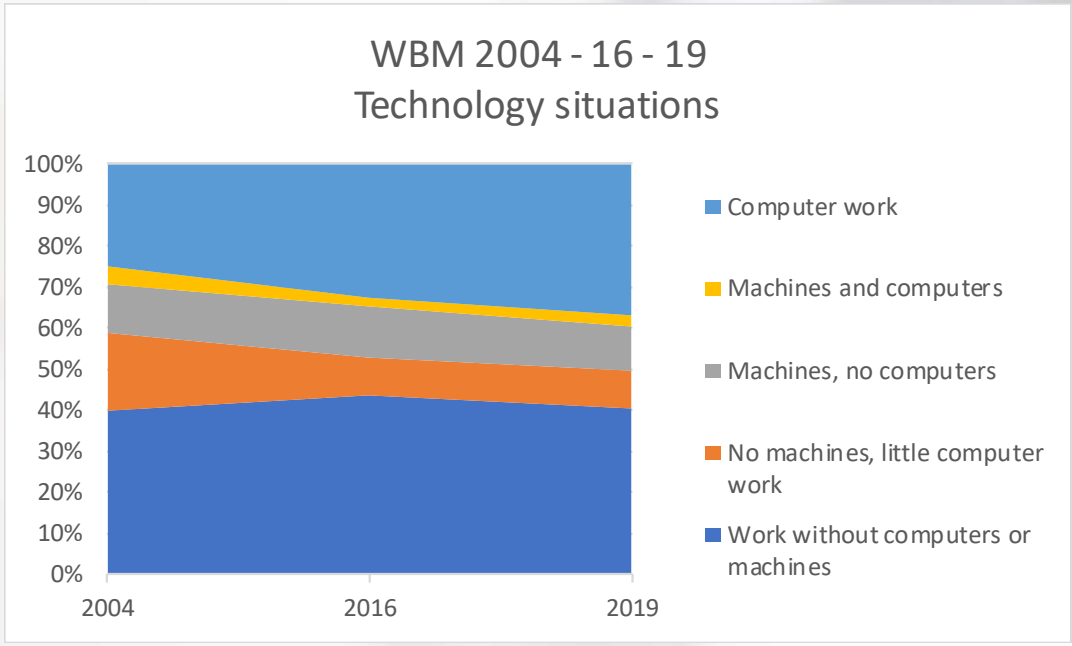
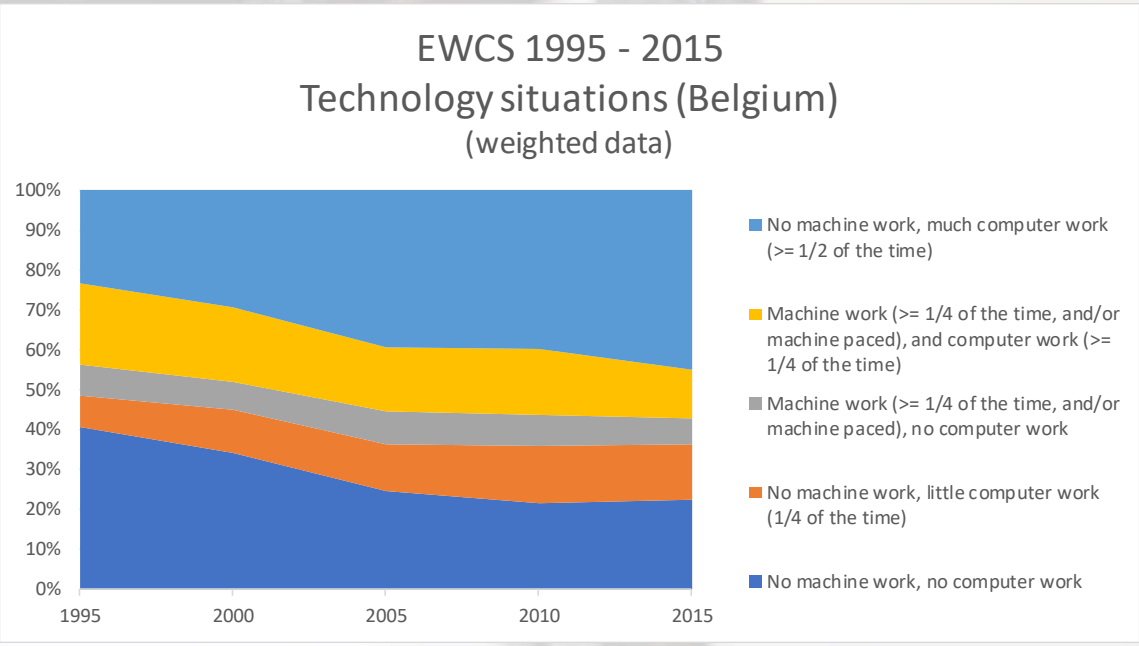
antwerp management school
Powered by the University of Antwerp

KU LEUVEN

TNO innovation for life

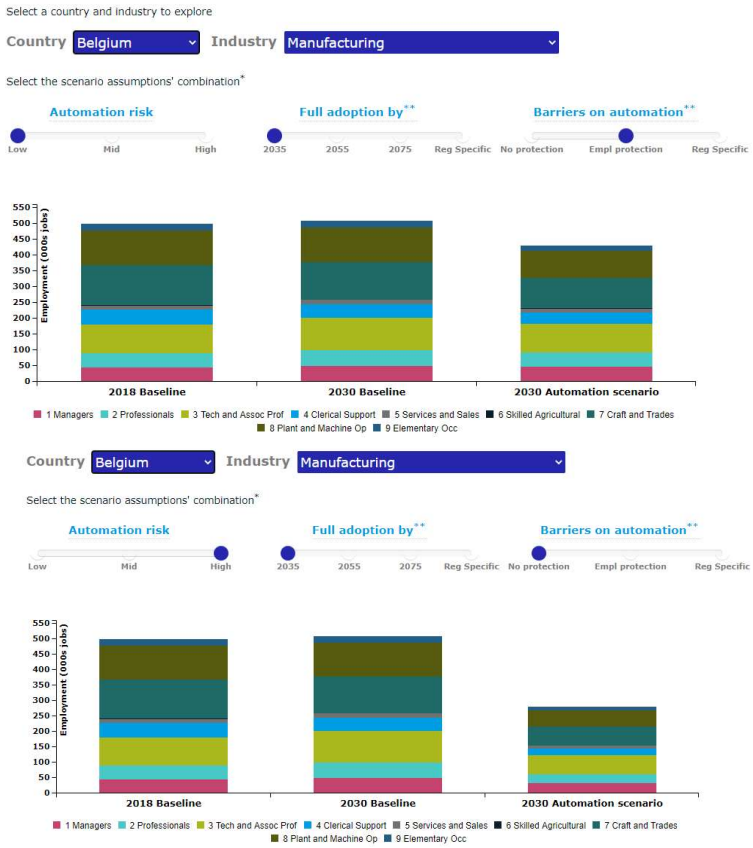
Digitalisation and the individual perspective



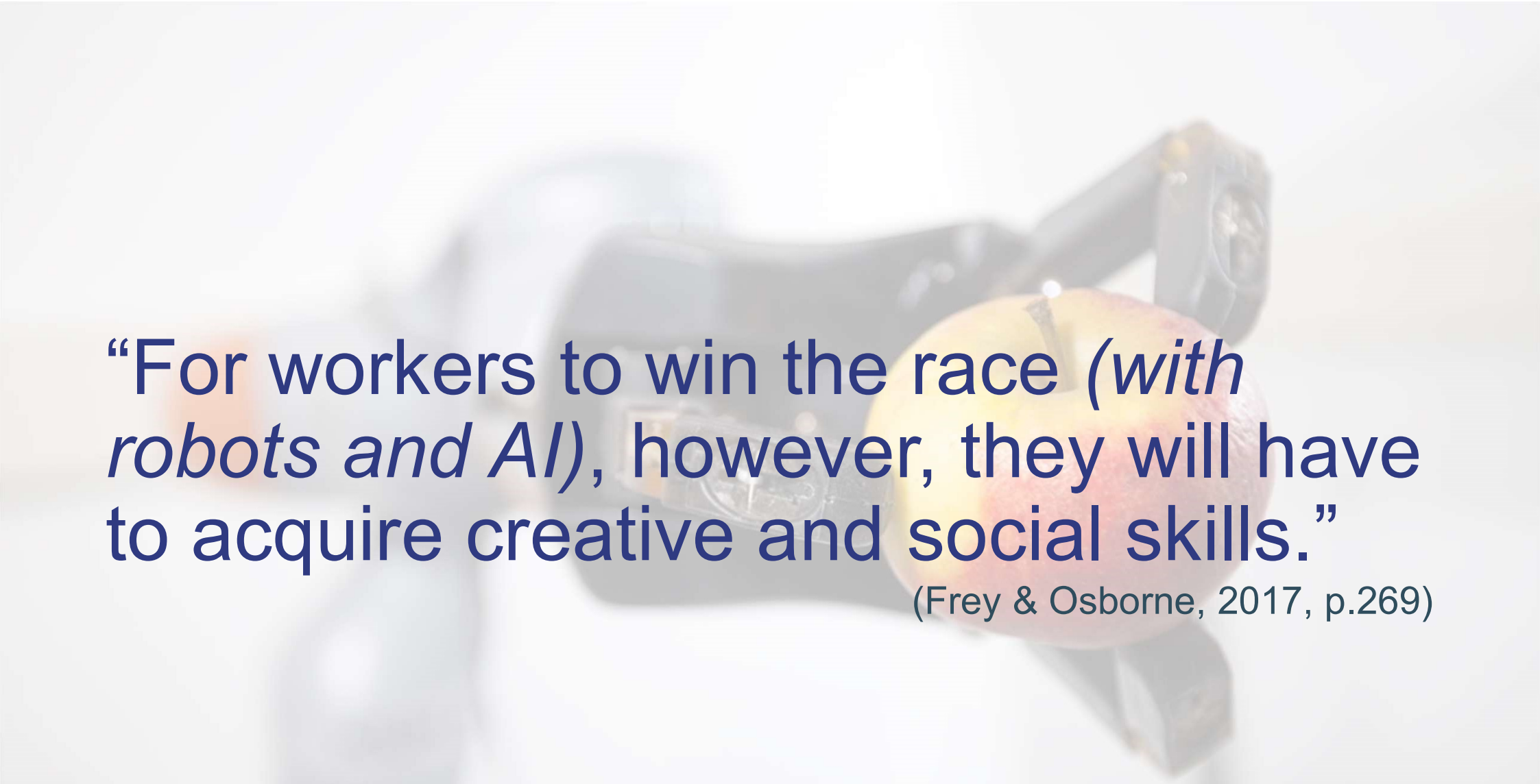


The individual worker and its adaptability

PIAAC NSS IAB



https://www.camecon.com/tools/labour-market-forecasting/



"For workers to win the race *(with robots and AI)*, however, they will have to acquire creative and social skills."

(Frey & Osborne, 2017, p.269)

Will robots take your job?

Source: https://www.bbc.com/news/technology-34066941

(r=-0,09)

Testing the predictive power of Frey & Osborne methodology - 1

To summarize:

Expert judgement of automation risks (1/0; 80 job categories)

↓

'Machine learning' approach (training/test data) (Arntz et al., 2016)
- Set of tasks related to automation probability (Nedelkoska et al., 2018)
- Development in training set
- Confirmation in test data (AUC)

↓

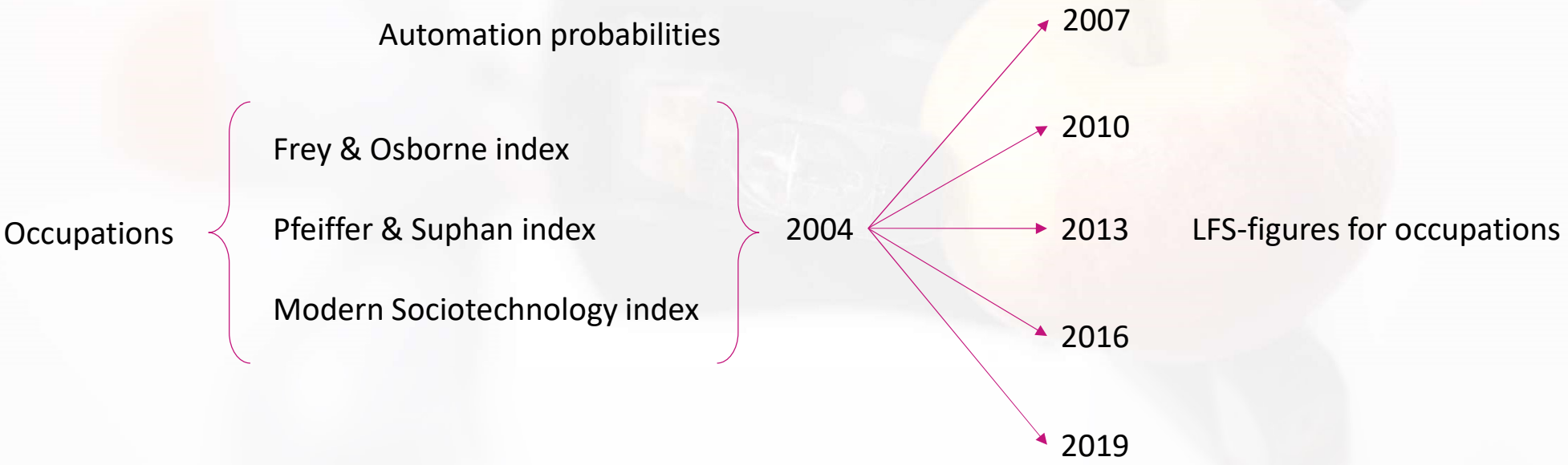
Estimation of automation probability at occupation level

↓

Estimation of conditions that influence change (Heald et al., 2020)

Testing the predictive power of Frey & Osborne methodology - 2

"if F&O can forecast the future from current survey result, then we can forecast the future going to past survey results"



(Dhondt, Eekhout, Kraan, 2021; *in preparation*)

Testing the predictive power of Frey & Osborne methodology - 2

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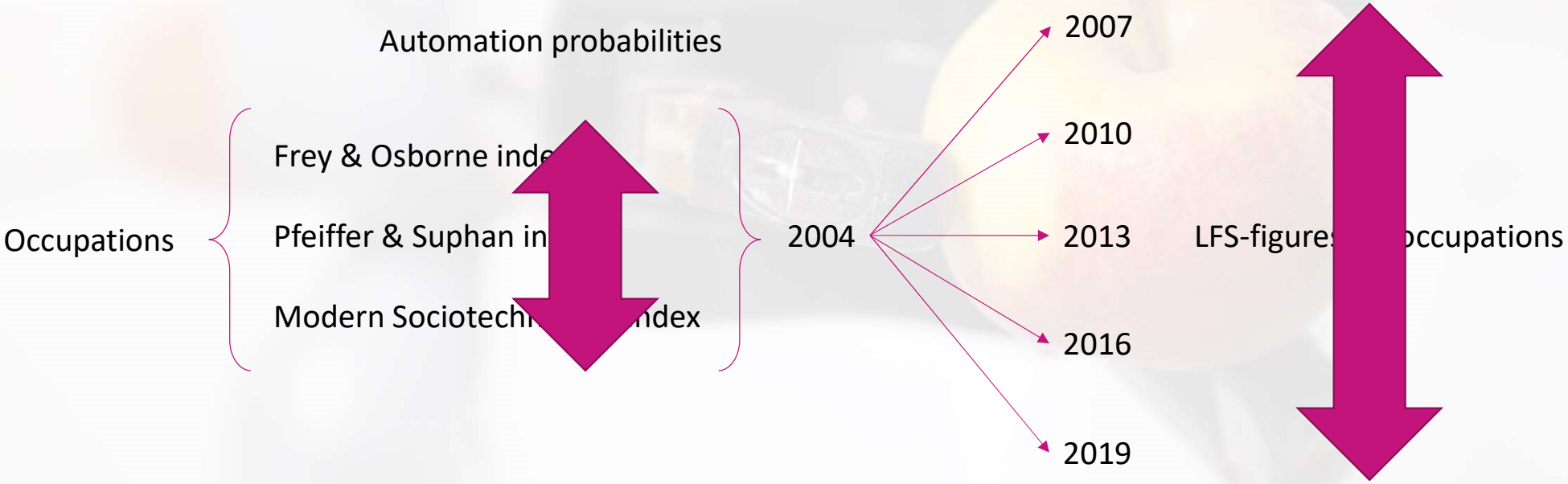


Testing the predictive power of Frey & Osborne methodology - 3

Comparison of estimates for impact on LFS-size of occupations in 2019 (proportions)

	FOI			LCI			MST-SCORE		
	Estimate	R^2	R^2delta	Estimate	R^2	R^2delta	Estimate	R^2	R^2delta
2004-19	-0.130 (n.s.)	11.8%	1.6%	0.287 (n.s.)	11.9%	1.7%	-0.129 (n.s.)	14.8%	4.6%
2007-19	0.127 (n.s.)	11.3%	4.5%	-0.128 (n.s.)	12.7%	5.9%	-0.435	21.5%	14.7%
2010-19	0.627 (n.s.)	21.6%	17.1%	-0.403 (n.s)	21.2%	16.6%	-0.682	40.1%	35.5%
2013-19	-0.611**	50.7%	21.6%	0.515*	54.3%	25.3%	0.408**	44.9%	15.9%
2016-19	-0.164 (n.s.)	32.4%	1.4%	0.149 (n.s.)	32.4%	1.3%	0.002	34.7%	3.7%

*: p<0.05; **: p<0.10; n.s.= not significant
Estimate : of coefficient of change in change 2019

(Dhondt, Eekhout, Kraan, 2021; *in preparation*)

We need to see the division of tasks in relation to organisational positions

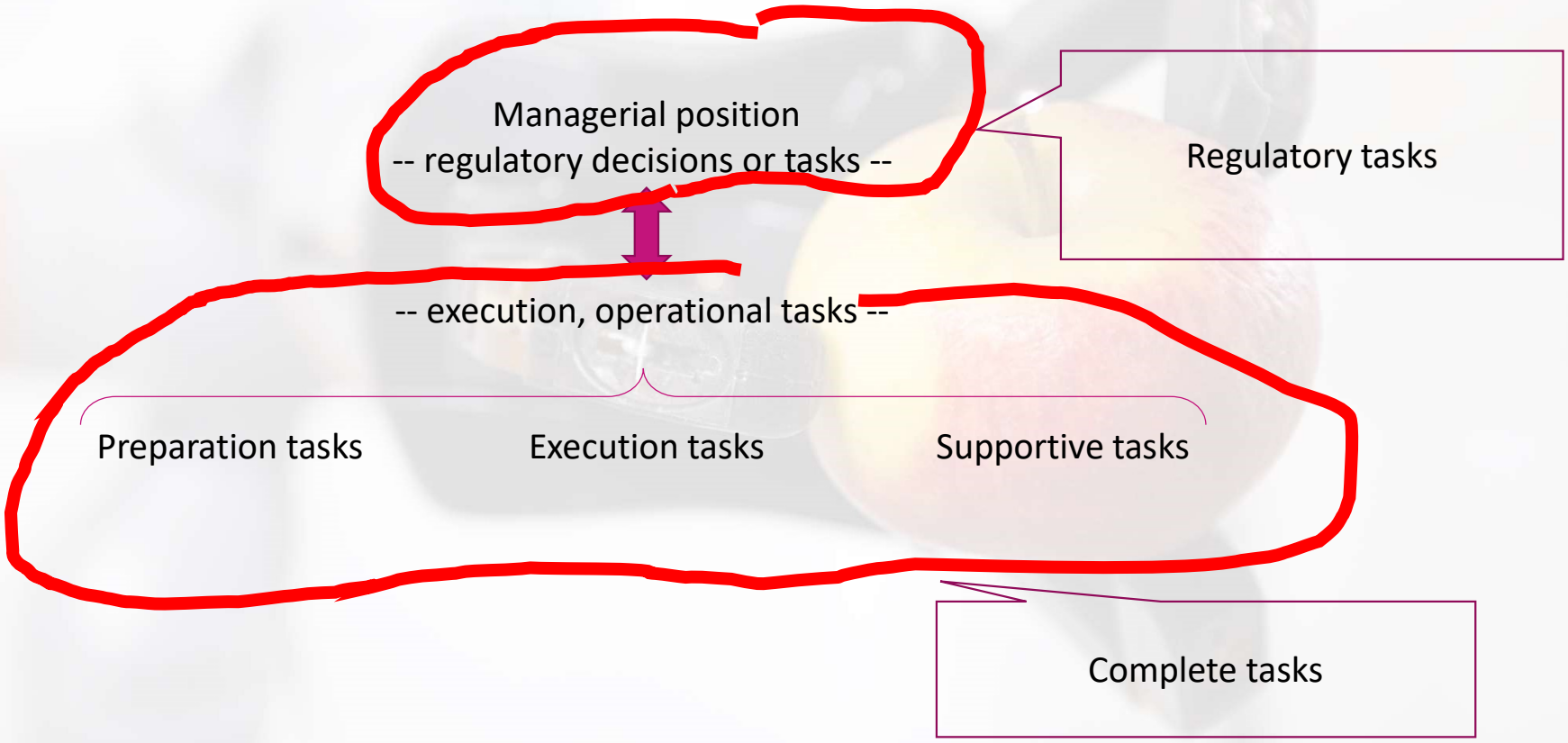
Managerial position
-- regulatory decisions or tasks --

- Production manager and director in manufacturing
- Functional manager or director
- Financial managers and directors

-- execution, operational tasks --

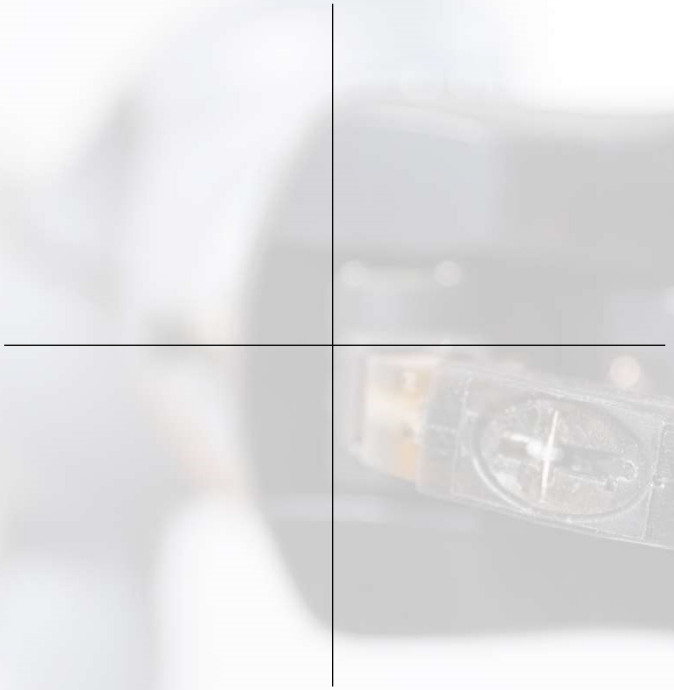
Preparation tasks	Execution tasks	Supportive tasks
Engineering technician	Metal machining setters and setter operators Metal working machine operatives Plant and machine operative (other) Process plant workers (other) Sheet metal worker Skilled trader Storage workers	Bookkeeper, payroll manager, wages clerks Quality assurance technicians Transport and distribution clerk

We need to see the division of tasks in relation to organisational positions



Measuring tasks divisions

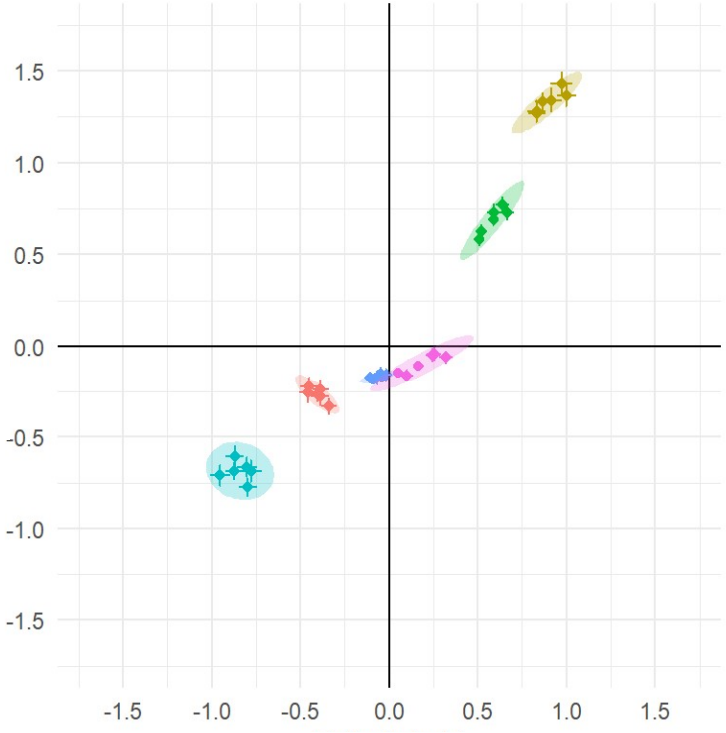
Regulation tasks (-1,5 = low degree of control tasks)



Complete jobs (-1,5 = high degree of operational tasks, low degree of support and preparation tasks

Task divisions remain stable over time

Regulation tasks (-1,5 = low degree of control tasks)



Occupational category

- Schooled worker, technician
- Management or director
- Middle management or professional
- Unschooled or halfschooled worker
- White collar employee
- Care or educational jobs

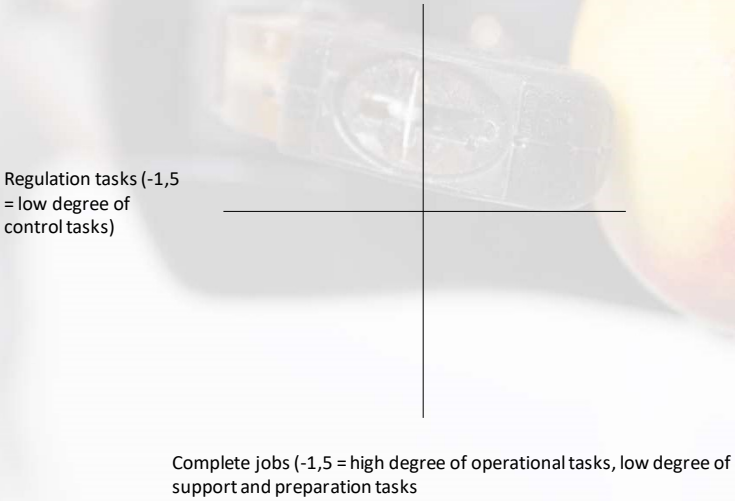
Complete jobs (-1,5 = high degree of operational tasks, low degree of support and preparation tasks

(WBM 2004-2019; 95% CI)

(Dhondt, Eekhout, Kraan, 2021; *in preparation*)

Does organisational context matter …

- How to check in surveys of individuals if changes in one occupational group is related to changes in other?



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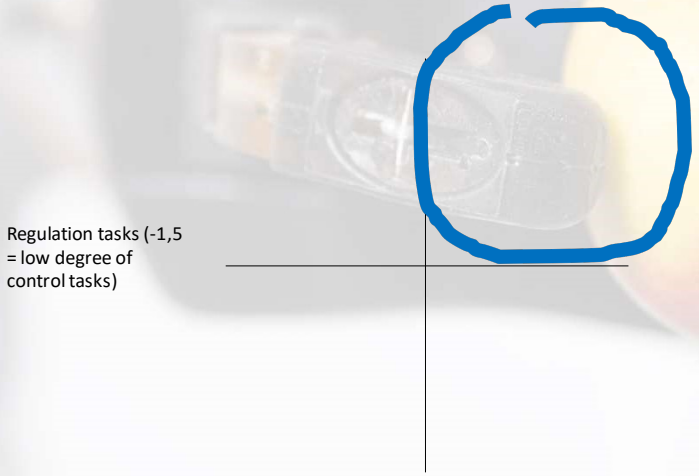

COMPLETE + REGULATION
Schooled worker, technician
Management or director
Middle management or professional
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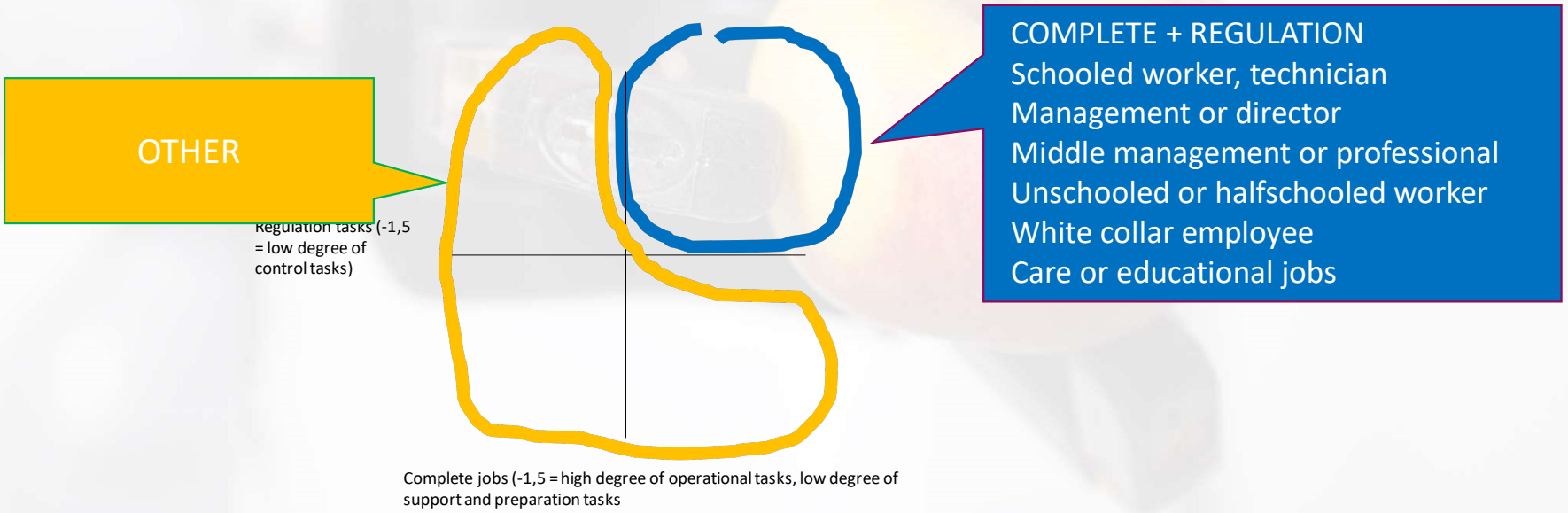
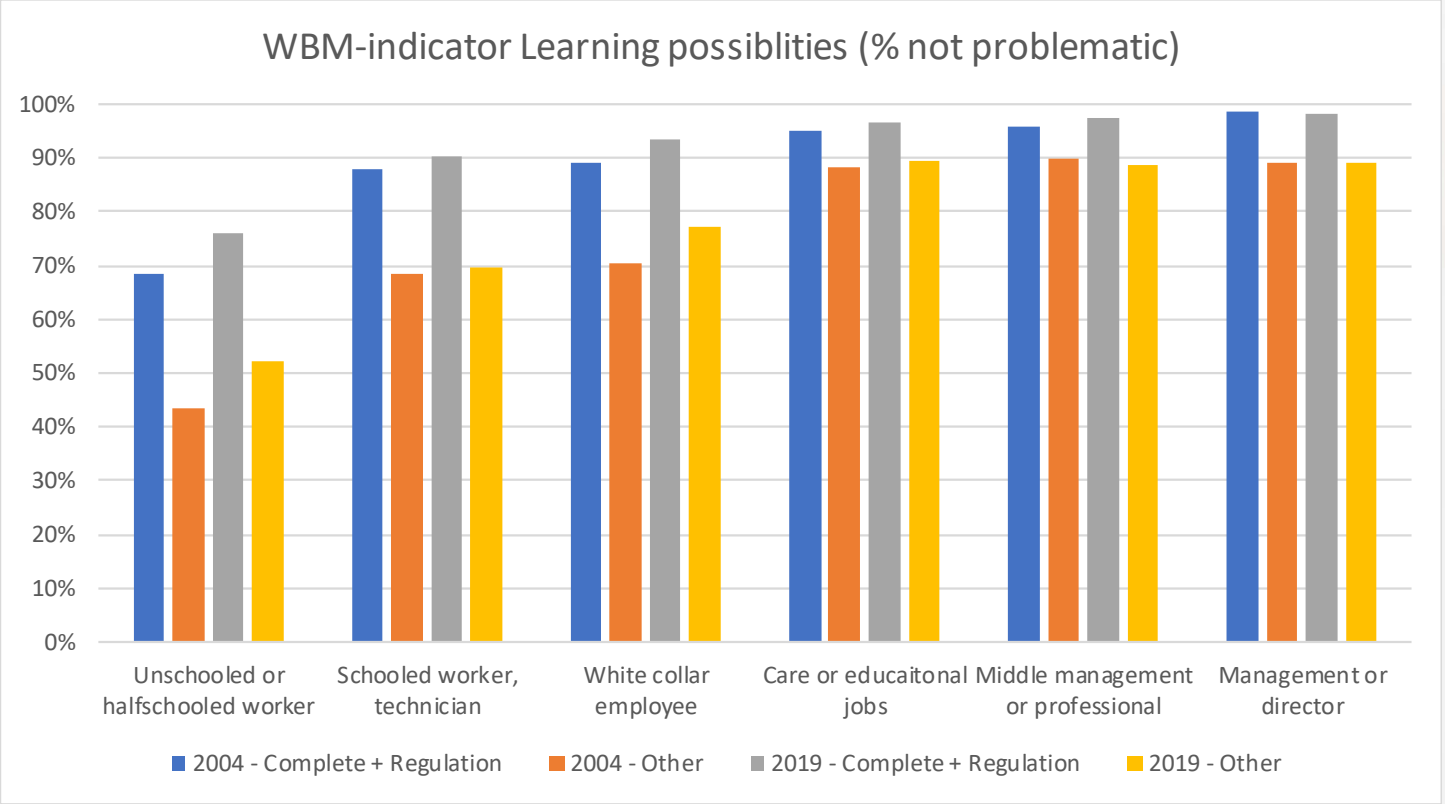


… for learning possibilities?



Note. Percentages are are tested with the Pearson χ^2-test (horizontal comparisons). All differences are significant ($p<0,05$; two-tailed), and Cohen's d is at least 0,20. Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale NJ: Erlbaum.

Does organisational context matter …

- We cannot check if changes at the different ‘organisational positions’ are related …
  - … for this we need connected employer-employee surveys and/or panel surveys.

… for skills use?

Results from a case-cross-over experiment: changing work environment, impact on skills

Workers change work organisation over time

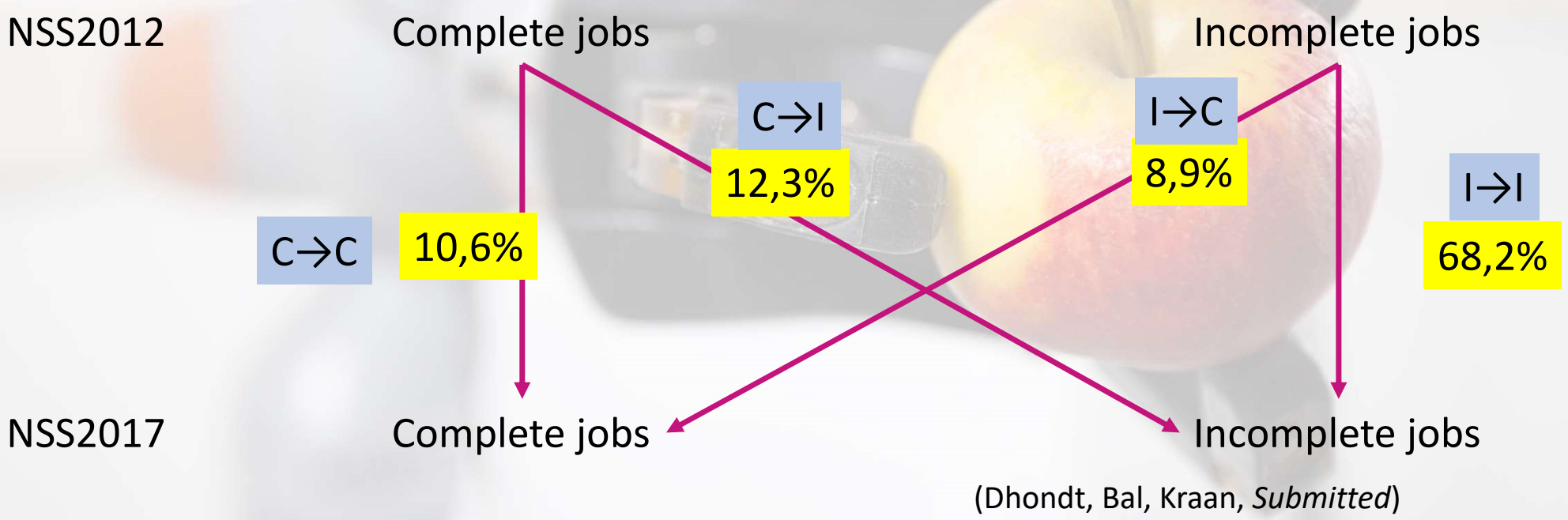
NSS2012 Complete jobs Incomplete jobs

(Dhondt, Bal, Kraan, *Submitted*)

… for skills use?

Results from a case-cross-over experiment: changing work environment, impact on skills

Workers change work organisation over time



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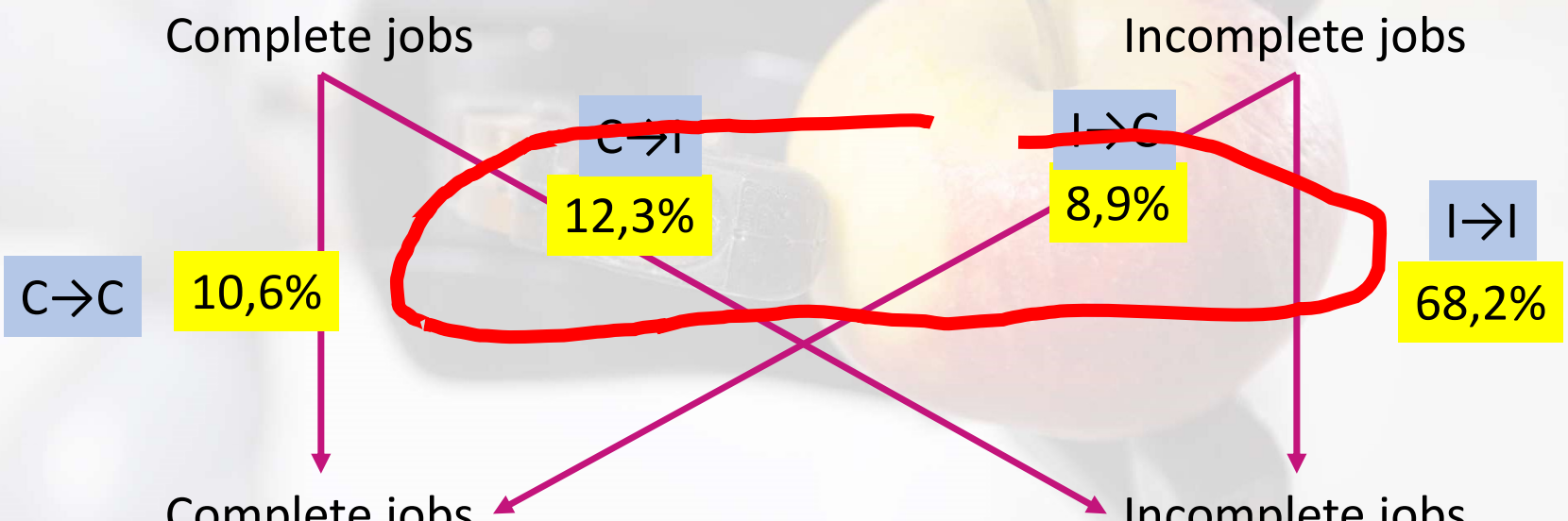

(Dhondt, Bal, Kraan, *Submitted*)

… for skills use?

	Complete 2012	Incomplete 2017	Incomplete 2012	Complete 2017
Communicative skills	High →	Low	Low →	High
Social skills	High →	Low	Low →	High
ICT and STEM	High →	Low	Low →	High

… meaning, for evaluation of work situation and for skill changes and development it is important to work in the right organisational context

(Dhondt, Bal, Kraan, *Submitted*)

To conclude …
… organisational design trumps technology

- Stress on social, creative and emotional skills as solution for the digital revolution misses the point
- Organisational contexts are very stable, with ‘traditional models’ still dominant
  - … hiding workplace innovation-models
- Workplace innovation has positive impacts
  - … on evaluation of work impacts
  - … and for skills use
- Impact technology dependent on organisational context.

This research is supported by FWO grant S006018N