

Session 3: The future of manufacturing and global value chains: Is the trend towards reshoring fiction or reality?

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Background

- The globalization of trade has among others resulted in processes with relocation of manufacturing
- The first waves have been outsourcing and offshoring of manufacturing to low cost countries in Asia and Western Europe
- The second waves is concerned with insourcing, backshoring and reshoring
- As relocation issues is a dynamic phenomenon the term rightshoring is appropriate to denote the right balance of manufacturing offshore and backshore
- Recent research has focused on the movement of manufacturing back to Western companies using automation and other Industry 4.0 technologies

Research gap

- Extant literature has demanded more research on offshoring and reshoring issues in the light of robotization, digitalization and automation (Brennan et al., 2015; Stentoft et al., 2016b; Tate and Bals, 2017)
- from various perspectives such as firm size (Arlbjørn and Mikkelsen, 2014; Stentoft et al, 2015; Tate, 2014)
- and technological intensity of industries (Forestl et al., 2016).

Industry 4.0 in Danish Industry

An empirical investigation of the degree of knowledge, perceived relevance and current practice

June 2017

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Recent research

Investigation of Danish manufacturers in 2013

- Contacted 3.572 manufacturers; 843 respondents; 23,7% have outsourced manufacturing during the last 5 years; 27% indicate that movement back can take place; 9 % have offshored; 2 % have backshored

Investigation of Danish manufacturers in 2015

- Contacted 2.026 Danish manufacturers; 245 respondents; 40% have moved manufacturing abroad; 14,7% have moved manufacturing back (a total of 847 responses including similar research in Sweden and Finland out of a total of 4,601 plants)

Investigation of Danish manufacturers in 2017

- Contacted Danish 1.580 manufacturers; 270 respondents; 18,9% have moved manufacturing abroad; 12,9% have moved manufacturing back

Investigation of Danish SME manufacturers in 2018

- Contacted 2.632 manufacturers; 305 respondents; 11% have moved manufacturing abroad; 9% have moved manufacturing back

Recent results

- Nordic data (Denmark, Sweden and Finland) from 2015 finds support for that companies that bring manufacturing back from abroad invest more in new manufacturing technologies
- Companies that move manufacturing abroad invest lesser in new manufacturing technologies
- There is not any significant relationship between the investment of new technology and a strategy that is based in staying at home in Denmark (this group is dominated by companies having a single plant)

Recent research dissemination

Stentoft, J., Mikkelsen, O.S., Jensen, J.K & Rajkumar, C. (2018), "Performance outcomes of offshoring, backshoring and staying at home manufacturing", *International Journal of Production Economics*, Vol. 199, pp, 199-208.

Heikillä, J., Nenonen, S., Olhager, J. & Stentoft, J. (201X), "Manufacturing relocation abroad and back: empirical evidence from the Nordic countries", accepted for publication in *World Review of Intermodal Transportation Research*

Stentoft, J., Rajkumar, C. & Madsen, E.S. (2017), *Industry 4.0 in Danish Industry*, Department of Entrepreneurship and Relationship Management, University of Southern Denmark.

Stentoft, J., Olhager, J., Heikkilä, J. & Thoms, L. (2016), "Manufacturing backshoring: a systematic literature review", *Operations Management Research*, Vol. 9 No. 3-4, pp. 53-61.

Stentoft, J. Mikkelsen, O.S. & Jensen, J.K. (2016), "Offshoring and backshoring manufacturing from a supply chain innovation perspective", *Supply Chain Forum: An International Journal*, Vol. 17 No. 4, pp. 190-204.

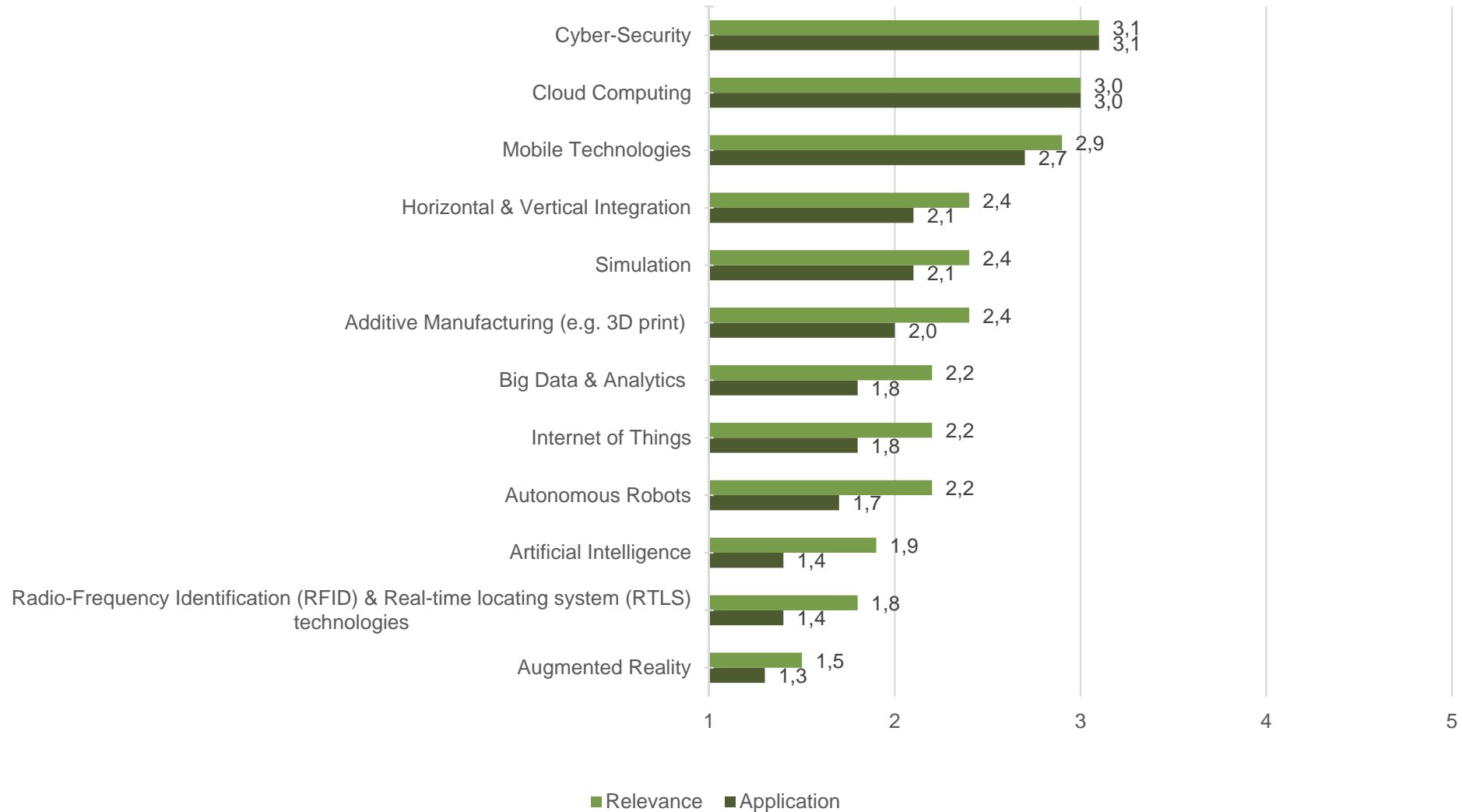
Barbieri, P. & Stentoft, J. (2016), "Reshoring: a supply chain innovation perspective", *Operations Management Research*, Vol. 9 No. 3-4, pp. 49-52

Stentoft, Mikkelsen, O.S. & Jensen, J.K.(2016), "Flexicurity and relocation of manufacturing", *Operations Management Research*, Vol. 9 No. 3-4, pp. 133-144.

Stentoft, J., Mikkelsen, O.S. & Johnsen, T. (2015), "Going local: a trend towards insourcing of production?", *Supply Chain Forum: An International Journal*, Vol. 16 No. 1, pp. 2-13.

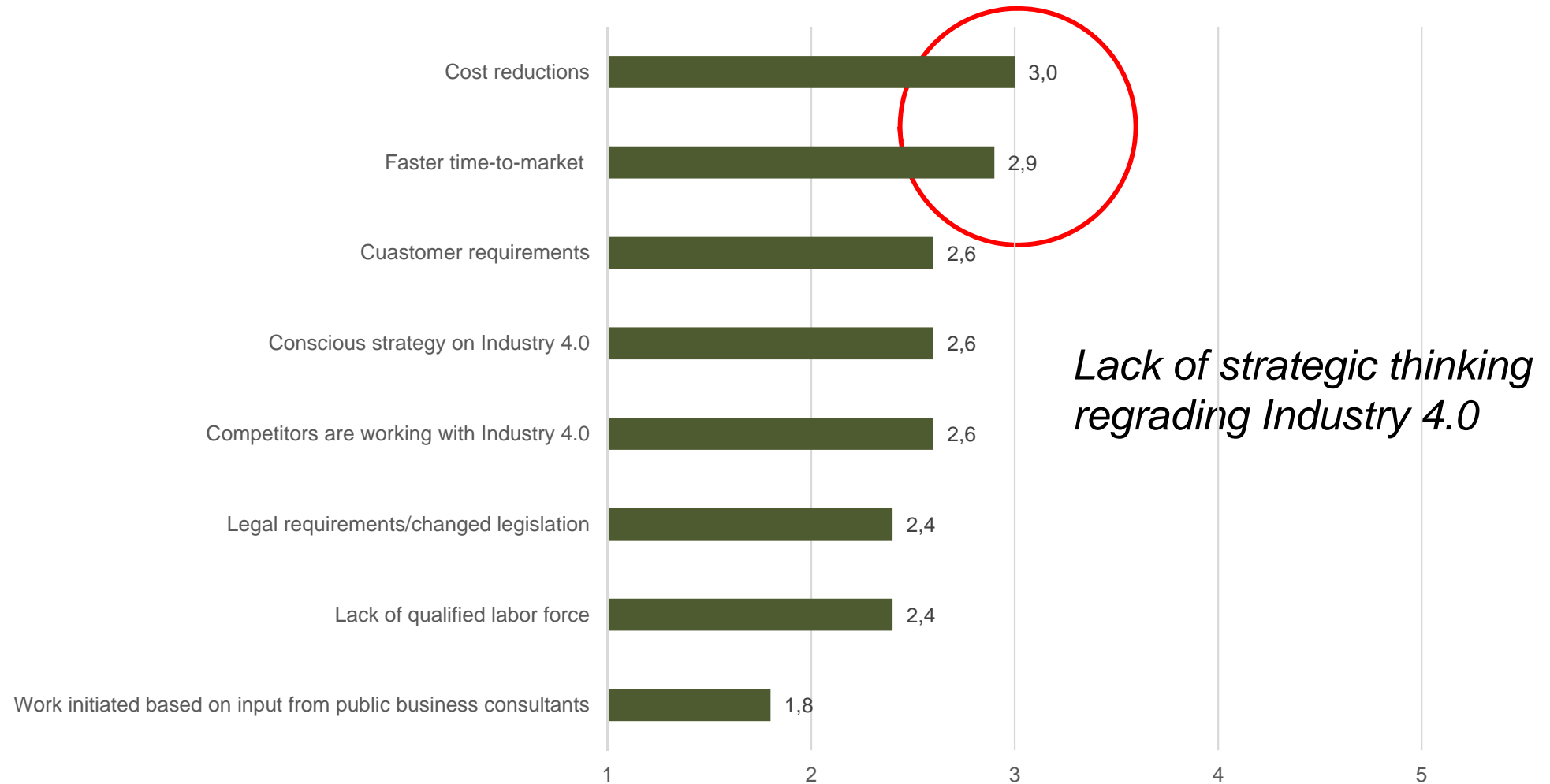
Arlbjørn, J.S. & Mikkelsen, O.S. (2014), "Backshoring manufacturing: notes on an important but under-researched theme", *Journal of Purchasing & Supply Management*, Vol. 20 No. 1, pp. 60-62.

Relevance and application



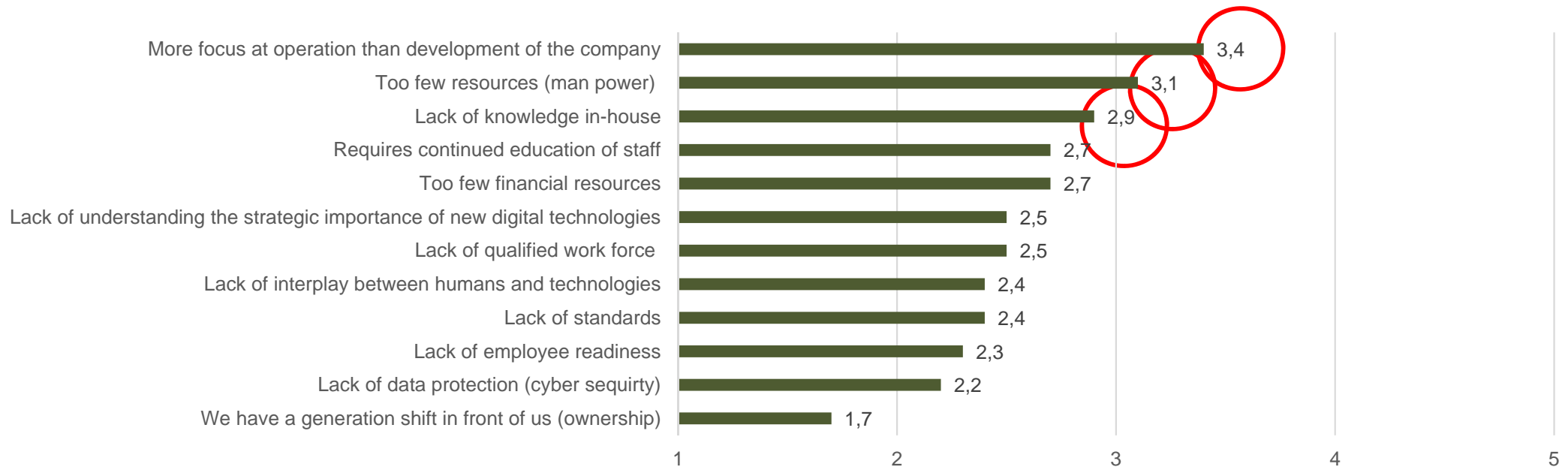
Source: Stentoft et al. (2018)

Driving forces



Source: Stentoft et al. (2018)

Barriers



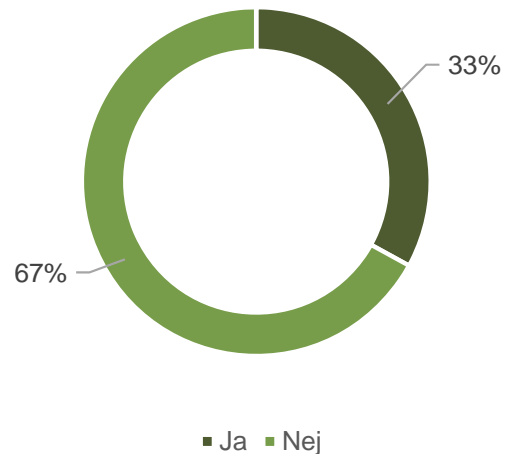
More focus on operation than development; too few resources; lack of knowledge

Lack of "hunger" is a major barrier for innovation.

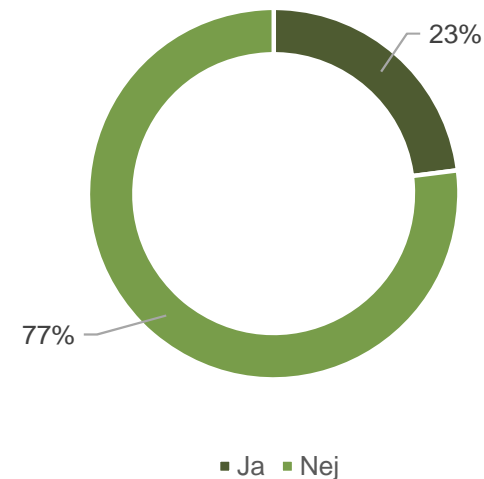
Source: Stentoft et al. (2018)

Public funding supporting adoption of new technologies

Do you know of public funding programs that supports companies' exploitation of digital technologies?



Are you utilizing public programs that supports the exploitation of digital technologies?



Kilde. Stentoft et al. (2018)

Industry 4.0 readiness



The larger the company, measured in number of employees, the higher degree of perceived industry 4.0 readiness.

Source: Stentoft et al. (2017)

Thank you