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Policy Briefing

Industry 4.0 is coming: Is digital adoption a new mechanism linking entrepreneurial ambition to business performance?

Research Paper 72

October 2018

Inspired by the prospect of Industry 4.0, we consider the potential importance of digital adoption as a link between ambition business performance. Are firms which are more ambitious more likely to adopt digital technologies? What other factors influence digital adoption? Our analysis is based on new survey data for large, representative samples of micro-businesses (c. 9,500 firms) in the UK, Ireland and the USA collected in early 2018.

Key findings

Four key conclusions emerge supported by broadly consistent evidence across the three countries considered:

- We find strong evidence that growth ambition is associated with digital innovation. The implication is that digital innovation can operate as a mechanism through which ambition is linked to subsequent business performance.
- Network and collaborative linkages are strongly associated with digital adoption as suggested in epidemic models of technology diffusion.
- There is strong evidence that firm-level strategic influences impact digital adoption. Micro-businesses with stronger internal resources (business plans, training, external finance) are more likely to be digital innovators, potentially reinforcing their competitive advantages over more resource-constrained competitors.
- Unexpectedly, prior adoption of digital technologies is negatively linked to subsequent adoption, while prior levels of sectoral adoption are positively linked to adoption.

Our results suggest the variety of factors which influence technology diffusion even in relatively small micro-businesses.

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Understanding technology adoption

Five mechanisms may explain technology adoption. First, epidemic or informational impulses may encourage firms to adopt new technologies. These will be related to networking. Second, 'rank' effects associated with firms' internal resources may be important. Third, 'stock' effects related to other firms' prior adoption may influence the returns to adoption and so the adoption decision. Fourth, learning by using from prior adoption episodes may encourage firms to adopt. Finally, ambition may increase firms' desire for higher returns (and risk tolerance) and promote adoption.

Table 1: Summary of estimation results by country

	UK	Ireland	USA
Rank effects			
Business Plan	++	++	+
Training	+	+	+
Exporting	+		
Stock effects	+	+	
Epidemic effects			
Breadth: partners	++	++	+
Breadth: advice	+	+	+
Breadth: network	+		++
Learning-by-Using effects	--	-	-
Ambition			
Build nat/ int. business	++	+	+
Keep business the same	-		

Note: '+' indicates a positive and significant effect across 2-4 technologies; '++' a positive and significant effect 5-7 technologies; '–' and '—' indicate similar negative effects.

Table 1 summarises the key results from our empirical analysis across the UK, Ireland and the US across a range of seven digital technologies: Customer relationship management (CRM), E-Commerce, Web-based Accounting Software, Computer-Aided Design (CAD), Cloud computing, Artificial Intelligence (AI) and Machine Learning.

Policy implications

Our analysis suggests the strong impact of epidemic or informational factors in shaping digital adoption by micro-businesses. This is evident in the strong association between networking, different sources of business support and adoption. Extending and developing policy measures – such as the Knowledge Transfer Network (https://ktn-uk.co.uk) - which support networks or collaborative linkages between firms, and which can provide information to help firms to understand the potential value of digital adoption and how to implement it effectively, seem an obvious response.

Full paper link: https://www.enterpriseresearch.ac.uk/our-work/publications/