ERC
Enterprise Research Centre

ERC Research Showcase

Thursday March 7th 2019

ERC Funded by

ESRC Economic & Social Research Council
Department for Business, Energy & Industrial Strategy
British Business Bank
Innovate UK Technology Strategy Board
Intellectual Property Office

Welcome

- Stephen Roper, Director, ERC

ERC
Enterprise Research Centre

Introducing ERC

Stephen Roper

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Introducing the ERC

- ERC is the UK's national SME research centre with a mission to deepen our understanding of 'what drives SME innovation, productivity and growth'.
- The Enterprise Research Centre was established in 2013 following an open competition. Funding has been renewed twice.
- We undertake ***primary research*** to address knowledge gaps and ***knowledge curation*** to ensure existing knowledge is readily accessible for policy making
- The focus of projects has shifted over the years from 'high growth' to a broader agenda on innovation, productivity and growth
- ERC research is strongly policy/practice focussed with the research agenda set by a 'Funders Group' of government departments

ERC research team (FTs)

Stephen Roper
Director
View profile

Vicki Belt
Deputy Director - Impact and Engagement
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Mark Hart
Deputy Director
View profile

Halima Jibril
Research Fellow
View profile

Maria Wishart
Research Fellow
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Temitope Akinremi
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Joanne Turner
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Neha Prashar
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Anastasia Ri
Research Fellow
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Akunna Oledinma
Research Fellow
View profile

… plus faculty members from partner institutions…

What we do in ERC …

Primary research programme on SME innovation, productivity (c. £1.5m pa)

Six key themes (2018-21)

- Leadership and management
- Diffusion and productivity
- Innovation and growth
- Finance and investment
- Local productivity disparities
- Supply chains and productivity
- Productivity in UK metalworking firms

Commissioned research projects (2018-2021) (c. £0.8-£1.2m pa)

Examples (2019-21):

- Resilience in SMEs Europe (JPM, £0.75m)
- 'Micro-business Britain' (BEIS, £0.5m)
- Scottish Account Management (SE, £27k)
- Design Economy 2018 (DC, £60k)
- Productivity in 6 UK Sectors (CPP, £230k)
- EMEA Evaluation Partner (JPM, £40k)
- Geographical indications post Brexit (ESRC, £250k)

Data development and matching

- Key aspect of ERC work has been addressing UK data deficit

Key data sources and matching:

Business Structure Data	UK Innovation Survey
Employer Skills Survey	Longitudinal SB Survey
SME Finance Monitor	IPO data
Insolvency data	Gateway to Research Data
CRM data	

Engagement, influence and impact

- High levels of 'soft engagement' – providing advice and input to development of partner initiatives including e.g. BEIS Research Conference
- Reaction Active engagement with Non Funders – LEPs, FSB, Finance Community (CDFA,UKBAA), Innovation Directorate BIS, HM Treasury, HMRC
- Knowledge curation including SOTA reviews

Getting the right recipe: optimal collaboration strategies for radical and incremental service innovators

- Halima Jibril
- Stephen Roper
- Jane Bourke

Motivation

- External collaboration has become a popular route to innovation, especially for service firms where customer co-creation is common
- External collaboration can occur at different stages of innovation
- A practical question many firms face is when to be open and when to be closed.
- We investigate possible complementarities in collaboration at the idea generation and commercialization stages of innovation- is there an optimal recipe?

Introduction

- Why do firms collaborate?
  - External collaboration for innovation has several potential benefits, especially for SMEs-combining resources, sharing risks, quicker time to markets.
- But collaboration can also be costly and risky, and its benefit reduces with the number of partners in ideation
- We argue that what matters is not only the number of partners, but also the phase of innovation in which the firm collaborates

Research questions

- We consider the following research questions:

➢ Are there optimal combinations of collaboration patterns across stages?

➢ Are there differences in optimal collaboration patterns for radical and incremental innovators
  - Radical innovators
    - Disruptive, completely new to the market innovation
  - Incremental innovators
    - New to the firm innovations, improvements on existing products and services

➢ Does the size of the firm matter?

Data and Methods

- We use the 2016 Organizational Practices in Professional Services (OPIPS) survey
- The survey covers 639 innovating firms in five service sectors: Accountancy, Architecture, Consultancy, Software and IT and Specialist Design
- Dependent variable : % of turnover accounted for by innovative sales
- Data on the incidence and breadth of collaboration at the ideation and commercialization stages
- Main independent variables: six mutually exclusive combinations of partnerships in ideation and commercialization, based on median levels of collaboration

Data and Methods

Categorization of firms based on their collaboration strategies in ideation and commercialization.

Collaboration strategy in ideation- Number of partners	Collaboration strategy in commercialization	Our terminology for resulting strategy	Proportion of firms adopting the resulting strategy
1. 0	Closed	None-C	18.5%
2. 0	Open	None-O	8.8%
3. 1-2	Closed	Few-C	13%
4. 1-2	Open	Few-O	6.6%
5. 3+	Closed	Many-C	25.8%
6. 3+	Open	Many-O	27.4%

Results

OLS estimates of the response of innovation performance to combinations of external collaboration in ideation and commercialisation

% of innovative sales	Radical Innovators	Incremental Innovators
None-O	-5.738	11.286
	[12.253]	[8.288]
None-C	12.948	0.158
	[9.139]	[6.733]
Few-O	9.779	13.736**
	[10.833]	[5.391]
Few-C	24.422**	10.558**
	[10.941]	[5.125]
Many-O	4.428	11.093**
	[8.196]	[5.048]
R2	0.28	0.26
N	186	280

Radical Innovators: Size effects in the response of innovation performance to combinations of external collaboration in ideation and commercialisation.

	None-O	None-C	Few-O	Few-C	Many-O
None-O-Small	-10.516				
	[15.126]				
None-O-Medium	5.171				
	[9.167]				
None-O-Large	18.720				
	[12.598]				
None-C-Small		12.245			
		[10.494]			
None-C-Medium		10.487			
		[11.285]			
None-C-Large		29.825*			
		[17.314]			
Few-O-Small			9.502		
			[14.805]		
Few-O-Medium			-1.113		
			[14.771]		
Few-O-Large			19.215		
			[16.522]		
Few-C-Small				25.222**	
				[12.268]	
Few-C-Medium				14.655	
				[17.105]	
Few-C-Large				22.172	
				[15.762]	
Many-O-Small					6.735
					[9.647]
Many-O-Medium					-3.966
					[6.755]
Many-O-Large					-0.480
					[9.474]

Incremental Innovators: Size effects in the response of innovation performance to combinations of external collaboration in ideation and commercialisation.

	None-O	None-C	Few-O	Few-C	Many-O
None-O-Small	15.339 [10.409]				
None-O-Medium	-5.851 [5.347]				
None-O-Large	3.962 [9.599]				
None-C-Small		0.027 [7.985]			
None-C-Medium		3.106 [5.873]			
None-C-Large		-7.947 [8.474]			
Few-O-Small			15.259** [6.002]		
Few-O-Medium			6.535 [7.988]		
Few-O-Large			-0.727 [7.899]		
Few-C-Small				11.769** [5.415]	
Few-C-Medium				-8.148 [5.671]	
Few-C-Large				16.971* [9.534]	
Many-O-Small					10.949* [5.967]
Many-O-Medium					15.355** [7.772]
Many-O-Large					4.527 [6.308]

Main findings and conclusions

- The benefits of external collaboration at one stage of the innovation process depends on collaboration at other stages.
- The optimal recipe differs for radical and incremental innovators. There are many ways to organise external collaboration for incremental innovators, but only one way for radical innovators
- Complementarities exist for incremental innovators, but not radical
- We need to re-think the premise of open innovation as a general prescription, and consider the conditions under which it is beneficial

The cost of discouragement

- Stuart Fraser
- Stephen Roper
- Anastasia Ri
- Mark Hart

Research questions

Finance

Investment

Performance

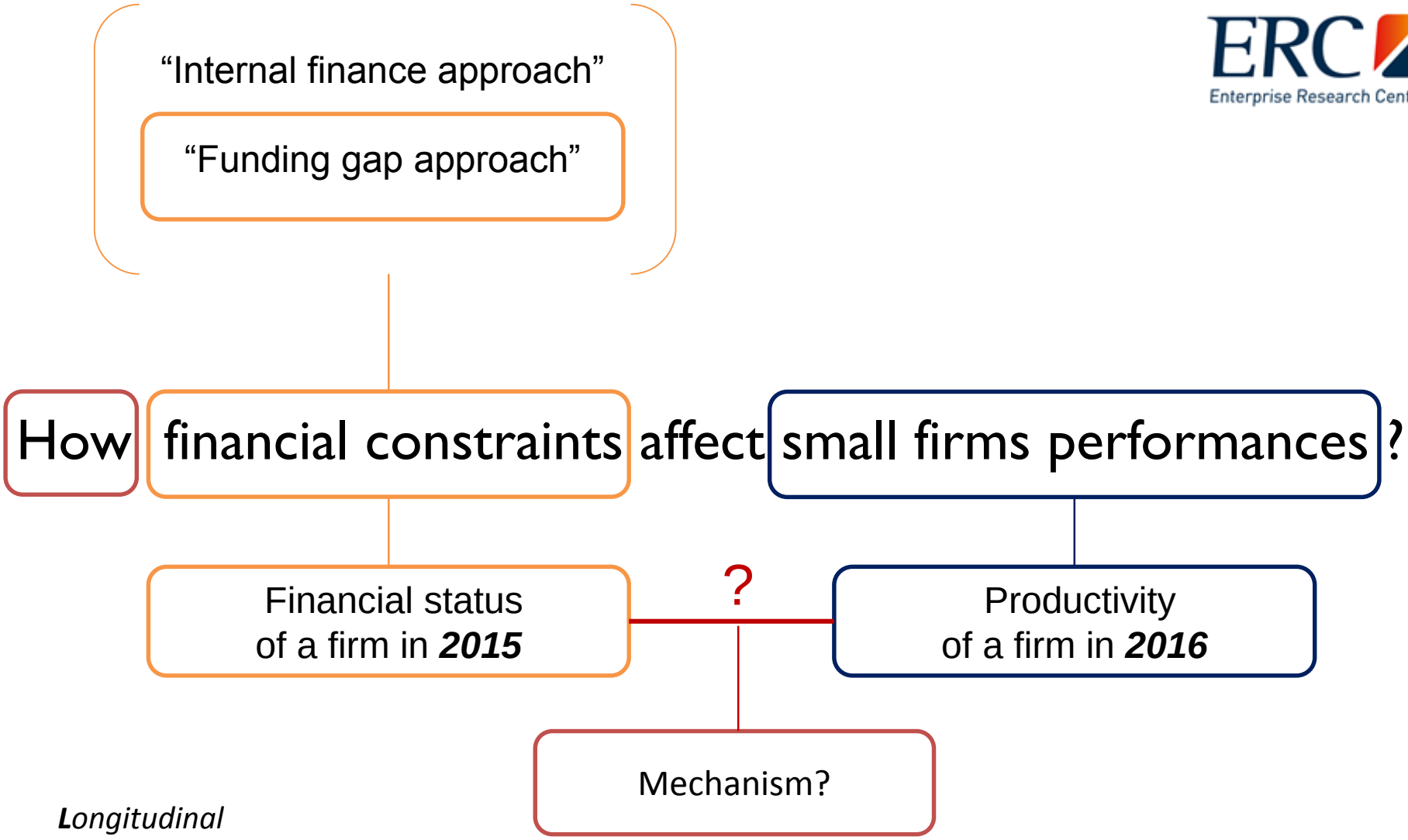
"Investment for the future"

- What factors shape SMEs' willingness to invest?
- How do different types of investment influence firm performance?
- How do different funding mechanisms shape these effects?

starting point:

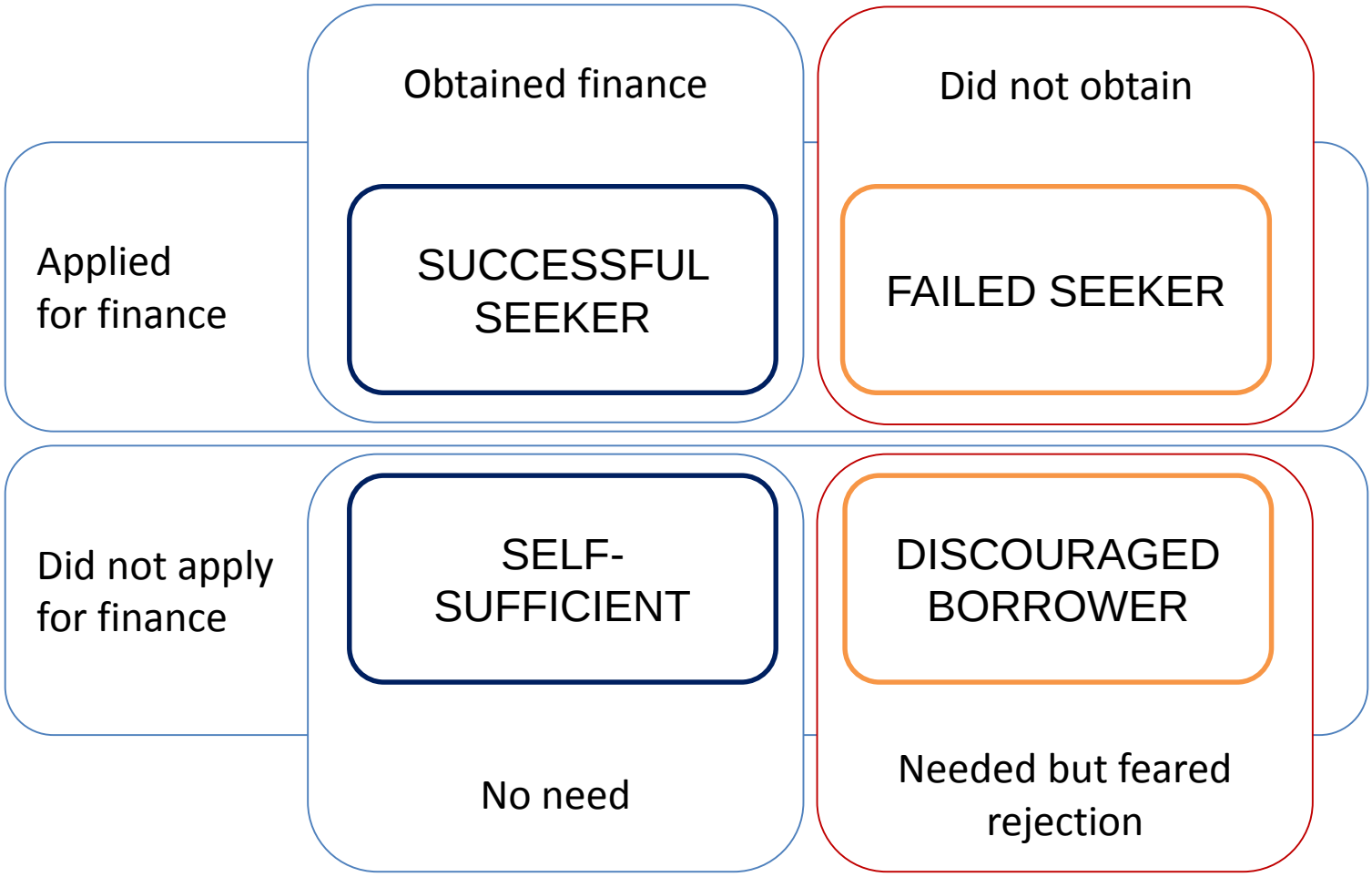
How do financial constraints affect small firms performances ?

Fraser, Peng, Roper (2018) "Missing links: what mechanisms connect financial constraints to the performance of small firms"



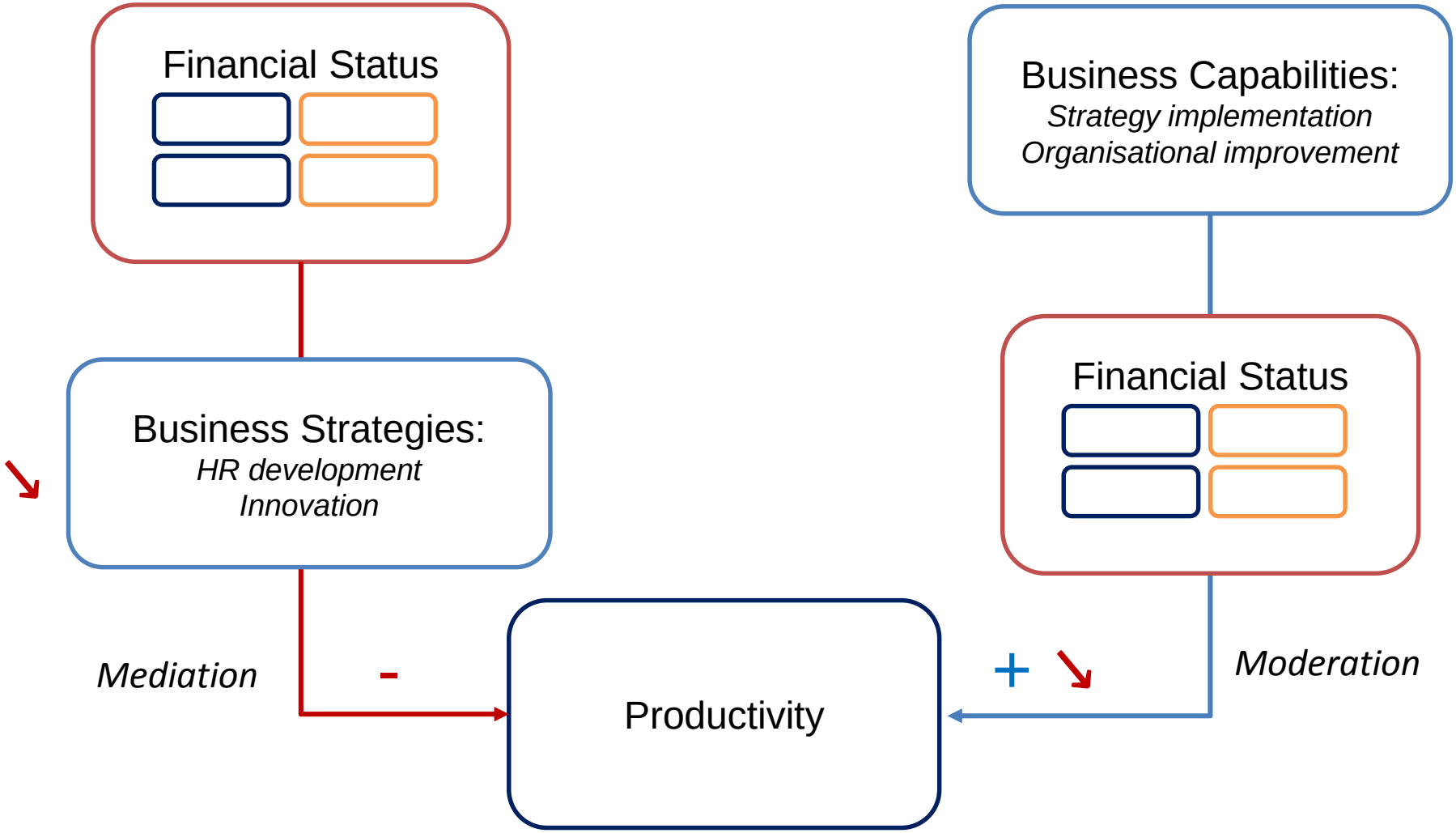
***L**ongitudinal*
***S**mall*
***B**usiness*
***S**urvey*
2015 and 2016 waves

Financial status



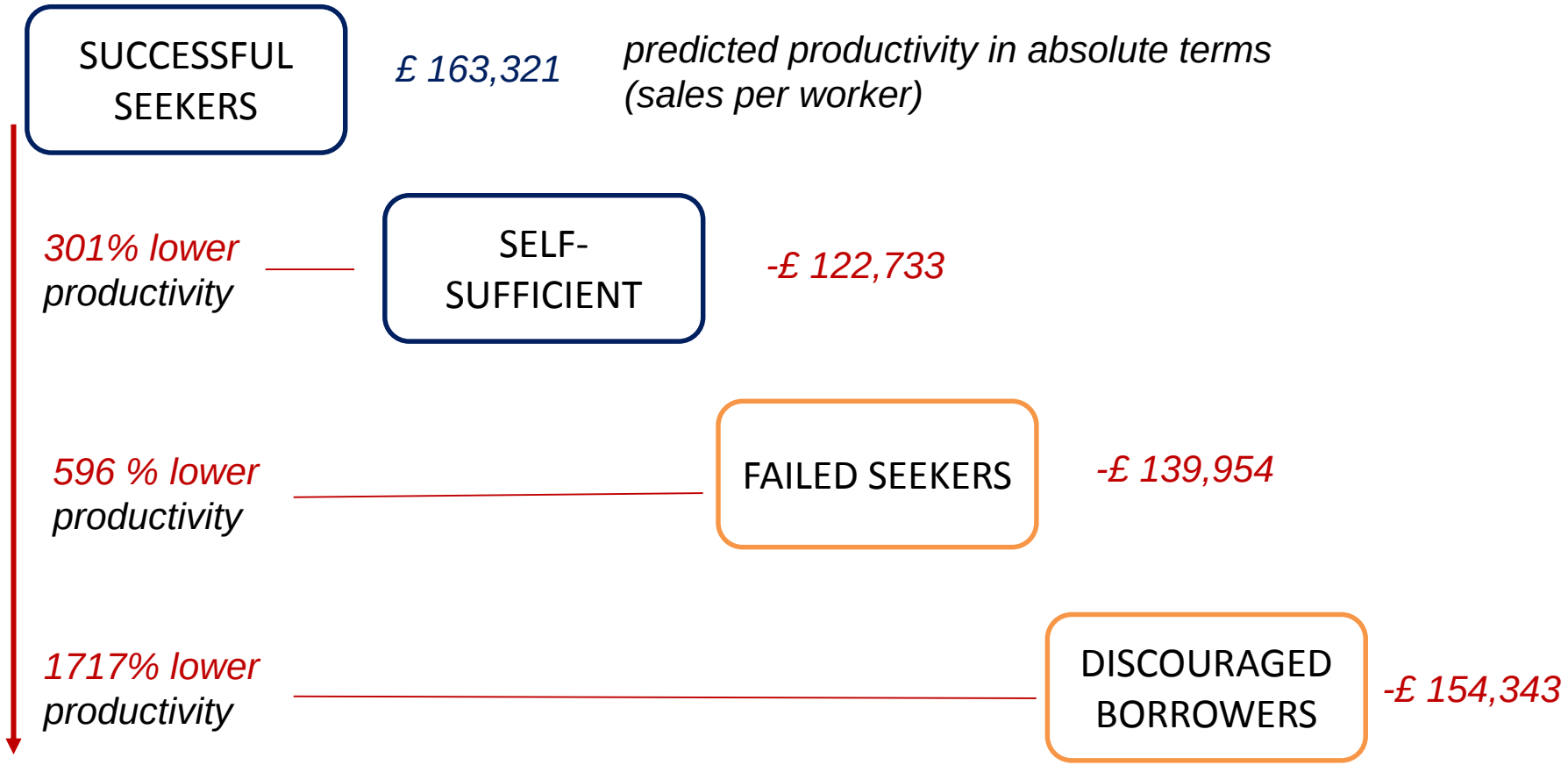
Financially constrained

Mediation and Moderation Mechanisms

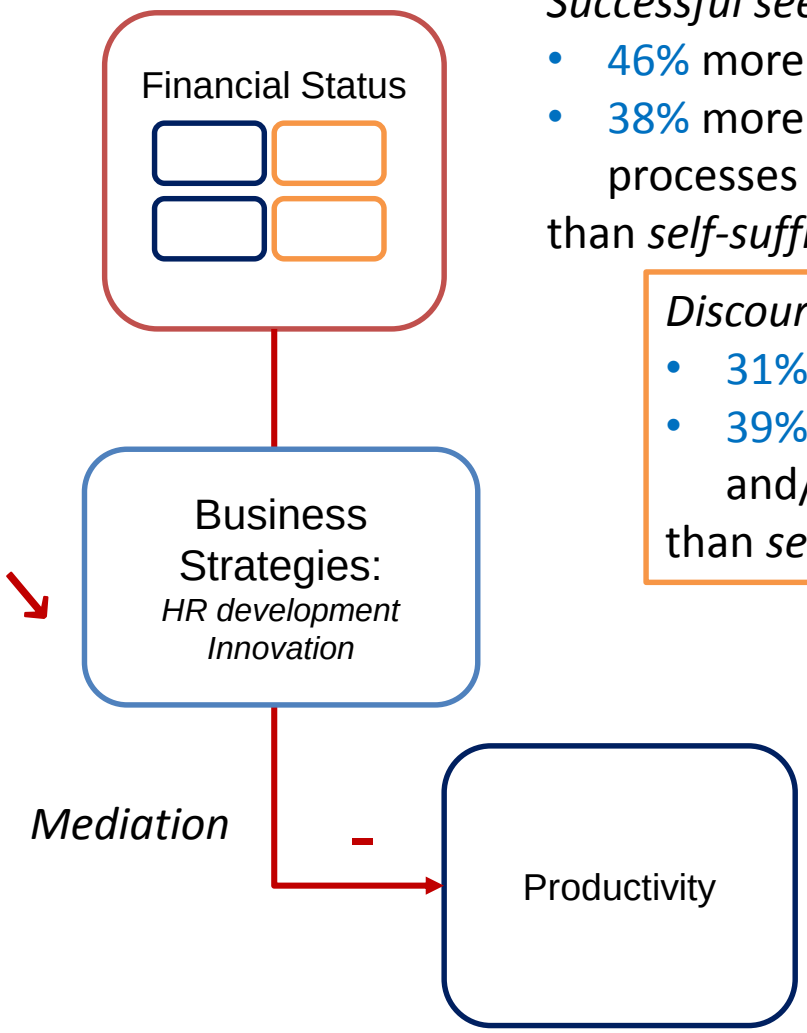


Results

Financial status affects performance:
Discouraged borrowers have significantly lower, and *successful seekers* have significantly higher, productivity compared to *self-sufficient firms*.



Results: Mediation



Successful seekers are
- 46% more likely to increase workforce skills
- 38% more likely to introduce new products, services and/or processes

than *self-sufficient firms*

Discouraged borrowers are
- 31% more likely to increase workforce skills
- 39% more likely to introduce new products, services and/or processes

than *self-sufficient firms*

Failed seekers are
- 45% more likely to increase workforce skills
- 54% more likely to introduce new products, services and/or processes

than *self-sufficient firms*

Necessity spurs on financially constrained firms to implement business strategies!

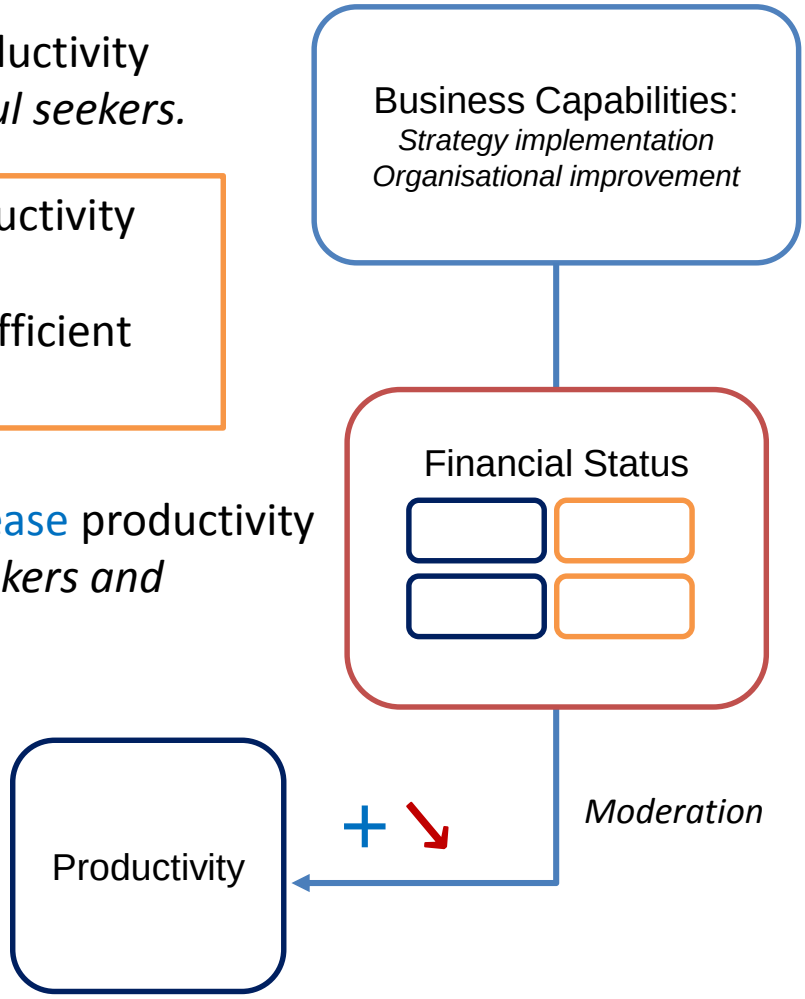
Results: Moderation

High business strategy capabilities increase productivity by 14% among *self-sufficient firms* and *successful seekers.*

High business strategy capabilities reduce productivity by 17% among *discouraged borrowers* and *by 59 %* among *failed seekers* relative to self-sufficient firms and successful seekers.

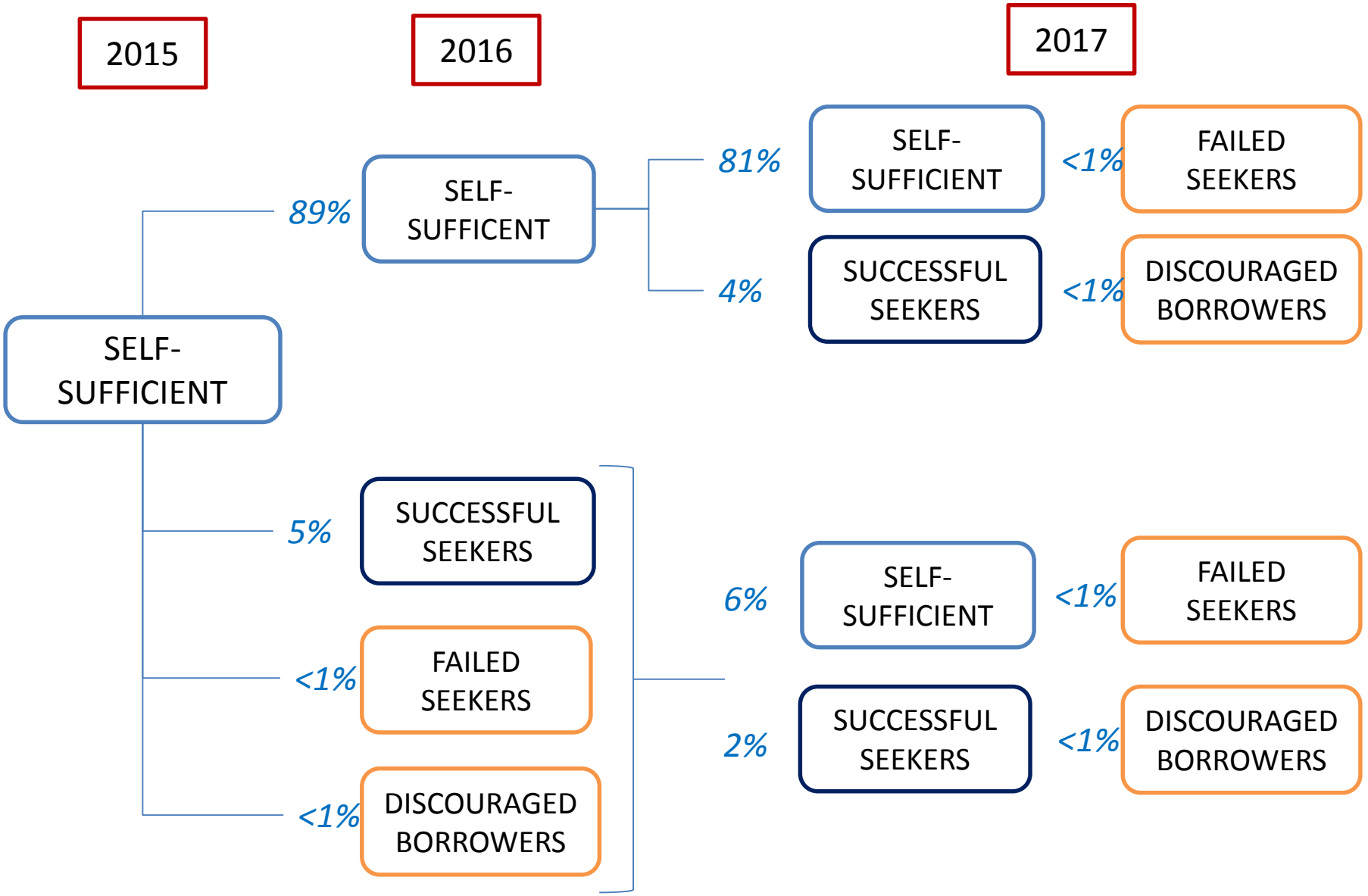
High operational improvement capabilities increase productivity by 9% among *self-sufficient firms, successful seekers and discouraged borrowers.*

High operational improvement capabilities reduce productivity *by 59 %* among *failed seekers* relative to self-sufficient firms and successful seekers.



Preliminary results:

transitions in financial status from year to year



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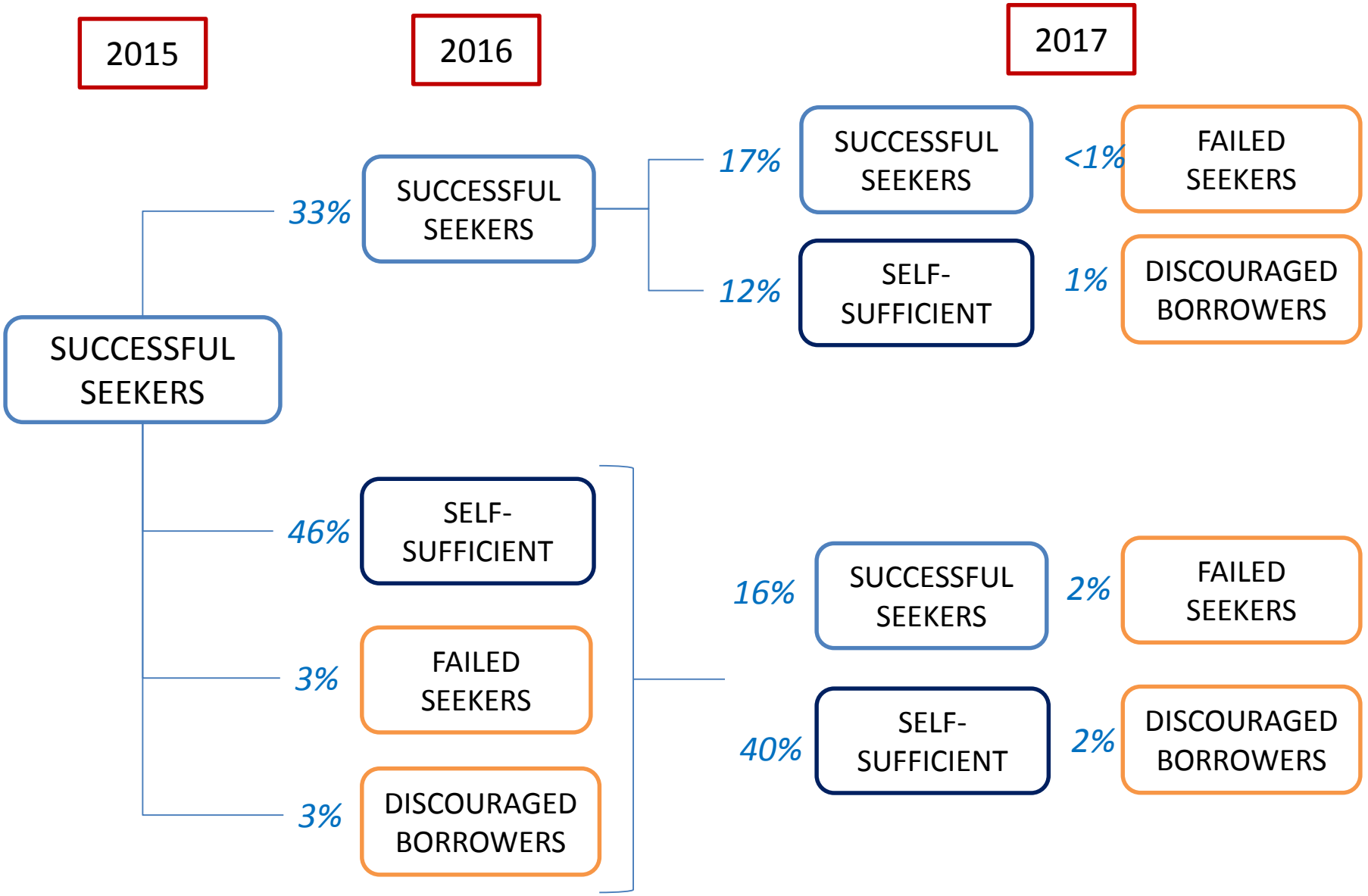

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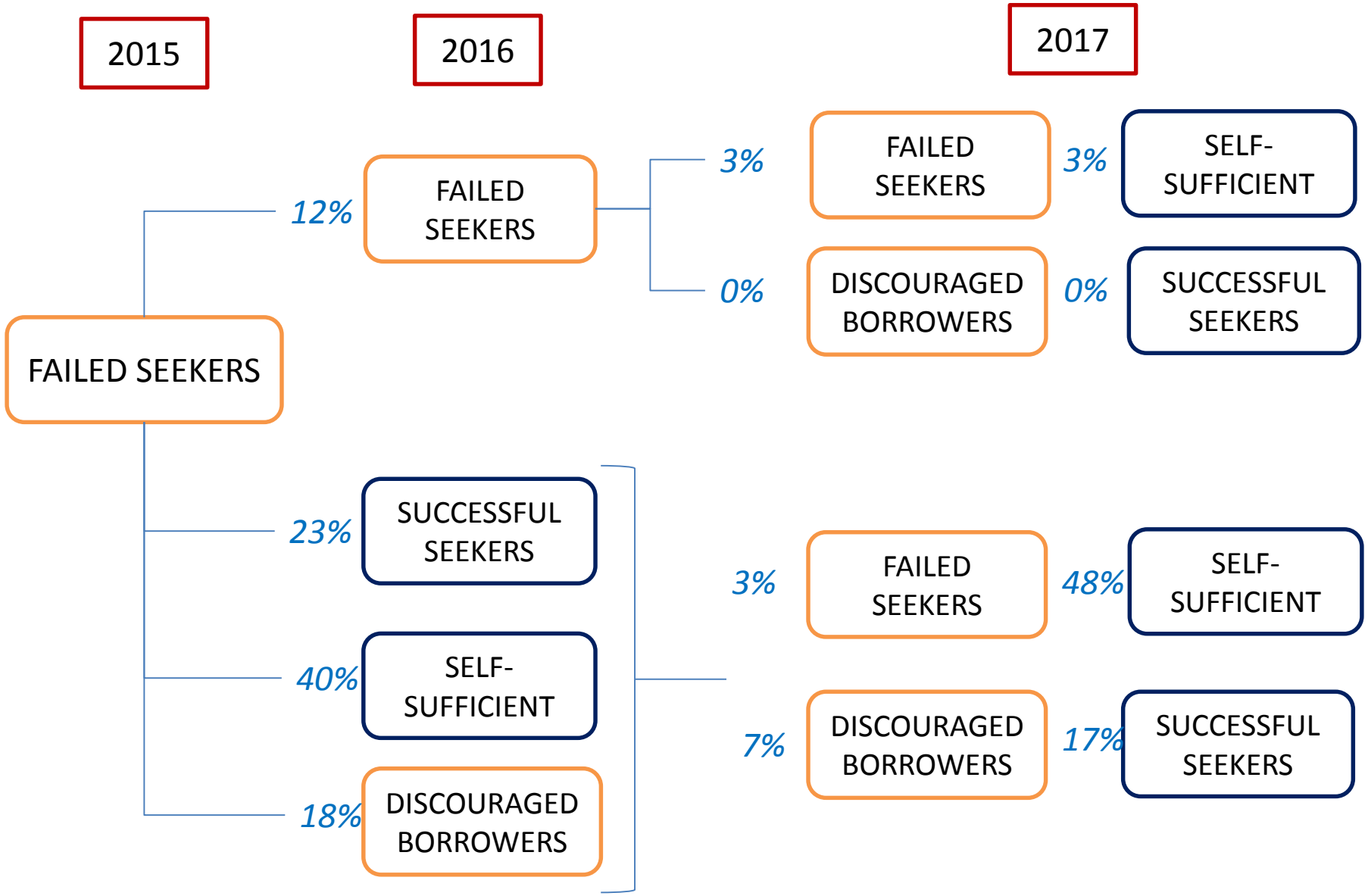

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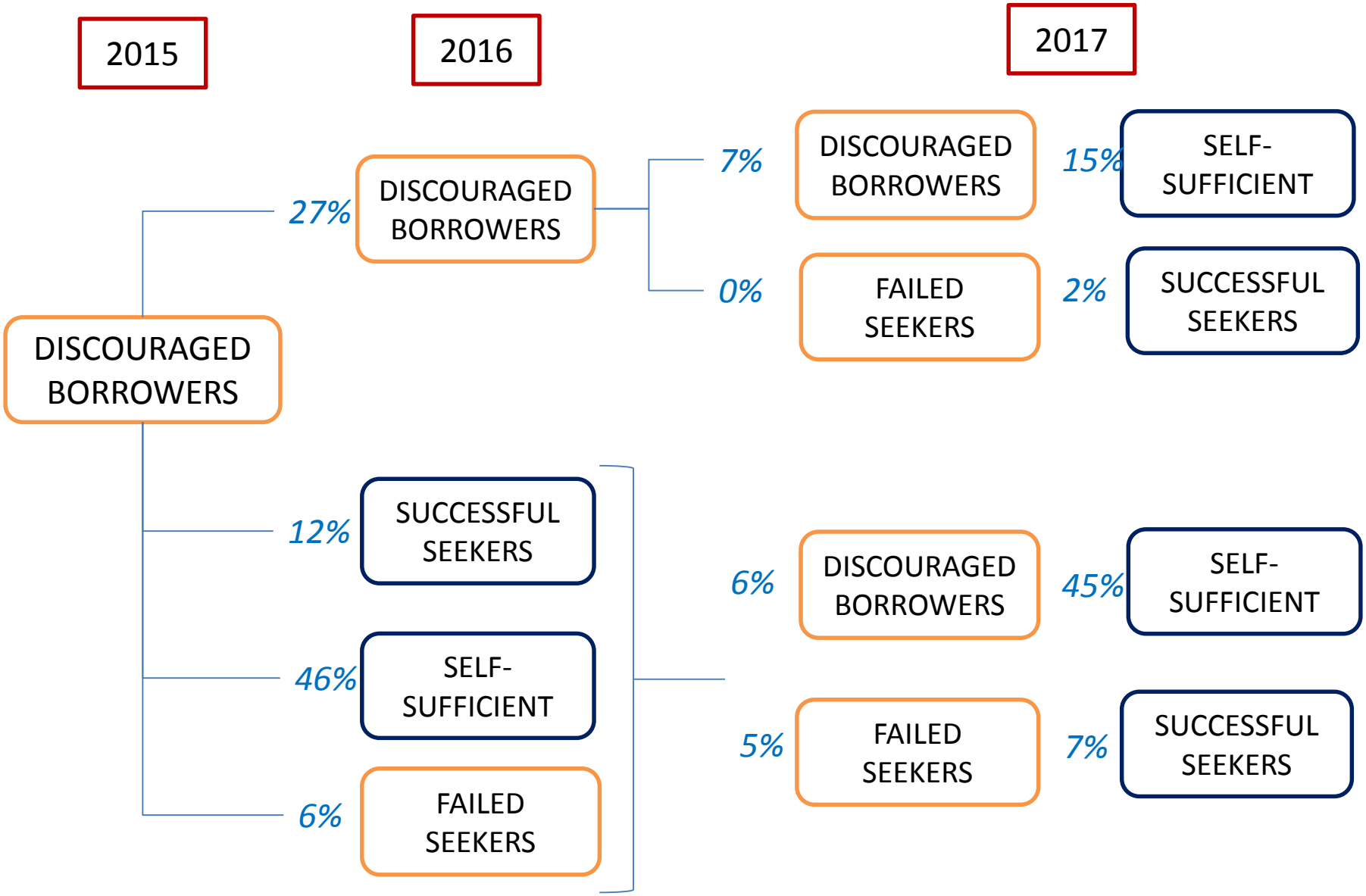
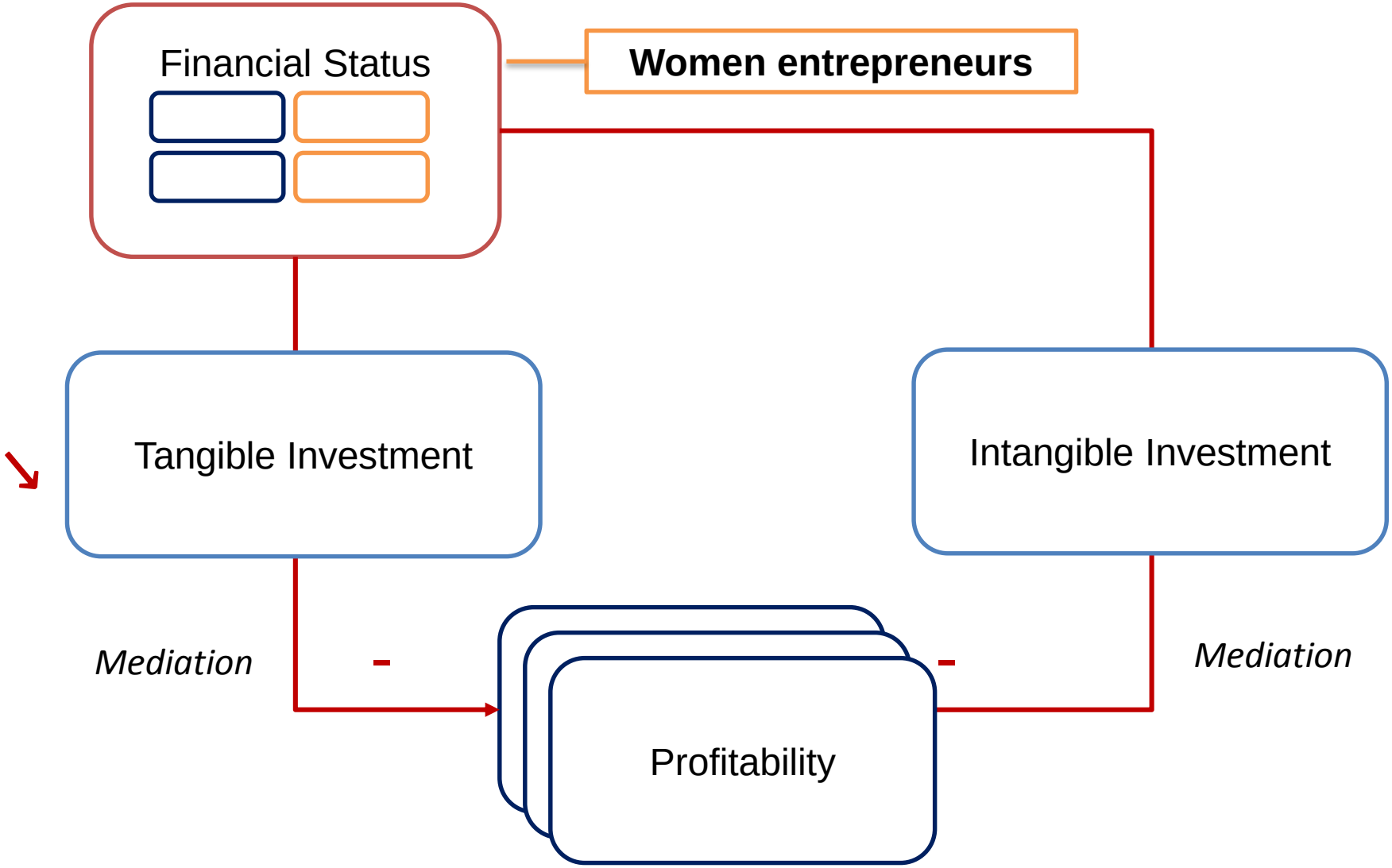


Further steps:

testing other mediating mechanisms



Thank you

If you would like any more information please contact

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Dr Anastasia Ri (a.ri@aston.ac.uk)

Returns to publicly supported and privately funded R&D

- Joanne Turner
- Stephen Roper
- Nola Hewitt-Dundas
- Bettina Becker

Research background

- Innovation is an important means through which firms compete and grow *(Mason et al., 2009)*
- Innovation involves the production of new knowledge through activities such as R&D *(Roper et al., 2008)* - R&D is very much part of the innovation process
- Appropriability problem *(Arrow, 1962)* – firms carrying out private R&D are unable to fully appropriate the returns to their investment
- Public support for R&D is justified on the basis of this appropriability problem or market failure *(Roper and Hewitt-Dundas, 2016)*

Research Questions

- How important is R&D in driving firm innovation?
- Which types of innovation have the greatest productivity payoffs?
- Which types of innovation have the greatest growth payoffs?
- How do innovation payoffs vary depending upon whether the innovation was publicly supported or wholly privately funded ?

Data and method

- UK Innovation Survey (waves 4-10) provides only a binary indicator of whether firms received or did not receive public support for their innovation
- We cannot be clear what proportion of firms' R&D spending was publicly supported, only that a proportion was supported
- Our approach is to estimate the relationship between R&D (innovation input) and innovation outputs, and to partition the R&D variable into that which was and was not publicly supported

Data and method

- We undertake a causal analysis of the links between R&D, innovation of different types, and productivity and growth

- We adopt a value-chain perspective suggesting that R&D may influence innovation in the short term, but that any productivity/growth effects may take some time to emerge

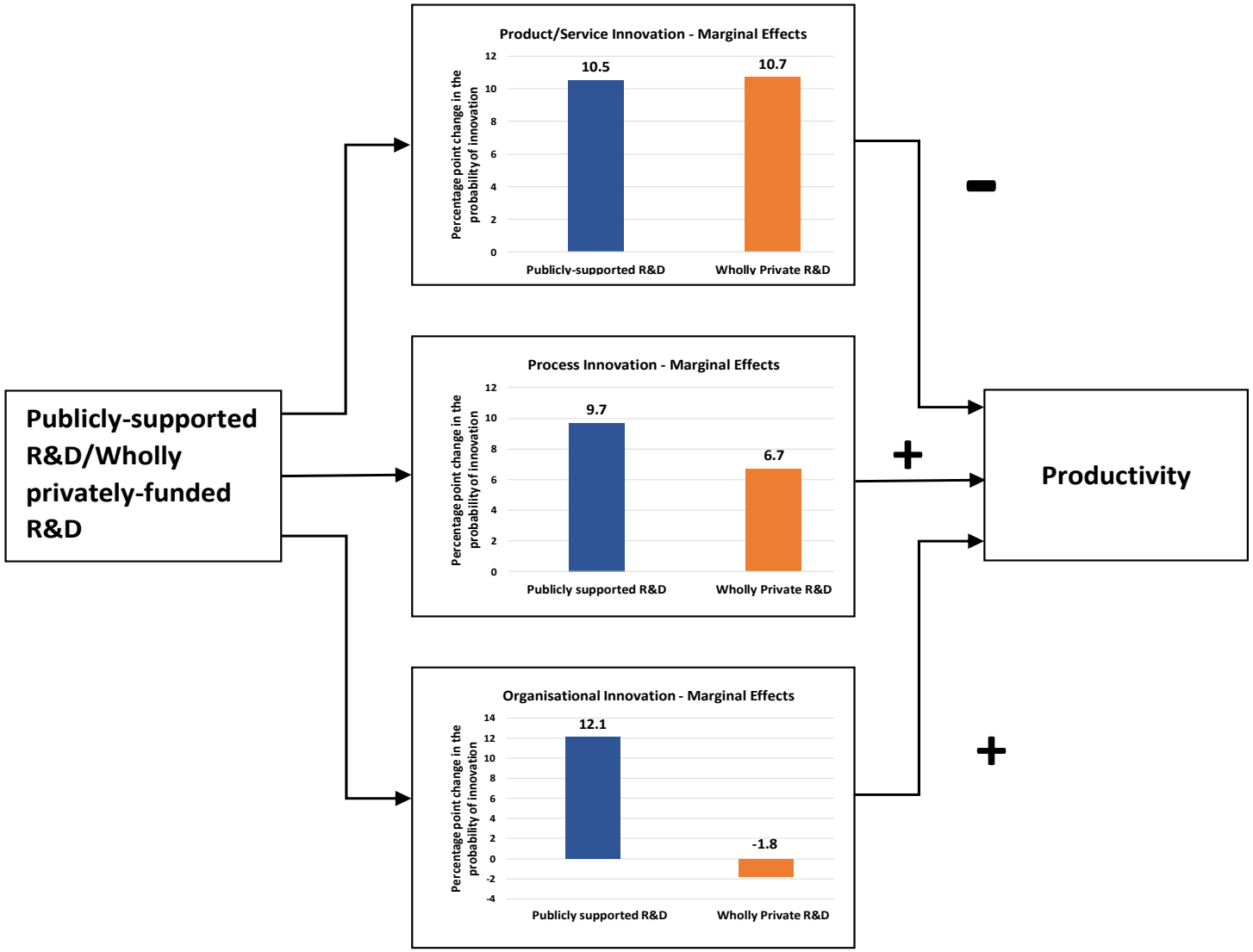
- We consider how innovation is related to productivity or growth in the subsequent survey period

- We allow for a range of other factors to influence firm performance

Estimation approach

- The model is estimated using the CMP procedure which instruments the binary right-hand side innovation indicators
- The first stage estimates a series of probit models to model the impact of R&D on the probability of innovation
- The second stage links the innovation probit models with a simple productivity or growth equation
- The innovation variables (and their determinants) are lagged to reflect the time taken for innovation to influence productivity or growth

Results – Modelling the link between UK-supported and unsupported R&D engagement, innovation and productivity: All firms



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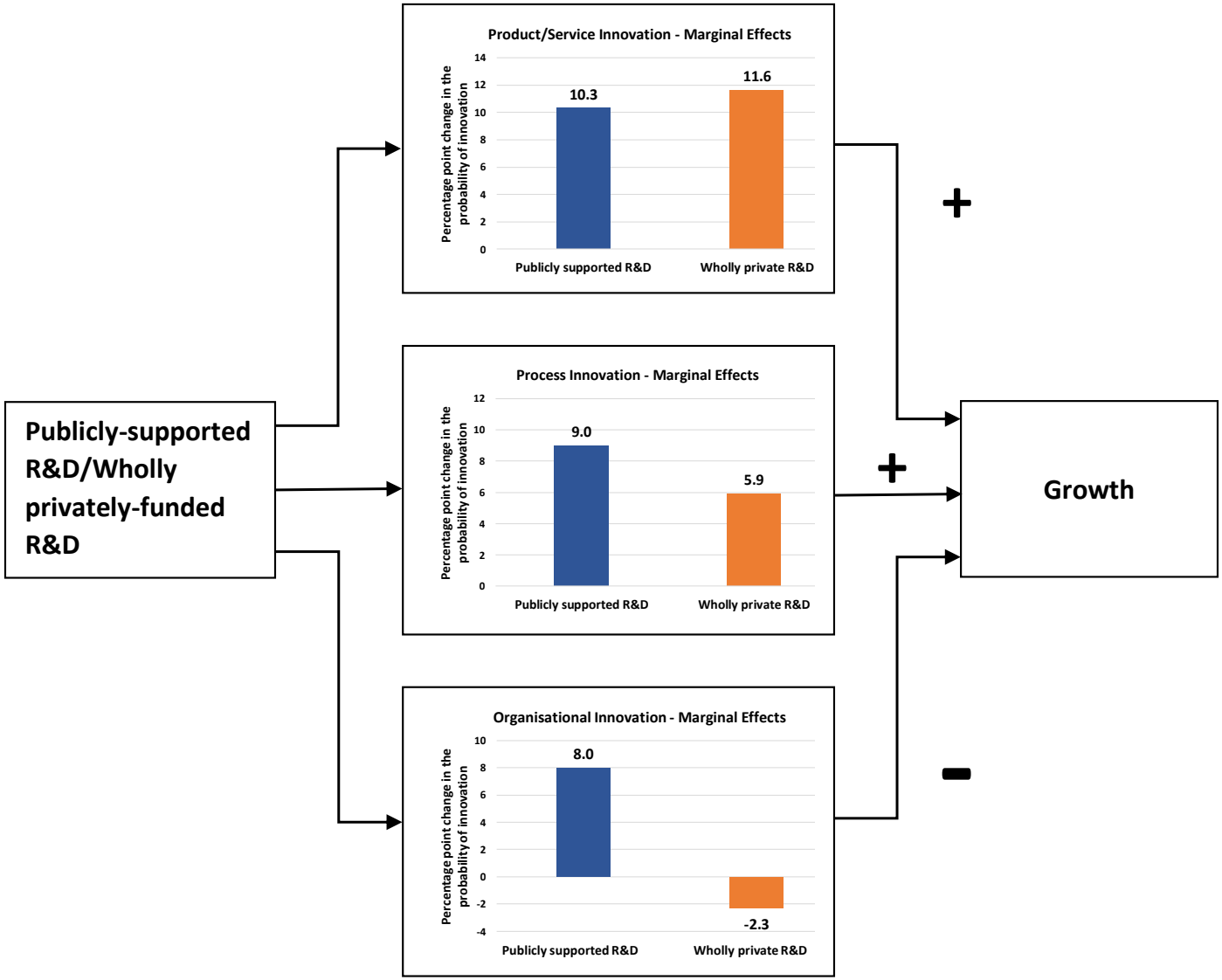
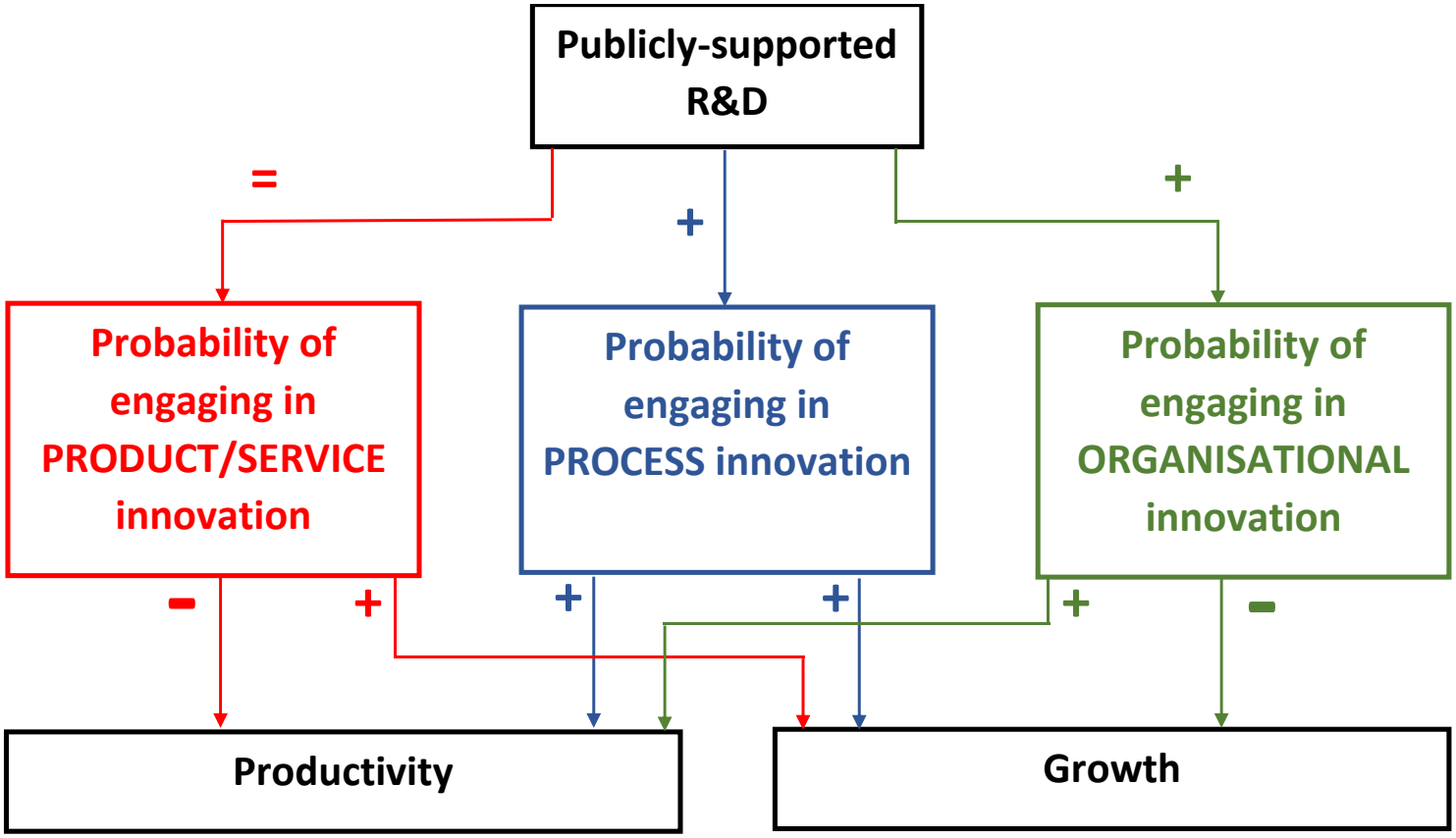


Key findings



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Thank you!

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Mason, G., Bishop, K. and Robinson, C. (2009). Business growth and innovation: The wider impact of rapidly-growing firms in UK city-regions, edited by NESTA. London.

Roper, S. and Hewitt-Dundas, N. (2016). The legacy of public subsidies for innovation: input, output and behavioural additionality effects. ERC Research Paper, No 21.

Roper, S., Du, J. and Love, J. H. (2008). Modelling the innovation value chain, Research Policy, 37, 6-7, 961-977.

Understanding Local Productivity Disparities

- Neha Prashar
- Michael Anyadike-Danes
- Mark Hart

Background

- We know that global frontier firms have seen significantly more rapid productivity growth when compared with non-frontier firms. This has remained robust since 2000s.

- The same can be said about UK frontier firms, where the top 10% in the productivity distribution are ten times more productive than those at the bottom 10%.

- **This dispersion remains persistent and impacts the way current measures of productivity, both aggregate and firm-level, should be interpreted….with caution!**

How should productivity be measured?

- This combination of dispersion plus persistence would yield meaningless average (mean) productivity estimates using firm-level data.
- There is a lack of understanding what explains large productivity differences between local areas outside of the “aggregate” productivity level measure.
- We need to consider points across the distribution during comparative analysis over time and area.

Main Research Question

- What explains productivity differences between local LEP areas?

    1. Differently shaped productivity distributions?
    2. Sectoral composition?
    3. Firm size distribution?

- Focusing on the first point…

Data

- Using data from the ONS IDBR (BSD and/or the refreshed BEIS version), we compare productivity at the: 25%; 50% and 75% points of the distribution for firms in each LEP area.

- Whilst such an approach will generate a considerable volume of data, the gains from taking a more nuanced view will allow us to form a more accurate and robust picture of the extent of productivity differences between LEPs.

- Firm vs local unit data at this level of spatial analysis will be a challenge.

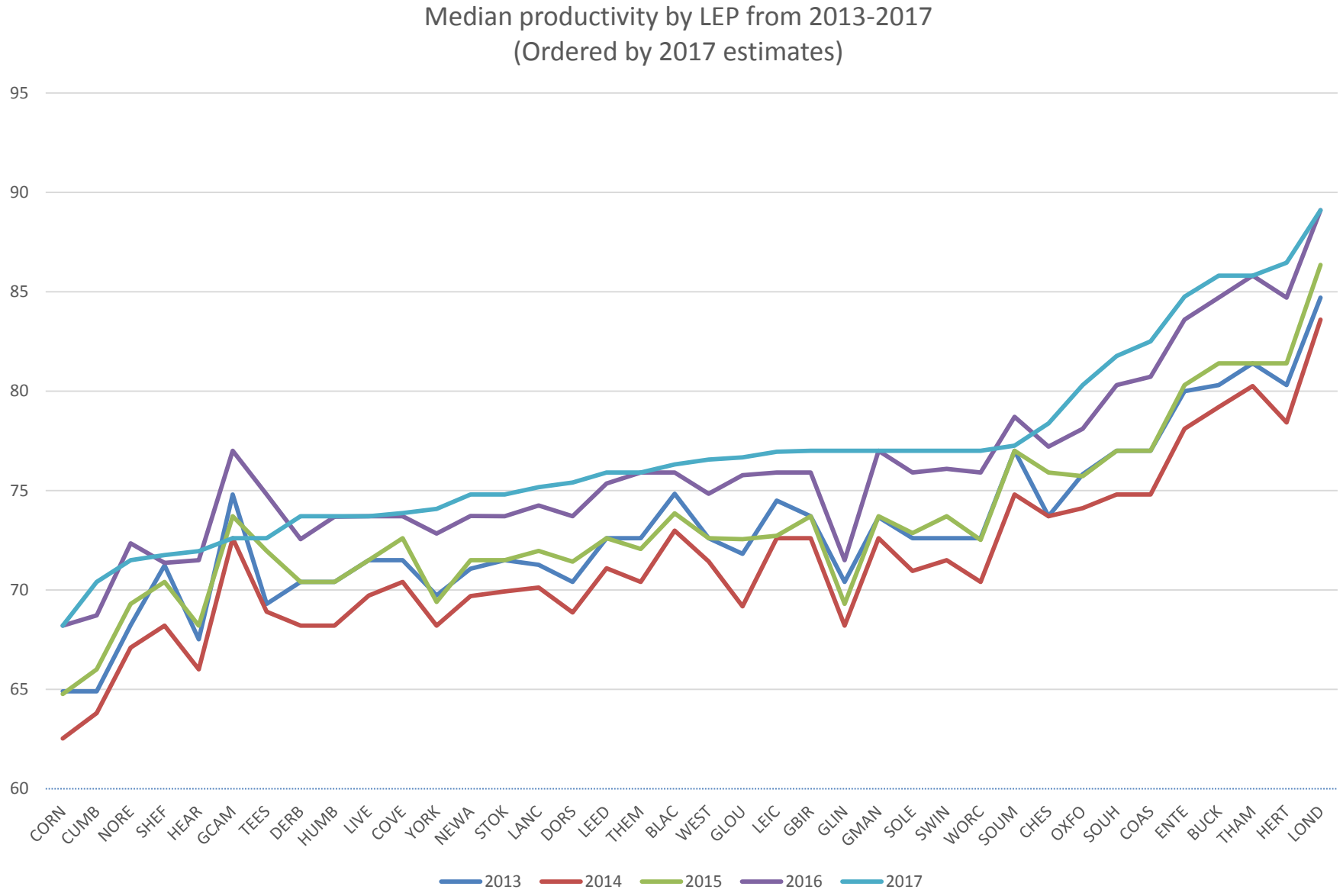
Method (1)

- To create points to select for the productivity (turnover per job) distribution for each LEP, quantiles were estimated at 2.5% intervals - initially done for one year.

- LEP's were then ordered by the 50th, 25th and 75th percentile to give an overview of high and low productivity LEP areas.

- We look at the medians (this is the average median due to disclosure issues which meant that we couldn't output the true median itself but rather +- 5 observations averaged) for each year between 2013-2017.

- What we want to know is if these LEP productivity distributions are significantly different from one another….


Median productivity by LEP from 2013-2017
(Ordered by 2017 estimates)
95
90
85
80
75
70
65
60
CORN
CUMB
NORE
SHEF
HEAR
GCAM
TEES
DERB
HUMB
LIVE
COVE
YORK
NEWA
STOK
LANC
DORS
LEED
THEM
BLAC
WEST
GLOU
LEIC
GBIR
GLIN
GMAN
SOLE
SWIN
WORC
SOUM
CHES
OXFO
SOUH
COAS
ENTE
BUCK
THAM
HERT
LOND
2013
2014
2015
2016
2017

Productivity Variations

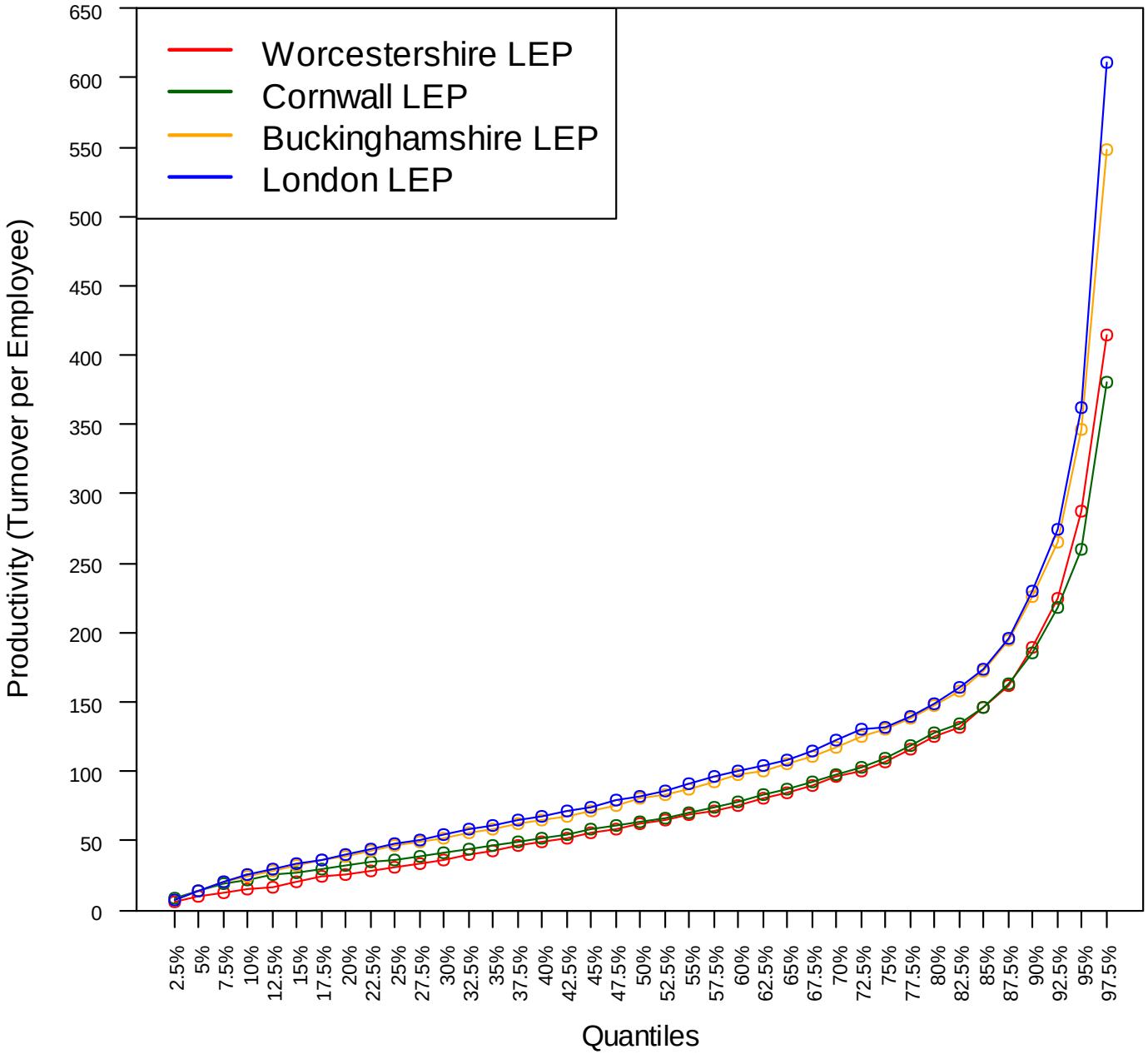
- No major productivity distribution differences year to year for each LEP
- Same top LEPs for productivity – London, Thames Valley, Hertfordshire (South East concentration)
- Same bottom LEPs – Cornwall, Cumbria, North East etc
- Using consensus ranking we can see these top and low productivity LEPs…

Consensus Ranking using 2013-2017 median productivity values

LEP	Consensus Ranking	LEP	Consensus Ranking	LEP	Consensus Ranking
LOND	1	LEIC	11	GLIN	19
THAM	2	SOLE	11	HUMB	19
BUCK	3	LEED	12	SHEF	19
HERT	3	THEM	12	YORK	19
ENTE	4	WEST	12	NORE	20
COAS	5	WORC	12	HEAR	21
SOUH	5	GLOU	13	CUMB	22
SOUM	5	COVE	14	CORN	23
OXFO	6	LANC	15		
CHES	7	LIVE	16		
BLAC	8	NEWA	16		
GBIR	9	STOK	16		
GCAM	9	TEES	17		
GMAN	9	DORS	18		
SWIN	10	DERB	19		

Method (2)

- We can see that the distribution of LEPs across time in terms of productivity does not change.
- We now want to test whether LEPs next to each other (i.e. London and Thames Valley), once ordered, have significantly different distributions, as well as, LEPs on opposite ends of the productivity order (i.e. London and Cumbria).
- A simple way to view this is by plotting the quantiles against productivity levels, however, statistical testing is better.
- We use the two sample Kolmogorov-Smirnov (K-S) test which compares whether the empirical distribution function of the same variable from two datasets differ significantly.
- This was the chosen test as there is no prior assumption on the distribution of the data and is nonparametric.
- We do this analysis for LEP pairs for each year between 2013-2018



This is the top two preforming LEPs (Buckinghamshire and London) and the two bottom preforming LEPs (Worcestershire and Cornwall) for 2018.

Distributions look very similar, which is confirmed through the KS test.

Results

- We find that there are no significant differences between productivity distribution across LEP pairs.
- This also holds when looking at LEPs at the opposite sides of the productivity order.
- In fact, results suggest no evidence of productivity distribution differences between any LEP pairs.
- So we can rule out overall productivity distribution differences as a possible explanation to local (LEP-level) disparities in productivity.
- However, this may change when looking at subsamples by size and sector….

Early Results from looking at size

- Distribution of productivity in different sized firms has also been estimated.
- Early results indicate that micro firms (1-9 employees) have no statistical difference in productivity distribution between LEPs.
- Medium and large sized firms, however, appear to have a statistical difference when looking at the opposite ends of productivity when LEPs are ordered by their 50^{th} , 75^{th} and 25^{th} percentile.
- These early results suggest that larger sized firms in more/less productive LEPs have other factors (outside of sector and size) that make them more/less productive to the extent that their productivity distributions are affected.
- Residual analysis – where we factor out sector fixed effects using an OLS estimation – was also undertaken and results were the same.

Ongoing work

- Next step….what could be causing the differences in distribution of productivity?

- Will also control for age of firms, legal ownership and other firm characteristics using residuals (or the “unexplained” productivity) from running an OLS regression and looking at the distribution by LEP.

- Sectorial differences may be limited due to disclosure issues in outputting data but aggregating certain sectors will still enable us to hash whether sector plays an important part in the productivity story as well.

Thank you!

Questions/Comments?

Professor Mark Hart (mark.hart@aston.ac.uk)

Dr Neha Prashar (n.prashar14@aston.ac.uk)

Barriers to collaborative innovation in SMEs

- Temitope Akinremi
- Stephen Roper

Introduction

Who

- ESRC funded project
- ERC
- CBM
- CMF

What

- Key Innovation Practices
- Extent of Adoption
- Barriers to Adoption
- Strategies for Adoption

Where

- UK
- 2 Case-Study Sectors
  - Metal Forming
  - Casting/Foundry

When

- 3-year project
- Completed 1st Year

Why

- Best Practice Diffusion
- Productivity Gains
- Policy Development

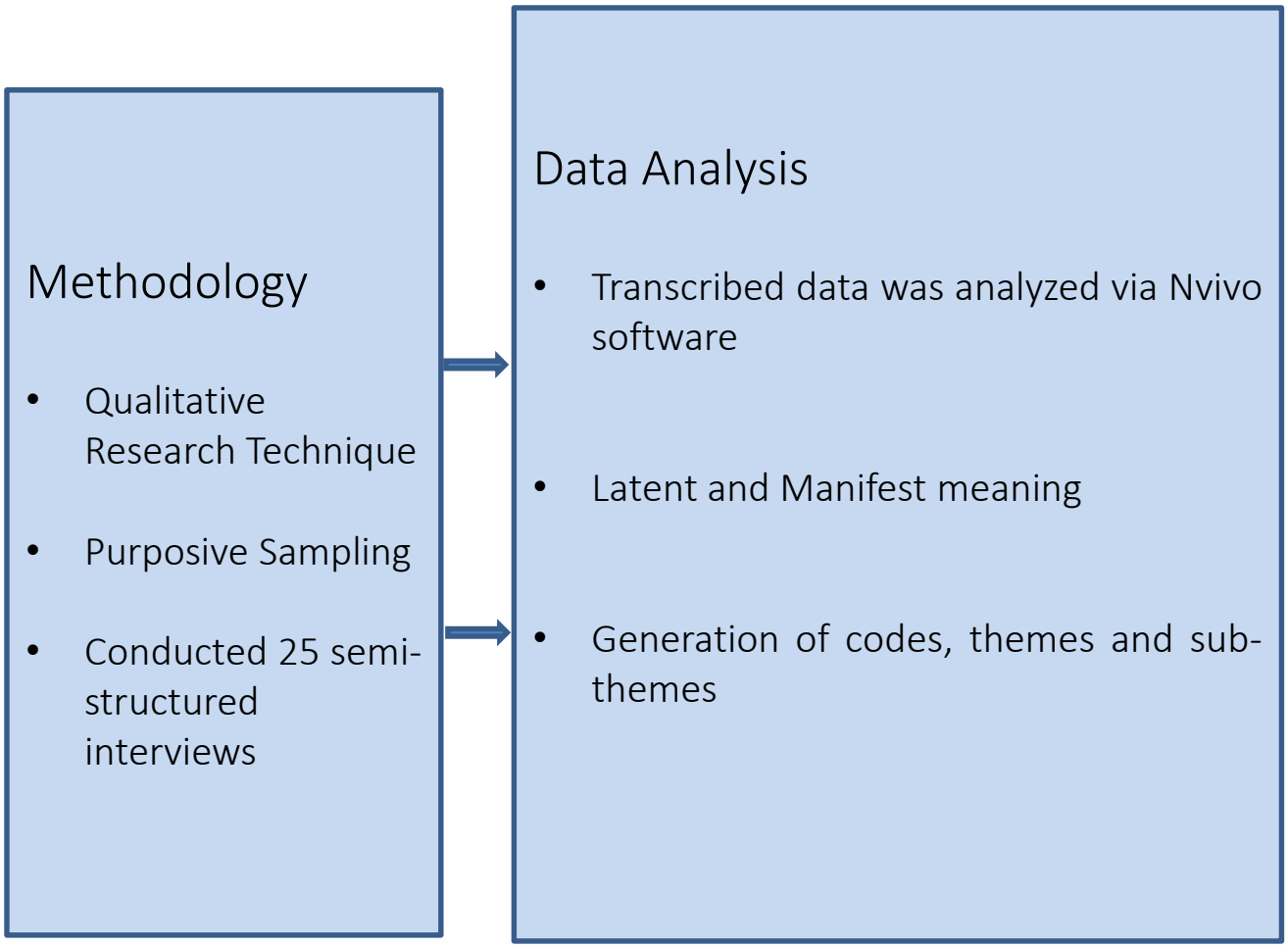
Background

- Innovation relates positively to competitiveness, productivity and performance (Gunday *et al*. 2011)
- Disparity between large firms and SMEs in innovation adoption (Wei and Yuzhen 2013)
- Open Innovation (OI); where innovation is shared and exchanged across individual firms (Chesbrough 2003 and Reed *et al*. 2012)
- Innovation Collaboration; Potential missed opportunity for SMEs
- Informational Market Failures; Trust & Knowledge about Capabilities (Hewitt-Dundas and Roper 2018)

Research Questions

- How are innovation partnership/collaboration perceived in the metal forming and foundry industries?
- Does insufficient information on partners' capabilities influence decisions to embark on innovation collaborations in the metal forming and foundry industry?
- How does access to information on potential partners' trustworthiness influence collaboration innovation in the metal forming and foundry industry?

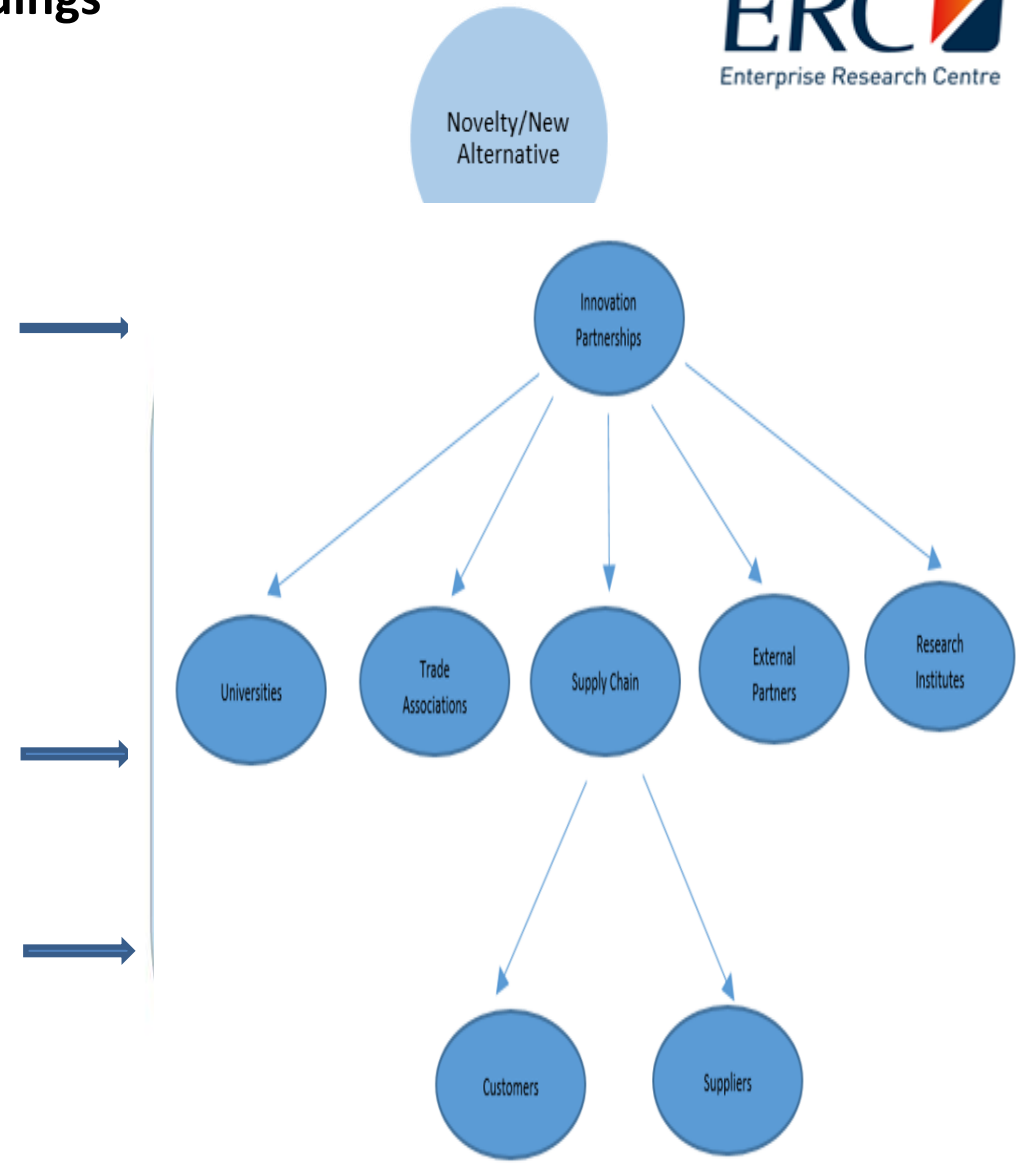
Methodology



Key Findings

RQ1

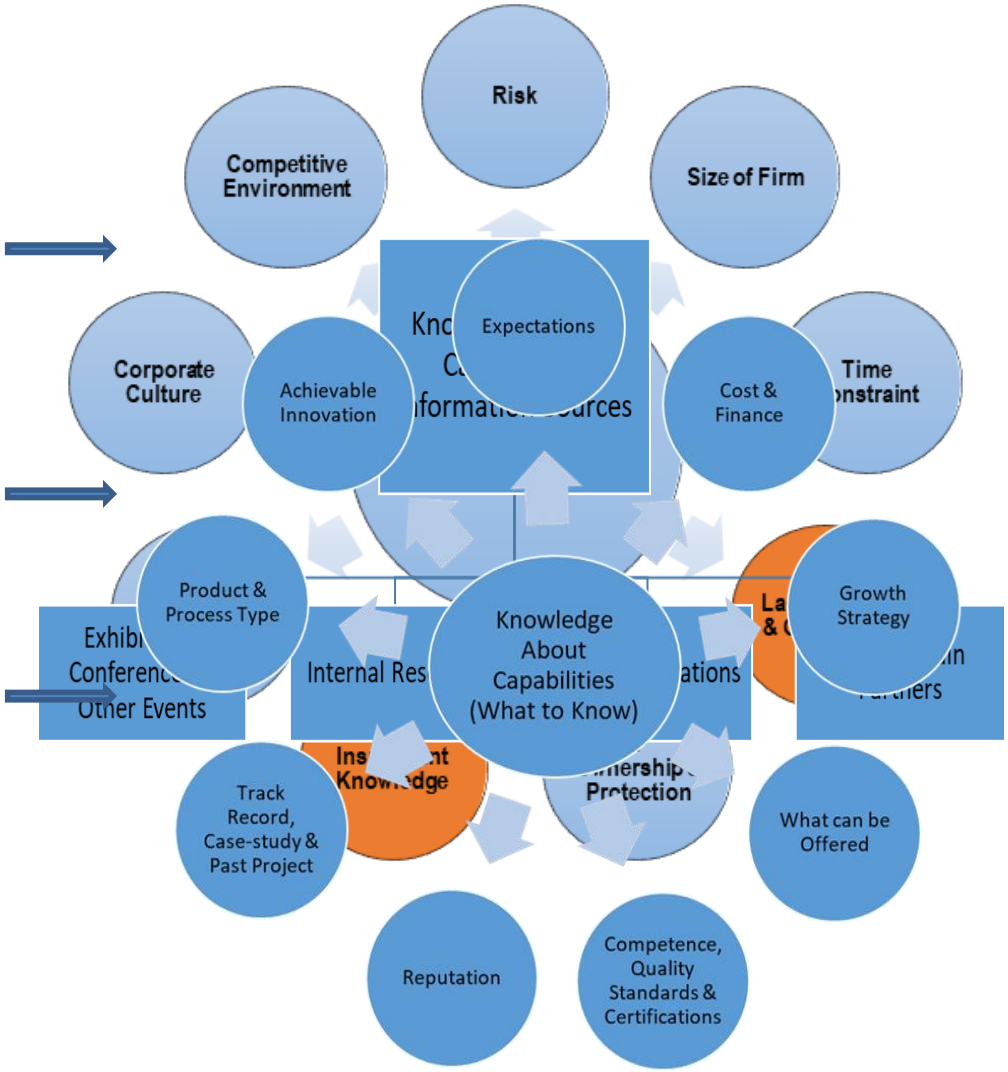
- Innovation definition reflected in organisation's supply chain position
- **Remaining Competitive**; the overriding motivation for innovation
- **In-House R&D** is the single most common innovation practice
- Inter-firm collaboration is currently **non-existent**



Key Findings

RQ2

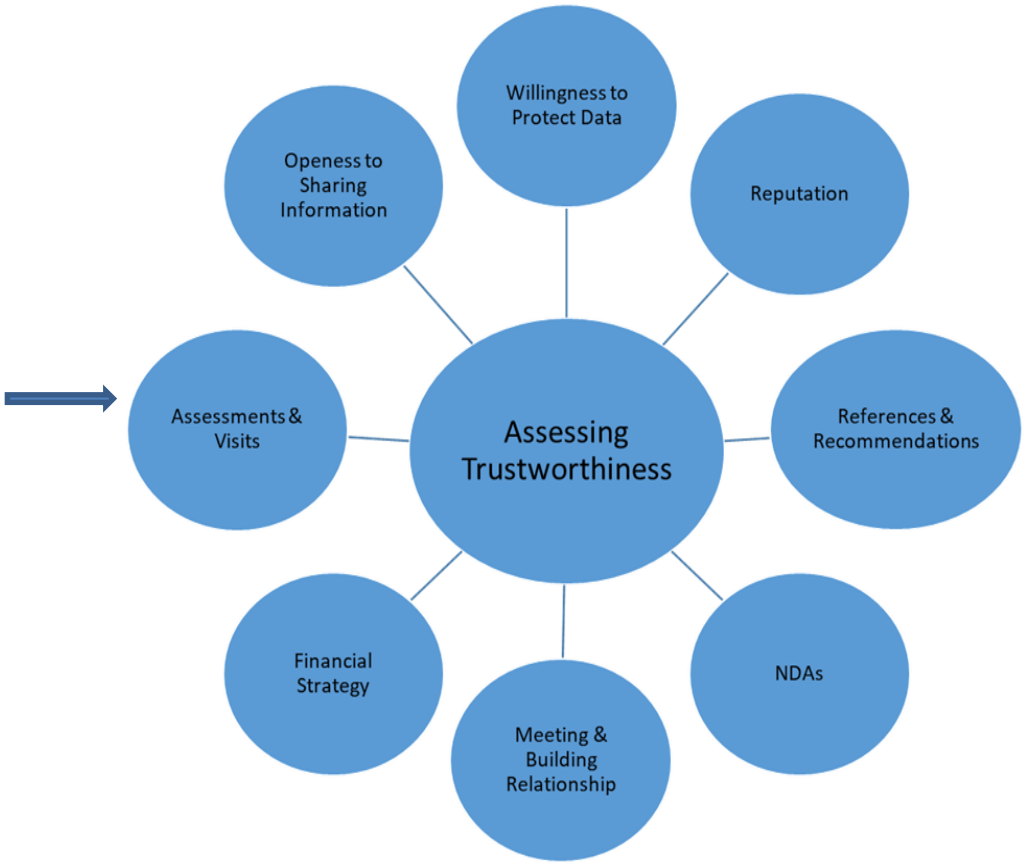
- Lack of knowledge of capabilities; a hindrance to innovation collaboration
- Information Sources
- What to Know



Key Findings

RQ3

- **Trust** is a key determining factor in the decision to collaborate
- Assessing Trustworthiness



Conclusion

- Innovation definition reflected in organisation's supply chain position
- Remaining competitive emerged as the overriding motivation for innovation across SMEs studied
- In-House R&D is the single most common innovation practice across analyzed firms
- Inter-firm collaboration is currently non-existent
- Lack of knowledge of capabilities of firms across the sectors is a hindrance to collaborations
- Suppliers and trade associations are important sources of information on capabilities
- Trust is essentially important in the decision to collaborate.

Next Steps

- Quantitative Study Based on Constructs from Qualitative Study
  - Survey of case-study sectors

- Follow a new line of inquiry emanating from analysed data;

  - Harnessing collaboration between firms and Research centres/Universities **(One-on-One Collaboration)**

  - Industry Project led innovation collaboration **(Multi-Firm Collaboration)**

ERC
Enterprise Research Centre

Thank you

Engaging with ERC projects

- Vicki Belt

A reminder: The ERC's mission

To be THE UK's 'go to' centre of research expertise on SME growth, innovation and productivity

- Providers of independent, **trusted** data and insight, based on **rigorous** analysis
- Delivering **relevant** research that focuses on the issues that policymakers and businesses face
- Giving **useful** advice, and practical, actionable **recommendations**

High quality engagement is absolutely crucial to our success and underpins all our activities

The engaged scholarship model

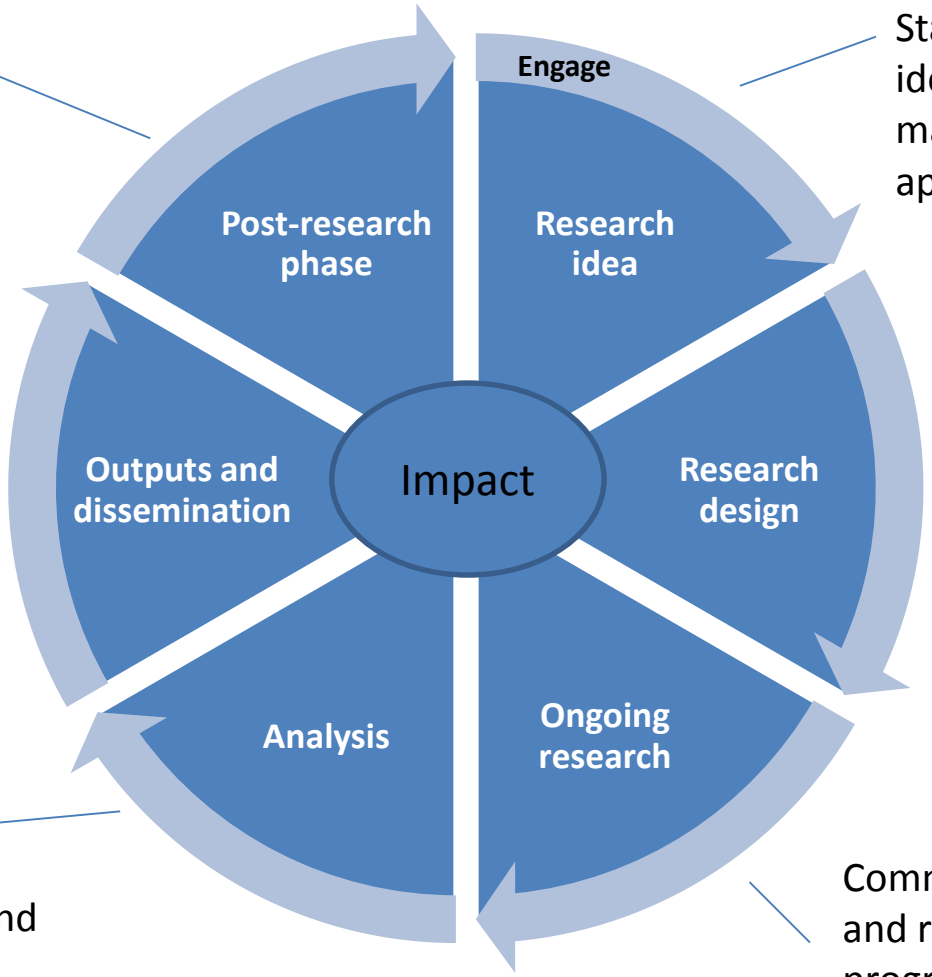
Enterprise Research Centre

Maintain stakeholder relationships, review and monitor impact capture learning

Stakeholder identification, mapping and approach

Discuss and agree how to best present findings, integrate stakeholders in dissemination activity

Mutually define aims, engagement plans, impact pathways



Share emerging findings, discuss and mutually interpret meaning

Communicate and review progress, address issues

Engagement building blocks

Engagement mechanisms

Communications	Steering groups	Events	Outputs
• Newsletter • ERC website • Twitter, LinkedIn	• ERC Steering Group • Project Advisory Groups	• Showcases, seminars • State of Small Business Britain Annual Conference	• SOTA Reviews • Infographics • Blogs

Commissioning projects

These projects have become a significant portion of the work ERC does.
Recent examples:

- Building better business resilience (JPMorgan Foundation)
- Assessing the drivers of productivity change in the six UK sectors (CPP)
- Business support in less favoured areas (FSB)

Final remarks

Future engagement priorities:

- Deeper engagement with nations and regions
- Maximising media/social media opportunities
- Research synthesis (SOTA Reviews, utilising the back-catalogue)

Get in touch ☺

Vicki.Belt@wbs.ac.uk

Lunch

Welcome Back

Diffusion of digital innovation

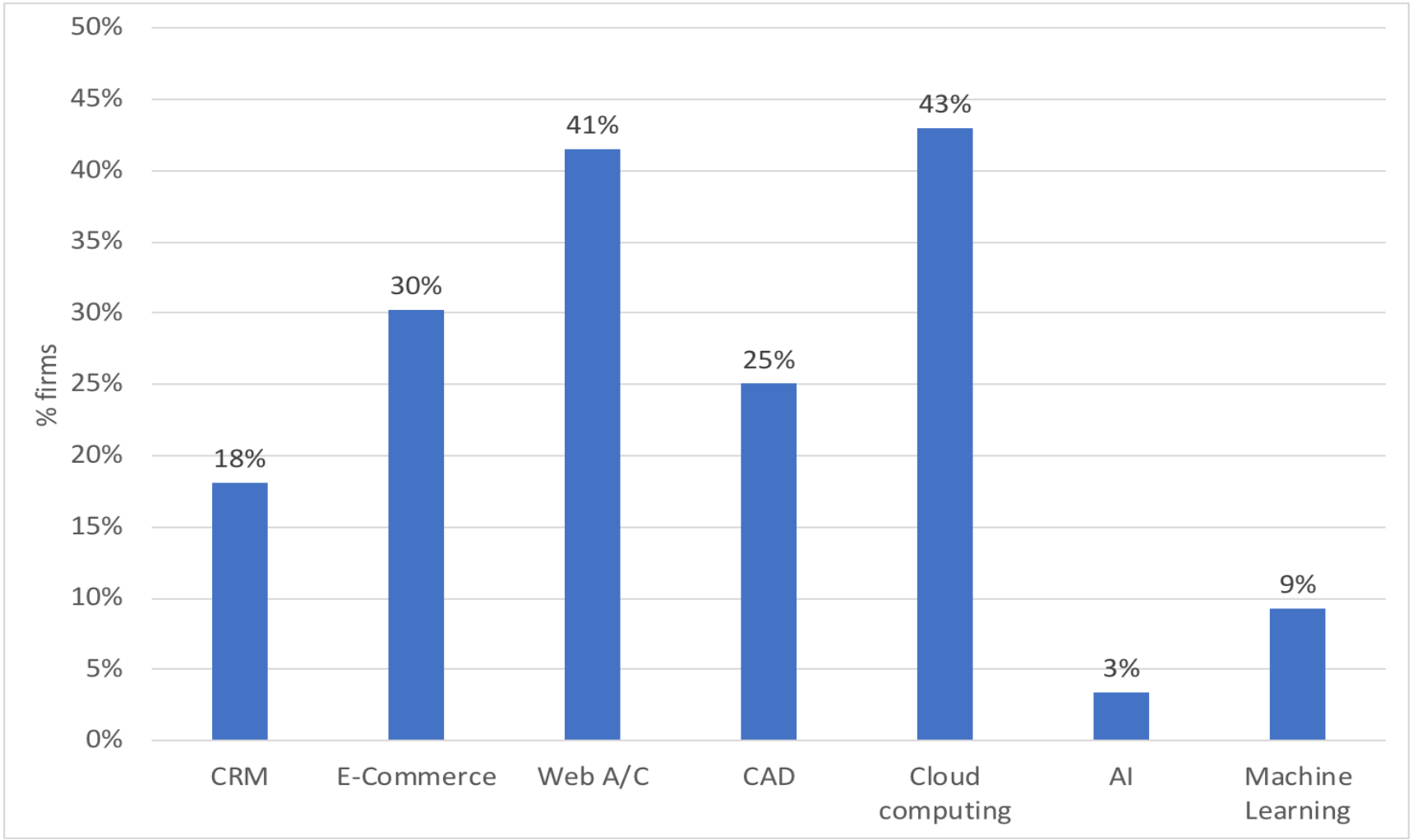
- Jane Bourke
- Stephen Roper

Agenda

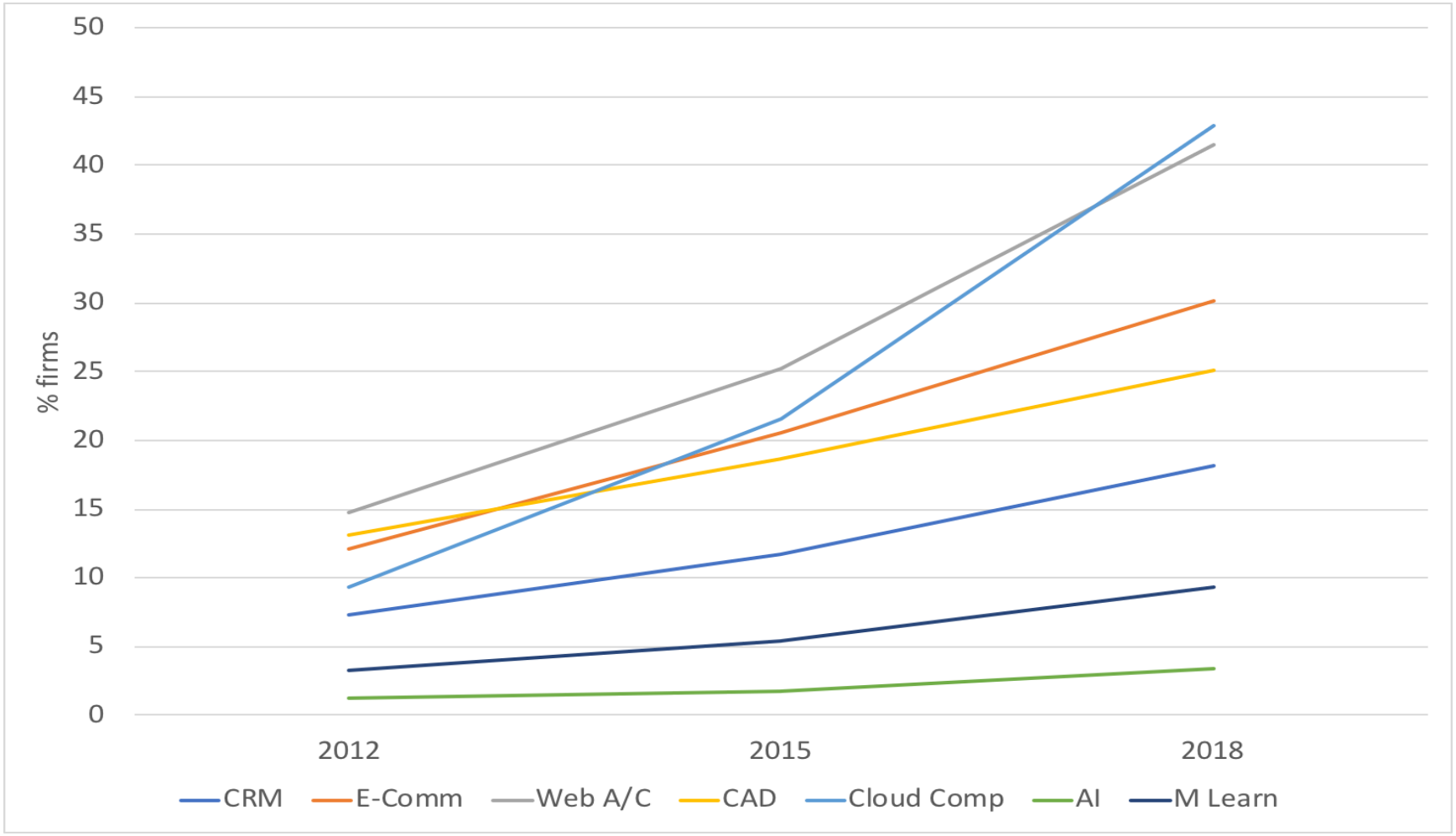
- What is the take-up of digital technologies in UK micro-businesses?
- What are the benefits of digital adoption?
- What shapes technology adoption by individual firms?
- Next Steps

What is the take-up of digital technologies in UK micro-businesses?

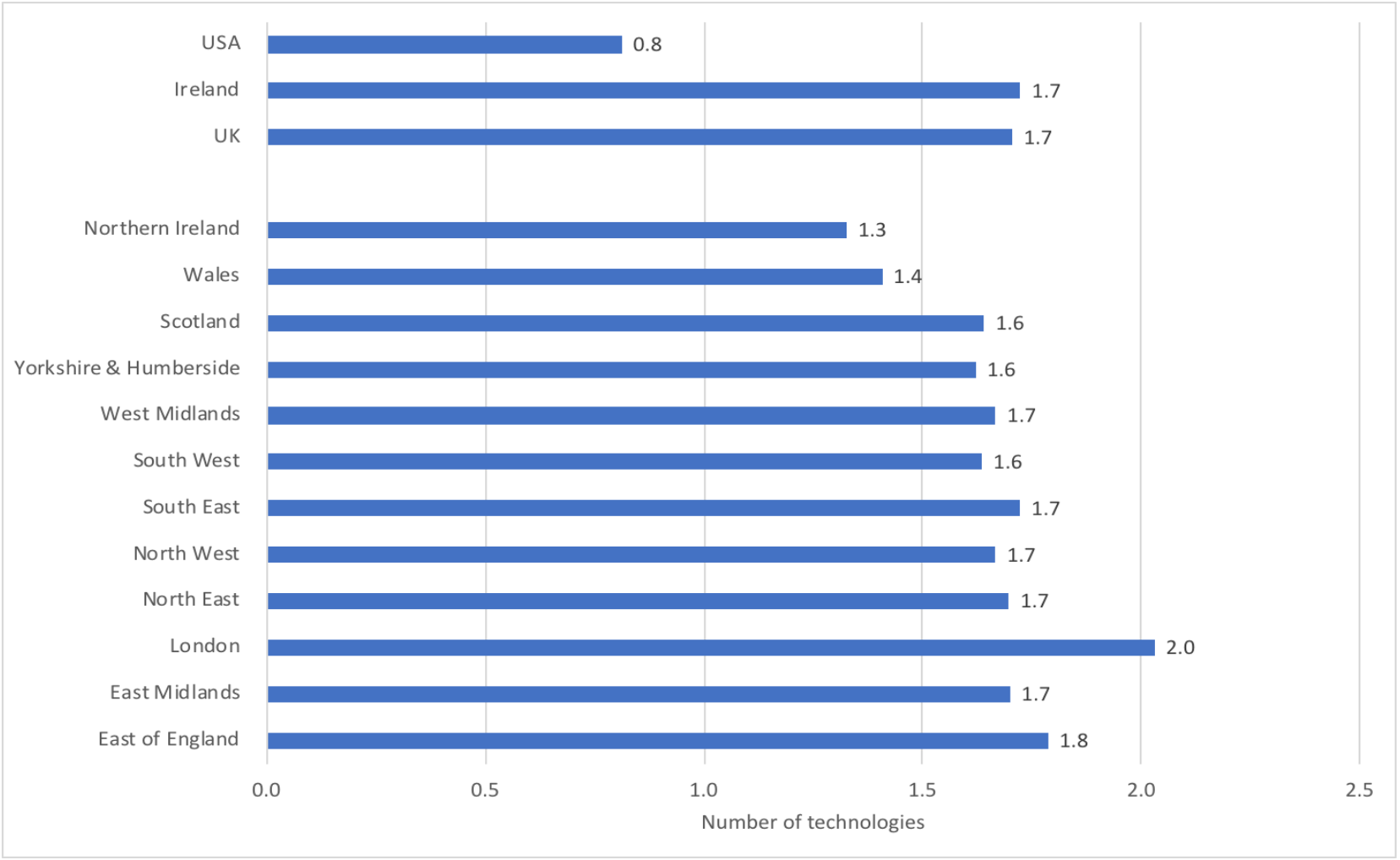
Digital adoption – as of 2018 (% firms)



Adoption has risen sharply since 2015 (% firms)



Number of digital technologies in micro-businesses by UK region



Source: Understanding micro-businesses in Northern Ireland, ERC Nov 2018

What are the benefits of digital adoption?

What are the benefits of digital adoption?

- Survey respondents highlighted **operational benefits**:
  - *'helps it run more smoothly and ensures data security'*
  - '*I just think it makes us more competitive*. *Tightened up admin, production scheduling. Increased productivity and reduced the time machines are standing. Therefore, reduced down-time*'.

- Similar benefits were noted in terms of the value of web-based accounting software:
  - '*It has streamlined the business - a lot of labour has been reduced*'
  - '*Enables you to run the business from a distance. It is more convenient to access things from different computers and devices. Means I don't have to be in the office to access data*'.

What are the benefits of digital adoption?

- In some cases, digital adoption led to significant changes in **working practices**
  - '*It has increased our orders, improved the structure of the business. We can now process and control our data more faster and efficiently. All our data is put on to our database rather on pieces of paper*'.

- Improvements in the quality of data and products/services have also had **commercial benefits**
  - *'increasing profitability and turnover'*
  - *'improved sales and attracted customers which lead to generating profit'*

What shapes technology adoption by individual firms?

What determines digital adoption by micro-businesses?

- Our recent ERC research paper asks this question focusing on UK adoption between 2015 and 2018
- We consider a range of factors which shape adoption
  - Information flows through networks (epidemic)
  - ‘Strategic’ factors which may shape the returns to adoption
  - Learning-by-using effects which capture prior experience of adoption
  - Ambition which may moderate the link between returns and adoption

Network Effects

Network and collaborative linkages are strongly connected to digital adoption

- Advisory networks, business networks and innovation collaborations can all provide micro-businesses with information and understanding of the value of digital technologies and are positively linked to digital adoption.

- Suggests the value of diverse sources of advisory support – both public and private in encouraging firms to adopt new digital innovations.

Strategic Effects

Strong evidence that firm-level strategic influences impact digital adoption.

- Micro-businesses with stronger internal resources (business plans, training) are more likely to be digital innovators.
- This potentially reinforces their competitive advantages over more resource-constrained competitors.
- This reflects arguments made in recent OECD publications which suggest that a stronger impetus towards innovation in ‘frontier’ firms and a failure of diffusion towards ‘laggards’ may be exacerbating disparities between high and lower productivity firms (OECD 2015).

Strategic Effects

Prior levels of sectoral adoption are positively linked to adoption.

- A potential supply-side effect related to the improvements in technology as the size of the user base increases.

Learning-by-Using Effects

Prior adoption of digital technologies is negatively related to subsequent adoption.

- Implementation challenges?
- Increased competitive advantage?

Growth Ambition

Firms with stronger ambition are more likely to adopt new digital innovations given level of returns.

Also, ambition strongly moderates the influence of the returns to adoption on the probability of adoption: firms with higher levels of ambition are more likely to adopt digital technologies given any particular level of anticipated returns.

The implication is that digital innovation can be a mechanism through which ambition is linked to subsequent business performance.

Next steps

Next steps

- Key finding here is that ambition strongly moderates the influence of the returns to adoption on the probability of adoption
  - Other moderators may also be of interest such as family ownership or other contextual factors.

- Rural-urban divide? Broadband availability?

Job creation and destruction in the English regions and Devolved Administrations

- Mark Hart
- Neha Prashar

Focus on Business Dynamism

- Clear connection between '***business dynamism'*** and growth in productivity

- Business start-up and growth metrics reveal the challenge ahead for the UK

- The job reallocation rate – a key metric of business dynamism

Overview

- Analyse how the business stock in the private sector in the UK has changed between 1998 and 2018 – specific focus on the key dynamics of job creation and destruction – **a simple accounting framework**

- These metrics help us to understand the level of turbulence in jobs and to analyse the type of firms which most contribute to job creation/destruction in the UK[1]

- Using employee data from the ONS BSD, we examined the average annual job creation and destruction rates between 1998-2018, as well as entry and exit rates.

(1. Davis et al., (2008); "Turmoil and Growth: Young Businesses, Economic Churning and Productivity Gains"

Metrics (1)

- The job creation and destruction rates are defined in the conventional way:
  - **Job Creation** – employment changes summed over all businesses that expand or start up in a given year.
  - **Job Destruction** – employment changes summed over all businesses that contract or exit in a year
- These job creation and destruction figures are expressed as rates by dividing by employment averaged over the current and previous year (businesses with no change in employment do not contribute to either job creation or job destruction).

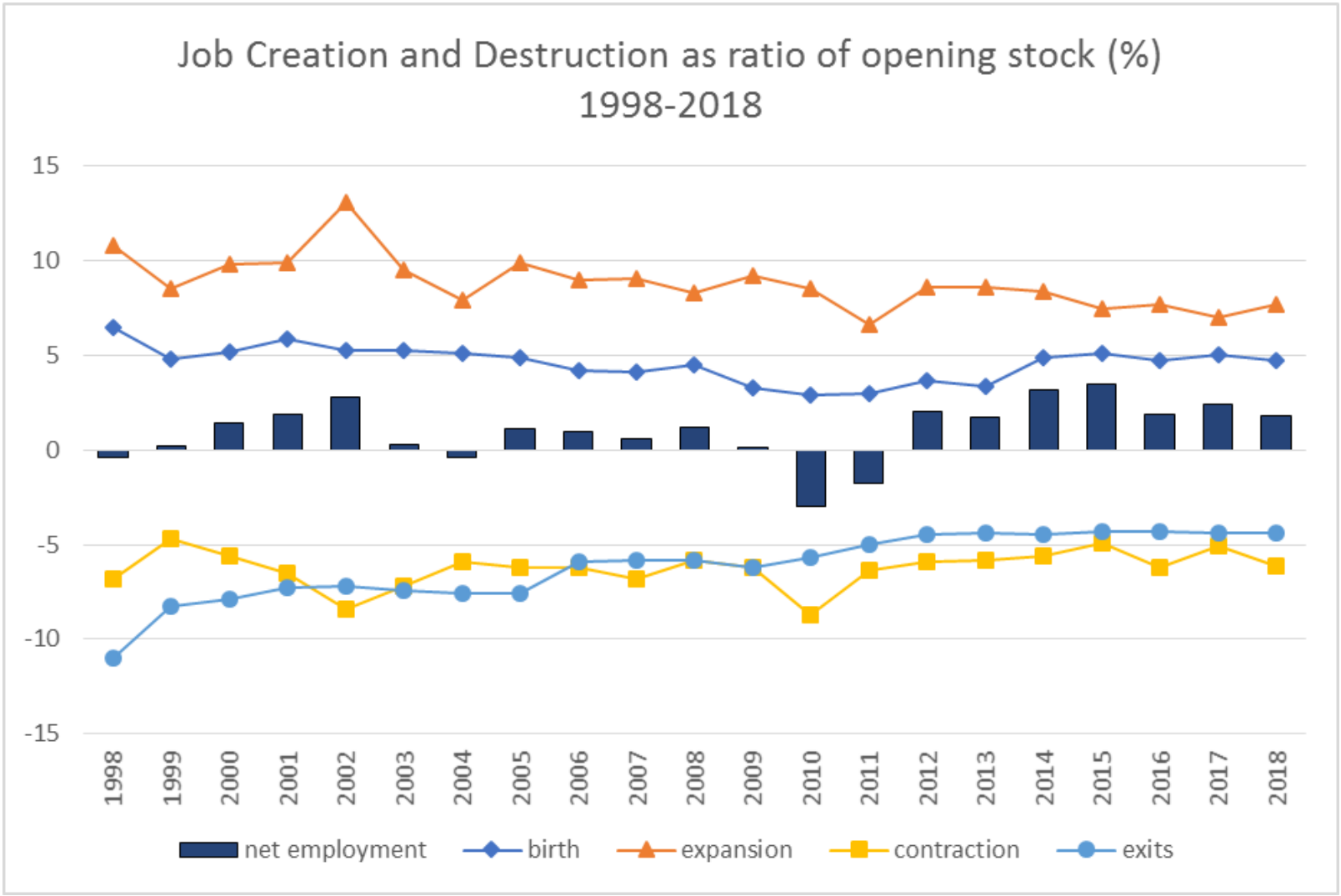
Metrics (2)

- The sum of the job creation rate and the job destruction rate is referred to as the job reallocation rate.

- It summarises the overall volume of change and in essence represents the ‘reshuffling of job opportunities across locations’ (Davis et al., 1996 – “Job Creation and Destruction”).

- Tracking the job reallocation rate allows us to arrive at a measure of business dynamism for the economy.

Job Creation and Destruction - UK



General Observations

- We can see that there was very little variation in these rates of job creation and destruction over the period – averaging around 20-28% over 20 years (i.e., the job reallocation rates).

- Prior to the Great Recession the job reallocation rates averaged 27% compared to 22% since 2010.

- This is in marked contrast to the US where there is growing evidence that business dynamism and entrepreneurial activity are declining as over the last 30 years the number of start-ups and the scale of job reallocation rates have been in decline (Goldschlag and Tabarrok, 2018).

Picking at the Bones

- Net employment change rose rapidly after the Great Recession but has fallen in recent years

- The Great Recession saw reduced job creation through entry and expansion, but what is very noticeable is the steady decline since the turn of the century in the amount of job creation through the expansion of existing businesses – a challenge recognised by the recent BEIS Industrial Strategy White Paper.

- Job creation through start-ups, however, has been on the rise since the economic downturn but is now beginning to plateau.

- Job destruction through contraction fell steadily between 2010 and 2015 but there is clear evidence they have begun to rise since then and particularly in the last 2-3 years.

Snapshot of last 12 months

Table 1: Job Gains and Losses in the UK, 2017-18

	Job Gains	Job Losses
Start-ups	1,002,747	
Expansion	1,646,242	
Closure/Exit		951,915
Contraction		1,307,640
Total	***2,648,148***	***2,259,555***
Net Job Change	**+389,439**	
Gross Job Churn	**4,908,544**	

Source: ONS Business Structure Database (1998-2018)

What's Changed?

- Job gains through businesses entering the market remained static at around 1 million jobs while expanding firms created an additional 180,000 jobs in 2017-18 compared to 2016-17.

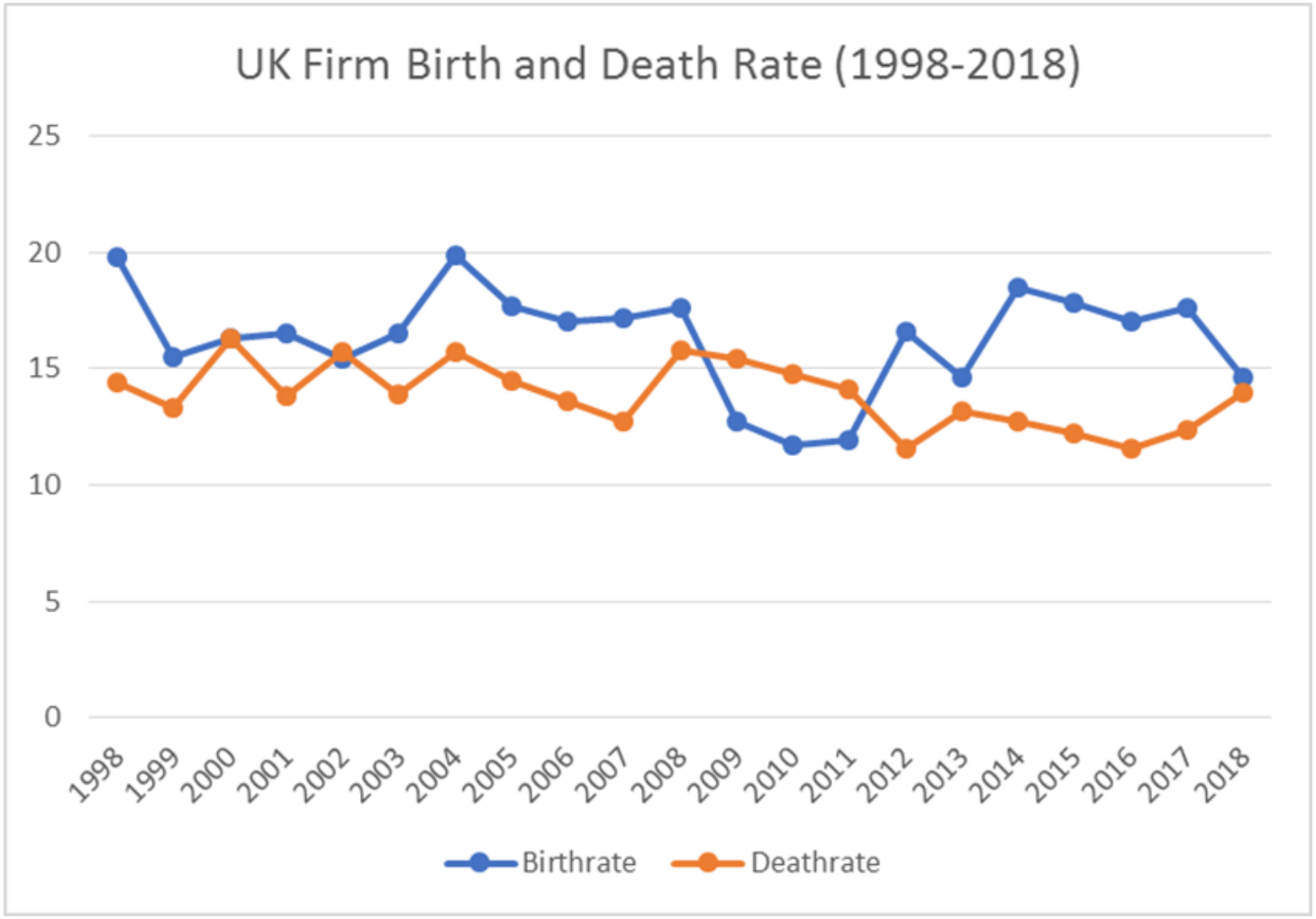
- On the debit side there were an additional 400,000 job losses through the closure of businesses and a sharp rise in job losses through the contraction of existing businesses – an additional quarter of million job losses.

- So, overall, there are both positive and negative messages in the analysis but one should not be rushing to draw a 'direct correlation' with the current levels of uncertainty and a stalled business environment in the UK economy.

- The key point to note is that there is an underlying level of turbulence in the private sector in periods of growth in the economy and this is an important indicator of business dynamism.

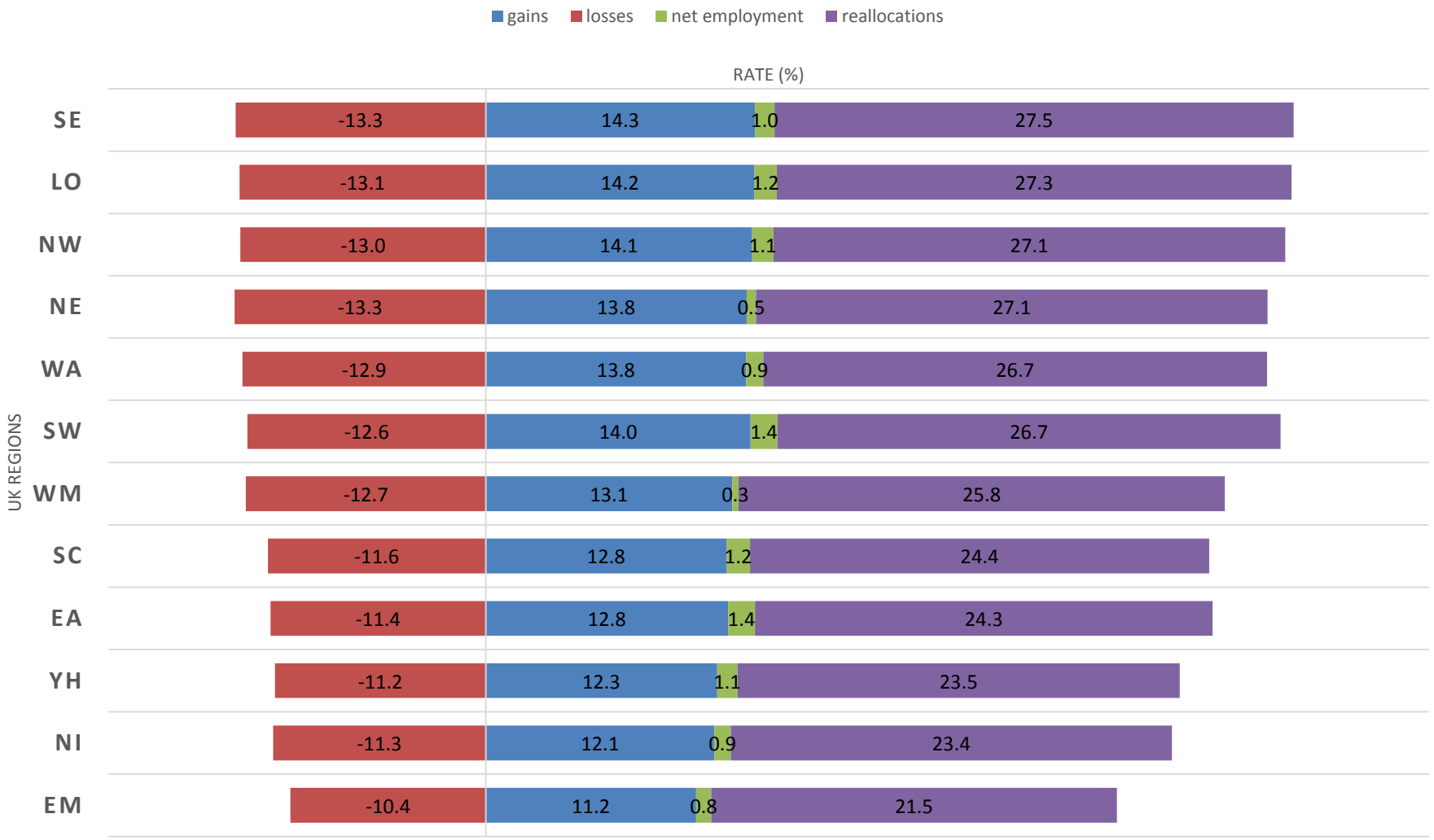
- It is the balance of the components which is important and the faltering level of job creation in business entry and the rise in job losses in existing businesses and though business exit are early signs of concern in the current economic context.

Employer Enterprises – entry and exit



Business Dynamism - Regional Dimension (Average – 1998-2018)

Enterprise Research Centre



Final Remarks

- Reminder – the analysis presented here is merely an accounting framework – nothing more, nothing less.

- Important to connect these ‘metrics’ to the processes that lie behind them.

Thank you!

Questions and comments?

More information at http://enterpriseresearch.ac.uk/

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Understanding business resilience among under-represented groups in London

➢Maria Wishart

Why does this research matter?

- SMEs account for 99% of businesses, 68% of jobs and 58% of value-added in the European Union (EU, 2017)
- Female and ethnic minority groups under-represented in entrepreneurial activities and entrepreneurship literature
- Very little known about how these entrepreneurs experience and respond to adversity
- More detailed understanding of these groups required, to underpin more flexible and nuanced policies and approaches

Part of a broader project

- 1st phase: Literature reviews (Completed July 18)
- 2nd phase: London fieldwork:
  - Survey of 600 firms (Completed Dec 18)
  - Qualitative research (In progress)
- 3rd phase: European fieldwork
  - Survey and Qualitative research (Spring 2019)

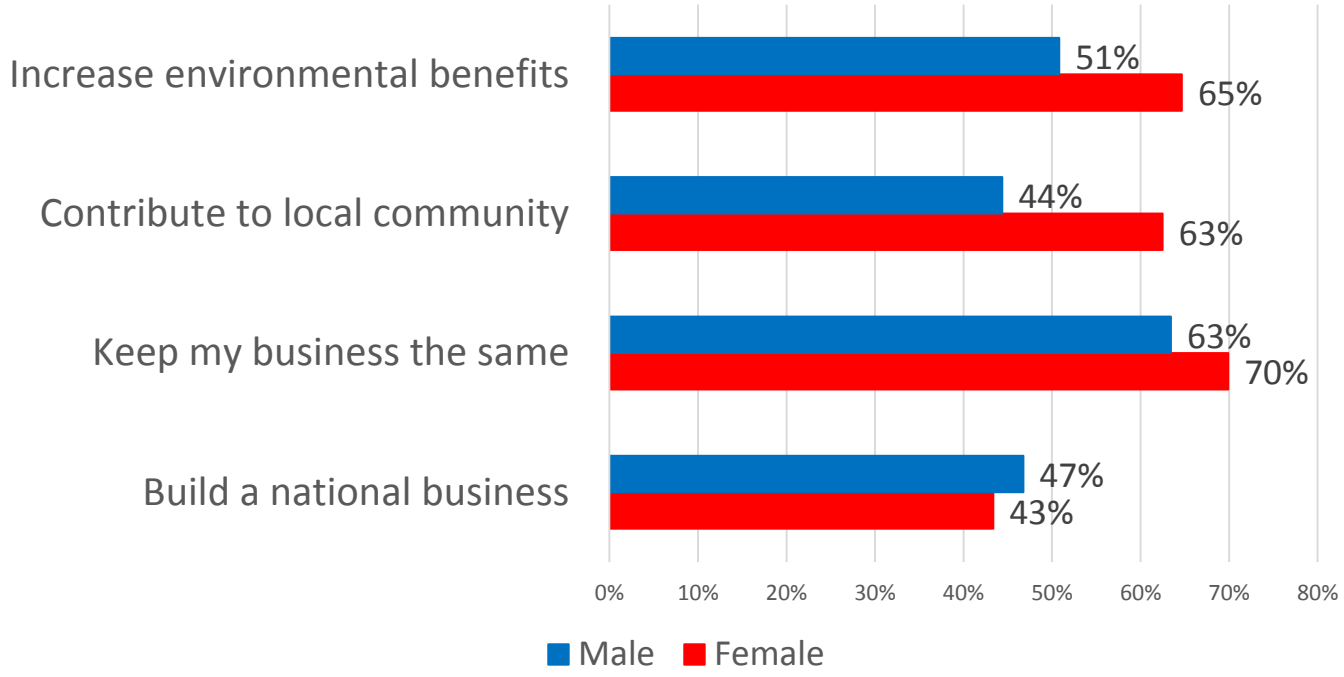
- Aims
  - Identify the characteristics and strategies that foster resilience, survival and growth in SMEs
  - Develop practical toolkits to support under-represented entrepreneurs in developing more resilient businesses

London survey – headlines

- 48% of ethnic firms vs 33% of non-ethnic had experienced an existential threat in the past 5 years
- Female and ethnic leaders judged threats differently to their male and non-ethnic counterparts
- Female and ethnic leaders identified different business priorities to their counterparts
- Female and ethnic leaders had consulted different external sources of advice

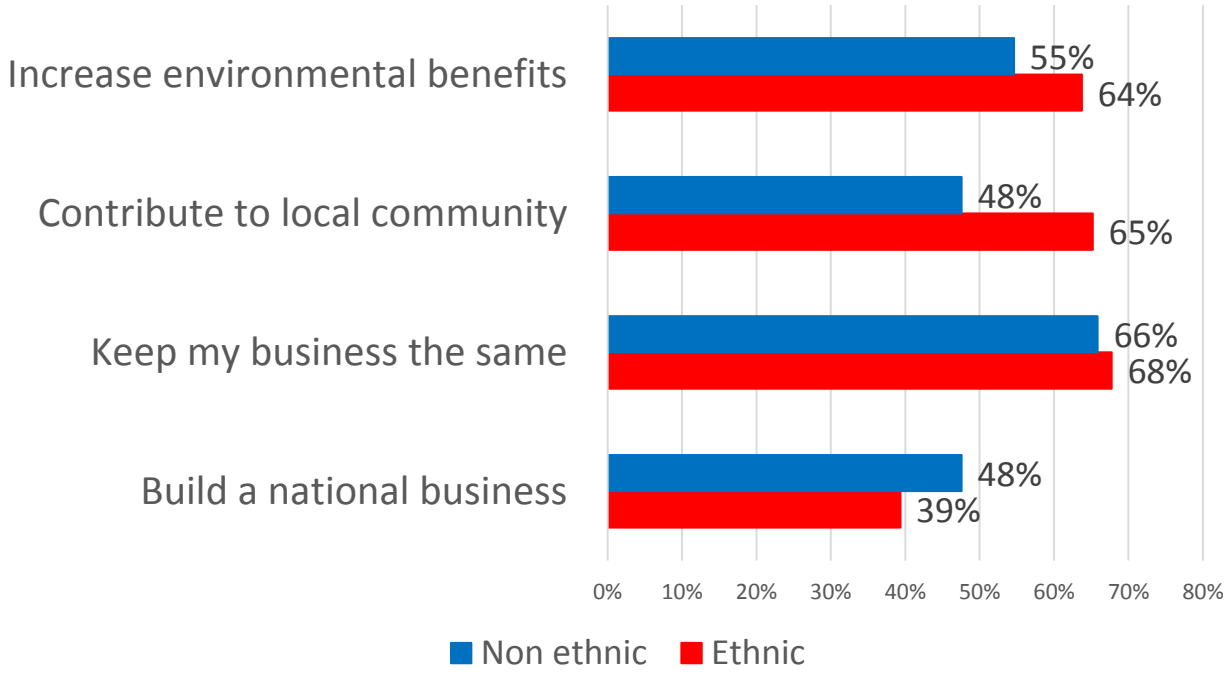
Anticipating & planning for adversity

Ambition and business objectives. Female vs male



Anticipating & planning for adversity

Ambition and business objectives. Ethnic vs non-ethnic



Anticipating & planning for adversity

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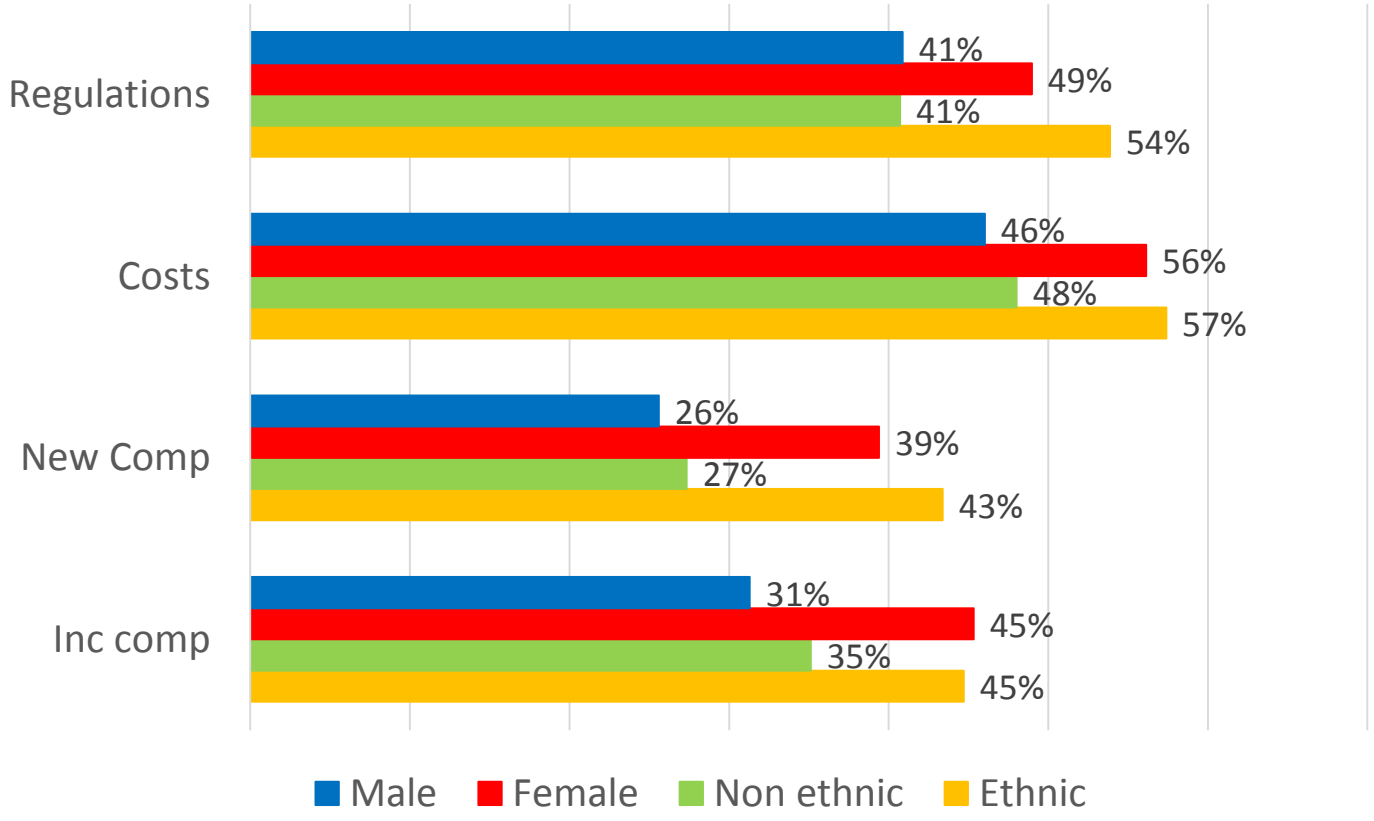
Perceived threats



Anticipating & planning for adversity

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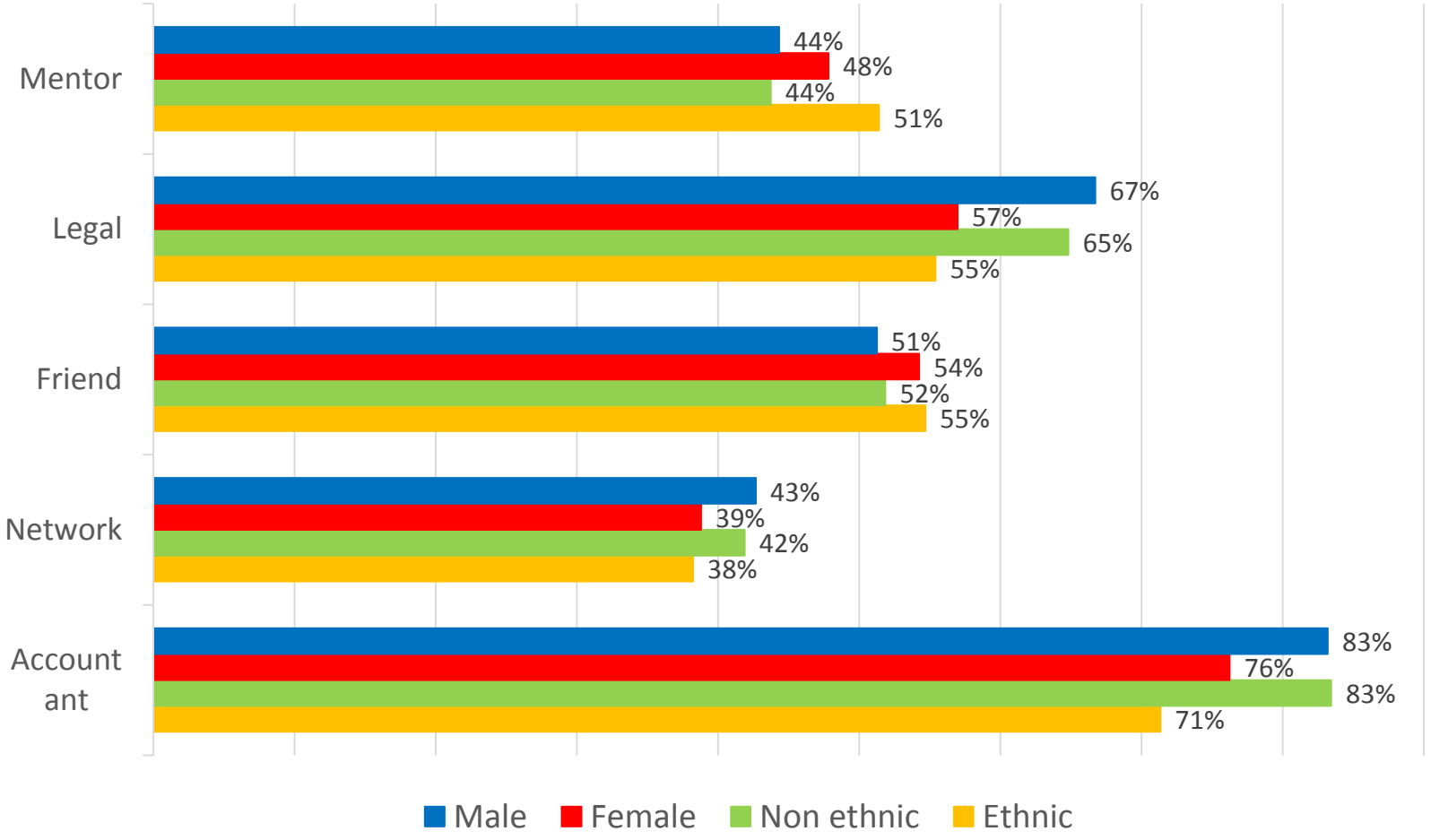
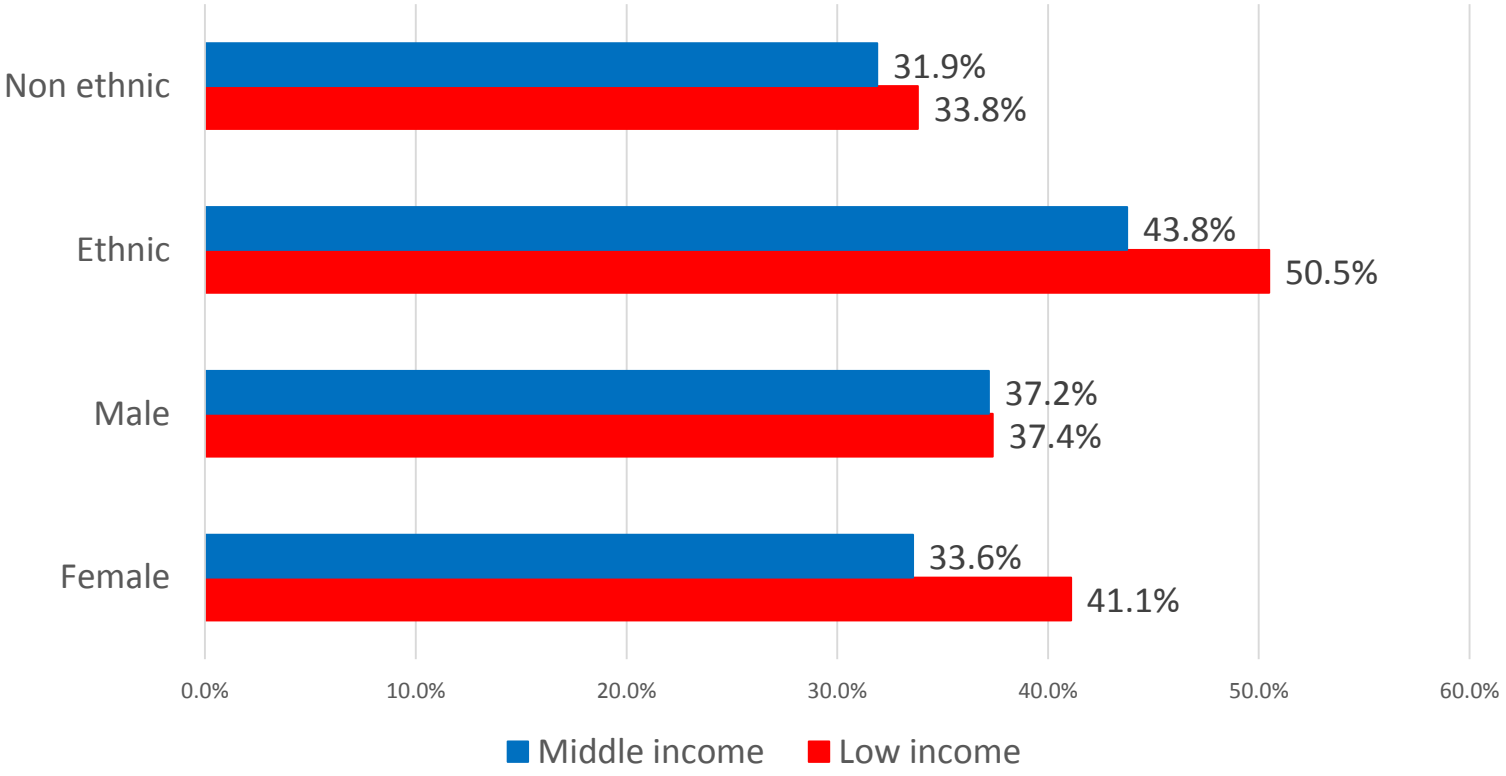
Sources of advice



Experiences of adversity

Firms experiencing a crisis in past 5 years



Conclusions

- Material differences in the ways in which female and ethnic leaders
  - run their businesses
  - plan for & experience adversity

  compared to male and non-ethnic counterparts
- Some differences can be amplified in different types of borough
- Female and ethnic leaders are not homogeneous – they have common and distinctive characteristics and experiences

Qualitative insights so far…

- Narratives of discrimination, lack of confidence, no time to plan

  I was just on a treadmill just getting through, just getting through, just getting though. (F1, manufacturing)

- Practical interventions, not an 'avalanche of information'

  I think that's the way to absorb the shocks and that's the way to survive …is if it's process driven, you know, you have policies and procedures and processes (F3, retail)

  It probably was going to that workshop, and that sounds absolutely bizarre I know, but it was just that sort of feeling that I'm OK, I can argue this (F2, publishing)

  …specific advice for my specific business I don't get that, I get the generic and implement the generic advice from entrepreneurs out there but I would love to kind of have specific [advice] (M5, retail)

Implications

- Developing targeted initiatives and support mechanisms for these under-represented groups is both appropriate and timely.
- The challenges faced by different under-represented populations have both general and more specific elements which could be addressed through bespoke support mechanisms.
- Policy and interventions that take account of borough type may also be appropriate.

Project round up and upcoming projects

- Stephen Roper
- Mark Hart

New ‘core’ research projects (March to November 2019)

ERC Enterprise Research Centre

Investment, non-borrowing and place

Project focuses on the ‘place’ agenda and the potential for differentiated Local Industrial Strategies related to finance status and access to finance

How does SMEs’ willingness to borrow and invest vary with place?

From eco-system to growth – the moderating effects of L&M practices

Effective LISs can create an eco-system which is conducive to growth and productivity improvement. But, do UK firms have the capabilities and practices – absorptive capacity – to capitalise on their beneficial environment?

What are the links between IP protection, innovation and growth?

Are firms with a history of registered IP investment significantly more likely to innovate? Is their innovation ‘different’? How do these effects differ in firms of different sizes? Sectors?

Learning from the best SMEs – a sectoral perspective

Which SMEs are at the national productivity frontier? What are their key characteristics? What is the potential for improving diffusion from these firms?

Investment, non-borrowing and place (Ri, Hart, Fraser, Du)

- Project focuses on the 'place' agenda and the potential for differentiated Local Industrial Strategies related to finance status and access to finance

- The project will focus on three research questions:
  - How does SMEs' willingness to borrow and invest vary with place?
  - How has this changed through time (2015 to now)?
  - What are the implications for Local Industrial Strategies?

- Two analyses are envisaged here with a focus on trends in local borrowing and firms' finance status in the period since 2015:

  - A comparison of investment intentions in the 2015 (pre-Brexit vote) and 2018 waves of the LSBS to consider how SMEs' borrowing and investment intentions have changed in different localities. What is shaping these shifts?

  - The SME Finance Monitor has since 2015 included questions about future borrowing and (tangible and intangible) investment intentions. ERC has matched this data with BSD, allowing place-based trends analysis. In particular, we will be able to consider how SMEs' borrowing and investment intentions change as we move towards and beyond Brexit and how any trends vary between regions and the home nations.

From eco-system to growth – the moderating effects of L&M practices (Hart, Becker, Prashar)

- For small firms, particularly those with ambitions to grow, external finance, advisory resources and knowledge for innovation and market development are critical.

- Effective LISs can create an eco-system which is conducive to growth and productivity improvement. But, do UK firms have the capabilities and practices – absorptive capacity – to capitalise on their beneficial environment?

- Specifically, what type of L&M practices enable small firms to most effectively take advantage of external eco-system resources?

- We plan an analysis of the LSBS waves 1-4, matched with the BSD and detailed data on firms' local business eco-systems to undertake a causal analysis of the links between management capability, eco-system characteristics and subsequent performance.

- The central research question is *'how do small firms' management and leadership practices moderate the links between eco-system resources and subsequent growth/productivity?*

What are the links between IP protection, innovation and growth?

(Love, Becker, Hewitt-Dundas, Turner, Jibril, Roper)

- What impact does the IP system have on growth and productivity? In Spain, the evidence suggests, industrial designs are the most economically-efficient form of IP protection for smaller firms, while patents prove more efficient for larger firms. What about the UK?

- New patent, trademark, copyright and registered design histories of UK firms using IPO data will be matched with UK Innovation Survey and BSD.

- Initial research questions:
  - Are firms with a history of registered IP investment significantly more likely to innovate? Is their innovation 'different'?
  - Are registered IP users more likely to translate innovation into productivity or growth?
  - How do these effects vary by type of firm and for combinations of registered IP instruments (e.g. patents and trademarks).

Learning from the best (most productive) SMEs – a sectoral perspective

(Jibril, Bourke, Becker, Mole, Roper)

- Previous research has highlighted the 'long-tail' of lower productivity firms in the UK as significant drag on national productivity performance.

- Other evidence suggests the importance of the diffusion of innovations within national industries: viz, firms' 'distance from the Global Frontier … matters significantly, [but] its pull is less than a third as strong as the National Frontier. … new global frontier technologies do not immediately diffuse to all firms. Instead, they are first adopted by national frontier firms, and only diffuse to laggards once they are tested by national frontier firms' (Andrews et al. 2015, p. 24).

- Our objectives here are to (a) identify SMEs which are at the national frontier of productivity within their sector (b) identify the correlates or causes of that performance and (c) consider the potential for improving diffusion.

- Analysis will adopt a mixed-methods approach combining data analysis of the correlates of high productivity growth among SMEs using survey data (e.g. UK Innovation Survey, IP data, ESS, LSBS) along with semi-structured interviews with around 25 high productivity SMEs.

A new long-term partnership …

- The Enterprise Research Group at Queen's University Management School, Belfast in partnership with ERC has agreed a three-year contract with the Department for the Economy (NI) and Invest NI
- This work is being led by Prof Nola Hewitt-Dundas and will fund staff and a programme of research based at Queen's undertaken in partnership with ERC
- Projects will draw on ERC data but recognize the particular opportunities and challenges faced by Northern Ireland firms and policy-makers
- During 2019-20 this will include projects on:
  - the Global Entrepreneurship Monitor for NI
  - spillovers from inward investment
  - sectoral productivity
  - R&D, innovation and productivity
  - SOTA reviews (4)

Other commissioned projects - selected (2019)

Productivity from Below

ERC is a partner is a major ESRC funded project to investigate productivity growth in micro-businesses with a particular focus under pressure sectors.

Led by Prof Monder Ram (Aston) this project lasts until 2022.

Mittelstand mindset for a digital age

Mittelstand meets Industry 4.0. How do management and digital practices differ between UK and German automotive SMEs?

A joint project with WMG. Reporting June 2019

Productivity in six UK sectors

Is value added per employee a useful productivity measure from a business perspective? What drives productivity change – internal or external factors?

Funded by the Centre for Progressive Policy and reporting April/May 2019

Intelligence system for LEPS

As Local Industrial Strategies are developed we aim to provide a robust and accessible data depository

Funded by BEIS (Local growth) ERC is working with Technopolis**.** Timeline till May 2019.

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Thank you

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