

The Effect of Knowledge Collaboration on Business Model Reconfiguration: Evidence from the United Kingdom

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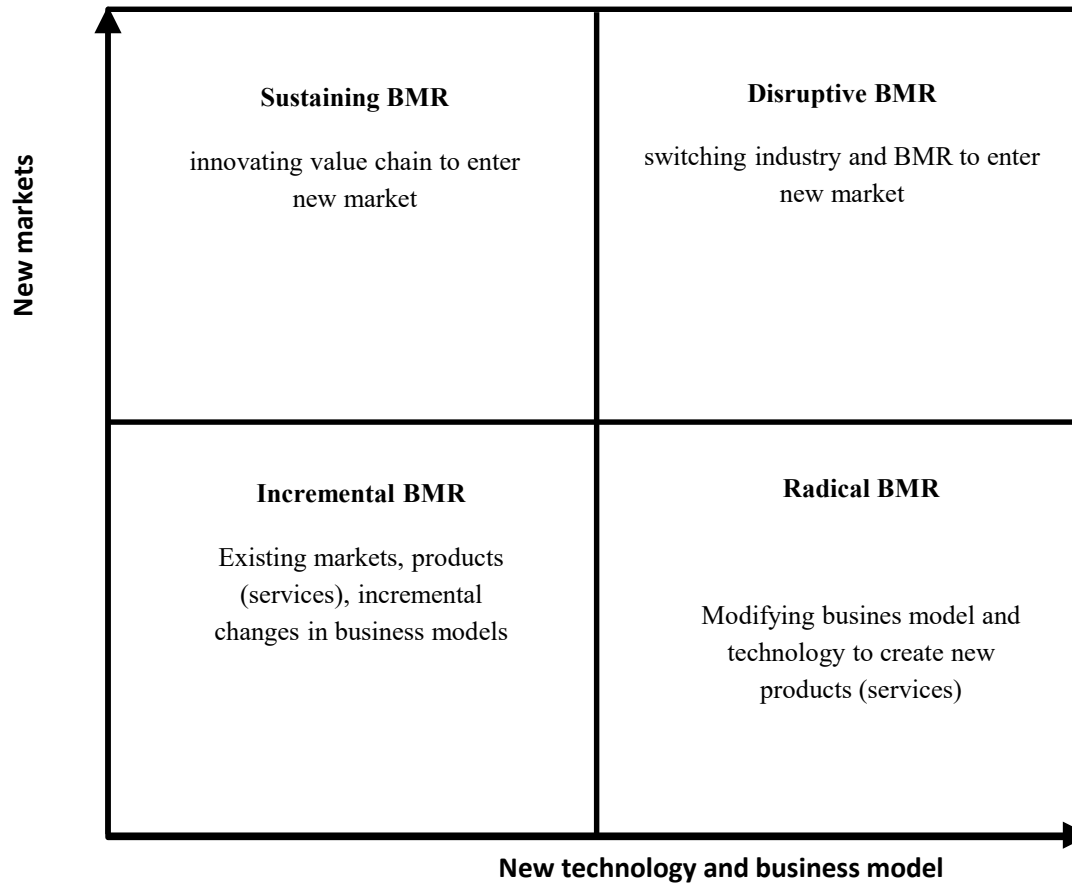
Motivation

- Given the high relevance of open inbound innovation (Faems et al. 2005; Laursen and Salter 2014; Ritala et al. 2015; Asimakopoulos et al. 2020), recent research approached firm-level collaboration with increased scrutiny on investigating the breadth and the depth of collaboration for different types of innovation activity (Stephan et al. 2019; Kobarg et al. 2019).
- The evidence about the sign and magnitude of the effect of knowledge collaboration breadth and depth on BMR does not exist, with the extant management literature has recently called for identifying the determinants of business model reconfiguration (Spieth et al. 2014; Foss et al. 2011, 2013; Foss and Saebi 2017; Desyllas, Salter and Alexy 2020).

Aim

- We contribute to open innovation literature by investigating the effects of the breadth and depth of knowledge collaboration and three modes of BMR filling the gap in the literature on a paucity of knowledge about the choice between different mode of BMRs.

Theoretical framework



Hypothesis

- *H1a: There is a positive relationship between the knowledge collaboration with diverse external partners (breadth) and radical and sustaining modes of business model reconfigurations (BMRs).*
- *H1b: There is no relationship between the knowledge collaboration depth and radical and sustaining modes of business model reconfigurations (BMRs).*
- *H2a: There is a positive relationship between the R&D collaboration depth and disruptive mode of business model reconfigurations (BMRs).*
- *H2b: There is a positive relationship between the intensity of knowledge collaboration with diverse external partners (depth) and three modes of business model reconfigurations (BMRs).*

Sample

- UKIS (2002-2014) six rounds
- BSD for 2002, 2004, 2006, 2008, 2010, 2012
- Matched sample results in 89518 obs.
- After cleaning and missing values our sample includes 24,211 observations and 17,985 firms who reported the absence or presence of all three modes of BMR.
- There is a small panel element of 2,651 firms observed at least twice over 2002-2014.
- We consider a REProbit models with a dependent variables $y_i \in [0,1]$, $1 \leq i \leq n$

Variables used in the study

Variables	Description (source of data)	Obs. original	Mean	Std. Dev.	Mean	Std. Dev.
					BMR sample N=24,211 obs	
Samples		Overall sample			BMR sample N=24,211 obs	
Disruptive BMR	DV: Binary variable =1 if a firm changed its 2 digits SIC sector in the survey period, zero otherwise (BSD)	52550	0.25	0.43	0.36	0.48
Radical BMR	DV: Binary variable =1 if introducing an increasing range of goods or services was important in a decision to innovate, zero otherwise (UKIS)	40411	0.74	0.44	0.71	0.45
Sustaining BMR	DV: Binary variable =1 if entering new markets was important in a decision to innovate, zero otherwise (UKIS)	27888	0.78	0.41	0.82	0.39
Suppliers breadth	Binary variable=1 if firm cooperates on innovation with any suppliers of equipment, materials, services, 0 otherwise (UKIS)	49942	0.79	0.41	0.77	0.42
Customers breadth	Binary variable=1 if firm cooperates on innovation with any clients or customers, 0 otherwise (UKIS)	42720	0.77	0.42	0.79	0.41
Competitors breadth	Binary variable=1 if firm cooperates on innovation with competitors or businesses in industry, 0 otherwise (UKIS)	49038	0.75	0.43	0.73	0.44
Consultants breadth	Binary variable=1 if firm cooperates on innovation with consultants, commercial labs or private R&D institutes, 0 otherwise (UKIS)	49117	0.54	0.50	0.50	0.51
Universities breadth	Binary variable=1 if firm cooperates on innovation with universities or high educational institutions, 0 otherwise (UKIS)	49217	0.41	0.49	0.34	0.47
Government breadth	Binary variable=1 if firm cooperates on innovation with any of other businesses within enterprise group, 0 otherwise (UKIS)	48807	0.42	0.49	0.35	0.48
Suppliers Depth	How efficient was firm cooperation with (0-3) any suppliers of equipment, materials, services 0- not efficient; 3 very important (UKIS)	52061	1.70	1.16	1.56	1.07
Customers depth	How efficient was firm cooperation with (0-3) any clients or customers, 0 – not efficient; 3 very important (UKIS)	49925	1.82	1.19	1.87	1.16
Competitors depth	How efficient was firm cooperation with (0-3) competitors or businesses in industry, 0 – not efficient; 3 very important (UKIS)	42720	1.49	1.13	1.37	1.04
Consultants depth	How efficient was firm cooperation with (0-3) consultants, commercial labs or private R&D institutes, 0 – not efficient; 3 very important (UKIS)	49038	0.88	0.99	0.74	0.88
Universities depth	How efficient was firm cooperation with (0-3) universities or high educational institutions, 0 – not efficient; 3 very important (UKIS)	49217	0.60	0.86	0.47	0.75
Government depth	How efficient was firm cooperation with (0-3) any of other businesses within enterprise group, 0 – not efficient; 3 very important (UKIS)	48807	0.61	0.84	0.48	0.75

Data structure

Industry distribution	BMR sample	
	Firms	Share, %
1 - Mining & Quarrying	197	0.81
2 - Manufacturing basic	1465	6.05
3 - High-tech manufacturing	4779	19.74
4 - Electricity, gas and water supply	210	0.87
5 - Construction	2291	9.46
6 - Wholesale, retail trade	3678	15.19
7 - Transport, storage	1384	5.72
8 - Hotels and restaurants	1203	4.97
9 - ICT	17.55	7.25
10 - Financial intermediation	898	3.71
11 - Real estate and other business activity	3198	13.21
12 - Public admin, defence	2471	10.24
13 - Education	98	0.40
16 - Other community, social activity	584	2.41
Total	24211	100
Regional distribution		
North East	1406	5.81
North West	2243	9.26
Yorkshire and The Humber	1974	8.15
East Midlands	2002	8.27
West Midlands	2159	8.92
Eastern	2147	8.87
London	2290	9.46
South East	2625	10.84
South West	2034	8.40
Wales	1640	6.77
Scotland	19.35	7.99
Northern Ireland	17.56	7.25
Firm size distribution		
small firms	10183	42.05
medium	6817	28.15
large	7211	29.78
Total	24,211	100

Results

Model	radical	radical	radical	sustaining	sustaining	sustaining	disruptive	disruptive	disruptive
Knowledge collaboration	Breadth	Breadth	Depth	Breadth	Breadth	Depth	Breadth	Breadth	Depth
Suppliers	0.37***	0.18***	0.31***	0.38***	0.15***	0.28*	0.05	0.02	0.05
	0.05	0.02	0.06	0.11	0.04	-0.12	0.05	0.03	0.03
Customers	0.72***	0.29***	0.27***	0.94***	0.32***	0.46*	0.03	0.02	0.21**
	0.06	0.02	0.06	0.14	0.04	0.13	0.06	0.02	0.6
Competitors	0.57***	0.24***	0.32***	0.74***	0.31***	0.25	0.12	0.01	0.02
	0.05	0.02	0.07	0.11	0.04	0.13	0.07	0.02	0.06
Consultants	0.22***	0.09***	0.03	0.47***	0.19***	0.24	-0.12*	-0.02	-0.08
	0.04	0.02	0.08	0.09	0.04	0.16	0.06	0.02	0.06
Universities	0.31***	0.18***	0.32***	0.64***	0.40***	0.32	0.14**	0.06	-0.03
	0.06	0.04	0.10	0.13	0.08	0.25	0.04	0.02	0.07
Government	0.13**	0.05**	0.02	0.04	0.08	0.25	-0.02	-0.04	-0.1
	0.05	0.02	0.11	0.13	0.07	0.21	0.05	0.03	0.09
Constant	-3.01***	-2.79***	-3.04***	-1.23*	-0.98	-1.22	1.52***	1.55***	1.56***
	0.24	0.24	0.25	0.6	0.63	0.69	0.25	0.25	0.26
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City and year controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
N	24,211	24,211	24,211	24,211	24,211	24,211	24,211	24,211	24,211
Log-likelihood	-9799.3	-9729.3	-9152.2	-2405.3	-2472.3	-2468.7	-11488.2	-11494.2	-11486.7
Chi2	9025.2	9136.2	9069.5	1898.5	1739.6	1748.6	7467.2	7453	7463.2

Policy implications

- First, our study complements our understanding of BMR modes and the effect of the breadth and the depth of innovation collaboration at the firm level.
- Second, together with previous findings on the differential effect of knowledge collaboration for innovation and business model innovation, we contribute to a more comprehensive understanding of the business model recombination and the choice between new technology, new markets and new industry as firm's strategic innovation objectives.
- It contributes to a more nuanced understanding of the hidden trade-offs that managers face when reaching out for external knowledge to reconfigure firm business model and retain the competitive position.
- While prior research illustrated that sourcing, external knowledge has both positive and negative effects on innovation efficiency, we demonstrated that BMR modes are positively affected by inbound open innovation.

Thanks for listening!