fsQCA in Management research

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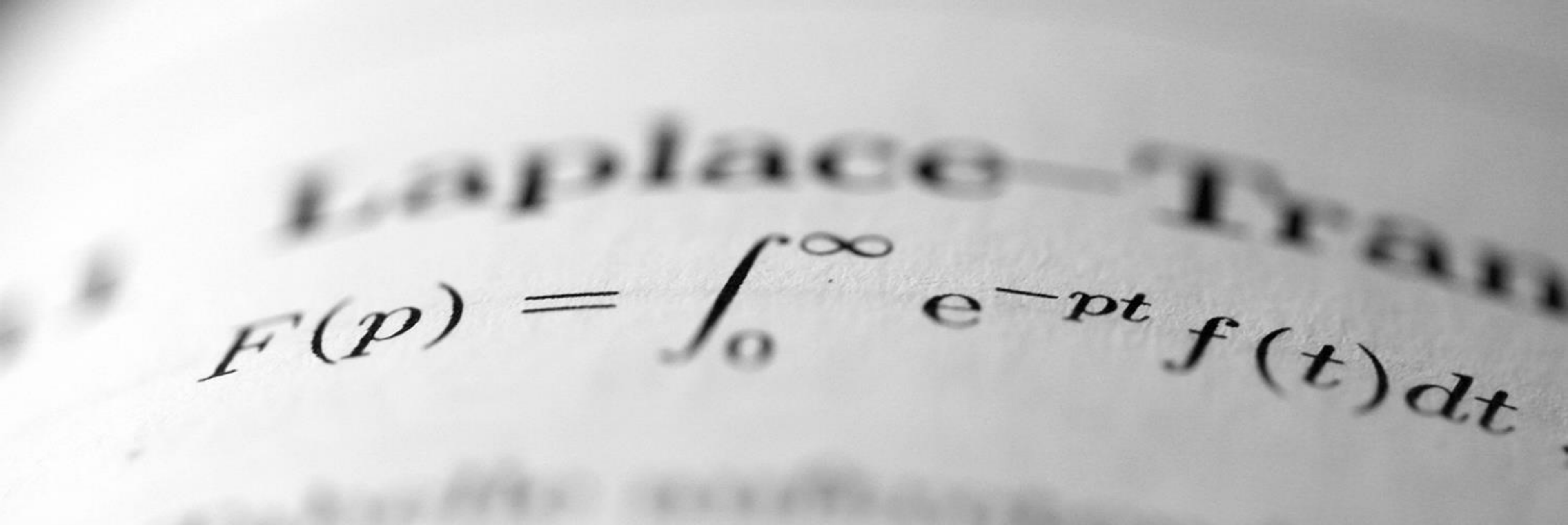

fsQCA in Management Research

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What is *fsQCA*

- fsQCA (fuzzy-set qualitative comparative analysis) is a statistical technique for investigating complex configurations of constructs (Ragin, 2009).

- It performs a systematic cross-case analysis that models relations among variables in pertaining to set membership and identifies configurations that reflect the *sufficient conditions* for an outcome of interest.

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fsQCA cont.

- Organizational phenomena are complex; the conventional reductionist analytical strategy results in lost information and critical strategic determinants to performance to be omitted due to reductionist symmetrical analysis (Drazin et al., 1985).

- Multiple regression analysis and structural equation modeling adopt symmetric thinking typical of net effects estimation approaches.

- Reductionist and bivariate models overlook the assumptions of *equifinality* and underestimate the effects of small changes which challenge organizational phenomena (Fiss, 2007).

What is *equifinality*?

- Equifinality assumes that multiple paths to a desired outcome may co-exist and not the one and only model (Fiss, 2007).
- These paths reflect one of fsQCA's principles and merits compared to symmetric quantitative approaches.
- fsQCA can identify several equifinal combinations of conditions that are sufficient to produce a given outcome of interest (Chang & Cheng, 2014).

Theoretical grounding

- Configuration theory embraces equifinality (Drazin & Van de Ven, 1985).

- It richly describes organizations, revealing their complex, gestalt, and systematic nature as well as avoiding "excessive aggregation" and "aiding prediction" of important outcomes such as firm performance (Miller, 1987, p. 686)

Assumptions of *fsQCA*

1. Comparative study
2. Presence of asymmetrical relationships

What is Asymmetrical relationships?

- Symmetrical relationship: When X variable changes then it will symmetrically effect Y.

- Asymmetrical relationship: when a substantial numbers of cases display relationships that are contrary to the main effect of an antecedent on an outcome variable (Woodside, 2014).

- To identify asymmetrical relationships, a cross-tabulation could be performed.

Sample of cross-tabulation analysis

Construct / Quintile		Firm performance 1	2	3	4	5	Total count	Effect size
Foreign business knowledge	1	0	4	0	1	0	5	0.116
	2	5	9	3	0	3	20	
	3	2	14	25	30	4	75	
	4	0	6	4	26	3	39	
	5	0	0	3	16	20	39	
Total count		7	33	35	73	30	178	
Foreign institutional knowledge	1	1	0	2	0	0	3	0.152
	2	6	11	5	7	1	30	
	3	0	20	23	31	9	83	
	4	0	1	4	12	0	17	
	5	0	1	1	23	20	45	
Total count		7	33	35	73	30	178	
Internationalisation knowledge	1	0	2	1	2	2	7	0.104
	2	5	6	3	4	1	19	
	3	2	17	14	21	8	62	
	4	0	7	15	39	10	71	
	5	0	1	2	7	9	19	
Total count		7	33	35	73	30	178	
Opportunity exploration capability	1	0	2	1	0	0	3	0.118
	2	5	5	3	1	1	15	
	3	2	22	25	16	7	72	
	4	0	4	6	43	2	55	
	5	0	0	0	13	20	33	
Total count		7	33	35	73	30	178	
Opportunity exploitation capability	1	0	2	0	1	1	4	0.184
	2	2	4	5	6	5	22	
	3	4	18	7	26	7	62	
	4	1	9	22	38	15	85	
	5	0	0	1	2	2	5	
Total count		7	33	35	73	30	178	

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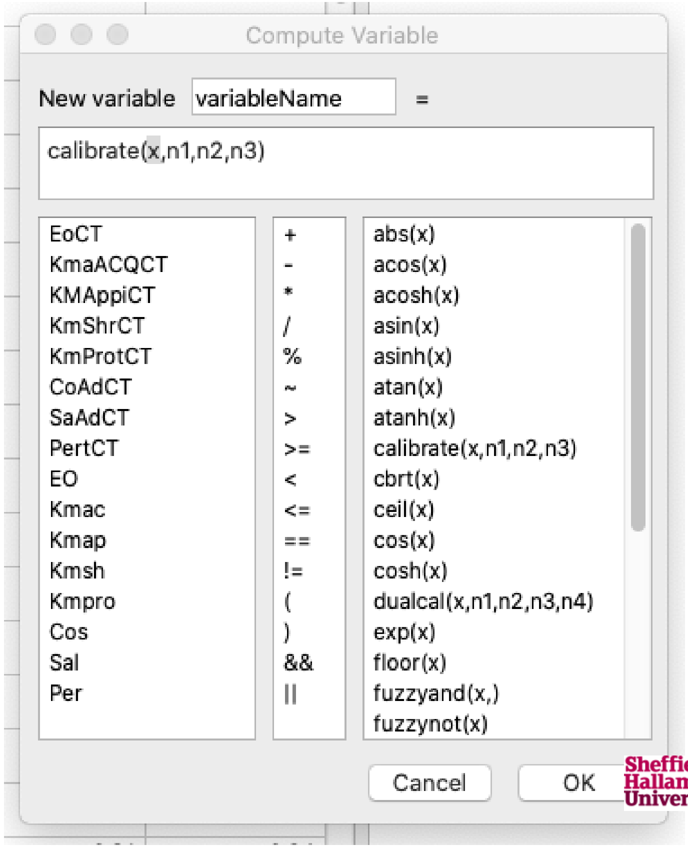
Performing *fsQCA*

- Calibrate the original data to fuzzy membership score ranging from 0.00 to 1.00; where the non-membership score represents 5%, cross-over anchors are 50%, and the full-membership score represents 95% of the value .
- This process could be carried out by using *fsQCA* 3 software

Data Calibration process

1. Put variable name:
2. Select calibrate option from right-hand-side.
3. X represents original value
4. n1 is full-membership (0.95) ; n2 is cross-over point (0.5 0) and n3 reflects non-mem bership is (0.05).



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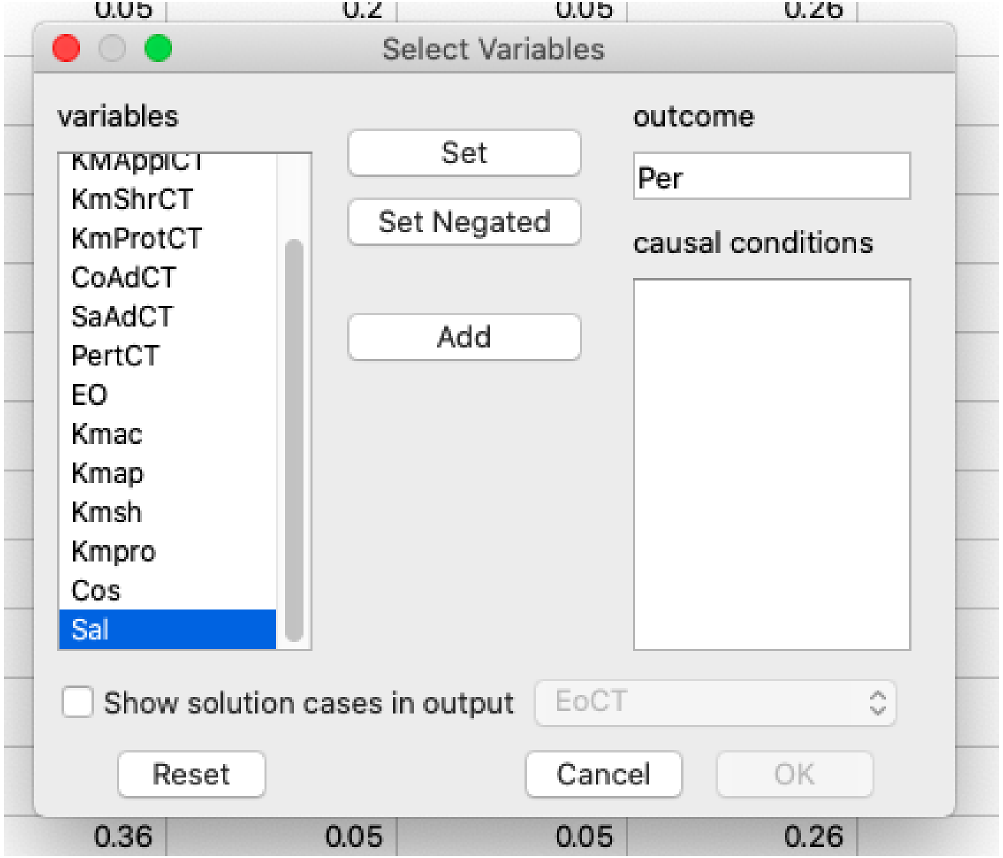
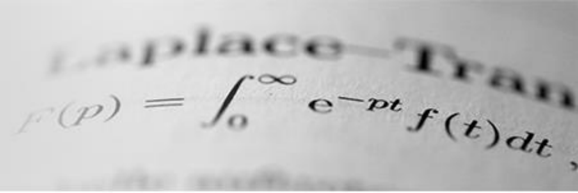
Calibrated score

EO	Kmac	Kmap	Kmsh	Kmpro	Cos	Sal	Per
0.05	0.05	0.05	0.2	0.19	0.05	0.21	0.05
0.05	0.05	0.05	0.2	0.19	0.64	0.84	0.05
0.05	0.05	0.36	0.05	0.53	0.26	0.21	0.24
0.05	0.05	0.36	0.2	0.05	0.26	0.21	0.05
0.05	0.05	0.36	0.2	0.19	0.26	0.21	0.05
0.05	0.42	0.05	0.2	0.05	0.26	0.21	0.05
0.05	0.42	0.36	0.05	0.05	0.26	0.05	0.05
0.18	0.05	0.05	0.2	0.19	0.05	0.21	0.05
0.18	0.05	0.05	0.2	0.53	0.26	0.57	0.05
0.18	0.05	0.36	0.05	0.05	0.26	0.21	0.05
0.18	0.05	0.36	0.05	0.19	0.05	0.21	0.24
0.18	0.05	0.36	0.05	0.19	0.26	0.21	0.05
0.18	0.42	0.05	0.05	0.05	0.26	0.05	0.05
0.18	0.42	0.05	0.2	0.05	0.05	0.21	0.24
0.18	0.42	0.05	0.2	0.19	0.05	0.95	0.05

Truth table algorithm



Truth table algorithm



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Edit Truth Table

			Kmsh	Kmpro	Cos	Sal	number	Per	raw consist.	PRI consist.	SYM consist
[illegible]	[illegible]	0	0	0	0	0	15 (10%)		0.597801	0.101951	0.101951
[illegible]	[illegible]	0	0	0	0	0	15 (20%)		0.757036	0.2042	0.204201
[illegible]	[illegible]	1	1	1	1	1	14 (30%)		0.971608	0.928238	0.928239
1	0	0	1	1	0	0	8 (35%)		0.931349	0.537218	0.537217
1	0	0	0	0	0	1	7 (40%)		0.812104	0.289984	0.289985
1	0	1	1	1	0	0	6 (44%)		0.89811	0.291969	0.291971
1	0	0	1	1	0	1	6 (48%)		0.906159	0.466666	0.466667
0	0	0	0	0	1	1	6 (52%)		0.792631	0.363158	0.363158
1	1	0	1	1	1	1	6 (56%)		0.965111	0.872111	0.872111
1	1	1	1	1	0	0	5 (60%)		0.897506	0.390836	0.39945
1	1	1	1	1	1	0	5 (63%)		0.966837	0.86219	0.931297
1	1	0	1	1	0	1	5 (67%)		0.929754	0.627078	0.627079
1	0	0	0	0	1	1	5 (70%)		0.872977	0.471427	0.471429
1	0	0	1	1	1	1	4 (73%)		0.945619	0.711998	0.712001
1	0	1	1	1	0	1	3 (75%)		0.949835	0.637449	0.63745
1	1	1	1	1	0	1	3 (77%)		0.945714	0.70235	0.741047
1	0	1	1	1	1	1	3 (79%)		0.968297	0.837912	0.837911
1	1	0	1	1	0	0	2 (80%)		0.940712	0.584617	0.584617
0	0	1	1	1	0	0	2 (82%)		0.867483	0.233037	0.233037
1	0	0	0	0	1	0	2 (83%)		0.86283	0.339491	0.339492
1	0	0	0	1	0	1	2 (84%)		0.890695	0.38843	0.38843
1	0	1	0	1	0	1	2 (86%)		0.933828	0.488987	0.488987

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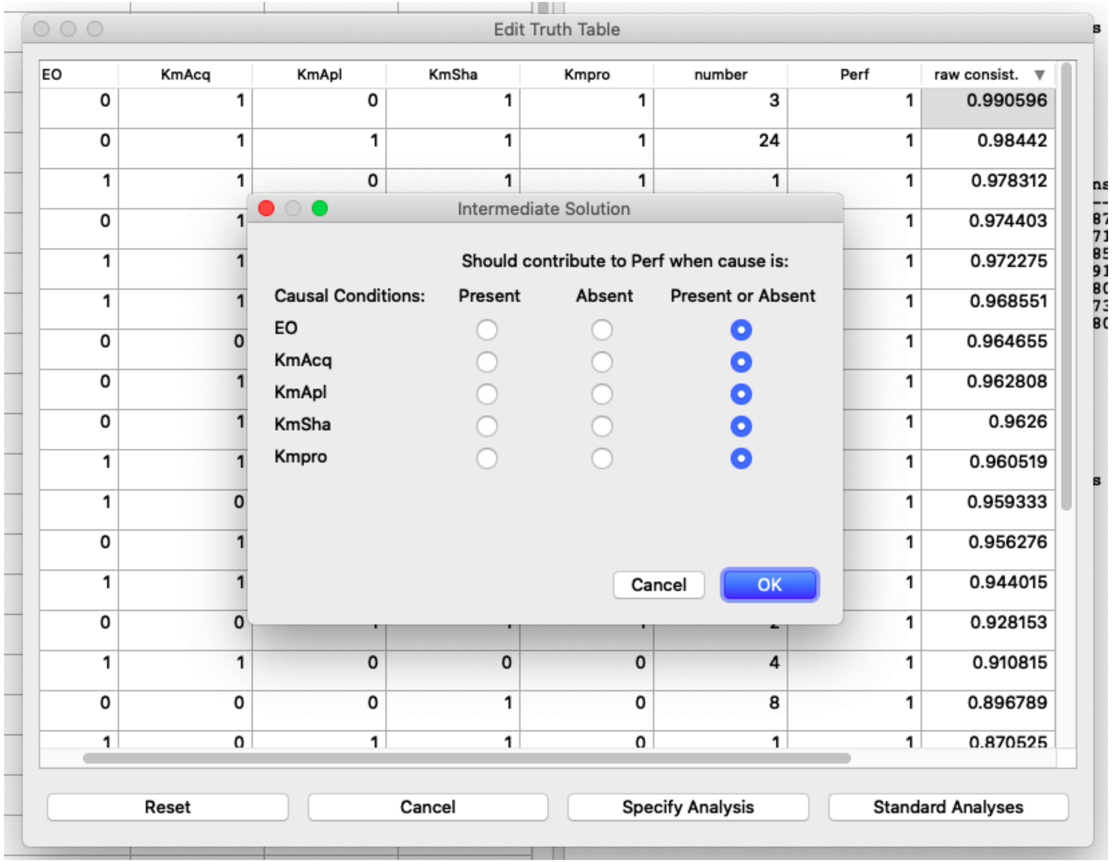
Performing *fsQCA*



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fsQCA results

- Three different outputs as complex solutions, parsimonious solutions and intermediate solutions are produced by the stand-ard analysis.

- The most acknowledged solution in management research is the intermediate solution, as it has the superiority over parsimo nious and complex solutions (Cheng et al., 2013; Hervas-Olive r, Sempere-Ripoll, & Arribas, 2015).

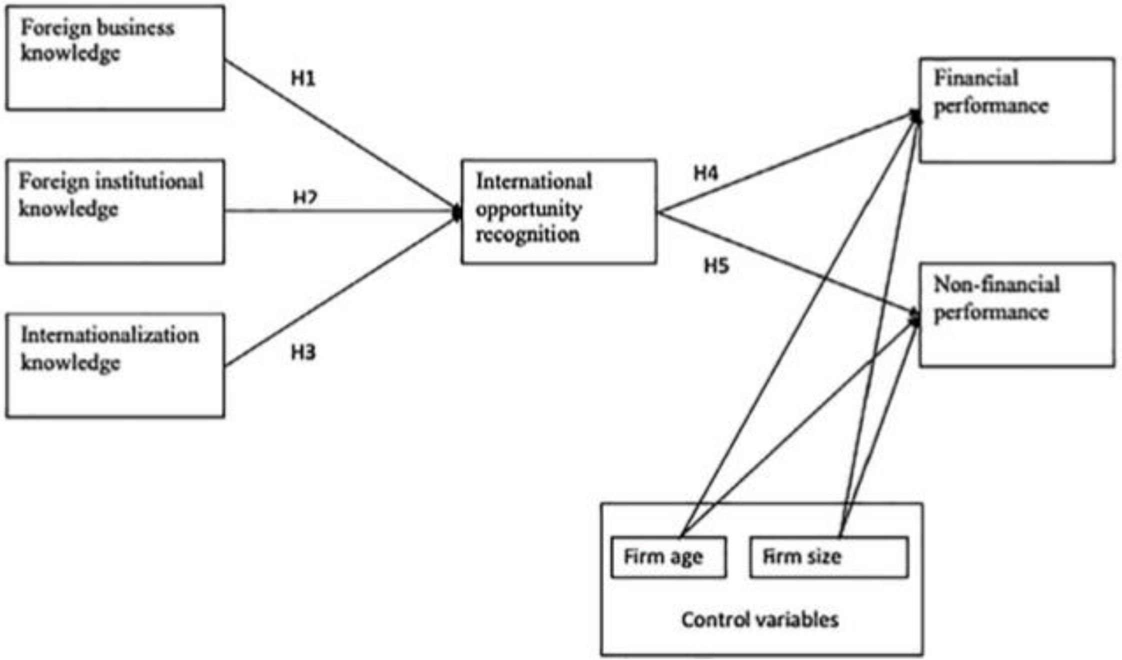
fsQCA results

	Path	FBK	FIK	IK	OExC	OEC	Raw coverage	Unique coverage	Consistency	Solution coverage	Solution consistency
Young firms (n= 178)	1a	●	●		●		0.418495	0.043696	0.941428	0.825031	0.764683
	2a	●	○	○	○	○	0.327974	0.027881	0.851836		
Mature firms (n= 194)	1b	○	●	●	○	●	0.415412	0.0691722	0.970661		
	2b	○		○	●	○	0.305142	0.0076386	0.817973	0.849855	0.72854
	3b	●	○	○	●	●	0.365175	0.0088377	0.899738		

Legends: FBK: foreign business knowledge, FIK: foreign institutional knowledge, IK: internationalisation knowledge, OExC: opportunity exploration capability, OEC: opportunity exploitation capability. '●' represent full membership; '○' represent partial membership, and 'blank' represent null membership

Framework and differences

FIGURE 1 Conceptual framework



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fsQCA framework

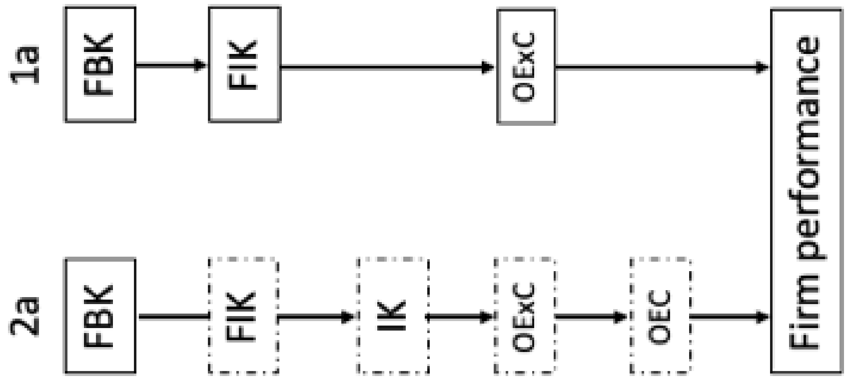

Figure 1 Configurational paths for young firms
[dashed box] represents partial membership and [solid box] represents full membership
Legends: FBK: foreign business knowledge, FIK: foreign institutional knowledge,
IK: internationalisation knowledge,
OExC: opportunity exploration capability, OEC: opportunity exploitation capability.

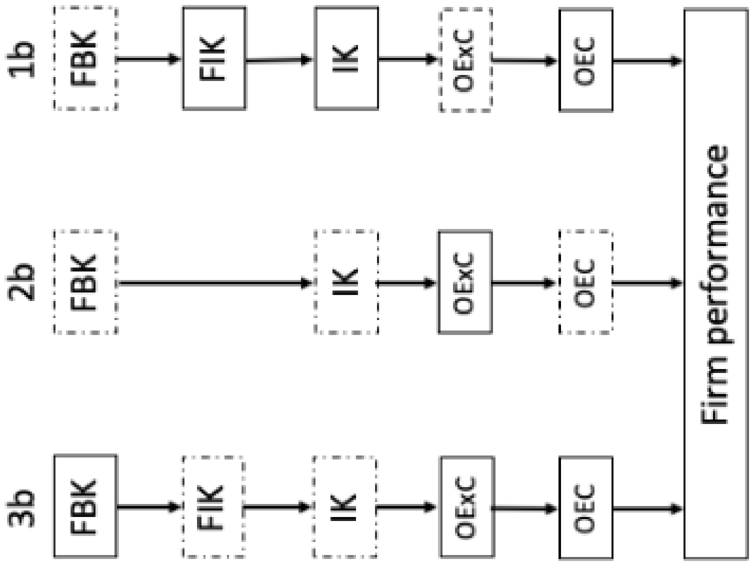

Figure 2 Configurational paths for mature firms
[dashed box] represents partial membership and [solid box] represents full membership
Legends: FBK: foreign business knowledge, FIK: foreign institutional knowledge,
IK: internationalisation knowledge,
OExC: opportunity exploration capability, OEC: opportunity exploitation capability.

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Limitations of *fsQCA*

- Generalizability issue
- Sufficiency not necessity

- To mitigate the limitation of necessity, we should perform necessary condition analysis.

Thank you