



What makes the difference?

Analysing how university structural configuration influences its regional innovation contribution.

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Background

- HEIs drivers of **regional development** through **third mission**
 - Knowledge spillovers
 - Knowledge production function
- Tensions:
 - Balance with teaching and research → excellence
 - Making engagement fit within the ‘business of science’
 - Engaging to complement scarce public resources vs heterogeneity
 - Governments promote **university-industry collaboration**
 - **Diversity** of initiatives and mechanisms
 - Pressures towards ‘**institutionalisation**’
- Our claim:
 - More attention how different internal structures may be associated with delivering different kinds of societal-regional benefits
- Research question:
 - How do universities’ structural configuration affect the university’s production of regional outputs?



University models

- Make simple distinction of 2 kinds of ‘ university orientations towards third mission outputs’ :
 - **Entrepreneurial University (EU):** Knowledge commercialization
 - **Regional Innovation Systems University (RISU):** knowledge production and shaping regional innovation systems

University model	
Entrepreneurial university	Regional Innovation Systems University
Commercialization activities: Patents, licensing, spin-offs	+ collaborative & contract research, consulting, ad hoc advice, networking with practitioners

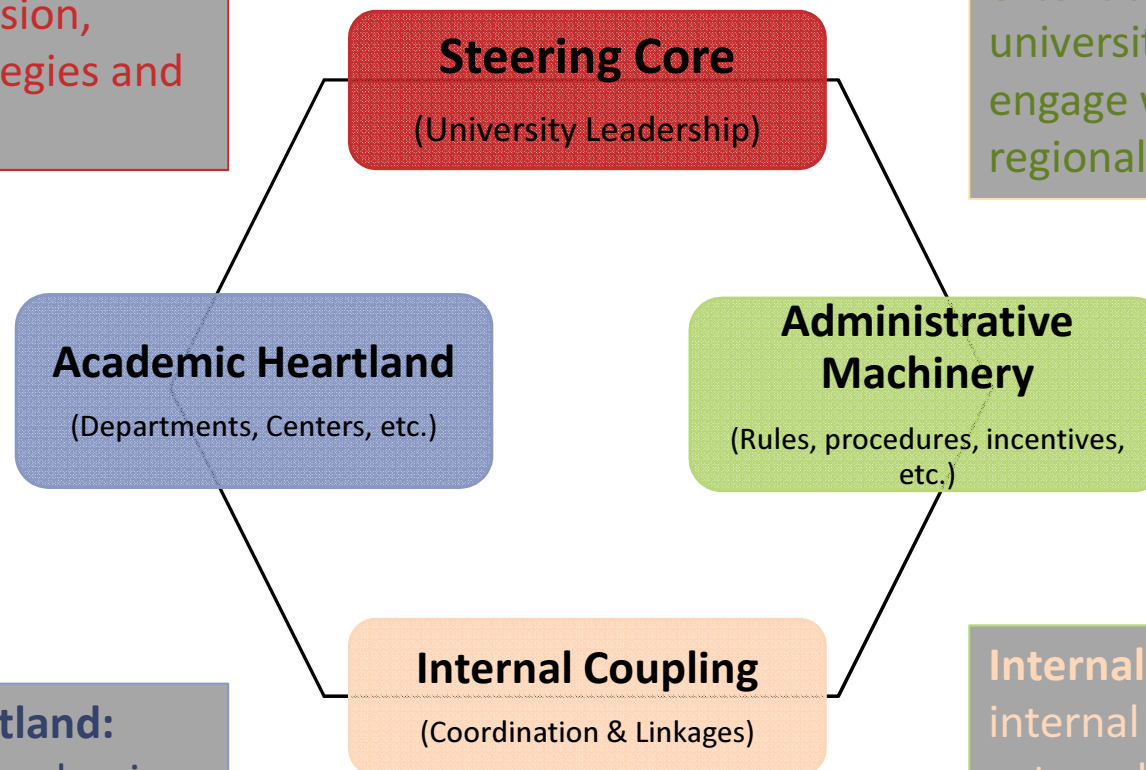
Source: Adapted from Trippl *et al.* (2014)



Internal configuration components

Steering Core: Leaders and senior managers articulated by policy documents mission, vision and strategies and aims.

Administrative machinery: decision-making apparatuses and extent to which universities are able to engage with their regional contexts



Academic heartland: core group of academics actively engaged

Internal coupling: internal validity of external engagement and mechanisms couple them to 'core' activities

Objectives

1. Which **components** of **universities' internal structural** affect its regional engagement **performance**?
2. Do **EU** and **RISU** models **differ**? And
3. How does university **internal strategic structure** specifically **affect third mission** delivery in terms of the regional development?

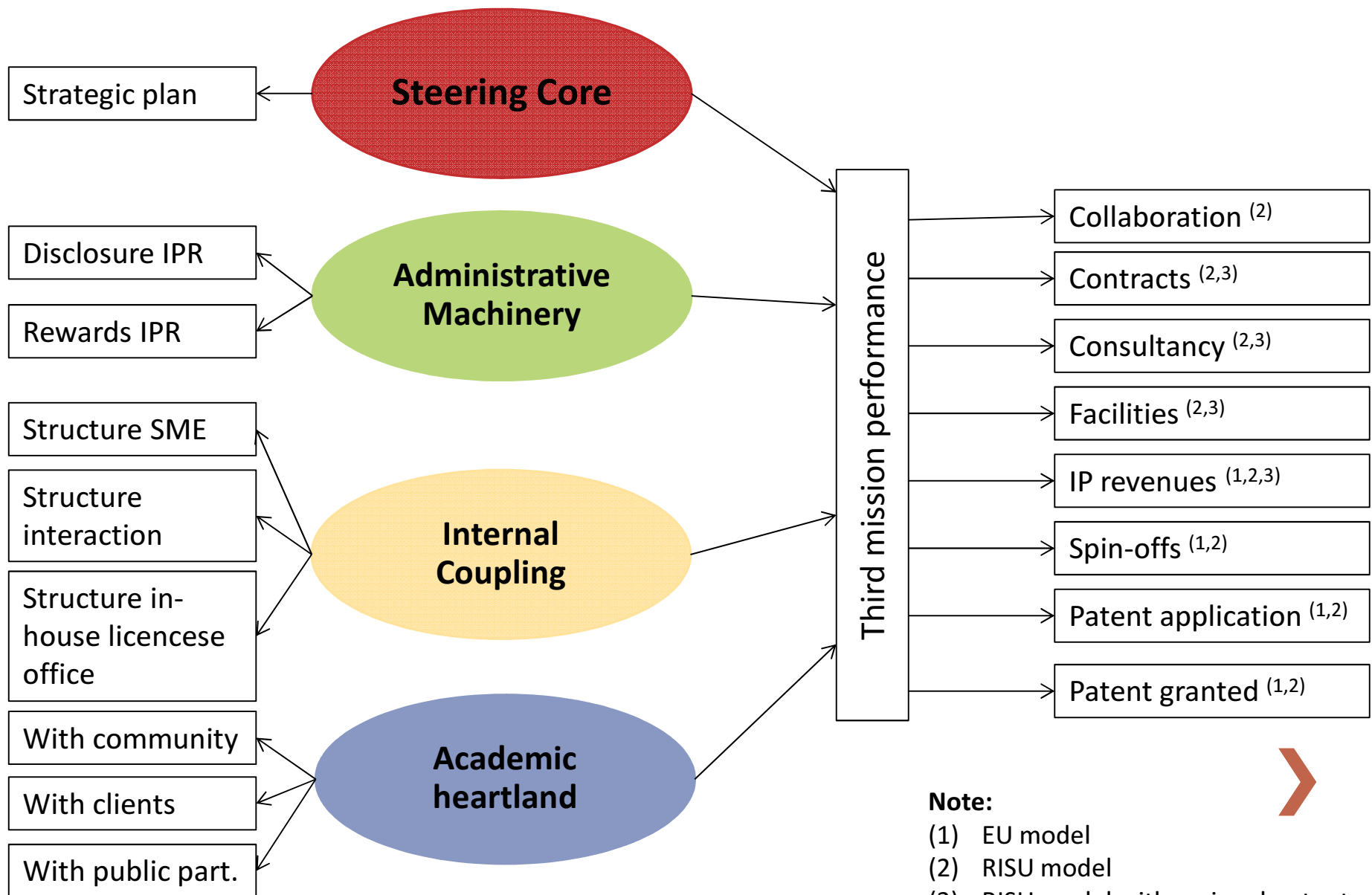


Context and data

- **Context:** UK Higher education sector
- **Period:** Academic year 2011-2012
- Higher Education Business and Community Interaction Survey (**HEBCI**)
 - **Part A:** strategy and infrastructure indicators → Internal structure
 - **Part B:** Commercialization and knowledge exchange activities → Third mission performance
- 135 out of 161 universities and HEIs included
 - 80% England, 11.9% Scotland, 6.7% in Wales 1,4% Northern Ireland.
- Main methodology: Structural Equation Modelling (SEM)



Operationalisation of theoretical model

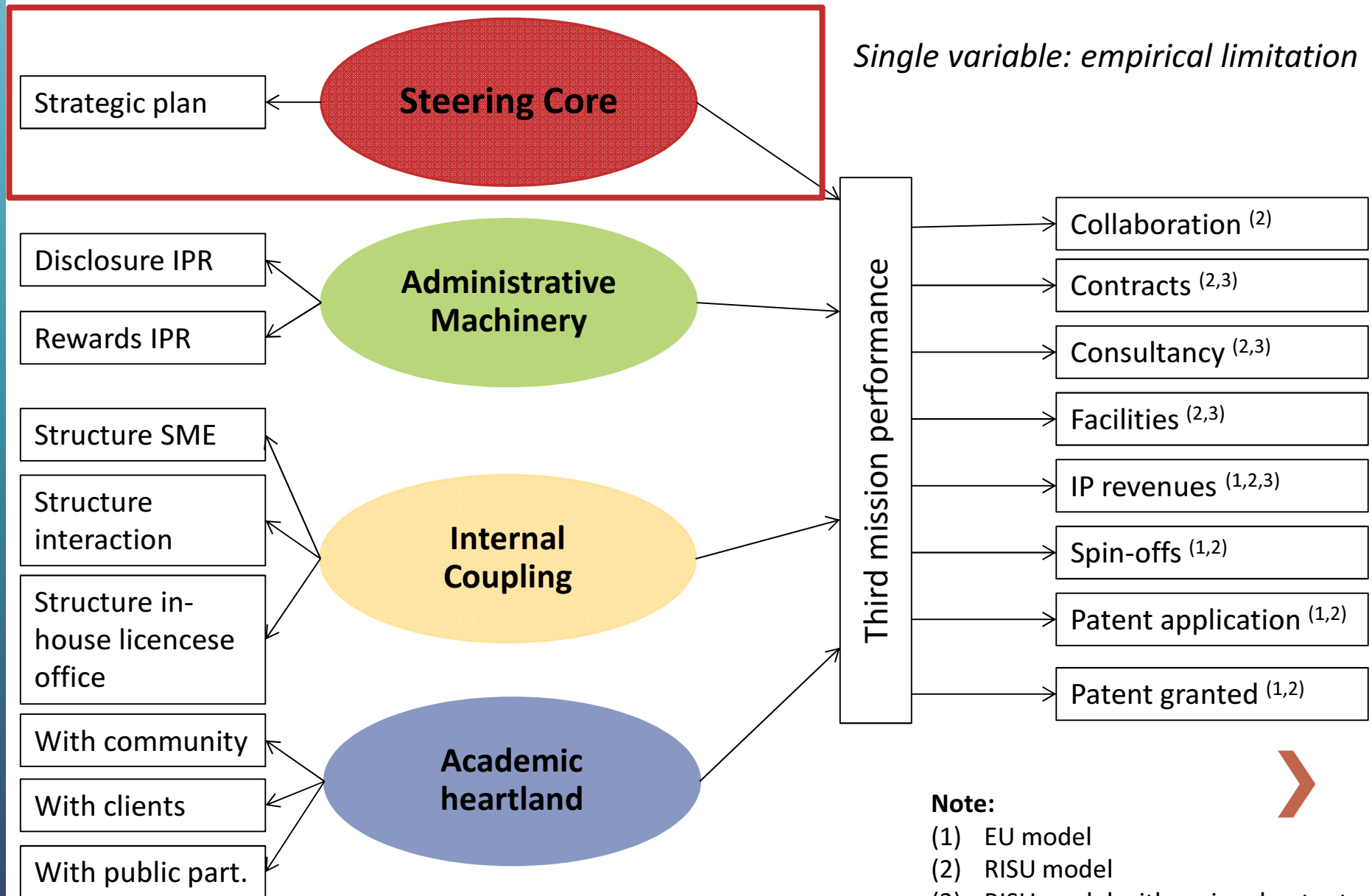


Note:

- (1) EU model
- (2) RISU model
- (3) RISU model with regional outputs



Operationalisation of theoretical model



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Part A. Structural configuration				
Internal conf.	Variable	Definition (Question number in HE-BCI)	Type of variable	
Steering core	Strategic plan	University has a strategic plan totally developed and partially or totally implemented for business support (Q7a).	Dummy variable with value 1 if university answered values 4 or 5 and 0 otherwise.	
Administrative machinery	Disclosure IPR	There are requirements within the HEI to report or disclose (internally) the creation of IPR (inventions, software, copyright, design, trademarks, plant/animal varieties) to the disclosure company or department (Q18)	Dummy variable with value 1 if university answered 'always' in at least one of the IPR categories and 0 otherwise.	
	Rewards IPR	University has rewards for staff related to the IPR that they generate (Q19)	Dummy variable with value 1 if university answered 'yes' and 0 otherwise.	
Internal coupling	Structure SMEs	University has a central dedicated unit that act as an enquiry point for SMEs or assistance to SMEs in specifying their needs (Q11)	Dummy variable with value 1 if university answered 'yes' to the availability of 'An enquiry point for SMEs' or 'Assistance to SMEs in specifying their needs' in Q11 and 0 otherwise.	
	Structure interaction	University has an internal department responsible for business and community interactions (Q12)	Dummy variable with value 1 if university answered 'yes, internal department' and 0 otherwise.	
	Structure in-house licence office/department	University has, at least, in-house capability to seek out licensing opportunities for IPR (patents, copyrights, designs & trademarks) (Q10)	Dummy variable with value 1 if university answered 'yes, in-house capability' or 'yes, in-house capability & external agency' and 0 otherwise.	
Academic heartland	Staff involved with community	Percentage of academic staff providing service to social, community and cultural partners between 1 August 2011 & 31 July 2012 (Q15a)	Continuous variable.	
	Staff involved with clients	Percentage of academic staff providing service to commercial partners/clients between 1 August 2011 & 31 July 2012 (Q15b)	Continuous variable.	
	Staff involved with public partners	Percentage of academic staff providing service to public sector partners/clients between 1 August 2011 & 31 July 2012 (Q15c)	Continuous variable.	
Part B. Third mission activities				
Name	Definition	University model		
		Model 1: EU	Model 2: RISU	Model 3: RISU (simplified) with regional outputs
Collaboration Research	Total income from collaborative research involving public funding in current year (£000s)		X	
Contracts	Total income of contract research (excluding collaborative research) in current year (£000s)		X	X
Consultancy	Total income in consultancy contracts in current year (£000s)		X	X
Facilities	Total income in facilities & equipment in current year (£000s)		X	X
IP Revenues	Total income in IP revenues in current year (£000s)	X	X	X
Spinoffs	Number of spin-offs with some HEI ownership in current year	X	X	
Applied patents	Number of new patent applications filed in current year	X	X	
Granted Patents	Number of patents granted in current year	X	X	



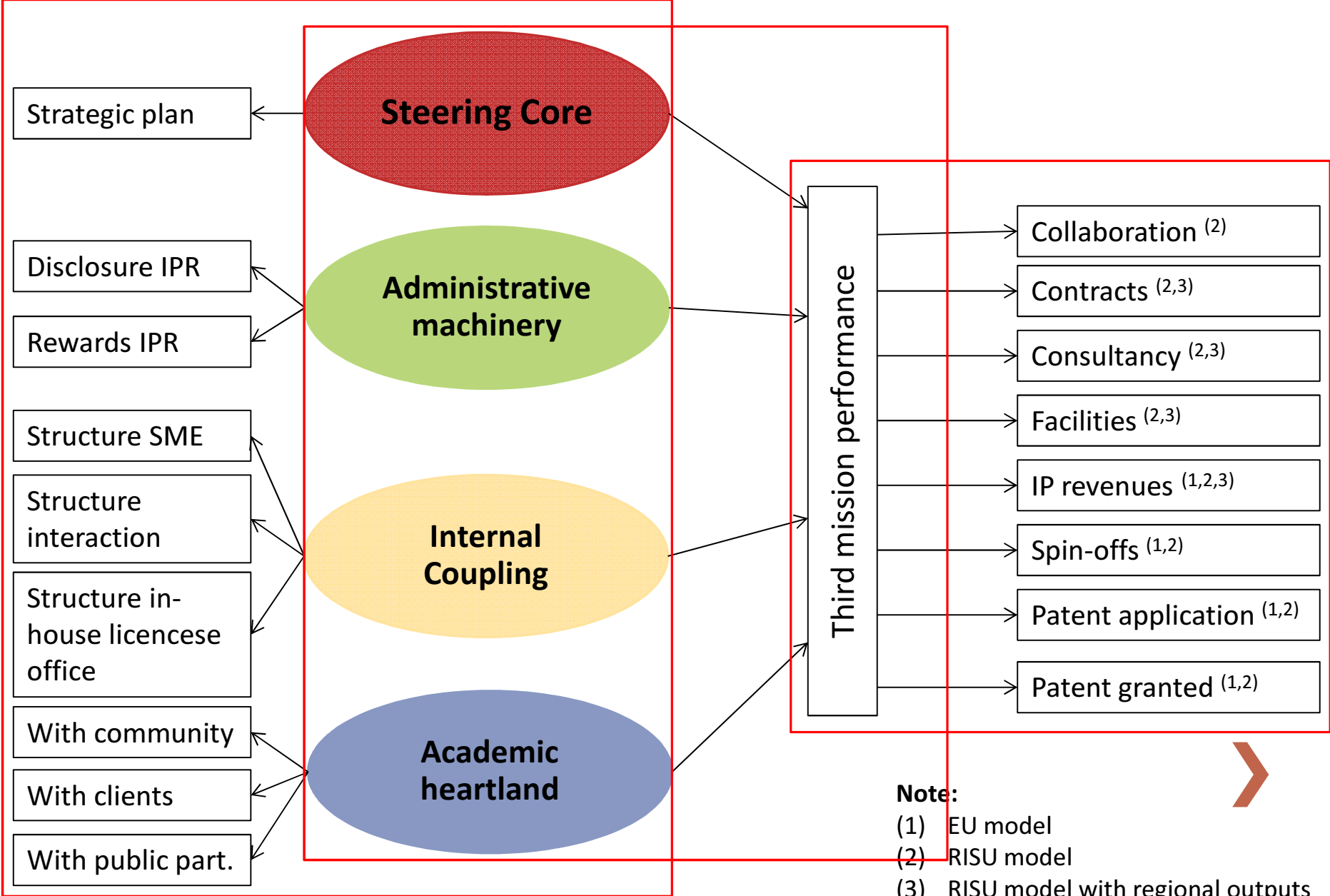
Results I: Measuring structural configuration

- For variable model is Optimum to explain university's internal structural configuration
 - Variables group in four dimensions of structural configuration
 - Total variance explained: 68.88%.

		Communalities	Item Score
Steering core	Strategic plan	0.694	0.750
	<i>Explained variance</i>	9.27	
	<i>Eigenvalue</i>	0.834	
	<i>Chronbach's alpha</i>	-	
Administrative machinery	Disclosure IPR	0.656	0.879
	Rewards IPR	0.777	0.572
	<i>Explained variance</i>	13.67	
	<i>Eigenvalue</i>	1.231	
	<i>Chronbach's alpha</i>	0.473	
Internal coupling	Structure SMEs	0.623	0.747
	Structure interaction	0.566	0.618
	Structure inhouse licensce office/department	0.570	0.606
	<i>Explained variance</i>	26.53	
	<i>Eigenvalue</i>	2.387	
	<i>Chronbach's alpha</i>	0.542	
Academic heartland	Staff involved with community	0.794	0.878
	Staff involved with clients	0.784	0.399 ^a
	Staff involved with public partners	0.734	0.827
	<i>Explained variance</i>	19.41	
	<i>Eigenvalue</i>	1.747	
	<i>Chronbach's alpha</i>	0.402	



Operationalisation of theoretical model



Results II: Measuring structural configuration in EU and RISU model

			EU	RISU	RISU simpl.
Components of each construct					
Steering core	λ_{11}	Strategic plan	0.348** (0.021)	0.348**(0.021)	0.348** (0.021)
Administrative machinery	λ_{21}	Disclosure IPR	0.422** (0.026)	0.422** (0.026)	0.155** (0.035)
	λ_{22}	Rewards IPR	0.116** (0.026)	0.116** (0.026)	0.315** (0.019)
Internal coupling	λ_{31}	Structure SMEs	0.013 (0.021)	0.097** (0.027)	0.100** (0.027)
	λ_{32}	Structure interaction	0.032 (0.031)	0.200** (0.045)	0.216** (0.048)
	λ_{33}	Structure inhouse license office/department	0.105** (0.037)	0.264** (0.057)	0.243** (0.056)
Academic heartland	λ_{41}	Staff involved with community	3.128** (0.442)	3.128** (0.442)	3.128** (0.442)
	λ_{42}	Staff involved with clients	1.054** (0.212)	1.054** (0.212)	1.054** (0.212)
	λ_{43}	Staff involved with public partners	1.003** (0.061)	1.003** (0.061)	1.003** (0.061)

- All variables selected to measure structural dimensions +/-ve**
- Adequacy and robustness of items to capture internal structure
- EU model captures the inadequacy of structure SMEs and interactions (RISU related)

Results II: Measuring structural configuration in EU and RISU model

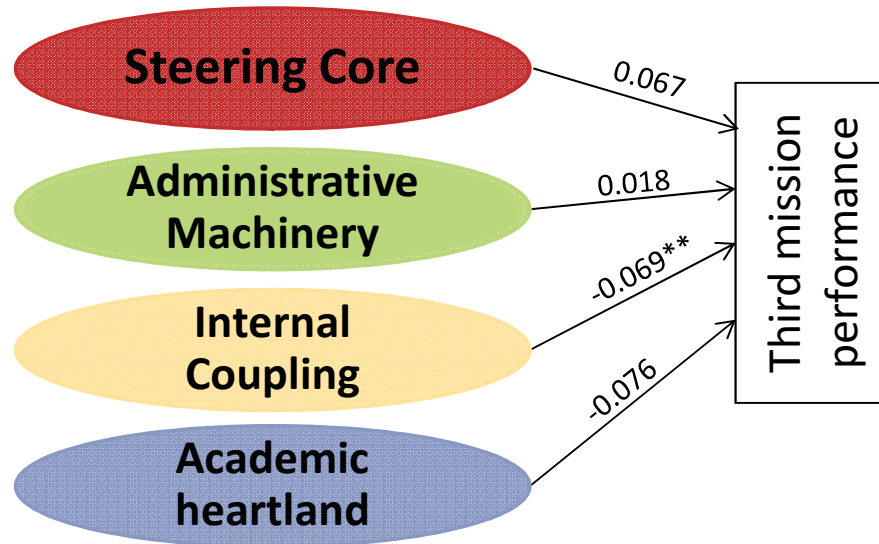
			EU	RISU	RISU simpl.
University performance	λ_{51}	Collaboration Research		-0.109 (0.069)	
	λ_{52}	Contracts		-0.156** (0.069)	0.190** (0.065)
	λ_{53}	Consultancy		-0.177** (0.021)	0.291** (0.069)
	λ_{54}	Facilities		-0.014 (0.069)	0.271** (0.068)
	λ_{55}	IP Revenues	0.081 (0.071)	0.074 (0.069)	0.172** (0.064)
	λ_{56}	HE Spinoff	0.305** (0.070)	0.277** (0.068)	
	λ_{57}	Patent application	0.881** (0.053)	0.800** (0.054)	
	λ_{58}	Patent granted	0.777** (0.061)	0.702** (0.062)	

- EU model described by spinoff and patent activities, not by IP revenues
- RISU model: ‘soft’ and ‘hard’ activities do not fit well
- RISU model description is completed when regional outputs are selected



Results III: Structural configuration on TM

(1) EU model

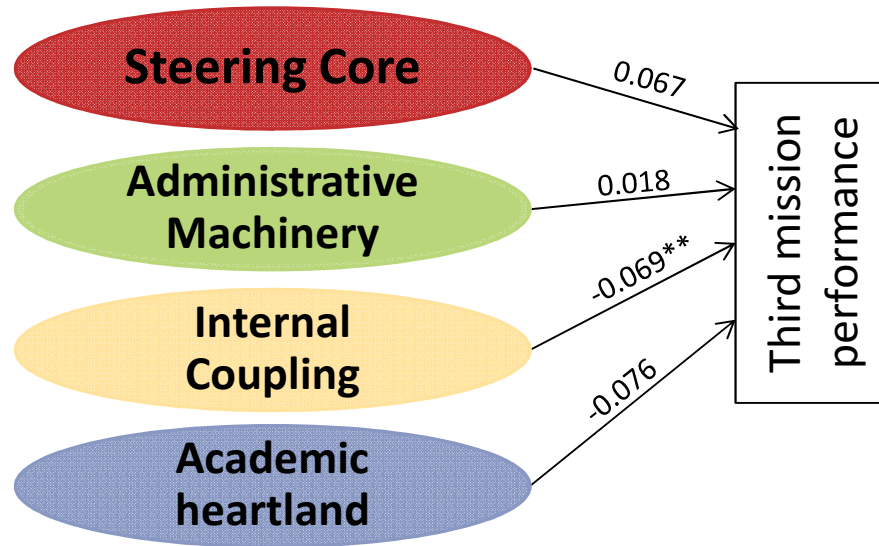


- Steering core and administrative machinery positive influence
- Internal coupling the highest negative effect

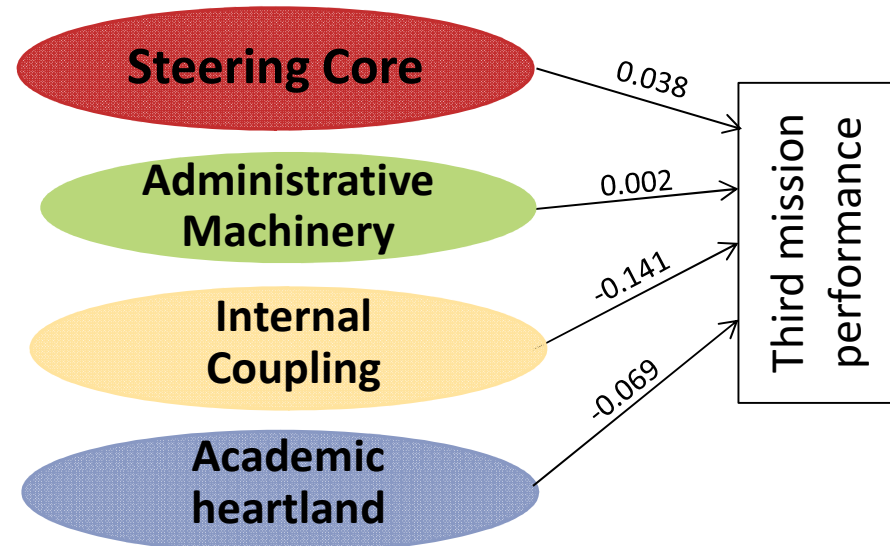


Results III: Structural configuration on TM

(1) EU model



(2) RISU model

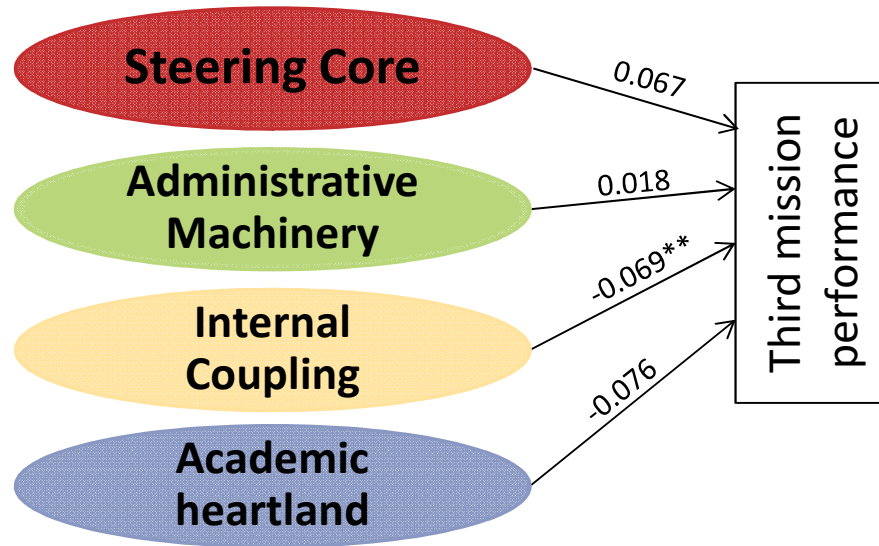


- Shares the sign of the coefficients with EU
- Differences in variables measuring structural configuration

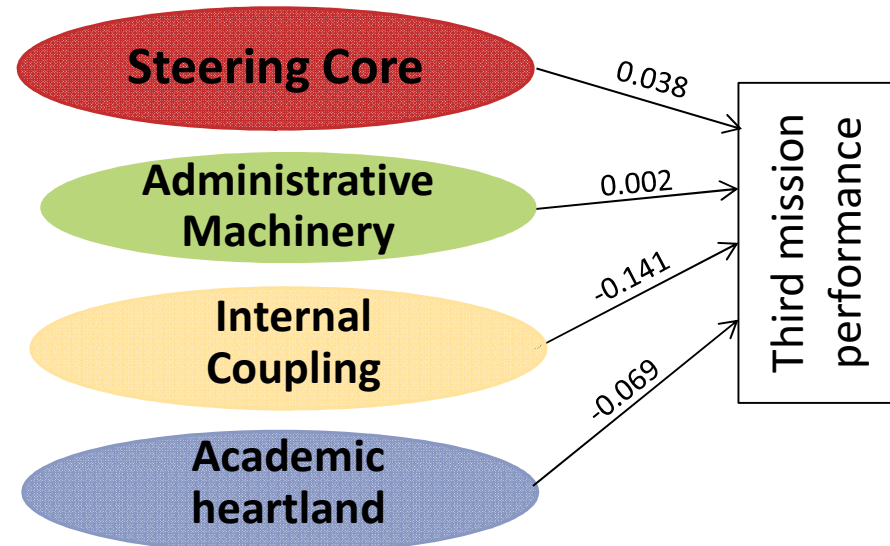


Results III: Structural configuration on TM

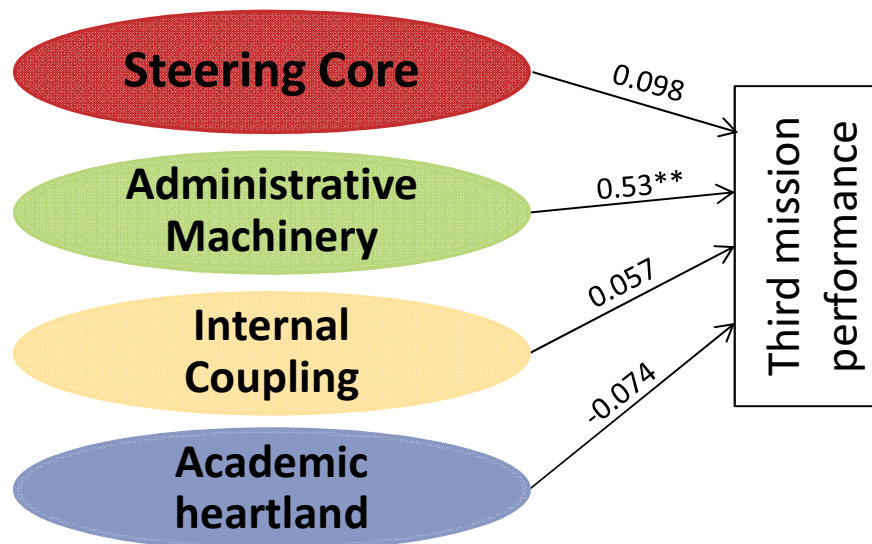
(1) EU model



(2) RISU model




(3) RISU model with regional outputs



- Academic heartland negative value
- Steering core, administrative machinery and internal coupling tend to increase regional outputs. ➤

Conclusions

- Role played by internal **university structure** shaping university **performance** through third mission activities
- Institutional structure is most amenable to **managerial input and control**
- **EU model:**
 - Third mission (TM) based on **patents and licensing**
 - **Internal coupling** (in-house license office/department) **negatively** influencing TM → importance of intermediary mechanisms (e.g. TTOs)?
- **RISU model:**
 - TM based on **'soft activities' + 'hard activities'**
 - **Steering core** and **administrative machinery** influence + performance
 - Internal coupling add other intermediary structures
- **RISU model with regional activities:**
 - Present a **regional** behaviour
 - **Administrative machinery** influence significantly TM performance → **role of proximity** 
- Policy implications: institutional structure makes a difference generating impacts



Thank you for your attention!



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