

The geography of innovation

Describing the location characteristics and connectivity of 39 technology campuses in industrialised countries.



Flavia Curvelo Magdaniel, ERES Conference 2017

Forthcoming paper 2017:
Competitiveness Review
Special issue:
'Competitiveness of
Locations'



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Research period:

June 2011 - September 2016



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Research period:
2013 - 2017

Published Book 2017:
Demand for case study references to support decision making.

Campuses, Cities and Innovation

39 international cases accommodating tech-based research



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Campuses and Innovation

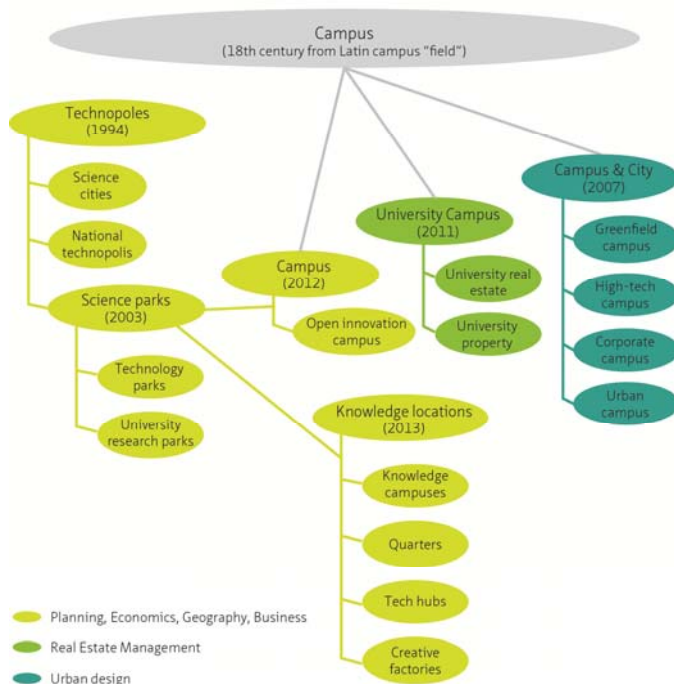
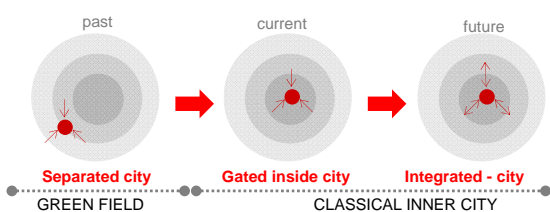


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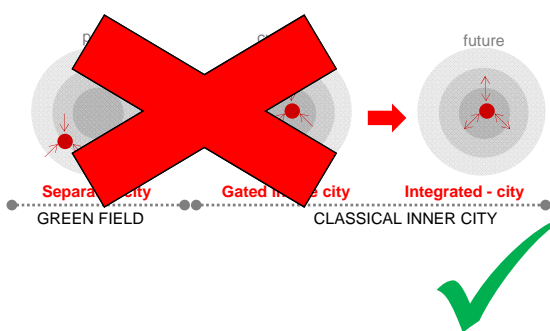


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Tech-campuses



Cities and Innovation



American cases: Cambridge, Philadelphia, St. Louis, Detroit, Seattle, Boston, Raleigh-Durham
 Katz, B., & Wagner, J. (2014).



Diversity | Innovation as social process

- ✓ Exchange of ideas
- ✓ Complementary intellectual background
- ✓ Geographical proximity
- ✓ Density of social interaction
- ✓ Opportunities to meet



Cities as natural sources of diversity

Jane Jacobs, 1961
Glaeser, 1992
Florida, 2002



... positive environments for innovation.

Influence urban competitiveness...

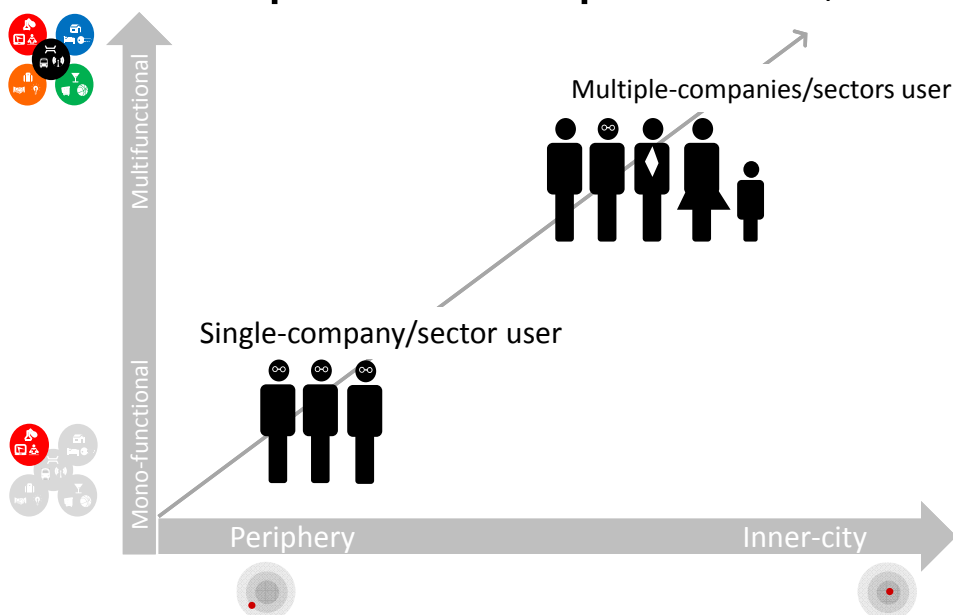


...the battle for brains!

Attracting and retaining students / knowledge workers



Trends in campus development...



Specialisation vs. Diversity

Competition within an industry

(Porter, 1990)

Localisation externalities

Regional/national clusters

Competition across sectors

(Jacobs, 1969)

Urbanisation externalities

Cities

Related variety

(Frenken, Van Oort, & Verburg, 2007)

Current debate in EG is inconclusive!



Specialisation vs. Diversity

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(Porter, 1990)

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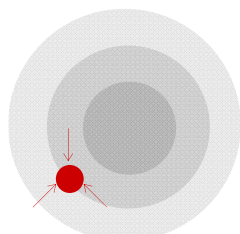
(Jacobs, 1969)

Urbanisation externalities

Cities

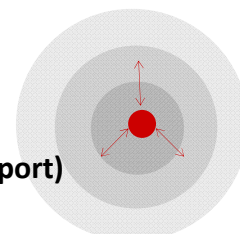
Related variety

(Frenken, Van Oort, & Verburg, 2007)



Separated city

- ✓ Spatial concentration (people/org)
- ✓ (Geographical) Proximity
- ✓ Access to knowledge networks (mobility/transport)



Integrated - city

How to support location decisions in new and existing campuses developed to stimulate innovation?



Demand - Supply

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Both types of environments have facilitated innovation (Curvelo Magdaniel, 2016)

HTCE, NL

MITC, USA



Separated city

Integrated - city

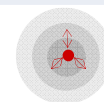
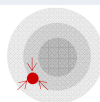


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Tool for campus planning

Campus models	Campus as the city	Campus in the city
Designation	Tech-park	Tech-district
Location characteristics		
Setting	Peripheral	Inner-city
Geographic scale	Region	City
Connectivity		
Distance to urban area with abundant amenities	Over 30 minutes (Less frequent public transport schedules)	Within 15 minutes (More frequent public transport schedules)
Travelling distance to international airport	Over 40 minutes (Less frequent public transport schedules)	Within 40 minutes (More frequent public transport schedules)
Primary transportation mode	Car-oriented	Transit-oriented
Planning frame		
Choices for the desired campus	Provision of enough amenities in campus and effective connectivity to cities	Balancing the provision of amenities between the campus and the city
Key partners	State-Provincial authorities	Municipalities
Consequences for the city	Concentration of innovative activities can shape the growth of cities and urban development towards those areas.	Concentration of innovative activities can lead to an increase of real estate and rental prices of the urban land in the vicinities of campus

(Curvelo Magdaniel, 2016)



Method

Planning tool

- Location
- Connectivity

→ Describe and compare 39 research sites in 16 industrialised countries → knowledge economy

technopoles creative factories science parks
 technology parks science cities
 knowledge university campuses
 locations university research park
 tech hightech innovation knowledge corporate campuses
 hubs campus campuses campuses quarters



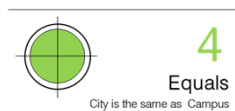
39 research sites 69,600 hectares 37 cities
 16 countries 5 built form qualities
 4 global regions 53 years of development
 5 design/planning concepts 5 topological relationships
 6 spatial/functional layouts 21 mixed sources of funding 2 block patterns
 5 main ambitions 3 main stakeholders
 5 context aspects 11 partnerships 1,3 million users
 1 accommodation solution 3 stakeholders' roles



Data collected

Data	Description
Location characteristics	
L1. Setting	Position → geographic coordinates from campus addresses → 2 categories: <ul style="list-style-type: none"> • Peripheral: location outside an urban agglomeration • Inner-city: location in an urban agglomeration
L2. Geographic scale	Contexts of the campus → 2 categories: <ul style="list-style-type: none"> • Region: when the campus is located outside the city • City: when the campus is located inside the city.
Connectivity	
C1. Distance to urban area with sufficient amenities	Numeric data in minutes → Google data (e.g. downtowns or CBDs and/or central train stations).
C2. Travelling distance to international airport	Numeric data in → Google data.
C3. Primary transportation mode	Google data on public transport → 2 categories: <ul style="list-style-type: none"> • Transit-oriented: multiple transportation modes in campus location • Car-oriented: only a single bus line as transportation mode or none.

Location: Campus & City

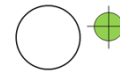


Location: Campus & City



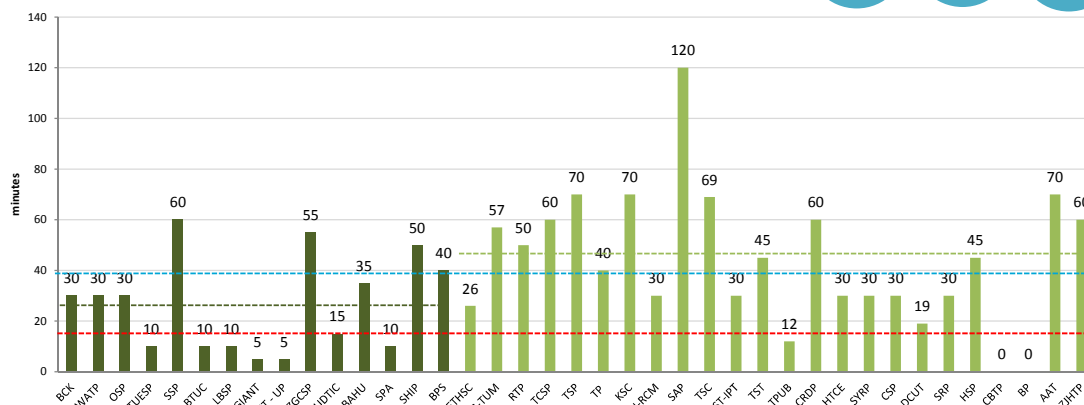
	CODE	Setting	Type of campus-city relationship	Geographic scale
Campus in the city	BCK	Inner-city	Contains	City
	WATP		Contains	City
	OSP		Contains	City
	TUESP		Contains	City
	SSP		Contains	City
	BTUC		Contains	City
	LBSP		Contains / Overlaps	City
	GIANT		Contains / Touches	City
	MIT - UP		Overlaps	City
	ZGCSP		Overlaps	City
	TUDTIC		Overlaps / Touches	City
	BAHU		Touches / Contains	City
	SPA		Touches / Contains	City
SHIP	Touches / Contains	City		
BPS	Touches / Contains	City		

	CODE	Setting	Type of campus-city relationship	Geographic scale
Campus as the city	ETHSC	Peripheral	Touches	Region
	RCG-TUM		Disjoint	Region
	RTP		Disjoint	Region
	TCSP		Disjoint	Region
	TSP		Disjoint	Region
	TP		Disjoints	Region
	KSC		Disjoints	Region
	RWTH-RCM		Disjoints	Region
	SAP		Disjoints	Region
	TSC		Equals	Region
	ST-IPT		Equals	Region
	TST		Equals	Region
	TPUB		Touches	Region
	CRDP		Touches	Region
	HTCE		Touches	Region
	SYRP		Touches	Region
	CSP		Touches	Region
	DCUT		Touches	Region
	SRP		Touches / Overlaps	Region
	HSP		Touches / Overlaps	Region
	CBTP		Touches	Region
	BP		Disjoints	Region
	AAT		Equals	Region
	ZJHTP		Touches	Region



Connectivity: Access to amenities

travelling distance to urban area with abundant amenities



Location setting: Inner-city - peripheral

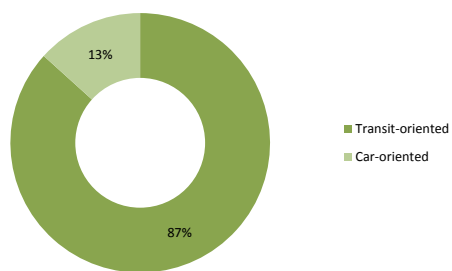


Connectivity: Access to knowledge networks

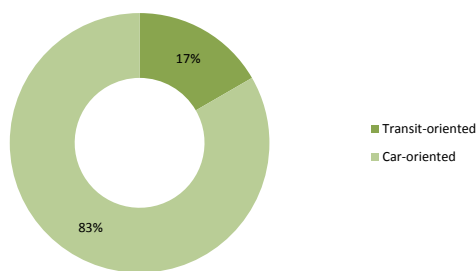


Connectivity: transportation

Transportation mode - Inner-city locations



Transportation mode - Peripheral locations



Conclusions



Revising the planning tool

	Campus as the city	Campus in the city
Campus models		
Designation	Tech-park	Tech-district
Location characteristic	Peripheral	Inner-city
Types of campus-city relationship	Disjoints-Equals (1) Touches (2)	Contains (3) Overlaps (4)
Geographic scale	Region	City
Connectivity		
Travelling distance to urban area with abundant amenities	48 minutes on average (Less frequent public transport schedules)	26 minutes on average (More frequent public transport schedules)
Travelling distance to international airport	89 minutes on average (Less frequent public transport schedules)	63 minutes on average (More frequent public transport schedules)
Primary transportation mode	Car-oriented	Transit-oriented
Planning frame		
Choices for the desired campus	Provision of enough amenities in campus and effective connectivity to cities	Balancing the provision of amenities between the campus and the city
Key partners	State-Provincial authorities	Municipalities
Consequences for the city	The concentration of innovative activities can shape the growth of cities and urban development towards those areas.	The concentration of innovative activities can lead to an increase of real estate and rental prices of the urban land in the vicinities of campus

Campuses in transition

87% of TCs have borders limiting their urban integration.

Campus Middle

Campus North

Technopolis

Concentration vs. Isolation paradox

Equals



Contains



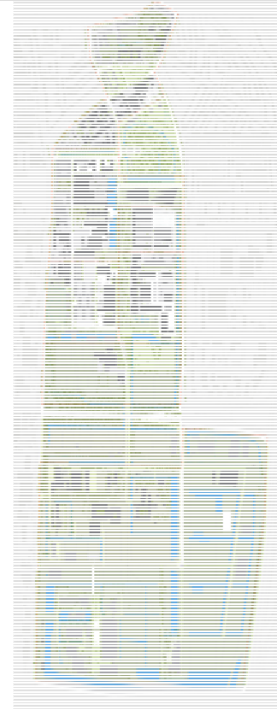
Overlaps



Touches



Disjoints



Conclusions

- **Diversity (people/functions)** as important aspects of innovation
- **Potential of different locations** to stimulate innovation
- **Transportation** plays an important role to access both knowledge networks and amenities
- **Context aspects** can enrich the discussion about competitiveness linking location decisions and innovation
- **Changing city –campus dynamics:** Campuses in transition (77% of TCs are in the categories Contains, Overlaps and Touches) → calls for exploring the **governance of these places.**
- **Peripheral campuses** have opportunities to explore and to improve this isolated condition with their associated challenges attracting and retaining talent.

Thanks!

