

# HSR AS TRANSIT

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*The continuing transportation-driven evolution of metropolitan form*

March 2015 – Ryan J. Westrom and Joseph M. Sussman

# OVERVIEW

- I. HSR as Transit
- II. The rise of urbanization: Transportation and metropolitan form
- III. HSR rail and metropolitan form
  - a) Metropolitan form effects
  - b) 21<sup>st</sup> Century Garden Cities?
  - c) Transit-oriented development
  - d) New urbanism
- IV. Learning from case communities
- V. Concluding thoughts

# HSR AS TRANSIT

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*“Transportation technology that allows individuals to access the megacity without living within its boundaries offers potentially large social benefits.”*  
-Siqi Zheng and Matthew E. Kahn

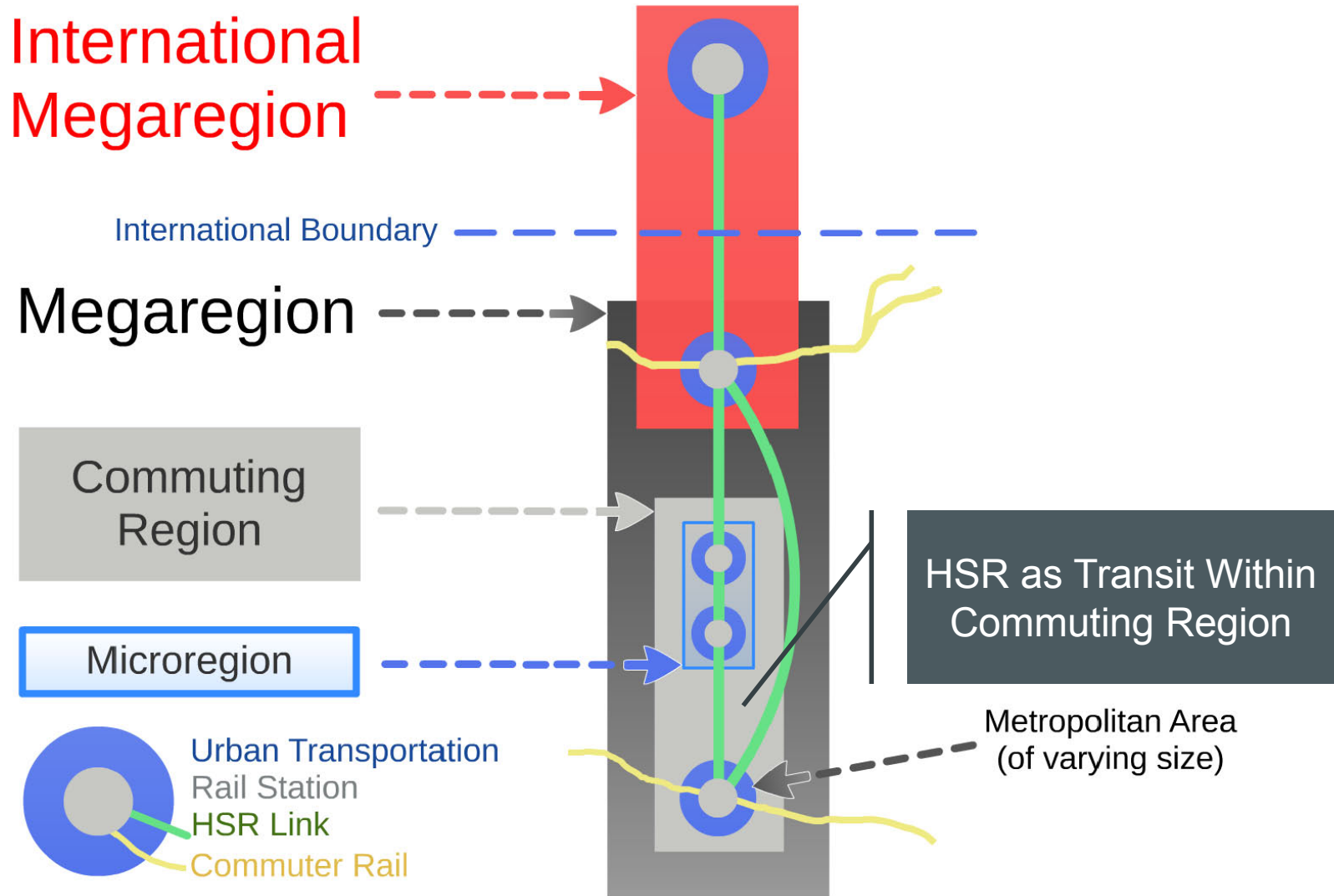
# Potential Bullet Trains



Source: Midwest HSR Association



# HSR and Regions



Source: Sussman, Archila, and Westrom, 2014

# THE RISE OF URBANIZATION

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Transportation and metropolitan form

# Cities

- Cities formed to allow collaborative (or agglomerative) benefits to society.
- Historically, villages grew up around wells, and then grew to the size a 20-minute walk to the well would allow.
- Villages at transportation crossroads grew further to become cities.
- But whatever their shape, cities have always been formed by their transportation. Economist Edward Glaeser observes, “Transportation technologies have always determined urban form.”



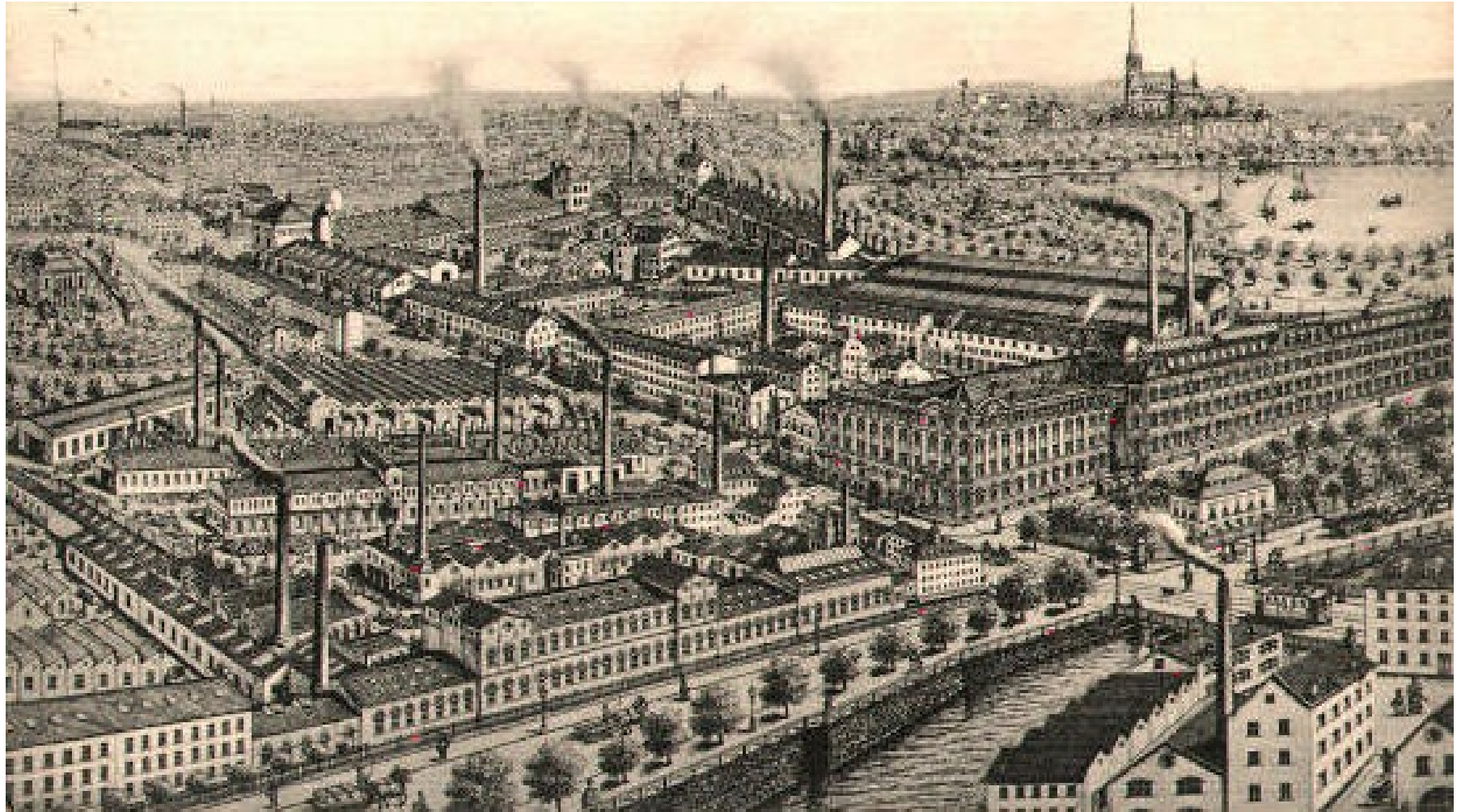
# Cities



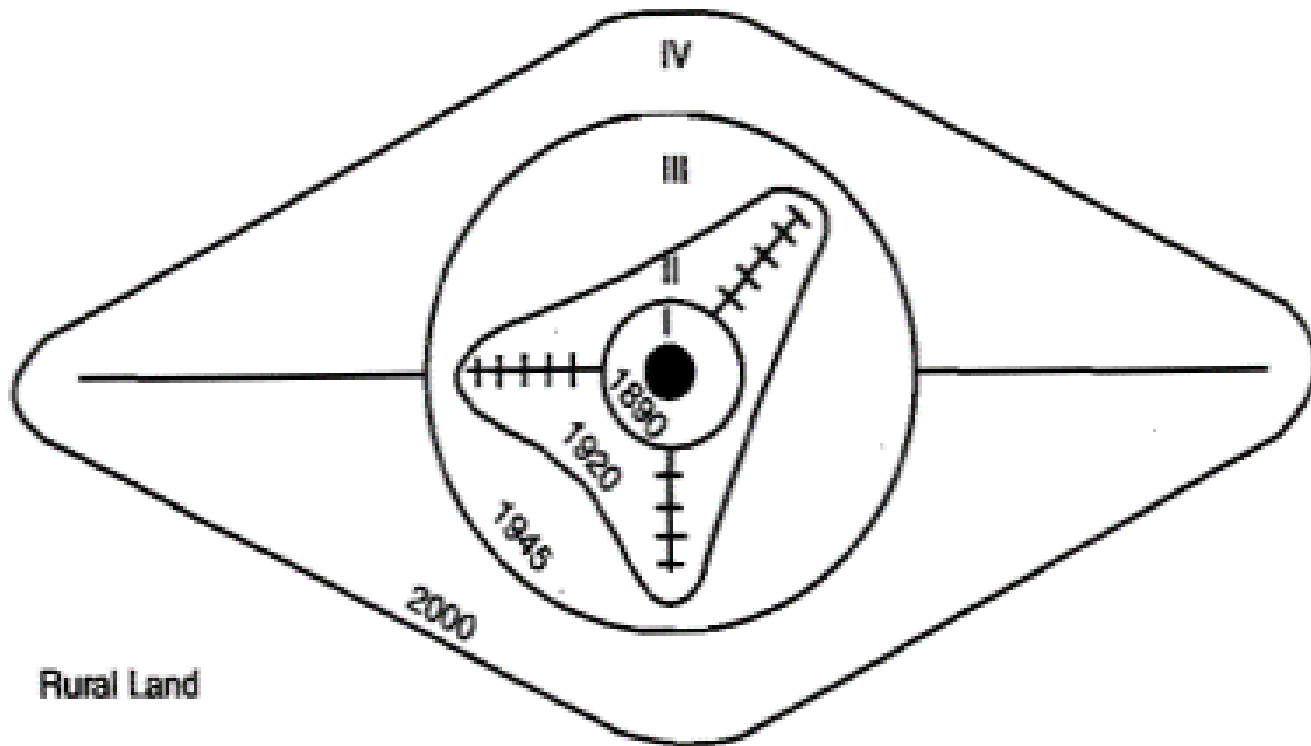
Published by Clark & O'Donnell, Baltimore.



# Cities



# Intraurban Transport and Metropolitan Growth



Rural Land

Source: Muller, 2004



# HSR RAIL AND METROPOLITAN FORM

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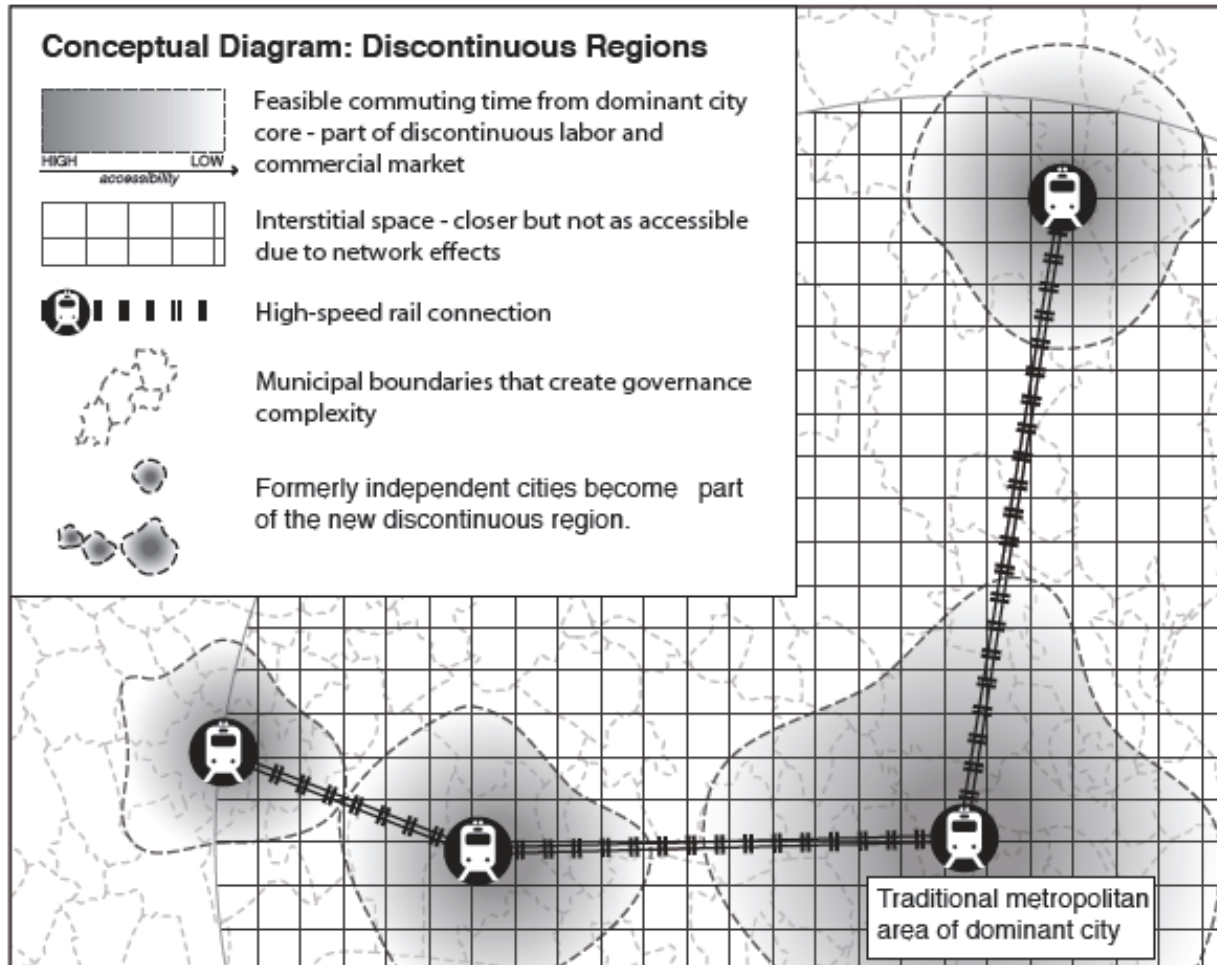
# Effects of Technological Innovations on Travel Speeds and Times

Technology	Approximate date introduced	Typical door-to-door speed (mph)	Travel time per mile (minutes)
Walking	Early	3	20
Horse-drawn omnibus	1827	4	15
Horse-drawn streetcar	1835	5	12
Cable car	1875	8	7.5
Electric streetcar	1890	10	6
Rail rapid transit	1910	15	4
Motor bus	1915	20	3
Automobile	1920	30	2
High-speed rail	1964	120	0.5

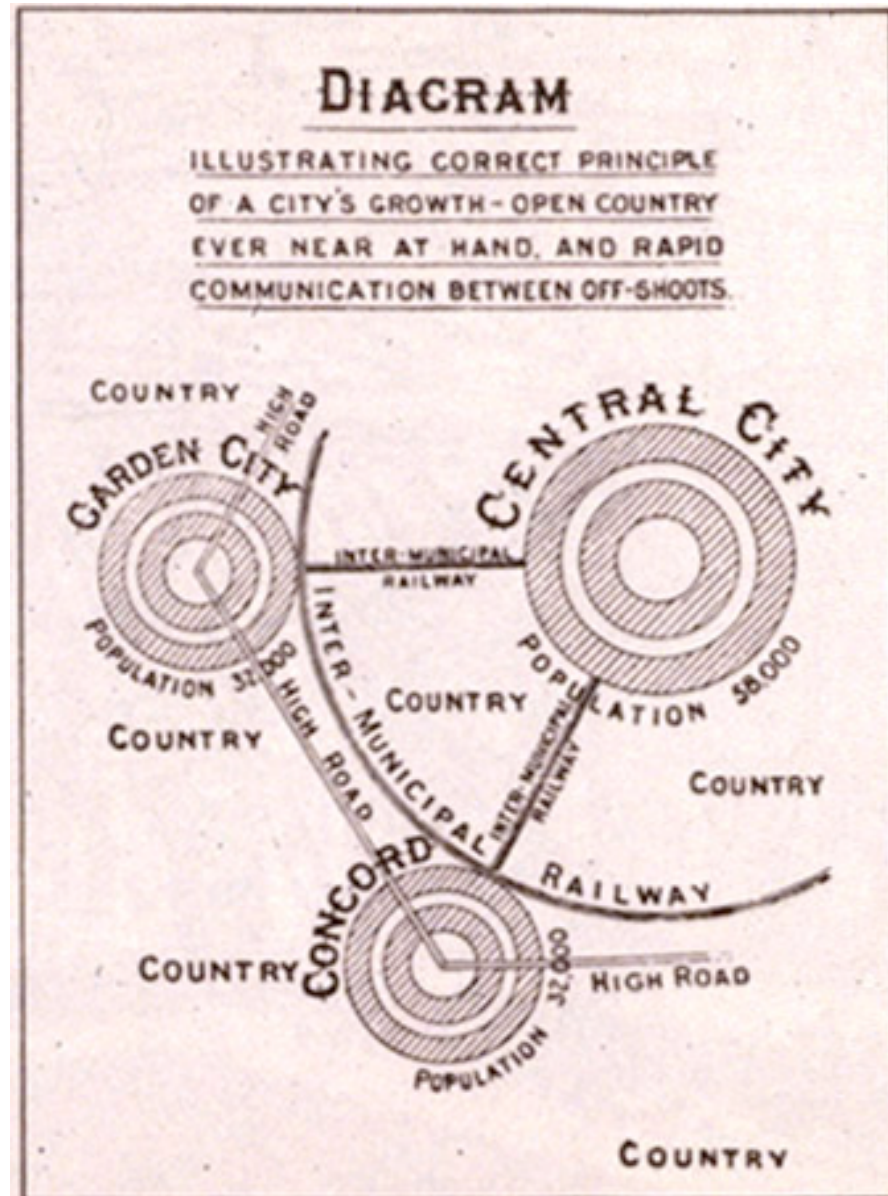
Source: Pickrell, 1999 and author



# The Formation of Discontinuous Regions

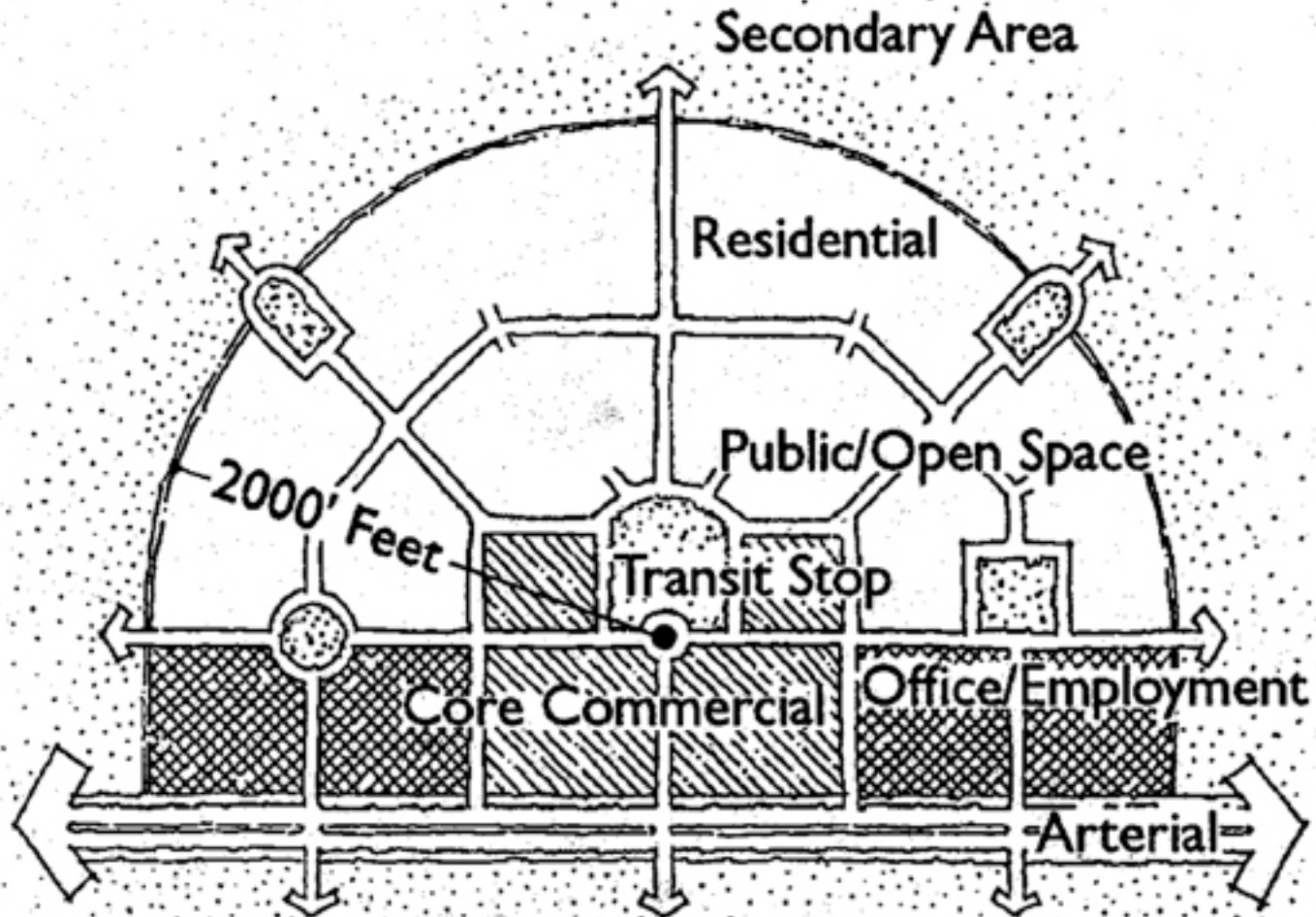


# 21<sup>st</sup> Century Garden Cities?



Source: Howard, 1902

# Transit-Oriented Development



Source: Peter Calthorpe





# New Urbanism



Source: PlaceMakers

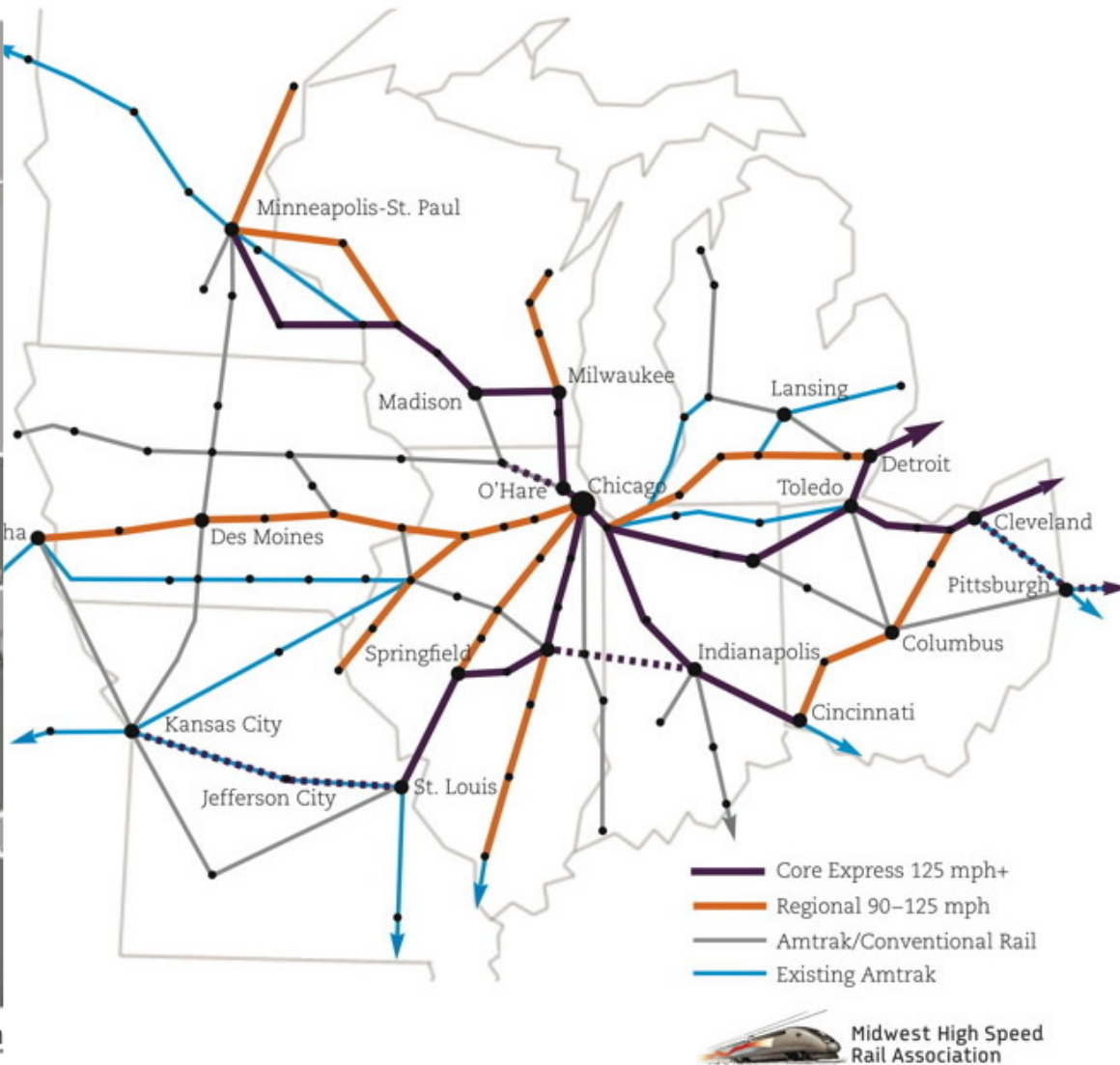


# LEARNING FROM CASE COMMUNITIES

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Leiria and Coimbra, Portugal

Kankakee and Champaign-Urbana, Illinois



Source: RAVE



# An Overview of Coimbra





# Coimbra, Portugal



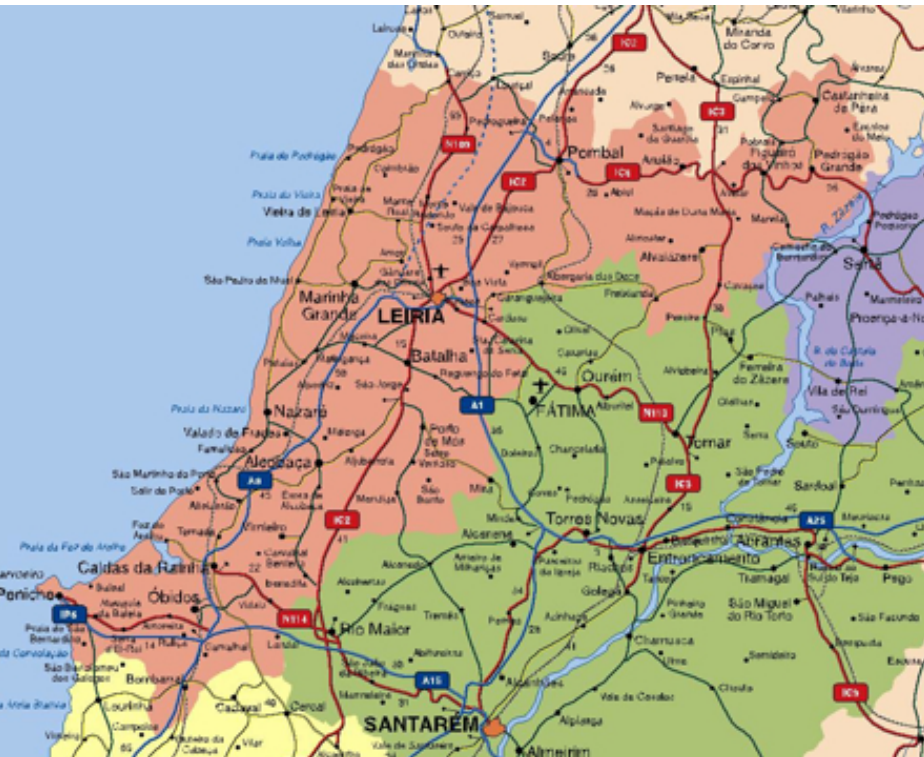


# An Overview of Leiria





# Leiria, Portugal





# An Overview of Champaign-Urbana





# Champaign-Urbana, Illinois





# An Overview of Kankakee





# Kankakee, Illinois



# Travel Time Comparisons

<b>Locale</b>	<b>Rail Distance (mi.)</b>	<b>Existing Highway Travel Time**</b>	<b>Existing Rail Travel Time***</b>	<b>Existing Flight Travel Time****</b>	<b>Proposed HSR Travel Time</b>
Chicago	-	-	-	-	-
Kankakee	56	61	73	-	30
Champaign-Urbana	129	129	130	135	55
St. Louis	314	267	320	155	127
Lisbon	-	-	-	-	-
Leiria	92.6	83	175	-	36
Coimbra	127.0	109	111	-	56
Porto	197.0	165	159	145	75

# Key Data

Locale	City Population	Metropolitan Population	Rail Distance (mi.)	GDP#	GDP/capita	Unemployment Rate%
Chicago	2,695,598	9,461,105	-	\$ 524.6	\$ 55,448.07	11.2
Kankakee	27,537	113,449	56	\$ 3.2	\$ 28,479.76	14.4
Champaign-Urbana	122,305	231,891	129	\$ 9.2	\$ 39,837.68	8.9
St. Louis	319,294	2,787,701	314	\$ 132.7	\$ 47,601.95	10.8
<i>Illinois</i>	12,830,632		-	\$ 695.2	\$ 54,182.83	9.2
Lisbon	547,361	3,035,000	-	\$ 95.2	\$ 31,367.38	11.7
Leiria	50,200	126,879	92	\$ 2.3	\$ 18,113.00	10.7
Coimbra	102,455	435,900	127	\$ 7.8	\$ 17,926.00	12.4
Porto	237,591	1,817,172	197	\$ 41.6	\$ 22,892.71	16.5
<i>Portugal</i>	10,562,178		-	\$ 237.6	\$ 22,495.36	12.3

# What are Coimbra and Champaign-Urbana like?

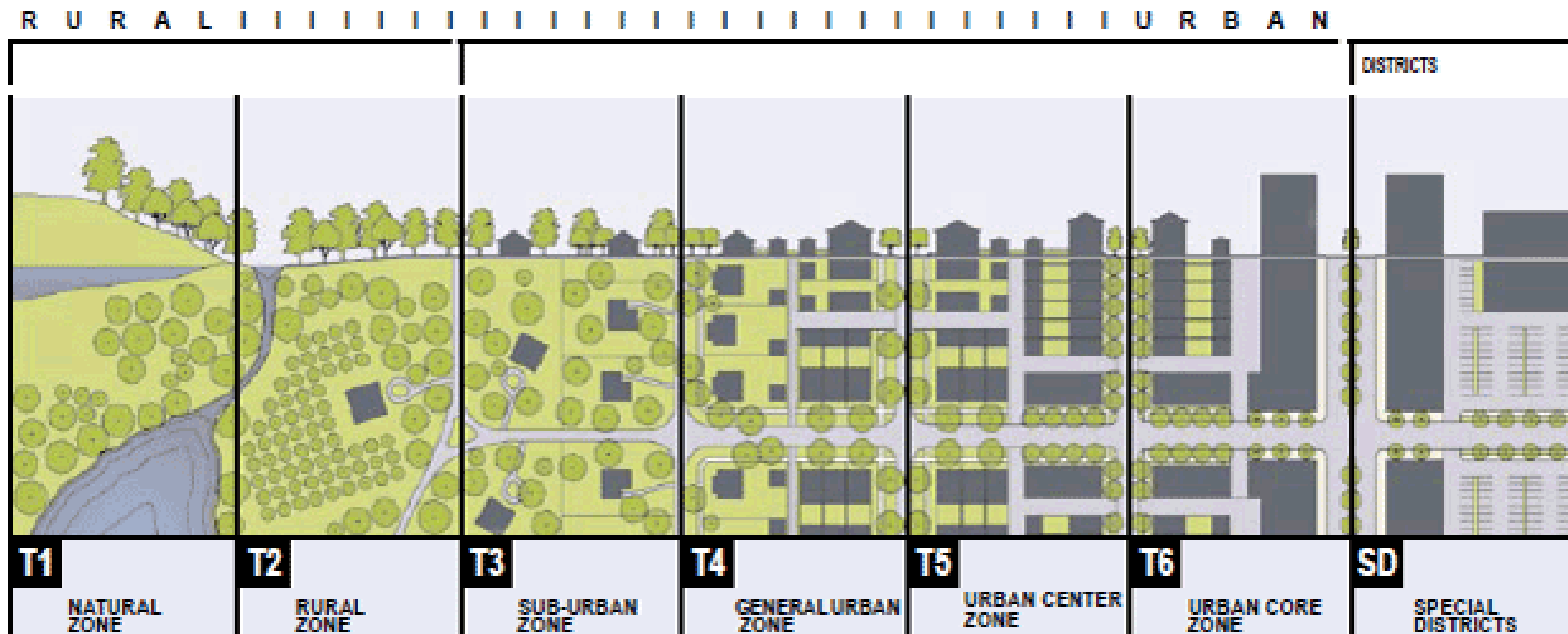
- Micro-urban
  - An informal term for smaller cities of 250,000 or less with specific urban characteristics normally found in large metropolitan centers
- How do they epitomize 21<sup>st</sup> Century urbanization?
  - Smart people intellectual leader and source of knowledge
    - ✓ University of Coimbra, University of Illinois
  - Technology exploration, innovation, and entrepreneurship
    - ✓ iParque, The Research Park at the University of Illinois
  - Academics, tech, and health care?
- One can imagine the potential for these 21<sup>st</sup> Century 'clusters'.

# CONCLUDING THOUGHTS

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# Urban Transect Zones





# Takeaways?

- HSR can move cities into a commuting region,
  - But these connections must be planned for.
- In the end, we do not invest in infrastructure as an end in itself. We do it for the benefits it brings.
- With the benefits shown for these HSR systems, planners must accommodate this investment in a fashion that further leverages their potential.
- Doing so may again shift metropolitan form, now to a regional scale, while also bringing corollary growth, but without the sprawl inherent in conventional megacities.

# Some Influential References

- **Muller, Peter O.**, “Chapter 3: Transportation and Urban Form”, *The Geography of Urban Transportation*, Guilford Press, New York, 2004.
- **Pickrell, Don**, “Chapter 12: Transportation and Land Use”, *Essays in Transportation Economics and Policy*, Brookings Institution, Washington, D.C., 1999, pp. 403–435.
- **Stein, Naomi E.G.**, “Spatial Dimensions of High-Speed Rail: Intermediate Cities, Inter-Jurisdictional Planning, and the Implications for High-Speed Rail in Portugal”, Massachusetts Institute of Technology, 2013.
- **Zheng, S., and M. E. Kahn.** “China’s Bullet Trains Facilitate Market Integration and Mitigate the Cost of Megacity Growth.” *Proceedings of the National Academy of Sciences* 110, no. 14 (March 18, 2013): E1248–E1253.

Thoughts/Questions?

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