

# **THE PRINCIPLE OF RELATEDNESS**

## **LOCAL & GLOBAL KNOWLEDGE SOURCING**

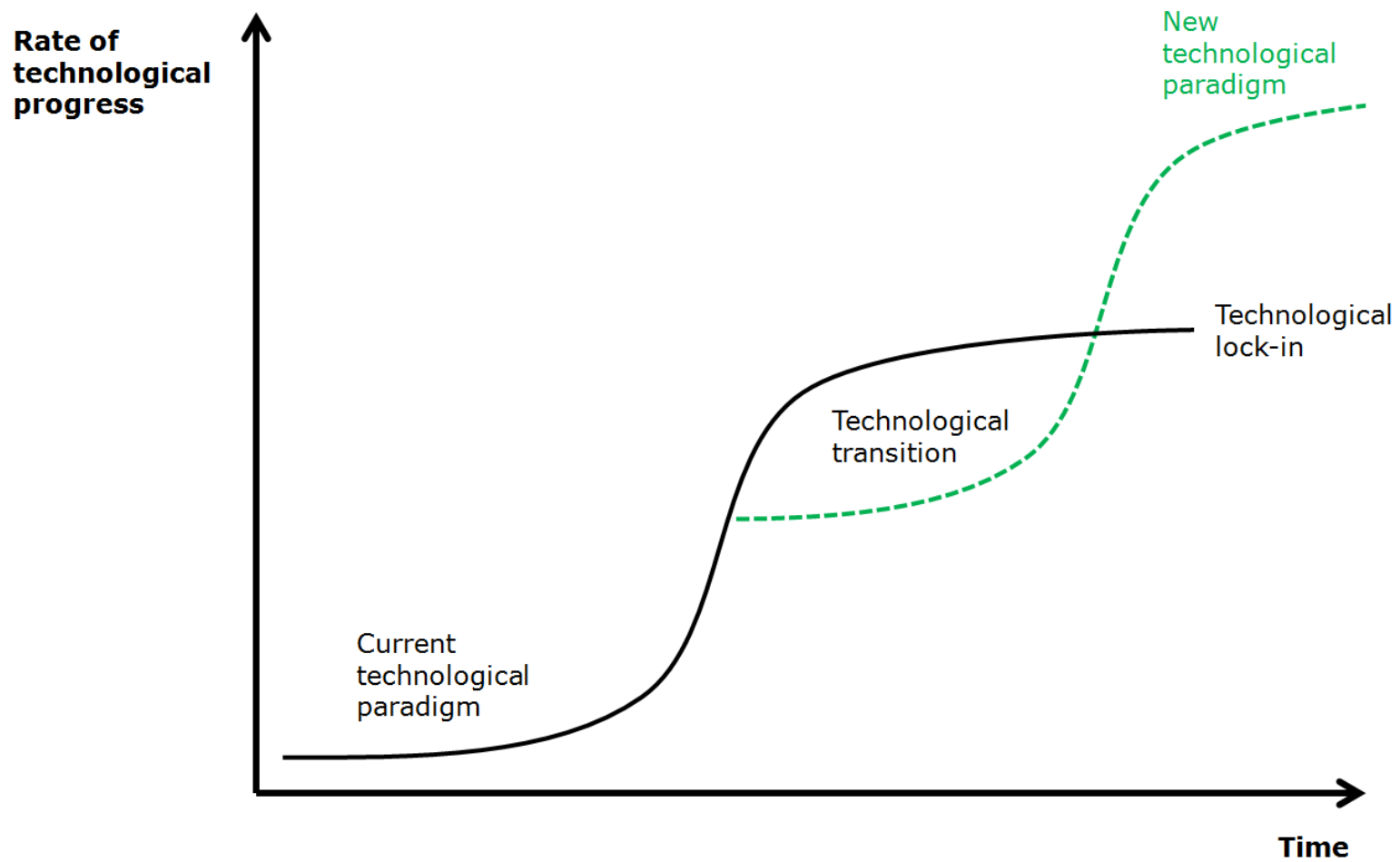
**Pierre-Alexandre Balland**











# Key issues

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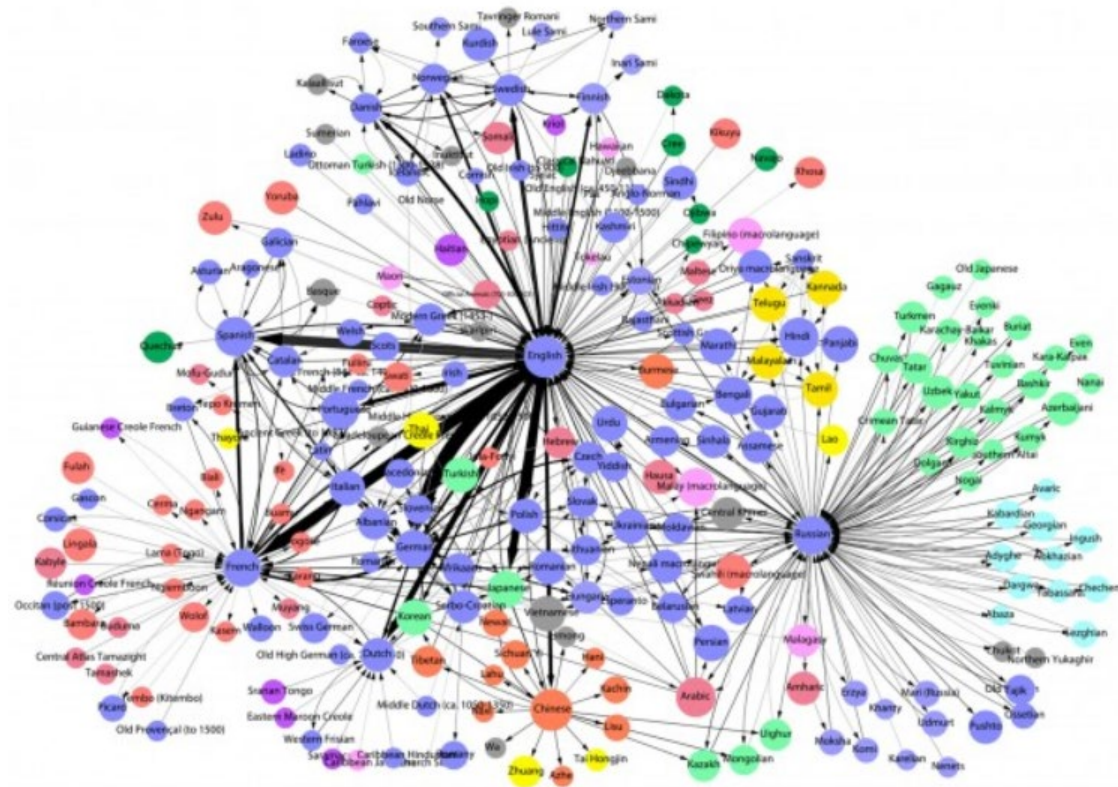
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  - By building on **local** capabilities (internal relatedness)



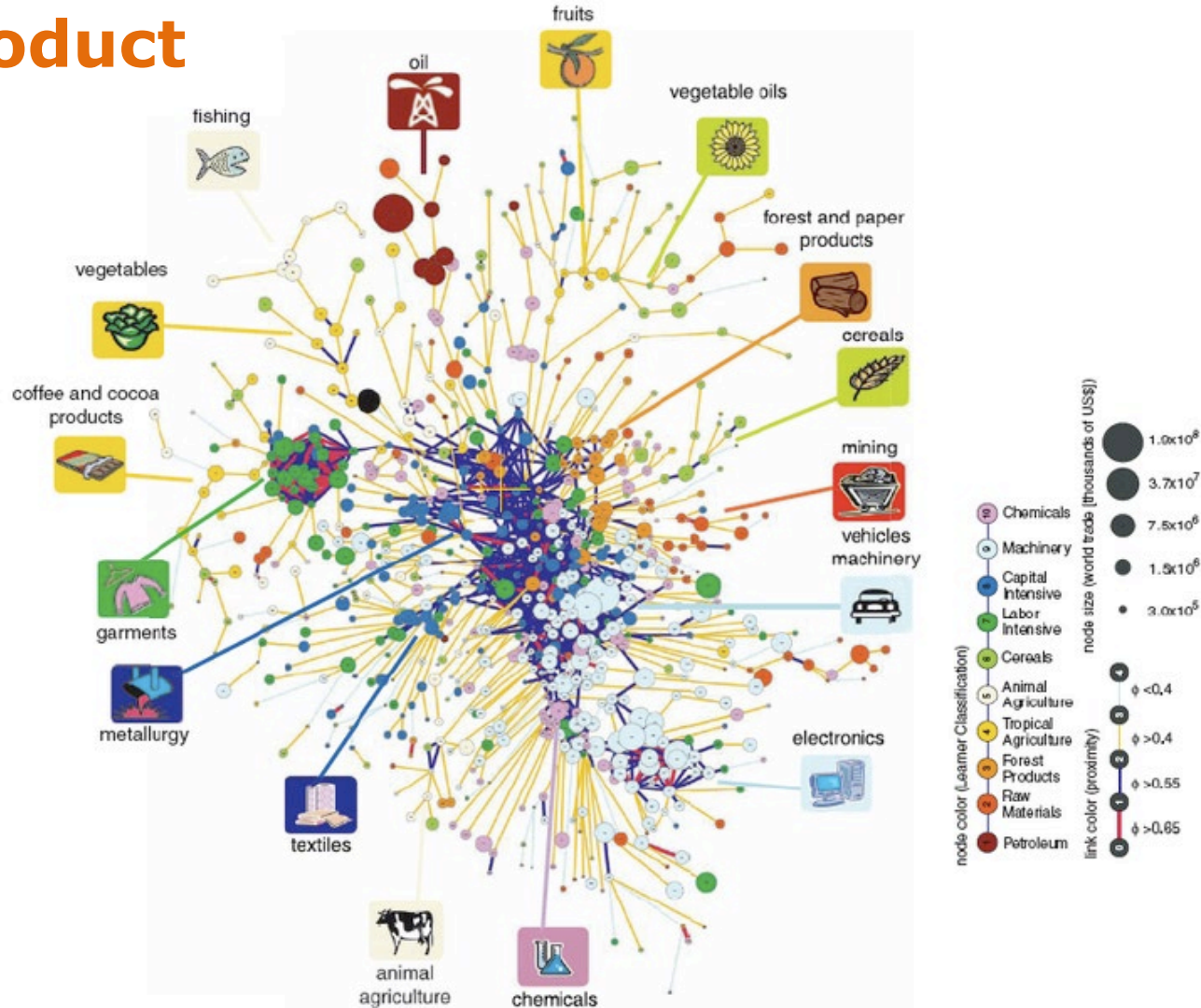
# Key issues

- Regions need to continuously **re-invent** themselves to secure long run prosperity
- Identify **diversification opportunities** that upgrade the regional economy
  - By building on **local** capabilities (internal relatedness)
  - By **connecting** to regions that have **complementary** capabilities (external relatedness)

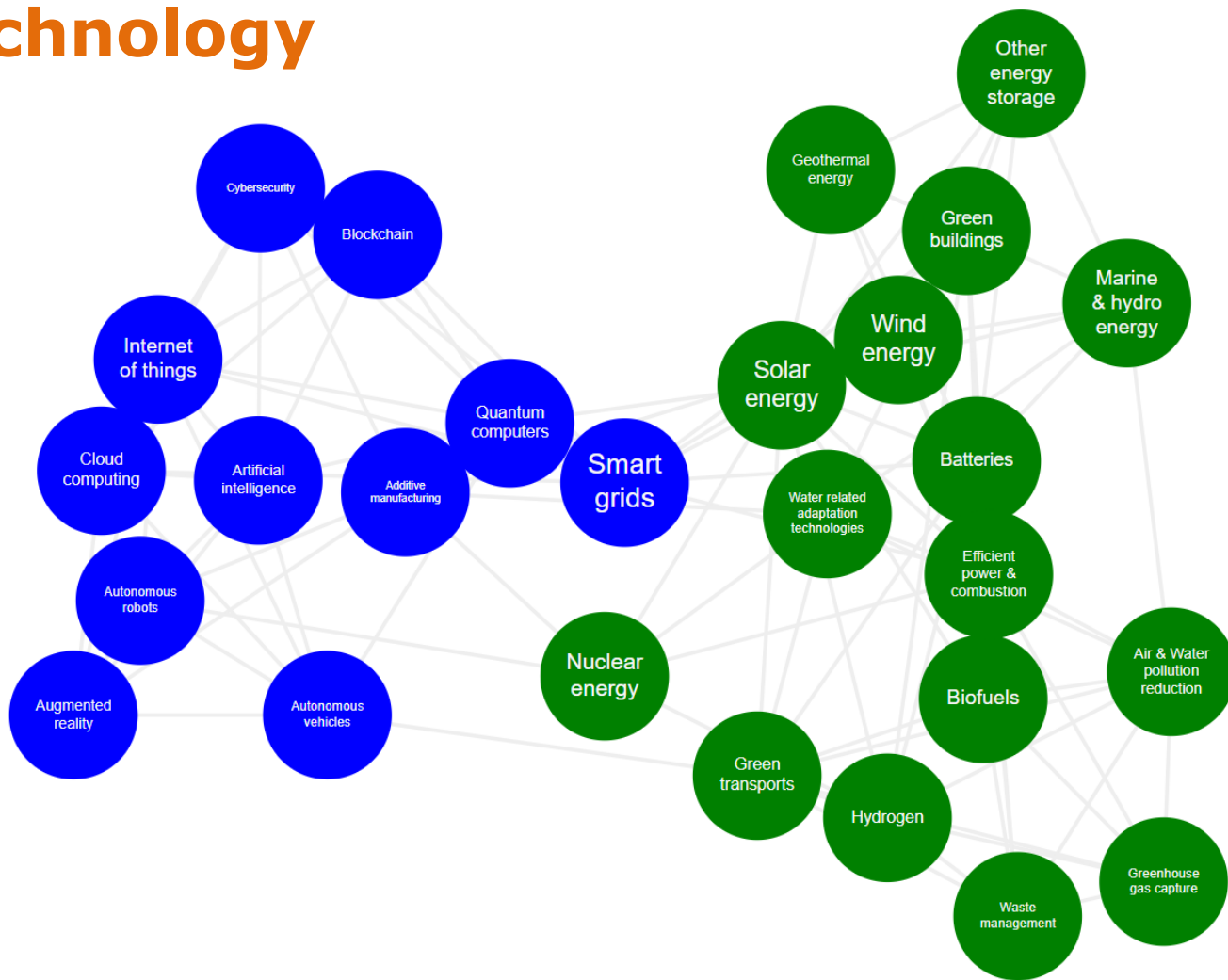
# Most influential languages



# The product space



# The technology space

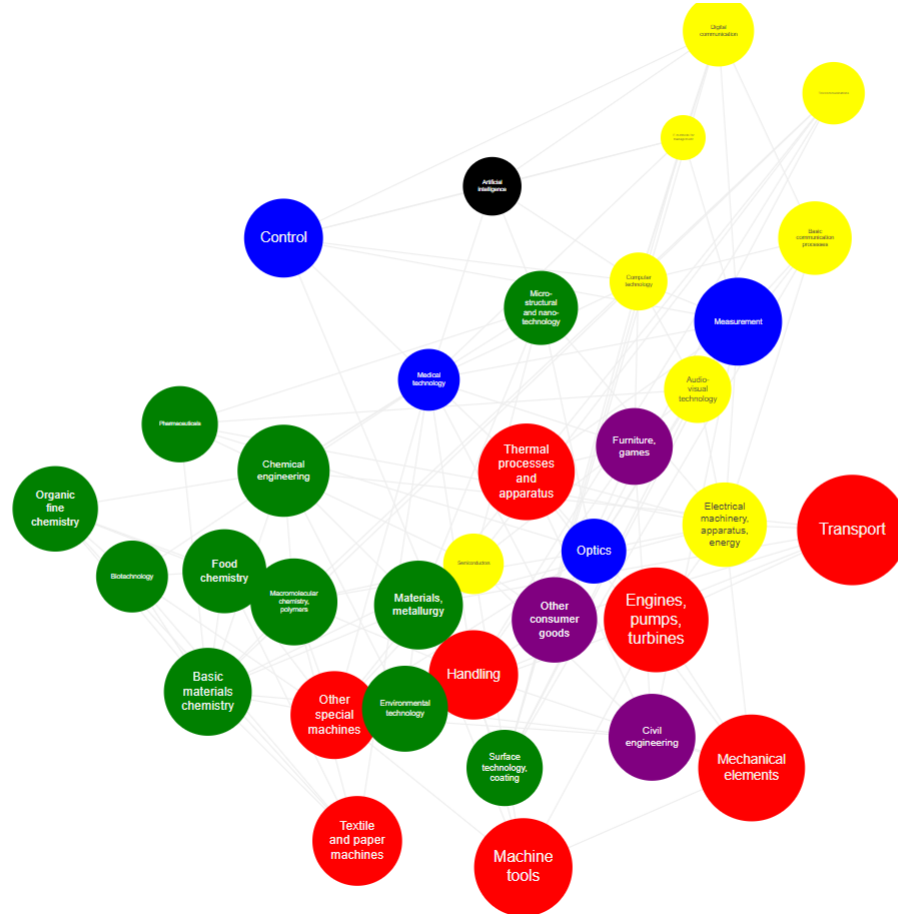


# US knowledge space prior to the AI revolution



Balland, P.A. (2021)  
Report for DG Grow

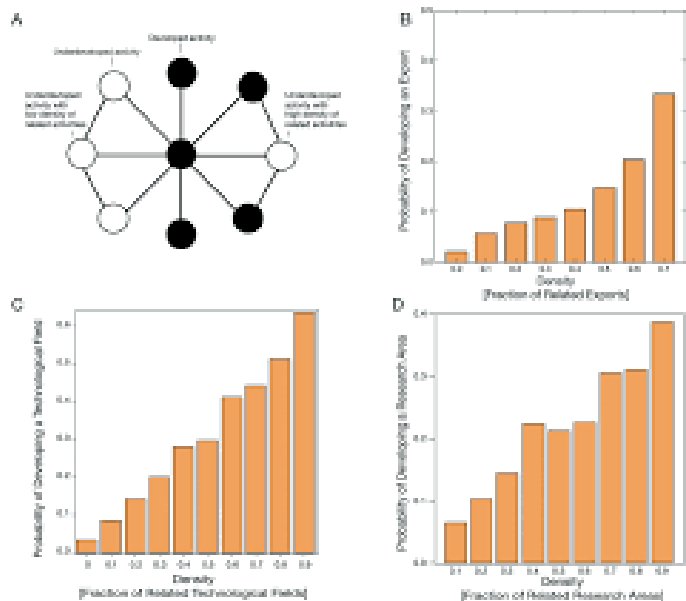
# EU knowledge space prior to the AI revolution



Balland, P.A. (2021)  
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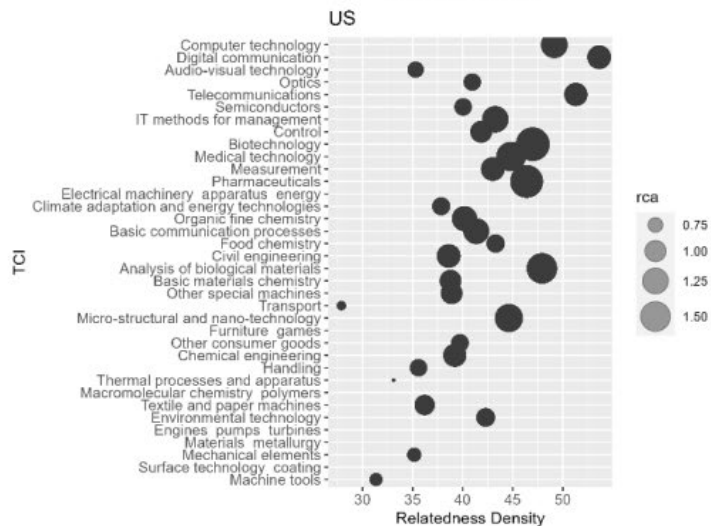
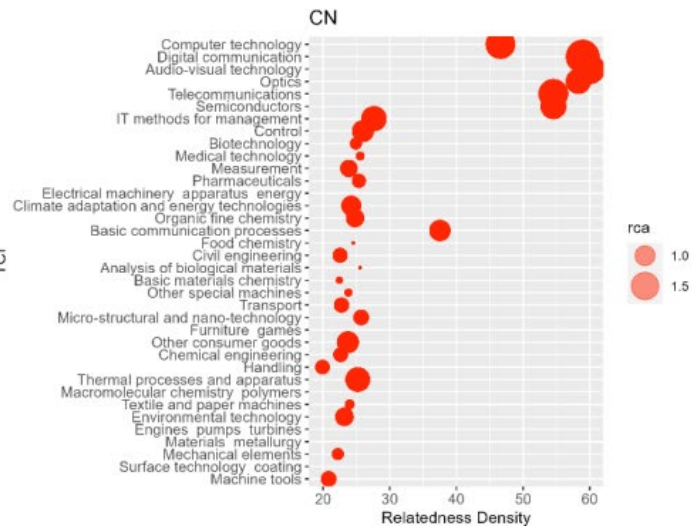


# The principle of relatedness



The structure of the economy allows to predict its further evolution

Hidalgo, C., Balland, P.A., Boschma, R., Delgado, M., Feldman, M., Frenken, K., Glaeser, E., He, C., Kogler, D., Morrison, A., Neffke, F., Rigby, D., Stern, S., Zheng, S., and Zhu, S. (2018) **The Principle of Relatedness**, *Unifying Themes in Complex Systems (IX)*: 451-457



# The global position of the EU in complex technologies



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Julien RAVET, Océane PEIFFER-SMADJA,  
Pierre-Alexandre BALLAND

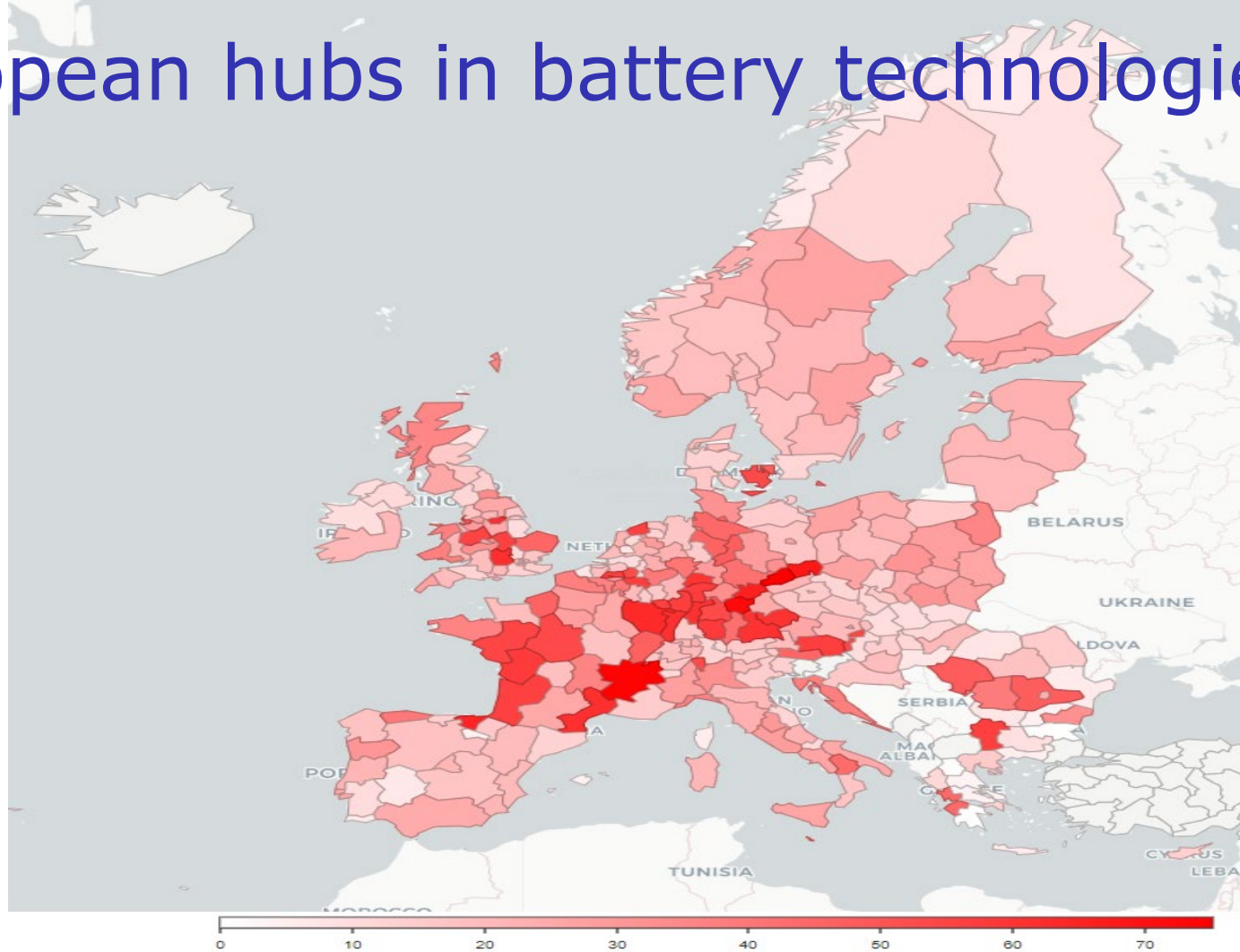
# The density of related technologies

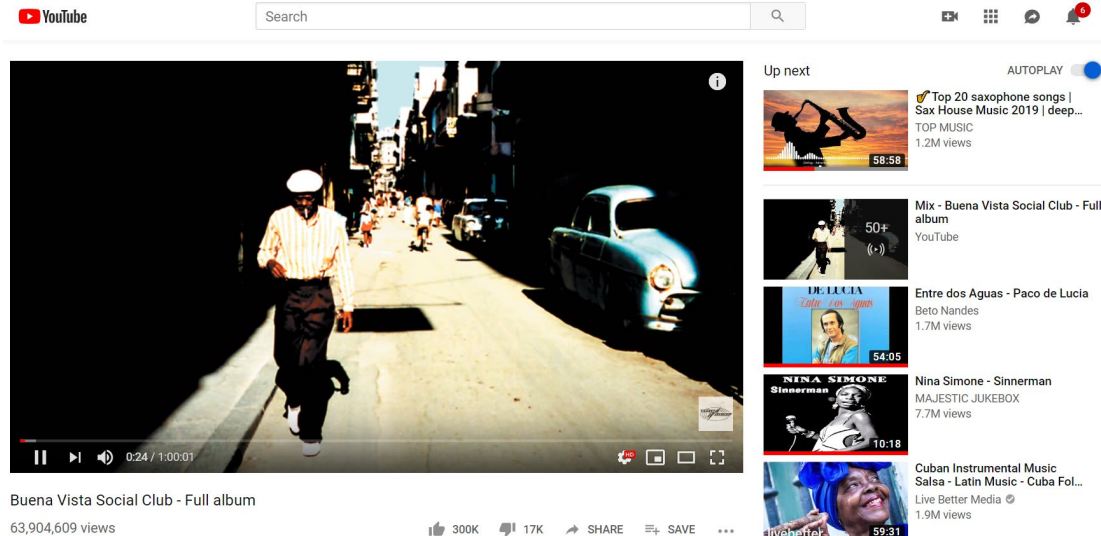
$$D_{i,c,t} = \frac{\sum_i x_i \varphi_{ij}}{\sum_i \varphi_{ij}} \times 100$$

City	Technology	Density (%)
Ile de France	Biotech	10
Ile de France	Nanotech	100
Rhone Alpes	Biotech	80
Rhone Alpes	Nanotech	0
...	...	...

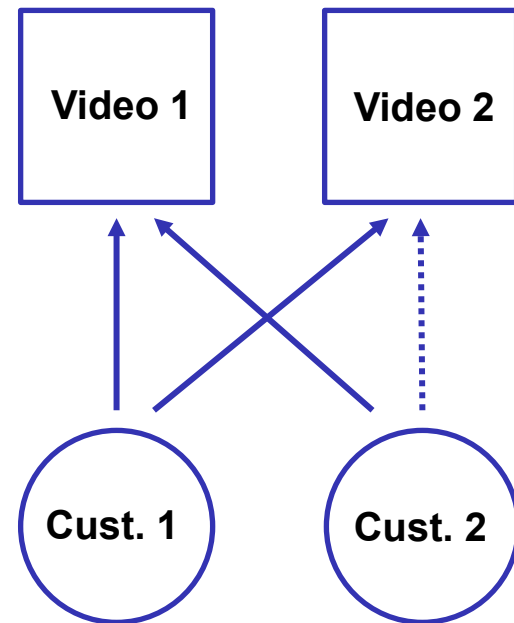
The **Density Index** indicates how close a potential new technology is to the knowledge bases of a given city

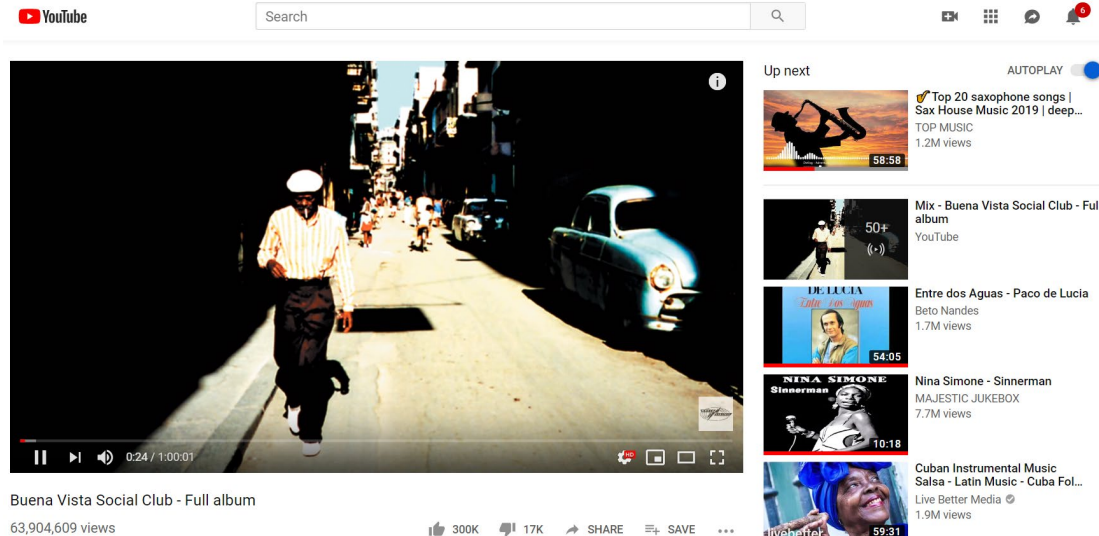
# European hubs in battery technologies



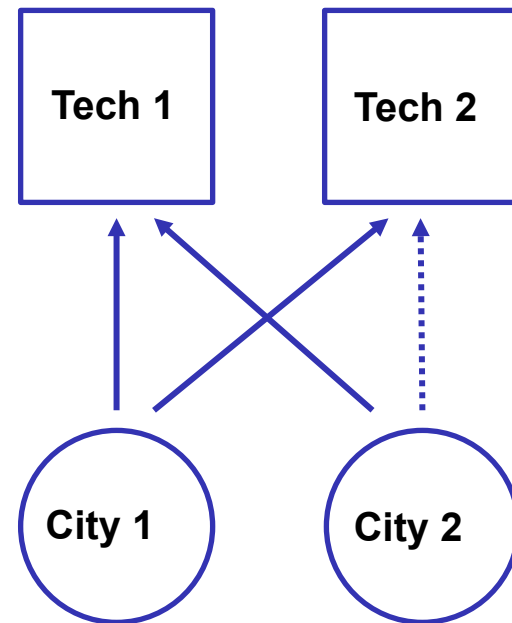


**We build recommendation systems to guide investment decisions in cities**



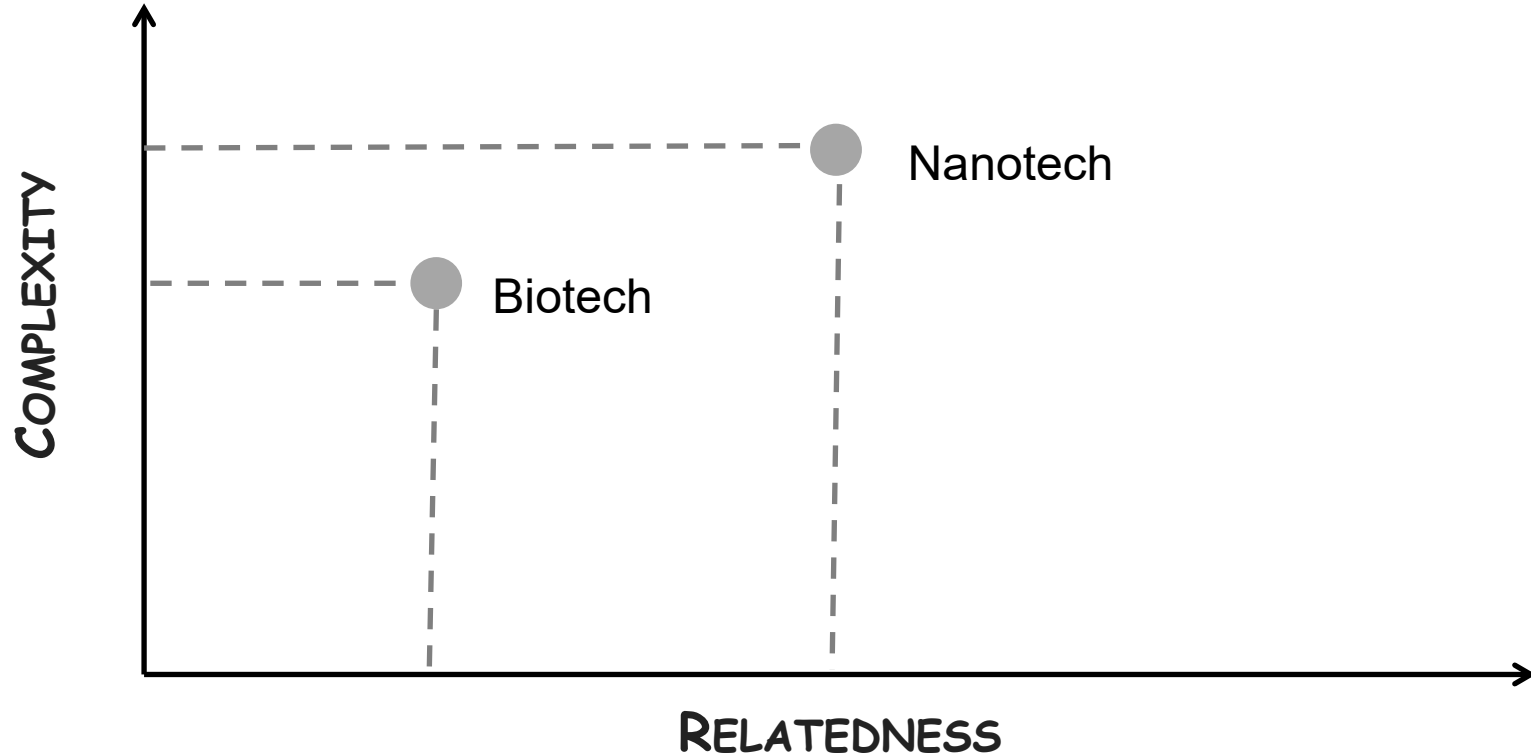


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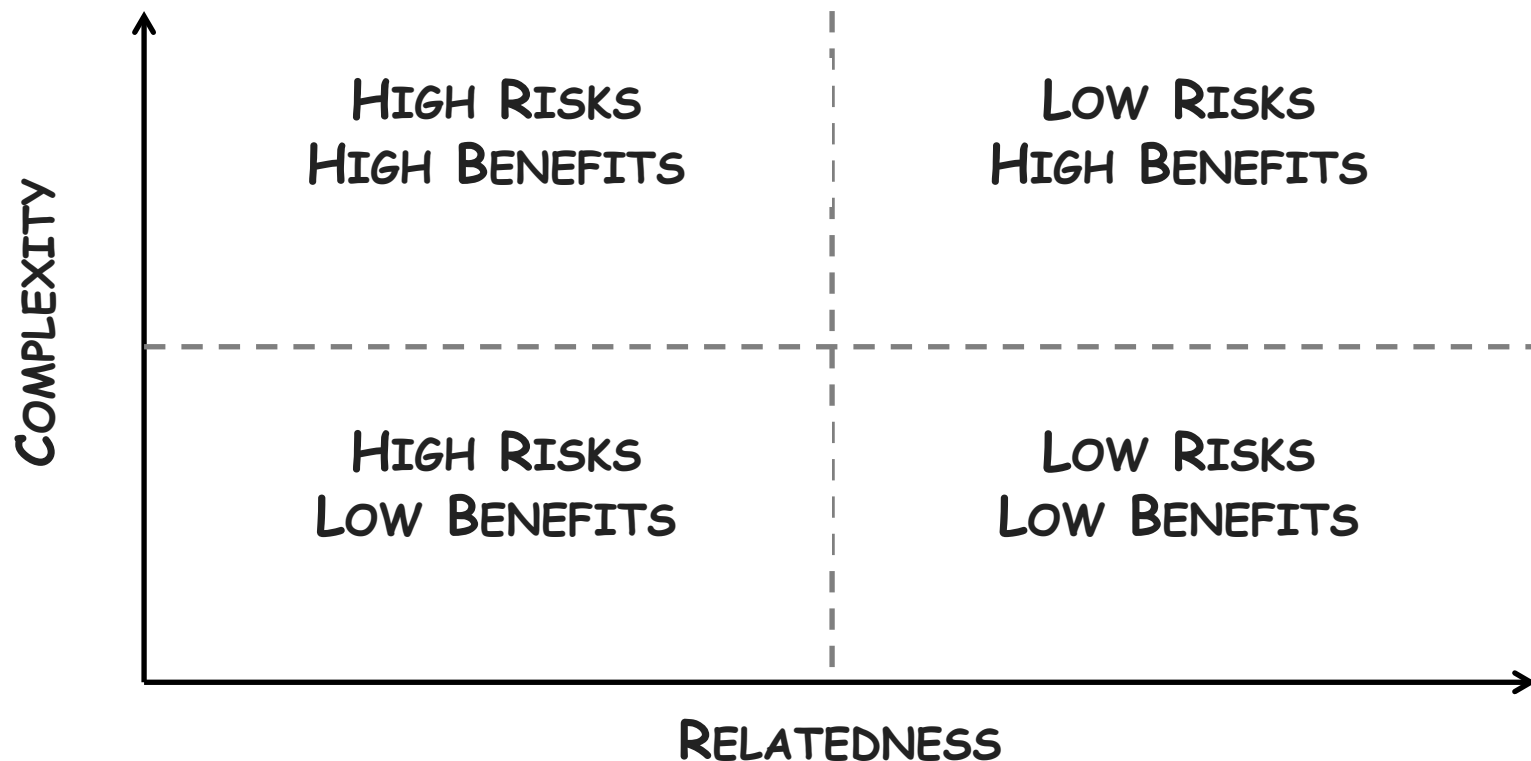


# Evidence-based framework for S3

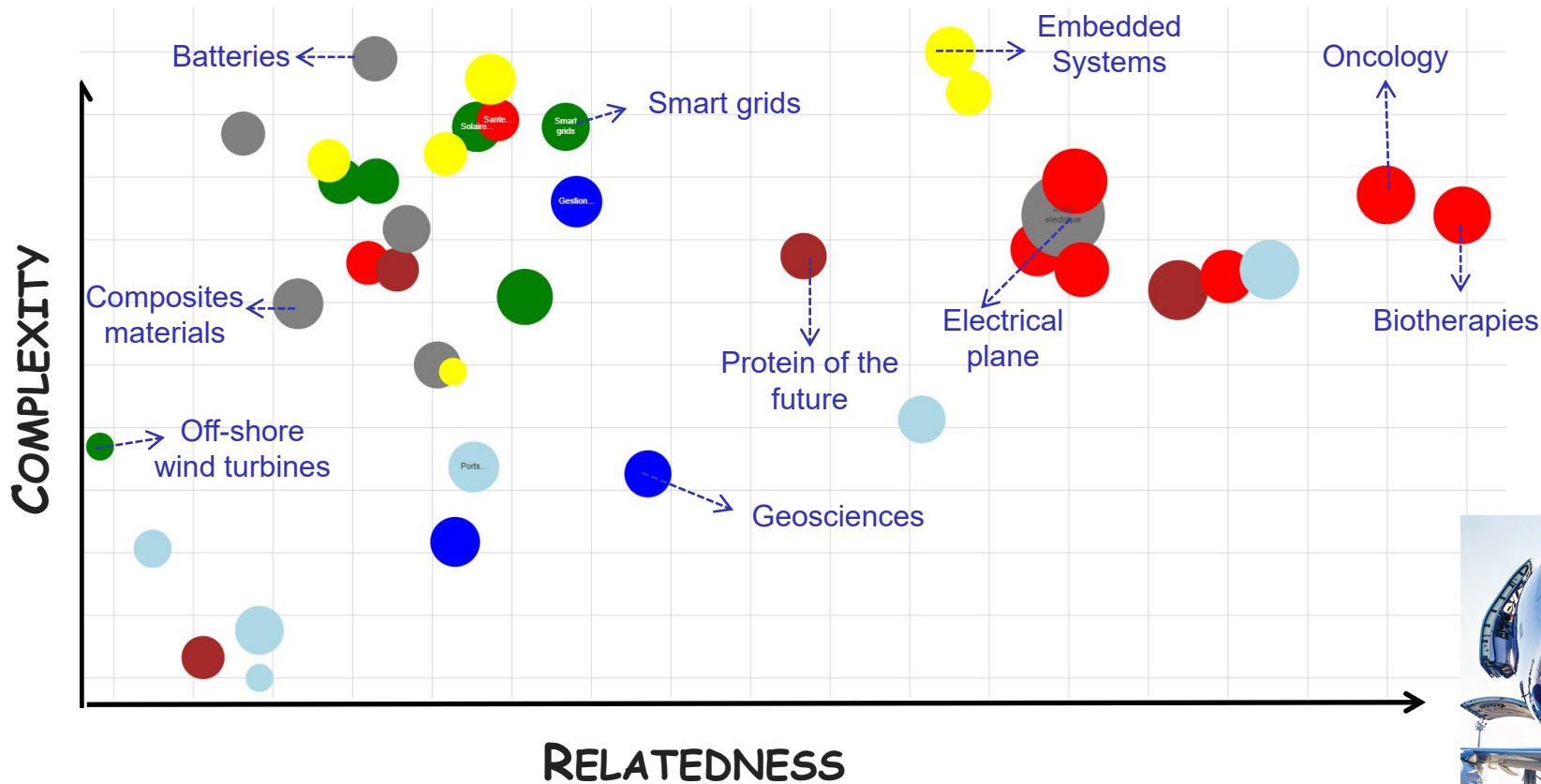


Balland, P. A., Boschma, R., Crespo, J., & Rigby, D. L. (2019). Smart specialization policy in the European Union: relatedness, knowledge complexity and regional diversification. *Regional Studies*, 53(9), 1252-1268.

# Smart Investment Framework



# The case of the Toulouse region



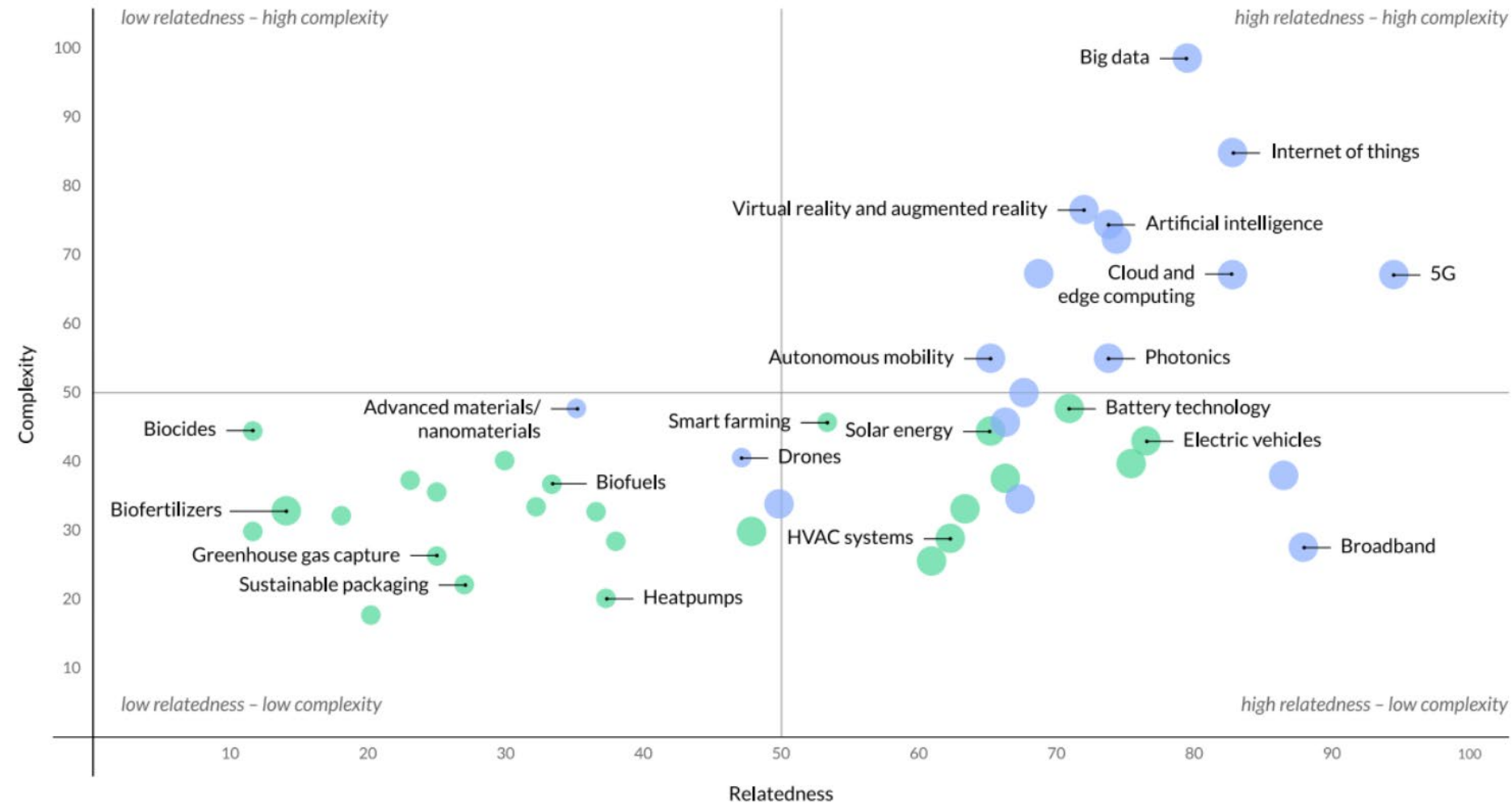
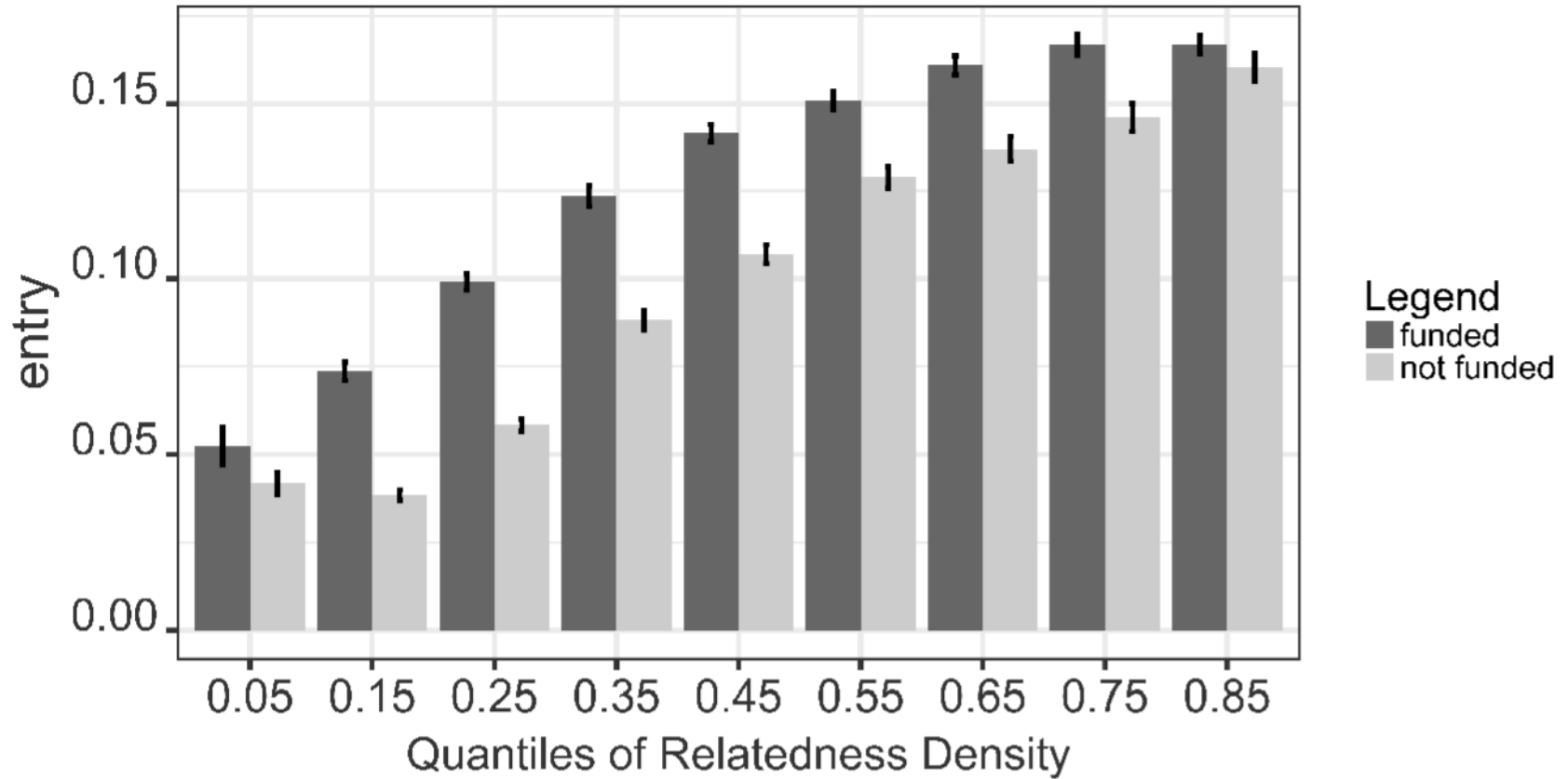


Figure 2: Differences of Mean Entry Probabilities



# Beyond local capabilities

- Local capabilities are key but so are **external** linkages
- Balland and Boschma (2019) show that regions that collaborate with **complementary** regions more likely to develop successful specializations
- A key issue to identify the right regions as **strategic partners** as part of S3
- Strategic partners not just any regions but the ones that can provide **missing** capabilities



# How to find strategic partners?

