(a) Coordinator   **(b) Gatekeeper**   **(c) Representative**   **(d) Itinerant**   **(e) Liaison**

0.0   1.0

(a)	(b)	(c)	(d)	(e)
Mazovia (PL)	Piedmont (IT)	Central (HU)	Paris (FR)	U.Bav. (DE)
Central (HU)	Central (HU)	Paris (FR)	R.Alpes (FR)	Stuttg. (DE)
Prov. (FR)	Attica (EL)	Mazovia (PL)	U.Bav. (DE)	Darmst. (DE)
South (FI)	South (FI)	Attica (EL)	Stuttg. (DE)	Karlsr. (DE)
Lisbon (PT)	South (DK)	South (FI)	Prov. (FR)	Dusseld. (DE)

Weighted-normalized GF roles in the 2010 manufacturing trade

The weighted-normalized Gould-Fernandez measure produces nuanced information on the brokerage role of EU regions.

The international organisation of production and its impact on regions: A network analysis

BACKGROUND: Regional inequality is growing

- Revenge of the places that don't matter: Brexit, Trump
- → Regions are even more exposed to the global nature of economy
- → Regions can create interregional & international ties that expose them to both development and potential shocks

RESEARCH QUESTION:

How does Global Value Chain participation affect regional growth and inequality?

→ How to measure GVC participation through brokerage measure?

Brokers connect otherwise unconnected actors and with this gain *access to resources* (information + power + economic activity) but are also *exposed to shocks.*

DATA & METHODS

EUREGIO: Trade Input-Output data on the regional level

→ Full network: weighted and directed

→ No appropriate network measure:

→ Betweenness centrality does not provide meaningful insights into broker roles
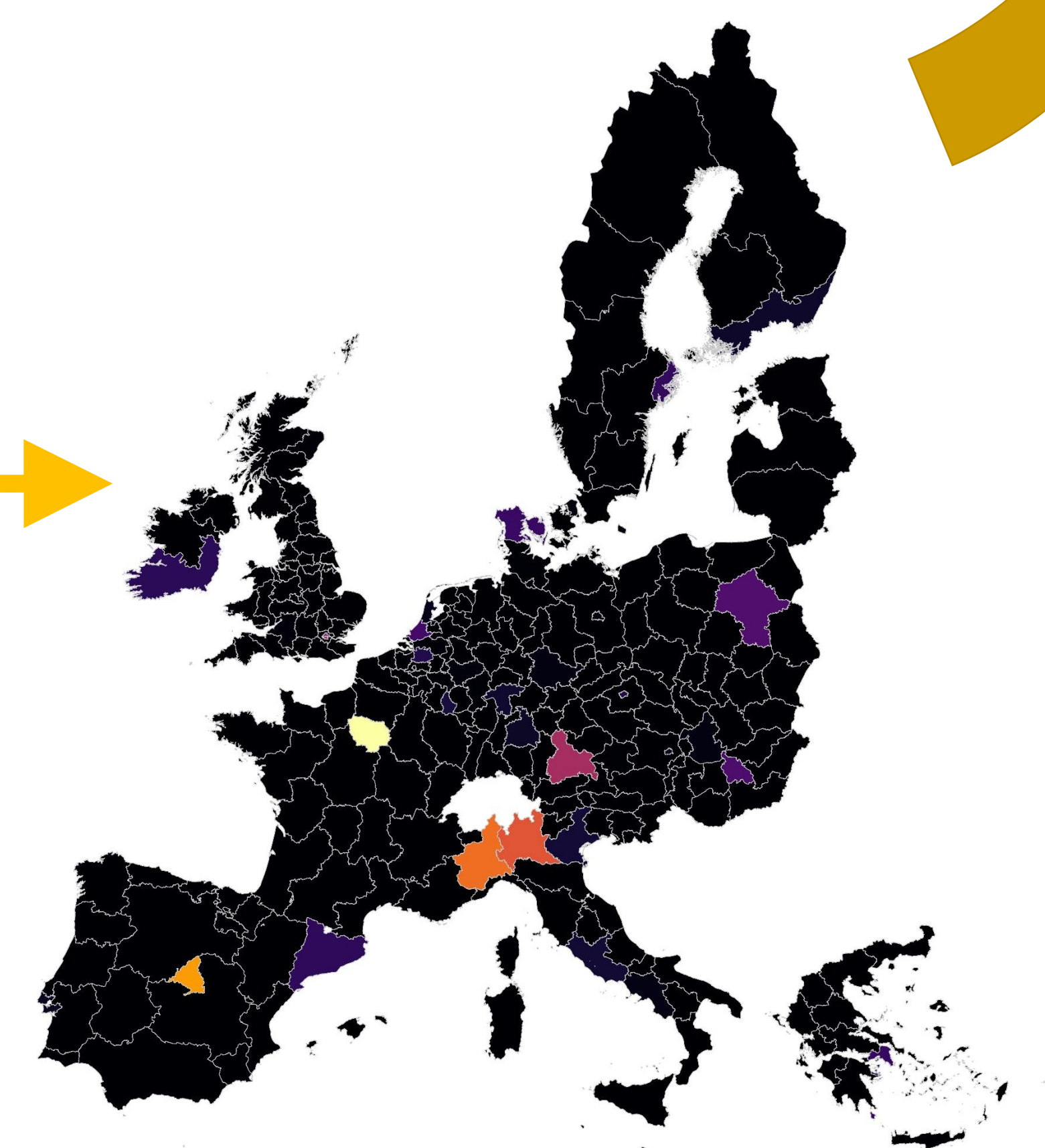
Need for new brokerage measure

RESULTS:

A weighted-normalized Gould Fernandez (WNGF) brokerage measure is introduced.

Brokerage Role	Visualisation	Description
Coordinator		$\min(Z_{qr}^{ii}, Z_{rs}^{ii}) > Z_{qs}^{ii}$
Gatekeeper		$\min(Z_{qr}^{ij}, Z_{rs}^{jj}) > Z_{qs}^{ij}$
Representative		$\min(Z_{qr}^{ii}, Z_{rs}^{ij}) > Z_{qs}^{ij}$
Itinerant		$\min(Z_{qr}^{ij}, Z_{rs}^{ji}) > Z_{qs}^{ii}$
Liaison		$\min(Z_{qr}^{ij}, Z_{rs}^{jk}) > Z_{qs}^{ik}$

Nodes are regions, the square is the broker, node colour indicates country.

Betweenness centrality of regions

INFORMATION MAXIMIZATION:

The ECDF plot shows that the WNGF measure (purple) has more normal distribution, while other methods retain less information.

ECDF of Representative Roles

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