ADAM MICKIEWICZ UNIVERSITY, POZNAŃ

INSTITUTE OF SOCIO-ECONOMIC GEOGRAPHY AND SPATIAL MANAGEMENT

CONTEMPORARY SOCIO-ECONOMIC DIVERSIFICATIONS OF EUROPEAN UNION REGIONS

CONDITIONS AND DEVELOPMENT FACTORS

Robert Perdał

Paweł Churski, Barbara Konecka-Szydłowska, Tomasz Herodowicz

„New challenges for the regional policy in determining the factors of socio-economic development in less developed regions"

NATIONAL SCIENCE CENTRE
POLAND

IGU UGI

IGU Thematic Conference
**PRACTICAL GEOGRAPHY
AND XXI CENTURY
CHALLENGES**
Moscow, 4-6 June 2018

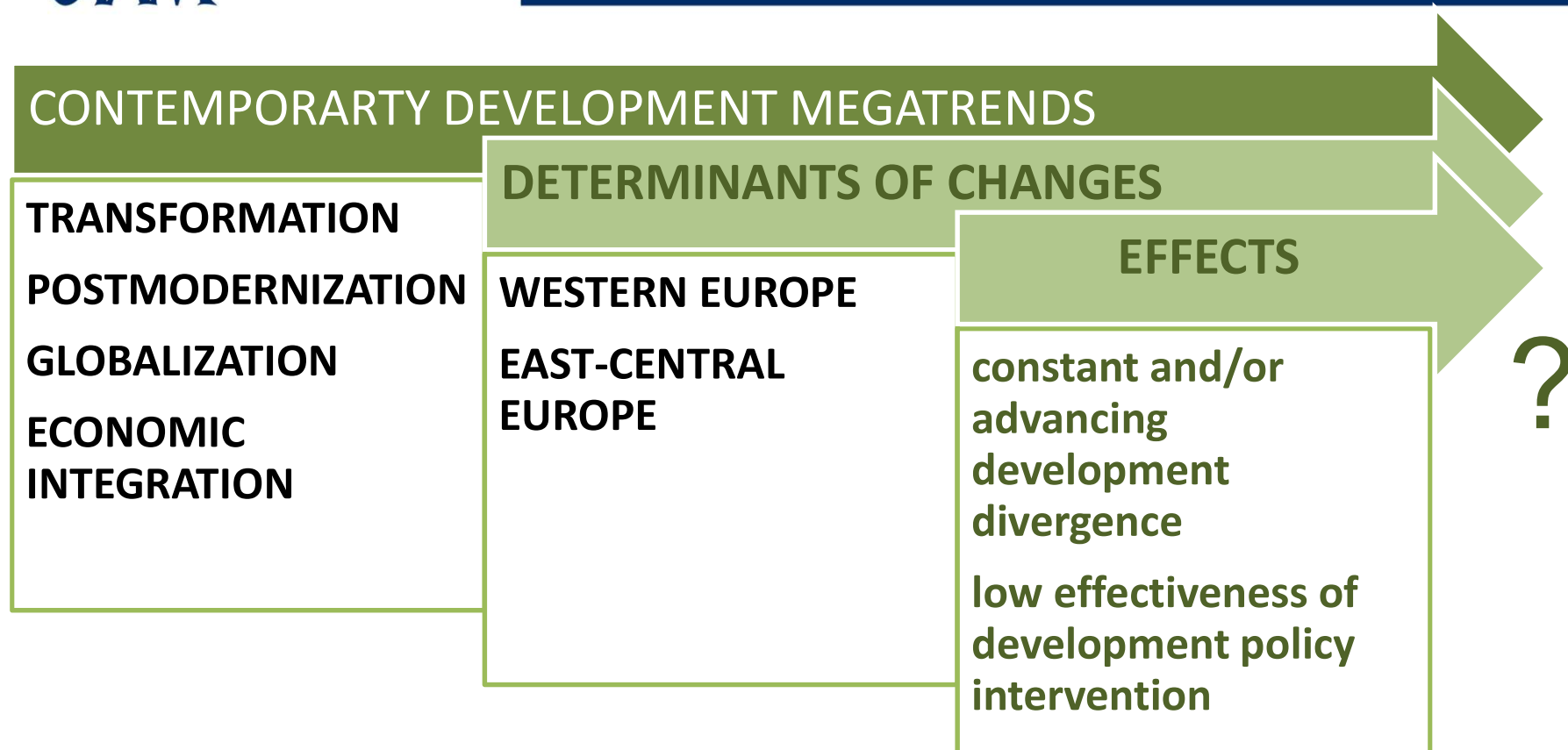www.amu.edu.pl

www.forsed.amu.edu.pl

Agenda

1. Introduction

2. Contemporary megatrends in socio-economic development vs regional development factors

3. Typology of differences in the development level and the dynamics of the development level of regions in the EU member states

4. Development factors of EU regions

5. Conclusion

Introduction

Introduction

CONTEMPORARTY DEVELOPMENT MEGATRENDS

DETERMINANTS OF CHANGES

EFFECTS

TRANSFORMATION

POSTMODERNIZATION

GLOBALIZATION

ECONOMIC INTEGRATION

WESTERN EUROPE

EAST-CENTRAL EUROPE

constant and/or advancing development divergence

low effectiveness of development policy intervention

?

Quo vadis, Europa?

Introduction

CHALLENGE

making use of contemporary determinants formed by megatrends to successfully influence **regional development factors and effectively optimize conditions of economic processes as well as to improve the level and quality of life socially accepted**

REGIONAL DEVELOPMENT FACTORS

| HUMAN CAPITAL | SOCIAL CAPITAL | MATERIAL CAPITAL | FINANCIAL CAPITAL | ORGANIZATIONAL AND TECHNOLOGICAL INNOVATIONS |

(The Future of Cohesion Policy… 2015; Seventh Report… 2017)

Introduction

Objectives of the analysis

- classifications of EU regions: on the scale of socio-economic development level and the scale of dynamics of this process
- identification of factors which determine development processes in these regions

Scope of the analysis

- regions of EU member states **(205 units – without Grecji, Croatia)**
- 1945 – 1989/1990 (empirical analysis) years **2004 – 2015**
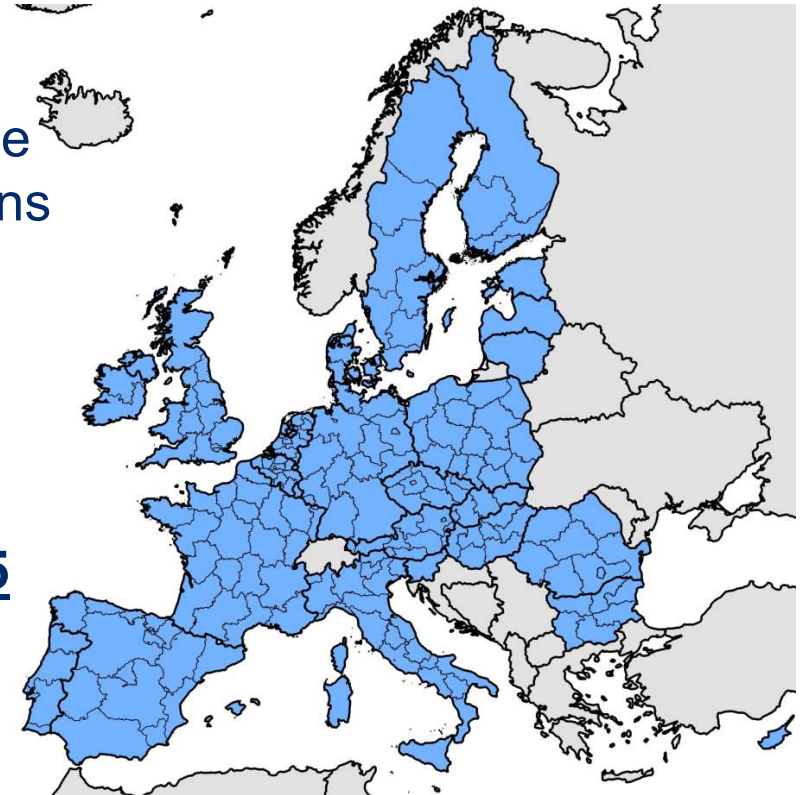
Introduction

Methods of the analysis

- systematization of sources and data found
- cluster analysis using k-means method
- classification trees – random forests
- frequency analysis – ranking
- analysis of forward stepwise regression
- analysis of backward stepwise regression

www.shutterstock.com · 704624344

Sources of data

- public data of EUROSTAT

Contemporary megatrends
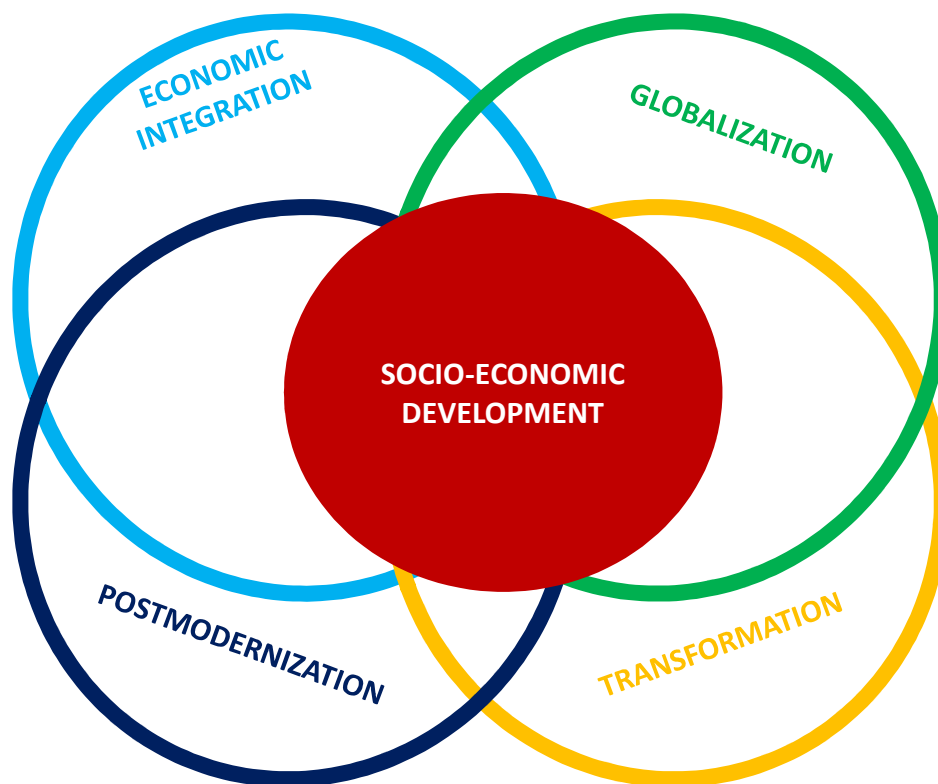# in socio-economic development
vs
regional development factors

Contemporary megatrends in socio-economic development vs regional development factors

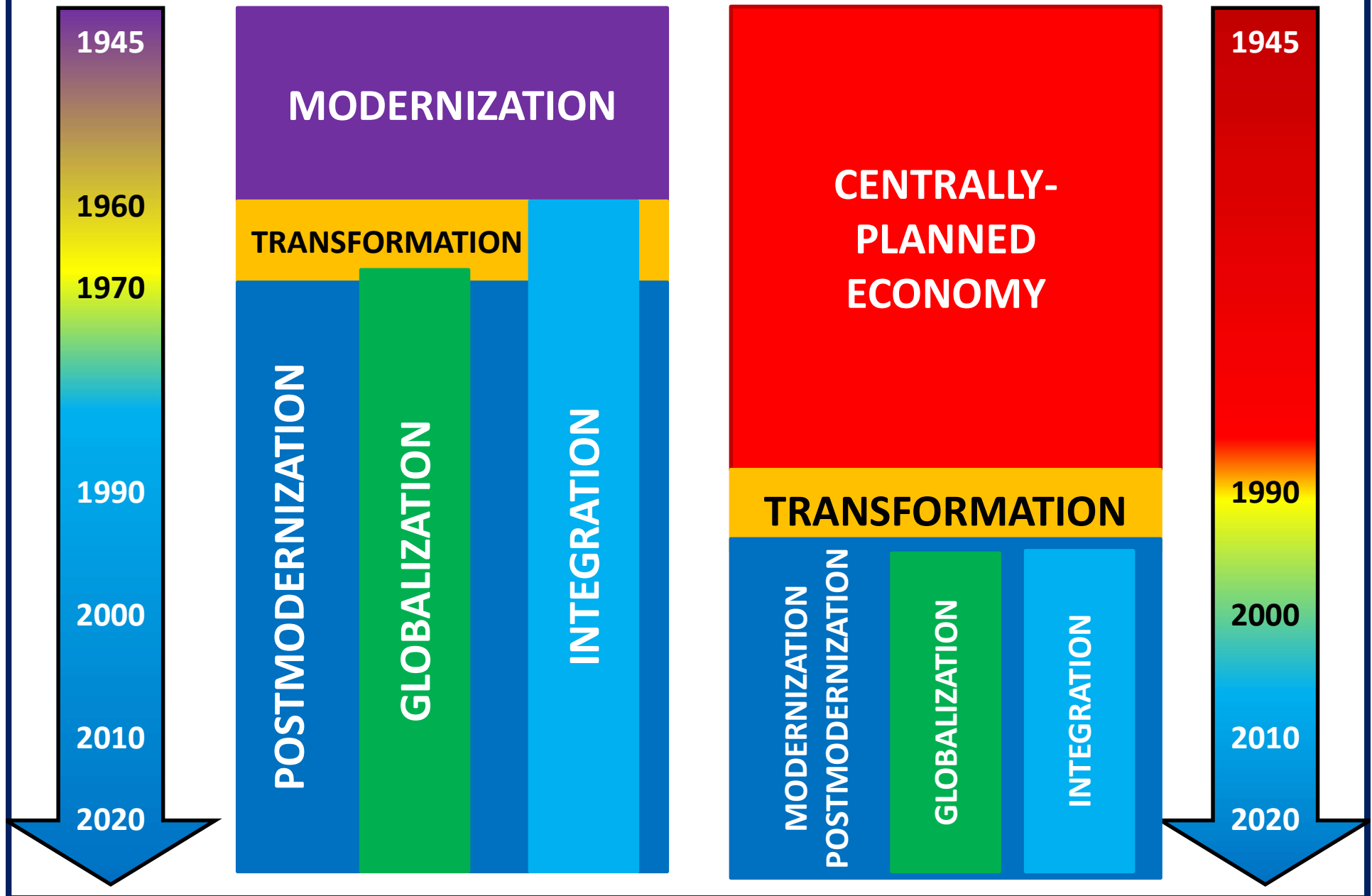## Contemporary megatrends in socio-economic development vs regional development factors

TRANSFORMATION	**improvement in effectiveness of economies and in scope and strength of relations**	
	WE: globalizing and integrating transformation	CEE: system transformation (privatization, post-industrialization, democratization, social polarization)
POSTMODERNIZATION	**cognitive capitalism – polarization – growth of interdependencies**	
	WE: intensive changes towards flexible economy, new regulation regimes and capital accumulation	CEE: imitation of WE solutions dependent on the transformation model (flexible production, SMEs, post-industrialization, ICT, development of regulation system
GLOBALIZATION	**internationalization of socio-economic processes**	
	WE: expansion of markets with internationalization of processes	CEE: catalyst of socio-economic processes (standardization, competitiveness, polarization)
ECONOMIC INTEGRATION	**production growth, cost reduction, mobility, specialization**	
	WE: uniform economic organism economic neocolonialism	CEE: adjustment of norms, institutions and structures (inflow of FDI, specialization, innovations, mobility growth)

Contemporary megatrends in socio-economic development vs regional development factors

Changes of theoretical approaches in the identification of development factors → **adaptation, modification or integration of classic approaches** to new and dynamically changing conditions (rather than – formulation of entirely new conceptions)
(Regions Matter… 2009; Rodrígues-Pose 2013; Camagni, Capello 2014)

❑ **NEW THEORY OF ENDOGENOUS GROWTH, a change in the interpretation of interaction of development factors** *(Aydalot 1986; Romer 1986, 1994; Lucas 1988)*

❑ **NEW ECONOMIC GEOGRAPHY, the need to use a combination of the theory of location and the theory of international economic exchange in the explanation of contemporary socio-economic development factors** *(Krugman, 1991a, 1991b, 1995; Venables 1996; Puga, Venables 1996; Fujita et al. 1999)*

❑ **NEW INSTITUTIONAL ECONOMICS, an increase in the importance of institutional factors for the course and especially the effectiveness of development processes** *(North 1990; Amin 1999; Farole et al. 2011; Rodríguez-Pose, Garcilazo 2015)*

Contemporary megatrends in socio-economic development vs regional development factors

MEGATRENDS

| TRANSFORMATION | POSTMODERNIZATION | GLOBALIZATION | INTEGRATION |

REGIONAL DEVELOPMENT FACTORS*

| HUMAN CAPITAL | SOCIAL CAPITAL | MATERIAL CAPITAL | FINANCIAL CAPITAL | ORGANIZATIONAL AND TECHNOLOGICAL INNOVATIONS |

* *Solow (1956); Coleman (1988); Molle, Cappelin (1988), Romer (1990); Barro, Sala-i-Martin (1992); Benko (1993); Putnam (1995); Keeble et al. (1999), Capello, Faggian (2005); Churski (2008)*

Contemporary megatrends in socio-economic development vs regional development factors

HUMAN CAPITAL

- **greater balance on the labour market**,

- **"flexible job„** (e.g. outsourcing, offshoring, telework),

- **poor adjustment** of the education system to the needs of labour markets,

- increased human capital mobility – **external and internal migrations; "brain drain"** → core – periphery relation,

- quantity of human capital is being replaced by **quality of human capital**,

HUMAN CAPITAL

Contemporary megatrends in socio-economic development vs regional development factors

SOCIAL CAPITAL

SOCIAL CAPITAL

- increase in negative social behaviour **(social anomie)** resulting from economic pressure,

- growing significance of **institutionalized and non-institutionalized forms of social self-organization**,

- growing significance of **non-governmental organizations**,

- **increase in civic engagement,** popularization of social participation (decentralization of power),

- growing share of **SME**s in the economic structure,

Contemporary megatrends in socio-economic development vs regional development factors

MATERIAL CAPITAL (natural resources, physical capital)

MATERIAL CAPITAL

- **improvement in environmental conditions and protection of natural resources** resulting from **economic restructuring** and the investment in **physical infrastructure,**

- **improvement in territorial cohesion** → development of transport and telecommunication infrastructure (ICT),

- diversified **effectiveness of infrastructural investments,**

- **improvement in the quality and a growing number of social infrastructure facilities** (education, health care),

- limited capability of modern material capital implementation and the **danger of implementation of dated technologies,**
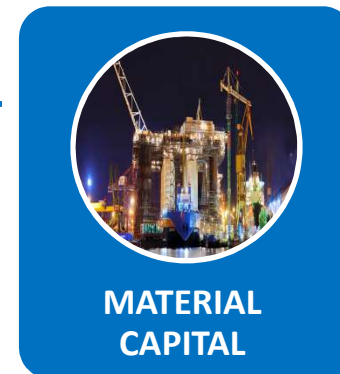
Contemporary megatrends in socio-economic development vs regional development factors

FINANCIAL CAPITAL

- diversification of the sources of **financial capital** inflow,

- **growing incomes and trade exchange**
  due to the access to the international market,

- capital increase under the **intervention of community policies**
  (especially the **cohesion policy)**,

- negative interaction of **global crises** resulting from the
  internationalization of capital,

- growing investment inflow causing an **increase in enterprises'
  capital**, **population's and self-governments' incomes** due to
  payments and taxes,

**FINANCIAL
CAPITAL**

Contemporary megatrends in socio-economic development vs regional development factors

TECHNOLOGICAL AND ORGANIZATIONAL INNOVATIONS

INNOVATIONS

- growing significance of **innovations** in development processes in a knowledge-based economy,

- **innovation development** (especially in ICT) creates **a new economic space**,

- growing **scope of comparative advantages** shaping conditions for competitiveness of the economies regardless of the volume of traditional resources possessed,

- lower innovativeness in Central-East European countries as compared with West European ones may lead to falling into the **trap of average growth**

Typology of differences in the development level and the dynamics of the development level of regions in the EU member states

Typology of differences in the development level and the dynamics of the development level of regions in the EU member states

DEVELOPMENT LEVEL – Algorithm of research procedure

14 variables and their standardization

Factor	Variable
human capital	demographic burden indicator (number of people of non-working age to number of people of working age)
	natural growth per 1,000 population
	migration balance per 1,000 population
	unemployment rate
social capital	share of people with higher education in group of persons aged 25-64
	labour effectiveness indicator (Gross Value Added per 1 person employed)
	share of long-time unemployed in total number of unemployed (measure of social dysfunctions)
	occupational activity indicator
material capital	density of motorways
	gross outlays on tangible assets per 1 person employed
fiancial capital	households' income for per capita disposal
	indicator of financial capital productivity (Gross Value Added of financial sector per 1 person employed)
technological and organizational innovations	public expenditure on research and development (GERD) in relation to GDP
	share of people employed in S&T in total population

Typology of differences in the development level and the dynamics of the development level of regions in the EU member states

DEVELOPMENT LEVEL – Algorithm of research procedure

14 variables and their standardization

cluster analysis (k-means, k=3) during 12 years of observation → 3 region types: high, average, low level of development

for each year (12) verification of typology using *random forest* method

for each year (12) creation of typology of EU regions with: high, average, low level of socio-economic development

creation of synthetic typology of EU regions with: high, average, low level of socio-economic development (frequency)
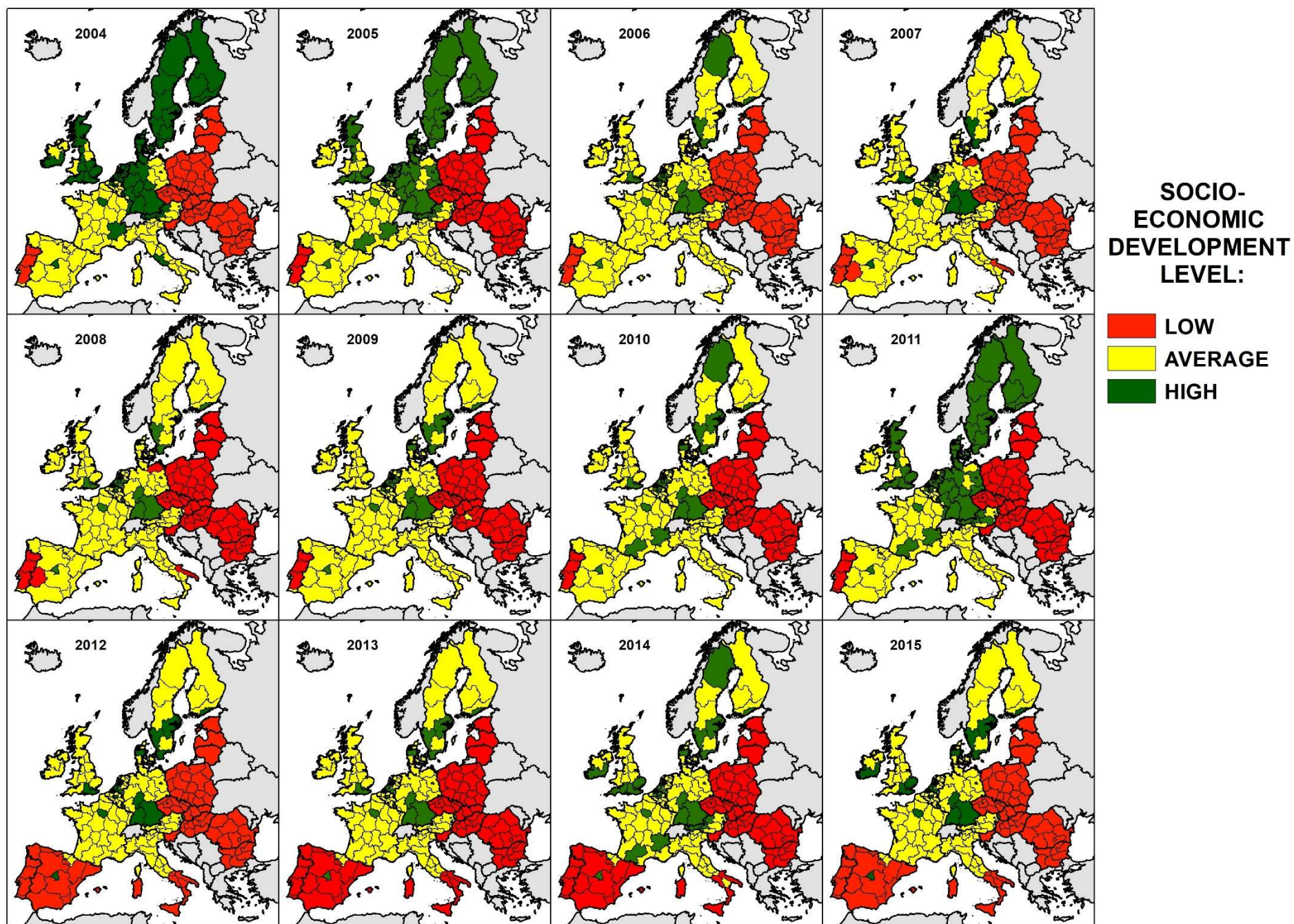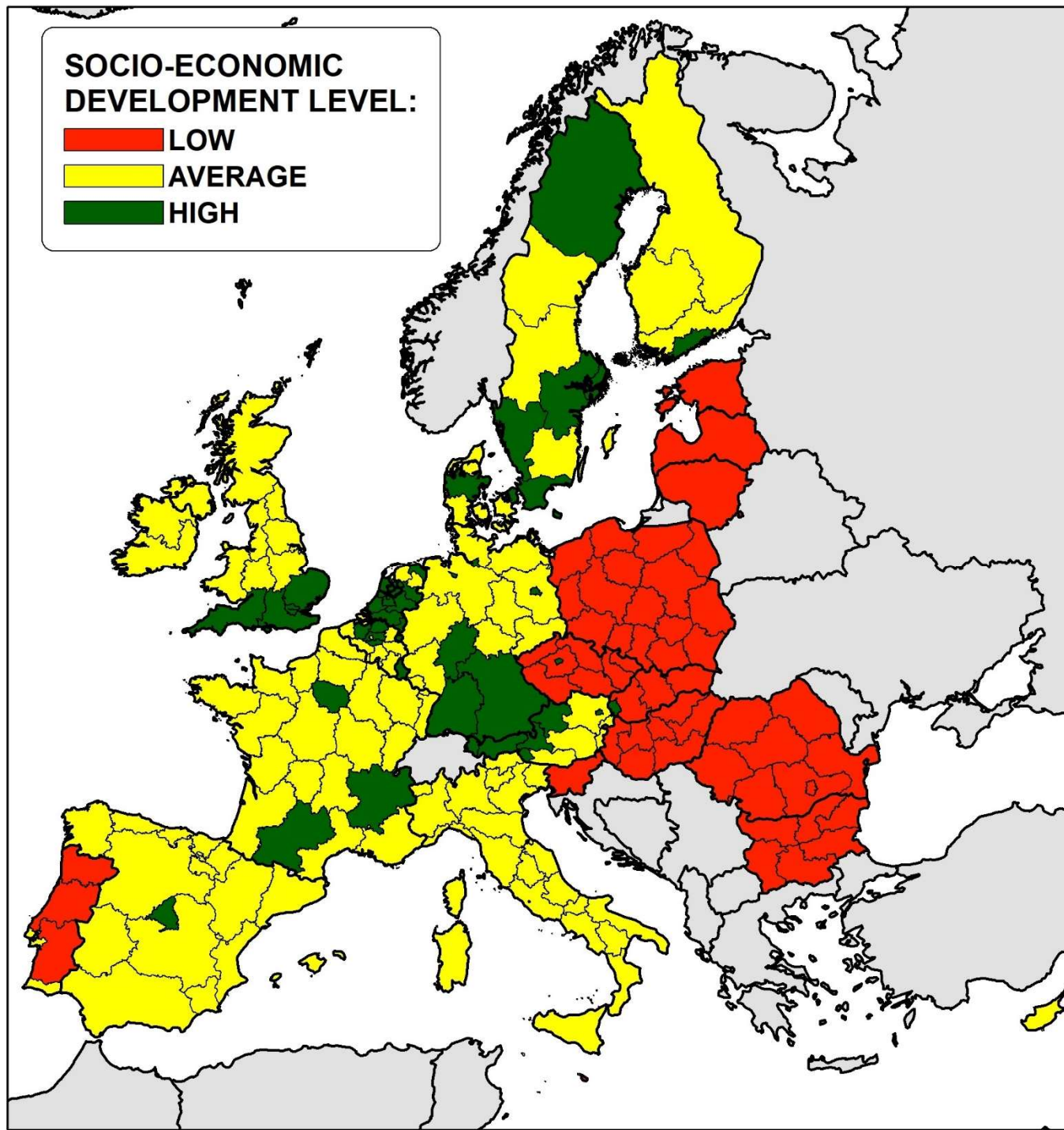
SOCIO-
ECONOMIC
DEVELOPMENT
LEVEL:

LOW

AVERAGE

HIGH

SOCIO-ECONOMIC DEVELOPMENT LEVEL:

- LOW
- AVERAGE
- HIGH

Typology of differences in the development level and the dynamics of the development level of regions in the EU member states

DYNAMICS OF DEVELOPMENT LEVEL – Algorithm of research procedure

14 variables expressed in form of indexes of dynamics with a fixed base (2004) and their standardization

cluster analysis (k-means, k=3) in 11 observations → 3 region types: high, average, low level of development dynamics

for each observation (11) verification of typology using *random forest* method

for each observation (11) creation of typology of EU regions with: high, average, low level of development dynamics

creation of synthetic typology of EU regions with: high, average, low level of development dynamics (frequency)
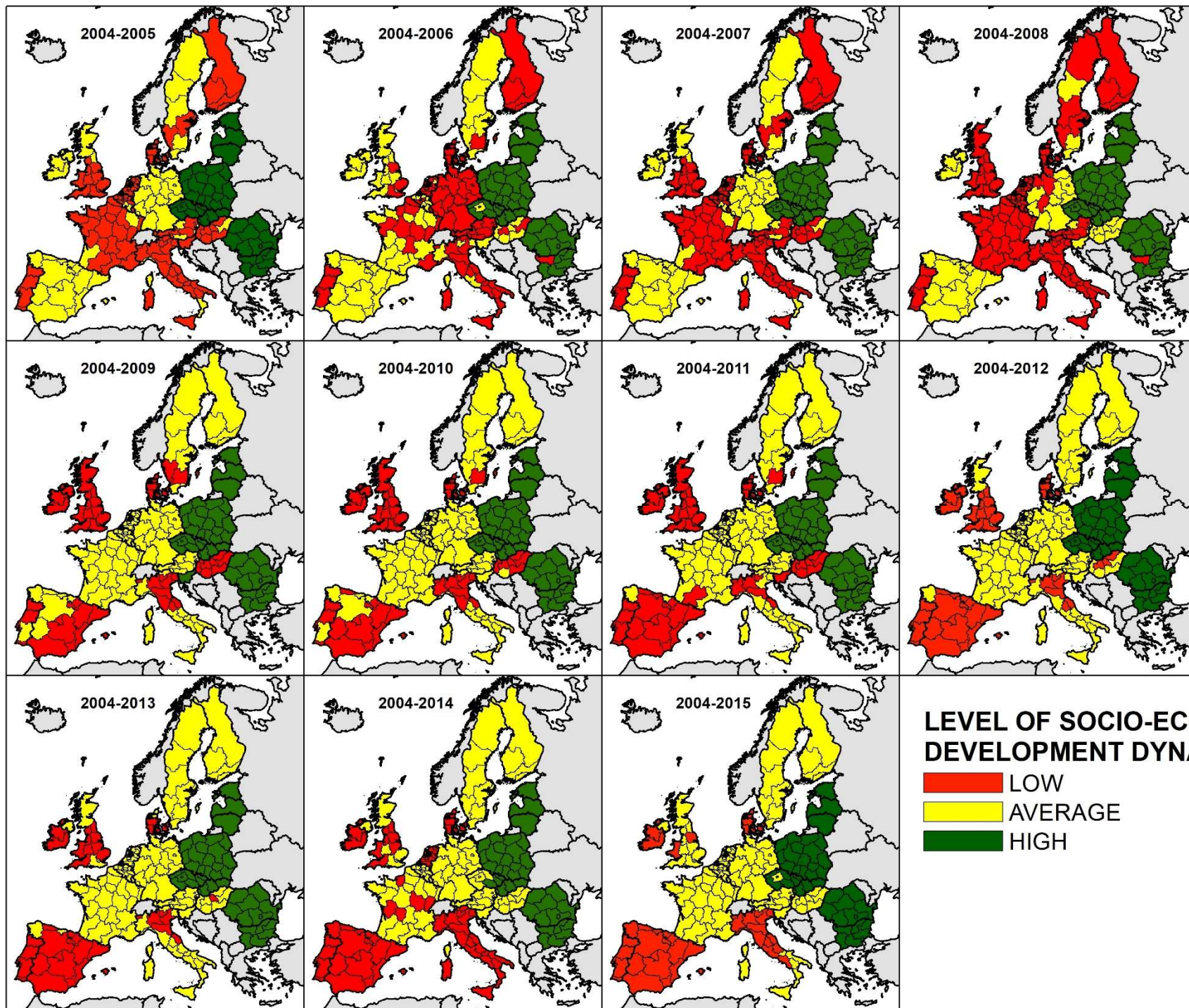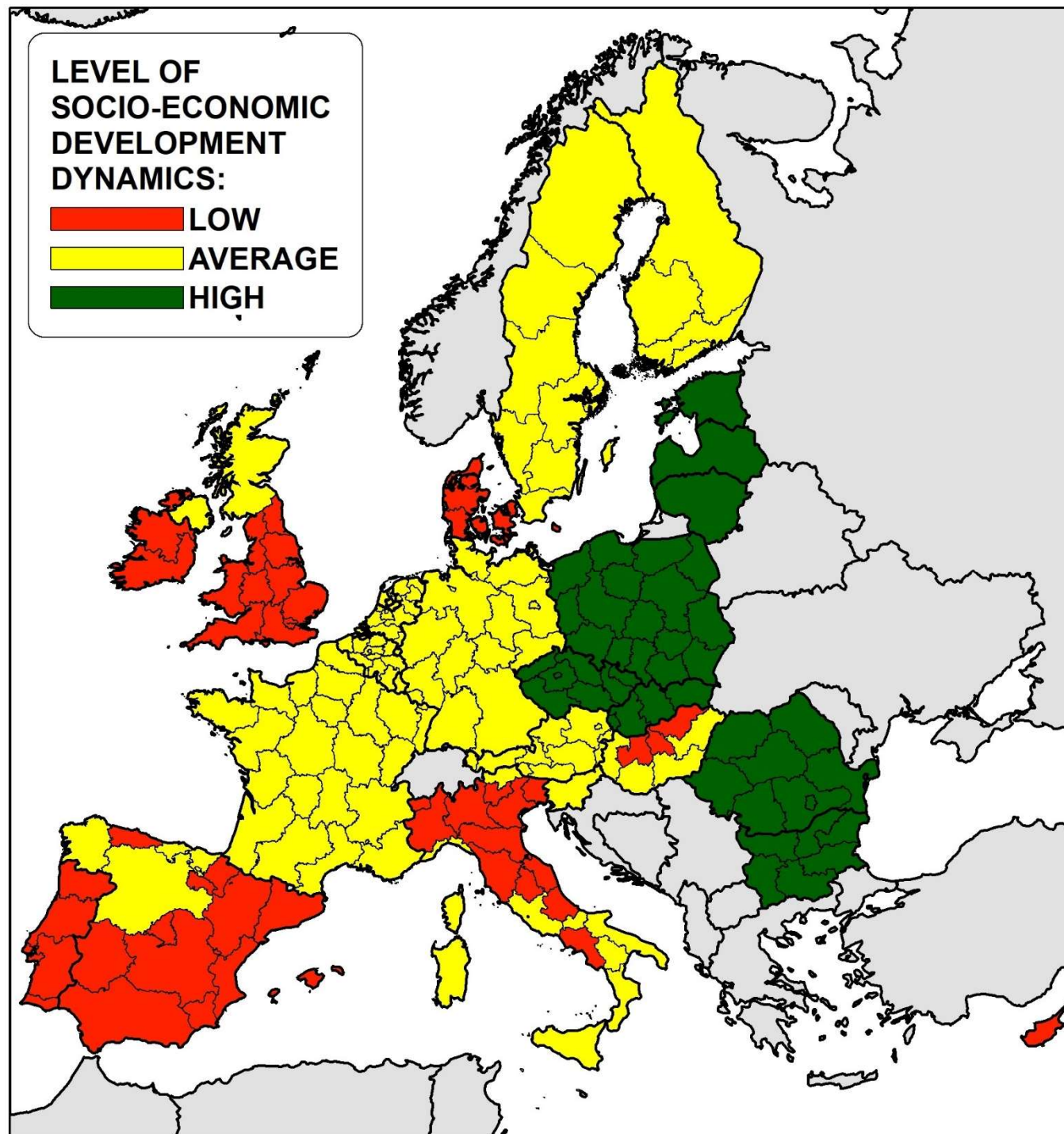
LEVEL OF SOCIO-ECONOMIC
DEVELOPMENT DYNAMICS:

- LOW
- AVERAGE
- HIGH

LEVEL OF SOCIO-ECONOMIC DEVELOPMENT DYNAMICS:
- LOW
- AVERAGE
- HIGH

Typology of differences in the development level and the dynamics of the development level of regions in the EU member states

SOCIO-ECONOMIC DEVELOPMENT LEVEL:
- LOW
- AVERAGE
- HIGH

LEVEL OF SOCIO-ECONOMIC DEVELOPMENT DYNAMICS:
- LOW
- AVERAGE
- HIGH
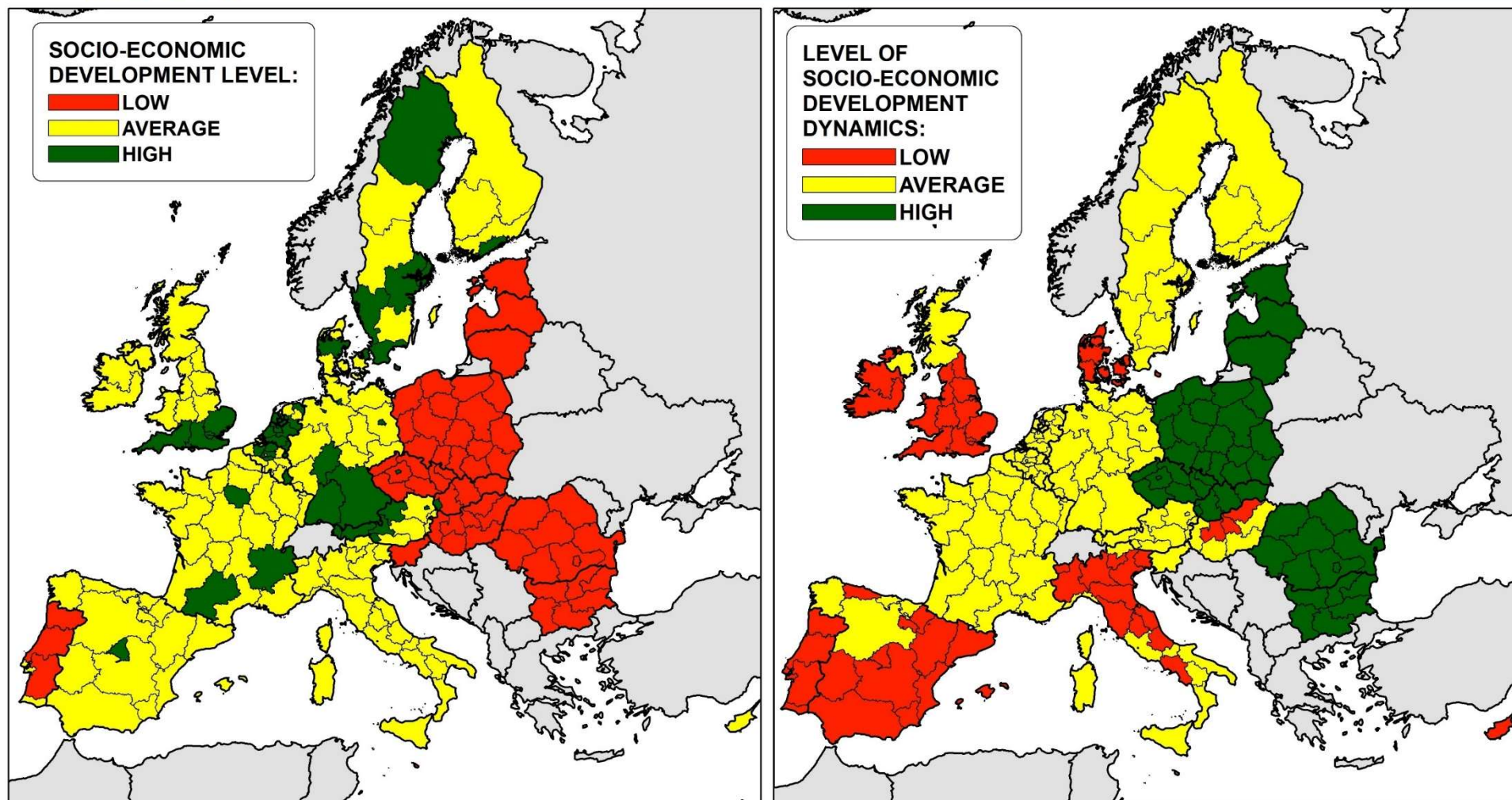
Development factors of EU regions

Development factors of EU regions

DEVELOPMENT FACTORS – Algorithm of research procedure

analysis of forward and backward stepwise regression

explained variable (dependent): GDP per capita as PPS per capita

explanatory variables (independent): 14 variables describing development factors

for each observation (12 years) analysis of stepwise regression in 3 territorial patterns – regions with:
(1) high, (2) average, (3) low development level

for each observation (12 years) indication of group of significant development factors in 3 types of EU regions with high, average, low development level → synthesis

Development factors of EU regions

Regions – high development level

HIGH DEVELOPMENT LEVEL														
FORWARD STEPWISE														
VARIABLE	N	N*	04	05	06	07	08	09	10	11	12	13	14	15
KL_1	12	12	X	X	X	X	X	X	X	X	X	X	X	X
KL_2	12	11	X	X	X	X	X	X	X	X	X	O	X	X
KL_3	5	1		O	O	X	O	O						
KL_5	12	12	X	X	X	X	X	X	X	X	X	X	X	X
KS_1	6	4	X	X	X	X			O	O				
KS_3	12	12	X	X	X	X	X	X	X	X	X	X	X	X
KS_4	9	2	O	X	O	X	O			O	O	O	O	
KS_5	8	6		O			X	O	X	X	X	X		
KM_1	11	7	O	O	O	X	X	X	X	X	X		X	O
KM_3	3	2									O	X		
KF_1	12	10	O	O	X	X	X	X	X	X	X	X	X	X
KF_2	8	4	X				O	X	O	O	O	X	X	
I_1	7	2			O		O	O	O		O	X	X	
I_2	9	4	X	X	X	X	O	O	O	O			O	
pop. R^2			0,953	0,951	0,956	0,958	0,960	0,940	0,954	0,960	0,952	0,955	0,955	0,936
BACKWARD STEPWISE														
VARIABLE	N	N*	04	05	06	07	08	09	10	11	12	13	14	15
KL_1	12	12	X	X	X	X	X	X	X	X	X		X	X
KL_2	9	9	X	X	X	X		X	X	X	X		X	X
KL_3	1	1				X								
KL_5	12	12	X	X	X	X	X	X	X	X	X	X	X	X
KS_1	0	0												
KS_3	12	12	X	X	X	X	X	X	X	X	X	X	X	X
KS_4	2	2		X		X								
KS_5	2	2					X					X		
KM_1	6	6					X	X	X	X				
KM_3	2	2										X	X	
KF_1	8	8					X	X	X	X	X	X	X	
KF_2	2	2										X	X	
I_1	1	1										X		
I_2	5	4	X	X	X	X						X		
pop. R^2			0,950	0,947	0,952	0,960	0,958	0,936	0,950	0,959	0,949	0,951	0,952	0,930

Legend:
- X — statistically significant variable
- O — statistically insignificant variable
- N — frequency in 12 years
- N* — frequency of variables significant in 12 years

Right-side factor list:
- ▼ (red, decrease) demographic situation
- ▲ (green, increase) state of labour market
- ▲ (green, increase) work efficiency
- ▲ (green, increase) income of population/purchasing power
- ▲ (green, increase) state of physical infrastructure

▼ decrease   ▲ increase

Development factors of EU regions

AVERAGE DEVELOPMENT LEVEL

FORWARD STEPWISE

VARIABLE	N	N*	04	05	06	07	08	09	10	11	12	13	14	15
KL_1	12	12	X	X	X	X	X	X	X	X	X	X	X	X
KL_2	6	0		O	O		O	O			O			O
KL_3	12	6	O	X	X	X	X	X	O	O	O	O	X	O
KL_5	6	4	X			O	X	X	X		O			
KS_1	4	2			X	O	X	O						
KS_3	12	12	X	X	X	X	X	X	X	X	X	X	X	X
KS_4	12	11	X	X	X	X	X	X	X	X	X	X	X	O
KS_5	5	2				O	X	X				O		O
KM_1	12	11	X	X	X	X	X	X	X	X	X	X	X	O
KM_3	7	1		O		O	X	O		O	O			
KF_1	7	4	O						O	X	X			O
KF_2	8	3	O				O	O	O	X	X	X		O
I_1	2	0			O	O								
I_2	11	10	X	X	X	X	X	X	X	X		X	O	X
pop. R^2			0,890	0,902	0,902	0,859	0,904	0,903	0,903	0,892	0,859	0,824	0,813	0,794

BACKWARD STEPWISE

VARIABLE	N	N*	04	05	06	07	08	09	10	11	12	13	14	15
KL_1	12	12	X	X	X	X	X	X	X	X	X	X	X	X
KL_2	0	0												
KL_3	6	6			X	X	X	X	X				X	
KL_5	3	3					X	X	X					
KS_1	1	1					X							
KS_3	12	12	X	X	X	X	X	X	X	X	X	X	X	X
KS_4	11	11	X	X	X	X	X	X	X	X	X	X	X	
KS_5	2	2					X	X						
KM_1	11	11	X	X	X	X	X	X	X	X	X	X	X	
KM_3	1	1					X							
KF_1	4	4									X	X	X	X
KF_2	3	3									X	X	X	
I_1	0	0												
I_2	8	8	X	X	X	X	X	X	X			X		X
pop. R^2			0,889	0,899	0,897	0,855	0,903	0,900	0,900	0,888	0,855	0,817	0,805	0,787

X	statistically significant variable	O	statistically insignificant variable
N	frequency in 12 years	N*	frequency of variables significant in 12 years

Regions – average development level

⬆ demographic situation

⬇ social dysfunctions

⬆ work efficiency

⬇ state of physical infrastructure

⬇ innovativeness level

⬇ decrease ⬆ increase

Development factors of EU regions

Regions – low development level

LOW DEVELOPMENT LEVEL														
FORWARD STEPWISE														
VARIABLE	N	N*	04	05	06	07	08	09	10	11	12	13	14	15
KL_1	12	11	X	X	O	X	X	X	X	X	X	X	X	X
KL_2	12	11	X	X	X	X	X	X	X	X	X	O	X	X
KL_3	10	4	O	O	X	X	X			O	O	O	X	O
KL_5	12	10	X	X	X	X	X	X	X	O	X	X	O	X
KS_1	8	5	O	X	X	X	O	X	X			O		
KS_3	12	12	X	X	X	X	X	X	X	X	X	X	X	X
KS_4	6	3		O	X	X	X			O			O	
KS_5	12	11	X	X	X	X	X	X	X	X	O	X	X	X
KM_1	2	2			O						O			
KM_3	9	7				X	X	X	X	O	X	O	X	X
KF_1	7	3				O	X	O		X	O	O	X	
KF_2	6	3					O		X	X	O	X	O	
I_1	6	2			O	X		O		O	X	O		
I_2	12	11	X	X	X	X	O	X	X	X	X	X	X	X
pop. R^2			0,969	0,978	0,971	0,965	0,965	0,946	0,952	0,954	0,944	0,925	0,936	0,918
BACKWARD STEPWISE														
VARIABLE	N	N*	04	05	06	07	08	09	10	11	12	13	14	15
KL_1	11	11	X	X		X	X	X	X	X	X	X	X	X
KL_2	11	11	X	X	X	X	X	X	X	X	X		X	X
KL_3	4	4			X	X	X						X	
KL_5	9	9	X	X	X	X	X	X	X		X			
KS_1	3	3			X	X	X							
KS_3	12	12	X	X	X	X	X	X	X	X	X	X	X	X
KS_4	2	2			X		X							
KS_5	11	11	X	X	X	X	X	X	X	X		X	X	X
KM_1	0	0												
KM_3	7	7					X	X	X			X	X	X
KF_1	3	3						X				X		X
KF_2	2	2							X	X				
I_1	2	2			X				X					
I_2	9	9	X	X	X	X			X	X	X	X	X	
pop. R^2			0,966	0,977	0,970	0,962	0,964	0,941	0,949	0,951	0,942	0,925	0,933	0,910

X	statistically significant variable
O	statistically insignificant variable
N	frequency in 12 years
N*	frequency of variables significant in 12 years

- ⬆ demographic situation
- ⬇ state of labour market
- ⬇ work efficiency
- ⬇ occupational activity indicator
- ⬇ level of material capital modernisation
- ⬇ innovativeness level

⬇ decrease ⬆ increase

Conclusion

Conclusion

- contemporary megatrends in socio-economic changes influence the **interpretation of regional development factors**

- indexing and empirical identification of this interpretation is difficult in the case of multi-year analyses in the EU regional pattern due to the **lack of data**

- the level and dynamics of the development of EU regions are characterized by the **reverse pattern of dependencies**: a high level and low dynamics in Western Europe vs a low level and high dynamics in Central-East Europe

- **regional development factors are different and has different influence in this three classes of regions** (high, average, low level of development)

Conclusion

▪ the most significant factors are: **human capital, social capital and innovativeness**

Factors		Level of socio-economic development of regions		
		HIGH	**AVERAGE**	**LOW**
human capital	demographic situation	X	X	X
	state of labour market	X		X
social capital	qualifications and skills			D
	work efficiency	X	X	X
	social dysfunctions	D	X	
	occupational activity	D		X
material capital	state of physical infrastructure	X	X	
	modernization level		D	X
financial capital	income of population/purchasing power	X	D	D
	productivity of financial sector	D	D	
innovations	public outlays on R+D	D		
	innovativeness level	D	X	X

X significant factor	**D** "strengthening" factor

INSTITUTE OF SOCIO-ECONOMIC GEOGRAPHY AND SPATIAL MANAGEMENT

Thank you for your attention

Robert Perdał   Paweł Churski   Barbara Konecka-Szydłowska   Tomasz Herodowicz
r.perdal@amu.edu.pl

IGU Thematic Conference
PRACTICAL GEOGRAPHY AND XXI CENTURY CHALLENGES
Moscow, 4-6 June 2018

„New challenges for the regional policy in determining the factors of socio-economic development in less developed regions"

NATIONAL SCIENCE CENTRE
POLAND

www.forsed.amu.edu.pl