



**UNIVERSITY OF THESSALY
SCHOOL OF ENGINEERING**

DEPARTMENT OF PLANNING AND REGIONAL DEVELOPMENT (DPRD)

Research Unit of infrastructure, Technology Policy & Development



From S to sigma: towards a new development pattern of the Hellenic space? Is there a role for Mega Transport Projects in spatial restructuring?

Prof. Pant. D. Skayannis

leonska@uth.gr

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Introduction

The fantasy of balanced development, and of the absolute spatial equity

The legitimate efforts

The role of infrastructures generally and specially

Greece and the problems of spatial organisation (international linkages, interregional cohesion, island complex)

The role of Athens

Which is the S development axis?

(P)ATHE

New networks → new pattern of spatial organisation

Polarisations, new roles, the transformation of the axis

Reversal of the historical spatial development trajectory



Chapter 1: The Aegean

The sea connects

Aegeocentric development
Geomorphological characteristics

History

- First colonisation (11th-8th century BC) → Minor Asia coasts
- Second colonisation (from 8th century BC) by colonies of Greek cities (colonies of Aegean colonies included)

The relation with Near East
Greek mainland cities with reference to the Aegean



Antiquity

Map (1): The main Hellenic colonies 8th-6th century BC



Source: Cycladic Art Museum/ thematic pages

Map (2): Hellenic and Phoenician colonies around 550 BC



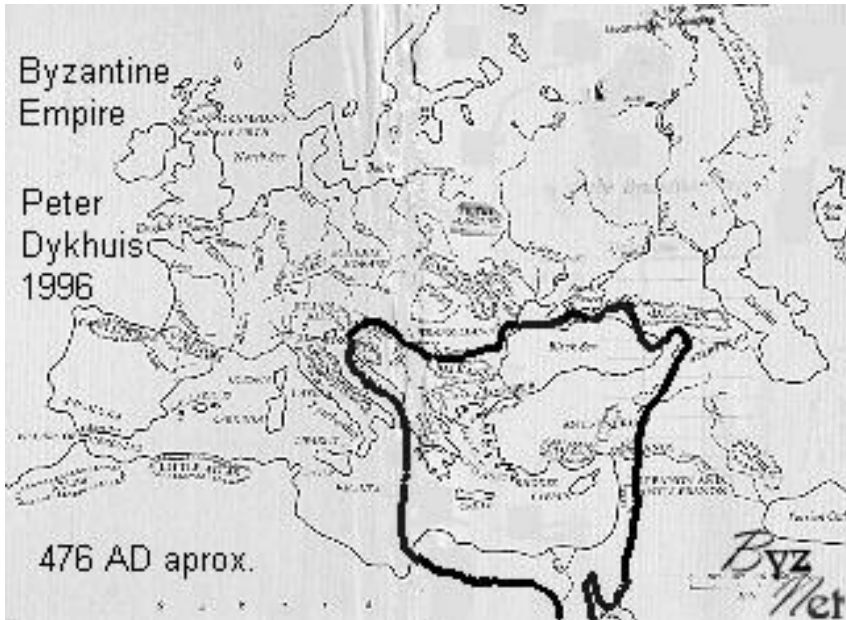
Source: Historical Atlas by William R. Shepherd, 1923

And the mainland coastal cities with their protected harbours

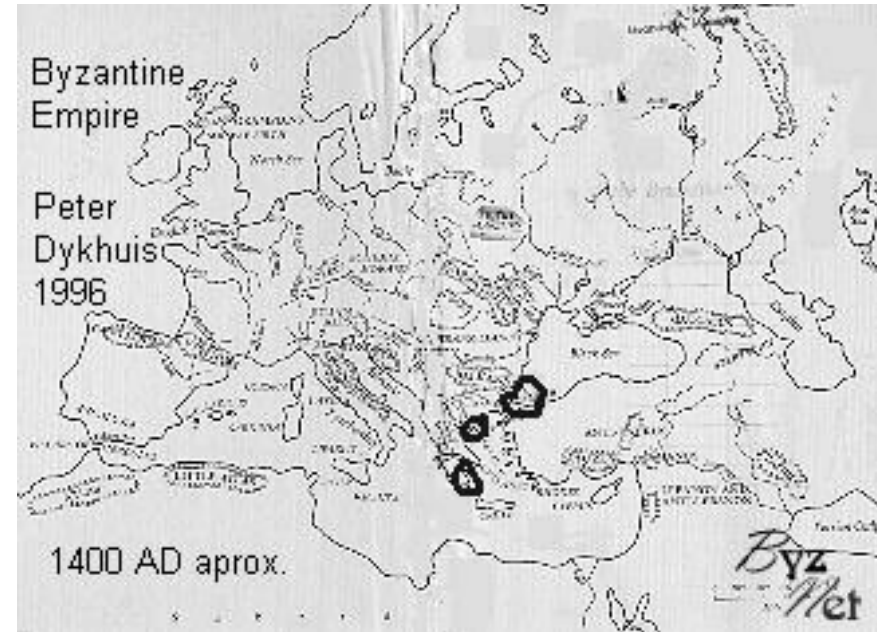


The Byzantine era

Map (3): The Byzantine Empire (Eastern Roman) around 476 AD



Map (4): The Byzantine Empire around 1400 AD



Source: Byzantine Studies on the Net, Thoughtline.com 1996-2000

Byzantium and the Aegean, the Westerners and the Aegean

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*From S to sigma: towards a new development pattern of the Hellenic space?
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Chapter 2: The S

2.1. From«1821» to WSWII: the development of the aegeocentric S

- Land transport takes gradually over
- Cities around the Aegean remain strong
- Tradition
- The provisioning hinterland (vs Western Greece)
- The shape of the country's territory
- The capitals (vs role of new cities during '1821')
- 1st expansion (Thessaly1881)
- Construction works, end of 19th century (Trikoupiis works)
- A cohesive aegeocentric state
- The new dawn of S
- The Balkan wars (expansion to Macedonia, the role of Thessaloniki)
- Industrial poles on S
- Path dependency in spatial development
(ideology, cultural background, symbolic capital, economic realism, etc)



Map (5): Railway map Athens - Northern borders (beginnings of 20th cent.)



Map (6): Railway map of the Peloponnese network (beginnings of 20th cent.)



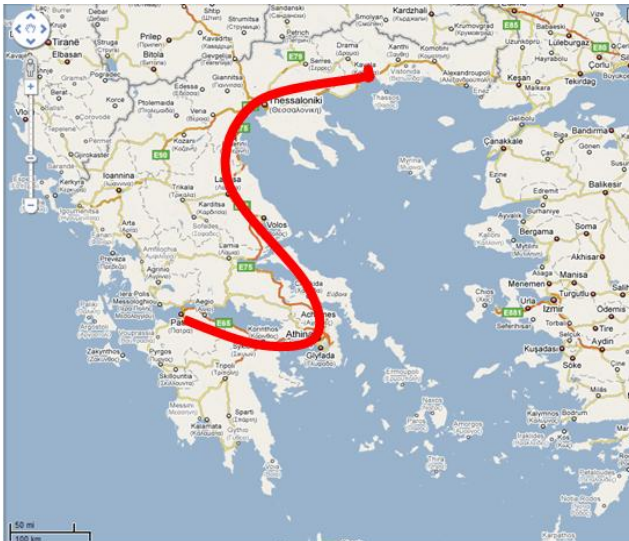
Source: (5&6): Androulidakis, 1995



2.2. The post war period: the contemporary S per se

Polarisation intensification along the S

Post war modes of regulation systematically lead to S with main pole Athens as never before



Source of background: Google maps 2009

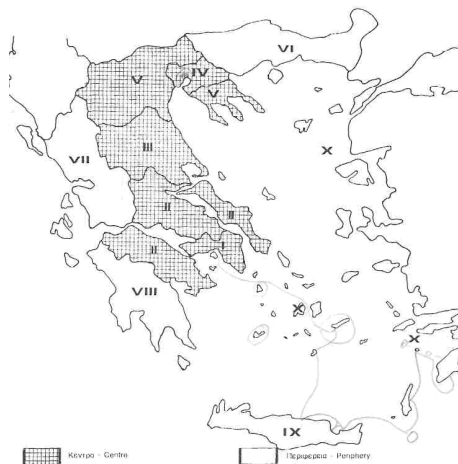
Along **S** most of the main cities of the country despite the lack of medium size urban centres

Researches (Katochianou/CPER, Kottis, Lagopoulos, Kafkalas, Andrikopoulou, Vaiou, Hadjimichalis, etc) trace an intensification of **S** in various of their spatial analyses until about the end of the '80s ...

But also a dissolution of **S** vis a vis industry for 84-88 (Kafkalas), that does not last and is not assured (Petrakos for 1994-2001).

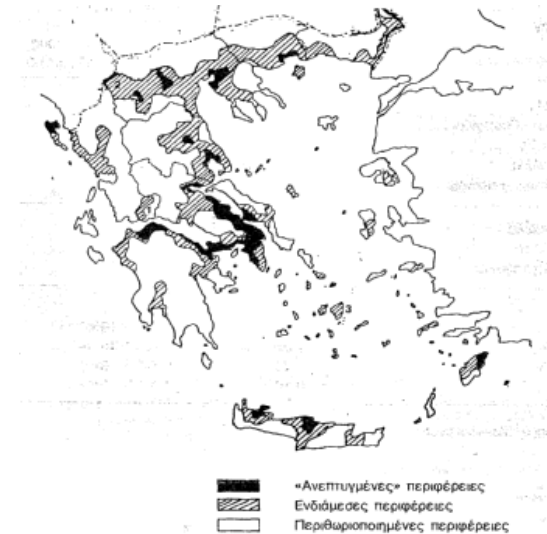


Map (8): Economic Peripheries



Source: Kafkalas, 1981 map (3), page 25

Map (9): Intermediate and Developed Peripheries



Source: Vaiou & Hadjimichalis, 1987 map (1), page 119

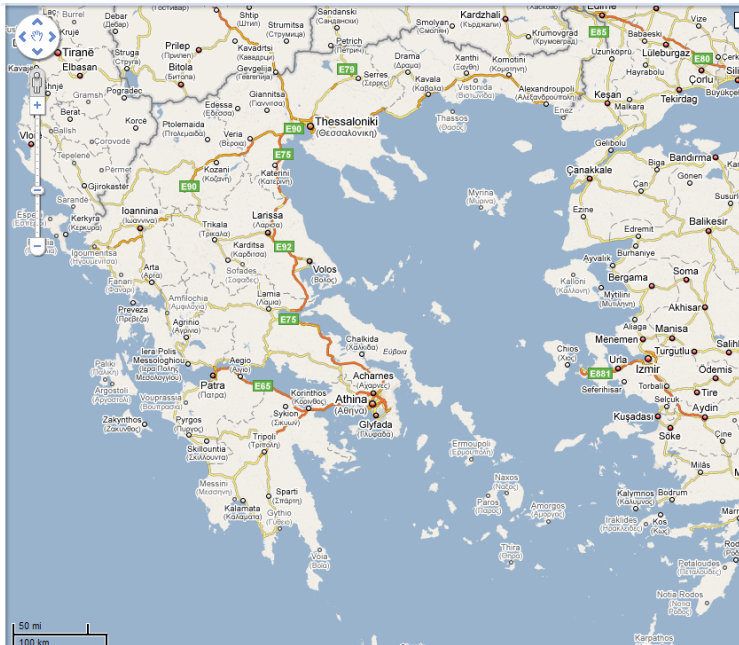


2.3. The support of s by the transport infrastructure networks

- Infrastructure as a constituent part of the regime of accumulation and mode of regulation (esp. in Greece)
- The S axis supported by the New National Road, to trunk railway network and today by the semi-finished (road & rail) (P)ATHE (on the footprints of Trikoupi)
- Development started on S and was capped by (P)ATHE (and the other infrastructures) (triggered the infrastructures)

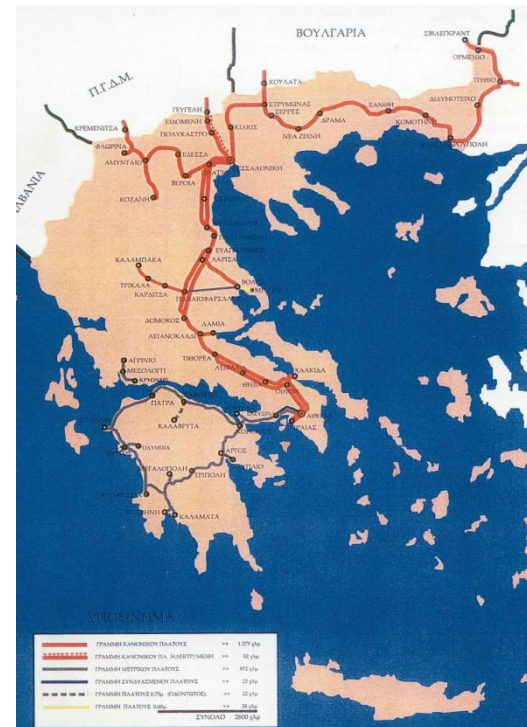


Map (10): Motorway Network and Main Road Network in Greece 2008



Source: Google maps 2009

Map (11): Railway Network in Greece 2008



Source: EDISY, 2007



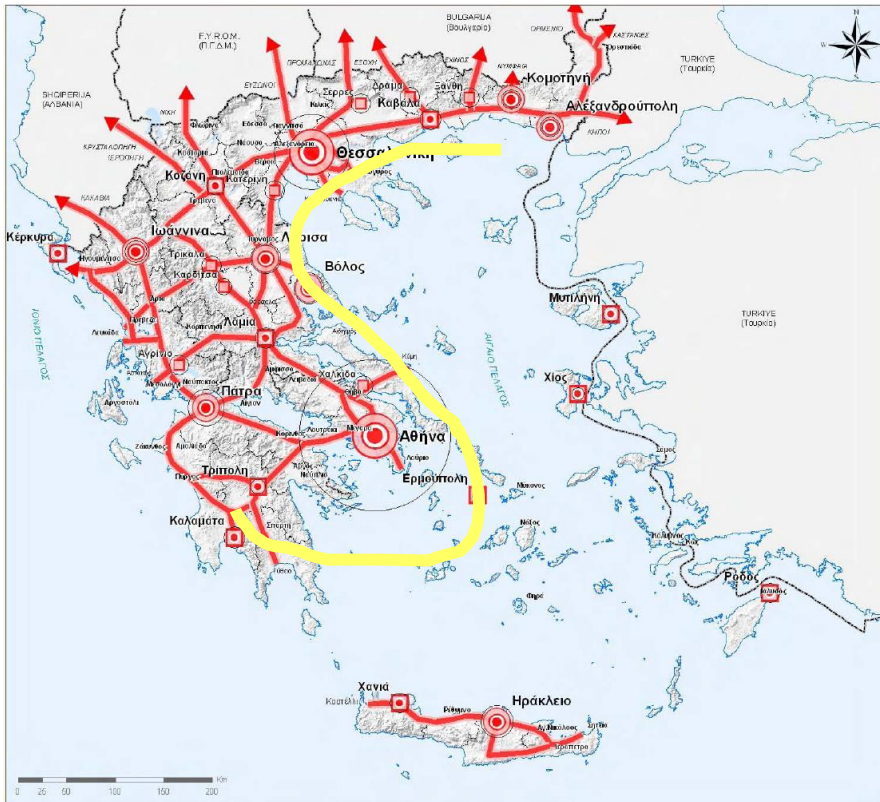
2.4. The S development axis and the levels of polarization of the Hellenic space

Three levels of polarisation:

- a) S vs the country
- b) Athens (& Thessaloniki) vs S
- c) Urban regions vs rural hinterland



Map (12) The Development poles in Greece: the S-axis



Aegeocentric development

Main cities:
Athens (~ 4 mill.) and
Thessaloniki (~1 mill.)

Lack of medium size urban
centres in urban hierarchy

Next city: Patras <500 th.

(country population ~11 mill.)

Background map MINENV, 2007



Table (1): Prefectures and main cities of the S-PATH

Prefectures	Main cities or regions
Attiki	Athens conurbation, Piraeus, Eastern & Western Attiki
Thessaloniki	Thessaloniki +16
Achaia	Patras, Aegio, (& Nafpaktos)
Magnesia	Volos-Nea Ionia
Larissa	Larissa
Corinth	Corinth, Loutraki, Xylokastro, Kiato
Boeotia	Levadia, Thebes
Eboea	Halkis
Fthiotis	Lamia, Styliida
Pieria	Katerini
Imathia	Veria



2.5. The S axis and the rest of the country: population and basic economic facts: (concentration of magnitudes on the S-PATH)

Table (2): Permanent Population of cities and GDP of prefectures in Greece and in the S-PATH (GDP in mill. € current prices, Source: elaboration of NSSG data)

	Population of Cities (2001)	%	GDP of Prefectures (2001)	GDP of Prefectures (2005)
Greece	10.934.097	100,00%	100,00%	100,00%
S-PATH axis (prefectures)	6.698.833	61,27%	69,95%	72,65%
Main Cities of S-PATH	5.600.111	51,22% (or 83,60% of S-PATH)		



Table (3): Value Added by sector of production

(GDP in mill. € current prices, Source: elaboration of NSSG data)

	Primary sector: agriculture, forestry, fishing		Secondary sector: manufacturing industry, energy, construction		Tertiary sector: all services	
	2001	2005	2001	2005	2001	2005
Greece	7.481	7.697	29.576	39.462	91.688	130.858
S-PATH axis (prefectures)	2.745	2.852	21.553	28.877	65.763	97.610
Prefectures of S- PATH % of Greece	36,69%	37,1%	72,9%	73,2%	71,7%	74,6%
Difference %	0,41%		0,30%		2,9%	



2.6. The polarization within the S-PATH axis

2.6.1. Athens (Attiki) & Thessaloniki

Population: 43,60% of the country & 85,20% of S-PATH (2001)

GDP: 54,46% of the country & 77,86% of S-PATH (2001)

58,22% of the country & 80,14% of S-PATH (2005)

Table (4): Gross Value Added by economic sector (prefectures)

(n mill. € current prices, Source: elaboration of NSSG data)

	Primary sector		Secondary sector		Tertiary sector	
	2001	2005	2001	2005	2001	2005
At. + Th. as % of S-PATH	22,66%	24,09%	61,60%	63,20%	85,49%	86,79%
At. + Th as % of Greece	8,31%	8,93%	44,89%	46,25%	61,32%	64,74%
Difference %	0,62%		1,36%		3,42%	



2.6.2. Two more emerging poles: Patras and the dipole of Volos-Larissa, a 'dispute' for the third place

The facts up to the 2008 crisis:

a) European funds, b) increase of GDP & expectations, c) network expansion, d) Olympic Games.

Potential third poles:

Volos - Larissa: a) complementarities, b) common projects, c) assistance by the potential dipole of Trikala - Karditsa

Patra: a) Gate, b) Rion-Antirion bridge, c) satellite towns, d) short distance from Athens



Table (5): Brief facts for Achaia, Larissa, Magnesia (Source: NSSG)

	Achaia		Larissa		Magnesia	
	Prefecture	Patras (+Aegio+Nafpaktos)	Prefecture	Larissa	Prefecture	Volos-Nea Ionia
Permanent population (2001)	323.704	164.534 (218.120)	282.156	132.779	205.005	117.980
GDP/c (2005) in th. €	12.752		14.572		16.543	

Additional Comments:

- 6% of country's GDP, 8,5% of S-PATH GDP,
- BUT, **in constant (%) marginal decrease** 2001-2005 (as all prefectures, except Fthiotis & Corinth)
- % increase of mean value added **ONLY** in the Primary sector



So, during the last years:

1. Enforcement of the role of the most central regions (esp. Athens)
2. Increase of disparity with the «periphery»
3. Questions about the «new poles»
4. Competition for the securing of roles

There is a need for further identification and documentation of S over the last years
(March 15, 2011 census very useful)



Chapter 3: The sigma «σ»

3.1. The challenge for the re-determination of the axes of the country: the prospect of the technical reversal of the S-axis

Reasons for infrastructure works:

- Covering needs or
- Cause positive impacts
- Political-national-international reasons

The Greek development model «asks» for infrastructure works

(perpetuation of infrastructure as a preferential tool for the mobilisation of the economy – infrastructure biased development model)

Chronical problems of the organisation of the Hellenic space

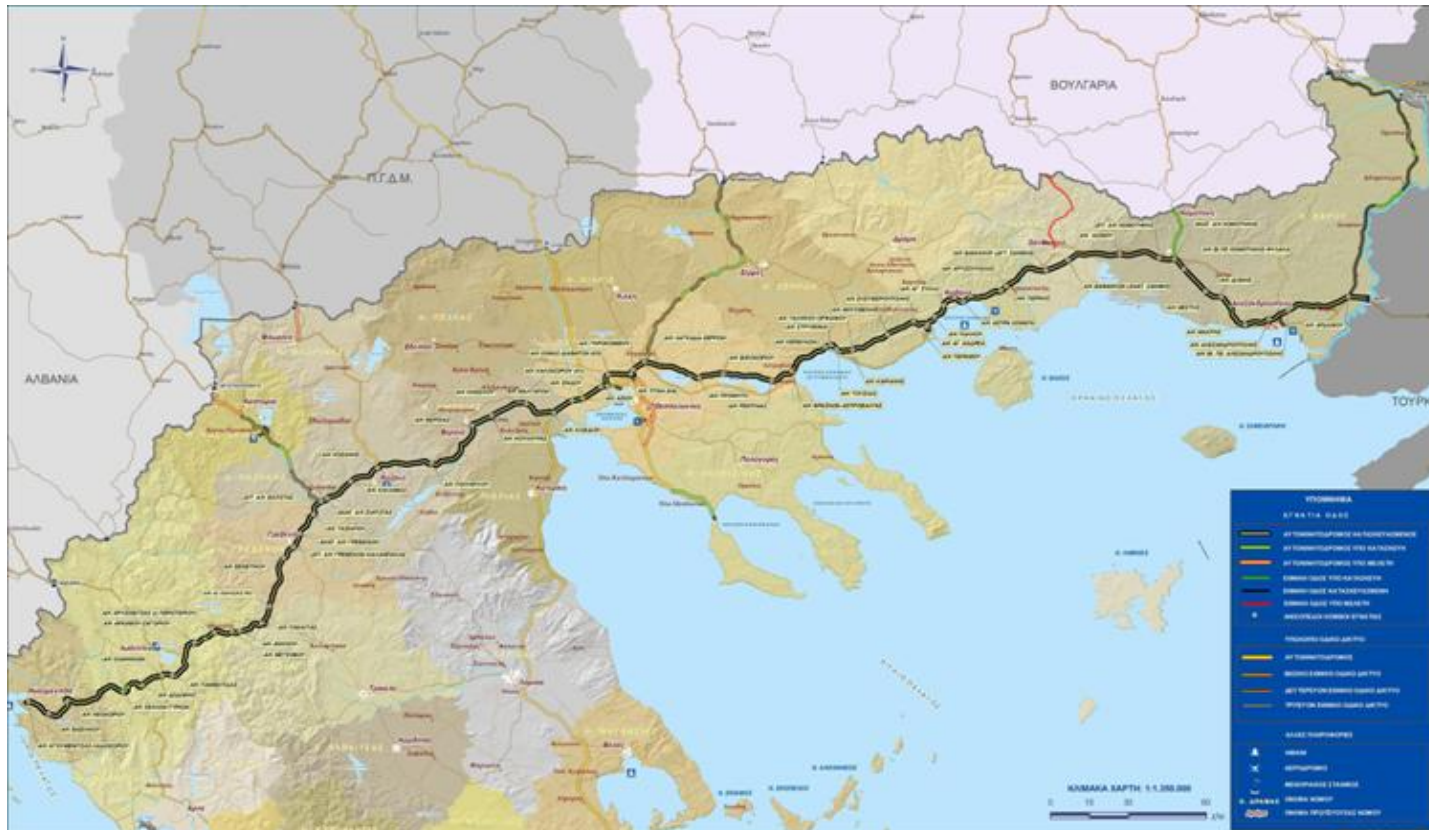
New facts:

- Egnatia motorway: the dawn of challenging of the technical background of S
- The orientation of the Olympic projects
- The construction crisis
- The expansion of the trunk land transport infrastructure network



3.2. The new infrastructure networks besides the S-axis, and their rationale

Map (13): Egnatia motorway June 2009 (progress of works)



Source: MINENV – EGNATIA ODOS, 2009



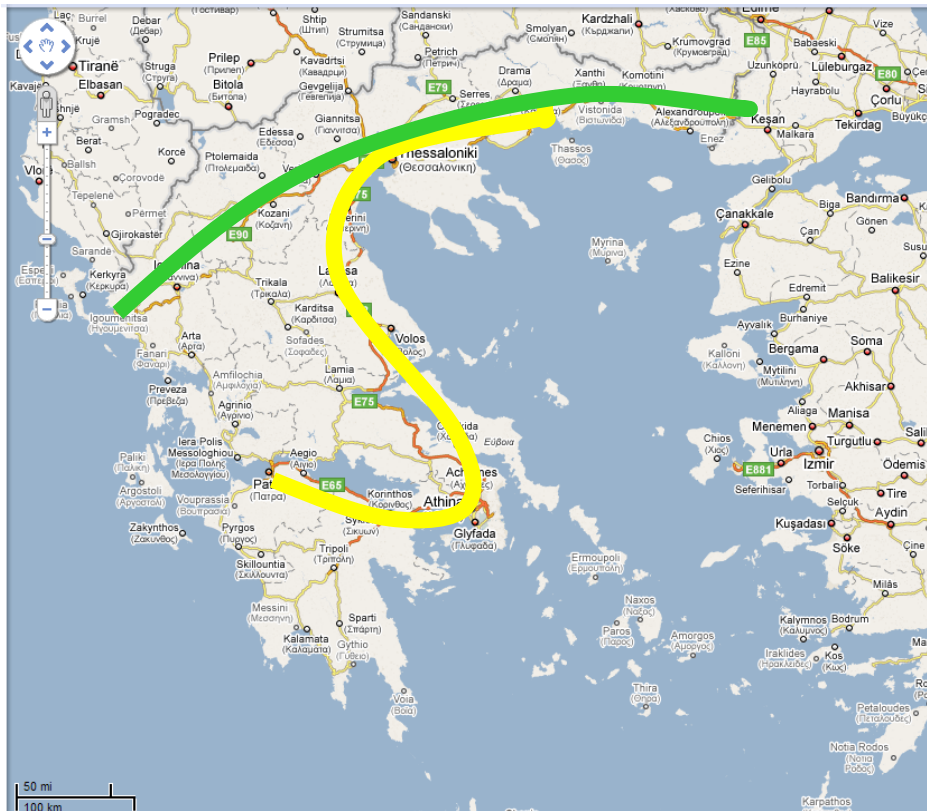


The Egnatia motorway

Source:
<http://www.egnatia.gr/page/default.asp?la=2&id=64>



Map (14): The Hellenic Motorway Network (mainland Greece)



Source: Google maps 2009

Two motorways:

1. PATHE = Patras – Athens –
Thessaloniki – Evzoni [=northern borders]

Started as national Road gradually after
WWII

Becoming motorway since 1985 and
since 1994 with the support of EU
Community Support Framework
Semi-finished

2. EGNATIA = Igoumenitsa – Thessaloniki
Alexandroupolis

At the track of the Roman Via Egnatia
since 1994 with the support of EU
Community Support Framework
Finishing May 2009



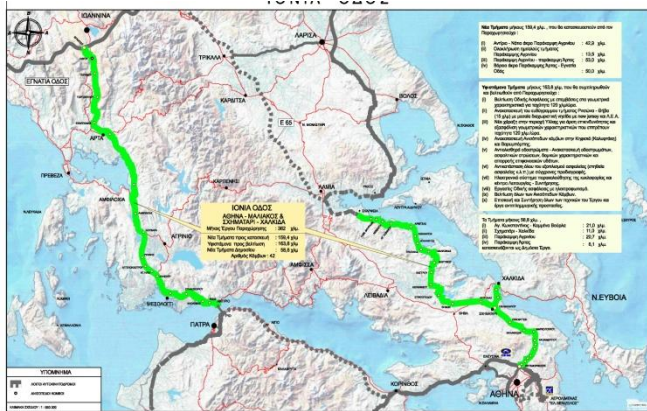


PATHE motorway

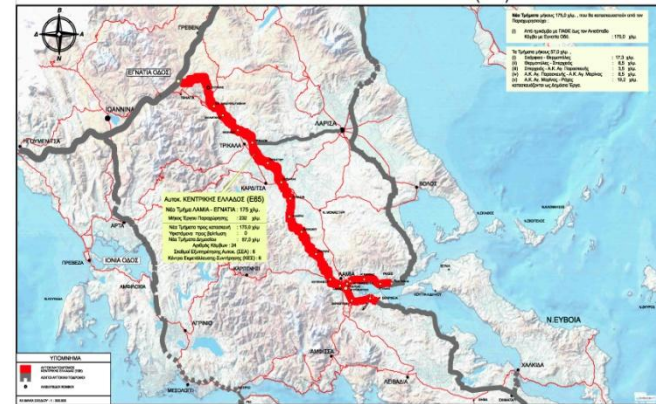
Source:
<http://www.google.com/images?num=100&hl=en&lr=&q=PATHE+Greece+motorway+photos&um=1&ie=UTF-8&source=univ&sa=X&ei=Hkd5Td7-F8-74gb04pm4BQ&ved=0C CQQsAQ&biw=1366&bih=554>



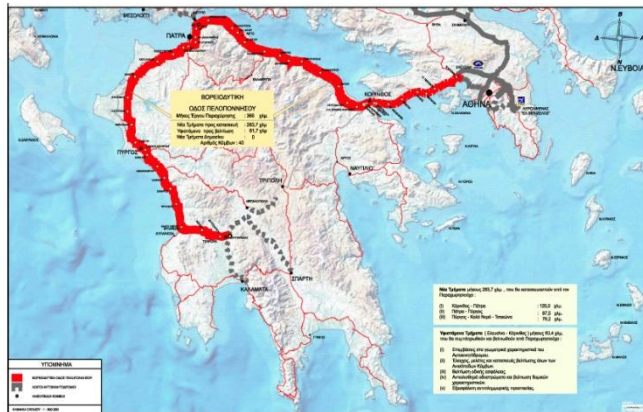
X-15 Ionian Odos (Northern part) (left)



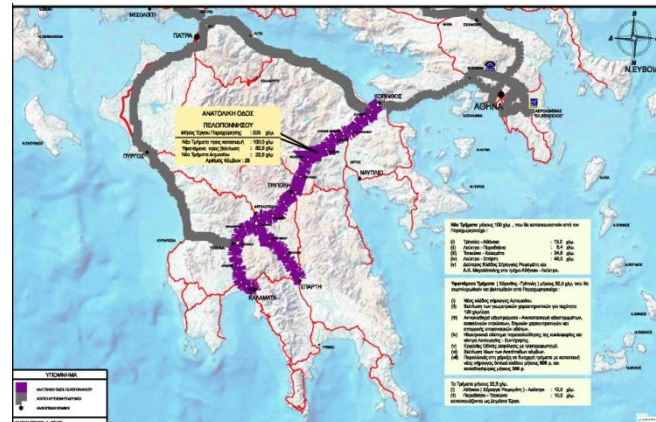
X-17: Motorway of Central Greece (E-65)



X-16: Ionian Odos (Southern part) (left) & PA (of PATHE)



X-18: Motorway of Eastern Peloponnese



Source: MINENV, 2006 & 2007



Rion-Antirion Bridge

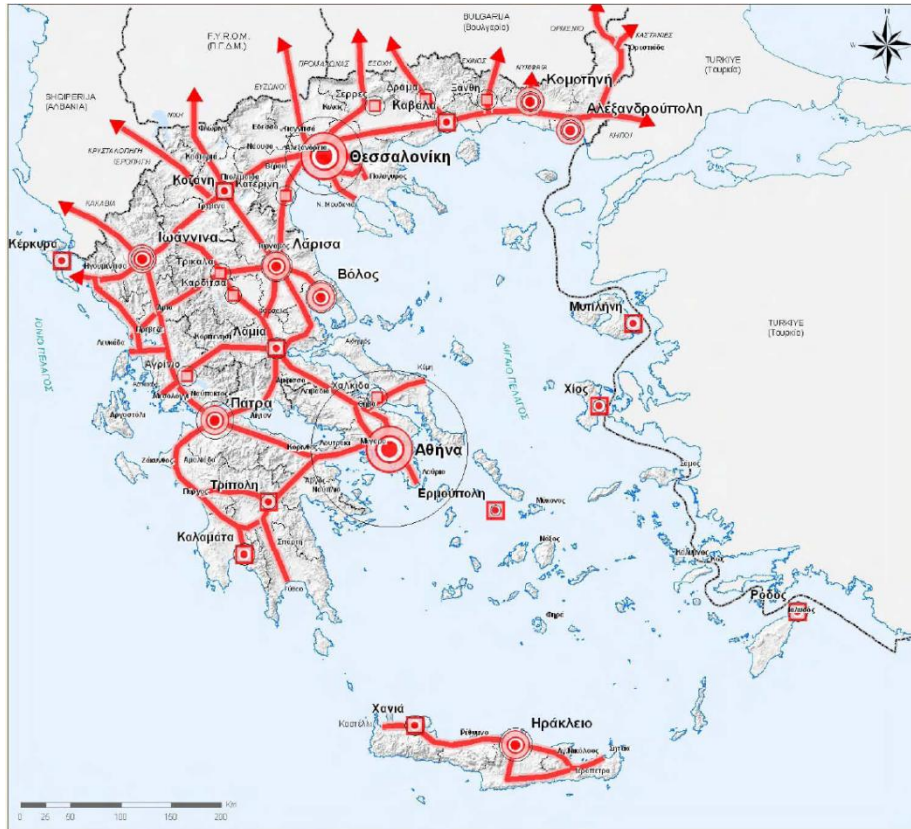


The longest cable bridge in the world with continuous deck (2,250 m)

Source: Gefyra SA



Map (19): The future motorway network of Greece



Source: MINENV, 2007

The net and the city - poles

The northern vertical (border) axes

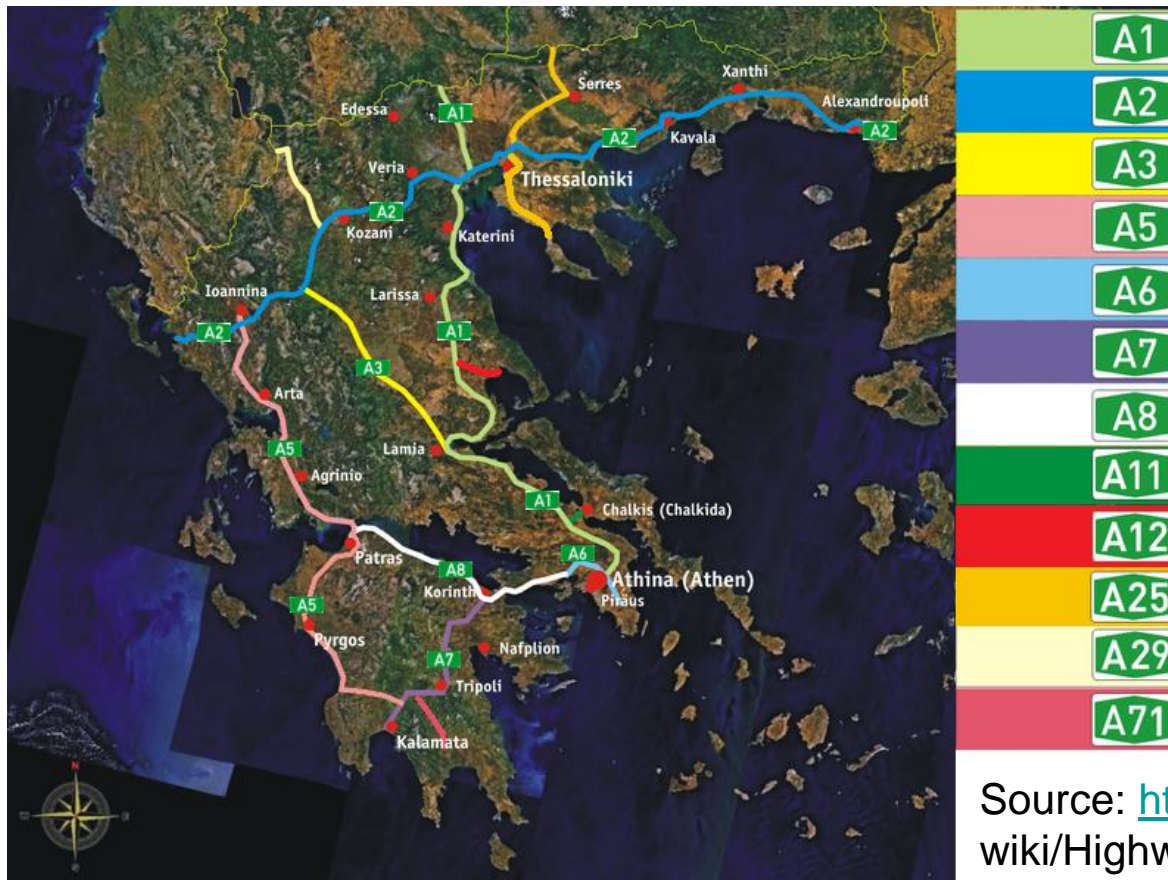
The surgical interventions on the mountains (esp. Pindos)

Big emphasis on the motorway network

Important increase of the density of km of motorways/area



Map (20) The route of the 8 motorways of Greece, a big part of which is yet planned, or under construction.



Source: http://en.wikipedia.org/wiki/Highways_in_Greece



Map (21): The proposed future railway network of Greece



Inclusion of Western Greece

Important increase of density, but inadequate network according to West European standards

«closing» of loops

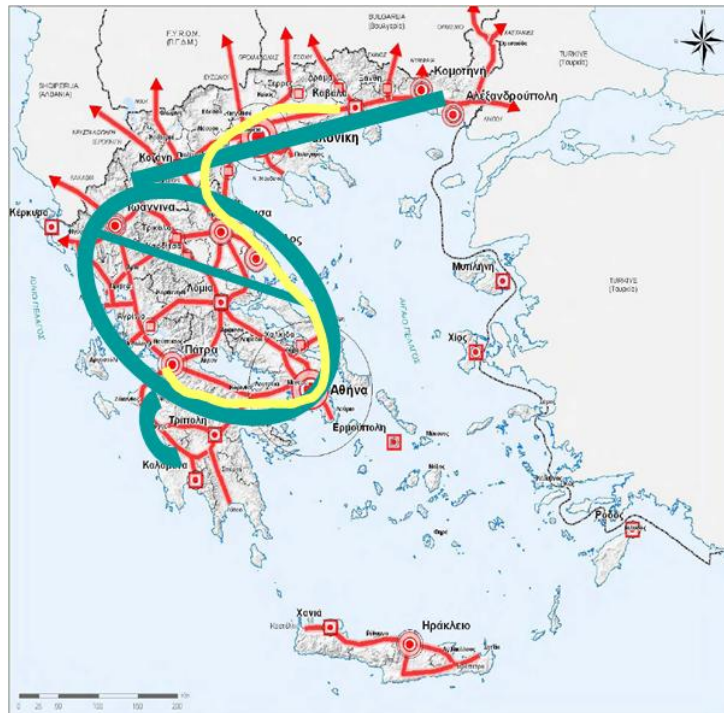
Fictional planning of the Egnatia railway

Source: Mouroudelis, 2007



Gradual formation of a network of land infrastructures of a sigma “σ” pattern

Map (22): The formation sigma «σ» underway



Issues emerging:

- Questions on the issue motorways vs railways
- Parallelism and Internal competitiveness
- National political reasons for planning
- (Historical – except Trikoupis) Lack of significant policies for railways
- networks for development mobilisation and not for congestion therapy
- Western and Northern Greece at the forefront



3.3. Challenges and questions for the transformation of the Hellenic space

Table (9): Epirus - GDP/c (€ in current prices)

	2000	2001	2002	2003*	2004*	2005*	2006*
Greece total	12.483	13.372	14.254	15.549	16.801	17.800	19.124
<i>Epirus</i>	9.742	10.480	10.794	11.924	12.793	13.368	14.346
Percentage in Greece	78,04	78,37	75,73	76,69	76,14	75,10	75,02

← declining rate

Source: NSSG*=provisional data

- One of the poorest EU-15 regions
- Difficult geomorphology



Table (10): Eastern Macedonia and Thrace - GDP/c (€ in current prices)

	2000	2001	2000	2003*	2004*	2005*	2006*
Greece total	12.483	13.372	14.254	15.549	16.801	17.800	19.124
<i>East. Macedonia & Thrace</i>	9.059	9.799	9.866	10.732	11.345	12.098	12.364
Percentage in Greece	72,57	73,28	69,22	69,02	67,53	67,97	64,65

Source: NSSG*=provisional data

← declining rate

- Lagging behind, ethnic minority and environmental problems
- Ineffective incentives
- Ecological and environmental questions about the Burgas – Alexandroupolis oil pipeline



Table (11): Western Macedonia - GDP/c (€ in current prices)

	2000	2001	2000	2003*	2004*	2005*	2006*
Greece total	12.483	13.372	14.254	15.549	16.801	17.800	19.124
<i>Western Macedonia</i>	10.355	10.757	11.880	12.518	13.016	14.638	15.436
Percentage in Greece	82,95	80,44	83,35	80,51	77,47	82,24	80,72



Source: NSSG*=provisional data

- Essentially poor region sensitive to dependence on coincidences (contingency)
- Isolation, FYROM
- Monoculture of electricity, and fair industry



For all three regions

Prospects - opportunities:

- Country gates – transport
- Universities
- Tourism (& alternative)
- Accession (gradual) of bordering countries to the EU



3.4. Transport axes and development corridors: from visual representations to the development net of «σ»

The central questions:

- Can the infrastructure network of sigma “σ” be transformed into a spatial development network?
- Are all these investments justified?
- Which is the relationship between transport and development?

[All earlier theorists refer to a positive relation (see development economists, Marx, etc). What is true today?]



Further thoughts:

- Transaction cost of firms is crucial (McCann and Shefer, 2004)
- Role of transport in the General Conditions of Production
- There must be an essential content of production (McCann and Shefer, 2004)
- There is a need for direct and indirect economic activity
- Possibility for the development of economic activity via network economies
- Restructuring of space as a surgical operation



Results:

Change of isochrones

Chain effects:

- restructuring of activity allocation
- change of urbanity
- changes in land uses and land values
- Changes in the sectoral and branch composition of production and in income
- Creation of new favoured and less favoured spaces



Emergence of new phenomena:

a) **Drag effect** (weakening/ satellisation of weaker spaces)
→ Increase of attractiveness via policies (e.g. big investments)

b) **Tunnel effect** (Graham and Marvin, 1996) (inability to participate in development due to isolation)
→ Accessibility / complementary networks

Sceptics are many:

e.g. Vickerman 1991, 1999, 2000, 2002, 2007, 2008 (!!!)
But also ESPON (200X), etc.

Risk of contradiction:

Between: economic efficiency, spatial equity and eco-environmental sustainability

The development of infrastructures reinforces current economic trends as well as polarisation
→ The importance of secondary networks



In Greece:

Optimism by Papadaskalopoulos and Christophakis, 2008

Sceptics Petrakos and Tranos, 2008

Moderate approach by Panebianco and Schürmann, 2002

All agree that development requires additional significant effort

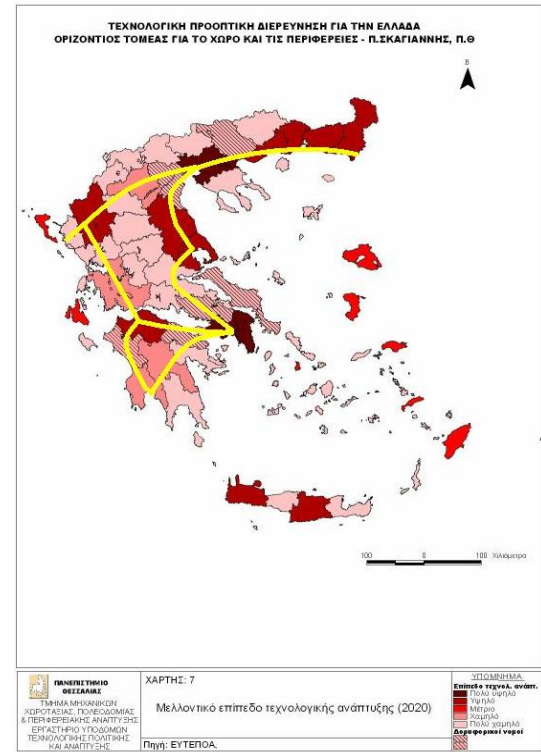
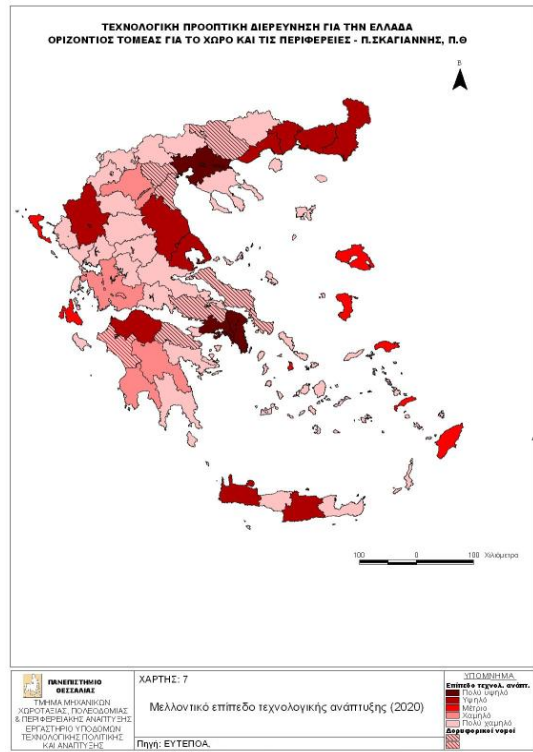
Emphasis and investment in **new technologies** has been acknowledged as an important counteracting measure (EU 200X)

In Greece, infrastructure development does not follow a clear pattern; it is influenced by factors such as the needs of tourism, profitability prospects of concessionaires, random initiatives, maturity of projects, needs of institutions [e.g. HEIs], etc)

This has been stated in the *Technology Foresight in Greece* project trying to foresee Greece of 2020



Map (23): Future development level of Greece: a foresight for 2020



Source: Skayannis, 2003

The losers: small islands, mountainous regions



Conclusions

Historical aegeocentricity

The **S** development axis

The expression of S in **(P)ATHE**

Claims for new roles and problems

From **(P)ATHE** to the σ net of the land transport infrastructures of the mainland

From the σ of infrastructures to the σ of development (required policies)

Foresight of **the development of new poles, relative balance within σ , και no dramatic changes**

Smaller place will claim roles



Thank you very much for your attention !!!!!

$S \rightarrow \sigma$

