

Science and Innovations

Ukraine benefits from a prominent potential in the field of science. In spite of the difficulties stemming from the transition to a new social and economic model, the country has succeeded in maintaining its extensive network of academic institutions, which testifies to the vitality of national science and its capability to gradually adapt to the challenges of a market economy.

In Ukraine, 1,452 organisations pursued scientific and technical R&D activities in 2006; of them 56.2% were independent scientific research institutions, 13.3% design bureaus, 3.4% planning and planning-design organisations, 11% higher education establishments, 5.4% in-house scientific-technical units and design bureaus in industrial facilities, and 10.8% other self-contained organisations. Between 1990 and 2004 the number of these institutions rose from 1,400 to 1,505, i.e. by 7%.

Nearly two thirds of *scientific organisations* are specialised in particular economic sectors (62.3%), 21.3% form part of the academic research sector, 11% are incorporated into higher education and 5.4% belong to industrial plants. 315 organisations within the academic sector are involved in fundamental research, comprising of research institutes of the National Academy of Sciences, along with academies specialising in a particular sector (agricultural, pedagogical, medical, engineering and legal). Research groups are active in 163 higher education establishments.

The natural and technical sciences are the leaders, representing 27.3% and 59.5% of establishments respectively. In 2006, 84.4 thousand people had higher-level scientific degrees, and of them 12.5 thousand were Doctors in science.

Expenditure on *scientific investigation and development* amounted to 1.2% of GDP in 2004, with a meagre contribution from the state sector (0.42%). Most scientific research into new kinds of techniques was undertaken in the City of Kyiv (32.8%), and oblasts centred on Kharkiv (22.8%), Dnipropetrovs'k (8.0%) and Donetsk (7.9%) (Figure 72).

Leaders in the field of *technological innovation* are the City of Kyiv (29.4%), and oblasts of Donetsk (14.0%), Kharkiv (13.2%) and

Dnipropetrovs'k (9%). The great majority of industrial plants adopting scientific innovations are to be found in the City of Kyiv (37.1%), Kharkiv oblast (13.6%), AR of Crimea (13.3%), and the oblasts of Chernihiv (10.8%), Ivano-Frankivs'k (10%), Ternopil' (9.7%) and Kherson (9.6%).

A wealth of *scientific potential* is concentrated in the National Academy of Sciences of Ukraine, with 164 separate institutions. They are dispersed across many urban settlements and belong to seven scientific centres: Northwestern, Donetsk, Western, Southern, Northeastern, Pridniprov'ye and Crimean.

A close interrelationship can be observed between the spatial concentration of scientific-technical potential, the intensity of innovation activity, and regional differences between the economic strength of oblasts, their level of social and economic development, and the sector-specific structure of production, etc. There is a characteristic pattern in focal areas where scientific research organisations, groups of scholars and academic connections tend to be concentrated. Foci of different magnitudes can be identified, the first being Kyiv; Kharkiv coming second; Donetsk and Dnipropetrovs'k third; L'viv and Odesa fourth; and Simferopol' fifth in the rankings (Table 20).

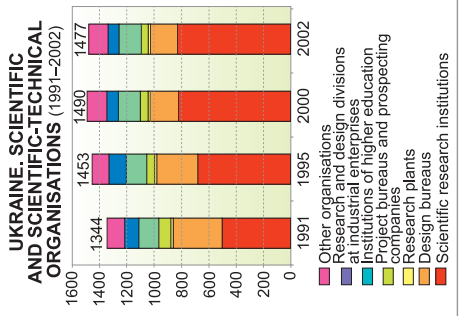
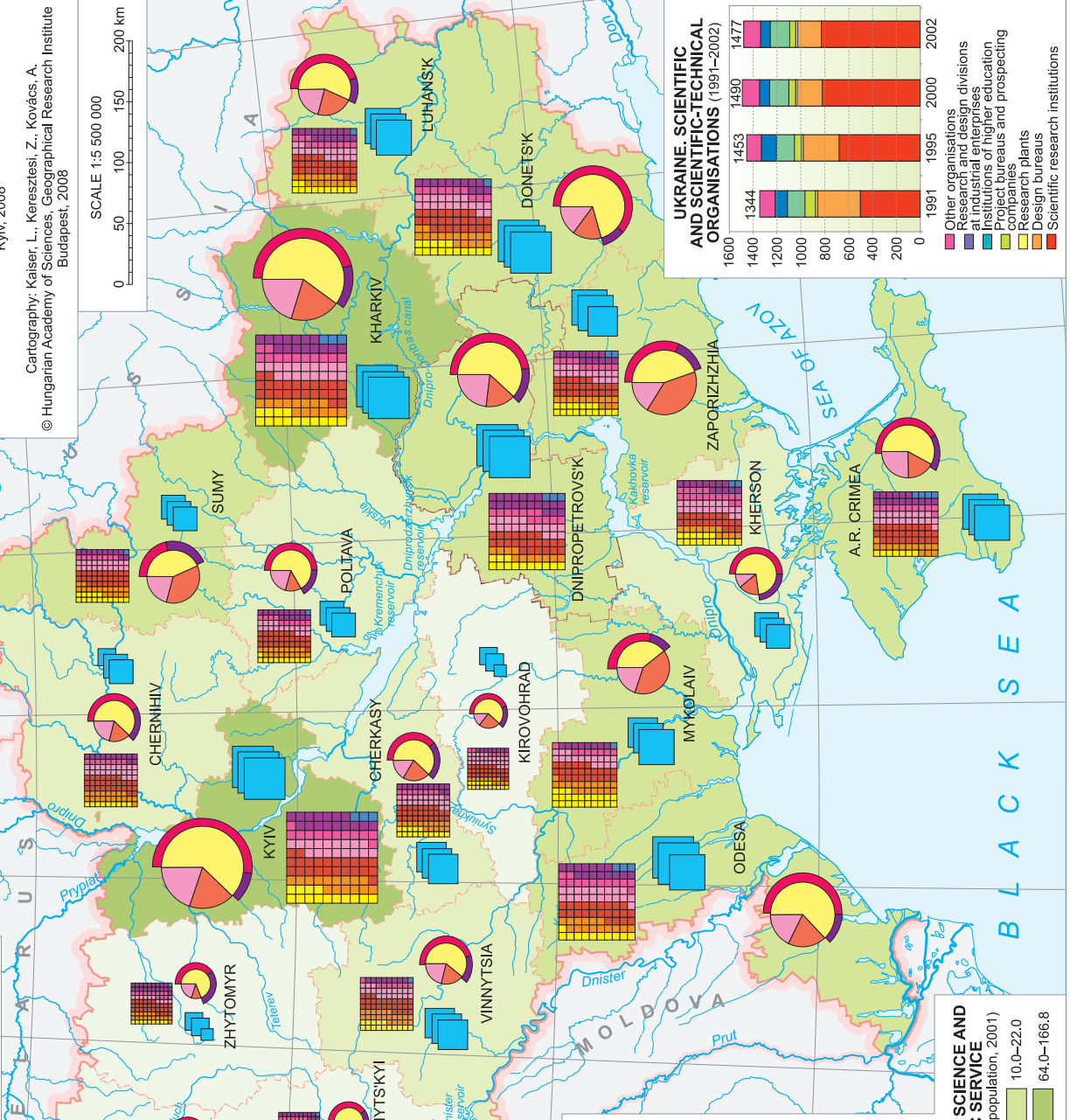
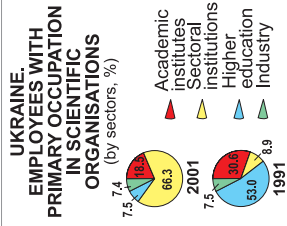
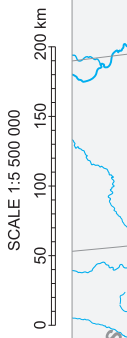
With respect to the forces of globalisation, Ukraine is strongly impacted by the leading powers of the world economy, and also notably by Russia as its closest neighbour, itself possessing significant economic potential. Within Ukraine, a marked spatial differentiation has been shaped by the relationship between the core and peripheries. 40% of GDP is produced by five regions (Kyiv and the oblasts of Donetsk, Dnipropetrovs'k, Zaporizhzhia and Odesa), which also share 59% of foreign direct investment, produce 67% of total exports and consume 65% of imports (2004). They also have the highest figures relating to dynamics in the sphere of innovation and infrastructure networks (Figure 73). There is a tenfold difference in magnitude between the leading region and those that are lagging behind, and similar disparities are also common at the lower administrative level of division.

Fig. 72

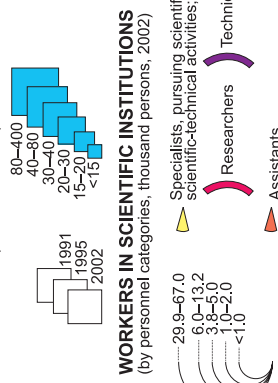
SCIENTIFIC-TECHNICAL RESOURCES

Author: Kozachenko, T., Kurach, T.
 Cartography: Molochko, V.
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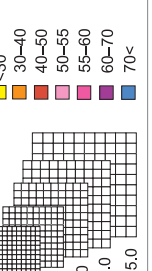
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SCIENTIFIC AND SCIENTIFIC-TECHNICAL ORGANISATIONS (units, 1991-2002)



RESEARCHERS (2002)



EMPLOYEES IN SCIENCE AND SCIENTIFIC SERVICE (persons per 10,000 population, 2001)

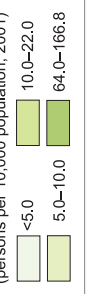


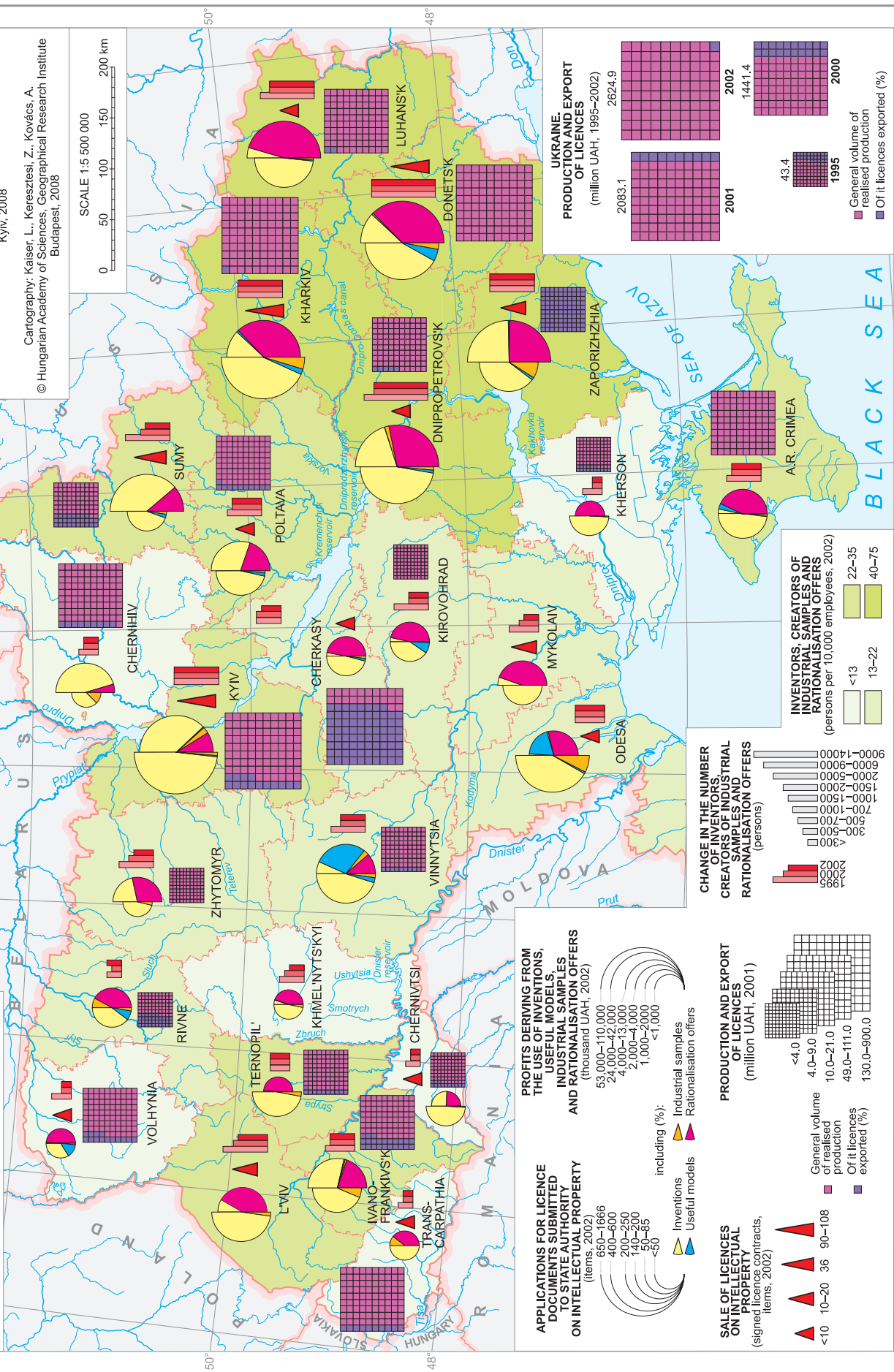
Fig. 73

INNOVATION ACTIVITY

Author: Kozachenko, T., Kurach, T.
 Cartography: Molochko, V.
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SCALE 1:5 500 000
 0 50 100 150 200 km



APPLICATIONS FOR LICENCE DOCUMENTS SUBMITTED TO STATE AUTHORITY ON INTELLECTUAL PROPERTY (items, 2002)

650-1666
 400-600
 200-250
 140-200
 50-65
 <50

including (%):
 Industrial samples
 Useful models
 Rationalisation offers

PROFITS DERIVING FROM THE USE OF INVENTIONS, INDUSTRIAL SAMPLES AND RATIONALISATION OFFERS (thousand UAH, 2002)

53,000-110,000
 24,000-42,000
 4,000-3,000
 2,000-2,000
 1,000-200
 <1,000

SALE OF LICENCES ON INTELLECTUAL PROPERTY (signed licence contracts, items, 2002)

<10 10-20 36 90-108

PRODUCTION AND EXPORT OF LICENCES (million UAH, 2001)

<4.0
 4.0-9.0
 10.0-21.0
 49.0-111.0
 130.0-900.0

General volume of realised production
 Of it licences exported (%)

CHANGE IN THE NUMBER OF INDUSTRIAL SAMPLES AND RATIONALISATION OFFERS (persons)

2002
 9000
 6661

0000
 0001
 0002
 0003
 0004
 0005
 0006
 0007
 0008
 0009
 0010
 0011
 0012
 0013
 0014
 0015
 0016
 0017
 0018
 0019
 0020

INVENTORS, CREATORS OF INDUSTRIAL SAMPLES AND RATIONALISATION OFFERS (persons per 10,000 employees, 2002)

<13 13-22 22-35 40-75

UKRAINE. PRODUCTION AND EXPORT OF LICENCES (million UAH, 1995-2002)

2083.1 2001 2624.9 2002

43.4 1995 1441.4 2000 2000

General volume of realised production
 Of it licences exported (%)

Table 20. *Scientific centres of Ukraine: Scientific-technical resources and research projects*

Name of scientific centre	Hub of the centre	Oblasts affected	Weight, %									
			By the number of organisations	By the number of experts	By the volume of research projects	Total	By the quantity of projects focusing on new developments in					
							Techniques	Technologies	Materials	Plants and animals	Methods, concepts	Other
North-western	Kyiv	Vinnytsia, Zhytomyr, Kyiv, Kyiv oblast, Khmel'nyts'kyi, Cherkasy, Chernihiv	35.1	36.8	41.5	41.9	41.2	34.5	43.0	32.3	36.2	43.9
Donets'k	Donets'k	Donets'k, Luhans'k	9.0	11.1	8.6	7.7	11.8	16.5	14.6	6.8	12.5	5.7
Western	L'viv	Volyn, Transcarpathia, Ivano-Frankivs'k, L'viv, Rivne, Ternopil', Chernyvtsi	13.6	8.8	6.1	17.5	6.5	9.3	11.7	12.2	16.2	20.1
Southern	Odesa	Mykolaiv, Odesa, Kherson	9.0	7.8	8.8	6.4	6.4	6.0	4.4	17.1	6.1	6.5
North-eastern	Kharkiv	Poltava, Sumy, Kharkiv	19.0	20.2	20.7	14.9	22.3	14.7	17.5	17.5	20.8	12.8
Pridniprovye	Dnipropetrovs'k	Dnipropetrovs'k, Zaporizhzhia, Kirovohrad	10.4	11.7	11.6	7.6	10.5	14.1	7.7	8.2	4.9	6.5
Crimean	Simfe-ropol'	Crimea	3.8	3.6	2.7	4.0	1.2	4.8	1.2	6.0	3.3	4.4

Sources: OSAULENKO, O.G. (Ed.) 2004. Statystychnyi schorichnyk Ukrainy za 2004 rik, Derzhavnyi komitet statystyky Ukrainy, Vyd. «Konsul'tant», Kyiv.

Ukraine is embarking on serious efforts to deal with the challenges of globalisation: the information technology sector is sprouting roots, Ukrainian corporations are well-established and developing, there are positive changes within the tertiary sector, and the transfer of technology is

expanding. At the same time, the negative effects of globalisation are also being felt: there is an outflow of labour, an influx of material-intensive production leading to environmental deterioration and financial pressures are growing.