INTERNATIONAL SOCIOLOGICAL ASSOCIATION

NEWSLETTER

of the Research Committee 23:

SOCIOLOGY OF SCIENCE AND TECHNOLOGY

Editor: Jaime Jiménez, IIMAS-UNAM, MEXICO

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Contents

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EDITOR'S NOTE

Dear Friends,
Gothenburg 2010, here we go!!

This NEWSLETTER is mostly dedicated to the RC23 Programme for the XVII ISA World Congress of Sociology to be held in Gothenburg Sweden, 11-17 July, 2010. Our main theme is **Science and Technology on the Move**. We stated in the Introduction to our Programme that in a world that is in perpetual flux, Sociology of Science and Technology (and Innovation) changes along with new ways of doing science, with the purposes for developing technology, and with the organization of innovation. Thus, we propose a central and important agenda for this event: *to better understand transformations in the social and cultural spaces of science, technology and innovation.*

Countries that traditionally have been behind in producing science are now at the forefront. New inter-disciplines and trans-disciplines are consolidating in their own right. New opportunities are emerging for scientific development in Third World countries. New means for information exchanges are opening up unexpected possibilities for cooperation and collaboration among countries that "have" and those that "have not". This is happening among established scientists and among scientists and other social actors in a myriad of 'new fora' outside of the traditional channels of academic exchange. New "invisible colleges" that connect scientists both North-South and South-South have arisen. Information and communication technologies offer new modes of knowledge generation, apparently reducing the gap between countries and societies. These and many other topics will be examined in our sessions on Science and Technology on the Move.

We made a special effort to organize joint sessions with other RC's, having succeeded in joining forces with as many as ten! These RC's are convinced along with us of the inter/trans-disciplinary nature of sociological science. These are:

RC02: Economy and Society.
RC04: Sociology of Education.
RC07: Futures Research.
RC09: Social Transformations and Sociology of Development.
RC13: Sociology of Leisure.
RC14: Sociology of Communication, Knowledge and Culture.
RC21: Regional and Urban Development.
RC32: Women in Society.
RC47: Social Classes and Social Movements.
RC48: Social Movements, Collective Action and Social Change.

Our Programme includes 18 sessions hosted by us plus four sessions hosted by other RC's, and participation in the Integrative Session IS01: Social Change and the

Mitigation of Climate Change: Future Scenarios, where Czarina Saloma is representing RC23. My expectation is that we will have a very attractive, enriching and exciting level of participation at the XVII ISA World Congress of Sociology.

Farewell

My term as RC23 President ends with the realization of the XVII Congress. I thank all of you who have supported and encouraged my activities during this period. I particularly express my gratitude to Czarina Saloma for her great work conducted as Secretary of the Committee and her dedication to the webpage and attention to new membership. With the participation of many of you in RC23, we have increased membership from 76 in 2002 to 128 in 2010. The number of countries represented grew from 20 to 40, many of them from the Third World, thus accomplishing one of our major objectives: to become a means for the development of other countries' science. These figures show a considerable increase of maturity in our academic community. I wish the best to the new Board and encourage everyone to take a more active role in the strengthening of our 'invisible' and 'visible' (at events such as the ISA World Congress) academic network.

Sincerely,

Jaime Jiménez
RC23 President

XVII World Congress of Sociology
RC23 Sessions

Session 1
Science, Technology and Innovation on the Move: The Changing Trends in Global Society. Session on the Congress theme. A

Monday 12 July, 15:30 - 17:30, Svenska Mässan G3

Chair
Hebe Vessuri
Instituto Venezolano de Investigación Científica
Venezuela

Session Details:

New Technologies on the Move: A Focus on Nanotechnology in India
Subhasis Sahoo
Science and Technology Area, The Energy and Resources Institute (TERI), India Habitat Centre Complex, New Delhi
India

Current Practic and Perceived Risks Related to Health, Safety and Environmental Stewardship in Nanomateria Industries
C. Engeman
B. Baumgartner
A. Fish
Department of Sociology, University of California, Santa Barbara, CA 93106
United States

Will Nanotechnology be the Vapour Machine of the Sixth Kondratieff Wave?
Rui Vieira Cruz
University of Minho
Portugal

The Social Inequalities in the Information and Knowledge Society. The Digital Divide in Spain
Cristóbal Torres Albero
José Manuel Robles Morales
Carlos Fernández Rodríguez
Oscar Molina Molina
Universidad Autónoma de Madrid
Spain

Globalized Work on the Move – How to Recombine Technological and Organizational Systems?
Bettina - Johanna Krings
Linda Nierling
ITAS (Institute of Technology Assessment and Systems Analysis). Karlsruhe Institute of Technology (KIT)
Germany

Unintended Consequences of use: Energy-Sustainable Innovation and the Hybrid Electric Vehicle
Ritsuko Ozaki
Isabel Shaw
Imperial College Business School, Imperial College
United Kingdom

University Research Institutes: New missions in Ancient structures
Laura Cruz-Castro
Luis Sanz-Menéndez
CSIC Institute of Public Goods and Policies
Spain

Session 2
Science, Technology and Innovation on the Move: The Changing Trends in Global Society. Session on the Congress theme. B

Monday 12 July, 17:45 - 19:45, Svenska Mässan G3

Chair
Hebe Vessuri
Instituto Venezolano de Investigación Científica
Venezuela

Session details:

Moving Topographies – The Social Constitution of Highly Mobile Lifestyles in Practice and Theory
Marcel Endres
Darmstadt University of Technology
Germany

Environmental Justice: Personal Responsibility and Game Theory
Siddharth Sareen
Department of Humanities and Social Sciences, IIT Madras
India

Reflexive Modernization in Action: The Institutional Pathway of Parliamentary Technology Assessment
Pierre Delvenne
Aspirant FNRS, SPIRAL, Université de Liège
Belgium

Alternative Ways of Learning and Research Conducive to Development
Jaime Jiménez
Juan C. Escalante
Carlos Rodríguez
Gregory Sandstrom
Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas, Universidad Nacional Autónoma de México (UNAM)
Mexico

Strategic Responses to Hype and Disappointment in Stationary Fuel Cell Innovation
Kornelia Konrad
University of Twente, Department of Science, Technology and Policy Studies, Netherlands
Jochen Markard
Annette Ruef
Bernhard Truffer
Cirus – Innovation Research in Utility Sectors
Netherlands

Science, Human Health and the Oppression of Nonhuman Animals: Morality and the Development of Transgenic Nonhuman Animals
Kay Peggs
School of Social, Historical and Literary Studies, University of Portsmouth
United States

Globalized Work on the Move – How to Recombine Technological and Organizational Systems?
Bettina-Johanna Krings
Linda Nierling
ITAS (Institute of Technology Assessment and Systems Analysis), Karlsruhe Institute of Technology (KIT)
Germany

Session 3
Ciencia y Tecnología para el Desarrollo del Tercer Mundo. Science and Technology for the Development of the Third World (Spanish Language Session)

Monday 12 July, 20:00 - 22:00, Svenska Mässan G3

Chair
Judith Zubieta
IIS, UNAM
Mexico

Session details:

Local Learning and Development in the Biosphere Reserve Management. The Sierra Gorda Case, Querétaro, México, Ciencia, Conocimiento Local y Desarrollo en la Gestión de la Reserva de la Biosfera. El Caso de Sierra Gorda, Querétaro, México
Mesa Aníbal
Departamento de Sociología y Facultad de Filosofía de la Universidad de La Laguna, Islas Canarias
Spain
Nieves Quintero
Yurena González
Universidad de La Laguna
Spain

Innovation and Nanotechnologies in Latin America, Innovación y Nanotecnologías en América Latina
Guillermo Foladori
Doctorado en Estudios del Desarrollo, Universidad Autónoma de Zacatecas
Mexico

Nanotechnology in Brazil: the Emerging Nanotechnologies and the Social Inclusion, Nanotecnología en Brasil: las Tecnologías Emergentes y la Inclusión Social
Noela Invernizzi
Universidad Federal de Paraná, Curitiba
Brazil

The Scientific-Thecnological Gap (Technoscientific) and its Future Permanence, La Brecha Científico-Tecnológica (Tecnocientífica) y su Permanencia Futura
Jesús A. Valero Matas
Juan Romay Coca
Departamento de Sociología. Universidad de Valladolid
Spain

Poverty and Social Inclusion in a New Model Based on Science and Technology in Latin America and the Caribean , Pobreza e Inclusión Social en un Nuevo Modelo Basado en Ciencia y Tecnología en América Latina y el Caribe
Rafael Palacios
Fundación Instituto de Estudios Avanzados (IDEA)
Venezuela

Pure vs. Applied Research in Developing Countries: Do Higher Education Institutions and Research Centres Have a Choice?, Inv Pura vs. Aplicada en los Países en Desarrollo: ¿Tienen Alternativas las Inst de Ed Sup y los Inst de Investigación?
Luísa Oliveira y Oliveira
Dept of Sociology, Lisbon University Institute, ISCTE
Portugal
Helena Carvalho
Department of Quantitative Methods, Lisbon U.
Portugal

Dominant Scientific Production in Sociology: Articles, Actors and Themes within High Impact Journals (1999-2009), Producción Científica Dominante en Sociología: Artículos, Actores y Temas en las Revistas de Alto Impacto (1999-2009)
Tatiana Maranhao
University of Brasília
Brazil

The User's Role in the Innovation Process in the Developing Countries, El Rol del Usuario en el Proceso de Innovación en los Países en Vías de Desarrollo
Cristian Monsalvez
Universidad Técnica de Berlín
Germany

Miths and Science Development in Brazil: the Scientific Travel Literature, Mitos y Desarrollo de la Ciencia en Brasil: la Literatura de Viaje Científica
Marcelo Fetz
Fabrício Defacci
Universidade Estadual de Campinas (UNICAMP)
Brazil

Session 4
Liberalizing Research in Science and Technology: Institutional and Policy Aspects, A

Tuesday 13 July, 10:45 - 12:45, Svenska Mässan G3

Chair
Binay K. Pattnaik
Indian Institute of Technology
India

Session details:

International Mobility as a Mechanism for Reproducing the Scientific Elite
Nadia Asheulova
Valentina Lomovitskaya
St. Petersburg Branch of the Institute for the History of Science and Technology, the Russian Academy of Sciences
Russian Federation

Assessment of State Foundations' Influence On the Advancement of Science In Russia Between 1992 And 2008
Elena Ivanova
Sociological Institute, Russian Academy of Sciences
Russian Federation

Politics and Poetics of Scientific Imagination in Pos-Colonial Contexts– Sociologizing Brazilian intellectual histories
Cláudio Costa Pinheiro
School of Social Sciences, Getúlio Vargas Foundation
Brazil

Research in Science and Technology in the Era of Liberalization in India: Institutional and Policy Issues
Sambit Mallick
Liza Das
Department of Humanities and Social Sciences, Indian Institute of Technology Guwahati
India

Connection of "Methodological Liberalism" in Science with Liberal Moods in Society
Yurevich Andrey V.
Institute of psychology of Russian academy of sciences
Russian Federation

Impact of Globalization and Information Technology on Teaching Profession in Higher Education
Duru Arun Kumar
NSIT, Dwarka
India

Scientific and Educational Personnel Preparation in Modern Russia
Tatyana Tikhomirova
Institute of Psychology, Russian Academy of Sciences
Russian Federation

The Relationship Among Academician, Student and University in Modern Society in a Context of Liberalization of S&T
Abulfaz D Suleymanov
Institute of Philosophy, Sociology and Law Researches, Azerbaijan National Academy of Sciences
Azerbaijan

Liberalization and Globalization Processes in Post-Soviet Russian Science Development of the International Scientific Collaboration
E.Z. Mirskaya
Russian Academy of Sciences
Russian Federation

Session 5
RC23/RC02 Science, Technology and Innovation in Cities and Regions

Tuesday 13 July, 15:30 - 17:30, Svenska Mässan G3

Chair
Maarten Mentzel (RC23)
University of Amsterdam
Netherlands

Co-Chair
Anup Dash (RC02)
University of Amsterdam
Netherlands

Session details:

Internet and the City: The Three Dimensions of Government Intervention in Virtual/Urban Space
Esteve Sanz
Yale University
United States

Beyond Creativity: Entrepreneurship and Every-Day Life in Milan
Carla Sedini
University of Milano-Bicocca
Italy

Knowledge at the Wheel – Innovation and Regional Integration in East Asia
Dennis McNamara
Georgetown University
United States

Transnational Linkages and Industrial Clusters in East Asia: China' Zongguancun, Taiwan's Hsinchu and Korea's Daedock's Science
Jenn-hwan Wang
National Chengchi University
Taiwan

Science Rewards Systems in Spain. Do the Regions Mark Any Difference?
Celia Díaz Catalán
IESA-CSIC
Spain

Strengthening the Assistive Technology Sector in San Sebastián (Spain) to Foster Citizens' Quality of Life & Improve the City's
Gerardo Zamora
Fundación Ingema (Instituto Gerontológico Matia)
Spain

Session 6
RC23/RC21 Local Manifestations of Global Surveillance

Tuesday 13 July, 17:45 - 19:45, Svenska Mässan G3

Chair
David Lyon (RC23)
Queen's University
Canada

Co-Chair
Murli M. Sinha (RC21)
Rochester Institute of Technology
United States

Session details:

In the Names of European Capital of Culture and Social Responsibility: State and Employer's Union Cooperation for Province Information
Alanur Cavlin Bozbeyoglu
Queen's University
Canada

Policies on Gender and Identification Systems in Mexico: The Case of the National Databank of Violence Against Women
Jimena Valdés Figueroa
Comisión Nacional Para Prevenir y Erradicar la Violencia contra las Mujeres Secretaría de Gobernación
Mexico

Surveillance and the Exercise of Legitimate Violence in the French Police: The Hypothesis of a "Re Weberianisation" of police administration
Anaïk Purenne
University of Lyon
France

Right of Admission Reserved. An Exploration of the Symbolic and Practical Interrelatedness between Non-State Actors of Surveillance
Thomas Søgaard Jensen
University of Aarhus
Denmark

Practice and Global Data: Loyalty Cards as Material Cultural and Cultural Practice
Nils Zurawski
Universität Hamburg
Germany

Mapping Concerns with Homeland Security Fusion Centers
Torin Monahan
Vanderbilt University
United States

Session 7
Academic Response to Changing Science and Technology in Developing Economies

Wednesday 14 July, 10:45 - 12:45, Svenska Mässan G3

Chair
S. L. Hiremath
Gulbarga University, Jnana Ganga
India

Session details:

Science and Society: Consensuses, Controversies and New Institutionalities
Alice Abreu
Regional Office for Latin America and the Caribbean International Council for Science, Brazil

Art of Development – Problems and Challenges for Research and Education
Lech W. Zacher
Centre for Impact Assessment Studies and Forecasting, Kozminski University, Jagiellonska 59, 03-301 Warsaw
Poland

Recent Changes in the Scientific Knowledge Production and Dissemination Regime in Brazil
Maria Caramez Carlotto
Department of Sociology, University of Sao Paulo, Sao Paulo
Brazil

Roads to Knowledge Society and Innovations?
Osmo Kivinen
Paivi Kaipainen
Juha Hedman
Research Unit for the Sociology of Education, RUSE, Hameenkatu 1, FIN-20014 University of Turku
Finland

Brand IIT and the Evolution of India's Technocratic Elite
Vibha Arora
Dept. of Humanities and Social Sciences, Indian Institute of Technology Delhi, Hauz Khas, New Delhi – 110016
India

Globalization and Emerging Challenges in Engineering Education in India with Respect to Industry Demands
Duru Arun Kumar
Netaji Subhas Institute of Technology, New Delhi
India

Specific Features of Public Attitudes toward S&T at Russia and Eastern Europe
Olga Shuvalova
State University – Higher School of Economics (HSE), 20, Myasnitskaya, Moscow, 101000
Russian Federation

Science, Technology, Education and Indian Leather Society-Role of Central Leather Research Institute
Giriyappa Kollannavar
CSIR Rural Development Project, Economics Research Division, Central Leather Research Institute, Adyar, Chennai-600020
India

Science and Technology on the Move
Seyed Reza Mirnezami
Institution for the Study of Science, Technology and Innovation (ISSTI), University of Edinburgh
United Kingdom

Promoting E-Research through the Alliance between Science and the Social Science: The Case of the Virtual Center for High Energies
Elias Said Hung
Dept. Comunicacion- Division de Humanidades, Observatorio de Educacion del Caribe Colombiano – IESE, Universidad de Colombia
Colombia

University Industry Interactions for Technology Inputs
S.L. Hiremath
Gulbarga University, Jnana Ganga, GULBARGA – 585 106, (Karnataka)
India

Session 8
Business Meeting. Traditional dinner late in the evening

Wednesday 14 July, 15:30 - 17:30, Svenska Mässan G3

Chair
Jaime Jiménez
IIMAS, UNAM
Mexico

Co-Chair
Czarina Saloma
Ateneo de Manila University
Phillipines

Session details:

Busines meeting

Session 9
RC23/RC14 Surveillance and Popular Culture

Wednesday 14 July, 17:45 - 19:45, Svenska Mässan G3

Chair
Torin Monahan (RC23)
Vanderbilt University
United States

Co-Chair
Hermilio Santos (RC14)
PUCRS
Brazil

Session details:

Face Recognition Systems: From Security to Convenience
Ariane Ellerbrok
University of Alberta
Canada

H1N1 Influenza Surveillance Systems in Mexico: An Approach from Biopolitical and Cultural Studies
Roberto Fuentes Rionda
Nelson Arteaga Botello
Universidad Autónoma del Estado de México
Mexico

Television and the (Re) Production of Surveillance
André Mondoux
Quebec University
Canada

UK News Media Representations of Surveillance
David Barnard-Wil
Cranfield University
United Kingdom

Assemblages, Data Doubles and Deleuze's Dividual: Cinematic Representations of the 'Control' Body
Lorna Elizabeth Muir
University of Aberdeen
United Kingdom

Towards a Cellphone Cinematography
Milena Szafir
University of São Paulo
Brazil

Session 10
RC23/RC09 Climate Change, Governance and the Sustainability of Cities

Wednesday 14 July, 20:00 - 22:00, Svenska Mässan G3

Chair
Czarina Saloma-Akpedonu (RC23)
Department of Sociology and Anthropology, Ateneo de Manila University
Philippines

Session details:

Urban Sprawl, Socio-Environmental Vulnerability and Climate Change: Urbanization Dynamics in Metropolitan São Paulo
Alves Humberto
Campinas/SP
Brazil

Water Shortage in Ankara, Turkey and Disaster Management Policy
Aytül Kasapoglu
Zuhal Yonca Odabas
Department of Sociology, Ankara University
Turkey

Urban Sustainability: A Case Study of Guanamara Bay, Brazil
Carmen Silvia Machado
Tania Maciel
Instituto de Pesquisas Jardim Botanico do Rio de Janeiro, Federal University of Rio de Janeiro
Brazil

Vulnerability, Adaptation and Resilience to Flood and Climate Change-Risks Among Marginal Riverine Communities in Metro Manila
Emma Porio
Department of Sociology and Anthropology, Ateneo de Manila University
Philippines

The Governance of Disasters in Two Indonesian Cities
Achwan Rochman
Department of Sociology, University of Indonesia
Indonesia

Social Sustainability in Relation to Urban Forms: An Analysis of Metropolitan Barcelona
Gemma Vila
Jordi Gavalda
Department of Sociological Theory, Philosophy of Law and Methodology for Social Sciences, University of Barcelona
Spain

Energy, Society and Innovation: Alternative Energy and Energy Transition, Société, Énergie et Innovation: les Énergies Alternatives et la Transition Énergétique
Leandro Raizer
Antonio David Cattani
PPG en Sociologie, Université Federál du Rio Grande do Sul, Porto Alegre
Brazil
Arnaud Sales
Departement Sociologie, Université de Montréal
Canada

Session 11
RC23/RC04 Changing Forms of University-Society Relationship, A

Thursday 15 July, 10:45 - 12:45, Svenska Mässan G3

Chair
Juha Tuunainen (RC23)
Department of Sociology, University of Helsinki
Finland

Co-Chair
Raj P. Mohan (RC04)
Auburn University
United States

Session details:

Changing Social Contract between Science and Society: Exploring the Case of Biotechnology in India
Renny Thomas
Jawaharlal Nehru University
India

Encountering Transdisciplinarity as Knowledge Regime: On the Possibilities and Limits of Socialising Early Stage Researchers
Andrea Schikowitz
Ulrike Felt
Judith Igelsböck
Thomas Völker
University of Vienna
Austria,

Researchers' Views on Knowledge Transfer to Firms: Grounds for University-Industry Cooperation
Irene Ramos-Vielba
Manuel Fernández-Esquinas
Nuria Hernández-Hernández
Spanish National Research Council
Spain

Boundaries and Strategies of Firms to Collaborate with Universities in a Regional Innovation System
Carmen Merchán-Hernández
Spanish National Research Council
Spain

Different Career Paths of Doctorate Holders of Various Disciplines
Hannelore De Grande
Ghent University
Belgium

Different Disciplines, Different Impact: Disciplinary Structures in Times of Mode 2
Kristoffer Kropp
University of Copenhagen
Denmark

Session 12
RC23/RC47/RC48 Round table: Towards a Dialogue between Scientists, Civic Groups and Social Movements. A - Nanotechnology, Assisted Reproduction and the Era of Uncertainty: Challenges for the Public and Researchers

Thursday 15 July, 15:30 - 17:30, Svenska Mässan G3

Chair
Paulo Martins (RC23)
Instituto de Pesquisas Tecnologicas
Brazil

Co-Chairs
Henri Lustiger Thaler (RC47)
Ramapo College, USA
United States

Benjamín Tejerina (RC48)
University of the Basque Country
Spain

Session details:

Nanotechnology and the Role of Researcher: Consciousness or Alienation?
Tânia Elias Magno Da Silva
Master Program of Sociology, Federal University of Sergipe
Brazil

Emerging Economies/Emerging Technologies: Prospects for Equitable Development
Richard Appelbaum
Rachel Parker
Center for Nanotechnology in Society, California University, Santa Barbara
United States

Human Rights and Nanotechnologies: Limits and Possibilities between Tecnological Innovation and Rights of the Human
Wilson Engelmann
UNISINOS (São Leopoldo/RS/Brazil)
Brazil

Socio-Technical Controversies on Assisted Reproduction and the Public Debate: Opportunities and Limits
Catarina Delaunay
CESNOVA – Centro de Estudos de Sociologia da Universidade Nova de Lisboa
Portugal

The Era of Uncertainty
Henrique Rattner
Faculty of Economy and Administration, São Paulo University
Brazil

Understanding People's Science Movement in India: From the Vantage of Social Movement Perspective
Binay Kumar Pattnaik
Department of Humanities and Social Sciences, Indian Institute of Technology, Kanpur
India

Nanotechnology and Environment Sustainability: A New Solution or a New Nightmare?
Paulo Roberto Martins
Research Inst of Tech. of São Paulo State
Brazil
Adriano Premebida
Djalma Batista Foundation. Manaus
Brazil

Session 13
RC23/RC47/RC48 Round table: Towards a Dialogue between Scientists, Civic Groups and Social Movements. B - Science, Public Engagements and Social Movements

Thursday 15 July, 17:45 - 19:45, Svenska Mässan G3

Chair
Paulo Martins (RC23)
Instituto de Pesquisas Tecnologicas
Brazil

Co-Chairs
Henri Lustiger Thaler (RC47)
Ramapo College
USA

Benjamin Tejerina (RC48)
University of the Basque Country
Spain

Session details:

Theories and Methods in Transdisciplinary Research: Foundations for Dialogue Bet. Scientists, Civic Groups and Social Movements
Bernhard Freyer
Sebastian Helgenberger
BOKU U. of Natural Resources and Applied Life Sciences
Austria
Jim Bingen
Michigan State University, East Lansing, CARRS
United States

Disregarded Knowledges or Forms of Knowledge Delegitimized. The Case of Two Biosphere Reserves
José Luis Castilla Vallejo
Aníbal Mesa López
Nieves Quintero Quintero
Department of Sociology, University of La Laguna, Canary Islands
Spain

Social Action and Scientific Knowledge in Environmental Conflicts
Mercedes Martinez-Iglesias
Sociology and Social Anthropology, University of Valencia. Valencia
Spain

When Scientists Manage a Public Health Program: Conflicts of Expertise Concerning a French Nutrition Health Program
Philippe Terral
Fabien Merlaud
Lab. Sports, Organizations Identities - SOI, Université Toulouse III
France

Motivations for the Access and Use of the Information and the Knowledge in Andalucia
José Manuel Rodríguez Victoriano
Departamento de Sociología y Antropología Social. Universidad de Valencia
Spain
Enrique Wulff Barreiro
Consejo Superior de Investigaciones Científicas
Spain

Nanotechnology and Environment: Topics for the Reflection for a New Possible World
Paulo Roberto Martins
Research Inst of Tech. of São Paulo State
Brazil
Adriano Premebida
Djalma Batista Foundation. Manaus
Brazil

Session 14
Global Structures, Scientific Cultures

Thursday 15 July, 20:00 - 22:00, Svenska Mässan G3

Chair
Richard Wooley
University of Western Sidney
Australia

Session details:

Training Trajectories of Young Scientists: Institutional and Disciplinary Configurations of PhD Programs in Mexico
Rollin Kent
Idolina Velázquez
Alma Carrasco
Autonomous University of Puebla
Mexico

Mobility, Publication Behaviour and Career Development of Argentinean Life Scientists
Koen Jonkers
CSIC Institute of Public Goods and Policies, Madrid
Spain

'Risky Business' - How Toxicologists Negotiate the Potential Danger of Nanoparticles
Mikael Johansson
University of California at Santa Barbara
United States

Online Visibility, Local Practices, and Access to Global Knowledge
Ralph Schroeder
Mark Graham
Oxford Internet Institute, University of Oxford
United Kingdom

Nikkei Nodes in East Asian NICs – Harnessing Local Knowledge to Host Country Networks
Dennis McNamara
Georgetown University, Washington DC
United States

Institutionalising Cross-Sector Collaboration: Comparing National and Regional Strategies in Spain and Australia
Irene Ramos Vielba
CSIC Institute for Advanced Social Studies, Cordoba
Spain
Tim Turpin
Richard Woolley
University of Western Sydney
Australia

The Role of National Innovation Culture in the Globalized World
Jasminka Laznjak
University of Zagreb
Croatia
Jadranka Svarc
Institute of Social Sciences 'Ivo Pilar' Zagreb
Croatia

The Russian Mathematical Community: 20 Years of Changes
Natalia Demina
Scientific observer, 'Polit.ru'
Russian Federation

Session 15
RC23/RC07 The Role of Policy and the Internet in the Future Development of Science in Depressed Regions and Countries

Friday 16 July, 10:45 - 12:45, Svenska Mässan G3

Chair
Jaime Jimenez (RC23)
IIMAS, UNAM
Mexico

Co-Chair
Radhamany Sooryamoorthy (RC07)
University KwaZulu-Natal
South Africa

Session details:

Learning and Teaching with ICT in Latin America: Potential Benefits
Sebastián Möller
Guillermo Sunkel
Daniela Trucco
United Nations Economic Commission for Latin America and the Caribbean (ECLAC, Chile)
Chile

Children with Disabilities in Bangladesh: Information Technology Based Integrative Programs
Mahjabeen Khaled Hossain
Institute of Hazrat Mohammad (SAW)
Bangladesh

Increasing Impacts of Modern Communication Technologies on Younger People in Tehran
Fereshteh Yekani
Ministry of Mines & Industries
Islamic Republic of Iran

The Internationalization of South African Medical Science, 1975-2005
Radhamany Sooryamoorthy
University of KwaZulu-Natal
South Africa

IKS: Poverty Alleviation and Sustainability of Community-Based Programmes and Projects– A Case Study of Inanda (Durban)
Mdu Mtshali
Tanusha Raniga
Sultan Khan
University of KwaZulu-Natal
South Africa

20014 University of Turku, Finland, Finland, Quasi-objects and actors in the web of belief. Formation of a national nuclear waste management system: the case of Finland
Kantola Ismo
Marianne Silvan-Lempinen
Dept. of Soc. Res. U. of Soc. U of Turku. Doc st.
Finland

Session 16
RC23/RC07/RC32 Gender, Science, Technology, Innovation and the Future

Friday 16 July, 15:30 - 17:30, Svenska Mässan G3

Chair
Radhamany Sooryamoorthy (RC07/23)
University of KwaZulu-Natal
South Africa

Co-Chair
Solange Simões (RC32)
Eastern Michigan University
United States

Session details:

Gender Styles in Online Campaigning: Comparing German and American Candidate Websites
Eva Johanna Schweitzer
University of Mainz
Germany

Gendered Technology, Changing Intimacy: Networked Communication in Transnational Families
Ting-Yu Kang
Kellogg College, University of Oxford
United Kingdom

The Scientific Culture: Attentive Public and Interested Public
Khosro Maleki
University of Metz
France

Gender Digital Divide among Professors: Are Universities Showing a Path for an Equitable Knowledge Society?
Judith Zubieta García
Instituto de Investigaciones Sociales, UNAM
Mexico
Nora Rocha Miller
Facultad de Ingeniería, UNAM
Mexico

Comparative Analysis of Scientific Literacy Scale by Gender
Roxana Toader
University of Bucharest, Romania
Romania

Session 17
Liberalizing Research in Science and Technology: Institutional and Policy Aspects, B

Friday 16 July, 17:45 - 19:45, Svenska Mässan G3

Chair
Nadia Asheulova
Centre for Sociology of Science and Science Studies, Russian Academy of Science, St. Petersburg
Russian Federation

Session details:

Administrative Action in Brazilian Free Software Public Policies
Daniel Guerrini
Renato de Oliveira
Universidade Federal do Rio Grande do Sul – Porto Alegre
Brazil

Innovations as New Opportunities for Economic Growth in Russia
Irina Eliseeva
Sociological Institute, Russian Academy of Sciences
Russian Federation

Limits and Prospects of Institutional Liberalization for High-Tech Policy: Russia Case
Svetlana Kirdina
Institute of Economics, Russian Academy of Sciences
Russian Federation

Socialization of Science Students in Indian Academia in the era of Liberalization
Madhav Govind
Centre for Studies in Science Policy, Jawaharlal Nehru University
India

China Needs to Reinforce the Governance of Nanotechnology
Nanyan Cao
Institute of Science, technology and Society, School of the Humanities and Social Sciences, Tsinghua University
China

Russia and Swedish Science: Comparative Statistical Analysis of Financial, Personnel and Gender Trends (1990-2005)
Alexander G. Allakhverdyan
Institute of the history of science and Technology, Russian Academy of Science
Russian Federation

Transition of Indian Firms in the Liberalization and Globalisation Era
Sujit Bhattachary
National Institute of Science Technology and Development Studies, India

Features and Tendencies of Scientific Institutional Cooperation between Russia and Mongolia
Tatiana Yusupova
Institute for the History of Science and Technology, St.Petersburg
Russian Federation

Diversity and Complementarity of National Sciences
Yu. I. Alexandrov
Institute of Psychology, Russian Academy of Sciences
Russian Federation

Innovation as Inter-Institutional Contests for Revaluing Assets and for Redistribution
Parthasarathi Banerjee
NISTADS, CSIR
India

"Open" or "half-open" Access?: Re-thinking Open Access Initiative (OAI) Policies
Jorge Machado
University of São Paulo
Brazil

Session 18
RC23/RC04 Changing Forms of University-Society Relationship, B

Saturday 17 July, 13:45 - 15:45, Svenska Mässan G3

Chair
Juha Tuunainen (RC23)
Department of Sociology, University of Helsinki
Finland

Co-Chair
Raj P. Mohan (RC04)
Auburn University
United States

Session details:

University-Environment Relationship in Finnish Universities - Contingencies in Space and Time
Maria Salmela-Mattil
University of Tampere
Finland

Transformation of Universities and Responses of Academy/Universities in Japan
Seiko Kitajima
Hirosaki University
Japan

Relatively Accountable: Shifting Meanings, Materialities and Practices of Accountability in Contemporary Universities
Ulrike Felt
Joachim Allgaier
Maximilian Fochler
University of Vienna
Austria

Knowledge Transfer beyond Patents and Scientific Articles
Nicole Schulze
Fraunhofer Institute for Systems and Innovation Research
Germany

Aiding Research Capacity: Abandoning or Strengthening the Linear Model?
Veronica Brodén
Linköping University
Sweden

RESEARCH ARTICLES

MULTIPLE TRAJECTORY EVOLUTION OF INFORMATION SOCIETIES

(Some Prospective Remarks and Reflections)

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Industrial technology and organization (e.g. machines, electricity, factory, mass production, Fordism) created rather universal patterns which are well-channeled and quite predictable. This technology assumes a constant flow of innovation from the Research and Development (R&D) sector to the industrial sector (which has increasingly organized its own labs). Industrial technology generated the *industrial society* in advanced regions of the world. Patterns of progress were quite clear: industrialization, modernization, and imitation. *Similarities* (philosophically interpreted as universalities) were evident and desirable. Industrial technology is the sign of a modern era, modern societies, and modern world. Such an interpretation of development is based on the *idea of progress* (as something inevitable, good, and deterministic) and theories of modernization (which means the quantitative and qualitative multiplication of mainly technological innovations, their wide diffusion and their mass impacts). Civilizational leaders (regions, countries, innovators, entrepreneurs, users) established patterns to be *imitated* by others who were not leading, who could only imitate. The results of imitators depended on their *cultural ability* to understand, perceive, apply, and use (in mass) new technologies as well as old technologies in the case of less developed countries). Therefore, incompatibilities, inefficiencies, and gaps emerged. Market mechanisms and international exchanges (technology transfer, trade of commodities, adoption of technical objects and skills by migrants, and so on) – it was believed and expected - should level existing differences and lead to *one future*. Some futurists, like H. Kahn in the 1970s, were quite optimistic about other countries catching up with the American model of development.

Deep beliefs in technology and its positive role were supported by convictions such as *technological determinism*, *technological imperative*, *technological fix*, and *technological optimism*. All detrimental effects were treated as necessary costs (on the altar of progress) and as something which could be managed somehow.

S*ingle trajectory* development based on technology was considered as optimal for all, and the world's *technological order* was established (and controlled) by a few. The model and vision of *technological society* was a kind of abstract construct or, in other words, the ideal type.

After the Era of Industrialism (or industrial technology dominance), the Era of Information appeared. Of course, what is often underestimated – the former segments of

economies and societies (like agriculture, traditional industries, old skills) – did not disappear. Processes of industrialization, urbanization, and motorization are still important, to a different extent, around the world. However, the *proportions* of these old and new emerging segments were changing, as were their importance, influence, and impacts. A new technological *substratum* came into existence, and moreover was connected with something as immaterial as information. Therefore, new info-technologies started their development, diffusion, and all-sphere applications. Their impacts in the traditional segments of the economy and society were immense as well. As a result, those impacts produced a new form of transforming society – an *information society*. This picture is somewhat oversimplified. It should be added that the new technologies – called ICTs – were based even more on science and research; however, other sets of disciplines become more important, such as physics, electronics, informatics, and computer science). The reflections of this *de facto* revolution – theoretically founded by J. D. Bernal in 1939, then developed by R. Richta and others in the 1960s and 1970s – were expressed in the suggested new labels (or rather etiquettes) marking the new societies: *computer society*, *telematic society*, *cyber society*, *information society*, *network society*, *virtual society*, *digital society*. Their characteristics were fundamentally different than in the case of the industrial societies. Sociology as a discipline emerged as the sociology of industrial societies, while present-day sociology is the sociology of information societies. The differences between these two kinds of societies are multi-dimensional.

The question is whether the new societies dominated by the production of ICT and their overwhelming applications and mass use will develop according to one universal pattern. It seems, for many reasons, that the *info-future* of societies can be very diversified, so it is better to use the plural form: info-futures (a few decades ago futurists begun to use "future" in plural to underline alternatives, options, and varieties of societal trajectories). New ICTs generate changes and diversities. Present ICTs created a new social space – *cyberspace* – which is not yet conquered and which will be arranged in a non-traditional way (mostly by younger generations), giving a way to almost unrestricted *network individualism*. Moreover, the Internet is a techno-social object (web) which cannot be fully controlled, and its expansion as a quite decentralized entity with open intelligence and an open system cannot be predicted (it is like a self-organizing cancer that continues to grow). This is a rather multitrajectory-oriented and quite indeterministic situation. Networked individuals and groups, rather than large structures like states, governments, or big companies, are trying to be more empowered, so unpredictable and individually profiled behaviors rather than structured policies will be of growing importance. Individuals use technical objects and devices (like computers or mobile phones) *individually,* but they are *networked* with other individuals. The Internet is borderless and multicultural, allowing for multi-identities and a constant change in relations, contacts, and points of reference; information and communication have become global and immediate (*online*). In the not distant future, VR technology will allow for the creation of *own worlds*. It seems that diversity is characteristic of the *e-society* ("e" accents its technological substratum – electronics). E-society can be treated as a *general techno-organizational framework* of societies under change and with increasing individualization and disintegration of the former bonds, relations, and networks.

Technologically pioneering countries are transforming themselves and their societies by creating the *first generation* information society (IS). Second generation IS will emerge

when new generations reach adulthood and are in power (political, economic, psychological, social, and so on). This generation will be based on so-called "digital natives" (born and raised in a digital setting – see G. Small 2008). The more digital natives there are, the more chances there are for further advances, so the differences among potentials of various countries will have a *demographic dimension*. This is a challenge for technical world leaders who have problems with the growing aging of societies (migration may help but it will cause some "alien" diversities).

The *technological embryos* of the information type of society were produced by science and technology as a universal chance and developmental occasion to capitalize on. Of course, there are pioneers, imitators, and lagging countries, as well as late-comers and those which have been excluded (we talk about the digital divide, which is not only technical but also organizational, educational, cultural, and so on). Basically, "digital" refers to technology. The question is whether it is possible to imagine and implement *alternative* e-societies and info-futures (see Zacher 2007). Some arguments for and against have been proposed, as discussed above.

To sum up: there are *differentiated potentials* (scientific, technological, educational, industrial), *various contexts* (domestic, international, global), and *diverse cultural abilities* in regards to informational change. All can make the future follow *multiple trajectories* in spite of some similarities and universalities (often superficial and expressed by the mass media). Gaps as well as *choices* and *external impacts* will be responsible for diversity, and it seems that diversity will outweigh universality. This can be treated as a sign of the new *postmodern era*. The modern era's features can be compared with the postmodern as shown in Table 1.

Table 1. Comparison of Characteristics – Modern vs. Postmodern Era

Modern era	Postmodern era
Growing speed of everything (faster, tyranny of time)	More dense world (nets of cables, networks, automobile and planes transport, cities, nanotechnology)
Rationality (general techno-economic)	Multi-criteria choices (many stakeholders, more information available)
Common goals and visions (more collectivity)	Individualism (multi-identity, transnational, individual centered)
Controllability (firm structures, state role)	Complex systems (unpredictable behavior)
Strategies (linear) (national, governmental, big business)	Global technological capitalism & turbocapitalism as framework (chaotics, changeability, unexpected emergencies, flexibility)
Traditional values and attitudes (historical heritage, tradition, strong social bonds)	Risk societies (openness uncertainty, cosmopolitanism, fear)
Hierarchical power based on firm structures (techno-structure, technocracy)	Networks of power and influence (e-government, e-governance, e-democracy, netocracy)
Internationalization and neoliberal (corporate) globalization (free competition, exclusion)	Globalizations (post-liberal, inclusive, imposed by alter-globalist movements, int'l organization and control)
Hegemonic world order or bi-polar (structured order, leadership, control)	Pole-less world order (post-hegemonic world, new emerging powers, anarchistic world system conflict and clashes)
Technology as universalization (standardization, common patterns)	Technology as source of diversity (multiple options and trajectories, different patterns)

Single-trajectory future (technological determinism, hegemony of pioneers, limited imagination, attempt to control)	Many info-futures (multi-trajectory evolution, digital natives as diversity, agents, changing contexts, uncertainties and flexible answers)
Economy (industrial economy, traditional structures and skills, overwhelming commercialization)	E-economy (new economy, digital economy, post-material)
Wars (based on arms and soldiers, conquests, world wars, mass destruction weapons)	Info-wars and terrorism (intelligent munitions automatic battlefield, logistic bomb, cyber-crimes, cyber-terrorism, local conflicts)
Cultural affairs (mass culture vs. elitist culture, traditional carriers, traditional values, nationalism, clash of cultures and religions)	Culture-networked and global (free culture idea, cultural populism in the Net, web2.0, cross-culturalism, global events and messages)

* * *

There are some paradoxes connected with civilization and political transformations and reconfigurations. Let us name just a few. As for the context of development, it should be noted that industrial technology and society emerged on the basis of *agricultural* technology and society. The information society (sometimes considered as the first stage of a knowledge society) developed from the *industrial* society (with differentiated scales of agricultural-type remnants in various countries). However, in some significant cases the *linear pattern* of civilizational and economic development was broken (developmental bifurcation). New emerging powers – China and India predominantly - have made the world *multipolar*, from the point of view of the economy, industrial production, and some advanced technologies (nuclear armaments, missiles, space exploration equipment, computers, and software). Moreover, their societies – in spite of evident backwardness and poverty – have become increasingly better equipped with technological goods (e.g. in China the number of internauts is bigger than in the U.S.). Both countries have science and technology centers or parks on the world level (e.g. in Beijing or Bangalore). Technicalities look similar but both countries differ from each other and follow the *non-Western* type of culture (the same case was earlier with Japan). What will their info-future be? Perhaps they will be the *e-enclave* type? Will they have an encouraging developmental model for others to follow? If so, to what extent? The Western historical and present patterns can be overcome or partially adapted or modified and sold in the world market of ideas, ideologies, and politics. *Global diversity* may increase even more, so the *civilization of diversity* may flourish in spite of similarities of technology, in spite of globalization and the efforts of former leaders and powers. They will not disappear; however, their meaning and impacts assume other proportions. Let us hope that this competition will not be a kind of armed clash of civilizations. In such conflicts, the role of ICTs will certainly be vital.

A change in leadership or at least in proportions among competitors will probably occur in the global economy, and in particular within the world of big corporations (both domestic and transnational). Non-Western large companies will find their place in the world market, and their aspirations, values, methods, and corporate cultures can be different than Western and increasingly influential internationally (in the places of their expansion, with reference to their multi-national staff – managerial, technical, and so on).

* * *

Apart from the existing diversities of countries and societies there will be some forces and

factors enabling even more diversification (the term *civilization of diversity* seems to match well with this situation). These forces and factors were rather underestimated in the stabilized and uniformized – by the absolute hegemons – world. Presently, it is more and more evident that things such as nation-state institutions and their conditions, roles, and performance count; the same refers, for example, to the scale and structure of migration (brain drain is a problem, also exclusion of immigrants). The role of ethnicity and language (even on the Internet) should not be overlooked. Traditions, customs, prejudices, religions (some are increasingly politicized and offensive), corrupted power, bureaucracy, and institutional disorder can hamper IS development even when state authorities and public administration increasingly use ICTs. E-government does not automatically mean democratic e-governance (see, for example, Zacher 2007). The Orwellian scenario is always possible, and the influence of the authoritarian regimes can reach democratic countries and impact the world order. Moreover, such regimes may dominate universal dimensions of IS development and make them degenerated (by ever-growing militarization, surveillance, censorship, and manipulation). The strategies and policies or even goals of IS development may be internationally (and over time) conflicting and contradictory, and clashes within the information civilization are very probable in this context.

The above-mentioned differences and divergent behaviors of IS development stakeholders empower a *multiple-trajectory* course leading to the future. This is illustrated schematically in Fig. 1.

Fig. 1. Multiple trajectories of IS development – A conceptual framework

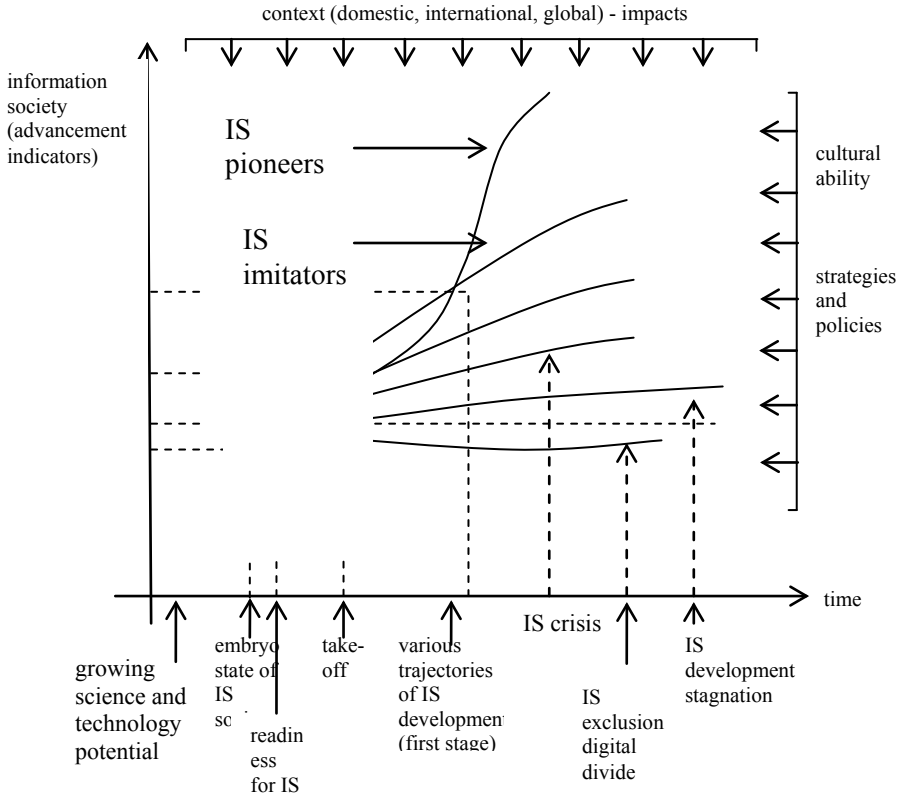


Fig. 1 illustrates possible trajectories of IS development over time. Some trajectories are steep, while some present decent growth and some others present crises in development. The worst cases are IS development stagnation and also exclusion. This is just a general picture indicating the dominating position of pioneers with future-oriented and aggressive strategies, great cultural abilities, and deliberately exploited (or overcome) contexts. Their advancement is fast and firm (sustainable). The IS development of imitators varies according to their capacities, factors, and contexts. Some countries (which can constitute a big part of the world) can have serious troubles expressed in crisis, stagnation, and even exclusion. The causes of these troubles vary – inadequate policies, low cultural ability to adopt and use ICTs, problems with negative effects of globalization, and so on. The "IS development lines" above in Fig. 1 show only the *shape* and *pace* of growth, as it is not possible to present in picture the qualitative "contents" of IS trajectories. This would require a detailed description of concrete cases or the construction of scenarios of the course of development (possible, desirable, and probable).
Models of IS development can be very general (see Fig. 2) or specific to a particular country or group of similar countries (see Fig. 3).

Fig. 2 General (universal) conceptual model of IS development

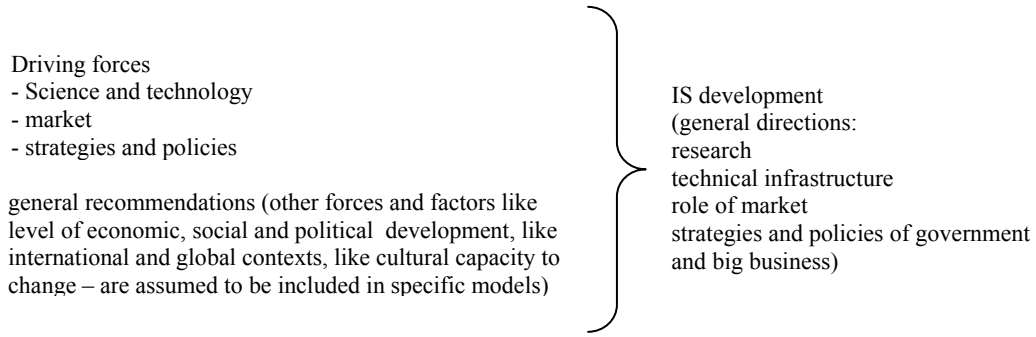
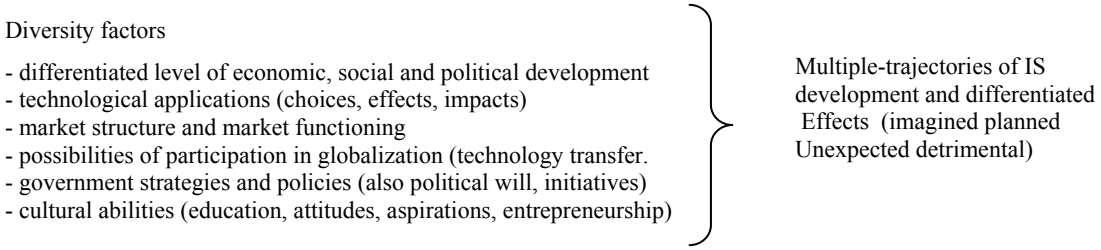


Fig. 3 Specific (diversification) conceptual model of IS development



* * *

In conclusion, it is important to properly estimate the forces, factors, and circumstances leading to diversity in IS development around the world. In spite of universalizing megatrends, there are real possibilities of various deviations and degenerations on national, international, and global scales. They directions of the megatrend

are not necessarily always positive. There will not be one single future for all, and global citizens will, at the same time, be *local* and *glo-cal* or parallel in various networks. Complexity, diversity, and multi-identity will shape their info-futures.

References

Bard, A., Söderqvist, J. (2000). *Nätokraterna – boken om det elektroniska klassamhället*. Stockholm: BookHouse Publishing.

Beck, U., Beck-Gernsheim, E. (2001). *Individualization – Institutionalized Individualism and Its Social and Political Consequences*. London: Sage.

Bell, D. (1976). *The Coming of Post-Industrial Society – A Venture in Social Forecasting*. New York: Basic Books.

Bernal, J. D. (1939). *The Social Function of Science*. London: Routledge.

Bugliarello, G. (1997). Telecommunities: The Next Civilization. *The Futurist*, vol. 31.

Castells, M. (2000). *The Rise of the Network Society*. Vol. 1, Second Edition, Oxford: Blackwell.

Castells, M. (ed.) (2004). *The Network Society*. A Cross Cultural Perspective. Cheltenhem: Elgar.

Coates, J. F., Mahaffie, J. B., Hines, A. (1997). *2025 – Scenarios of US and Global Society Reshaped by Science and Technology*. Greensboro, NC: Oakhill Press.

Currie, W. (2000). *The Global Information Society*. Chichester – New York: Wiley.

Davis, J. et al. (eds.) (1997). *Cutting Edge – Technology, Information Capitalism and Social Revolution*. London – New York: Verso.

Drucker, P. F. (1993). *Post-Capitalist Society*. New York: HarperBusiness.

Ellul, J. (1964). *The Technological Society*. New York: Vintage Books.

Ester, P., Vinken H. (2003). Debating Civil Society: On the Fear for Civic Decline and Hope for the Internet Alternative, *International Sociology*, vol. 18, no. 4, December.

Featherstone, M. (2000). *Technologies of Post-human Development and the Potential for Global Citizenship*. in: J. N. Pieterse (ed.) Global Futures – Shaping Globalization. London-New York: Zed Books.

Forester, T. (ed.) (1984). *The Microelectronics Revolution – A Complete Guide to the New Technology and Its Impact on Society*. Cambridge, Ma.: The MIT Press.

Friedrichs, G., Schaff, A. (eds.) (1982). *Microelectronics and Society For Better or For Worse*. Oxford-Frankfurt: Pergamon Press.

Gates, B. (1996). *The Road Ahead*, 2nd ed. London: Penguin Books.

Grin, J., Grunwald, A. (eds.) (2000). *Vision Assessment: Shaping Technology in the 21st Century Society – Towards a Reportoire for Technology Assessment*. Heidelberg: Springer.

Harman, W., Markley, O. W. (1985). *Changing Images of Man*. New York: Pergamon.

Harrison, L. E., Huntington, S. P. (eds.) (2000). *Culture Matters – How Values Shape Human Progress*. New York: Basic Books.

Hodgson, G. M. (2000). *Socio-economic Consequences of the Advance of Complexity and Knowledge*. in: *The Creative Society for the 21st Century*. Paris: OECD.

Jamison, A., Rohracher H. (eds.) (2002). *Technology Studies and Sustainable Development*. München – Wien: Profil.

Kerckhove de, D. (1997). *Connected Intelligence – The Arrival of the Web Society*. Toronto:

Somerville House.
Masuda, Y. (1981). *The Information Society as Post-Industrial Society*. Washington, D.C.: World Future Society.
Mattelart, A. (2001). *Histoire de la societé d'information*. Paris: Editions La Découverte.
May, Ch. (2002). *The Information Society – a sceptical view*. Cambridge: Polity.
Naisbitt, J. et al. (1999). *High Tech – High Touch: Technology and Our Search for Meaning*. London: Nicholas Brealey Publications.
Rheingold, H. (1993). *The Virtual Community: Homestanding on the Electronic Frontier*. Reading, MA.: Addison-Wesley.
Rheingold, H. (2002). *Smart Mobs – The Next Social Revolution – Transforming Culture and Communities in the Age of Instant Access*. Cambridge, Ma.: Basic Books.
Rifkin, J. (2000). *The Age of Access – The New Culture of Hypercapitalism Where All of Life is a Paid – for Experience*. New York: Jeremy P Tarcher/ Putnam.
Ritzer, G. (2000). *The MacDonaldization of Society*. London – New Delhi: Sage.
Rushkoff, D. (1999). *Playing the Future – What We Can Learn from Digital Kids*. New York: Riverhead.
Schiller, D. (1999). *Digital Capitalism*, Cambridge, Mass. – London: The MIT Press.
Schumacher, E. F. (1975). *Small Is Beautiful – Economics as if People Mattered*. New York – London: Harper & Row
Small, G. (2008). *iBrain: Surveying the Technological Alternation of the Modern Mind*. New York: HarperCollins.
Tapscott, D. (ed.) (1998). *Blueprint to the Digital Economy: Wealth Creation in the Era of E-business*. New York: McGraw – Hill.
Toffler, A. (1981). *The Third Wave*. London: Pan Books.
Toffler, A. and H. (1995). *Creating a New Civilization – New Directions. The Politics of the Third Wave*. Atlanta: Turner Publishing, Inc.
Virilio, P. (1998). *La bombe informatique*. Paris: Éditions Galilée.
Webster, F. (1995). *Images of Information Society*. London: Routledge.
Webster, F. (1995). *Theories of the Information Society*. London: Routledge.
Wellman, B. (1999). *Networks in the global village*. Boulder, Col.: Westview Press.
Wellman, B. (2001), Physical place and cyberplace: the rise of networked individualism, in: *International Journal of Urban and Regional research*, No. 1.
Woolgar, S., Ingram, C. S. (2000). Virtual Society? the social science of new technologies. *Assignation*, 17,2.
Zacher, L. W. (1995), The Unrealized Vision of Future: The Case of Radovan Richta Predictions, *Dialogue and Universalism*, vol. 5, nos. 11-12.
Zacher, L. W. (2000). *The Way Towards a Knowledge Society – Some Barriers not only for Countries in Transition*. in: G. Banse et al. (eds.) Towards the Information Society, Berlin – Heidelberg: Springer.
Zacher, L. W. (2001). *Between Risk and Trust – Values, Rules and Behaviour in the E-Society*. in: Innovations for an e-Society – Challenges for Technology Assessment, Berlin (conf. proc.), ITAS – VDI.
Zacher, L. W. (2007). *E-Transformations of Societies,* in: *Encyclopedia of Digital Government*, vol. II. Hershey – London – Melbourne – Singapore: Idea Group Inc.
Zacher, L. W. (2009). *Information Society Discourse. in: Encyclopedia of Information Science and Technology*. Second Ed. Hershey, PA.: IGI Global.

The Higher Scientific Competence – the More Opponents to Use New Technologies

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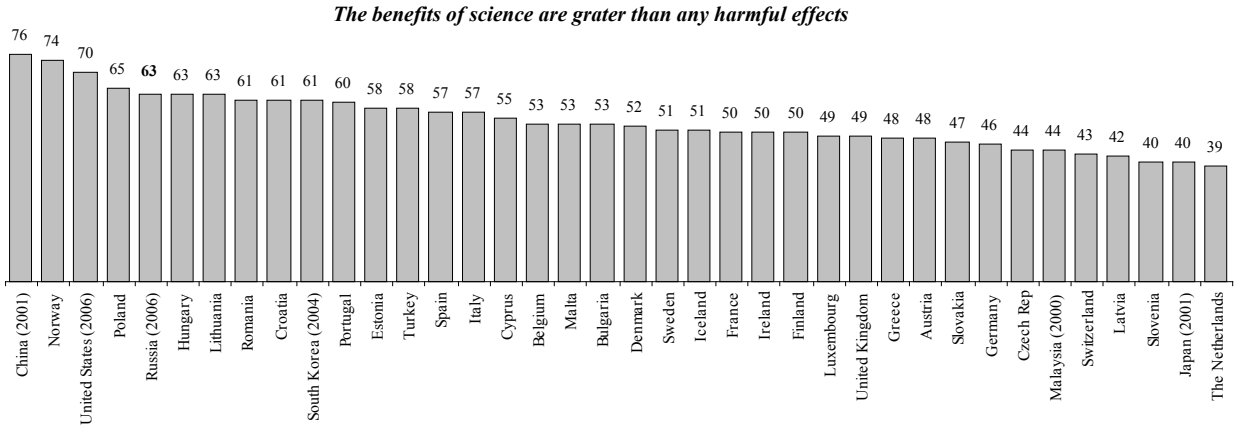
As a sociologist with natural science background and a strong supporter of pro-scientific views I was surprised by the fact that so many people are highly sceptical about long-term S&T development consequences. Comparison of surveys that have been conducted in 38 countries shows that in 16 countries (mostly in Western Europe) less than 50% of respondents believe that the benefits of science are greater than any harmful effects (Fig. 1).

Fig. 1. Integrated assessment of consequences of S&T development *(per cent of respondents)*



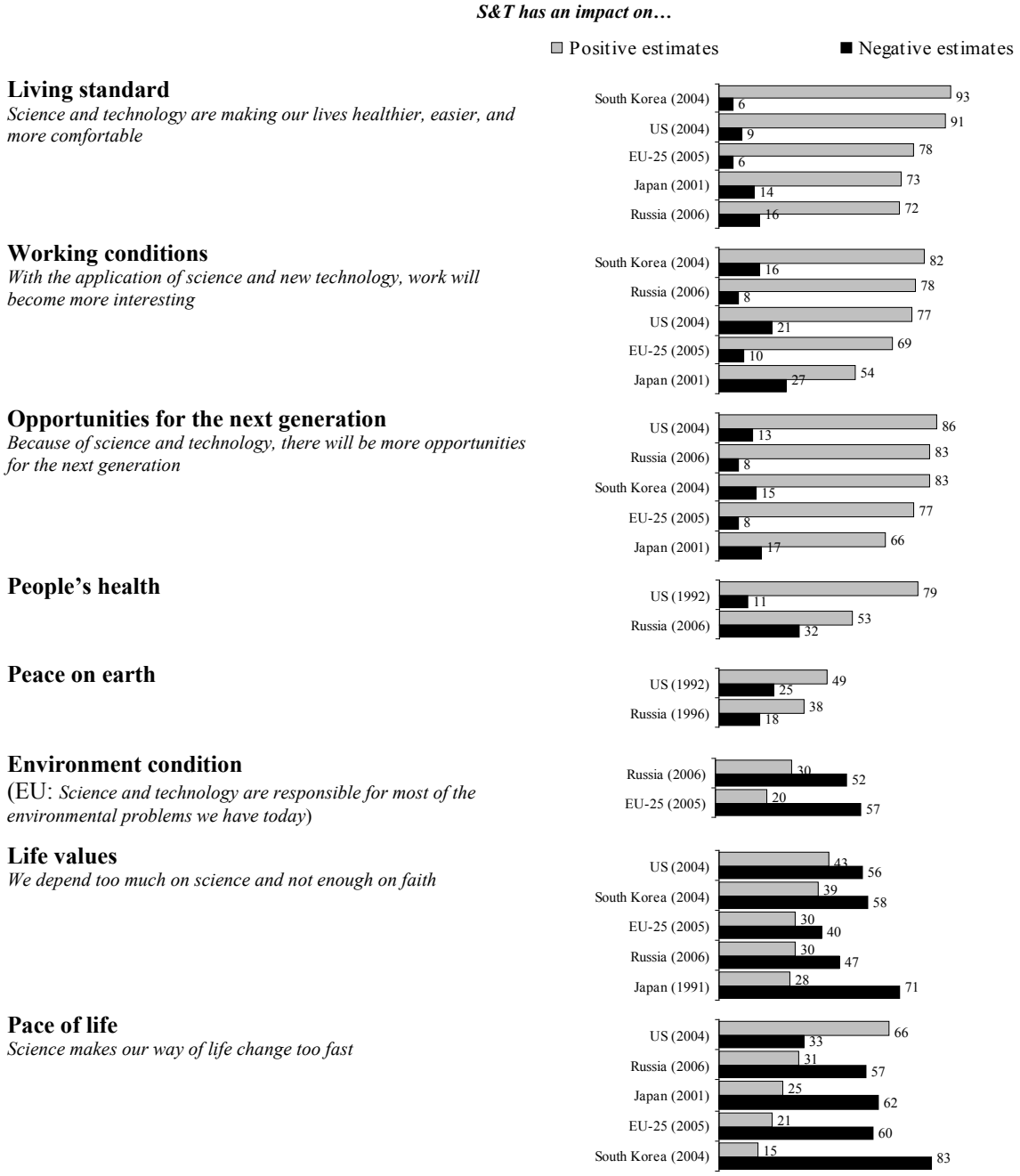
Sources: *Science and Technology Indicators in the Russian Federation; National Science Board,* 2006, 2008*; Eurobarometer 224*.

What are the components of this integrated assessment? The most positive opinion is about the impact of S&T development in the area of improving of the living standards, the working conditions, and opportunities for future generation (over 3/4 of adults gave the positive estimates, and less than 1/5 gave the negative ones). The assessments of the impact of science and technology on global peace were ambiguous; however, in this case positive opinions were approximately twice as much (Fig. 2). The most negative opinions had developed about the impact of science and technology on the environment, life values, and pace of life (less than 1/3 of adults gave the positive estimates, and more than one half gave the negative ones). Russians are also concerned about the negative impact of S&T progress on public health - 32% negative answers.

Is it possible to neutralize a negative side of the progress in science? Are the prohibitive measures acceptable? To find out how the population would react to such a measure as restrictions on some areas of scientific research, respondents were asked to comment on two statements: a positive and a negative one. From 21 to 36% of EU-25 citizens and 10% to 31% of Russian respondents supported complete freedom of scientific research. From 43 to 51% of Europeans and from 33% to 63% of Russian respondents supported restrictive measures (Fig. 3). To put it in other words, at least two in five citizens

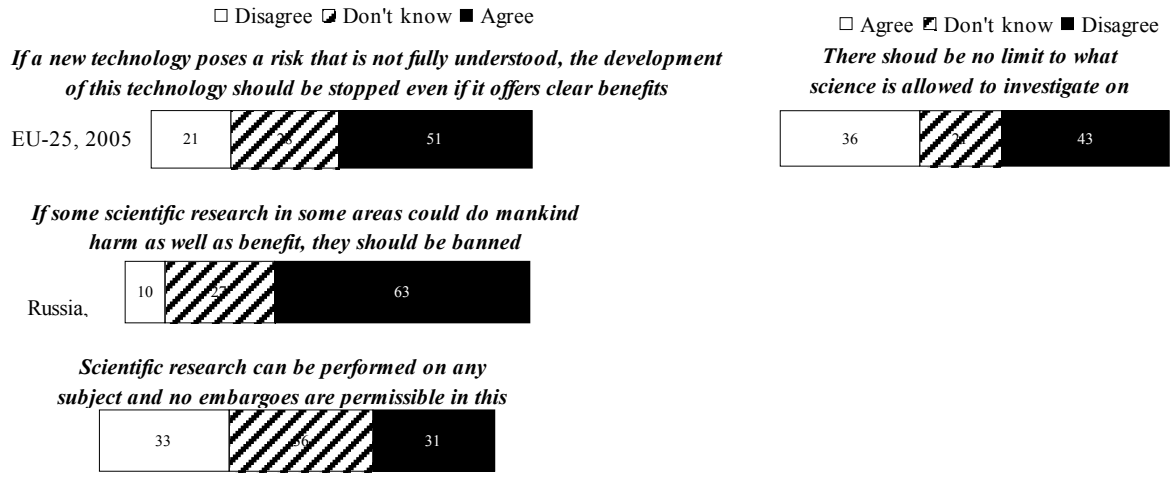
of EU and one in three Russians would support a ban of those research areas that may harm humankind, and only two in ten Europeans and one in ten Russians firmly stands on the position of unrestricted freedom of scientific research.

Fig. 2. S&T impact on people's health and environment *(per cent of respondents)*



Sources: *Science and Technology Indicators in the Russian Federation*; *National Science Board*, 1992, 2006*; Eurobarometer 224*.

Fig. 3.Opinions on embargo against scientific research in specific areas (*per cent of respondents*)



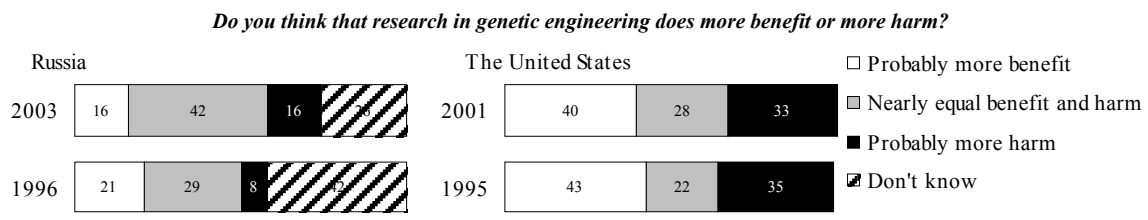
Sources: *Eurobarometer 224; Gokhberg and Shuvalova.*

There are three areas of the most intense debates: the use of nuclear power, GMO and cloning. Nuclear facilities usually have local impact, and the world community succeeded in non-proliferation of nuclear technologies, while the genetic changes still can get out of control, and public debates occur in parallel with basic research.

Let's consider how the attitudes towards biotechnology have been changing with the progress in research in this area. In 1997 the cloning of Dolly the Sheep got a lot of media attention. Though this event has been generally represented as a success story of genetic engineering for animal husbandry, many ethical problems began to rise, including those related to future of the human cloning. However, Russian respondents have shown little interest in this subject: 42% of those interviewed were undecided as to what would prove most important in the end, namely benefit or danger from such studies (Fig. 4). The number of pessimists was insignificant (8%), Skeptical (both beneficial and dangerous – 29%) and optimistic (21%) forecasts prevailed.

Then media attention was galvanized by a sensational declaration of Dr. Richard Seed on human cloning in the near future. And the general evaluation of the achievements of genetic engineering became more skeptical: the majority of the respondents stated that genetic engineering is both beneficial and dangerous (42%), the number of respondents who consider it dangerous became the same as the number of those who viewed it as beneficial (16%).

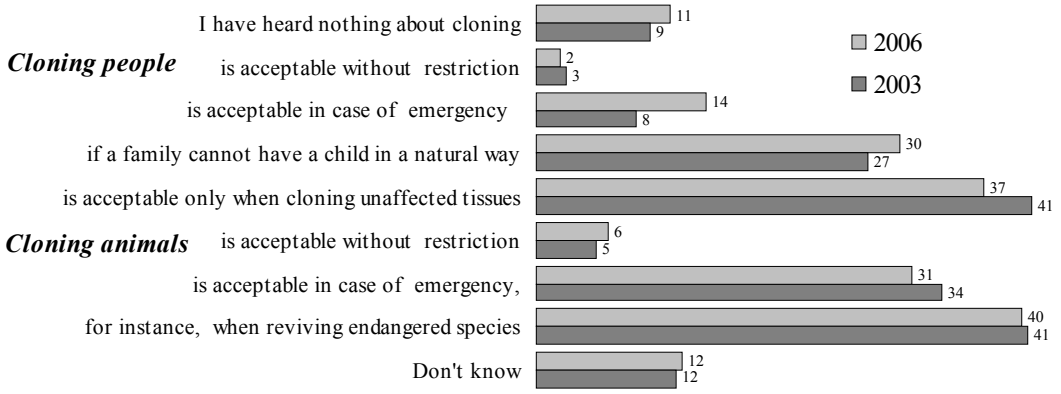
Fig. 4. Assessment of the consequences of genetic engineering development (*per cent of respondents*)



Sources: *Gokhberg and Shuvalova; National Science Board, 1995; National Science Board, 2002.*

And in 2003 the majority of people had already made up their minds about cloning. This opinion turned to be negative and rather rigid. In Russia 41% of the respondents are convinced that cloning of people or animals is unacceptable under any circumstances. Among the 'cloning advocates', only 3% approve of such techniques being applied without any moral restriction with respect to people and 5% with respect to animals (Fig. 5). In 2001 the opinion in European countries was much more rigid: 90% of those surveyed opposed human cloning and 64 percent opposed animal cloning. The US respondents expressed a more positive opinion, particularly toward animal cloning – 47% of respondents would support *cloning animals such as sheep whose milk can be used to make drugs and vaccines*, and those who would oppose it constituted 48% [National Science Board: 2002].

Fig. 5. Opinions on cloning in Russia (*per cent of respondents*)



Sources: *Science and Technology Indicators in the Russian Federation*; *Gokhberg and Shuvalova*.

Now the opinion has been softened, at least toward medical application. In 2003 only 8% of Russians would allow a naturally unfertile married couple to clone, in 2006 - 14%, and if one partner has a genetic disease – 51% (in EU – only 35%). In 2003 27% of Russians would permit cloning tissues to treat affected organs, and in 2007 - 75%, and in EU countries - 72% (table 1).

The news on cloning polarize the society as supporters versus opponents of this technology. There are economical and political reasons behind widely publicized declarations to attract the public attention. On the economy side there is an emerging market of new medical services (the demand for these services will be enormous, especially, in those countries with strong feministic movement and with liberal attitude to gay and lesbian rights). On the political side there is a new area to mobilize electoral support and to gain votes, as illustrated by a populist slogan "Embargo against cloning". Science was lost in these debates. Does the support of new technologies, having ambiguous societal attitude, depend on public awareness of science?

The results of the last representative surveys in 32 European countries (2005, presented in the Eurobarometers) and in Russia (2006–2007, Higher School of Economics) may help us to answer this question.

The Eurobarometer 225 represents what do European citizens think about acceptability of 22 future applications of science and technology. We chose 15 applications

comparable to Russian survey – from technology *Protecting and re-introducing in their natural environment wild animals that are now nearly extinct*, which rises minimum opponents, to technology *Cloning human beings so that couples can have a baby even when one partner has a genetic disease*, which collects 59% opponents in EU-25 and 35% in Russia (Table 1).

Table 1. The opinion on approving the usage of possible future applications of science and technology *(per cent of respondents)*

The share of those who approved (*approved in all circumstances + only if it is highly regulated and controlled + only in exceptional circumstances*) versus the share of those who answered *never*

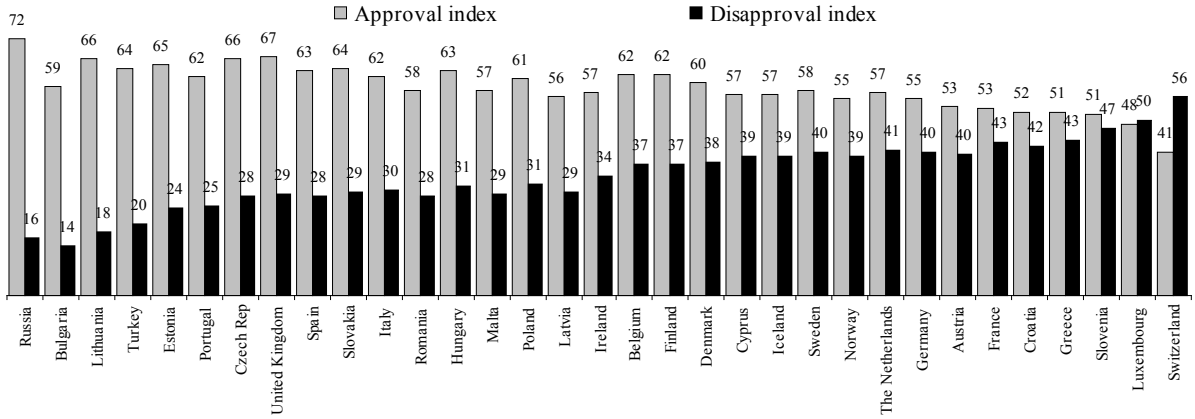
	EU-25, 2005	Russia, 2007
Protecting and re-introducing in their natural environment wild animals that are now nearly extinct	89 (46+33+10) : 7	87 (34+38+15) : 5
Developing genetically modified bacteria that could clean up the environment after environmental catastrophes	76 (20+37+16) : 19	84 (26+42+16) : 6
Storing everyone's genetic data so that criminals can be caught easily	74 (26+33+15) : 21	82 (22+43+17) : 8
Cloning human stem cells from embryos to make cells and organs that can be transplanted into people with diseases	72 (11+41+20) : 22	75 (20+36+19) : 12
Cloning animals such as monkeys or pigs for research into human diseases	65 (8+35+22) : 31	66 (14+30+22): 21
Using genetic testing to produce a child that could act as a born-marrow donor for a brother or sister who has a life threatening disease	64 (11+28+25) : 31	62 (12+27+23) : 22
Storing all the genetic data of our population in data banks in order to study the genetic causes of human diseases	61 (20+41+15) : 17	85 (26+44+15) : 5
Developing genetic treatments to get rid of people's bad habits like smoking or alcoholism	61 (15+29+17) : 33	87 (31+39+17) : 5
Developing for everybody a genetic test that would tell us about diseases we might get, even if we cannot do anything about them	61 (14+27+20) : 34	87 (32+40+15) : 4
Developing genetically modified crops to increase the variety of regionally grown foods	56 (8+31+17) : 37	60 (13+31+16) : 26
Developing a genetic treatment that would prolong our expected life span by 25 years	52 (12+26+14) : 42	82 (25+39+18) : 8
Developing for children a genetic test that would identify their talents and weaknesses	41 (6+19+16) : 54	65 (14+28+23) : 22
Implanting into our brain a tiny computer cheap that would improve our memory	41 (6+17+18) : 54	59 (10+24+25) : 28
Growing meat from cell cultures so that we do not have to slaughter farm animals	36 (6+18+12) : 54	48 (9+22+17) : 36
Cloning human beings so that couples can have a baby even when one partner has a genetic disease	35 (4+15+16) : 59	51 (7+20+24) : 35

Sources*: Indicators of Innovation in the Russian Federation, Eurobarometer 225*.

We have noticed that the opinion on the approval rate of using some new technologies had been more negative in some countries, and more positive in the other countries. For example, the highest shares of those who answered *never* were in Switzerland (also in Slovenia, Greece, Croatia and Germany). On the contrary the most positive opinions were observed in Russia, United Kingdom, Czech Republic and Turkey.

Then we have calculated two indicators for each country – approval index and disapproval index – as an average share of supporters and opponents (Fig. 6).

Fig. 6. The proportion of supporters and opponents on 15 particular technologies in 33 European countries *(an average share, per cent of respondents)*



Then we selected 20 indicators from Eurobarometers 224, 225, 236 (Table 2). The analysis has revealed a strong direct correlation between the average share of opponents (not supporters!) of 15 particular technologies, by country, and four indicators of public awareness of S&T: the level of scientific literacy (0,611), the share of respondents, who demonstrated a high level of interest in scientific discoveries (0,683), in new inventions and technologies (0,631), and who consider astrology as pseudoscience (0,643). On the contrary, the share of "supporting" respondents (in all circumstances, or - more frequently - only if the usage of technologies is strictly regulated and controlled, or only in exceptional circumstances) has a feedback correlation with that same indicators, although this correlation is not that strong (-0,209, -0,487, -0,444 and -0,346).

Table 2. The degree of dependence between the share of supporters/ opponents on new technologies and indicators of public awareness of S&T

Indicators of public awareness of S&T	Pearson correlation*	
	Disapproval index	Approval index
The share of respondents, who demonstrated *a high level of interest in scientific discoveries,* N=33 countries	**,683**	**-,487**
The share of respondents, who consider that *astrology is not a science at all*, N=33 countries	**,643**	**-,346**
The share of respondents, who demonstrated *a high level of interest in new inventions and technologies*, N=33 countries	**,631**	**-,444**
The level of scientific literacy **, N=33 countries	**,611**	-,209
The share of respondents, who consider *We depend too much on science and not enough on faith* N=33 countries	**,537**	-,163
The share of respondents, who disagree *The benefits of scientific research outweighed the harmful results* N=33 countries	**,539**	-,288
The share of respondents, who consider *The benefits of scientific research outweighed the harmful results* N=33 страны	**-,430**	**,380**
The share of respondents, who disagree *It is not important for me to know about science in my daily life* N=33 countries	,301	-,062
The share of respondents, who disagree *Research conducted by industry is well controlled and regulated* N=32 countries	,176	,037
The share of respondents, who agree *Research conducted by industry is well controlled and regulated* N=32 countries	,302	-,230
The share of respondents, who consider *Government R&D funding is insufficient* N=33 countries	-,198	,158
The share of respondents, who disagree *Scientific research, even though not yielding immediate profit but increasing human knowledge, should receive financial support from the government* N=33 countries	,294	-,276
The share of respondents, who consider *Science makes our way of life change too fast* N=33 countries	,166	,081
The share of respondents, who consider *Because of science and technology, there will be more opportunities for the next generation* N=33 countries	-,132	,201
The share of respondents, who consider *Innovative products or services often simplify everyday life* N=30 countries	,323	-,339

The share of respondents, who consider *Purchasing an innovative product or service is risky for the consumer* N=30 countries	,204	-,297
The share of «*enthusiasts*» N=30 countries	,036	-,104
The share of «*attracted*» N=30 countries	,258	-,246
The share of «*reluctant*» (conservators) N=30 countries	-,195	,326
The share of «*antiinnovators*» N=30 countries	-,074	-,058

*Pearson correlation indicates the degree of linear dependence between two variables. It changes from +1 (direct linear relationship) to -1 (feedback linear relationship), if the variables are independent then the correlation is 0.

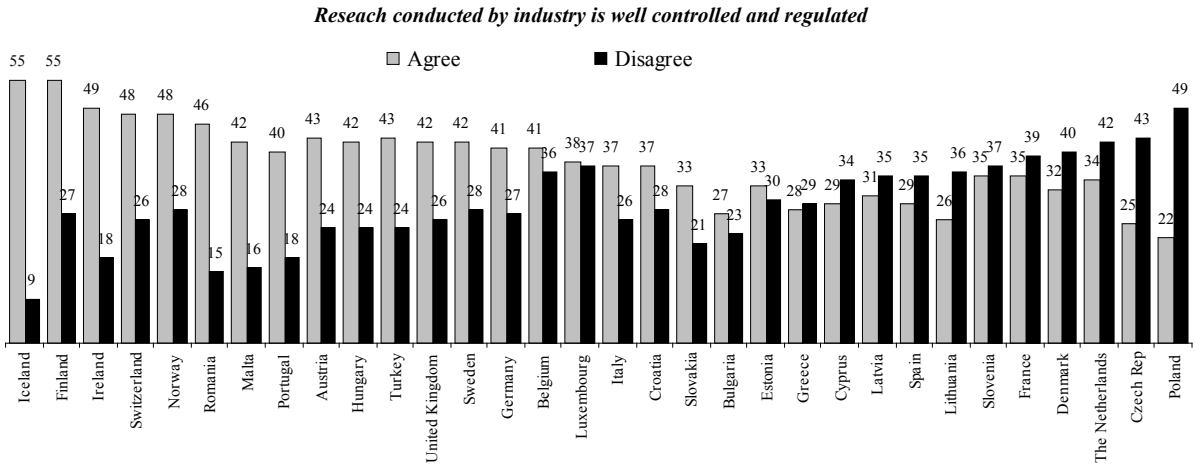
** An average share of correct answers on 7 tests (Human beings, as we know them today, developed from earlier species of animals, Electrons are smaller than atoms, All radioactivity is man-made, Antibiotics kill viruses as well as bacteria, The centre of the Earth is very hot, Lasers work by focusing sound waves, The continents on which we live have been moving for millions of years and will continue to move in the future).

Sources: *Science and Technology Indicators in the Russian Federation*; *Indicators of Innovation in the Russian Federation; Eurobarometers 224, 225, 236*.

Thus, the higher is the level of public awareness of science in the country, – the more is the share of opponents to use the new technologies. May have it been true, is it not required for the public to care about the science? Or, as it was formulated by George Orwell, is ignorance really a strength? No, in no way!

Considered phenomenon shows that there is a competent worriment in the society as to uncertain consequences of cloning and some other new technologies and there are doubts about the effectiveness of control over their usage. Thus, only 36% of the Europeans agree with the statement *Research conducted by industry is well controlled and regulated*, while 32% disagree. Maximum trust was demonstrated in Finland and in Iceland – 55%, maximum distrust – in Poland – 49 (Fig. 7). In Russia when asked: *Who most often is responsible for the negative consequences of scientific achievements?* a majority of Russians blame politicians, all levels of government, and officials (38%). Notably, among highly educated respondents this opinion is shared by one in two. Personnel involved in the operation of dangerous systems and scientists were referred to significantly less often (12 and 9%), while architects and construction workers were most seldom to blame (Fig. 8).

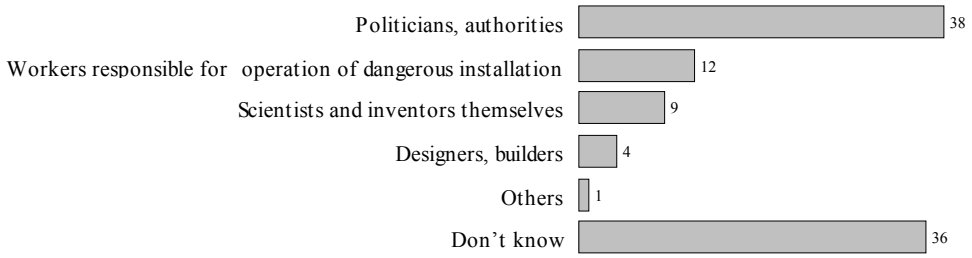
Fig. 7. Trust in controlling and regulation of new technologies
(per cent of respondents)



Source: *Eurobarometer 224*.

Fig. 8. Who are, in the Russian population's opinion, to blame for harm caused by S&T progress? 1997
(per cent of respondents)

Who are mostly to blame for harm caused by S&T progress?



Source: *Gokhberg and Shuvalova*.

Then I measured the correlation between the share of those who was disagreeing with the statement *Research conducted by industry is well controlled and regulated* and the disapproval index, but this correlation was not strong (0,301, see Table 2). This may tell us that in such countries as Finland, which enjoy a combination of very advanced new technology development, and of high level of public awareness of science, over the process of innovation is under control, and so people have high confidence in it, but worriment is focused on lack/failure of such a control in other countries, which a potential for worrisome consequences for humankind.

Thus the problem of building up the public trust must be solved by increasing the accountability and competence of decision-makers, and by increasing the level of civic scientific literacy of the population. The society and scientists must collaborate in improving methods how to control the use on new technologies– both in acceptability industry and on international stage. And at same time the scientific knowledge should be popularized, for only educated citizens are ready to assume social responsibility.

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References

Gokhberg, L., Shuvalova, O. Russian Public Opinion of the Knowledge Economy: Science, Innovation, Information Technology and Education as a Drivers of Economic Growth and Quality of Life. 2004. The British Council.

Science and Technology Indicators in the Russian Federation*:* 2007. Data book. HSE, Moscow. (in Russian)

Indicators of Innovation in the Russian Federation*:* 2008. Data book. HSE, Moscow. (in Russian)

Eurobarometer 224. Europeans, Science and Technology. 2005. Office for Official Publications of the European Communities, Luxembourg.

Eurobarometer 225. Social values, Science and Technology. 2005. Office for Official Publications of the European Communities, Luxembourg.

Eurobarometer 236. Population Innovation Readiness. 2005. European Commission, Research Directorate-General, CORDIS, Luxembourg.

National Science Board. Science and Engineering Indicators – 2008, 2006, 2002, 1992. US Government Printing Office, Washington.

Endangered and dangerous individuals. Genetic testing as a "subcellular panoptism"

Thomas Lemke

Today, the talk about genes has become an important part of media and everyday communication (see Nelkin/Lindee 1995; van Dijck 1998; Duden/Samerski 2007). As familiar as we may be by now with the genetic discourse, the question may still be asked how the continual talk about genetic dispositions, risks, or diseases fits in with a social climate characterized by the omnipresent call for self-responsibility and taking care of oneself. What is the relationship between genetic rationale on one side and political demands for mobility, flexibility, and autonomy on the other? Are not genetic dispositions nonnegotiable, *a priori* to individual action and decision-making processes and thus beyond influence? What is the connection between these two aspects – biological destiny and freedom of the will?

My thesis is that instead of granting exoneration from institutional expectations the debate concerning genetic information constitutes an arena in which autonomous subjects come forward – or do not come forward. In the act of controlling genetic risks, modes of self-government are linked to the government of others (cf. Foucault 2000a), and individual preferences remain coupled with collective norms. Instead of proceeding on the assumption of dissociation, their interaction is to be pointed out here.

In the following I will illustrate this thesis by referring to some empirical trends in different social areas. I shall begin with the field of medical genetics in order to outline the contours of "genetic self-responsibility", using statements from bioethicists and representatives of the medical profession. The next section will deal with the popularization of genetic knowledge through how-to-literature using a selected example. Finally, some possible bearings of the genetic discourse upon criminal justice and the social treatment of deviance will be discussed under the heading of "The return of the dangerous individual".

1. Contours of genetic self-responsibility

"Self-responsibility" and "personal responsibility for health and provision" are rated very highly in the current health system and policy of prevention. The call to meet individual genetic risks through individual responsibility is not a breach with this (health) policy, but its continuation. The personal will to good health ought not to be limited to matters of lifestyle such as smoking or the consumption of alcohol, but should include the "responsible" dealing with genetic information. This is documented by the statements of eminent representatives of the medical profession and of bioethics as well as by the self-presentation of genetic testing companies (cf. Höhn 1997; Fogarty 2004).

From this perspective genetic knowledge is regarded as empowering, replacing fate with the freedom to choose between several options. While formally a right to non-knowledge is respected, this right is increasingly being ruled out in bioethical literature. Only those who draw the right conclusions from genetic knowledge can claim to act autonomously, i.e. those who accept the imperative of risk prevention and self-surveillance. As Rosamond Rhodes has put it: „[W]hen genetic information is likely to make a significant difference in my

decisions and when the information is obtainable with reasonable effort, I have no right to remain ignorant. From the recognition of my own autonomy, I have a duty to be informed." (Rhodes 1998: 18)
While the principles of autonomy and non-directiveness are upheld in principle in genetic counselling, it is also clear that some decisions do not qualify as "rational" or "reasonable". To seek and acquire knowledge about genetic risks and engage in preventive action comes to stand out as the "right" way to relate to oneself (cf. Koch and Svendsen 2005). In this perspective, all those people look genetically irresponsible who fail to show the will or the ability to understand and use genetic information for reproductive decisions and health options. The genetic enlightenment vision of the mature and responsible patient therefore does not mean that affected persons' are able to make decisions in line with their own preferences and values. To the contrary, the rationality and moral integrity of the decisions made will be measured against whether they lead to a reduction of genetic risks for the individual and society (cf. Sass 2003).

2. Practical Advice for a Rational Conduct of Life: Genetic Guides as Government Literature

In recent years a series of guides has been published which put a central focus on the appropriation and dissemination of genetic knowledge (Lemke 2006). The spreading and turning of genetic diagnosis into a household commonplace is reflected in these guide books in a twofold way. On one side patients and "individuals at risk" – thus all readers – are conceptualized in health guides as "customers" who ask specifically for genetic information and medical services, such as in the case of a book titled *Does It Run in the Family? A Consumer's Guide to DNA Testing for Genetic Disorders* (Teichler Zallen 1997; Milunsky 2001). On the other side, the use of genetic screenings breaks away from a more or less specific suspicion of disease and is increasingly used for the screening for general health dispositions and risks relating to the lifestyle. Thus, for instance, in wellness and diet guides issues of personal genetic constitution play an increasing important role (Bland/Benum 1999; Hesch/Bosch 2001; De Busk 2003; Huber/Klentze 2005),
However, there are also general guides outside the medical context which provide information on the meaning of genetic factors for life decisions and issues of everyday life. Among those features the book *Mean Genes – From Sex to Money to Food: Taming our Primal Instincts* by Terry Burnham and Jay Phelan (2000). The thesis it starts from – though hardly original – is that the instincts we inherited from our ancestors and which secured their survival in the context of the Stone Age are ill-adjusted to life in our modern age and thus lead to a variety of problems. This guide maintains the conviction from evolutionary biology that with regard to our genetic layout we are "still cavewomen and cavemen" (2000, p. 246). The causes of a variety of personal shortcomings and everyday problems from unfaithfulness to idleness, from greed to drug addiction, are attributed to genetically-fixed behavioural dispositions. The putative free will, according to the authors, is inevitably over-determined by genetic factors, and the "I" not king of his own castle. In making these claims the authors are not advocating, however, genetic determinism; quite to the contrary they see their book as a recommendation for self-discipline and as a measure for resisting genetic programming. Genes are understood not only as the cause of behavioural shortcomings and

inner struggles, but also as the "tools" (ibid., p. 248) with which to fight them.
Thus the authors outline an agonistic concept of the self in which the "I" keeps watch over "its genes", and controls, contains, or rejects the archaic natural appetites resulting from them. The individual's moral and social competence manifests itself in whether or not and to what extent he or she is successful in this task. To some degree, in fact, the "I" only becomes manifest in this act of control and taming of the genes. The subjects' rational conduct of life permanently threatens to fall back to outmoded behavioural patterns of the past. Only those individuals who display a competent engagement with their genetic heritage may succeed as subjects. The rest – thus the argument of the authors could be continued – remain at the same developmental stage as the Stone Age men, which evolution has left completely untouched. How one deals with one's genes, it seems, is a kind of Litmus test which indicates a subject's moral autonomy and self-control.
In this approach, the liberal subject assumes shape in controlling natural dispositions, in the knowledge about internal resistances against a rational conduct of life, and in dealing actively with one's genes (cf. Valverde 1996). Freedom, thus, is not the antithesis of nature – on the contrary: only in the struggle with inner nature, with appetites and inertia, is the autonomy of the subject revealed. The authors' metaphor of the "genetic stage" (Burnham and Phelan 2000, p. 3) indicates: though the genes are the stage on which the play takes place, the kind of play enacted – whether it is a comedy or a tragedy – is up to the individual.
This, of course, requires the individuals' general ability to assume social roles. But what about those whose Litmus test turns out negative? How are these cavemen, who populate modernity but fail to live an autonomous life, to be dealt with? Alongside the endangered individual a second character appears on the (genetic) stage: the dangerous individual.

3. The return of the dangerous individual

It does not suffice to appeal to the subjects' responsibility; first it must be clarified whether they are fundamentally capable of accepting responsibility. Accordingly, the bioethicist Sass calls for "responsibility competence" (1994: 350) in dealing with one's genome. The danger inherent in this conception of responsibility is to search for the objective foundation for subjective competence in responsibly dealing with one's genetic information again in biological factors. Consequently, the question emerges whether there are subjects who, owing to their (genetic) constitution, find it more or less difficult to act responsibly. Conversely, the question can be asked whether there are biological prerequisites for responsible action. This notion is illustrated by a medical study which concludes that "risk behaviour", such as smoking, drug consumption, and alcoholism, is genetically conditioned (Bhattacharya 2003). Hence, there are not only genetic risks that predispose one toward certain illnesses, but there are also genes which predispose a person toward "risk behaviour" relevant to disease. Outside the medical context behavioural geneticists are searching for genetic peculiarities which go to make some people more prone to violent, criminal, or anti-social behaviour than others (Ciba Foundation 1996; Wasserman/Wachbroit 2001; Caspi et al. 2002; Craig 2007). This research raises the question whether individuals with specific genetic properties have the same capacity as others to act autonomously and to make responsible decisions.

Particular relevance is lent to this question in the context of legal judgement and attributions of accountability. Thus, the concepts of culpability and legitimate punishment could conceivably be called into question if it is assumed that behaviour is determined or at least predisposed by biological-genetic factors. This, however, apparently is not the case. The re-emergence of biological explanations in criminology and criminal justice does not remotely result in the relativization of accountability and culpability. Rather, they "are bound up with a new 'public health' conception of crime control. In these strategies, socio-political interventions are legitimated not in the language of law and rights, but in terms of the priority of protecting 'normal people' against risks that threaten their security and contentment." (Rose 2000: 7)

This new prevention strategy, which aims at the protection of the public and the avoidance of future crime, has already resulted in a significant increase of the population of offenders considered to be dangerous to society. While in the Western part of Germany 1995 2.902 persons were living in psychiatric hospitals because of their assumed "dangerousness for the general public", the number increased to 5.917 in March 2006 (Krauth 2008: 10). It is quite difficult to explain this surprising trend in some accumulation of danger to the public. It seems rather plausible to account for this rise by investigating the transformation of prevention strategies that more and more operate with the idea that certain offenders, because of their biological design, respond neither to social rehabilitation nor to medical therapy. (cf. Klingst 2003)[1]

The popularity of DNA analysis arises not only from its professed technological superiority over traditional methods of identification (cf. with a critical assessment: Pugliese 1999; Cole 2001; Gigerenzer 2002: 161-183; Liptak 2003). The so-called "genetic fingerprint" is not merely a forensic instrument capable of identifying a person as the offender by comparing evidence secured at the crime scene with details from genetic analyses; rather any DNA analysis nourishes the suspicion that there is a connection between the offender's genetic profile, secured after the offence and used for its solution, and the origin of the offence itself: Do the offenders' natures possibly precede the crime, and is the latter perhaps only an expression of a biologically determined personality? Is it possible that the offenders had no choice but to commit a crime, because they are "born criminals"? (cf. Rafter 1997; Blech 2003)

4. Conclusion

Quite different from the criminology of the late 19th century, which assumed that criminals formed a certain kind of race with outwardly visible signs of delinquency which were clearly identifiable through, for instance, phrenology, the behavioural genetics of today believes the traces of deviance, aggression, and cruelty are located within the body. Nikolas Rose (2000) notes a "new biology of control", which in contrast to the eugenic practices of the past is not so much interested in certain populations characterized by unchangeable and visible peculiarities, but rather focuses on "individuals at risk"– that is, potentially all

[1] On the history of the „dangerous individual" see Pratt 1995; McCallum 2001; Foucault 2000b; Krauth 2008.

members of society. Following this logic of control are the recurring calls of politicians to secure DNA samples of every citizen, in order to be able to prevent or to solve future criminal offences (Spiegel Online 2001; Jeffrey 2003; Patalong 2005). Thinking further along these lines: Should people outfitted with "defective" genes or a "diseased" brain perhaps be put away into mental institutions on grounds of prevention based upon genetic or neurobiological diagnoses before they can commit a criminal act? (cf. Kröger 2005) Would it not be sensible to test every newborn for genetic risks of common diseases immediately after birth in order to run targeted preventative measures, thus saving medical costs?
These claims may sound exaggerated and their future implementation may seem doubtful, yet they merely represent an ultimate consequence of the current logic of risk and prevention. The latter is characterized by the continuum of a control strategy which nevertheless exhibits an internal differentiation and channelling. It features the responsible subject and responsibility without the subject. The former are the addressees of the genetic responsibility discourse: mature subjects who pursue rational health management and (are supposed to) use genetic knowledge for their family planning, prevention of diseases, and conduct of life. The latter stands for individuals with a propensity towards aggression or antisocial behaviour and who need to be "readjusted" in terms of biochemistry and pharmacology, without being held wholly responsible for "their" offence. They are "handicapped" with genetic and environmental risks such that they represent a constant threat to others or for society as a whole. In this vision of the future, genetics represents a kind of "social medicine" in which illness and deviance point to biochemical and genetic disorders, which can be diagnosed and neutralized by medicine. It is the promise of this medicine that it will effectively prevent future illnesses and behavioural disorders. The paradox, however, is that it can only deliver on that promise by turning all members of society into patients.

Literature

Bhattacharya, Shaoni 2003: »Genes linked to high-risk personalities«, in: *New Scientist,* June 17, 2003.

Bland, Jeffrey S./Benum, Sara H. 1999: *Genetic Nutritioneering. How You Can Modify Inherited Traits and Live a Longer, Healthier Life*. Los Angeles: Keats Publisher.

Blech, Jörg 2003: »Spurensuche im Täterhirn«, in: *Der Spiegel* No. 2, 125.

Brand, Angela/Dabrock, Peter/Paul, Norbert/Schröder, Peter 2004: *Gesundheitssicherung im Zeitalter der Genomforschung. Diskussion, Aktivitäten und Institutionalisierung von Public Health Genetics in Deutschland* (Report commissioned by the Friedrich-Ebert-Foundation). Berlin: Friedrich-Ebert-Stiftung.

Burnham, Terry/Phelan, Jay 2000: *Mean Genes. From Sex to Money to Food: Taming our Primal Instincts*. New York: Perseus Pub.

Caspi, A., McClay, J., Moffitt, T., Mill, J., Martin, J., Craig, I. et al. (2002): »Role of genotype in the cycle of violence in maltreated children«, in: *Science* 297 (5582), 851-854.

Ciba Foundation (Ed.) 1996: *Genetics of Criminal and Antisocial Behaviour*. Chicester u.a.: John Wiley and Sons.

Cole, Simon A. 2001: *Suspect Identities. A History of Fingerprinting and Criminal* Identification. Cambridge, MA/London: Harvard University Press.

Craig, I. (2007). »The importance of stress and genetic variation in human aggression«, in: *Bioessays* 29 (3), 227-236.

DeBusk, Ruth M. 2003: *Genetics: The Nutrition Connection*. Chicago, IL.: American Dietetic Association.

Dijck, José van 1998: *Imagenation. Popular Images of Genetics*. New York: New York University Press.

Duden, Barbara/Samerski, Silja 2007: »›Pop genes‹: An investigation of ›the gene‹ in popular parlance«, in: Regula Valérie Burri und Joseph Dumit (Eds.), *Biomedicine as Culture. Instrumental Practices, Technoscientific Knowledge, and New Modes of Life*. New York/London: Routledge, 167-189.

Fogarty, Mignon 2004: »Getting Hip, Getting Tested. Genetic testing – not the serious kind – hits the mainstream«, in: *The Scientist* vom 21. Juni 2004, 64.

Foucault, Michel 2000a: 'The Subject and Power'. In: Michel Foucault: Power, Essential Works Volume 3, New York: The New Press, 326-348.

Foucault, Michel 2000b: »About the Concept of the ›Dangerous Individual‹ in Nineteenth-century Legal Psychiatry, in: Michel Foucault: Power, Essential Works Volume 3, New York: The New Press, 176-200.

Gigerenzer, Gerd 2002: *Reckoning with Risk. Learning to live with uncertainty*. London et al. : Penguin.

Hesch, Rolf-Dieter/Bosch, Gerald 2001: *Absolut Mann*. München: Midena Verlag.

Höhn, Holger 1997: »Die Genetifizierung der Medizin und die Zukunft der Humangenetik«, in: *Medizinische Genetik*, Vol. 9, 173-174.

Huber, Johannes/Klentze, Michael 2005: *Die revolutionäre Snips-Methode. Genetisch bedingte Gesundheitsrisiken erkennen und aktiv gegensteuern*. München: Südwest Verlag.

Jeffery, Simon 2003: »Police seek DNA record of everyone«, in: *Guardian,* September 8, 2003, 6.

Koch, Lene & Svendsen, Mette N. 2005: »Providing solutions – defining problems: the imperative of disease prevention in genetic counselling«, in: Social Science and Medicine 60, 823-832.

Klingst, Martin 2003: »Wenn das Böse bleibt«, in: *Die Zeit* No. 30, July 17, 2003, 3.

Krauth, Stefan 2008: *Die Hirnforschung und der gefährliche Mensch. Über die Gefahren einer Neuauflage der biologischen Kriminologie*. Münster: Westfälisches Dampfboot 2008.Kröger, Fabian 2005: »Die Biologisierung des Geistes«, in: taz , September 2, 2005, 18.

Lemke, Thomas 2006: »›Du und deine Gene‹ – Subjektivierungsprogramme und Verantwortungskonzepte in Gesundheitsratgebern«, in: Pflege und *Gesellschaft. Zeitschrift für Pflegewissenschaft*, Vol. 11, No. 4, 293-306.

Liptak, Adam 2003: »You think DNA evidence is foolproof? Try again«, in: *New York Times,* March 16, 2003, 5.

McCallum, David 2001: *Personality and Dangerousness. Genealogies of Antisocial Personality Disorder*. Cambridge: Cambridge University Press.

Milunsky, Aubrey 2001: *Your genetic destiny. Know your genes, secure your health, save your life*. Cambridge, MA: Perseus Publishing.

Nelkin, Dorothy and Lindee, Susan M. 1995: *The DNA Mystique. The Gene As a Cultural Icon*. New York: W. H. Freemann & Co.

Patalong, Frank 2005: »Transparent sollst du sein, Bürger«, in: *Spiegel Online.* January 19, 2005 (http://www.spiegel.de/netzwelt/web/0,1518,337285,00.html; Access: November 14, 2006)

Pratt, John. 1995: »Dangerousness, Risk and Technologies of Power«, in: *Australian and New Zealand Journal of Criminology*, 28. Jg., S. 3-31.

Pugliese, Joseph 1999: »Identity in question: A Grammatology of DNA and Forensic Genetics«, in: *International Journal for the Semiotics of Law*, Vol. 12, 419-444.

Rafter, Nicole Hahn 1997: *Creating Born Criminals*. Urbana and Chicago: University of Illinois Press.

Rhodes, Rosalind 1998: »Genetic Links, Family Ties, and Social Bonds: Rights and Responsibilities in the Face of Genetic Knowledge«, in: *Journal of Medicine and Philosophy* 23 (1), 10-30.

Rose, Nikolas 2000: »The biology of culpability: Pathological Identity and crime control in a biological culture«. In: *Theoretical Criminology*, Vol. 4, S. 5-34.

Sass, Hans-Martin 1994: »Der Mensch im Zeitalter von genetischer Diagnostik und Manipulation. Kultur, Wissen und Verantwortung«, in: Ernst Peter Fischer/Erhard Geißler (Eds.), *Wieviel Genetik braucht der Mensch? Die alten Träume der Genetiker und ihre heutigen Methoden*. Konstanz: Universitätsverlag Konstanz, 339-353.

Sass, Hans-Martin 2003: »Patienten- und Bürgeraufklärung über genetische Risikofaktoren«, in: Hans-Martin Sass/Peter Schröder (Eds.), *Patientenaufklärung bei genetischem Risiko*. Münster: Lit-Verlag, 41-55.

Spiegel Online 2001: »Unionspolitiker fordern: Zwangs-Gentest für alle Männer«, in: *Spiegel Online* March 11, 2001 (Access: July 1, 2002).

Teichler Zallen, Doris 1997: *Does it run in your family? A Consumer's Guide to DNA testing for genetic disorders*. New Brunswick, NJ/London: Rutgers University Press.

Valverde, Mariana 1996: »›Despotism‹ and ethical liberal governance«, in: *Economy & Society*, Vol. 25, 357-372.

Wasserman, David/Wachbroit, Robert (Eds.) 2001: *Genetics and Criminal Behavior*. Cambridge: Cambridge University Press.

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