

Synopsis of Global Scenario and Forecasting Surveys Scenarios in Risk Habitat Megacity (RHM)

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Abstract

Main objective of the paper is to provide a synopsis of global scenario and forecasting surveys. First, the paper will give an overview on existing global scenario and forecasting surveys and their specific scenario philosophies and storylines. Second, the major driving forces that shape and characterise the different scenarios will be identified.

The scenario analysis has been provided for the research project Risk Habitat Megacity (HRM) that aims at developing strategies for sustainable development in megacities and urban agglomerations. The analysis of international scenario surveys is an essential component within RHM. The scenario analysis will be the basis and source for the development of own RHM-framework scenarios and for defining specific driving forces of change.

Key-words: scenarios; megacities; risk habitat

JEL codes: N90; O18; R21; R52

Introduction

Main objective of this paper is to provide a synopsis of international scenario and forecasting surveys. The paper will give an overview on existing scenarios surveys (mainly at the global level) and their specific scenario philosophies and storylines. Moreover, the major driving forces that shape and characterise the different scenarios will be identified.

The scenario analysis has been provided for the research project Risk Habitat Megacity (HRM) that aims at developing strategies for sustainable development in megacities and urban agglomerations. The project tries to understand the consequences of urbanisation as one of the most dramatic processes of global change. Central is the question, what risks and what opportunities are associated with the trend towards mega-urbanisation.

Five research centres of the Helmholtz Association (Helmholtz-Gemeinschaft Deutscher Forschungszentren, HGF) and partner organisations in Latin America are involved in RHM. The project is coordinated at the Helmholtz Centre for Environmental Research (Helmholtz-Zentrum für Umweltforschung, UFZ) in Leipzig, Germany 13.

The analysis of international scenario surveys is an essential component within RHM. The scenario analysis will be the basis and source for the development of RHM-framework scenarios and for defining specific driving factors of change. Moreover, the consideration of alternative development options and relevant driving factors will lead to higher quality of project results and elaborated proposals in terms of reflection, consistency, comparability of working group results, and therefore to a higher acceptability of results in policy and administration to be used as a support of decision makers for improving strategic planning activities (Simon/Kopfmüller/Stelzer 2007).

Scenarios: A Tool for Prospective Analysis

Scenarios are a central concept for prospective analysis. They can be considered as a rich and detailed portrait of a plausible future world and a plausible description of what might occur. Thus, scenarios describe events and trends as they could evolve. In terms of their purpose, scenarios are either normative or exploratory. Normative scenarios base on norms or values. Normative uses of future methods answer the following questions: What is the desirable future? What do we want to become? Explorative scenarios explore what is possible regardless of what is desirable. What are the possible futures - whether they are desirable or not (Moniz 2007)?

Scenarios provide a well-established tool for dealing with uncertainties that result from numerous complexities, interdependencies and dynamics within society. Scenario building is a method that does not aim at exact forecasting future developments, but at creating or improving insights into the broad range of future possibilities (Kopfmüller/Büscher/Stelzer 2007). Scenario planning is used as a practical tool to aid decision making in complex contexts and when future circumstances are uncertain. The use of scenarios can provide a tool that encourages policy professionals, planners and managers to establish strategies for alternative futures that allow for a clearer understanding. Scenarios are integrated as key instruments in the decisional process of corporations. The use of scenarios in business can be traced back in the early 1970s. Multinational oil companies developed scenarios for the future environment they might operate in when the conventional forecasting techniques in use at the time failed to anticipate the rapid increase in oil

13 For further project information see: URL:<http://www.risk-habitat-megacity.ufz.de/> (last access: 03-15-2009).

prices. Shell International, in particular, developed the use of scenarios in order to provide additional planning tools that could take better account on the complexity and unpredictability of the economic, social and political environment (Leney/Coles/Grollman/Vilu 2004). But scenarios are not only used as a basis for management decisions and for developing business strategies in the face of various uncertainties. Scenarios are also seen as a useful tool for initiating and stimulating a broad public dialogue on possible alternative futures, uncertainties or driving factors of change (TNS Infratest 2004).

The principal scenario methods were already established in the 1970s. Since that time, the methods have been continually modified. Most widespread is a combination of prospective and participative methods (dependent whether the scenarios are normative or explorative in purpose), such as trend extrapolation (trend impact analysis – TIA) or the Delphi method. Trend extrapolation involves trend analysis on quantitative data. The trend extrapolation of a times series is taken to be a “baseline” scenario, based on the assumption that no future trends are changing. The Delphi method is a forecasting method which relies on a panel of experts. The experts address forecasting issues in two or more rounds. The consultations with experts are used to reach agreement about alternative future developments (Steinmüller 2003; Leney/Coles/Grollman/Vilu 2004; Moniz 2007). Other participatory methods are for instance (Leney/Coles/Grollman/Vilu 2004): expert workshops, focus groups, discussion groups, working groups, sector expert groups, brainstorming sessions, questionnaires, expert interviews, desk research or case studies.

Scenario planning involves considering the driving forces of change (who or what make change happen). Most driving forces of change are not constant forces. The factors can change, disappear or metamorphose. Also new drivers can emerge (Leney/Coles/Grollman/Vilu 2004). Furthermore it is possible to keep some factors constant over the time, such as population growth. These factors can be considered as stable or solid trends.

Synopsis of Global Scenario Surveys

Among the wide variety of existing scenario surveys, thirteen documents and scientific surveys were considered as a basis for the scenario analysis. The documents were selected according to the following criteria:

- (1) Surveys that were conducted by important global institutions, organisations or corporations, such as the United Nations Environment

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Programme (UNEP), the Organisation for Economic Co-Operation and Development (OECD) or Royal Dutch Shell;

- (2) Surveys that were conducted by important scientific institutions that deal with future issues, such as the United Nations University (UNU) or other relevant futurology institutes;
- (3) Scenarios that have a global perspective or were developed in a global context.

World Business Council for Sustainable Development (WBCSD): "Exploring Sustainable Development. WBCSD Global Scenarios 2000-2050" [1997]

Within the report "Exploring Sustainable Development", the WBCSD (WBCSD 1997) has built scenarios in order to illustrate a number of plausible routes forward that pose challenges for business. Scenarios are seen as a basis for the assessment of adoption strategies, business plans, and management decisions. WBCSD's scenarios aim to enrich the debate and widen the strategic conversation in organisations, to search for corporate resilience and to trigger a formal strategic planning process, including the assessment of existing strategies and plans.

In general, WBCSD's scenarios describe different and possible responses of human social systems (human societies) to the challenges of sustainable development. Three scenarios have been developed:

- *FROG! (First Raise Our Business)*: A world in which economic growth is the major concern, with sustainable development acknowledged to be important, but not pressing.
- *GEOpolity*: Because neither governments nor business are able to respond adequately to the global problems, new global alliances and new global institutions have been formed – such as the Global Ecosystem Organisation (GEO). This leads to a new global consensus that welcomes technocratic solutions, and more direct control of the markets to ensure that environmental values and social cohesion are preserved.
- *JAZZ*: A world characterised by competition, transparency and consensus. JAZZ is a world of social and technological innovations, experimentations, rapid adoption, voluntary interconnectedness, a powerful and ever-changing global market, and strong global institutions.

WBCSD also presents three pre-determined elements that can be considered as the driving forces that shape the global business environment and that will persist in any scenario. The three drivers form the common starting point from which the three scenarios emerge and diverge:

- *The New*: Social and technological innovations (e.g. innovations in the field of biotechnology and ICT or the emergence of micro-credit systems), the emergence of new global economic players (such as China and India), and the emergence of new partnerships (new partnerships in business; NGOs).
- *The Many*: Global population growth; increase in material consumption and resource depletion; increased environmental stress.
- *The Connected*: greater extent of global interdependencies and interconnectedness (global communication; human beings and ecosystems).

(2) Organisation for Economic Co-Operation and Development (OECD): "The World in 2020. Towards a New Global Age" [1997]

The OECD survey "The World in 2020" (OECD 1997) tries to develop a "vision of the world economy in the year 2020 where governments and societies seize the challenge of realising a new age of global prosperity". The survey explores prospects for the world economy to the year 2020 under different policy assumptions and adjustment strategies to global change.

The OECD report presents two alternative visions of the world in 2020:

1. *Business as Usual* (low-growth scenario): A slow-track reform and adjustment scenario.
2. *New Global Age* (high-growth scenario): A high performance vision of the world economy.

At the same time, the report lists a set of key drivers of current global change (central question: what will mark the world in 2020?):

- the increasingly widespread acceptance of democratic institutions and market-based economic development;
- the unprecedented increase in world-wide trade and investment;

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- the rapid growth of several non-OECD countries;
- the emergence of Brazil, China, India, Indonesia and Russia (the so-called “big-five”) as major global players in the economic scene;
- the restructuring of national labour markets in the OECD economies;
- rapid technology advances, particularly in information and communications technologies;
- a large increase in non-OECD population and ageing in OECD countries;
- rapid urbanisation;
- dietary changes and increasing food demand;
- international migration;
- emerging environmental problems.

These key drivers of change can be considered as stable trends that are held constant in both scenarios. The difference between both scenarios lies within the policy response to the global change. Accordingly, the low-growth scenarios bases on the continuation of current policies. In contrast, in the high-growth scenario a policy is created which aims at changing the economic and societal structures and framework, increasing cooperation and establishing an efficient, sustainable economy.

(3) European Commission, Forward Studies Unit: “Scenarios Europe 2010. Five Possible Futures for Europe” [1999]

In 1999 the Forward Studies Unit of the European Commission launched the project “Scenarios Europe 2010” (European Commission 1999) with the objective of producing a set of coherent and thought-provoking images of the future of Europe. The principal aim of “Scenarios 2010” was twofold: (1) to stimulate a debate inside and outside of the Commission on the future of the European integration; (2) to develop a tool to put the Union’s policies and strategies into perspective and contribute to their improvement.

The survey presents a selection of variables that were considered in writing

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each of the scenarios. These variables receive the name of key drivers, for instance:

- Technology/work organisation (e.g. Can new technologies fully realise their potential?);
- Culture/values (e.g. self-reliance vs. solidarity, subsidiarity);
- Politics (e.g. increasing importance of the regional level relative to the national level);
- Administration (e.g. reform of public administration vs. lack of reforms);
- General public (e.g. increasing public participation vs. public passivity);
- Labour markets and social policies (e.g. US-style regulation vs. European corporatist model of regulation);
- Globalisation (e.g. progress on trade and investment liberalisation vs. globalisation loses some of its momentum);
- Regional security (e.g. military actions vs. building of solid partnerships).

Moreover, the survey presents a set of factors that kept constant over the time (solid trends): demography; globalisation and inequalities; technology and productivity; social trends and values; new security threats; environment. Five scenarios were built:

1. *Triumphant Markets*: Shift of the European political debate to liberalism and individualism; privatisation (e.g. of social services) and deregulation (e.g. of labour markets) are central strategies; in the face of an almost unanimous world consensus in favour of free markets, the European economies have emerged more competitive and more flexible; but the adjustment towards liberalism has been made at the cost of scaling down social and environmental ideas; the results are a rapid increase in social and regional inequalities and increased damage to the environment.
2. *The Hundred Flowers*: It's a world without national government; as a result of a deep-seated public dissatisfaction with the economic and political system hundreds of citizen's action groups were set up; the emergence of an enormous number of grassroots initiatives throughout the world are seen as a signal for the beginning of a global participatory

democracy, but the process is in fact completely rudderless and uncoordinated.

3. *Shared Responsibilities:* In a favourable world economic climate Europe has found a way of reconciling its ideals of solidarity and respect for the individual with technological innovation and the pursuit of economic efficiency; substantial progress has been made in social affairs (renewal of the social dialogue) and environmental protection as well as in the reform of governance; in that respect four fundamental principles have been proclaimed: decentralisation, openness, subsidiarity, duty to co-operate.
4. *Creative Societies:* Cuts in public spending and new austerity programmes and a growing gap between the public's needs and aspirations and the economic realities lead to massive public protests all over Europe; as a result ambitious reforms have returned man to his rightful place at the heart of economic development and laid the foundation for a new social solidarity, based on new ethic of human quality and individual fulfilment; the reforms lead to more employment, enhanced social cohesion and improved social situation; in particular innovative and creative industries (such as education, knowledge service, entertainment and cultural production) and environmental protection and tourism take advantages of the new socio-economic framework.
5. *Turbulent Neighbourhoods:* A world of increasing global political instabilities; security concerns are of particular interest; as a result, the European Union starts military actions to restore peace; economic globalisation has not brought all the promised benefits.

(4) Graf, H. G.: "Global Scenarios. Megatrends in Worldwide Dynamics" [2000]

The report "Global Scenarios. Megatrends in Worldwide Dynamics" (Graf 2000) by Hans Georg Graf, director of the Centre for Future Research (St. Gallen, Switzerland), investigates alternative future developments of the world economy. The report presents a set of predetermined trends on which a broad global consensus exists:

- demographics;
- remaining reserves of not renewable resources;
- new technologies;

- changing world nutrition;
- change of world economy (increasing international division of labour and increasing number of participants in the globalisation process);
- social and political trends (inter-generational conflicts, crime, individualisation, nationalism);
- increasing importance of knowledge (emergence of a knowledge society);
- change in work organisation;
- change in national and international institutions (diminishing influence of nation states, increasing influence of transnational corporations, increasing influence of international organisations such as the WTO).

The report also presents unforeseeable trends that shape and affect possible future developments. These unforeseeable trends can be considered as “wild cards”:

- vulnerability of globalisation (financial crisis, risks of financial speculation, risks of free capital flows);
- changes in geopolitics (possible future development in Russia, China or Brazil).

Both predetermined trends and “wild cards” describe the point of departure for all scenarios. On the basis of the two scenarios developed by the OECD in the report “Towards a New Global Age”¹⁴ (high-growth scenario and low-growth scenario), Graf presents two additional scenarios that describe possible futures for the world economy:

1. *The Macro-industrial Society*: The scenario describes a world of increasing efficiency and flexibility. Technological advances are essential for solving global problems. Industrial production and technological advances lead to a general improvement of living conditions.
2. *The Soft Society*: A global debt cancellation, the expansion of local economic activities, the emergence of local barter systems and local currency systems as well as environmental protection,

14 See section (2).

resource protection and grassroots democracy leads to an enormous economic growth.

(5) Stockholm Environment Institute (SEI): "Great Transition. The Promise and Lure of the Times Ahead" [2002]

Within the report "Great Transition" (SEI 2002) it is argued that mankind is currently in the midst of a third significant transition, towards the Planetary Phase of Civilisation. The character of the global system that will emerge from that transition cannot be predicted. The ultimate shape of things to come depends to a great extent on human choices yet to be made and actions yet to be taken. Therefore, scenario building is seen as a tool that can support informed and rational action by providing insight into the scope of the possible. Moreover, scenarios can illuminate the role of human actions in shaping the future. Three scenarios (three world-views) were considered in the survey. For each of the scenarios SEI defined two variants. Each variant is distinguished by distinct responses to the social and environmental challenges:

1. *Conventional Worlds* (essential continuity): A world characterised by the optimism that the dominant patterns of globalisation can deliver property, stability and ecological health.
 - ➔ *Market Forces* (1st variant): Competitive, open and integrated global markets drive world development. Social and environmental concerns are secondary.
 - ➔ *Policy Reform* (2nd variant): comprehensive and coordinated government action is initiated for poverty reduction and environmental sustainability.
2. *Barbarisation* (fundamental but undesirable social change): A world characterised by the fear that deepening social, economic and environmental tensions will not be resolved, with dire consequences for the world's future.
 - ➔ *Breakdown* (1st variant): Conflicts and crises spiral out of control and institutions collapse.
 - ➔ *Fortress World* (2nd variant): Authoritarian response to the threat of breakdown. The world is divided into a kind of global apartheid with the elite in interconnected, protected enclaves and an important impoverished majority outside.

3. *Great Transitions* (fundamental and favourable social transformation): Also a world characterised by fears. But the Transformationists believe that global transition can be seized as an opportunity to forge a better civilisation.

→ *Eco-communalism* (1st variant): A vision of bio-regionalism, localism, face-to-face democracy and economic autarky.

→ *New Sustainability Paradigm* (2nd variant): A world of global solidarity, cultural cross-fertilisation, economic connectedness, liberty and humanism.

The report "Great Transition" also presents a collection of driving forces of change that can be considered as solid trends. While the global trajectory may branch in very different directions, the point of departure for all scenarios is a set of driving forces and trends that currently condition and change the system:

- demographics (population growth, ageing of population, urbanisation);
- economics (advances in information technology, international agreements to liberalise trade, diminishing influence of states);
- social issues (increasing economic inequality among nations and within many nations, persistent poverty, erosion of traditional support systems, erosion of traditional norms and values);
- culture (information technologies and electronic media foster consumer culture in many societies, rise of nationalist and religious reactions on globalisation, emergence of global terrorism and fundamentalism);
- technology (technology continues to transform the structure of production, work organisation and the use of leisure time);
- environment (global environmental degradation);
- governance (significant trend towards democratisation and decentralisation of authority).

(6) Siemens & TNS Infratest: Horizons 2020: „Ein Szenario als Denkanstoß für die Zukunft“ [2004]

With the communications scenario “Horizons 2020”, Siemens has begun to study what life will be like in the world of tomorrow. At Siemens’ request, TNS Infratest interviewed experts from across Europe about the economic, political, technological, and social developments up to the year 2020 (Scharioth/Huber/Schulz/Pallas 2004).

Main objectives of “Horizons 2020” are to foster a broad public dialogue about the future and to encourage readiness to take an active role in forming the future and taking responsibility for that future.

Siemens identified ten megatrends that have an important influence on present and future development:

- increasing globalisation;
- increasing longevity;
- fewer children;
- greater significance of women in business and society;
- free choices of lifestyle;
- growing significance of virtual communities;
- networking of communication media;
- growing mobility;
- growing migration to Europe;
- acceleration of technological knowledge creation and product cycles.

The report also identified (as a result of the expert interviews) a total of 76 critical descriptors and 32 non-critical descriptors that can be considered as indicators that are relevant for the description of the scenarios. Siemens developed two visions of the world of tomorrow:

1. *The Decelerated Society*: A socially responsible market economy with top environmental quality. The overall development in this scenario represents a trend towards "deceleration".
2. *The Performance-oriented "Me"-Society*: A world of a dynamic market economy. National states define only the regulatory framework and restrict their services to minimal state-support social security. In the scenario there is an emphasis on individual responsibility and flexibility. Lifestyles are characterised by rampant competition and little commitment to permanent structures.

(7) Shell: "Shell Global Scenarios to 2025. The Future Business Environment: Trends, Trade-offs and Choices" [2005]

Main goal of "Shell global Scenarios to 2025" (Shell 2005) is the identification of factors that will shape Shell's global business environment in the future. Scenarios are seen as a tool to explore factors that drive present and future changes and developments. Moreover, scenarios are used to cast light on the context in which Shell operates and to identify emerging challenges. The scenarios are developed in order to assess possible adoption strategies and to foster adaptabilities to change. Three scenarios were developed:

1. *Low Trust Globalisation*: A world of heightened globalisation and more coercive state and regulators.
2. *Open Doors*: A world of heightened globalisation and more coercive civil societies.
3. *Flags*: A world of nation states, of national regulation, economic nationalism and opportunistic economic policies.

Previous Shell Scenarios (in the 1990s and in 2001) focused mainly on the following drivers of change: globalisation, market liberalisation, economic integration, efficiency, new technologies, declining power of nation states, and declining power of cultural values and cohesion. The authors of the current survey underline that these factors are still very relevant, but the "Shell Global Scenarios to 2025" also try to explore the so called dual crisis of security and market trust as an important driver of change. In particular terrorism (the events of September 11, 2001), instabilities in the Middle East, nuclear proliferation and failed states are affecting national security. Energy supply security is also a crucial factor that affects national security. The crisis of market trust (distrust towards corporations, governments and parliaments) is

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mainly affected by major corporate governance failures (exemplified by Enron’s bankruptcy) and distrust against governments, parliaments and market liberalisation.

The Shell survey emphasises that present challenges such as the dual crisis of security and market trust as well as globalisation, new technologies and changes in policy regulation make the interaction between the different actors (market participants, states and society) more complex. In order to navigate through that complexity and in order to build scenarios, three sets of essential forces (that shape the scenario) have been outlined: market incentives, the force of community and coercion and regulation. The Shell survey tries to explain how these forces drive towards three different objectives: efficiency, social cohesion/justice and security. At last, the survey tries to explore how the different groups (market participants, state and society) adopt to these changes.

Tab. 1: Key drivers of change in “Shell Global Scenarios to 2025”

Key drivers of change
Globalisation
Market liberalisation
Economic integration
Efficiency
New technologies
Declining power of nation states
Declining power of cultural values and cohesion
Crisis of security (terrorism, instabilities in the Middle East, nuclear proliferation, failed states, energy supply security)
Crisis of market trust (e.g. corporate governance failures)

Besides the major drivers of change, Shell also lists a set of predetermined trends and descriptors of all scenarios, that can be considered as stable or solid trends, for instance: growing influence of the US and China on globalisation (the US as the world’s innovation, financial and security hub, and China as the world’s manufacturing hub), the transformation from nation states to market states (deregulation and diminished direct control that states have over the economy), demography and migrations (fast growing world population, shrinking population in several European countries, rising

migration flows) or climate change.

(8) Millennium Project: "2006 State of the Future" [2006]

Aim of "2006 State of the Future" (Glenn/Gordon 2006) – which is the tenth update – is to provide an additional eye on global change. The report provides a global strategic landscape that public and private policymakers may use to improve their own strategic decision making and global understanding. The report was provided for the Millennium Project, which was created as a global participatory think tank of futurists, scholars, scientists, business planners and policy makers who work for international organisations, governments, corporations, NGOs and universities.

In order to assess the global and local prospects for humanity, "2006 State of the Future" describes the trends for 15 global challenges (sustainable development, water, population and resources, democratisation, long-term perspectives, information technology, rich-poor gap, health, capacity to decide, peace and conflict, status of women, transnational crime, energy, science and technology, ethical considerations). Referring to those trends, four energy scenarios (up to 2020) have been provided by means of a trend impact analysis (TIA). The trend impact analysis based on a whole lot of key variables which were described in the State of the Future Index (SOFI). Energy is currently one of the top issues because of increasingly high oil prices, projections of climate change and speculations about when global oil production will peak and then decline. The four energy scenarios describe how alternative global energy conditions could emerge:

1. *Business as Usual*: This scenario assumes that the global dynamics of change continue without great surprises or much change in energy sources and consumption patterns. Further assumptions: moderate growth in technological breakthroughs, moderate environmental movement impacts, moderate economic growth and moderate changes in geopolitics.
2. *Environmental Backlash*: This scenario assumes that the international environmental movement becomes much more organised; some groups lobby for legal actions and new regulations. Further assumptions: moderate growth in technological breakthroughs, high environmental movement impacts, moderate economic growth and moderate changes in geopolitics.
3. *High-Tech Economy – Technology Pushes Off the Limits*: This scenario assumes that technological innovations accelerate beyond current

expectations and have impacts in the energy mix supply and consumption patterns. Further assumptions: high growth in technological breakthroughs, low environmental movement impacts high economic growth and few changes in geopolitics.

4. *Political Turmoil*: This scenario assumes increasing conflicts and wars, with several countries collapsing into failed states, leading to increasing migrations and political instabilities around the world. Further assumptions: moderate growth in technological breakthroughs, low environmental movement impacts, moderate/low economic growth and major changes in geopolitics.

(9) Opaschowski, H. W.: „Deutschland 2020: wie wir morgen leben – Prognosen der Wissenschaft“ [2006]

Main objective of the future report “Deutschland 2020” (Opaschowski 2006) by Horst W. Opaschowski, director of the BAT15-Stiftung für Zukunftsfragen (BAT-Foundation for Issues of the Future), is to impart knowledge of the future. Moreover, the report aims at providing concrete information and perspectives on how humanity will influence life in future. The demonstrated future prospects also aim at motivating and inspiring politics, science and society to create a better (and more sustainable) world.

On the basis of five global change processes (socio-economic problems; environmental problems; increasing crime and terrorism; increasing gap between rich and poor/increasing inequalities; increasing unemployment) and future trends (globalisation; flexibility; emergence of a service-oriented society; society is increasingly fixed on performance; ageing of society; emergence of a “single society”; individualisation; emergence of a experience-driven and leisure-oriented society) the report outlines four scenarios that describe the life in the year 2020:

1. Illusory Employment Society

- Continuation of current employment trends.
- Permanent increases in productivity lead to mass unemployment.

2. Utopian Leisure Society

- Elimination of human labour.
- Idleness is the major value in society.

3. Visionary Activity Society

- Labour, leisure time, culture education, entertainment and politics are equal elements of quality of life.
- Principal model of the Visionary Activity Society is a free, active, creative and hedonistic human being.

4. Realistic Performance-oriented Society

- Boundaries between gainful employment and voluntary, unpaid work are starting to disappear.
- Flexibility is the major value in society.

(10) European Spatial Planning Observation Network (EPSON): "Scenarios on the Territorial Future of Europe" [2007]

The EPSON report "Scenarios on the Territorial Future of Europe" (EPSON 2007) presents three contrasting scenarios for the European territory. The spatial scenarios explore alternative directions of possible trends and driving forces related to the future territorial development of the EU. Main aim of the scenario building is to increase the general body of knowledge about territorial structures, trends, perspectives and policy impacts in an enlarging European Union. The European territory is currently at the crossroads of numerous factors of change, many of which are exogenous in nature (such as accelerating globalisation, rising energy prices, stronger external immigration pressures or emerging climate change) while others are more indigenous in nature (such as population ageing).

Three scenarios were developed by EPSON. The scenarios comprise a full set of assumptions related to various policies.

1. *Trend scenario 2030*: A simplified image of the European territory, based on the continuation of current trends and policies. Main assumptions of the trend scenario:

- total EU population increases only through enlargement;
 - increasing, but globally controlled external migration;
 - slowly increasing total activity rate;
 - slowly growing R&D expenditures;
 - decreasing public expenditures;
 - steady increase in energy prices;
 - further liberalisation of international trade;
 - little coherence between policies devoted to innovation and competitiveness and those devoted to cohesion;
 - moderate overall climate change.
2. *Competitiveness-oriented scenario for 2020:* Most of the autonomous developments (e.g. globalisation, climate change) identified in the trend scenario were held constant. The difference lies in the policy response. In this scenario a policy-mix is created which is aimed at boosting Europe's competitiveness. Main assumptions of the competitiveness-oriented scenario:
- strong reduction of the total EU budget, and a retargeting of funding towards R&D, education, ICT and strategic external accessibility;
 - focus of EU-policies on regions with strongest potentials;
 - further liberalisation and privatisation of public services;
 - immigration promoted to enlarge labour force;
 - investments in infrastructure are performed according to market demand;
 - environmental measures undertaken only if market-efficient.

3. *Cohesion-oriented scenario for 2030*: In the cohesion-oriented scenario, a policy-mix is created which is aimed at improving cohesion in Europe. Main assumptions of the scenario:

- maintaining the volume of the EU budget, reinforcement of Structural Funds;
- concentration of European policies on the weakest regions;
- more public intervention and more decentralised and coherent governance;
- no new EU enlargement:
- priority given to deepening EU cooperation;
- restrictive policy on external immigration;
- peripheral regions given priority for infrastructure investments;
- promotion of decentralised energy production;
- strict environmental measures.

(11) United Nations Environment Programme (UNEP): "Global Environment Outlook GEO4" [2007]

UNEP's scenarios (UNEP 2007) try to explore how current social, economic and environmental trends may unfold along different development paths in the future. Central are the following questions:

- Which of the current environmental, social and economic trends will continue, and which will see dramatic shifts?
- What will this mean for the environment and human well-being, particularly the most vulnerable ecosystems and groups in society?
- What will this mean for individual sub-regions and regions, and, collectively, at the global level?

GEO4 presents four scenarios. Each scenario outlines a pathway into the future up to the year 2050. Each scenario looks at who is making the key decisions (the dominant actors), how these decisions are made (the dominant approaches to governance) and why these decisions are made (the dominant priorities).

Markets First: The private sector, with active government support, pursues maximum economic growth as the best path to improve environment and human wellbeing.

Policy First: Government, with active private and civil sector support, initiates and implements strong policies to improve the environment and human wellbeing.

Security First: Government and private sector compete for control in efforts to improve, or at least maintain, human well-being for mainly the rich and powerful in society.

Sustainability First: Government, civil society and the private sector work collaboratively to improve the environment and human well-being, with a strong emphasis on equality.

GEO4 also identifies key drivers of environmental change and makes assumptions about how these drivers will evolve. In the GEO4 conceptual framework, the key drivers of environmental change include:

- institutional and socio-political frameworks;
- demographics;
- economic demand, markets and trade;
- scientific and technological innovations;
- value systems.

(12) Shell: "Shell Energy Scenarios to 2050" [2008]

In the face of dramatic developments and transitions in the global energy system, Shell also developed two scenarios that describe alternative ways the future energy system may develop (Shell 2008). The survey asks: "How will

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the transition emerge over the next few decades". The two scenarios bring out the impact of critical differences in the pace and the shape of political, regulatory and technologic change.

The survey mentions three major drivers of change with regard to energy demand and supply:

- Change in energy use: developing nations, including China and India, are entering their most energy-intensive phase of economic growth;
- Increasing supply-demand tensions: by 2015, growth in the production of easily accessible oil and gas will not match the projected rate of demand growth;
- Environmental stress is increasing: increasing levels of CO₂-concentration in the atmosphere (due to the use of fossil fuels) will become increasingly different.

When all three of the drivers – demand, supply and effects on the environment – are set to change, the result will be an era of revolutionary transitions and considerable turbulences.

Besides these most powerful drivers, the shape of the two scenarios is also affected and driven by decisions of governments and energy companies as well as the development of prices, new regulatory frameworks, new technologies and new infrastructures. Two scenarios were developed:

1. Scramble

- Decision-makers pay little attention to more efficient energy use and environmental concerns;
- Demand-side policy is not pursued meaningfully until supply limitations are acute and until supplies are light;
- Environmental policy is not seriously addressed until major climate events stimulate political responses;
- Instead of this, governments focus their energy policies on the supply; the result is a relatively uncoordinated range of national mandates and incentives for developing indigenous energy supplies where available (including coal, heavy oil, biofuels and other renewables); but in the

long view supply-side actions are inefficient because the growth in coal, oil and gas can not be maintained in the long view.

2. Blueprint

- Growing local actions (grassroots pressure) begin to address the challenges of economic development, energy security and environmental pollution;
- Growing fears about life style and economic prospects forge new alliances and leads to parallel responses to supply, demand, and climate stress;
- Market-oriented measures (e.g. market driven CO₂ management, carbon trading markets) are the most widespread strategies to meet the new challenges; also more efficient and clean technologies (wind, solar, fuel cells, etc.) are crucial strategies;
- The main revolutionary transition in Blueprints is that economic growth no longer mainly relies on an increase in the use of fossil fuels.

(13) National Intelligence Council (NIC): “Global Trends 2025: A Transformed World” [2008]

One of the most recent surveys is “Global Trends to 2025” (NIC 2008) by the US National Intelligence Council (NIC). The survey already tried to consider the impacts of the current global financial and economic crisis. Main objective of “Global Trends to 2025” is to stimulate strategic thinking about the future by identifying key trends and the factors that drive them. Moreover, the survey aims to identify opportunities for policy interventions to change or look in the trajectories of specific development. The report uses scenarios to illustrate some of the ways the drivers of change may interact to generate challenges and opportunities for future decision makers. “Global Trends 2025” is the fourth effort of the National Intelligence Council to identify key drivers and developments likely to shape. Former reports were: “Global Trends to 2010”, “Global Trends to 2015”, and “Global Trends to 2020”.

Central element of the study is the description of the factors that will shape future events and that will have a disproportionate influence on future possibilities. The following key drivers of change were identified in the study:

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- globalisation;
- demography;
- the rise of new powers/new players;
- the decay of international institutions;
- climate change;
- geopolitics of energy.

The study presents four fictionalised scenarios that could emerge as a result of the ongoing global transformation. The scenarios present new situations, dilemmas, or predicaments that would cause upheavals in the global landscape, leading to very different “worlds”:

1. *A World Without the West*: In this world new powers supplant the West as the leaders on the world stage. However, the lack of any stable bloc – whether in the West or in the non-Western world – adds to growing instabilities and disorder, potentially threatening globalisation.
2. *October Surprise*: In this world many countries have been preoccupied with achieving economic growth at the expense of safeguarding the environment. New York City is hit by a major hurricane linked to global change. Due to the destruction world leaders must begin to think about taking drastic measures, such as relocating parts of coastal cities.
3. *BRIC’s Bust-Up*: In this world conflict breaks out between China and India over access to vital resources. The scenario highlights the importance of energy and other resources to continued growth and development of great power.
4. *Politics is Not Always Local*: In this world various nonstate networks – NGOs, religious groups, business leaders, and local activists – combine to set the international agenda on the environment. The global political coalition of nonstate actors and transnational interest groups play a crucial role in securing a new worldwide climate change agreement.

Time horizon

Time horizons of the different scenario surveys differ between a medium-term (10 to 20 years) and a long-term perspective (reference date is 2050). The reason for the difference lies in the purpose of the surveys. On the one hand, surveys (such as Shell 2005 and WBCSD) are used as a basis for future business and management decisions. On the other hand, surveys (such as Great Transitions) aim at the description of fundamental changes by the year 2050 and at providing insight into the scope of the possible.

Identification of essential drivers of change

The storylines show that the scenarios are shaped by different responses (e.g. specific policy assumptions) to (1) the globalisation of world economy, (2) to the pressing global problems (ecological, economic and social) or (3) to the concept of sustainable development. Moreover, the storylines show that almost all scenario surveys refer to three main types of scenarios: (1) optimistic scenarios, (2) pessimistic scenarios, and (3) business as usual-scenarios.

But which drivers of change shape and characterise the different scenarios? Based upon the analysis of thirteen global scenario surveys, the following categories of drivers of change were identified:

(1) Globalisation and economic integration

Central factors of this driver are the degree of economic integration into the world market, the degree of further decline of trade barriers and the degree of protection.

(2) Economic development

Key issues: economic growth by world regions (of particular interest is the Asia-Pacific region because of the emergence of China and India as new global economic players); increase in productivity; increase in income.

(3) Global governance/global political-institutional framework

Key issues are the degree of global co-operation and the role of the global civil society. At the same time, the following questions are of particular interest: How is global crisis management organised? How does the global community responds to global problems and to the global change? Is the global

community characterised by multilateralism, unilateralism, US-hegemony or European “soft power”? Is there a need for the reform of international institutions (e.g. United Nations, World Trade Organisation, World Bank, International Monetary Fund)?

(4) National governance/national political-institutional framework

Almost all scenarios deal with the topic of regulation. The central question is: market regulation or nation state regulation? At the same time, trust or distrust in market, state and government are important factors that shape the scenarios: Are markets or the state able to solve global problems and to deliver sustainable development?

(5) Local governance/local political-institutional framework

Besides national and international regulation most of the scenarios discuss also the role of local governance, local civil society, local actors, public private partnerships, subsidiarity and transparency.

(6) Technological development

Almost all scenarios focus on new technologies, technological advances and scientific innovations as major drivers of change. Fundamental are the advances and improvements in the fields of ICT, transport technology, biotechnology, energy technology, material technology or nanotechnology. There is a broad consensus that the future synergies of these technologies will fundamentally change the future prospects for civilisation. At the same time, the following questions are addressed in some of the surveys: Can (and how can) new technologies or technological innovations help to solve global problems? How do technologies and technological innovations need to develop to help to solve global problems?

(7) Security

Security can also be identified as a major driver of change within the scenario surveys. Key issues are international terrorism, the growing potential for interstate and intrastate conflicts, increasing global instabilities, internationalisation of crime, energy security or nuclear proliferation.

(8) Allocation of changes

Central questions: How are life chances distributed? How is life chances affected? Which are the resulting patterns of social problems and social decline? Other key issues: Poverty; income disparities; economic inequality;

impacts of environmental change (unequal allocation of risks); gender inequality; access to knowledge (in particular: digital divide).

(9) Demography

Almost all surveys emphasise that demography will strongly shape the development in all scenarios. Almost all scenarios assume a large increase in the non-OECD population, a shrinking population in Europe, the ageing of population in particular in OECD-countries as well as increasing migration flows. This means that the future demographic development will be characterised by global disparities and differences.

(10) Urbanisation

In most scenario surveys urbanisation is one of the major drivers of change. Key issues are the patterns of urban growth, urban-rural distribution or social-spatial differentiation. Besides quantitative issues also qualitative issues are of particular interest: What functions can offer urban areas?

(11) Environmental change and climate change

Environmental problems and climate change are seen as major challenges in a number of scenario surveys. Key issues: climate change (global warming) and ozone hole; environmental change (e.g. decline in biodiversity, air pollution or deforestation); demand growth for natural resources due to the emergence of China and India as global economic players.

(12) Energy

A number of scenario surveys address the topic of energy in a more detailed way. Key issues are the development of demand for energy (oil, natural gas, coal, renewables) and the development of supply conditions and supply structures in particular in the context of the emergence of China and India as new global economic players.

(13) Change in society's values, lifestyles and culture

Central are the following questions: Are western values (e.g. Western consume patterns or individualisation) still predominant on the global level? Do new values appear (e.g. sustainability)? What is the role religion and fundamentalism? What is the role of global protest?

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