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Sustainability and Jobs in the Knowledge Economy[1]

Peter Johnston
(European Commission, Information Society DG
Peter.Johnston@cec.eu.int**)**

Abstract: The rapid emergence of a global knowledge economy both shortens the timetable for progress on sustainable development and also offers a potential "win-win" alternative to the traditional trade-off between growth and environmental sustainability.
The Lisbon Strategy and e-Europe initiative to accelerate development of the knowledge economy in Europe already addresses several aspects of social and economic sustainability. However, the trends in most resource-use and environmental impact indicators are still worsening, and much more needs to be done to realise the potential benefits of structural change in business and employment, notably in the service sector.
The Stockholm and Göteborg EU Summits, and the subsequent Rio+10 conference give a timely and unique opportunity to establish European coherence and leadership in seeking sustainable development in the knowledge economy.
However, we also need a new clarification of individual and business-level responsibilities for lifestyle and business organisation changes, and a much wider take-up of innovative "win-win" solutions for growth with reductions in resource use and impacts.

Key Words: information society, knowledge economy, sustainable development, European Union
Category: J.4

1 European Policies and Strategies

Sustainable development is now a Treaty objective of the European Union, and strategies for sustainable development are again under critical review. In December 1999, the Member States asked the European Commission to develop a coherent European Strategy for sustainable development, which can provide a common framework for action. A strategy was proposed by the Commission in May 2001 [1] and adopted in Göteborg in June 2001. It will now become the basis for Europe's contribution to the Rio+10 "Earth Summit" in South Africa in 2002 and an integrated part of the social and economic development strategy of the EU.

This new debate now takes place against the background of the success of the Lisbon Summit in March 2000, at which all Member States agreed to a new strategic objective for "Europe to become the most dynamic and competitive Knowledge economy in the world, with sustained growth, more and better jobs, and greater social cohesion". This objective is already reflected into the e-Europe Action plan adopted in June 2000 – a set of short term measures to ensure cheaper and secure access to the

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[1] The views expressed are those of the author(s) and do not necessarily reflect the policies of the Commission of the European Union.

Internet; to strengthen investment in people and skills; and to stimulate the use of the Internet – all by the end of 2002.

Member States have recognised that the spectrum of Government policy measures must form a coherent whole, and that the social and economic dimensions to sustainable development are as important as the environmental dimension. It is as important to sustain social structures and cohesion in society through policies for social inclusion, as it is to preserve environmental resources. Economic stability and sustained growth are essential to the quality of life and employment of most people.

The linkage between this Lisbon strategy and sustainable development was already made in the Commission's Synthesis Report to the Stockholm Summit and in the conclusions of the Swedish Presidency. The economic and social dimensions of Lisbon will now be completed by adding an environmental element: building a strategy for sustainable development in which economic growth, social cohesion and environmental protection go hand-in-hand. It is a strategy for new technology and more investment. A strategy which offers a transition away from old, environmentally unfriendly technologies and low quality jobs. This overall approach to sustainability has been endorsed at the European Council in Göteborg.

The Commission's key target now is to return to the Spring European Council in 2002 having identified the decisions required to adapt the Lisbon Strategy to the objectives identified in Göteborg. By Madrid 2002 sustainability will be a central element within the Lisbon Strategy.

Finally, the EU strategy for sustainable development has to be based on a strong analytical basis, which should as far as possible include an analysis of the costs and benefits of different policy options over a defined time span. For this reason, European research investments have been re-oriented towards sustainable development through the knowledge economy development in the current 5th Framework programme, and will be further strengthened in this area in the proposal for the next (6th) Framework programme.

Our continued long-term prosperity depends critically on advances in knowledge and technological progress. Without these investments, adjustment to sustainable development will have to happen much more through changes in our consumption patterns. By promoting innovation, new technologies may be developed that use fewer natural resources, reduce pollution or risks to health and safety, and are cheaper than their predecessors.

2 New Challenges and Perspectives

2.1 The Urgency of Action

Intergenerational solidarity was the dominant theme in the original Bruntland Commission's definition of sustainable development. The concern was to avoid that we destroy, exhaust or sterilise resources that future generations might also need for comparable life-styles to our own. This was applied to resources taken from the environment such as fossil fuels, as well as to the natural environment as a resource for leisure activities, for new medicines, or for its ability to renew resources. It can

also be applied to cultural and social capital, but the responsibility is indirect and to an unknown future.

Transversal solidarity within societies, and globally, was initially less of an immediate concern, but has emerged as the dominant concern as economy growth has overtaken population growth as the principal cause of increasing resource use, and in the debates on social inclusion and the "digital divide". This is not just a reflection of our joint responsibility around the world to act together to achieve sustainable global development, and of the wider recognition of universal Human Rights. It is also a reflection of the tighter time-scale within we now must achieve sustainable development. Young people alive today need to develop sustainable lifestyles (and business strategies) by the time they will share the world with several billion equally prosperous people in 10 or 20 years time (as well as with several billion people living in more precarious subsistence). Enormous population growth has already happened (although it will still continue for another 50 years or more), and growth in resource use now comes more from rising prosperity than from population growth itself. It is, in particular, the development of affordable access to networked services and business opportunities that is now accelerating growth around the world, bringing a much larger proportion of the world population into both work and the consumer economy. This accelerated growth shortens the timetable within which sustainability must be achieved.

2.2 Growth of the Knowledge Economy

There is wide recognition that the transition to an Information Society and a Global Knowledge Economy will be the most important social and economic changes of the next decade. However, while there is optimism that the greater dominance of immaterial services will offer opportunities for economic growth without increases in resource use (or even with dramatic decreases), there is as yet little evidence of greater resource-use efficiency in the "new economy"[2], and no consensus on how significant progress might be achieved.

The perception that sustainable development inevitably implies constraints to growth and a new "trade-off" between growth and protection of social structures or the environment, is now being replaced by a wider recognition of potential win-win scenarios. In fact, if the knowledge economy can be both more prosperous **and** more sustainable, then the best route to global sustainable development may be through **accelerated** technology development, business innovation and structural change. This changes completely the ground-rules for the policy debate. Sustainable development is no longer a cost-benefit issue in which, for example, the benefits of stabilising CO_2 emissions are set against the costs of moving to less "carbon-intensive" fuels [2].

There is no doubt that the revolution in information and communication technologies is accelerating the shift to a service-dominated economy, in which more

[2] Some evidence of gains in the energy-efficiency of growth in the USA is highlighted in the Cool-Companies report: www.cool-companies.org.

"value" is associated with immaterial features and knowledge[3] This has led many to presume that these new technologies offer an opportunity for continued (or even greater) economic growth; with greater social inclusion and with no increase in material use, or even with factors of 4 or 10 reductions in material use. Some industries have, in fact, already made substantial reductions in the "material intensity" of their activities, notably in manufacturing and in their use of the "built environment" [3].

A set of case studies of radical innovation with information and communications technologies [4] shows that substantial positive benefits can be achieved in both efficiency and in reductions of material use and resources. These initiatives are still limited to a few organisations in a few regions, but accelerated deployment of such innovations across most business sectors and in all regions could clearly cut overall material and resource use. The *e*-Europe initiative adopted in March 2000 is a valuable first step, but the momentum of structural change will need to be sustained for at least a decade and re-focused more onto the objectives of sustainable development, rather than only on accelerating economic growth and widening employment.

The new objectives of sustainable development might then be **positive** objectives for more rapid development of a networked knowledge economy, rather than negative objectives for reduction in environmental damage, at the expense of current prosperity and growth.

3 Progress Towards Social, Economic and Environmental Goals

The Table in Annex summarises some of the top-level policy objectives and current indicators for the different dimensions of sustainable development. Some of these are relatively well established, others are more volatile, and most organisations dealing with sustainable development have variants to them.

The Lisbon Summit and e-Europe objectives of “digital literacy” for all, increased participation in knowledge work, and increased investment in life-long learning are a valuable step towards **social sustainability**. The Lisbon Strategy also recognises that sustainable development of social capital in institutions and the social infrastructure of government (education, care and health services) can also be best assured by accelerated development of more efficient and responsive e-Government services.

At the Stockholm Summit, Heads of State also addressed the “quality of work”, both in the life/work balance; and in terms of workplace safety. The Commission has now proposed to *develop by 2003 a comprehensive Community strategy to promote health and safety at work, to achieve a substantial reduction in work accidents and professional illness* as part of the extended “Lisbon Strategy” for sustainable development.

The creation of the European Central Bank, the Euro and its “stability pact” are also significant steps towards economic stability and sustainable growth. Questions still remain about the stability and growth potential of the new “e-business” economy,

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[3] GDP grew 10-times more than total material use since 1950 in the USA, and increased by 35% with no change in total energy use from 1970 to 1990 (US EIA).

but the key measures of stability are now well known – price stability as ensured through low retail-price inflation (< 2% per year), and a manageable level of public debt. Other "stability" measures, such as for exchange rates and equity-prices may also need to be considered but the institutional frameworks are largely in place.

3.1 The Most Difficult Area is the Environmental Dimension

While the "end products" of economic activity are being de-materialised in the emerging knowledge economy, the overall use of physical resources and materials in both Europe and the US continues to grow. The Commission has therefore proposed to *break the links between economic growth, the use of resources and the generation of waste and to develop an Integrated Product Policy in co-operation with business to reduce resource use and the environmental impacts of waste. The Commission will also propose a system of resource productivity measurement to be operational by 2003.*

Transport growth is one valuable indicator of increasing resource use: since 1980, the number of air passengers has doubled; car use has increased by 60% and freight traffic has increased by 75%. The number of vehicles in use in Europe has increased from 129 million in 1980, to 191 million in 1990 and to 256 million in 1996. Even e-Commerce may initially add to growth: The Dutch organisation for road freight transport estimates that it will add 17% to freight traffic growth by 2005 (on top of the 21% increase already expected) because of the increased use of vans and small trucks for parcel deliveries. The Commission has therefore proposed to *decouple transport growth significantly from growth in Gross Domestic Product in order to reduce congestion and other negative side-effects of transport* and to *promote more balanced regional development by reducing disparities in economic activity and maintaining the viability of rural and urban communities, as recommended by the European Spatial Development Perspective.*

Construction and use of buildings is another key indicator. Since 1980, new building and construction activities have more than doubled. Heating and lighting of buildings now accounts for 50% of the industrialised world's energy consumption: Twice as much as transport and agriculture/industry [5]. In the UK, nearly half of all CO_2 emissions result from energy used in buildings. Construction takes up 40% of the total flow of raw materials into the global economy every year – some 3 billion tonnes. This growth in construction is almost entirely associated with the growth in employment in services and with changes in lifestyles, notably the growth of commuting and one-person households.

The result is that employment and work organisation in the "immaterial" service sector now imposes a greater burden of material use on our environment than manufacturing industry. Most is associated with material use in the workplace; inefficient use of workplaces, and inefficient organisation of work. In the Netherlands in the 1990, offices are now only actively used by their occupants for less than half of the working week; less than 10% of the total time. New "e-work" models, flexible in time and place, with greater use of shared workplaces, and more work in local communities can reverse these trends, but only when wide adoption is accompanied by structural change in work organisation by most companies. Some "new economy" companies have shown remarkable improvements. IBM has achieved 4% per year

improvements in overall energy efficiency (energy used per $ output) through the 1990s. Virtually all sales staff operate independently of traditional offices, and over $1 billion has been saved in real-estate costs.

The Commission has therefore proposed to *promote teleworking by accelerating investments in next generation communications infrastructure and services,* and to *diversify income sources in rural areas, including by increasing the proportion of Common Agricultural Policy funds directed to rural development.*

The Commission has also recommended *clear action to reduce energy demand, through, for example, tighter minimum standards and labelling requirements for buildings and appliances to improve energy efficiency.*

4 Public Awareness, Understanding and Commitment

Perhaps the greatest political challenge in the area of sustainable development is to find a way of getting greater popular and business support for change. While most people and businesses in Europe now accept that climate change and further increases in resource use present the greatest and most immediate risks to our societies and planet[4], few people feel able to change their lifestyles, and many don't even support government actions, notably in taxation.

Fuel use and greenhouse gas emissions are a particularly striking example. There is still widespread opposition to high duties on petrol and to congestion-pricing on roads: most people see such economic measures as a "loss of amenity value"; reducing their ability to travel and do not understand the environmental cost. Few people can say how much CO_2 is generated by using a litre of petrol[5]. Not only is this incremental contribution unknown, but most people are not aware of the emission-impact of their activities and anyway feel their "own" emissions are trivial compared with the total CO_2 emissions of 25,000 million tonnes a year. In addition, the "costs" of climate change are likely to be borne mainly by poor people in developing countries, rather than by prosperous people in Europe and the US.

Widespread popular "ownership" of the goal of sustainable development depends not only on more openness in policy-making but also on the perception that individuals can, through their own actions, make a real difference. For example, local Agenda 21 has been effective at promoting sustainable development at the local level. The education system also has a vital role to play in promoting better understanding of the aim of sustainable development, fostering ***a sense of individual and collective responsibility****, and thereby encouraging changes in behaviour.*

New approaches to "governance", but within the EU and globally, will be essential to progress. Globalisation and network-based activities (Internet, etc.) raise extra-territorial governance issues, some of which can only be handled collaboratively

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4 51% of people in the GEO2000 (UNEP) survey put climate change at the top of the list of their major environmental problems.

5 One tonne of air contains 360 grams of CO_2 (360 ppm). Burning one litre of petrol generates about twice its weight of CO_2; about 1500 grams – enough to double CO_2 concentrations in 5 tonnes of air.

between governments, multi-national businesses and civil society organisations: And structural change in life-styles and business practices throughout the world – will need the commitment of civil society and the business community.

Civil society has demonstrated its unease with a purely economic focus in the MIA and proposed new WTO negotiations. The UN and OECD have recognised the need for a more open approach in collaboration with business and civil society: The UN Global Compact; and the OECD Forum. However, simply adding-on consultation with business and civil society organisations into the existing set of inter-government frameworks (UN ILO, UNEP and UNESCO; WTO; OECD; World Bank; G8; and IMO) will complicate and slow down decision-making, and will not help to rationalise the "Architecture" of global governance, nor encourage a new "sharing of responsibilities" between governments, business and civil society.

Public policy also has a key role in encouraging a greater sense of corporate social responsibility and in establishing a framework to ensure that businesses integrate environmental and social considerations in their activities. Some of the most far sighted businesses have realised that ***sustainable development offers new opportunities*** *and have begun to adapt their investments accordingly. In the Commission's policy proposals to the Göteborg Summit, businesses are encouraged to take a pro-active approach to sustainable development in their operations both within the EU and elsewhere.*

The EU is itself a model of how to combine economic, social and environmental policies in an inter-government framework. It is in itself a model of subsidiarity and respect for diversity in its combination of EU and national responsibilities. The extension of subsidiarity "downwards" to the regional level must also be accompanied by a new extension "upwards" to the global level, and an extension transversally to business and civil society. A wider public debate, and resource use and emissions trading at the individual- and company- level, would also give a strong stimulus to the new "win-win" solutions of structural change in both business organisation and lifestyles for the knowledge economy. *The Commission will therefore establish a sustainable development "Round Table" of about 10 independent experts offering a broad range of views, who will report directly to the Commission President in time for the preparation of the Commission's synthesis report to the Spring European Council and make recommendations to improve the coherence of Community policies.*

The Union's efforts to achieve sustainable development ultimately depend on widespread "ownership" of the strategy by individuals and businesses, as well as civil society and local and regional authorities. Prospect for public acceptance of the strategy will be greater, the more it is based on comprehensive dialogue with representatives of society at large.

OBJECTIVES	***INDICATORS***
1. **Social Sustainability**	
Preserving social cohesion/inclusion.	The employment rate[6]. The literacy, numeracy and "digital literacy" rates.
Increasing human capital.	Proportions with school-leaving qualifications, and in higher education.
Preserving social infrastructures.	Effectiveness of health-care and pensions provisions.
2. **Sustainable Economic Development**	
Preserving economic stability.	Retail price stability. Public debt and annual deficit. Exchange-rate stability. Equity price stability.
Sustaining economic growth.	GDP growth and related "productivity" increases.
3. **Sustainable Cultural Development**	
Preserving cultural diversity and capital.	Number of people involved in cultural activities/services. Number of museums, art galleries, concerts. Proportion of communities[7] with self-managed cultural programmes.
4. **Environmentally Sustainable Development**	
Stabilising total material use: (cut per-capita material use in OECD countries by a factor of 4 by 2010 and by a factor of 10 by 2050).	Total material use: - transport use (Truck—kms; km-tonnes; car-kms and km-persons); - new construction and occupancy rates of buildings.
Stabilising the climate: reduce greenhouse gas emissions to 95% of 1990 levels by 2008-2012.	Total greenhouse gas emissions.
Preserving bio-diversity.	Proportion of forests and fisheries covered by "stewardship agreements". Proportion of land in "nature reserve" areas.
Sustaining water use and food production.	Water consumption as a proportion of renewable supply, and land area fit for food production.

Table 1: Objectives and Indicators of Sustainable Development

6 The proportion of the working-age population in work.
7 Social units of more than 10,000 people.

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