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From collaborative initiatives to holistic innovation

Paper for Panel 4:

« Sustaining innovation process – Capacity Building for innovation »

(A first set of lessons learned through the implementation of Innovation Projects of the Fifth Framework Programme of the EC)

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Introduction

Innovation is the engine that drives the economy and should be viewed as a complex multidimensional concept. The statement that innovation is under-utilised is often linked to the fact that the company lacks the resources to bring the technology to market or that a technology is exploited in only a few applications relevant to the company's core business. Yet that same technology could be applied in many ways, across products, industries, sectors or regions and could offer the potential to enhance economic and social development. However, this potential can neither be realised through technology push strategies (more research and more technology transfer), nor through pure market orientations. To establish a 'culture of innovation' supporting sustainable economic development, new ways of managing the inherent complexity of innovation must be explored.

Scientific advances have opened wider opportunities for innovation than ever before. Increasingly, the real innovation bottleneck is not the supply of new knowledge but external factors surrounding the process of technology transfer. Managing information overload, social acceptance of new technologies, environmental concerns, and the basic logistics of introducing change often pose a far greater challenge to businesses and institutional structures than the underlying technologies themselves.

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As a possible remedy, earlier approaches essentially focused on building innovation support infrastructures such as science parks and incubators, and on the promotion of specific transfers of technology. They tended to concentrate on the adaptation of a product or process to solve a particular problem. Many included a programme of pilot testing, in some cases supported by a market study. Over time the emphasis has shifted and today, the aim is orientated much more to integrate sectoral or regional structures and create mechanisms and processes with the potential to solve a wide range of problems in many different disciplines.

That experience revealed a need to look more carefully at the global context in which innovation takes place - at the management of the obstacles and risks imposed by external factors. The acceleration of scientific progress, globalisation, and the advent of the information society have all contributed to the growing expression of the intrinsic complexity of our societies. Innovation typically conjures up an image of a new technology passing from the realm of research into the commercial sphere, to provide benefits in the real world. But this simple linear model, with a technology provider supplying end-users, does little to improve the wider capacity for innovation. Traditionally, efforts to support technology transfer have focused on 'hard', technical issues. They have also tended to deal only with those organisations taking part directly in the technological transfer.

A Reference Concept for Innovation

The importance of 'softer', non-technical barriers - once viewed as extraneous or even irrelevant - has gained increasing recognition. In reality the innovation process affects a far wider range of organisations than just those directly involved. Innovation is about people, not just technology. Aptitude and attitude will always be major factors in the process.

A number of non-technical barriers can hamper effective technology transfer and adoption, including inadequate management capacity, bad communication, poorly understood end-user requirements, lack of long-term strategies or responsiveness to change. Organisations that have systematically addressed these pitfalls in parallel with more conventional technical work have derived substantial practical benefits in terms of the speed, range and sustainability of the resulting innovation. Frequently, they have a more advanced infrastructure and long term information strategy and can enjoy the critical competitive advantage in the global economy of the next generation.

Stimulating a culture of 'thinking differently' in both policy and process can induce intraor inter-company innovation mechanisms, developing competencies that enable enterprises to grow in new dimensions. As a first approach this process could be conceptualised in the *adaptation* of codified knowledge, *anticipation* of future developments based on tacit knowledge and on *organisation* skills.

Making relevant information more easily accessible to specialised sectors of the economy, by adapting the terminology and consolidating the information on best practice solutions for the cleaning of metal surfaces, has been tackled by a publicly funded body.

A Case Study

Metal surface cleaning is a common process in industrial sectors such as food, automotive parts, aircraft, heating systems, and electrical equipment. The market for cleaning

equipment and agents is diverse and complex. The range of proven solutions is enormous, but several factors must be taken into account when selecting a product or process. Clearly, cost and efficiency are of prime importance, but companies are also increasingly concerned about environmental and health and safety performance.

The range of expertise from partners in Germany, Spain, Iceland, Estonia and Greece, providing a comprehensive analysis of the existing cleaning processes, includes socioeconomic considerations such as environmentally friendly solutions and renewable resources.

The organisational structure behind this open and interactive source of targeted information will help industry to strike a better balance between economic objectives and social responsibilities, especially in light of the growing focus on sustainability as an overarching socio-economic goal.

The holistic innovation system is a prerequisite for long-term global competitiveness, beyond economic consideration. Technological development is essential for economic growth, but the innovative dynamism that is necessary to make it sustainable must integrate considerations of social relevance and environmental protection.

Innovation Projects as Innovation Systems

The described methodology is extending a commercial exploitation of pre-existing technologies, tackling common barriers to wider uptake and adoption. As an incremental change, codified knowledge is *adapted* to the broader socio-economic context. *Anticipatory* initiatives explore the scope for novel products or the development of new markets and the way it should influence, for example, in-house competencies. Projects, considered as 'innovation systems', *oscillate* between *adaptation* of existing competencies and *anticipation* of future developments within and beyond their sectors of activity.

Organisations or groups can cope with these three dimensions in a fragmented way. To integrate fragmentation, *facilitation* aims at gearing internal and external dynamics. It provides access to a wide range of *external* knowledge and competencies, in a *ready to use* format, while activating *aptitudes* and stimulating open and proactive *attitudes* of those organisations in the project that may behave as *Trojan horses* for Change.

The capacity to innovate is equivalent to any number of assets that can be adapted over time, stored and deployed when needed. Future opportunities take place within the context of the external competitive, economic and political environment which prevails, taking into account the respective internal resources, capabilities, cultures, structures and systems. Identifying the demand of society and turning obstacles into opportunities demand a flexible organisation and broadly shared collaboration. The importance of sharing knowledge, and the need to find solutions based on co-operation and consensus, are becoming increasingly evident.

It is possible to formulate the organisation's strategic priorities for relevant arenas, through the analysis of existing and potential interest. Some actions can turn out to be unfeasible, but when a suitable strategy has been defined, the critical competitive factors and the associated sustainable impact become the reference point for any functional strategy and management decisions. To implement *innovation systems*, *anticipation* and *organisation* emphasise close collaborations (leadership, management, governance, strategy, constructive

diversity between public and private sector, etc.) and involve organisations that may have never been part of an *innovation system* (users, public authorities, trade unions, and non-profit organisations).

Conclusion

Metaphorically, *Innovation Systemics* can be compared to Cell Biochemistry. External physico-chemical mechanisms generate viable *fragments* channelled to individual cells through complex *organisms*, which are integrated selective responses to evolving boundary conditions. Indeed, the sustainability of the process demands the presence of specific replication mechanisms in cells themselves as a way to ensure the durability of this *innovation* process. *Facilitation* mechanisms contribute to an optimised correlation between internal *capabilities* and external *opportunities* and *threats*.

The very concept of 'sustainable development', key factor in the pursuit of long-term economic and social progress, is based on the principle of consensus-building. Innovation's success increasingly relies on non-technological factors, and businesses are gradually acknowledging the benefits of integrating all the stakeholders in the innovation process. 'Corporate citizenship' is widely recognised among larger corporations, many of whom prepare an annual 'social balance sheet' to review company performance in areas such as environmental impact, staff relations, and relations with local communities.

Screening different approaches to sustainable innovation has come a long way from their earlier focus on solving single technological problems to tackle wider socio-economic, health and other themes. To maintain and improve their competitiveness, the enterprise arena will need tools to assess the impact of future technological development. These tools can not be seen as isolated methodologies for technological adaptation but must work as an integrated platform with a broader scope of social, economic and environmental indicators, for society to benefit fully from research and innovation.

Enterprises in different production sectors could open a platform to exchange the needs and solutions with services that offer competencies. In order to function harmoniously, all will have to fit some basic parameters such as comparable quality management, identified value analysis, consolidated human resources and flexible decision-making mechanisms. Based on trust and sector knowledge, facilitation to circulate the available competencies will create groups of small companies that become problem solver.

Beyond economic considerations, holistic *innovation systems* are prerequisite for long-term global competitiveness. The capacity to innovate is determined by any assets that can be adapted over time, stored and deployed when needed. Future opportunities take place within the context of the external competitive, economic and political environment which prevails, taking into account the respective internal resources, capabilities, cultures, structures and systems. Identifying the demand of society and turning obstacles into opportunities demand a flexible organisation and broadly shared collaboration.
