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D11.9 – Multi-stakeholders policy framework for regional economic development through Digital Ecosystems



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1. Introduction

*Policy making is the ability to forecast
what will happen during the next year
and, next year, to explain why
it did not happen.
(W.Churchill)*

The focus of this deliverable is on policy strategies for DE deployment as a means for sustainable economic local development.

The objective of this report is to develop some reflections and recommendations by relying on an analysis of the project's research domains of intervention in terms of policy, technology policy and uses, legal measures and institutional and governance models, and to identify emerging operational priorities at EU, national and regional levels to develop recommendations for the facilitation of a multi-stakeholder policy framework for regional economic development through Digital Ecosystems.

The target audience is the stakeholder base around the Digital Ecosystems community of scientists and practitioners, which includes SMEs, public administrations and related organs, and policy makers involved in regional economic development. In this, the main goal of the Deliverable is to make operational the findings of the different socio-economic workpackages of the project, that is, how to convert the research findings into actionable domains through specific recommendations of practical policy relevance. As such, its target audience is more explicitly public administrations and policy makers actively involved in the development and regulation of Digital Ecosystems but also regional economic policy.

A novel and multidimensional domain as the DE strategy for local sustainable development requires a focus on policy that goes beyond traditional actions, addressing also topics that are at the boundary of policy design as the recognition of voluntary commons schemes in the legal environment, the R&D environment, innovation incentives, technology transfer mechanisms and experiences, education access, the facilitation of industry fora, and also encouragement to form partnerships

between large ICT industry and emerging advanced SMEs, together with the conditions for the development of Digital Ecosystems approaches in industrial sectors and in public administration.

The research on policy strategies able to support and promote the implementation of the Digital Ecosystems as a model for sustainable local development did have an initial start in the research work done in the DBE project in the social science domain¹. *“DBE represents an important scientific, technological and business proposition, and also constitutes an ambitious policy intervention involving many different actors and, therefore, a variety of competing viewpoints, interests and agendas, both disciplinary and political”*².

Further research has been presented in the DBE Book (Nachira et al., 2007) in the chapters on governance and policy framework as to the interlinked elements of a structured policy approach, The understanding of the need of a legal and policy framework encompassing the function of DEs, the multi-stakeholder approach, the importance of governance and the dynamics of representation together with the understanding of a harmonised approach to DE policy all came from the first research work done in the DBE project. This document builds on those research findings moving on a grounded approach to operational recommendations and strategic actions to be implemented at the local level.

The deliverable focuses on a policy-making approach to DE implementations based on policy-making process based on a multi-stakeholder approach as a fundamental attribute of the DE methodology. The report is structured as follows.

Chapter 1 focuses on the policy-making process and the different approaches that can support the DE objectives and are consistent with the fundamental democratic, transparent and accountable values that characterize the DE approach to sustainable development. Chapter 2 gives an introduction to the main policy strategies for development designed and implemented by the European Union, starting with the Lisbon agenda and looking at the DE contribution to regional innovation systems strategies. Chapter 3 focuses on the multi-stakeholder governance approach to DE policy development as a possible way to look at possible models to apply to create governance structures/institutions, but without presenting an operational solution.

¹ See deliverable DBE D18.7 Final synthesis of social science contribution by E.Berdou

² *ibid*

Chapter 4 outlines the principles for a Digital Ecosystem policy framework design, and identifies 15 basic recommendations to be taken in consideration in the planning of a policy action in support of a Digital Ecosystem development. Finally, in Chapter 5 a quick overview of programmes supporting regional innovation policy is given.

It must be noted that the implications and recommendations developed in this document are derived largely from the broader stream of research and stakeholder engagement. Given that this work is still in development, the present deliverable should not be considered as final but more like an interim report, a living document. The theoretical and empirical frame of reference underpinning the implications and recommendations articulated here is under construction and refinement through the collaborative work of the OPAALS consortium. Further work will be done in WP12 mainly focusing on the regulatory and governance strategies for the development of Digital Ecosystems. As a result, the insights presented here must be taken as tentative as they are likely to be refined and further qualified as the project develops, the Digital Ecosystems technology is fully deployed, and the regional strategy becomes better understood.

2. Digital Ecosystem Approach to Policy-Making

Policy is defined in different terms and with different descriptions depending on the context. A policy may be usefully considered as “a course of action or inaction rather than specific decisions or actions”³ or “a set of interrelated decisions...concerning the selection of goals and the means of achieving them within a specified situation...”⁴

But where do policies come from? How are they generated? This is not a marginal question once we have decided to try to define a multi-stakeholder policy framework for Digital Ecosystems deployment.

Policy research is a complex domain in which the “examination of research theories, methods, results and policy proposals (...) in a real world policy context can provide a more rigorous critical assessment of views than any provided in the more antiseptic atmosphere of professional journals and meetings”⁵. At this stage we have derived some insights from the work the social science has done on the analysis of the experience of the regions which have set forth an initial structured approach to deploy Digital Ecosystems. The long-term objective is to gather an initial understanding of the hurdles posed by a policy-making process and to understand how transparent approaches to public deliberation can enable trust relationships among interested parties in a Digital Ecosystem deployment.

In general terms individuals and groups often attempt to shape public policy through education, advocacy, or mobilization of interest groups, and the process always involves efforts by competing interest groups to influence policy-making in their favour.

The general rational model for the public policy-making process can be divided into

³ Hecló, H. (1972), ‘Review Article: Policy Analysis’, *British Journal of Political Science*, Vol. 2. pp. 83-108

⁴ Jenkins, I, 1978, *Policy Analysis: A Political and Organisational Perspective*, Martin Robertson, London

⁵ Melody, W. and R. Mansell (1983). ‘The Debate over Critical and Administrative Research: Circularity or Challenge.’ *Journal of Communications* 33, no. 3: pp.103-116.

three parts⁶:

- Agenda-setting
- Option-formulation
- Implementation.

In the agenda-setting stage, the agencies and government officials meet to discuss the problem at hand. In the second stage, option-formulation, alternative solutions are considered and final decisions are made regarding the best policy. Subsequently, the policy chosen is implemented in the final stage. Implied within this model is the fact that the needs of society are a priority for the players involved in the policy-making process.

A linear model for policy setting is very unlikely to represent the real process taking place in society and among the interested stakeholders. Indeed, it is far from certain that government will follow through on all decisions made by the policies chosen. Specific policy rationales can represent explicit and/or implicit models of action used by policy-makers for the design, selection and use of a particular policy instrument or mix of chosen policy instruments. In real policy-making, it is frequent to find specific blends of justifications and policy rationales, which are often in tension with each other. Policy mixes at the regional level are indeed becoming more complex in terms of the combination of policy instruments and objectives used. It is a matter of fact that the regions are increasingly exposed to the influence of external economic and political dynamics in their strategy-setting and in their decisions, and more pressed by the competition between regions within the same nation, and as a consequence their innovation strategies become progressively more complex. In this scenario the mix of policy instruments needs to interact to influence the extent to which the goals of innovation policy are achieved (innovation outcomes) in stable and durable ways.

Ultimately, looking at European Regional Innovation strategies, policy rationale is about trade-offs between a variety of policy objectives: increase of R&D capacity, fostering of university-industry links, promotion of clusters, raising public awareness, and specific priorities/targets. Specific priorities could be, for example, a particular sector, SMEs, or a choice of instruments: e.g. industrial policies, incentives and

⁶ N.Zahariadis *Ambiguity and Choice in Public Policy: Political Decision Making in Modern Democracies*, Georgetown University Press, 2003

grants, tax breaks, financing of infrastructure for innovation, etc.

Unfortunately, those who frame the issue to be addressed by policy exert an enormous amount of influence over the entire process through their personalities, personal interests, political affiliations, and so on. The final outcome of the process, as well as its implementation, is therefore not as effective as that which could result from a purely rational process.

A possible means of mitigating the interests of the players involved is to rely on a *multi-stakeholder governance* of policy by drafting a mechanism capable of bringing together diverse interested stakeholder groups to address Digital Ecosystem policy issues in a concerted way. Since governments are amongst these stakeholders, the network may determine that they should address the policy issues through domestic legislation or intergovernmental agreements. In this way the top-down approach meets the bottom-up processes that always exist at local level, and the Regional Catalyst becomes the principal actor responsible for the grey area in the middle, where the institutional level has to meet the needs and aspirations of the community level (this is an abstraction of the concrete process being followed in the Trento region)⁷; which can be visualized following the abstraction and further development by Szabo and Botto (2008).⁸

⁷ for more details please see Opaals deliverables D12.7 and D12.8

⁸ see Opaals D12.10

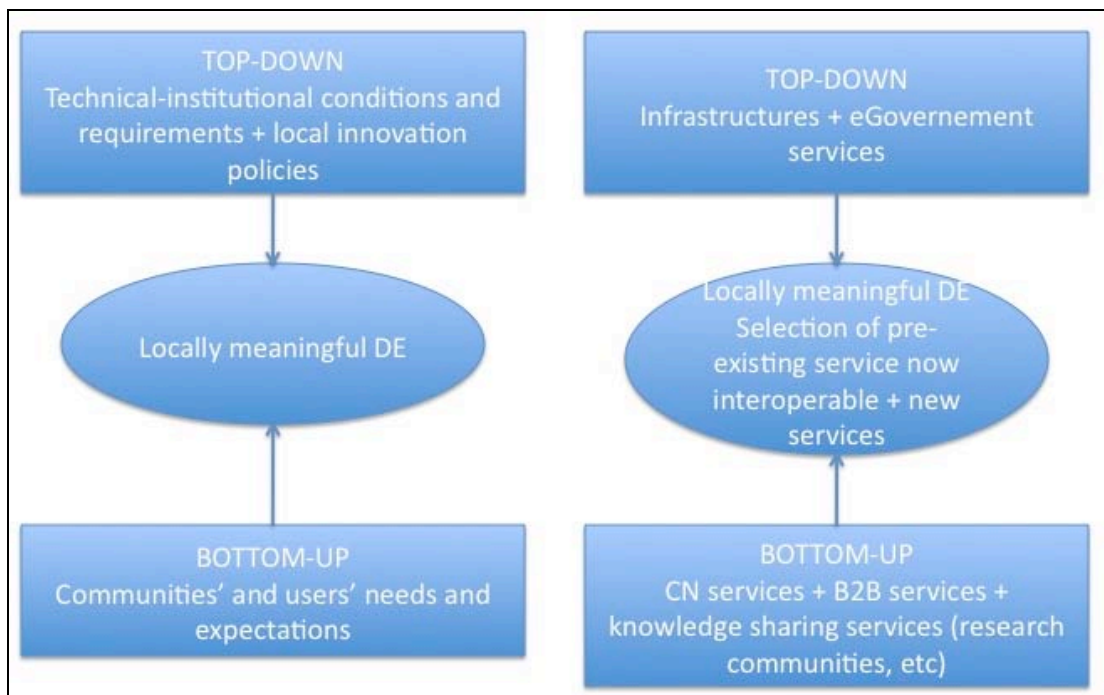


Figure 1

We know that the bottom-up approach to Digital Ecosystem policy development encourages local agencies to develop their own distinctive Digital Ecosystem policies which will compete for, receive, absorb and integrate funds and programs developed at national or EU levels. These bottom-up innovation policies linked to Digital Ecosystems should, at the same time, also accommodate top-down programs and funds into the policy frameworks, and the ‘*absorptive capacity*’ of each region in an institutional and organisational sense.

The dominant regional policy trend in the '90 was towards network building, supply chains, and clusters, and emphasised the role of learning. It has been argued⁹ that in regional policy there has been a shift from top-down to more bottom-up approaches. However, whether there is yet evidence of this being translated into innovation policy, which still remains overwhelmingly top-down in most national economies, remains questionable. Still Regional innovation policy is caught uncomfortably between the two.

In the two partial tests of Digital Ecosystem deployment (Lazio and Aragon) there has been a concerted effort at trying to balance the top-down and the bottom-up approaches, so that the role of Regional Catalyst evolved significantly as a

⁹ Lagendijk, A., Cornford, J., 2000. Regional institutions and knowledge – tracking new forms of regional development policy. *Geoforum* 31, 209–218.

consequence.^{10,11} Following this approach also the influence of a few stronger stakeholders has been mitigated in going through a direct and continuous involvement of different levels of participants and interested parties in the policy implementation activities. In D12.10 the participatory process of DE adoption has been summarised in Figure 1. above

It is clear that such a complex participatory process needs a transparent approach at the governance of the network of the stakeholders involved. We always tried to direct the formation of the Digital Ecosystem community as much as possible towards a democratic participatory network. Unfortunately is not clear yet which form this process should take, but an initial understanding of the form and processes of a Digital Ecosystem policy framework is needed to better define recommendations which will be effective in establishing a better boundary to policy drafting. We tend to consider the process that stands at the bottom of a Digital Ecosystem stakeholder community as a substantive democratic process with a strong social focus, as a participatory or collaborative democracy. As the participants in such processes are usually self-selected, opportunities for public participation in policy-making are generally advertised through the media, though briefings to known interest groups may also be initiated by the government (a feature of so-called pluralist democracy).

¹⁰ It is important to notice that the role of Regional Catalyst can be played in a collaborative way by more than one local actor. For example a local development agency can act as RC in the first steps of the process positively engaging the insitutional level, then a research centre or an innovative software enterprise can take action as Regional Catalyst when dealing with participatory service design. This issue has been already covered during the DBE project, see D31.6

¹¹ Opaals D12.10

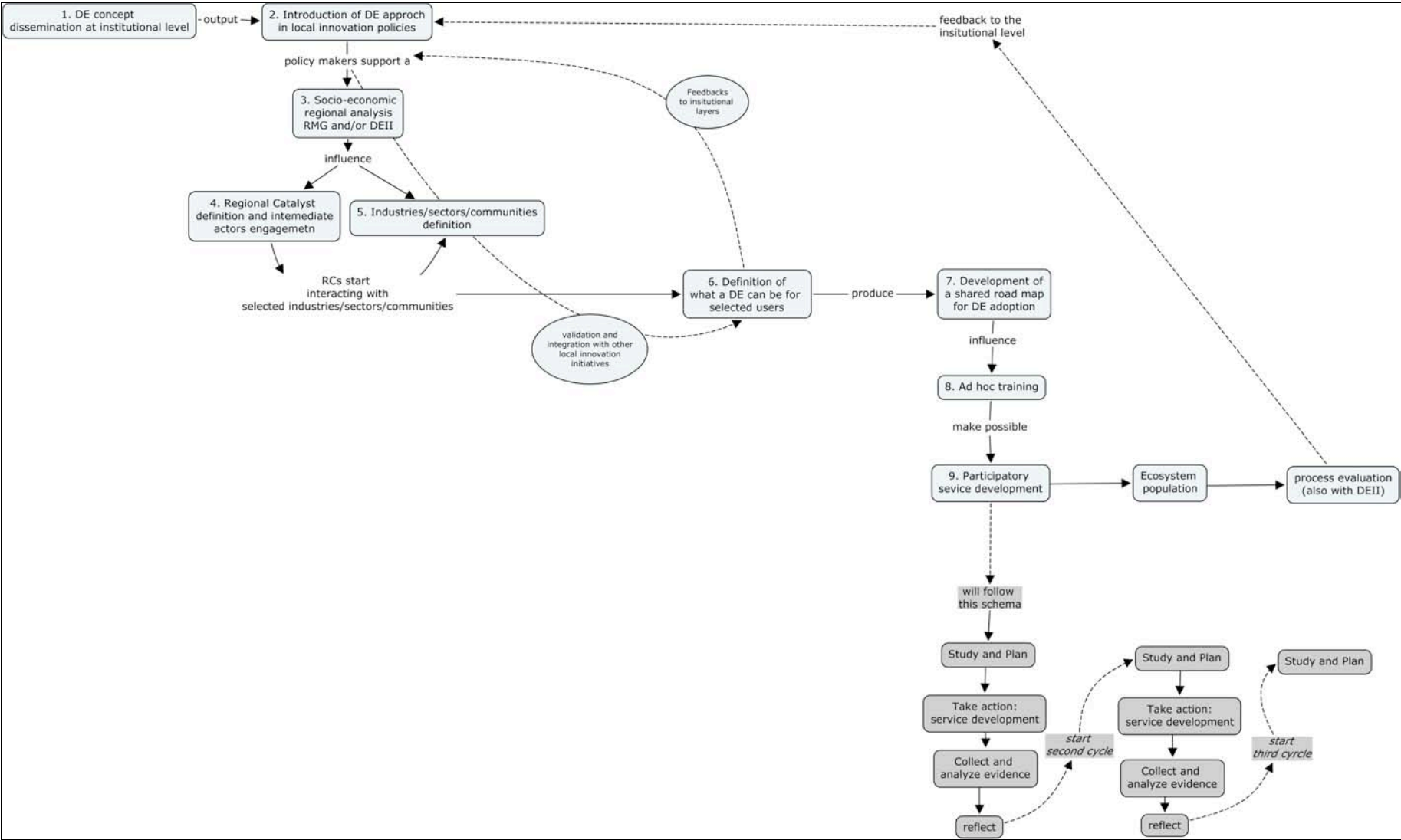


Figure 2 - Participatory Process of DE adoption

But participative democracy is subject to the provision that responsibility for the final decision or policy formulation rests with the government – which may or may not be consistent with a deliberative democratic programme, depending on how accountable the government is for the consideration of the stakeholder input through institutionalised political processes. Moving further along this line and considering the strong bias of Digital Ecosystems towards open, transparent, accountable and continuous information flow among interested stakeholders, we can look at the Digital Ecosystem Policy framework more as a deliberative democratic process.

Thus where direct democracy fails because its ability to produce reasoned decisions is dependent on the existence of a more informed citizen than really exists, and where representative democracy cannot, without bias, represent the interests of all citizens (and in practice best represents those of powerful elites), deliberative democracy aims to remedy both those deficiencies, resulting in closer adherence to the democratic principle of consent¹².

Deliberative democracy is concerned with decision-making. We should distinguish this also from “grass-roots democracy” which considers that democracy is to be exercised at the lowest possible level.¹³ Deliberative democratic procedures may be applied at the grass-roots level, and they are equally applicable within other layers of governance that may be further removed from the grass roots. Similarly, deliberative democracy is a broader empowered participatory governance¹⁴, because “by empowering stakeholders with the authority to make decisions affecting them it gives community members the authority to make decisions and choices and facilitates the development of the knowledge and resources necessary to exercise these choices.”¹⁵

Again sticking to the foundational principles of the Digital Ecosystem community, it is clear that in this scenario any position must be supported by reasons that appeal not just to the proposer but to all, or at least to a majority of the community members.

¹² Dryzek, John S & List, Christian, *Social Choice Theory and Deliberative Democracy: A Reconciliation* (2003)

¹³ Kaufman, Michael & Dilla Alfonso, Haroldo, *Community Power and Grassroots Democracy: The Transformation of Social Life* (1997)

¹⁴ Fung, Archon, Wright, Erik O, & Abers, Rebecca, *Deepening Democracy: Institutional Innovations in Empowered Participatory Governance* (2003)

¹⁵ Zippay, Allison, *The Politics of Empowerment* (1995)

This results in a tendency for democratic deliberation to be conceived in terms of the common good, simply because a participant's appeal solely to his own self-interest is unlikely to be successful in convincing others¹⁶. In this way we believe that the act of public deliberation¹⁷, at the base of the agenda-setting and option formation of the Digital Ecosystems policy-making process, could transform the democratic process from something potentially quite arbitrary into an approximation of the liberal ideal, that makes the impossible (according to Arrow's theorem) possible.¹⁸

Indeed not only does the foreseen deliberative democratic process of the Digital Ecosystem community produce better and more reasoned outcomes, but because it takes place through a process of open and equal public deliberation, its transparency and accountability are also of a high standard, which in turn contributes to the consideration of legitimacy of the agreed output and the extension of that output's acceptance¹⁹.

Deliverable D12.10 has deeply analysed the ontological framework of digital ecosystems²⁰ and also what concerns the democratic process of "digital ecosystems formed as communities of practice (for whatever purpose: enterprise and trade, agricultural development, or research) will experience a similar depth and breadth of difference in membership and imagination"²¹. Moral equality and citizenship, and consensus building together with the structure of power and knowledge, all contribute to build a better understanding of the underlying tension and informal structures which steer the decision processes and the organisations.

As stated in the conclusion of Chapter 2 of D12.10,

"The theorisations of knowledge as discourse, power as distributed and systemic, and democratic processes as defined by both diversity and a drive towards consensus are helpful in that they are transparently harnessed as framing values for digital ecosystems research, and reflect our belief that they are fundamental to any theoretical

¹⁶ Cohen, Joshua, *Deliberation and Democratic Legitimacy* (1989), 25; Dryzek, John S., *Deliberative Democracy and Beyond* (2002)

¹⁷ Generally public deliberation has been mediated by strong public institutions but the shift towards more direct citizens, interest groups involvement pose the question, within the Digital Ecosystem policy process on how to solve the different regulatory issues that might exist within different community or circles of innovation. T12,12 of Opaals deal with those problems

¹⁸ see note 10

¹⁹ Innes, Judith E & Booher, David E, *Reframing Public Participation: Strategies for the 21st Century* (2004)

²⁰ Opaals D12.10 – Foundations of the Theory of Associative Autopoietic Digital Ecosystems: Part 3 by Paolo Dini, Mehita Iqani and Lorena Rivera-León (LSE), Antonella Passani (T6 ECO), Sotiris Moschoyiannis (SURREY), Ossi Nykanen (TUT), Debashis Pattanaik and Jayanta Chatterjee (IITK)

²¹ Opaals D12.10 pag 20

framework of future research in this area(...) In terms of governance, it is clear that distributed, horizontal models of power are the most appropriate for theorising the ways in which digital ecosystems should be self-governed, and the impacts that the outputs of digital ecosystems research can have upon socio-economics and development policy more broadly. And, in terms of socio-economic development, it is clear that a model of democratic process that recognises both the presence of diversity, and the need for building consensus, must be based on moral equality and consensus-oriented communication²²

If we do understand indeed the complexity of the socio-dynamic forces involved in the building and governance of Digital Ecosystem constituencies we will be better positioned to support the emergence of the dynamics of social, economic and technological inclusion and to minimise existing divisions within society, which are among the fundamental values embedded in the research approach of the OPAALS community.

²² Opaals D12.10 pag.24

3. Regional Innovation Strategies in Europe

In March 2000 the European Union launched the Lisbon Strategy with the objective to become the most competitive knowledge-based economy in the world. This ambitious project was decided at the European Council of Lisbon. The key elements of the Lisbon strategy are fast economic growth, creation of better jobs, boosting innovation and entrepreneurship, increase of social cohesion, and sustainable and eco-friendly development. This mandatory recipe was launched because the EU realized that its competition and research gap with the USA and Japan was growing and because in order to maintain and improve the welfare and the protection of environment a rapid and high-quality economic growth was necessary in Europe.



Source: Knowledge Board 2006

The figure above describes the three pillars of the Lisbon Strategy: economic, social and environment sustainable development. (The third pillar – environmental sustainability – was added to the Lisbon strategy some years after 2000). Only a faster and qualified economic growth based on innovation, technology, research and development and supported by a flexible labour market could guarantee to Europe a better social cohesion and environmental sustainability. In fact, it is generally believed that for Europe to support a growing ageing population, to implement social protection programs, to improve the sustainability of its environment, and to guarantee full employment it needs to grow economically and technologically.

The Lisbon Strategy was launched to boost economic growth through increasing R&D spending in private and public sectors, which would stimulate spillover of scientific and technological knowledge from universities to companies. It aims to spread a strong entrepreneurial spirit, to facilitate the setting up of companies, and to widen the use of ICT technologies for everyone. It aims to reform the labour market by pursuing the new concept of *flexicurity* (flexibility + security), introducing more flexibility while at the same time introducing active labour market policies, life-long learning programmes, raising educational and skill levels, and the restyling of social programs.

After a promising beginning in 2000, its results have not been encouraging. In actual fact employment growth slowed sharply and productivity did not reach the planned objectives (3% of economic growth and 70% employment rate), because of the inability to take full advantage of the knowledge-based economy as defined by the Lisbon Strategy. According to the Kok report²³ *"External events since 2000 have not helped achieving the objectives but the European Union and its Members States have clearly themselves contributed to slow progress by failing to act on much of the Lisbon strategy with sufficient urgency. This disappointing delivery is due to an overloaded agenda, poor coordination and conflicting priorities. Still, a key issue has been the lack of determined political action"*.

The re-launch of the Lisbon Strategy based on the Kok report recommendations in 2005 has been focused on the following basic principles: *"... renew the basis of its **competitiveness**, increase its **growth potential** and its productivity and strengthen **social cohesion**, placing the main emphasis on knowledge, innovation and the optimisation of **human capital**. ...mobilize all appropriate national and Community resources - including the cohesion policy - in the strategy's three dimensions (economic, social and environmental) so as better to tap into their synergies in a general context of sustainable development"*²⁴. The Lisbon Strategy is focused on the role of innovation as the engine to economic growth. Innovation is considered by the EU to be a key factor for transforming the industrial economy into a knowledge-based

²³ Kok report Kok review of Lisbon Strategy, 2004, EurActiv Official Web page Available from <http://www.euractiv.com/Article?tcmuri=tcm:29-131812-16&type=News>

²⁴ Lisbona Strategy Lisbon Strategy 2000, European Union Official web page. Available from http://europa.eu.int/growthandjobs/index_en.htm

economy. However, the innovation process is not equally spatially distributed in Europe like elsewhere²⁵.

The Regional Innovation System is a somewhat new concept, having been discussed and written about in the early nineties²⁶. Porter's studies of American high-tech clusters and the weakness of National Innovation Systems in Europe made the concept of Regional Innovation Systems attractive to explain and analyse the success of industrial districts in Europe²⁷.

Asheim²⁸ defines three kinds of Regional Innovation Systems. The first kind is called *territorially embedded regional innovation system* (example Emilia-Romagna, Italy), where enterprises, as Asheim points out, "base their innovation activity mainly on localized learning process stimulated by geographical, social and cultural proximity...these territorially embedded system provide bottom-up, network-based support through...technology centers, innovation networks...providing market research and intelligence service, to promote the adaptive technological and organizational learning in territorial context"²⁹. The second type of Regional Innovation System is defined *regionally networked innovation system* (example Baden-Wurttemberg, Germany) where enterprises are still embedded in a particular regional system of interactions and learning. However, as Asheim points out, "policy interventions lend these systems a more planned character through the intentional strengthening of the region's institutional infrastructure...a regional cluster of firms surrounded by a regional supporting institutional infrastructure". The third type of Regional Innovation System is called *regionalized national innovation system* (examples France and Japan), where institutional networks and innovation practices take place without regional embeddedness. In such systems of innovation "...parts of industry and the institutional infrastructure are more functionally integrated into

²⁵ Asheim B, T. and Gertler M (2005): "The Geography of Innovation: Regional Innovation Systems", in Fagerberg, J., Mowery, D., and Nelson, R. (eds.), "The Oxford Handbook of Innovation. Oxford", Oxford University Press, pp. 291-317

²⁶ Lundvall B (1992): "National System of Innovation: towards a theory of innovation and interactive learning", Printer, London; Cooke P, Memedovic O.(2006): "Regional Innovation Systems as Public Goods", UNIDO Policy Papers, Vienna

²⁷ Porter M.E, (1998): "Clusters and the new economics of competition", Harvard Business Review, November-December, 1998. Porter, M.E, (1990): "The competitive advantage of nations", London and Basingstoke, Macmillan

²⁸ see n.14

²⁹ Storper, M. (1993): "Regional worlds of production: Learning and innovation in the technology districts of France, Italy and the USA", Regional Studies 27: 433-455.

national or international innovation system...innovation activity takes place primarily in cooperation with actors outside the region"³⁰.

We can easily say that the Digital Ecosystem innovation strategy sits in the middle among the three regional models identified here.

The Digital Ecosystem community realised, indeed, that to bring into existence information and communication technologies (ICTs) that help in the achievement of the challenges identified by the objectives of the Council of Lisbon (higher growth, more and better jobs, and greater social inclusion) there was the need to widen the horizons with a more holistic and systemic approach. In addition to ICT, this new approach considers socio-economic aspects and the human perception, communication and representation dimensions in one single domain. This approach, applied to social and economic processes and their digital representation, is consistent with the changes in the production processes brought by networks of users/producers³¹, which have clarified the processes of technological and social innovation and have helped imagine the development of a Digital Ecosystem framework.³²

Digital Ecosystem innovation strategy tries to find a balance between "old" theories of stagnation brought by oligopolies³³ on the one hand and Open Innovation³⁴ and "Crowdsourcing"³⁵ on the other. It looks at new institutional and transaction costs economics³⁶ as well as at the economics of sharing and community currencies.³⁷

³⁰ see n.14

³¹ Benkler, Y (2006). *The Wealth of Networks: How social production transforms Market and Freedom*, New Haven and London: Yale University Press; Benkler, Y (2004). "Sharing Nicely: On Shareable Goods and the Emergence of Sharing as a modality of Economic Production", *Yale Law Journal*, Vol 114, pp 273-358

³² O'Callagan, R (2004). "Technological Innovation in Organisations and Their Ecosystems", in *Transforming Enterprise: The Economic and Social Implications of Information Technology*, Edited by William H. Dutton, Boston: MIT Press.

³³ Steindl, J (1990). "From Stagnation in the 1930s to Slow Growth in the 1970s", in *Political Economy in the 20th Century*, Maxine Berg Ed., London: Philip Allan.

³⁴ Chesbrough, H (2003). *Open Innovation: The New Imperative for Creating and Profiting from Technology*, Boston: Harvard Business School Press

³⁵ Crowdsourcing is defined as new business model in which a company or institution takes a job traditionally performed by a designated agent (usually an employee) and outsources it to an undefined, generally large group of people in the form of an open call over the Internet. Crowdsourcing has been used the first time by Howe, J (2006). In "The Rise of Crowdsourcing", *Wired*, June 2006

³⁶ Coase, R (1937). "The Nature of the Firm", *Economica*; William; Benkler, Y (2002). "Coase's Penguin, or, Linux and The Nature of the Firm", *Yale Law Journal*, Vol 112, pp 369-446. son, O (1975). *Markets and Hierarchies: Analysis and Antitrust Implications*, New York: The Free Press

³⁷ More information at <http://www.openmoney.org>

Perhaps most importantly, it strives to remain open to new ideas coming from research and academia as well as from business and development experience. It is a body of knowledge on innovation that constantly innovates itself with new ideas and new points of view.

4. A Multistakeholder Governance-to-Policy Framework

The PEARDROP³⁸ project states in one of its toolkits for Digital Ecosystem deployment “

at the beginning, however, Digital Ecosystem implementation needs a systemic approach. In its start up phase, the Digital Ecosystem model involves some key players including: Regional catalysts, which are public, private or mixed organisations, operating at regional level, they involve and help SMEs in integrating business processes based on ICT, and in adopting Digital Ecosystem. Regional policies, which can act in order to improve conditions enabling a regional system to favour Digital Ecosystem implementation. Such conditions are used as a lever to promote regional development and growth. A Digital Ecosystem, thus, refers to the regional economic system and the policies for its implementation must have a systemic approach. Other regional actors involved in Digital Ecosystem are Universities, research centres and innovation centres that can provide the basic scientific knowledge. They also can act as regional catalysts. Professional and industrial associations that can help in achieving a local consensus within the entrepreneur community”³⁹

Implementation of regional policy, indeed, can no longer rely exclusively on the government. In earlier approaches, government was seen as responsible for a stable macroeconomic and legal context and a functioning infrastructure, while companies were to compete in the market place. Competition under globalization alters the structural conditions of policy intervention. Government is an important factor in shaping the business environment but so are companies, universities and public and private research bodies, and many other institutions of government and civil society.

Government itself is not the unitary entity it appeared to be when macroeconomic policies were the focus. At the microeconomic level many different types of government agencies at all levels of geography have an impact. And this is fundamentally a question not of government but one of governance among different stakeholding organizations within a spatially dispersed system of competencies.

It is clear that such a diversity of actors and not necessarily converging interests cannot be managed following a traditional policy-setting approach with agencies and local government officials setting up the rationale and the policy mix for this domain, also because policy issues raised by economically sustainable development and Digital Ecosystems tend to be inherently transnational in nature. A different level of governance is then needed to achieve the identified goals.

³⁸ <http://www.peardrop.eu>

³⁹ Peardrop Wp3 toolkit

Governance by a multi-stakeholder network conceptually provides a solution bringing together each of the mechanisms of governance. Governance by network does not however emerge spontaneously, but requires supportive institutional structures and processes to maintain a balance of interest and power.

For the need of balance between each of the mechanisms of governance, it would be useful if there were some theoretical or empirical basis upon which to determine which mechanisms, either alone or in combination, are most likely to be effective for a given set of issues⁴⁰.

The sphere of governance in which the mechanism is to be applied should also be thoroughly considered, to determine whether the chosen mechanism is likely to be adequately effective for application in that sphere, such as the Digital Ecosystem. Legitimacy is then a first requirement, as the authority that undertakes the exercise of public policy governance must normally be accepted by the governed through some form of political process, such as democratic accountability to a broad range of stakeholders.

It is therefore no coincidence that the predominant mechanism of governance in the public policy sphere has been rules, since the authority of the rule-maker is normally negotiated through a political process seen as legitimate within the international and/or domestic legal systems of its subjects⁴¹. In contrast, the legitimacy of the other, more decentralised mechanisms of governance – norms, markets and architecture – is much weaker in the public policy sphere, Such policy-making may for example be driven, in the case of markets, by the “invisible hand of commerce,” or in the case of technical policy by unexamined accidents of design that conflict with more fundamental social values⁴².

Given the peculiar case of the Digital Ecosystem, the likely effectiveness of a given mechanism within a particular sphere of agreed governance should also be considered. In the case of the Digital Ecosystem community or constituency, it should be a multi-stakeholder governance network, which should combine the merits (and overcome the limitations) of both hierarchical and decentralised modes of

⁴⁰ This is still an general open area of research not only for the project which should require further efforts of investigation but it's likely to not be well understood within the timing of this project

⁴¹ J.Malcom, Multi-Stakeholder Public Policy Governance and its Application to the IGF, 2008,

⁴² Regionalization of innovation policy, Research Policy 34 (2005)

governance, by coordinating the application of the most appropriate mechanisms of governance for the setting up of a policy framework for Digital Ecosystems, and making everybody accountable to the stakeholders by which the network is formed.

A multistakeholder governance-by-network process for Digital Ecosystems policy drafting seems to be the only mechanism capable of bringing together multiple groups to address Digital Ecosystems policy issues in concert. Since governments (national and local) are among these stakeholders, the Digital Ecosystem network may determine that they should address a policy issue through regional or national legislation or intergovernmental agreement. Or all the groups may act together, by collaboratively developing an independent body of transnational law for the guidance of their respective constituents.

What we cannot discuss here is exactly how they should make those sorts of collective decisions. In a sense, consensus is the fundamental decision-making structure for governance networks. The unique insight gained from consideration of consensual decision-making is its application at larger scales, through consociationalism⁴³.

Consociationalism is the theory of a form of organisation designed to institutionalise the reservation of power to distinct stakeholder groups within a consensual decision-making forum. First and most famously described by Arend Lijphart,⁴⁴ it describes an ideal form of what may more broadly be called consensus democracy, which includes various other forms of democratic governance characterised by the sharing of power between stakeholder groups at the executive level⁴⁵. This can allow groups insistent upon retaining their independent power yet wishing to collaborate in governance, to do so in the knowledge that they and the other participating groups share the power of mutual veto over any decision of collective concern.

Drawing together these insights, it can be concluded that an appropriate structure for a transnational network for Digital Ecosystem policy framework drafting could consist of an open, transparent forum within which members of all stakeholder groups deliberate with the aim of reaching consensus, led by a meritocratic executive council to which each group appoints its representatives using a consociationalism

⁴³ *ibid.*

⁴⁴ Lijphart, Arend, *Consociational Democracy* (1969)

⁴⁵ Lijphart, Arend, *Patterns of Democracy: Government Forms and Performance in Thirty-Six Countries* (1999)

approach, and which would be required to ratify all decisions of the forum by consensus.

This is all very well, except that of course the question of an appropriate design for such a multi-stakeholder governance network is not an abstract one and should be objective of detailed further investigation during the last phase of the Opaals project. Further, these considerations on democratic processes and power relationships need to be compared to and reconciled with the overarching theoretical framework developed by D12.10.

5. Rationale and Principles for the Design of a Digital Ecosystems Policy Framework

The growing interest for the Digital Ecosystem model among regional development agencies comes from an understanding of the intrinsic different capacities a Digital Ecosystem embodies, which can provide an innovative framework to develop local economies.

The outcomes of the projects in the Digital Ecosystem cluster, in spite of starting from a novel area of research, indicated that the Digital Ecosystem approach could provide a large number of favourable outcomes to the development of local economies⁴⁶. In spite of this positive response, it is very difficult at this stage to identify the precise role policy intervention should play given the multidisciplinary and multi-stakeholder approach needed.

At the end of DBE project⁴⁷ the process of local implementation of digital ecosystems was defined as one influenced by different variables, and as a process that needs to be adapted to local needs, user behaviours, and specific historical/economic junctures.

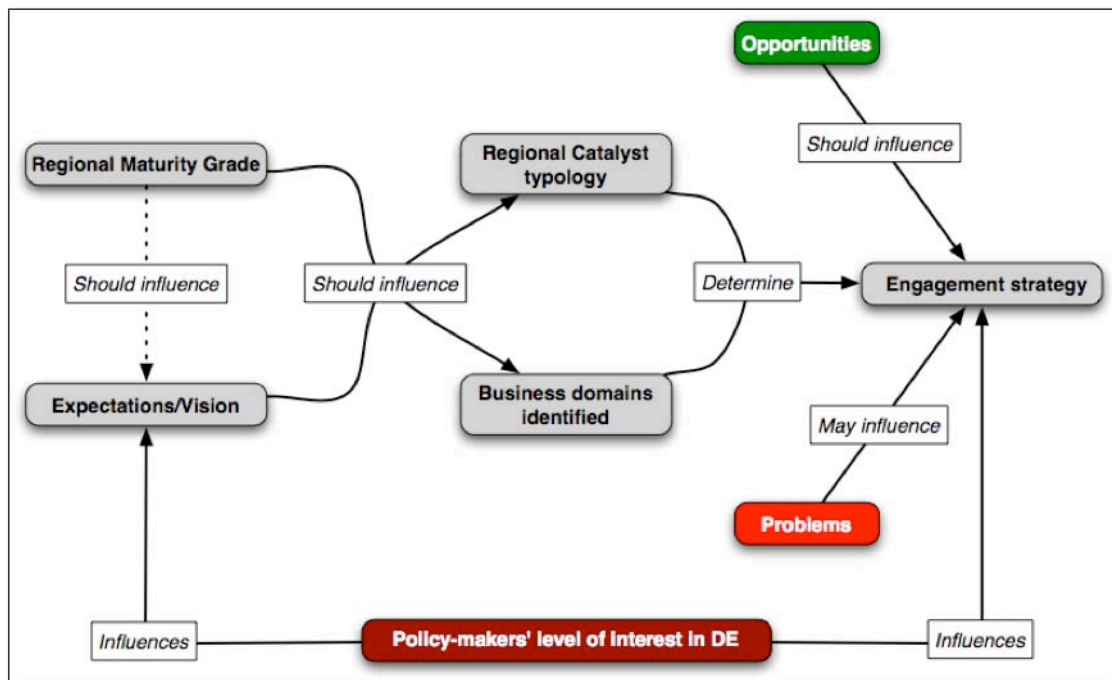
Although the Digital Ecosystem adoption process, as Digital Ecosystem technology, needs to be planned with the specific aim of be adaptable to specific local needs, the adoption process is explained in the following sequential steps:

1. DE concept dissemination and awareness building
2. Socio-economic regional analysis: Regional/territorial Maturity Grade and/or DEII
3. Regional Catalyst definition and engagement
4. Industry/sector/community definition
5. Users definition (Cluster and SMEs identification and selection, or research community identification, etc)

⁴⁶ Regional development strategies drafted in the region of Lazio, Aragon and Wales directly address the Digital Ecosystem in their planning documents setting up the regional innovation strategies for the period 2007-2013

⁴⁷ Passani, A (2007a). "The Territorial Prospective fo Digital Ecosystems", in Nachira F, Nicolai A, Dini P, Le Louarn M and Rivera León L (Eds), Digital Business Ecosystems, Brussels: European Commission.

6. Development of a shared roadmap for the development of the first habitat
7. Training
8. Service development and ecosystem population
9. Pilot action evaluation (with DEII)⁴⁸ and digital ecosystem systemic deployment planning
10. Steps from 3 to 8 can be replicated for different habitats adapting the activities to the specific needs of each industry/sector/community⁴⁹



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This 10-step process is an important, yet simple, blueprint to be followed to understand how a local Digital Ecosystem can be bootstrapped.

It is important to highlight that such a process will be applied to soft regional assets (knowledge bases or institutional settings) that are the results of long histories in particular regional contexts. Policy makers should be aware **no to simply imitate successful models**, as regional best practices cannot be transferred easily from one environment to another. Policy makers are thus responsible for tailoring region-specific policy recognizing the institutional and governance capabilities of the region.

⁴⁸ The Digital Ecosystems Impact Index is an aggregated composite indicator, formed of four evaluation accounts: financial, user, economic development and social. It is an open and scalable tool for assessing the socio-economic impact of DE deployments at local/regional level, and it has been presented in the Opaals deliverable D11.1

⁴⁹ see Opaals D12.10

They should take into account differences in the quality of regional communication infrastructures, technology readiness and understanding of the knowledge base advantages of the region, and presuming that the regional innovation system to be connected to the Digital Ecosystem policy might not be complete in most regions.

In simpler terms, we can say that policy-makers should try to pay attention only to policies that are able to **create a favourable environment** (that can be assessed through the use of the Digital Ecosystems Impact Index) for the Digital Ecosystem deployment and which are bespoke on the regional industrial and economic environment. The first question a policy intervention should answer is whether the resources spent to create and support a regional Digital Ecosystems with the aim to generate economic value are higher than their opportunity cost, and whether a Regional Digital Ecosystem is sustainable once the initial public funding is spent. The long-running experience gathered in last 5 years of advocacy and pilot projects in several European regions does say that building a Regional Digital Ecosystems is a long and expensive process, which needs **long-term support from local development funds**.

When we position the policy rationale at local level we also have to understand that Digital Ecosystem policy might clash with national/local strategic industrial policies. Industrial policy suggests indeed that a few sectors of the economy are inherently more 'strategic', than others. The Digital Ecosystems approach, instead, suggests that all the sectors are important and should cooperate and exchange knowledge for the creation of favourable ecosystemic conditions for development, increasing competitiveness and productivity across all regional industrial domains. Clearly at the beginning it will be advisable **to focus on a restricted number of industrial domains (platform approach)**. The selection can be done following the concept of drivers at the level of Regional Catalyst, domains and enterprises that have high ability and motivation to be involved and to improve their status. Better would be to make the selection following specific regional priorities and applying a structured methodology developed within the research projects of the cluster (i.e. Territorial Maturity Grade methodology)⁵⁰.

Policy-makers in the drafting a DE policy framework should move from informed

⁵⁰ An approach followed in the Region of Lazio for the identification of industrial domains readiness for the application a DE framework.

decisions made through **in-depth analysis of their territorial readiness**, avoiding to invest in sectors without a clear competitive advantage and a technology infrastructure. A non-informed strategic decision will tend to encourage competition only proportionally to the amount of financial incentives provided by the policy initiative and not based on their inherent merit for these activities.

A more concrete approach emerging for a Digital Ecosystems policy framework is to look at it as an enabling framework able to create favourable business and development conditions and to **remove formal and informal obstacles** for its deployment. Obstacles and roadblocks to create favourable business and development conditions in a given region span over different policy domains and can be divided in local and global needs. Roadblocks can be indentified in several domains like entrepreneurship, public financing, exchange of people/experience between SMEs, large corporations and universities, standards, openness and licensing content/IPR protection, users' needs, and early involvement

The importance of a key challenge for policy-makers is then evident: **prioritization**. Given the limited resources and ability to mobilize joint policy actions, prioritization among them is of fundamental importance. While past discussions were about which policies created economic benefits and which did not, Digital Ecosystems policy framework discussions need to select the most effective policies, for a given location at a given time, out of all the available policies that could improve the business environment following the Digital Ecosystems rationale.

The development of a Digital Ecosystems policy framework needs to be based not only on the territorial readiness assessment, but also on an **identification of the most critical barriers** that hold back economic improvements and innovation. To act upon this set of factors, a broad group of institutions have to work together. A generally accepted policy framework, which explicitly seeks inclusion and 'buy-in' on the part of all stakeholders, is a critical condition for the mobilization of actions and resources in clusters. At the same time public funding on the part of national or regional authorities for the support and development of clusters is also important as it demonstrates commitment and credibility. However, these conditions in themselves are not sufficient: critical is a **governance framework** that encourages relationships between and among the stakeholders.

Regional and national institutional structures are the only ones able to provide the

strategic frameworks of policy action for a given region. Public policy plays a crucial supporting role in the innovation process. Such support includes the provision of **funding in the earliest stages**. At the same time the innovation process can be stimulated by public investors acting as “first buyers” of innovation outcomes. This should be done so that they do not act as protectionists by favouring domestic companies or – even worse – acting as developers/producers themselves. These actors must realise that they are important big purchasers and must have a strategy for their actions (to add to public procurement regulations) so that they can contribute to new businesses and technology adoption.⁵¹

Policy approaches, which are based on a systemic view, or as ‘platforms’ for local development, can enhance synergies across sectors holding significant advantages for all the areas. Policy platform approaches might easily take form in well-integrated domains but are very rare when trying to develop an innovation strategy from a systemic point of view and systematically strive to support the interaction of different competence areas, which is the challenge of the Digital Ecosystems approach

A policy framework for Digital Ecosystems, as a long-term development program, should be a **stable approach for a significant amount of time**, enabling SMEs and industrial/sectorial commitments to build a stable network of relations, exchange, and projects. At the same time an adequate policy framework should be planned with flexible and modular components to be combined and adapted to external and internal changing economic, industrial and technology conditions. **Flexibility of the framework** should also be considered in the light of the different organisations and value chains of the domains involved. Knowledge-intensive and heavy industrial domains will have a different level of complexity and vertical and horizontal integration, therefore the policy framework should be general and local at the same time, enabling mechanisms which allow competences, requirements and integration with a dispersed and diverse local network of knowledge and expertise.

Regarding the duration of such a framework there is evidence in favour of longer duration of specific policy intervention, i.e. **more than five years**. Five years seems necessary when we consider the complexity and diversity of activities and objectives

⁵¹ One possibly relevant innovation policy in Europe could be a Europe-wide Small business act similar to what has been done in US and France, reserving a percentage of the national public procurement to Small and Medium Enterprises.

that are included in a Digital Ecosystems policy framework. The experiences gathered in the regions, which are experimenting the Digital Ecosystems approach, suggest that such timeframe is barely enough to test and deploy an enabling ecosystem infrastructure.

Digital Ecosystems should be **transnational** to extend as much as possible their empowerment to SMEs and regions. It is therefore needed that the policy framework clearly **promote transnational/regional cooperation**. In particular cooperation should be activated between public research organisations and industries, reinforcing capacity building.

A policy framework for Digital Ecosystems should take in consideration also legal enabling conditions and roadblocks establishing a favourable environment for their adoption. The Digital Ecosystems approach to open knowledge should serve as a model to **stimulate publicly funded research to be available to the public**. A European Commission DG Research expert group⁵² suggested the promotion of open IPR licensing for publicly funded ICT-related research. A policy mix directing Digital Ecosystems with a default licensing scheme for research results that receive public funding would move in the direction suggested by the expert group.

Various policy (regional and national) measures can be envisaged to plan incentives to investment in innovation in a way that is favourable to Digital Ecosystems. Creating incentives for investment on commons-based and commons-produced innovation systems like the Digital Ecosystem can be done also through instruments like **mutual funds**, which allow the mutualisation of efforts between a set of different involved stakeholders so that they can share the cost of development of a Digital Ecosystem solution, needed in a given domain. The development of a Digital Ecosystem is a clear case for the need of public funding to bootstrap such a mutual fund. Further support could be given through **tax incentives** or other public finance instruments.

Digital Ecosystems represent also a seminal case in the domain of commons-based production schemes. A more explicit recognition of **commons schemes** in the foundations of the **IPR conditions** would be useful or even necessary as it

⁵² Kamperman-Sanders, A., Granstrand, O., Adams, J., Blind, K., Dumortier, J., Ghosh, R.A., De Laat, B., Kircz, J., Lindroos, V., De Moor, A. 2003. *Expert Group Report on Strategic Use and Adaptation of Intellectual Property Rights Systems in Information and Communications Technologies-based Research*. European Commission, DG Research. Available online at <http://ec.europa.eu/research/era/pdf/ipr-ict-report.pdf>

represents a major roadblock for Digital Ecosystems enlargement. Even if this area is outside of the reach of local policy intervention, if such a understanding were to happen at the level of regional government it will surely emerge in policy discussions at national and international levels.

A formal recognition would make clearer that one can have a combination of different knowledge and tools (like software tools) between an absence of liability and warranty for contributing to the commons. Such recognition is potentially non-controversial as it does not require any change to the substantive definition of IP titles and would create a better legal certainty for investment in commons-based approaches. Such recognition is most likely to proceed at the level of global international arenas. In particular in World Intellectual Property Organisation (WIPO), a number of steps have been taken, at the initiative of NGOs as well as WIPO's own initiative.

Up to now, the attitude of the EC and the EU presidencies has been relatively unsupportive of these initiatives, which is surprising considering the leading role that Europe has in the contribution and in some forms of deployment of the software commons and Digital Ecosystems.

Summary of Recommendations

Following the considerations made above here we try to summarise a first list of policy recommendations to be taken in consideration when planning a policy making action at local level in support of a Digital Ecosystem development

<p><i>Recommendation 1</i></p>	<p>In accordance with the 3% action plan of the Barcelona objective, we recommend that regions must become more efficient in using their resources for investing in innovation policies as well as for developing their capacity for knowledge creation and exploitation as a means to support sustainable economic development through Digital Ecosystems.</p>
<p><i>Recommendation 2</i></p>	<p>Copying of best practices is almost impossible when it comes to intangible regional assets that are the results of</p>

	long histories in particular regional contexts. Policy-makers are advised to be wary of simply imitating successful models. Therefore, local solutions have to be inspired by endogenous/ethnographic capacity which needs to evolve rather than selecting from a portfolio of specific models or recipes.
<i>Recommendation 3</i>	Evaluate the impact of resources spent for supporting Digital Ecosystems and the increase in economic value of the industrial fabric
<i>Recommendation 4</i>	Digital Ecosystems, being a complex socio-technical innovation process, need long-term support from local government
<i>Recommendation 5</i>	While rigid sectoral policies at regional levels can be at risk in a globalised competition environment, a Digital Ecosystem platform approach offers a better context to foster technology adoption by SMEs (digital divide reduction), stimulating increase of capacity and establishing new connections between economic actors
<i>Recommendation 6</i>	No Digital Ecosystem policy intervention can be done without an in-depth analysis of territorial readiness (possibly using the Territorial Maturity Grade methodology)
<i>Recommendation 7</i>	Digital Ecosystem policy should be aware of, and remove, the major formal and informal roadblocks and obstacles which could harm the effectiveness of the actions
<i>Recommendation 8</i>	Prioritization of platform intervention and economic improvement
<i>Recommendation 9</i>	Establish since the very beginning of the policy drafting a clear, open and accountable process favouring a multi-stakeholder governance framework by network

<i>Recommendation 10</i>	Provide funding to SMEs at earliest stage of deployment
<i>Recommendation 11</i>	The Digital Ecosystem policy framework should be a stable initiative for a significant time, no less than five years
<i>Recommendation 12</i>	The policy framework should be flexible and adaptive to changing local, national and international conditions.
<i>Recommendation 13</i>	Plan and fund transregional cooperation among SMEs and stakeholder communities
<i>Recommendation 14</i>	Stimulate and/or establish that results from publicly-funded research should be made publicly available
<i>Recommendation 15</i>	Plan the creation of financial and taxation instruments in support of the policy framework

6. European Programmes Supporting Regional Innovation Policies that Can Be Used to Advocate DE Policy Deployment

A brief history⁵³

Neither industrial policy nor research and development policy were among the areas covered in the 1967 Treaty of Rome. By the early 1980s, however, both had found a place among the European Commission's directorates. With the information technology revolution already underway and evidence of Europe's declining market share accumulating, RTD programmes under the first and second framework programmes were, thus, designed more for competitiveness than for innovation.

This included well-known programmes such as the European Strategic Programme for Research and Development on Information Technologies (ESPRIT) whose main goals were: (i) to promote intra-European industrial co-operation through pre-competitive R&D; (ii) to thereby furnish European industry with the basic technologies that it needed to bolster its competitiveness through the 1990s; and (iii) to develop European standards and the Basic Research in Industrial Technologies (BRITE) programme, also aimed at enhancing competitiveness.

Well into the 1990s, Community RTD programmes, including the Community Programme in Education and Training for Technology (COMETT), the SPRINT Specific Projects Action Line which sought to promote technology transfer across sectors and regions in Europe, and the Value programme, set up to diffuse the results of European RTD projects, were aimed at achieving competitiveness by increasing the supply of research and technological skills and stimulating demand for these outputs.

But it was precisely within somewhat 'linear' programmes such as these, and SPRINT, within DG-XIII (now DG-Enterprise), that a new approach to conceptualizing innovation and hence re-conceptualising policy approaches emerged. SPRINT was aimed at innovation and technology transfer, but it also incorporated an analysis

⁵³ the narrative presented in this section is based on the collection of several official documents of the European Commission which, in different ways, do summarise the approach to regional policy at European level until the last programming documents have been released.

programme, the 'European Innovation Monitoring System' (EIMS), which became a focus for innovation studies across a wide field of applications. EIMS also became the initiator, together with Eurostat, of the 'Community Innovation Survey', which was based on the conceptual and statistical work initiated by the OECDs TEP programme — so there was also a general interplay between some of the agencies that were open to the ideas of the new innovation theory. This programme is a good example of a niche area in which heterodox approaches took root, supported and encouraged by small numbers of policy makers and administrators seeking new approaches and tolerant of the complexities and messiness of empirical innovation research.

These EU programmes—and earlier initiatives such as the late 1980s to early 1990s programmes MONITOR (on evaluation) and FAST (on forecasting and technology assessment) provided both research support and a meeting place for European innovation researchers.

As such, they played an important role in the evolution of the field, both giving it intellectual credibility and financial support that were crucial to some research institutions. This process arguably can be seen as an example of precisely the type of interactive and feedback-based learning modelled within innovation theory itself. On the one hand there was a supply of new ideas emanating from a vibrant but very small intellectual community. On the other there was a demand for policy solutions to growth and equity issues at regional, national and European levels. But most importantly, there were continuous feedback loops in the form of monitoring and evaluation projects, analysis and development of the results of innovation survey data, and a continuous dialogue between research and policy-makers in regional authorities and relevant EU agencies. Continuous interaction and feedback had an important impact on both innovation theory and the world of policy ideas. But it was not until the focus shifted to regional development policies that the kind of interactions that theory suggested were critical for innovation became more fully integrated into EU programmes. This was reflected in the participatory methodologies used to capture inputs from the demand-side adopted in the new regional policies, particularly the set of regional innovation and technology transfer initiatives called RTP, RITTS and RIS. These actions differed significantly from the more traditional RTD policies, from efforts to transfer technology to smaller firms and less-favoured regions and from earlier uses to which structural funds were put. To some extent,

therefore, the equity issue played the role of a demand-side factor in pulling forward conceptual change. Over time, and in parallel with the OECD, the problem was reformulated from competitiveness to innovation and equity, the inter-relatedness of policies was given greater consideration and the process itself became more interactive. Social scientists played a major role in this transformation at both the design stage and in undertaking the monitoring and evaluation that provided feedback into the policy process.

Such processes began to emerge onto a wider stage over the 1990s. In the early 1990s, RTD issues began to play a more significant role both in policy pronouncements, and in the organisation of policy-related research in the European Commission. With regard to the former, the Maastricht Treaty, for example, specifically mentioned the role of R&D policy in industrial change, and regional cohesion. Statistical indicators collected by the OECD and the EU were slowly developed or redesigned to give effect to the insights flowing from innovation theory and the Framework Programmes, the overall R&D programme budget within which 'packages' dealing with the major European-level scientific and technological RTD effort were organised, became one of the few growing areas.

With regard to the latter, a really major impulse to the development of innovation research in support of policy came with the 'Targeted Socio-Economic Research' (TSER) programme in the fourth framework programme (1995–1999), and the follow-up 'Improving Human Potential' programme in the fifth framework programme. Here the initiatives lay with policymakers and administrators. TSER was large, carefully designed and rather well-prepared by commission staff who, in general, were well-informed and rather widely-read within the field. In effect, they took on board the new innovation theories, identified the gaps and weaknesses, and sought to research some of the key unresolved problems. Projects emerged on a wide range of topics: these were usually multi-year projects, with a wide range of partners across Europe, and were well-funded.

They included such topics as:

- innovation in service industries;
- innovation systems and European integration

- new innovation statistics and data;
- S&T policies in transition countries;
- institutional restructuring in transition countries;
- public participation in environmental policy;
- modelling sustainable growth in Europe;
- universities and technology transfer on the periphery of Europe;
- economic analysis of technology, economic integration and employment;
- strategic analysis: policy intelligence and foresight;
- regional innovation systems and policy;
- multimedia and social learning.

This kind of wide-ranging support has continued, and has produced a very substantial change in the character of innovation research in Europe. Every significant institution working in the innovation field in Europe has participated, and virtually every significant researcher. The level of networking and contact between researchers has multiplied dramatically, as have the number of journals and the volume of publication. So these EU-backed projects have provided a major dynamic impetus to innovation studies, as well as providing a practical level of support without which some key institutions in the area might not have survived.

The new programs and innovation instruments

Policies, and in particular DE policies, to become engine of the regional innovation systems do require adequate resources to build up the needed awareness and participation among SMEs and other involved actors. National and local governments can develop their innovation action accessing European, national and local dedicated program. The European Union in the period 2007-2013 has three programmes which can be used in support in DE policy deployment:

- The Competitiveness and Innovation Framework Programme (CIP) (3,6B€)
- 7th Framework Programme for Research and Development (FP7) (53B€)
- Structural Funds (SF) (280B€)

Among other Programmes the Education – Integrated Action Programme in Lifelong Learning (2007-2013) and Rural development programmes can be of help.

CIP Competitiveness and Innovation Framework Programme

The Competitiveness and Innovation Framework Programme (CIP) was adopted on 24 October 2006 by Decision No. 1639/2006/EC of the European Parliament and of the Council (the “Programme Decision”). This Community programme runs for the years 2007-2013 and is organised around three multi-annual specific programmes:

- The Entrepreneurship and Innovation Programme (EIP);
- The Information and Communication Technologies (ICT) Policy Support Programme (ICT PSP);
- The Intelligent Energy-Europe Programme (IEEP).

The EIP focuses in particular on the following objectives. With a budget of € 2.17 billion for the overall period of 2007-2013 the programme aims to achieve its objectives through the following actions:

1. Access to finance for SMEs through "EU financial instruments". These EU instruments target companies in different phases of their lifecycle: seed, start up, expansion and business transfer; and will support investments in technological development, innovation (including eco-innovation), technology transfer, and the cross border expansion of business activities. They are managed by the European Investment Fund (EIF) in cooperation with financial institutions. This action is currently under preparation and it will be progressively operational in 2008.

2. "Enterprise Europe Network": a network of business and innovation service centres. Regional centres providing integrated business and innovation support services form part of a European network, drawing on the experience of the Euro Info Centres (EIC) and Innovation Relay Centres (IRC). They provide enterprises with a range of quality services to help make them more competitive.

3. Support for initiatives to foster entrepreneurship and innovation. Support will be given to encourage the trans-national networking of innovative companies and all other actors in the innovation process, including benchmarking initiatives and the exchange of best practice.

4. *Eco-innovation - making sustainable development become a business reality.* Innovative products, processes and services aiming at reducing environmental impacts, preventing pollution or achieving a more efficient and responsible use of natural resources will be supported.

5. *Support for policy-making.* Under the EIP a number of conferences can be organised to assemble and publicise sectoral knowledge, inform policy-makers, and make policy suggestions to increase the coherence and cooperation between EU Member States. The programme will also be used to support policy-makers; the latest trends and developments in certain sectors - as well as European and global markets- will be analysed in studies and the results disseminated.

The program CIP PSP, the ICT Policy Support Programme is one of the main financial instruments of i2010. The EU adopted in 2005 a new strategic framework, i2010 – A European Information Society for growth and employment that promotes an open and competitive digital economy and emphasises ICT as a driver of inclusion and quality of life. i2010 proposes three priorities for Europe’s information society and media policies:

1. the completion of a Single European Information Space which promotes an open and competitive internal market for information society and media;
2. strengthening Innovation and Investment in ICT research to promote growth and more and better jobs;
3. achieving an Inclusive European Information Society that is consistent with sustainable development and that prioritises better public services and quality of life.

Eligibility: The programme is open to all legal entities established in the EU Member States and associated countries to the ICT Policy Support programme. Iceland, Lichtenstein, Norway and, starting from 2008 Croatia, are associated countries to the ICT PSP. Organisations from those countries can be financed by the programme.

Time frame: 2007-2013

Budget envelope: €3.621 million, Annual work programmes for each of the three specific programmes:

Type A pilots Funding: supports up to 50% of cost of the effort to achieve interoperability Community contribution available is 5-10M€ / pilot). Budget 5/10M€ per pilot

Type B pilots Funding: supports (up to 50%) of the costs of implementing the pilot service Community contribution available is 2-2.5M€ / pilot)

Thematic Networks Funding: Community contribution consists of a lump sum covering additional costs of work directly related to the network objective. Typically, community contribution is 300-500K€ / network

FP7 Capacities and Region of Knowledge

Regarding FP7 two main programme can be used to stimulate and support DE policy development. The FP7 Capacities programme and the Region of Knowledge. The Capacities programmes basically funds research and innovation action for the benefit of SMEs developing research potential in synergy with research centres and universities also through the development of coherent national and local research policies. The Regions of Knowledge aims to strengthen the research potential of European regions by supporting the development of regional 'research-driven clusters'. Typically the programme foster the preparation of projects which includes industries, governments and research actors following the triple helix model of collaboration. The projects in the RoK can be only regional authorities, which are ready to prepare transnational collaboration facilitating the emergence of new clusters and mutual information exchange

Structural Funds

Structural Funds are divided in two main lines of funding:

- ERDF (European Regional Development Fund)
- ESF (European Social Fund)

The two funds are allocated at European level but managed directly by the member states, which design and implement the national and regional operational program

approved at EU level. The table below summarise the areas of intervention of the two funds.

Objectives	Structural Funds and instruments		
Convergence	ERDF	ESF	Cohesion Fund
Regional Competitiveness and Employment	ERDF	ESF	
European territorial Cooperation	ERDF		
	infrastructure, innovation, investments etc.	vocational training, employment aids etc.	environmental and transport infrastructure, renewable energy
	all Member States and regions		Member States with a GNI/head below 90%

Figure 3- Structural Funds

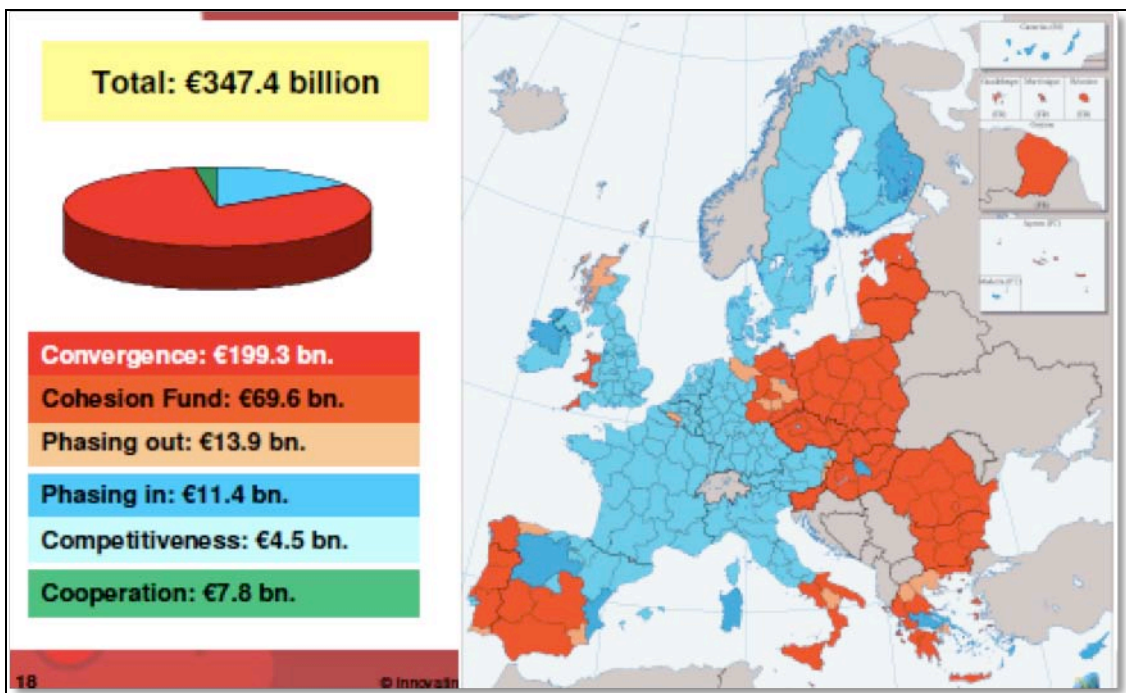


Figure 4 - Structural funds budget allocation

Interregional cooperation

European Territorial Collaboration objective – known as ‘INTERREG’ is aimed at fostering and encouraging cross and trans territorial cooperation among regions and member states. The INTERREG IVA which has almost the 70% of the funds of the whole program (€ 5.4 billion) provide the means for cross-border collaboration in 52 different programmes (infrastructure, natural resources management, entrepreneurship, business encouragement and collaboration etc.)



Figure 5 - Interreg Area of intervention

The INTERREG IVB, which has 25% of the Funds (€ 1.8 billion) provide the means for transnational collaboration in 13 programmes (identified in geographical collaboration areas), on issues important in the area (communication corridors, natural resources and innovation networks)

Finally the programs like INTERREG IVC, INTERACT, URBACT II, ESPON (with 5% of the funds, € 445 million) are aimed at Interregional collaboration mainly towards action supporting networking activities and the exchange of experience. In particular the Interreg IVC, which is open to EU-27, Norway and Switzerland, is an important

vehicle for Regions for Economic Change and a fast Track to optimise the transfer of experience and knowledge between Regions. The Interreg IVC has 2 main priorities:

- Innovation and knowledge economy
- Environment and risk prevention

Projects can be developed with the following instruments:

Regional Initiative Projects - networking activities related to experience and knowledge transfer and the implementation of pilot projects. Also small programmes can be launched (with simple deliverables on policy recommendations or good practice guides)

Capitalisation Projects which focus specifically on the transfer of good practices into Structural Funds mainstream programmes

In particular Interreg is divided in different operational program dedicated to different European Areas.

Interreg IVB Operational Programme Central Europe

The new Central Europe Programme includes eight Member States (Czech Republic, parts of Germany, parts of Italy, Hungary, Austria, Poland, Slovenia and Slovak Republic) and one permanent observer (Ukraine).

Overall goal:

Strengthening territorial cohesion, promoting internal integration and enhancing the competitiveness of Central Europe

Priority 1 – Facilitating Innovation across Central Europe

- 1.1 *Enhancing Framework Conditions for Innovation;*
- 1.2 *Establishing Capabilities for the Diffusion;*
- 1.3 *Application of Innovation, Fostering Knowledge Development).*

Programme budget: EUR 298.295.837

ERDF contribution: up to 85% of eligible expenditures incurred by Lead Partners and project partners located in the Czech Republic, Hungary, Poland, Slovakia and Slovenia and up to 75% in Austria, Germany and Italy.

Project budget: ca. 1 to 5 million EUR

Interreg IVB South East Europe (Transnational Co-operation Programme)

Overall goal

Improvement of the territorial, economic and social integration process and contribution to cohesion, stability and competitiveness through the development of transnational partnerships and joint action on matters of strategic importance.

Priority 1: Facilitation of innovation and entrepreneurship

- 1.1 Development of technology and innovation networks in specific fields;*
- 1.2 Development of enabling environment for innovative entrepreneurship;*
- 1.3 Enhancement of the framework conditions and pave the way for innovation.*

The eligible area for SEE comprises Albania, Austria, Bosnia and Herzegovina, Bulgaria, Romania, Croatia, FYR Macedonia, Greece, Hungary, parts of Italy, Serbia, Montenegro, Slovakia, Slovenia, Moldova and parts of Ukraine.

ERDF budget: EUR 206.691.645

Co-financing:

- 85% ERDF (Austria, Bulgaria, Romania, Greece, Hungary, Italy, Slovakia, Slovenia);*
- 85% IPA (Albania, Bosnia-Herzegovina, Croatia, Former Yugoslav Republic of Macedonia, Serbia, Montenegro, Turkey).*

Interreg IVB Alpine Space

The Alpine Space Programme 2007-2013 is part of the "European Territorial Cooperation" (Objective 3 of the Regional Policy 2007-2013). Together with 13 other programmes it strives for transnational cooperation in and between the European regions. The programme's overall aim is to increase the competitiveness and the attractiveness of the cooperation area in a sustainable way. Thus it supports transnational projects in the Alpine area fostering territorial development and cohesion. These projects involve key actors of the cooperation area and develop joint actions for shared solutions on specific Alpine issues as laid down in the programme "priorities"

Priority 1 Competitiveness and Attractiveness

- * clusters generation and the strengthen of the key economic branches;
- * the development of pilot initiatives for technology transfers;

- * the setting up of joint actions dealing with valorization of cultural heritage;
- * the development of production chains based on regional products or joint quality labels for key economic branches;
- * the promotion of integrated tourism systems.

Eligible areas

Austria: whole country; France: Rhône-Alpes, Provence-Alpes-Côte d'Azur, Franche-Comté, Alsace; Germany: districts of Oberbayern and Schwaben (in Bayern), Tübingen and Freiburg (in Baden-Württemberg); Italy: Lombardia, Friuli Venezia Giulia, Veneto, Trentino-Alto Adige, Valle d'Aosta, Piemonte, Liguria; Slovenia: whole country.

ERDF budget 130.000.000 EUR

The contribution of the project partners coming from the EU are co-funded by ERDF up to a rate of 76%. The remaining costs have to be covered by other public funds, depending on rules at national level. Project partners coming from Liechtenstein and Switzerland can not apply for ERDF, but will be supported by the countries' own national funding schemes

Interreg IVC

The INTERREG IVC Programme is part of the European Territorial Cooperation Objective of the Structural Fund policies for the period 2007-2013. It aims, by means of interregional cooperation, to improve the effectiveness of regional development policies and contribute to economic modernisation and increased competitiveness of Europe, by:

- * Enabling local and regional actors across the EU to exchange their experiences and knowledge;
- * Matching regions less experienced in a certain policy field with more advanced regions;
- * Ensuring the transfer of good practices into Structural Funds mainstream programmes.

Regional initiative projects (Type 1)

Exchange of experiences dedicated to the identification and analysis of good practices, production of concrete documents e.g. good practice guide / recommendation paper.

Supported activities:

- Pilot experimentations (e.g. in the context of a transfer of practice);
- Development of regional policy tools (methodologies, software);
- Thematic seminars, Study visits, Exchanges of staff, Conferences;
- Web sites, newsletters, brochures;
- Production of good practice guides.

Recommended budget: Min. ERDF €500.000, Max. ERDF €5 million

Partners: according to level of intensity of cooperation; recommended 8-20 (at least from 3 countries, from which at least two partners must be from EU Member States and financed by Interreg IVC Programme).

Capitalisation projects (Type 2)

Exchange of experience dedicated to the transfer of good practices into the Structural Funds mainstream programmes + production of concrete action plans

Supported activities (similar to Type 1):

- Seminars
- Workshops
- Study visits
- Staff exchanges

Recommended budget: Min. ERDF €300.000, Max ERDF €3 million

Partners: no specific requirement in terms of number or partners, but in terms of countries represented the project consortium should range in between 6-10 For both types of intervention the following applies:

Eligibility:

- EU 27 Member States, Norway and Switzerland (participation of other countries on their own costs);

- Only public authorities and bodies governed by public law (also called public equivalent bodies).

Co-financing: 75% ERDF (Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Luxemburg, Netherlands, Spain, Sweden, UK); 85% ERDF (Bulgaria, Czech Republic, Cyprus, Estonia, Greece, Hungary, Lithuania, Latvia, Malta, Poland, Portugal, Romania, Slovakia, Slovenia); 50% Norway.

Some Considerations

As a general strategy ERDF funds do provide an immediate and more comprehensive tool to regions to help them implement or evaluate the real impact and implications of a regional innovation strategy. The approach to use the available programs to support and finance policy intervention should be evaluated case by case by keeping in consideration the time frame of the available funding and the different scope of each of the programs.

An efficient approach should be to use a mix of tools which can be seen as a model for “knowledge capital” building at local level.

The use of the different available programs can support the different phases of the design of a policy framework for Digital Ecosystems. Moreover as different goals are identified by the programs regions should program the actions starting from having the best possible informed picture of the readiness and industry fabric in the territory. Only in this way the subsequent planning and use of development funds can be as efficient as possible. Indeed local administrators tend to think they have a clear understanding of local needs and/or industrial domains to promote to sustain regional development. Unfortunately this is not always the case and research action which move from local projects to interregional/international and then back to regional seems to have a better chance to succeed.

7. Conclusion

The overall objective of WP11 is to provide a workable policy framework tool in support of regional sustainable development through the use of the Digital Ecosystems approach.

Much theoretical research has been done in WP12 in getting to the final objective set forth in WP11, but it seems that the more research in this domain is done the more the understanding is that we need to investigate more the dimension of the way public deliberation is effected, as well as models of constituency organisation.

It is relevant here to link to the important results of D12.10 regarding the epistemological framework to guide the digital ecosystem development and research.

Five main points were indentified⁵⁴:

1. A rationalisation by which candidate theories or extensions to digital ecosystems theory can be legitimately assessed through empirical tests and observation (Popper's falsifiability).
2. A methodology rooted in empirical qualitative and quantitative data that, through integration with Giddens's structuration, can combine the empirical testing of theories with social constructivist multi-stakeholder processes for the phased introduction of digital ecosystems in different regional contexts.
3. An epistemology based on structuration that puts processes of institutionalisation and of technology development on a similar footing, where Marxian structuralism is balanced by individual action and social constructivist processes.
4. A subjectivist and reflexive discourse that provides the foundation for the shared construction and equitable negotiation of a governance framework for digital ecosystems communities.
5. A compound epistemology of order construction in computer science that leverages nature's symmetries whilst remaining open to new forms, and hence able to interface to human expression and behaviour.

Point 2, 3 and 4 are particularly relevant in our approach to build an initial policy framework for digital ecosystem deployment, as they give the fundamental theoretical foundation to our understanding of a democratic multi-stakeholder approach to Digital Ecosystem governance. Following the line of thought of D12.10, which has tried to

⁵⁴ D12.10 *ibid*, pag 33.

map Luhmann's autopoietic system of communications to an autopoietic system of theories⁵⁵ we have looked at new models of democracies which can fit the framework for Digital Ecosystems development, grounding them from empirical evidence and established theories on multi-stakeholders governance approaches which do respect moral equality and consensus-oriented communication as identified fundamental values of our community.

This report has addressed 3 objectives

- 1) A specific Digital Ecosystems approach to policy making
- 2) Identification of a multi-stakeholder governance model for the policy framework
- 3) A set of recommendations in support of the rationale and design of a Digital Ecosystem Policy.

Regarding the first objective different democratic processes have been evaluated in light of the fundamental requirements of the Digital Ecosystem approach. While we understand them as a substantial democratic process it is true that we needed to identify a process, which was open and transparent and not necessarily owned by the government. A deliberative democratic process, which relies fully on community members and interested stakeholders to establish sound policies, is the only one able to incorporate fully informed decisions in the final agreement. The term "deliberative democracy" was originally coined by Joseph M. Bessette, in "Deliberative Democracy: The Majority Principle in Republican Government," in 1980, but French philosopher Rousseau was the first to give deliberative democracy a modern formulation stating that following this approach all citizens were able to make effective use of their deliberative opportunities⁵⁶, and that their reasons may reasonably expect to be adopted in the final decision. It is evident how this model fits the peculiar and stringent requirement the DE has adopted has a fundamental characteristic of its action.

The second objective identified is, somehow, an unavoidable consequence of the understanding of the DE as a deliberative democratic process which embeds knowledge, power, democratic process, and non-linearity in one nexus of interlinked

⁵⁵ D12.10 *ibid*, pag.68

⁵⁶ [J.Bohman](#), [W.Rehg](#), *Deliberative Democracy: Essays on Reason and Politics*, The MIT Press, 1997

structures. A multi-stakeholder approach is the only one emerging from the research which is capable of providing all the inputs and representation of the partners involved in setting up an innovative policy framework.

The problematic question was on how a consensual decision-making could be applied at larger scales like a regional system. One possible model identified is through consociationalism⁵⁷. Arend Lijphart coined the term "consociationalism" to describe the sharing of power between segments of society joined together by a common citizenship but divided by ethnicity, language, religion, or other factors or conflicting interests. Consociationalism is the theory of a form of organisation designed to institutionalise the reservation of power to distinct stakeholder groups within a consensual decision-making forum, the four key elements of consociationalism are:

- sharing executive power among representatives of all significant groups
- segmental autonomy: each group has a great deal of internal leeway
- proportional representation and allocation of positions
- minority veto on vital issues (mutual veto)

Even if we have identified a working model for decision making and multistakeholder approach to the Digital Ecosystems policy framework design is true that the question of an appropriate design for such a multi-stakeholder governance network still remains open and a new round of further investigation should be planned to get to an operative solution which can be palatable of regional decision makers.

But in spite of the difficult exercise of defining operational models and decision-making processes we have concentrated our attention on identifying a first set of recommendations to be taken in consideration when planning a policy-making action at local level in support of a Digital Ecosystem development. The initial list of 15 recommendations requires national and/or regional actions depending on the regulatory systems in place in the region. The list, while identifying 15 main actions, can also be seen as an initial blueprint to remove and set up the basic fundamental conditions to make Digital Ecosystems happen.

⁵⁷ *ibid.*