

# Εκπαίδευση, Δια Βίου Μάθηση, Έρευνα και Τεχνολογική Ανάπτυξη, Καινοτομία και Οικονομία

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## Innovation Policy in European Union: a supply chain perspective

*Aikaterini Kokkinou, Christos Ladias, Efstratios Papanis, Panagiota Dionysopoulou*

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# Innovation Policy in European Union: a supply chain perspective

**Kokkinou Aikaterini<sup>1</sup>, Ladias Christos<sup>2</sup>, Papanis Efstratios<sup>3</sup>, Dionysopoulou Panagiota<sup>4</sup>**  
[aikaterinikokkinou@gmail.com](mailto:aikaterinikokkinou@gmail.com), [caladias@otenet.gr](mailto:caladias@otenet.gr), [papanis@me.com](mailto:papanis@me.com), [yoldi63@gmail.com](mailto:yoldi63@gmail.com)

<sup>1</sup>Higher Hellenic Military Academy, <sup>2</sup>Department of Economic and Regional Development, Panteion University,

<sup>3</sup>Department of Sociology, University of the Aegean, <sup>4</sup>Director of General Directorate of Tertiary Education, Ministry of Education, Greece

## Abstract

The spectrum of implemented instruments of research, technology and innovation policy is widely differentiated nowadays, reflecting the scope of institutions and interests involved, stretching from public funding of research institutions over various forms of financial incentives to the conducting of research and experimental development, including the institutions and mechanisms of technology transfer. In many European countries, these instruments dominated the research and technology policy for the last three decades. This paper focuses on the analysis of these topics, focusing on the institutional context of innovation supply chain in European Union, providing insights of an efficient supply chain management, towards an effective innovation policy in European Union level.

**Keywords:** Productive Efficiency, Innovation and Industrial Policy, Supply Chain Management

## 1. Introduction

Nowadays, European Union is challenged in the global arena in capturing and capitalizing on knowledge and technology in the context of innovation. The innovation supply chain is becoming increasingly complex, open and internationalized, including different agents and stakeholders, from different sectoral and regional levels. These challenges result in a lag in terms of competitiveness, innovation and growth (European Commission, 2010), replying that innovation supply chain should include all the different agents and stakeholders in the innovation supply chain: industry, academia, public and private financing organizations, NGOs, society and citizens, politicians, and policy-makers, alike, across all sectors of economic, social and political activity (Anvret, et al., 2010).

European industrial, technology and innovation policies are no longer exclusively in the hands of national authorities: increasingly, national initiatives are supplemented by or even competing with regional innovation policies or transnational programmes within European Union. At the same time, industrial innovation increasingly occurs within international networks. Research, technology and innovation policies of European countries clearly reflected the profiles of their national (and regional) innovation systems, understood as the various institutions, corporate actors and processes contributing to industrial and societal innovation.

This paper focuses on analysing the innovation supply chain, through the spectrum of innovation policy in European Union. First the paper describes the framework of the efficiency in innovation supply chain, as well as, the implication towards growth. Secondly, the paper focuses on the situation in European Union innovation policy and especially within the current Agenda 2020, which, among others, promotes policies towards an efficient supply chain in innovation, both in national and European level. Third the paper concludes with relevant policy implications onwards managerial and efficiency policy aspects.

## 2. Productive Efficiency and Innovation Policy

Growth and competitiveness become contingent on the ability of firms to compose, establish and maintain external interfaces (Oh et al, 2009), to choose the right mode of governance and to link these effectively to internal knowledge accumulation and capability development.

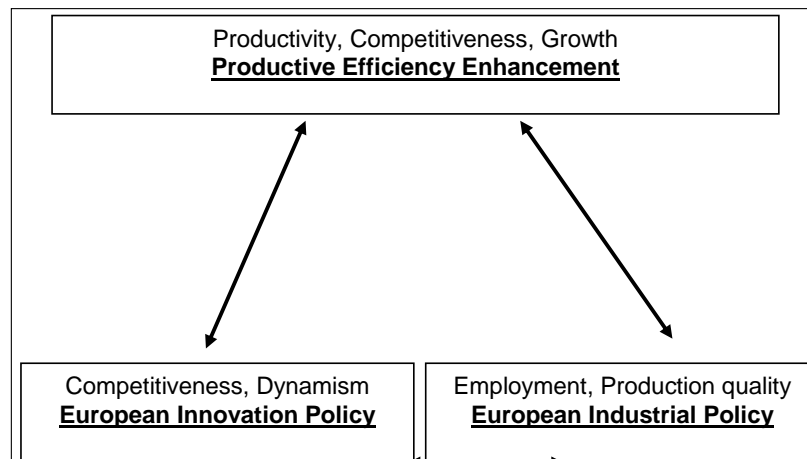


Figure 1: Strategic policies flows

Source: Own Elaboration

The relationship between productive efficiency and innovation and industrial policy is illustrated in Figure 1.

The innovation policies of the European Union played a noticeable, but not yet a dominant role in the national contexts, at least not in the bigger member states (Battese et al., 2001). The following figure highlights the interactions among the main policy elements regarding the enhancement of technical and productive efficiency:

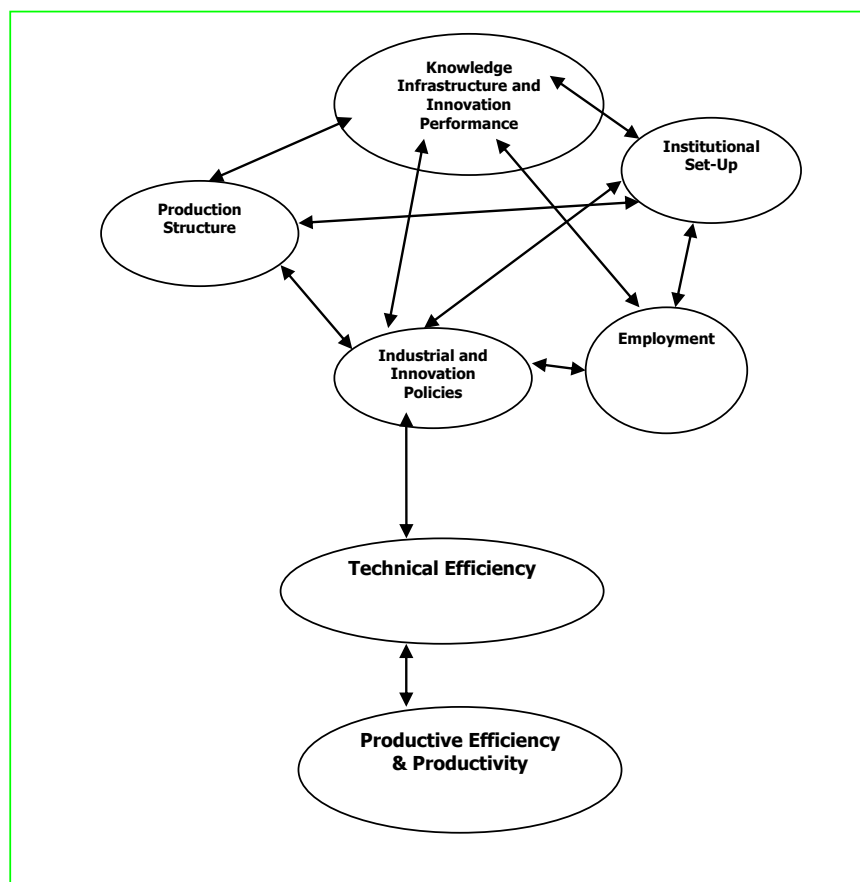


Figure 2: Productive Efficiency and Institutional Framework

Source: Own elaboration

The spectrum of implemented instruments of research, technology and innovation policy is widely differentiated in the meantime, reflecting the scope of institutions and interests involved: it stretches from public funding of research institutions over various forms of financial incentives to the conducting of research and experimental development in public or industrial research labs, up to the design of an innovation-oriented infrastructure, including the institutions and mechanisms of technology transfer. In many European countries, these instruments dominated the practice or research and technology policy for the last three decades. As further instruments one could mention efforts to guide public demand, measures in education and further training and the regulatory possibilities available.

During the last two decades, though, national and regional innovation systems are experiencing revolutionary shockwaves: the growing pull of internationalising economic relationships has mixed up traditional regional or national divisions of work between industrial enterprises, educational and research institutions as well as administration and politics, and it debased many of their traditional strengths.

Internationalisation, however, has so far not led to a uniformity of the national innovation systems, which would finally mean their abolition. The various national and regional innovation cultures and related policy arenas react very differently, which partly leads them into crises, partly stabilises, but partly also reveals unexpected, novel chances in a transformed international context.

At the same time, European transnational innovation policies have been entering the stage, increasingly since 1985, nowadays covering the whole range of instruments (Battese et al., 2001).

The following table presents the main priorities regarding the effectiveness of innovation and industrial policy implementation:

Table 1: Policy Effectiveness Priorities

Priority	Means and actions
<ul style="list-style-type: none"> <li>• give priority to innovation and enterprise</li> <li>• ensure full employment</li> <li>• ensure an inclusive labor market</li> <li>• connect European Union</li> <li>• protect the environment</li> </ul>	<ul style="list-style-type: none"> <li>• creating closer links between research institutes and industry, developing conditions favorable to R&amp;D, improving access to finance and know-how and encouraging new business ventures;</li> <li>• emphasizing the need to open up employment opportunities, to increase productivity and quality at work and to promote lifelong learning;</li> <li>• reducing unemployment and disparities in access to employment;</li> <li>• promoting closer integration by improving transport, telecommunications and energy networks;</li> <li>• stimulation of innovation, and introducing new technologies, for example, in energy and transport.</li> </ul>

*Source: Own elaboration*

European industry must also strengthen the knowledge base to remain competitive, investing in research and innovation for a sustainable and inclusive economy. Most importantly, science, technology and innovation play a significant role in increasing technical efficiency and are a driving force in international competition.

### 3. Supply Chain Management and Efficiency

Currently, competition, the efficiency of public and private services, and infrastructure are important determinants of industrial competitiveness in European member states. A stronger enforcement of competition rules is necessary to reduce competition distortions. Moreover, today, the competitiveness of European industry crucially depends on the quality and efficiency of the energy, transport and communication infrastructure services, with the upgrading and modernisation of these networks being rather essential. Transport networks need to be improved to overcome any related obstacles and improve cross-border connections. These improvements will require massive investments and the development of innovative financing solutions. According to European Commission (2010), a new industrial innovation policy is needed to encourage the development of supply chain management of goods services, as well as the enhancement of productive efficiency.

As a consequence, supply chain management policies were defined, aiming mainly to the competitive growth of the European industry, focusing on the following objectives:

- Accelerating the adaptive process of the industry to the structural changes;
- Developing an environment in the favour of initiative and development of enterprises;
- Encouraging the favourable environment for business cooperation;
- Favouring the industrial potential of the research, technologic development and innovation policies.

On the other hand, as technical efficiency enhancement becomes an increasingly important issue, production must draw on a wide range of production ideas, component technologies and complementary capabilities.

Within this framework, it is rather difficult for any single industry to incorporate and take advantage of the relevant technological advances, as well as the underlying industrial and innovation policies. This means that the actions of industries involve the targeted development of specialized knowledge assets, which are integrated from a wider range of knowledge areas (Oh et al., 2009).

A transition towards a sustainable, resource efficient economy is paramount for maintaining the long-term competitiveness of European industries. Overall, European member states have made significant progress in defining and implementing consistent national legislative frameworks for stimulating efficiency. However, some lack the experience and the administrative capacity to do this and for these countries the framework legislation at the EU level can provide guidance and support.

To ensure progress towards the Europe 2020 goals, a broad range of existing EU policies and instruments are used, including the single market, the EU budget and external policy tools. The ten priorities of the Commission guide the EU policies and help ensure progress towards smart, sustainable and inclusive growth. The strategy itself identified seven policy areas where jobs and growth were put forward through the following seven flagship initiatives: 'Innovation Union', 'Youth on the move', 'Digital agenda for Europe', 'Resource efficient Europe', 'An industrial policy for the globalisation era', 'Agenda for new skills and jobs' and 'European platform against poverty and social exclusion'.

The Europe 2020 strategy gives recognition to the economic, social and environmental dimensions of sustainable development by drawing attention to education, research and development and innovation, low carbon emissions, climate resilience and environmental impact, and job creation and poverty reduction. In a broader policy perspective, the Europe 2020 strategy plays an important role in addressing the internationally adopted 2030 Agenda for Sustainable Development and thus putting the European Union on the right track to achieving a sustainable future, preparing for the long-term implementation of the Sustainable Development Goals:

- Goal 1. End poverty in all its forms everywhere

- Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- Goal 3. Ensure healthy lives and promote well-being for all at all ages
- Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- Goal 5. Achieve gender equality and empower all women and girls
- Goal 6. Ensure availability and sustainable management of water and sanitation for all
- Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all
- Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- Goal 10. Reduce inequality within and among countries
- Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable
- Goal 12. Ensure sustainable consumption and production patterns
- Goal 13. Take urgent action to combat climate change and its impacts
- Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
- Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
- Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development

The quality and availability of infrastructure (energy, transport, and broadband) make an important contribution to an efficiency promoting environment. Industrial sectors need a modern public administration, able to deliver efficient and high quality public services (Korres & Kokkinou, 2011, Kokkinou, 2010). Coordinating clusters and networks improve industrial competitiveness and innovation by bringing together resources and expertise, and promoting cooperation among businesses, public authorities and universities. EU industrial and innovation policies should aim to overcome existing market failures and funding gaps, especially to supply the bridge between technical efficiency and productivity enhancement.

#### **4. Findings and Propositions**

One of the main aims of industrial policy regards the encouragement of innovation, knowledge and research. European Union industrial policy consists a framework which aims to encourage private investments in R&D, and insure an optimal use of the public resources for industrial research. Furthermore, encouraging investments in intangible assets and human capital is crucial, in order to maximize the efficiency of the current technology and its effects. Furthermore, supporting entrepreneurship and developing industrial sectors is an objective that goes beyond the limits of the industrial policy, by joining actions of the educational policies, internal market, financial services

and tax policy (Bhattacharjee et al., 2009). Certain fields require specific intervention, in order to improve the internal market, such as the financial or services markets, where the technical barriers and the legislative differences limit the free trade, in order to improve the economic environment, with special attention in areas which present the fastest technological progress.

However, the development objectives set at European level cannot be reached without a tight interconnection of the industrial policy measures with those of some complementary policies, such as the commercial policy, the single market policy, transport and energy policies, research and development policies, competition policy, regional and macroeconomic policies. While in these fields the policies are already coordinated, the sustainable development requirements, with the three development pillars: economic, social and environmental, require supplementary measures for coordinating the industrial policy with the associated policies and requirements.

The difficult fiscal environment sets limits to policy action, but robust growth will reduce the burden of public deficit and debt, in line with the goals of the Stability and Growth Pact. For this an environment that favours new ideas and new businesses is required. Innovation is the primary driver of a successful and sustainable industrial policy. A strong lead in R&D and innovation is Europe's key competitive advantage and of central importance in finding solutions to economic challenges. With increased globalisation, one can only hope that industry will be an engine for the spreading of social progress, environmentally friendly technologies and innovations worldwide (Bhattacharjee et al., 2009). To achieve a truly sustainable, positive effect for manufacturing industry and the workforce it employs, the EU and its Members States should aim to avoid the relocation of manufacturing activities and related services (e.g. R&D, ICT) and support the permanent upgrading of European manufacturing industries.

Thus, European Union must insure the balance between the different policies, and this balance must be followed at national level, within the limits of competency of the different member states (Nica and Cuza, 2010). On the other hand, cohesion policies amount to an efficiency-based long-run strategy of 'catch-up growth', in which the interventions aim to accelerate catch-up growth and achieve cohesion policies, rendering industrial policy aims into increased growth and employment and the improved international competitiveness of European industrial sectors (Belyakova et al., 2017, Almeida et al., 2017).

European governments are in need of a more coherent, more coordinated approach towards industrial technical efficiency support. However, the pressure on public budgets adds to the urgency of this matter in different policy areas of industrial and innovation policy.

The range of explicit innovation policies being applied is very much concerned with the supply side and even more with R&D support of various types, ranging from funding of science in public institutions through to fiscal incentives for firms to increase R&D spend. A comprehensive approach to industrial and innovation policy can be achieved by supporting markets for innovative goods and services and excellence in research in new technologies, including information and communication technologies (ICT), introducing a more focused strategy to facilitate the creation of areas for action, and in particular introducing a more focused strategy to facilitate the creation and marketing of new innovative products and services (European Commission, 2006).

Within the domain of industrial and innovation policy, regulatory reform is seen to affect innovation indirectly through affecting the funds available for investment and market size and structure, and directly through its impact upon the promotion of technical efficiency and productivity, as a new approach to EU research and innovation policy (European Commission, 2010):

1. First, they will be challenge-driven, focusing on societal benefits and a rapid modernization of the associated sectors and markets.

2. Second, they will act across the whole research and innovation chain, bringing together all relevant actors at EU, national and regional levels
3. Third, they will streamline, simplify and better coordinate existing instruments and initiatives and complement them with new actions where necessary, making it easier for partners to co-operate and achieve better and faster results compared to what exists already.

Therefore, these priorities should build upon relevant existing tools and actions (joint programming, lead markets, joint pre-commercial and commercial procurement schemes, regulatory screening), integrate them into a single coherent policy framework (Anvret, et al., 2010).

Towards this direction, an open, efficient and competitive business environment is a crucial catalyst for growth in a global context. Improving the business environment covers policies in areas ranging from improving infrastructure to shortening the time needed to obtain a building license. In many cases, better institutional mechanisms need to be functioning as a single research area, business environment and innovation system. There need to be strategic approaches, which not only promote closer interaction among sectors but also among policy-makers (from different policy fields and different levels of government). European innovation and industrial policy is therefore recommended to develop strategic approaches which integrate R&D, innovation and industrial policy along with a more coherent EU strategy for innovative competitiveness, giving special attention to ICT in innovation and industrial policy, ensuring a secure supply and achieve efficient and sustainable management along the entire innovation supply chain in European Union.

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