

# WHEN WILL ALPHA AND OMEGA COLLIDE?

IN SEARCH OF THE THEORETICAL RELEVANCE OF EU INNOVATION POLICIES

## MIKOR ÉR (VÉGRE) ÖSSZE AZ ALPHA ÉS AZ OMEGA?

KUTATÁS AZ EU INNOVÁCIÓS POLITIKÁINAK ELMÉLETI KERETEIBEN

Innovation has been really become a buzzword in recent decades both in the scientific and the political community. It is regarded as a primary driver of social and economic development. However, the EU's innovation performance hasn't improved significantly in the past 15 years, despite the remarkable political effort to boost it. In this paper, by a thorough analysis of the most relevant EU policy documents from 1995 to 2014, the authors examined the evolution of the European innovation policies and compared it with the evolution of innovation studies. They found that just as Europe is lagging behind its most important competitors in terms of economic performance, so does the innovation policy lag behind the current state of the art of innovation research. This poses significant problems if we are to fully exploit the social and economic potential of innovation activities. They argue that a broader operational concept of innovation could make innovation policies more inclusive and thus both the capacities and the gains of innovation could be more effectively developed. However, this can only be achieved through closer cooperation and interactions between the scientific community and those actively involved in different stages of policy making processes. This would be even more beneficial in the eve of digitalisation, automation and robotisation when the new technologies are near to being fully integrated into diverse economic activities, if we are to minimise the social risks and maximise the economic gains associated with the 4th industrial revolution.

**Keywords:** EU innovation policies, SMEs, inclusion

Az elmúlt évtizedekben az innováció, a társadalmi és gazdasági fejlődés elsődleges motorjaként közkedvelt témája volt nem csak a tudományos közösségnek, de a politikusoknak is. Az innovációt övező érdeklődés és az ösztönzésére irányuló számtalosan politikai akarat ellenére az adatok azt mutatják, hogy az EU innovációs teljesítménye nem sokat javult az utóbbi 15 évben. A szerzők tanulmányukban arra vállalkoznak, hogy közelebbről is szemügyre veszik az 1995 és 2014 között született legfontosabb dokumentumokat, amelyek meghatározták az EU innovációs politikáját és ezek alapján rekonstruálják az EU innovációs politikájának fejlődését, majd összevetik ezt a fejlődési pályával, amelyet az innovációról szóló szakirodalom befutott. Az innovációról szóló politikai és szakmai diskurzus összehasonlítása arra az eredményre vezetett, hogy amiképp az EU jelentős lemaradásban van legfontosabb versenytársaihoz képest az innováció területén, az innovációs politika hasonló távolságból követi az innovációs szakirodalom változásait. Ez a politikai tudásdeficit pedig jelentős akadályt jelent annak, hogy kihasználjuk az innováció kínálta társadalmi és gazdasági előnyöket. Tanulmányukban emellett érvelnek, hogy az innováció tágabb megközelítésére alapozott innovációs politika jelentős mértékben hozzájárulhat ahhoz, hogy inkluzív módon hasznosítani lehessen az innovációban rejlő lehetőségeket. Ehhez azonban az eddigieknél szorosabb együttműködésre van szükség a tudományos közösség tagjai és a politikaformálásban érintett szakértők között. Mindez még fontosabb lenne a digitalizáció, az automatizáció és a robotizáció hajnalán, amikor az új technológiák a hagyományos gazdasági tevékenységeket is egyre inkább átforgatják, egyszerre kínálva jelentős társadalmi és gazdasági kockázatokat és hasznokat.

**Kulcsszavak:** EU innovációs politikák, kis- és középvállalkozások, befogadás

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Innovation has become a core issue over the past few decades, and especially since 2010, with the new European development strategy called Europe 2020 – A strategy for smart, sustainable and inclusive growth (hereinafter Europe 2020). However, despite the rather ambitious initiatives aimed to reduce the gap in innovation performance between the EU and its main competitors, that is the USA and Japan, we are witnessing relatively slow development in this field. One of the reasons for that is enduring differences between the innovation performance of large firms and small- and medium-sized enterprises (SMEs). For example, the Community Innovation Survey collects data on the share of innovative enterprises by the size category of the firms. While the firms with a smaller number of employees tend to be less innovative in all European countries, there are significant differences in the gap between the ratio of large and small, as well as large and medium-sized firms. In the next table we compare the innovation performance of different size categories of firms. The second column displays the difference between the share of innovative large enterprises (250 or more employees) and innovative small (less than 50 employees) firms (thus referred to as the innovative L/S ratio), the third column shows the similar difference between the proportion of innovative large enterprises and innovative medium-sized (50-249 employees) firms (innovative L/M ratio).<sup>1</sup>

As we can see from the Table 1, the differences between the innovation performance of large and small firms are relatively high in the case of post-socialist and Mediterranean countries, the size gap significantly decreases in the case of the most developed European countries. It is also worth noting that the differences are much bigger between the large and small firms, than between large and medium-sized firms.

Table 1 Size gap in innovation performance

	Innovative L/S ratio	Innovative L/M ratio
Poland	3,9	1,8
Hungary	2,5	1,5
Spain	2,4	1,4
Czech Republic	2,2	1,3
Slovakia	1,9	1,4
Italy	1,9	1,2
EU-28	1,7	1,3
Portugal	1,7	1,3
Austria	1,7	1,2
France	1,6	1,2
Finland	1,5	1,2
Germany	1,5	1,2
Ireland	1,5	1,2
United Kingdom	1,2	1,1

Source: Eurostat – Community Innovation Survey, 2014

Our study examines whether or not current innovation policy at European level is apt to boost the innovation performance of the SME sector and to reduce the above-mentioned size-gap. The paper is structured as follows. In the first section we will shortly outline a theoretical framework in which we will analyse and evaluate the development of European innovation policies. This is followed by an overview of the most important phases of EU innovation policy development: the Green paper on innovation (1995), the Lisbon strategy (2000-2010) and the Europe 2020 strategy (2010-2020). In the third and final section, we will summarise the main findings and draw some conclusions.

### Theoretical framework of innovation policy analysis: narrow vs. broad approach of innovation

The origin of modern innovation studies dates back to the 1950s when it was called ‘science policy research’ (Martin, 2016). This heritage has a long-standing impact on how innovation is perceived today by the actors involved in the innovation policy formulation process. There are two main approaches of innovation policies. In the more traditional (i.e. narrow) policy approach, innovation is regarded as a linear process, where the source of all innovation activity is scientific research. The results of scientific basic research transformed into engineering and manufacturing, while the new product is distributed through marketing and sales activities. The directions in the process are unilateral, there are no feedback mechanisms included in this system. An implicit consequence of this approach is that innovation is mainly regarded as a radically new product or process, and incremental innovations are seen as of secondary importance.

It is also worth noting that this traditional approach places particular emphasis on the emergence of new ideas, while their wider exploitation and diffusion remains a relatively neglected aspect of innovation. In this narrow approach, innovation is very technological in its nature and thus the primary manifestation is in the manufacturing sector. This approach also focuses specially on the generation of explicit knowledge. Policies therefore aim to improve both the quantitative and the qualitative aspects of the higher education system (e.g. by raising the number of PhD students) and the research base of the country. All these characteristics of the narrow/traditional approach denote the main rationale of state intervention in the field of innovation (Fagerberg, 2014, p. 5). It is embedded in the neo-classical stream of the economic literature in which self-regulated markets would create the optimal resource allocation. According to this argument, innovation has ‘public good’ properties inhibiting firms to invest as much in innovation as the ‘optimum level’ would require because the returns from innovation investments cannot be fully appropriate, as new ideas and solutions are diffused throughout society and the economy after some time has passed. This is the so-called market failure argument (Fagerberg, 2014, p. 5).

Schienstock and Hamalainen (2001) gave an essential critique of the narrow (traditional) approach by underlining its implicit assumptions as follows: innovation is understood in the narrow approach as an exceptional event; innovation and the process of knowledge creation is seen as an isolated process; problems of uncertainty remain unsolved; R&D is supposed to be the main (if not the only) source of innovation; and the narrow approach also neglects collaborative elements of innovation (Schienstock & Hamalainen, 2001, p. 50). There is an increasing volume of evidence that suggests that the linear model of innovation represents the exception rather than the rule. Most of the time it is hard to find any direct causal link between new scientific knowledge and innovation. Schienstock and Hamalainen (2001) contrast the science-based notion of innovation to the activity-based one which can take place anytime and anywhere. Instead of being a single event, innovation should be rather seen as a continuous process related to the everyday practice of organisation. Thus, they stress the importance of incremental innovations. Another basic feature of innovation concerns its ambiguous and uncertain character. In order to cope with this inherent uncertainty, this approach proposes to use the recursive model of innovation as opposed to the linear one (ibid., p. 51). In this model the triggers of innovation may vary depending on the given case, there are multiple actors involved in the process of innovation and there are ‘complicated feedback mechanisms and interactive relationships’ among them. As this model stresses the importance of the socially embedded character of innovation, it is implied that instead of explicit knowledge, the tacit dimension will be more relevant with trust relations and collective knowledge playing a key role.

This critique of the narrow approach of innovation policy is deeply rooted in the theoretical stream of national innovation systems which is the result of the 30-year old evolution of the innovation studies from the late 1950s until the late 1980s. In this view, each country represents a specific case with specific actors and institutions and with unique relationships among them. As Martin puts it: “The notion of a ‘national system of innovation’ (NSI) is one of the most important conceptual developments to emerge from *Innovation Studies*. It shifted attention from the previous focus on individual innovation actors (e.g. firms, universities, and public research labs) to the links and interactions between the various actors making up the national innovation system” (Martin, 2016, p. 435).

National systems of innovation (Lundvall, 1992; 2016) evolve historically and seem to show path-dependent characteristics, i.e. resisting capacity towards the changes in the environment. It is also implied that there are no universal policy solutions or instruments that can be effectively implemented independently from the context of the given country. The two models of innovations imply two different knowledge management models as well, since they rely on two different types of knowledge. According to Jensen et al. (2004), the narrow approach can be characterized by the STI-mode (Science, Technology, Innovation) of knowledge management system dealing mostly with explicit and codified knowledge, while the broad approach involves tacit and ‘often highly localized’ knowledge where Doing, Using and Interacting, the so-called DUI-mode of knowledge management plays an important role (Table 2).

Table 2 The evolution of innovation studies: narrow and broad approach of innovation

Dimensions	Narrow Approach	Broad Approach
Model of innovation	Linear	Recursive
Dominant form of innovation	Radical	Incremental
	Technological	Non-technological
Knowledge base	Scientific, explicit and individual	Practical, tacit and collective
Mode of innovation	STI-mode	DUI-mode
Sector	Manufacturing	No focus on specific sectors
Policy implications	Market failure approach	System approach

Source: own compilation

### The evolution of innovation as a concept in European innovation policies

In this section we will investigate how the concept of innovation has been changed in different European policy documents during the past 15-20 years. By doing so we will rely to a large extent on the theoretical framework briefly summarised earlier. First of all, we would like to present some methodological limitations of this section. Public policy can be defined as: ‘all actions by public organizations that influence certain societal processes’ (Edquist, 2014). However, in this policy analysis we cannot meet these criteria, therefore we limit our focus to the main policy documents of the single public organization of the European Commission (EC). The EC has had so many programmes and initiatives that a holistic evaluation would be impossible. Therefore, we will examine only the most important innovation policy documents of the three most important strategic documents of the EU, namely the Green Paper on Innovation (1995), the Lisbon Strategy (2000) and Europe 2020 (2010). Beside these, some additional reports and communications were produced. Our main argument is that although a relatively stable consensus was reached within the research community about the advantages of systemic or broad approach of innovation compared to the narrow one already during the early 1990s, the innovation policy was dominated by the latter until the 2010s.

#### Green Paper on Innovation (1995)

The beginning was surprising. One of the very first documents aimed at determining innovation policy at the European level was the Green Paper on Innovation adopted in 1995 (European Commission, 1995). The objective of the Green Paper was to identify key factors and policy measures through which innovation activity can be enhanced in the EU. Although the definition of innovation adopted in this strategic document was quite vague: ‘the successful production, assimilation and exploitation of novelty in the economic and social spheres’, later we can find definitions for product, process and organisational innovation (European Commission, 1995, p. 1). The document also emphasizes the importance of such background factors as the innovation culture or skill basis of the society, as well as the contribution of the public service sector. As the document puts it: ‘... innovation is (...) the introduction of changes in management, work organisation, and the working conditions and skills of the workforce’ (European Commission, 1995, p. 1).

These are clearly important elements of the broad approach. Similarly, the document recognizes that innovation is not a linear process but involves dense interactions of different actors, including the users 'and anticipating the needs of the market and society are just as important – if not more so – than a mastery of the technology' (European Commission, 1995, p. 1). The Green Paper also distinguishes between radical and incremental innovation - giving equal importance to both kinds. Concerning the sectors involved in innovation activities the document also remains neutral, recognizing the importance of innovation not only in high-tech sectors but also in agriculture, service, and even public sector innovation is underlined. Later in the document, the authors argue that organisational innovation plays a crucial role as it is frequently a necessary precondition for the success of other forms of innovation and that Europe lags behind its competitors in this field.

In relation to the theoretical framework briefly sketched in the previous section, the Green Paper is balancing between the broad and narrow approach of innovation. There is an inevitable gap between the theoretical background of the Green Paper and the measures proposed: although from a theoretical point of view, this document can be evaluated as one which fully applies the broad-based approach, in terms of policy measures it remains technology-oriented. According to the document one of the most important weaknesses the European Union has to face is the so-called European paradox. This term refers to the fact that while Europe performs well in terms of basic scientific research, it struggles in transforming its scientific excellence into commercial success compared to its main competitors, i.e. to the US and Japan. This analysis had a long-lasting impact on the orientation of European innovation policies, focusing mainly on patent regulation, tax incentives and stronger collaboration between R&D sectors and industry, strengthening the technology absorption capacity of SMEs, etc. This phenomenon can be observed in the Green Paper itself.

This is most visible when it comes to the measures proposed on the basis of the broad-based theory applied. In the second part of the paper, the Commission outlines a full set of actions that has to be taken in order to improve innovation capacity of both firms and individuals in the European Union (European Commission, 1995, pp. 38-47). None of the listed 13 measures can be linked to non-technological innovation but reflect a narrow approach especially emphasizing the importance of technological innovation, scientific, explicit and individual knowledge-base, the STI mode of innovation and the manufacturing sector. This divide between theoretical assumptions and concrete policy measures can be identified in subsequent innovation strategies and other policy documents, too.

### *The Lisbon Strategy: one step forward, two step back towards a holistic innovation policy*

The Lisbon Strategy (2000) aimed to create a model for a knowledge-based economy and society which is the most competitive and dynamic in the world. The Strategy defined three strategic goals: sustainable economic growth, more and better jobs and greater social cohesion.

It was not at all surprising that in the context of knowledge-based economy, innovation quickly became a core issue. There were two main initiatives aimed to foster innovation. The first was the establishment of the European Area of Research and Innovation, the second aimed to create friendly environment for start-ups and SMEs. As part of this initiative, the Commission aimed to increase the competitiveness and dynamism of the business sector by creating a friendlier environment especially for start-ups and SME-s. This involved lowering the costs and the administrative burdens of doing business. Encouraging interfaces between the partners of the Triple Helix models and advisory services and other types of business angels also became a priority in the policy agenda. It is important to note that this was the first time in the history of the EU's innovation policy when innovation activity of the SMEs had been given top priority.

However, in these key policy documents one can hardly find any traces of broad-based innovation. In fact, the only quantifiable innovation-related objective of the Strategy was to increase the share of R&D expenditures in GDP from 1.9% to 3% by 2010 and to raise the proportion of private investments within these expenditures from 55% up to 67%. The implementation of the Lisbon Strategy has been achieved in three main phases. This first period is also known as Lisbon I and took place between 2000 and 2004. This was followed by a mid-term review and a second period of the Strategy 2005-2008, also known as Lisbon II. The third phase was the continuation of Lisbon II in the context of global financial crisis and economic downturn. The mid-term review resulted in a slightly modified innovation strategy 'European Partnership for Growth and Jobs' and in an Action Plan 'More Research and Innovation – a Common Approach'. The analysis of these documents together with other key policy documents shows that the broad approach has never been fully applied during this period of time. It is especially true for the action plans, more concrete policy measures and evaluation methods.

A good example for this contradiction at different policy levels can be found from 2003 when the European Commission issued a communication on updating the concept of innovation (EC, 2003a) and also an action plan (EC, 2003b). Both documents were approved in 2003. The first one represents a theoretical shift from linear to a systemic model of innovation though keeping the strategic aim of raising the share of R&D expenditure to 3% of the GDP: 'Important though research is as the source of invention, innovation encompasses more than the successful application of research results. The evolution of the innovation concept – from the linear model having R&D as the starting point to the systemic model in which innovation arises from complex interactions between individuals, organisations and their operating environment – demonstrates that innovation policies must extend their focus beyond the link with research' (EC, 2003a, p. 4). Beside the R&D-based linear approach, the document also recognises the importance of incremental innovations, the so-called value-innovation, organisational and business model innova-



tion and design and marketing innovation. The document criticizes the innovation policies of the past: 'Although it is the systemic model that now dominates in policy discussions, many measures put into practice with the intention to promote innovation still appear to owe more to the linear view' (EC, 2003a, p. 7). This broadening of the innovation approach involves a shift in the focus of the innovation policy as well as recognising that enterprises are at the heart of the innovation process. Therefore, the most important target of the innovation policy should be the enterprises, their behaviour, capacities and environment. In parallel with this shift, statistical data analysis also has to be reviewed as well: 'These models also colour measurements of the innovation process and innovation performance, which are usually biased towards indicators of technological innovation' (EC, 2003a, p. 7).

While the developed policy document explored the new broad-based approach of innovation, the Commission issued an innovation action plan three months later in the same year which reflected rather few elements from the renewed concept of innovation elaborated a few months earlier. The only focus of the action plan was to design policy initiatives which can effectively help to increase the average research investment level from 1.9% of GDP to 3% of GDP by 2010, of which 2/3 should be funded by the private sector. As it has been argued earlier, this objective, that has never been achieved, would require at that time an annual growth rate of 6% in the public sector and 9% annual growth in the private investments. Initiatives, on the other hand, aimed to boost organisational or other non-technological innovation are completely missing from the action plan. Concerning the measurement, we can see the dominance of indicators reflecting the narrow approach of innovation throughout the Lisbon process. In March 2000 the European Council approved a set of structural indicators. Among these only the following ones were aimed to measure innovation to a very narrow extent: public expenditure on education, the total R&D expenditure, the level of Internet access, the number of science and technology graduates, the patenting activities, venture capital investments and ICT expenditure.

### *Europe 2020: significant changes in European Innovation policy*

In the new European strategy called Europe 2020 – A strategy for smart, sustainable and inclusive growth, innovation remained an important issue and became one of the seven flagship initiatives. The aim was to adopt a much more strategic approach to innovation: 'An approach whereby innovation is the overarching policy objective' (European Commission, 2010, p. 2). The so-called Innovation Union initiative is built around 34 specific commitments in five main thematic areas: strengthening the knowledge base and reducing fragmentation, getting good ideas to market, maximising social and territorial cohesion, pooling forces to achieve breakthroughs: European Innovation Partnerships, and leveraging policies externally. We can see two major steps towards the broad-based approach of innovation: the emergence of social aims as

an outcome of innovation activities and the importance of policy learning with self-reflection and different feedback mechanisms, implicitly assuming some sort of social dialogue in this field.

Instead of presenting all 34 commitments we will only outline the most important points of the strategy. One of the primary aims of the strategy is to increase the R&D&I investments to 3% as a share of GDP in all Member States. This remains an important threshold to reach despite the financial and economic crisis. Fast growing SMEs are one of the most important target groups of these initiatives of easing access to finance, making intellectual property rights more affordable to enterprises and setting interoperable standards. In order to tackle societal challenges more effectively, the strategy launched a special programme called the European Innovation Partnership. The main societal challenges identified by the strategy are among others: life-threatening diseases, new solutions to improve the lives of elder people, ways to radically cut CO<sub>2</sub> emissions, alternative sources of energy, reducing and recycling waste, smart transport, healthy or high-quality food stuffs, communication and interfacing (European Commission, 2010, p. 22).

The Commission monitors the innovation performance of the Member States through the Innovation Union Scoreboard (IUS) and through the Summary Innovation Index (SII). The Scoreboard was first created in 2002 and has been revised several times since then. The SII is a composite indicator of 25 sub-indicators. Since this is the primary monitoring tool of the EC which is reflective of the EU's innovation policy approach and influencing it at the same time, it is essential to thoroughly analyse it. In a recent research paper, Havas et al. (2015) revealed a strong bias towards R&D-based innovations, that is, towards the narrow approach of innovation policies. As they argue, among the 25 indicators: '10 indicators are *only* relevant for, and a further four *mainly* capture, R&D-based innovations; seven could be relevant for both types of innovations; and a mere four focus on non-R&D-based innovations. Given that (i) the IUS is used by the European Commission to monitor progress, and (ii) its likely impact on national policy-makers, this bias towards R&D-based innovation is a source of major concern' (Havas et al., 2015, p. 18). The only other instrument to measure innovation activities of the firms is the Community Innovation Survey (CIS) carried out every second year.

According to the first evaluations of the Europe 2020 strategy, further improvements are needed in eliminating inconsistencies in rules and practices making innovation activity less burdensome and risky, especially by creating a real European single market. Another gap identified is the weak innovation culture which could be only improved by a closer involvement of society. Although major achievements have been reached concerning public sector innovation, significant reserves remained unused in this field. The strategy puts a special emphasis on promoting the inclusive character of innovation, that is on equal access to both development capacities and the benefits of innovation, further steps need to be taken in order to strengthen this inclusive dimension. The evaluation also identifies considerable skills shortage and mismatches: 'It does not only concern sector-specific skills,

but also numeracy and literacy skills, as well as the ‘21st century skills’ for creativity and entrepreneurial spirit’ (European Commission, 2014, p. 11). From the perspectives of this paper, the most important elements are the recognition of the inclusive character of innovation and the necessity of the development of generic skills instead of industry-specific ones.

It is also worth noting that since the beginning of the launch of Innovation Union Initiatives (2010), important policy priorities have been defined. Among the top six priority areas we can find social innovation, design-driven innovation, demand-side innovation policies, public sector innovation, public procurement of innovation and workplace innovation. Overall, we can say that the European innovation strategy represents a significant shift from the narrow to the broad approach of innovation policy although it is far from its full application and can be placed somewhere midway between the two. The essence of the evolution of the European innovation policies is summarised in the Table 3.

## Conclusions and implications

A remarkable shift in the evolution of the EU’s innovation policy was found from the narrow to broad-based approach when it comes to its theoretical basis. This is, however, only true with two restrictions. First, there is a considerable gap between the theoretical foundations of innovation policies and their policy measures. As we could see from the Green Paper on Innovation (1995), at a theoretical level, innovation policies have been open to a broad-based, systemic or holistic approach from as early as the mid-90s. On the other hand, this is hardly reflected in action plans and on a policy measure level in general: the measures seem to be derived from the narrow approach to innovation where state intervention is justified by market failures and which is characterised by the linear model of innovation focusing on radical and technological innovation of the manufacturing sector on the basis of scientific, explicit and individual knowledge.

Table 3 The evolution of EU innovation policies 1995-2015

	Green Paper (1995)	Lisbon I (2000-2005)	Lisbon II (2005-2008)	Lisbon III (2008-2010)	Europe 2020
Elements of broad-based innovation concept	Fully applied broad-based approach	A slight shift from a linear towards a systemic approach appears only in 2003	Public procurement as a tool to boost innovation	No significant changes compared to Lisbon II	Top 6 priorities: social innovation; design-driven innovation; demand-side innovation policies; public sector innovation; public procurement of innovation; workplace innovation
Elements of narrow innovation concept	In terms of proposed policy measures, it remains technology-oriented: importance of technological innovation, scientific, explicit and individual knowledge-base, the STI mode of innovation	Strategic objective is to raise the share of R&D expenditures in the GDP from 1.9% to 3% by 2010	Focus is on R&D expenditures, green economy, strong industrial base and on innovation-friendly environment, explicit reference to market failure approach	Increase investment in R&D, innovation and education. Develop clean technologies for cars and construction. High-speed internet for all	Innovation statistics remain science and technology-focused
Measurement		Establishment of the European Innovation Scoreboard: no indicators of non-technological innovation and Job Quality			5 key indicators and the creation of Innovation Union Scoreboard and Summary Innovation Index
Sector prioritised	Innovation is important in low-tech sectors, in private and public segments of services	No sectoral focus	Promotes innovation in the services	Green economy, car manufacturing and constructions	Health and social service, green economy, public sector
Interrelation of Innovation and Job Quality	Recognised but poorly developed, more focus put on quantitative dimension of employment	Exclusive focus on quantitative dimension of employment, although improving working conditions becomes a strategic objective	'Better jobs' dropped from the agenda		Job quality is of high priority again, though not in direct relation to innovation
Social inclusion	Does not appear				Special emphasis on promoting the inclusive character of innovation.

Though this shift does not appear in concrete policy measures and action plans and remains mainly rhetoric: ‘enterprises are at the heart of the innovation process’.

Contribution of innovative-related trade in manufactured goods to the balance of trade of goods; Share of fast growing and innovative firms in the economy; Percentage of employment in knowledge intensive activities; Patent applications weighted by GDP; Hourly labour productivity

The weaknesses of the narrow approach are numerous and obvious. Concerning education, for example, which is an important element of all innovation policies, we did not find any references to the skill needs, knowledge and manpower use practices of the enterprises and especially SMEs (i.e. demand side). Instead, European policies targeted almost exclusively the supply side of education. In the context of the current disruptive technological changes (like automation, digitisation, robotisation, etc.) the skill biased aspect of innovation is worth special attention: 'Beyond the quantitative effect of new technologies on the number of employees, it is also important to investigate the qualitative effect of technological change on different categories of workers. The basic premise here is that innovations are skill-biased and, therefore, replace tasks traditionally carried out by unskilled workers with new jobs demanding skilled workers' (Vivarelli, 2014, p. 138).

The market failure argument is about the justification of state intervention. According to the argument rooted in traditional neoclassical economics such an intervention can only be justified in the case of market failure, i.e. when markets are unable to produce optimum functioning. Market failures may have various sources: economies of scale and scope, asymmetric information, externalities, etc<sup>ii</sup>. As Edquist (2014) rightly argued: 'the notion of optimality is irrelevant in the field of innovations and innovation systems' (p. 15). The design of innovation policies should not follow universal objectives (such as the share of R&D expenditures in GDP) but has to be based on the analysis of the characteristics, strengths and weaknesses of the individual national innovation systems. In relation to this, it is necessary to stress the differences in the countries' historical and institutional contexts. This institutional variety plays an important filtering role between such megatrends as globalization, networking of economy and society, ICT, outsourcing of business functions etc. On the basis of these concluding remarks, we can formulate some general propositions for a future innovation policy:

- 1) Separate research policy from innovation policy. This is the heritage of the traditional linear view of innovation inhibiting the shift towards a holistic policy approach.
- 2) Another important element which may facilitate such a shift in policy orientation would be the development of a measurement tool better at capturing the complex character of innovation processes.
- 3) Innovation policies should be more open to low-tech sectors and put less focus on high-tech. The case of Denmark and Austria are the examples of highly innovative countries with low-tech industrial structure. In addition, low and medium-low sectors represent important segments of the economies where the dominant form of innovation is incremental innovation.
- 4) A similar shift in the focus is needed from large to small and medium-sized enterprises because this sector is an important locus of employment and economic performance in every country.

- 5) The shift towards a broad approach also involves changes in innovation governance where processes of policy design and policy learning are of essential importance.

We would refrain from proposing a set of more concrete actions because an appropriate innovation policy takes into account the specificities of different national innovation systems and there are no universally applicable political solutions. There exists, however, numerous national level initiatives that can serve as an example for measures based on a holistic innovation approach such as the Swedish functional public procurement system (Edquist, 2018) or the Finnish workplace development programme (Alasoini, 2015). The Swedish functional public procurement system is a good example for how to increase the demand for innovation, whilst the Finnish programme is aimed to enhance the learning networks consisting of enterprises, universities, research institutes and other stakeholders at a local level.

Although we examined primarily the evolution of the EU's innovation policy in this paper, it is also worth noting that the main locus of innovation-related public actions and measures can be found at a national level. The EU innovation policy is important in this regard as a general framework which orientates national innovation policies to a different extent. There is some inherent contradiction between a single EU innovation policy and the real needs of different Member States having their own historical developments and path dependent national innovation systems. What is important here, therefore, is the existing policy learning processes and mechanisms enhanced basically by a more or less intensive dialogue between the stakeholders involved. It is only through this dialogue that a compromise can be reached between the feasibility of scientifically desirable and the politically administrative policy actions.

These conclusions derived from an analysis of the development of the European innovation policy are especially relevant in the Hungarian context. According to the results of the latest issue of the European Innovation Scoreboard the indicators indicating the most significant lagging compared to the European average can be found in the SME sector. Hungary is a moderate innovator, its overall innovation performance is 66% of the European average, the three indicators reflecting the innovation performance of the SME sector vary between 13.7-16% of the EU-average (European Union, 2018, p. 66). It is clear from this analysis that it will be extremely difficult and costly to narrow the gap between the European and the Hungarian SME-sector's innovation performance, if the Hungarian innovation remains in the old paradigm of the narrow approach of innovation as SMEs generally lack the necessary human, financial and technological resources to run R&D projects and the majority of them operates outside of the manufacturing sector. Therefore, the redesign of Hungarian and European innovation policies is a major challenge ahead of us and must represent a top priority for all stakeholders of the national innovation system.

## Endnotes

- i For example, in the first case we divided the proportion of innovative large enterprises from all large enterprises by the proportion of innovative small firms from all small firms, and so on. The table shows that the proportion of innovative large enterprises is 3.9 times higher than the innovative small firms in Poland.
- ii For a literature review, see: BIS, 2010.

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