Quality of Jobs and Innovation Generated Employment Outcomes (QuInnE)

WP4: Policy Analysis

Innovation policy review: National and European Experiences

(Draft version)

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Introduction

One of the main research activities carried out in the framework of the QuInnE project is systematically review EU and national level policies aimed to boost innovation. The aim of this activity is to better understand which policies and modes of implementation produce positive innovation effects, especially in relation to job quality and employment under various national contexts. As QuInnE has a very strong focus on policy, this initial review has an ambition to give a first stage evaluation on the innovation policies implemented in the QuInnE countries, i.e. in France, Germany, Hungary, the Netherlands, Spain, Sweden and in the UK. In doing so, we try to find evidences of possible linkages to job quality and employment creation in these national innovation policies.

Our work is based on an overview of existing policy evaluation literature and especially on the contributions of our project partners. Each partner involved in Work Package 4 prepared a short overview on their national innovation policies. We are more than grateful to them because this task required working with extremely tight deadlines at the very beginning of the project. This was achieved through the following steps:

1) After the kick-off meeting held in Lund on early April 2014, the Hungarian research team elaborated the draft template for the national reports on innovation policies.
2) This template was circulated among the project leaders and the relevant experts of the project's Advisory Board members.
3) The final version of the template was sent to the project partners on 24th April 2015.
4) The partners had 3-4 weeks to populate the country template.
5) The synthesis of this first stage policy evaluation report was elaborated during the last two weeks of May 2015.

This extremely reduced amount of time of course poses substantial limitations to the depth and scope of this policy evaluation. This report can be regarded as a first attempt how to process national innovation policies in a meaningful way in order to create possible linkages to job quality and employment creation. First section presents the theoretical foundations and outlines the main features of both narrow and broad approach of innovation policies. In the second section of the report EU-level innovation strategies will be analysed according to the theoretical framework

elaborated in the first one. In the third section we will draw the most important lessons from the national innovation policy reviews and finally we will make some concluding remarks.

1. Theoretical framework of innovation policy evaluation

Although innovation policy is not a new phenomenon at all, it gained particular attention from the mid-1990s. Accordingly, the theoretical thinking about what innovation policy is and how can it be evaluated is still in its infancy. There is a consensus in the community of innovation researchers that there are two main approaches related to innovation policy. The broad approach considers all policies that influence innovation in a way or another. In contrast, the narrow approach deals exclusively with those policies that have been created with the intention of direct impact on innovation. Though effective policy making requires the broad approach, in this initial review we limit the scope of analysis to innovation policies defined in the narrow sense of the word.

As Fagerberg (2014) rightly observed the definition of innovation policy depends on the theoretical foundations of innovation. This means that all choices policy makers do in elaborating innovation policies have their more or less direct theoretical implications. In order to understand innovation policies in Europe at different (European, national or regional) levels we have to understand the theoretical choices and assumptions that are implicitly or explicitly made. On the basis of the abovementioned recent work of Fagerberg, we can sketch two stylized approach of innovation policies. In the following we will shortly present these two approaches and complement it by the explanation of some basic notions of innovation theory.

Before presenting and comparing the main characteristics off the two approaches, we will shortly present the most widely used classifications of innovation, firstly the definition of the Oslo Manual and then the differences between radical and incremental innovations. Innovation encompasses a wide range of activities including, as the Innovation Union document notes, new processes, not just new products, as well as marketing and organizational innovations. In this respect, the EC defines innovation as ‘the creation of new or significantly improved products, processes, marketing or organisation that adds value to markets, governments and society’ (EC 2013a:4). Similarly, the latest

edition of the Oslo Manual includes in its definition of innovation the implementation of a new or significantly improved new organisational method in business practice or workplace organisation (OECD & Eurostat, 2005). The Oslo Manual defines and classifies types of innovation. Its primary aim is to standardise data collection and statistical measurement. It distinguishes four types of innovation within two categories of technological and non-technological innovations:

- Product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses.
- Process innovation is the implementation of a new or significantly improved production or delivery method.
- Organisational innovation is the implementation of a new organisational method in the firm's business practices, workplace organisation or external relations.
- Marketing innovation is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing.

The literature also distinguishes between incremental and radical innovation. As Orlikowsky (1991) explains : 'The former implies a linear, cumulative change in a process or product … while the latter are nonlinear, paradigmatic changes, representing significant departures from existing practice or knowledge. The categories of radical and incremental are intended as ends of a continuum representing the level of new knowledge embedded in an innovation, and not as exclusive categories.' Even in innovation leader countries such as Denmark, radical innovations account for less than 6% from all innovations (Nielsen et al. 2012: 11). In this relation it is worth noting that the majority of innovations are non-technological and arise from the introduction of new organisational values and practices.

Following the brief presentation of the most basic classifications of innovation, the next sub-sections describe two main types of approaches innovation policies and their implicit and explicit theoretical background.

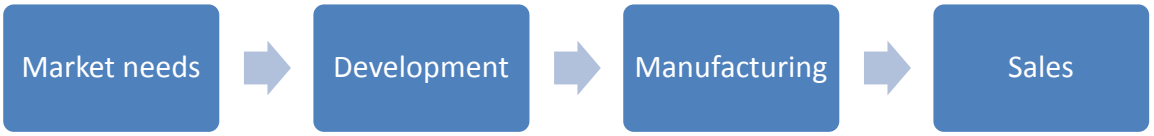
1.1 The narrow approach of innovation policy

The first approach is based on a narrow definition of innovation. This approach conceives innovation as a result of scientific activities regarded as the primary source of economic progress. This is the well-known linear model of innovation and within this stream it represents the science push model, where all innovation activities begin with scientific basic research, the result of which is then transformed into engineering and manufacturing, while the new product is sold through marketing and sales activities. The directions in the process are unilateral, there are no feedback mechanisms in this system. The other type of linear model of innovation is the demand or market pull model where the trigger of the innovation processes is not science but market needs. Beside this, the logic of this model is quite similar, i.e. there are no feedback mechanisms and the relations between the elements of the innovation process are unidirectional.

Figure 1: Linear models of innovation: the science push model

Source: Arnold and Bell, 2001, quoted by Schienstock and Hamalainen, 2001, p. 53.

Figure 2: Linear models of innovation: the market pull model



Source: Arnold and Bell, 2001, quoted by Schienstock and Hamalainen, 2001, p. 53.

The narrow approach of innovation focuses primarily on technological innovation, non-technological forms of innovation, such as organisational and marketing innovations are assumed to be of minor importance. Another implicit consequence of this approach that innovation is mainly regarded as

something radically new product or processes, incremental innovations are seen as of secondary importance. It is also worth noting that the narrow approach put particular emphasis on the emergence of new ideas, while their wider exploitation and diffusion remains a relatively neglected aspect of innovation. However, as Fagerberg argues: 'employing a narrow perspective, i.e., focusing just on the first occurrence of a new idea and not on its subsequent exploitation would not only exclude what matters most economically but also make it more difficult to understand the innovation dynamics' (Fagerberg, 2014., p. 3.). It is also a logical consequence that in the narrow approach innovation mainly takes place in the manufacturing sector which is considered as the backbone of the economic activity. This often involves that innovation policy identifies key sectors or branches that has to be primarily targeted by state intervention. A very important aspect that has to be taken into consideration is that the science push model puts special emphasis on the generation of explicit knowledge. Policies therefore aim to improve of both the quantitative and the qualitative aspects of the higher education system (e.g. by rising the number of PhD students) and the research base of the country.

All these characteristics of the narrow approach denote the main rationale of state intervention in the field of innovation. 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 the firms to invest as much in innovation as the 'optimum level' would require. This is the so-called market failure argument: '(…) from the economists' perspective the fact that other firms may benefit just as much or more, also implies that it may be difficult for a firm investing in the creation of new knowledge to recoup its investment, not to say earn a profit from it. Rational firms would therefore according to this reasoning tend to stay away from such investments, even if the potential benefits for society as a whole might be very large. Thus, in this case, a self-regulating market would fail to secure a socially optimal allocation of resources in the economy. For economists such 'market failure' provides a justification for market interventions – or policy instruments – aiming at increasing investments in science in the economy towards the socially 'optimal level' (Fagerberg, 2014, p. 5.)

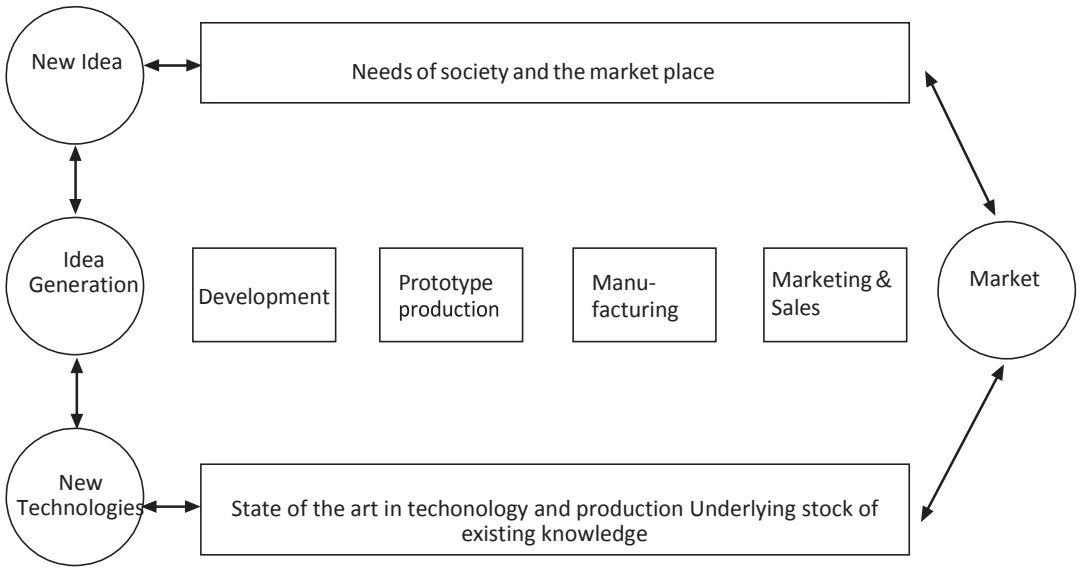
Schienstock and Hamalainen gave an essential critic of the narrow (traditional) approach by underlining its following implicit assumptions: innovation is understood in the narrow approach as an exceptional event; innovation and the process of knowledge creation is seen as an isolated process; problems 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 and Hamalainen, 2001, p. 50.).

1.2 Broad based approach of innovation policy

There is increasing volume of evidence that suggests that the linear model of innovation represents rather the exception than the rule. Most of the times it is hard to find any direct casual link between new scientific knowledge and innovation. As Schienstock and Hamalainen argue: 'Innovations do not occur as a limited number of giant mental leaps within the human mind, as the traditional mentalistic perspective on knowledge assumes. They are not limited to cognitive processes. Instead, knowledge creation is intertwined and co-evolves with practical activities.' (ib. id. p. 51.) They contrast to the science-based notion of innovation the activity-based understanding of innovation 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, they propose to use the recursive model of innovation as opposed to the linear one: 'Because of this uncertainty, we cannot identify clear sequences of stages in innovation processes; instead, we have to analyse innovation as a recursive process, in which particular innovation activities can become both cause and effect, consequence and prerequisite' (ib. id. p. 51.) In this model the triggers of innovation may vary depending of the given case, there are multiple actors involved in the process of innovation and there are 'complicated feedback mechanisms and interactive relationships' among them.

Figure 3: Recursive model of innovation



Source: Arnold and Bell, 2001, quoted by Schienstock and Hamalainen, 2001, p. 54.

As this model stresses the importance of socially embedded character of innovation, it is implied that instead of explicit knowledge, the tacit dimension will be more relevant, trust relations and collective knowledge playing a key role. 'This is based on the assumption that innovation processes vary from company to company and that innovation to a great extent depends upon organisational learning processes enabled by human capital, organisation forms, and ICT use. As there is no clear development logic, an efficient innovation and knowledge management within and among firms becomes crucially important…' (ib. id. p. 54.)

Similarly Jensen et al. (2004) analysed the interrelationships between innovation activities and their knowledge base. They distinguished four types of knowledge and two main modes of innovation activities. The four types of knowledge are 'know what', 'know why', 'know who' and 'know how'. The former two types ('know what' and 'know why') refer mainly to explicit scientific knowledge, whilst the latter two ('know who' and 'know how') are something which are closer to tacit knowledge: competence or (social skills). These types of knowledge are complementary, in most of the cases all of them are used during the process of innovation. However, they involve different types of learning processes and thus require different types of knowledge management systems (KMS).

The authors distinguish two types of KMS: the STI-mode and the DUI-mode. As concerning the former: 'The STI-mode of knowledge management and learning (Science, Technology, Innovation) implies that codified knowledge, and scientifically based ways of getting access to, producing and utilizing it are dominating the process of innovation. The STI mode most obviously depends on explicit know-why though, as we have argued, skills and interpretative frames also play a role' (Jensen et al., 2004, p. 14.). In contrast: 'The DUI-mode of learning and innovation (Doing, Using, Interacting) most obviously relies on know-how, which is tacit and often highly localized. This mode involves building structures and relationships, which enhance and utilize learning by doing, using and interacting. (…) The DUI mode of learning is characterised by on-going changes that continuously confront employees with new problems. Finding solutions to these problems enhances the skills of

the employees and extend their repertoires. Some of the problems are specific while others are generic ' (Jensen et al., 2004, p. 15-16.).[1]

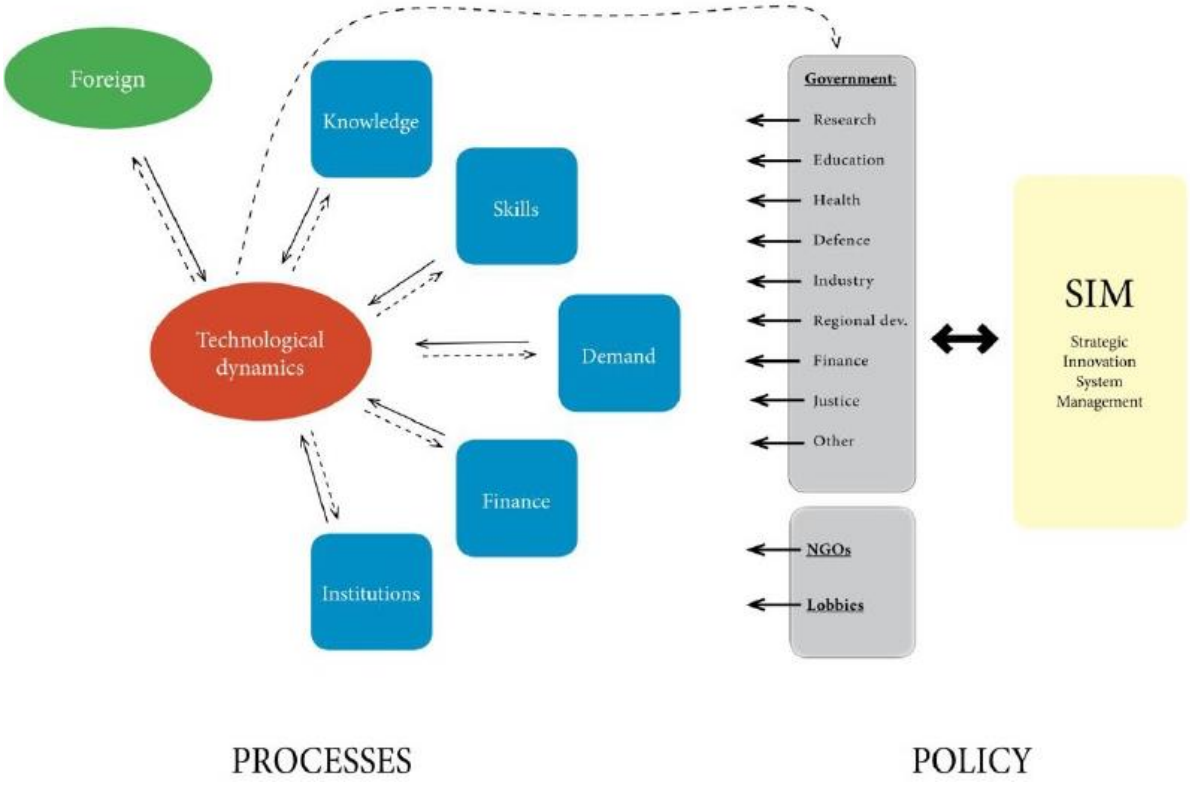
The recursive model of innovation implies different policy making strategy compared to the linear model of the narrow approach. This is mainly because the interactive character of innovation, much emphasised in the recursive model, has to be taken into account. Trust relations, strong cooperation and intensive social interactions between the actors involved ensure the necessary flow of information and shape continuously the learning processes playing a central role in this model. This different approach in policy making is best reflected by the theoretical stream of national innovation systems. In this view each country represents a specific case with specific actors and institutions and with unique relationships among them. National systems of innovation evolve historically and show path-dependent character, 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 concrete context of the given country: 'As a result national systems of innovation may differ greatly, (…) and a policy mix that works in one context may be totally inadequate in another. Adopting an innovation system approach, therefore, leads to a sceptical attitude towards policy advice that advocates the same solution everywhere independent of contextual differences (for example, the European Union's stated goal of raising R&D investments as a percentage of EU GDP to 3%).' (Fagerberg, 2014, p. 9.)

Fagerberg gives a stylized model of national innovation system, where the output of all innovation activities is labelled as 'technology dynamics'. These technology dynamics are influenced by both domestic and international processes. Fagerberg identifies five generic and strongly interrelated processes which have decisive impacts on technology dynamics: knowledge, skills, demand, finance and institutions (possible feedback mechanisms are represented by dotted arrows). As Fagerberg rightly stresses, there is a strong complementarity in this dynamic system. If one element of these five processes doesn't function at an appropriate level, it negatively affects the outputs of the whole system. According to this model, policy making can only influence innovation indirectly, by shaping these five generic processes: ' Policy makers may influence the technological dynamics by helping to shape the processes that impact the dynamics. To do so they need to have access to an adequate supporting knowledge base and they may need to coordinate policies across different domains (see

[11] Lundvall (2008) demonstrated that this distinction is not new at all and some its elements can be traced back to Adam Smith (Lundvall, 2008, p. 22-23.).

below). Their actions will also be motivated by goals they themselves set, i.e., strategic choices that they make and their "visions" for the development of society. Therefore we have labelled this process "strategic innovation system management".' (Fagerberg, 2014, p. 11.)

Figure 4: The National Innovation System: Dynamics, processes and policy



We can summarise this short overview of the two main approaches on innovation in the following way.

Table 1: 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

2. Innovation policy mixes in the European Union

A recent analysis (Izsák et al., 2014) of types of innovation policy instruments established five country clusters in Europe. The authors adopted the following definition of policy instruments: 'A policy instrument is an intervention into a dynamic and ever-changing system of actors, institutions, networks and knowledge in a certain period. The combination of policy instruments together with complementary framework policies (such as fiscal policies, education, regulatory framework etc.) forms the innovation policy mix.' (Izsák et al. 2014:4) According to the authors in analysing policy instruments and policy mixes one has to answer four key questions: why to intervene, how, where and when (ib. id. p. 4.). They also argue that a good policy mix responds to the actual needs of the country, universal solutions rarely work. The policy mixes thus are continuously changing in time and are shaped according to the policy learning mechanisms which are therefore of crucial importance.

This analysis was based on the database produced by Erawatch and INNO Policy TrendChart initiatives of the European Commission (referred to as 'TrendChart database' in the followings). This database gathered more than 2000 policy measures launched at national level among the EU-27 member states plus Norway and Switzerland (for a detailed description of these policy measures see EC 2013b:90-92). Izsák and her colleagues classified these policy instruments in 6 main categories as follows:

1) Public R&D including Competitive research and Centres of excellence;

2) Industry-Science Collaboration including Collaborative research, Cluster policies and Competence centres where both industry and academic sector is involved;

3) Knowledge and technology Transfer including Technology transfer and Spin-off measures;

4) Business RDI including direct support to business R&D and business innovation;

5) Tax incentives and

6) Venture capital funds (state-backed).

The cluster analysis was looking for similar patterns of innovation instruments and policy strategies across countries independently from their real innovation performance. The results show significant

stability over time among the country groups: 'The relative stability of policy mixes is quite a robust feature of the EU27 countries, which suggests that policy mixes are shaped either by durable structural features and/or by equally persistent policy philosophies or policy approaches.' (Izsák et al. 2014:10) In order to measure the variability over longer periods of time, the authors distinguished policy instruments launched between 2004-2008 and those implemented between 2009-2012. The country groups remained the same with the only exception of Germany moving from its own cluster to Group 2 of countries. Therefore we will only present here the results referring to the period 2009-2012. The five clusters identified during the analysis were as follows:

Table 2: Country clusters according to their implemented innovation policy mixes (2009-2012)

Country groups	Description of group following a qualitative analysis
Group 1: Ireland, Malta, Poland, Slovenia	Focus on competitive R&D programmes with increasing share of business innovation support measures and the use of R&D tax incentives
Group 2: Estonia, Finland, **Germany**, Greece, Latvia, **Sweden**, Switzerland	Focus on collaborative R&D, support to loan and venture capital funds, no use of R&D tax incentives
Group 3: **France**, Italy, **Netherlands**, **UK**	Focus on technology transfer mechanisms, strong support to entrepreneurship, loans and venture capital and extensive use of R&D tax incentives
Group 4: Austria, Belgium, Czech Republic, Denmark, **Hungary**, Norway, Portugal, **Spain**	Focus on direct business R&D and business innovation, use of R&D tax incentives
Group 5: Bulgaria, Cyprus, Lithuania, Luxembourg, Romania, Slovakia	Focus on competitive R&D programmes, no use of R&D tax incentives

Source: Izsák et al., 2014:14-15.

After establishing five country clusters, the authors confronted the results by the innovation performance of the countries. The innovation performance was measured by the Innovation Union Scoreboard (IUS). This Scoreboard is composed by 25 indicators measuring the enablers (such as human resources; open, excellent and attractive research system; finance and support), the firms' activities (e.g. investments, linkages and entrepreneurship, intellectual assets) and the outputs (e.g. share of innovative firms and economic effects of innovation). The IUS 2013 distinguished five country clusters based on their innovation performance. These were the followings:

Table 3: Country clusters based on Innovation Union Scoreboard's Summary Innovation Index (2013)

Country clusters	Countries
Innovation leaders	Finland, Denmark, **Germany, Sweden**
Innovation followers	Estonia, Cyprus, Slovenia, **France**, Ireland, Austria, **UK**, Belgium, Luxemburg, **Netherlands**
Moderate innovators	Lithuania, Malta, **Hungary**, Slovakia, Greece Czech Republic, Portugalia, **Spain**, Italy,
Modest innovators	Bulgaria, Romania, Poland, Latvia

Source: European Commission, 2013:5

Izsák et al. demonstrated that very similar policy mixes can lead to very different results in the Scoreboard ranking. The only exceptions are countries belonging to the category of innovation leaders. Three out of four countries (i.e. Sweden, Germany and Finland) follow rather similar mixes in terms of policy instruments and all of them belongs to the Group 2 of countries. The next table shows the composition of the policy clusters by the innovation performance measured by the IUS 2013. We may see from the table that the countries represented in the QuInnE consortium belong to three different cluster. **Sweden and Germany** (as *innovation leaders* according to the IUS ranking) belong to the Group 2 which is focused on collaborative R&D, that is on the cooperation of university-academic research and business R&D activities. As the authors stress: 'Germany, Finland, and Sweden have been increasingly focusing their research and innovation budgets on collaborative R&D programmes and have invested in innovation and technology platforms for academia and industry. Given that their business sectors invest relatively high shares of their revenues in R&D and given their position in relation to technology development, this focus on collaborative R&D appears to be justified.' (Izsák et al. 2014:11)

France, the Netherlands and the UK belong to Group 3 which is characterised by a strong focus on commercialisation and technology transfers. In contrast to the former group of countries, in these countries tax incentives play an important role among the innovation policy instruments. It is also worth noting that this is a relatively new phenomenon which might be explained by the effects of the global financial crisis and economic downturn: 'The shift towards commercialisation is quite recent (2009-12) as these countries were previously less oriented towards this area and more oriented towards collaborative R&D activities. This may be a result of the increasing pressures in the post-2008 period to generate visible results in order to justify public investments in R&D. These pressures are particularly apparent in the UK.' (Izsák et al. 2014:12)

Spain and Hungary belong to the Group 4 characterised by a focus on support business R&D&I activities. The use of tax incentives to promote R&D are widespread This country cluster is very heterogeneous, we may find innovation leader country of Denmark as well as countries near to innovation leaders like Austria, Belgium, Norway and moderate innovators like Spain and Hungary.

Table 4: Similar policy groups and diverging innovation performance

Country groups	Brief description	IUS 2013 performance groups
Group 1: Ireland, Malta, Poland, Slovenia	Structural Funds-driven; Dual orientation on science and business R&D but with stronger focus on science (competitive R&D) orientation	*Innovation followers, Moderate innovators, Modest innovators*
Group 2: Estonia, Finland, **Germany**, Greece, Latvia, **Sweden**, Switzerland	Science and collaborative R&D oriented policy	*Innovation leaders, Innovation followers, Moderate innovators, Modest innovators*
Group 3: **France**, Italy, **Netherlands**, **UK**	Orientation towards commercialisation of public R&D coupled with support to framework conditions (fiscal incentives)	*Innovation followers, Moderate innovators*
Group 4: Austria, Belgium, Czech Republic, Denmark, **Hungary**, Norway, Portugal, **Spain**	Business R&D and innovation focused policy coupled with support to competitive R&D	*Innovation followers, Moderate innovators*
Group 5: Bulgaria, Cyprus, Lithuania, Luxembourg, Romania Slovakia	Structural funds driven; Dual orientation on science and business R&D but with stronger focus on business R&D orientation	*Innovation followers, Moderate innovators, Modest innovators*

Source: Izsák et al. 2014:10

3. Lessons from the Comparison of the National Policy Review in the QuInnE countries

After reviewing the characteristics of the innovation policy measures and instruments in the EU-27 countries, in this section we turn our attention to the content analysis of innovation policies in the QuInnE countries, that is in Sweden, Germany, the UK, the Netherlands, France, Spain and Hungary. As we mentioned earlier in the Introduction, all partners participating in work package 4 were asked to write a short report on the existing innovation policies. The Hungarian research team as work package leader prepared a guideline to identify the following main characteristics of the national innovation policies:

1) **What features innovation in the policy document(s):** if there are explicit or implicit references to different types of innovation, with a special focus on the classification of the Oslo Manual, the radical vs incremental dichotomy of innovation, broad or narrow approaches, sectorial distinctions, etc.
2) **Drivers, motives and priorities of innovation policies**: triggers of innovation, to what extent are these policies evidence-based, top three priorities (if any), linkages between innovation policies and the EU innovation policies or other national level policies (e.g. policies aimed to foster education, employment, economy, science and technology, etc.)
3) **Stakeholders**: main actors involved in the processes of design and the implementation of the innovation policy.
4) **Implementation:** main instruments of the policy, sources of funding, territorial scope of the policy (e.g. regional aspects), mechanisms through which the policy document was adopted (i.e. a top-down or bottom-up approach)
5) **Monitoring and evaluation:** what are the expected outcomes of the policy and how are these monitored and evaluated with a special focus on the mechanisms of policy learning.

In what follows we will briefly synthetize the results of these national reports according to the following structure: first it will be surveyed whether the national policies adopted a narrow or broad approach of innovation, second we will give an overview on the top policy priorities, thirdly the main actors and stakeholders will be identified, then we will focus on the policy tools implemented by the policies and finally we will analyse the learning mechanisms set up by these policies.

3.1 Innovation in policy documents: dominance of the narrow approach and first initiatives to broadening the concept towards non-technological innovation in Sweden, Germany and France

Policy makers in all countries participating in the QuInnE project emphasized the key role science and innovation play for both economic future (i.e. sustainable growth) and well-being. For example, the main UK policy document 'Our Plan for Growth: Science and Innovation' elaborated by the UK Department for Business, Innovation and Skills (UK BIS) states that 'firms with high innovation intensity grow twice as fast as non-innovative firms; for better during periods of economic turmoil; and are more likely to still be active after eight years." (Our Plan for Growth, 2014:17)

It is not surprising that in all countries Parliament (legislature) did approve a bill for innovation strategy and governments developed several key policy documents on the country innovation strategy. For a list of key laws and strategy documents see Annex 1 at the end of the report.

The majority of the government innovation strategies is shaped by the narrow, technology focused approach and reflects the STI mode of innovation. However if we look at the debate surfaced in the policy analysis, we may say that in **France** a debate has been recently started on how to change the existing top-down 'dirigiste' industrial and innovation policy and implement a 'new industrial policy'. Until the 2010's there was no discussion on the various models of innovation, 'France hesitates between the American model of the Silicon Valley, where radical innovation are introduced by start-ups, the German model of the well-established industrial "Mittlestand", highly successful in terms of incremental innovations, and the French tradition of industrial planification in key state-led sectors. This hesitation blurs the representation of innovation in France, as it does not make a distinction between radical innovation, incremental innovation, strategic innovation policy.' (Beylat&Tambourin, 2013:6, in: Gautié, 2015:1). In **Netherlands**, there were some attempts using the European Social Fund to support workplace innovation, however the Dutch government did not integrated this scheme into the national innovation policy: 'The innovation policy of the Dutch government is mainly focused on technological innovation without making clear differences between product and process.' (Tros, 2015:2)

Similarly, in the **UK**, as Wright stresses 'While the need for innovation is discussed throughout the policy document, it makes reference to a narrowly defined, science-based approach to innovation. ln this respect, the policy largely reduces innovation to R&D.' (Wright, 2015:1) Similar pattern could be identified in **Hungary** too, where the background report the Bill on the "National Research – Development and Innovation Strategy (2013-2020)" is based on did mention the importance of the non-technological or adaptive innovation only in the public serve sector where '... the great majority of adaptive innovations are as follows: organising, marketing, service innovations relaying on the ICT to improve productivity and quality in both private and public sectors.' (IF, 2013:38) ln the case of Spain, from the innovation policy review, it is difficult to identify the implicit approach of innovation behind the Spanish strategy of science, technology and innovation for the period 2013-2020.

Only in the case of **Sweden and Germany**, we found a clear and decisive governmental action to make distinction between strategies of Research and Development and Innovation. For example, the Ministry of Education prepared the bill on research and innovation (2012) and the Ministry of Business produced the National Innovation Strategy (2012) The situation is very similar in Germany, where Federal Ministry of Education and Research is responsible for research policy, while the Federal Ministry of Economics and Technology is in charge of the innovation policy.This more differentiated approach of the Swedish policy makers was the result of the application of the systems approach and the refusal of the 'linear mode of innovation' in the community of researchers. 'A direct consequence of abandoning the linear model would be to down-play the role of academic research as the primary source of innovation and turn serious attention to the other components of innovation systems; and breaking the policy link between research and innovation and seeing and dealing with them as to separate policy areas.' (Mathieu, 2015:2) In Germany the federal government went further very recently, and approved the 'New High-Tech Strategy' in 2014. This is a core document for German innovation policy designating 6 key priority areas where government should primarily intervene. Five of them respond to global challenges such as climate change, digital society and economy, but the sixth one aims to promote 'innovative world of work' representing a clear rupture with the narrow approach.

Another source of a slight shift in the policy orientation can be observed in countries where the state is organised on a federal basis. The innovation policy itself is geographically fragmented allowing to states or regions to implement autonomous innovation policies at a subnational level. This is true for the **UK, Spain and Germany**. This fragmentation paves the way for innovation policies with an

alternative approach. This is especially true for the UK, where Scottish, Welsh and Northern Irish administration approved their own innovation policies echoing much more the key notions of broad-based innovation approach like 'systems-based approach to innovation', 'non-science-based forms of innovation' with the aim to promote some kind of incremental and organisational and social innovation (Wright, 2015:7-8).

Similar trends can be observed in **France** where an 'Action plan for innovation in service activities' was adopted in 2011 emphasising the importance of non-technological and incremental innovations. 'Along the same lines, the recent "New Deal for Innovation" (2013) adopts a new vision and definition of innovation, much broader than in previous policies. It refers explicitly to the Oslo Manual, in particular to break with the narrow view of exclusively "R&D technological based" innovation. Whereas previous policies were mainly focused on start-ups (innovative entrepreneurship, the Silicon Valley model), and, at the other extreme, on big firms ("national champions" of the strategic industrial policy), more focus is put in the new policy on medium-sized firms. The document presenting the law mentions (implicitly) job quality as a precondition of innovation' (Gautié, 2015:2) What is more: 'Since 2012, public funding has been extended more explicitly to non R&D based and/or technological innovations, with the introduction of an "innovation tax credit", and the broadening of the criteria of Bpifrance[2] to provide financial support to innovators.' (Gautié, 2014:4)

It is too early to assess the real impact of these initiatives, but a broad-based orientation has been clearly emerging in these countries in the recent years.

3.2 Priorities in the innovation strategies: focus on sectors, intelligent infrastructure and on their combination

Reviewing priorities identified in the various national innovation policy reviews is giving more insights into the thinking of policy makers on the various types of innovations. In the **French** case, knowledge transfer between public research and business, innovative entrepreneurship and promotion of young technology companies are mentioned. In addition we have to note that due to the strong regional dimension of the French economy, regional and local actors are playing visible role in promoting 'competitiveness clusters'. In the **Hungarian** case, the three prioritised or pull sectors for the 2013-

[2] Key French institution for the promotion and financing of innovation

2020 innovation policy are the followings: pharmaceutical, auto and ICT industries. In the **Netherlands** the 'path-dependent history of industrial policies and science & technology policy' worth highlighting: 'Focus and mass' in 'key areas' of (research) capacity provided a rationale during the first decade of the 21st century for a strategy to strengthen the sector orientation of science, technology and innovation policy in the Netherlands and is the predecessor of the top sector policy since 2011.' (Tros, 2015:3) The following main priorities are underlined in the Dutch policy documents: focusing on technological innovation, improving cooperation between the public and private sectors (i.e. better collaboration between the knowledge institutions, firms and government), promoting entrepreneurship and improve workers skills by training and education.

In the **Swedish** case globalization is the key determinant when selecting priorities. The push sectors are the followings: sustainable health care, pharma-biotech, energy systems, IT/communications, construction and transportation. 'These are the areas that Sweden feels it can capitalize on a frontrunner position and invests in already established research and innovation rich environments. Here we see an emphasis on science, technology and engineering, but the presence of the social and welfare sectors indicates an interest in more organizational and (public) service activities.' (Mathieu, 2015:3) In the case of **UK**, there is no clear distinction between sectors, the 'UK government policy is increasingly targeted towards 'economically important sectors' and technology focused.' (Wright, 2015:2). In the **Spanish** case, the primary attention will be paid in the 2013-2020's state plan to the following fields: promotion of talent and employability, stimulus of scientific and technical research excellence, promoting entrepreneurial leadership in R&D&I. In addition, there is no explicit reference to key sectors or technologies were found, instead they defined priority areas where Spanish government should intervene more actively. These are the followings: promotion of talents and employability, stimulus of excellence, boost of entrepreneurial leadership, promotion of R&D&I addressed to the challenges of the society.

In **Germany**, the six key priority areas laid down in the 'New High-Tech Strategy' are: Digital economy and society; sustainable economy and energy; healthy living; intelligent mobility; civil security and innovative world of work. Beside these, the policy defines four cross-cutting activities, that is: 'support of clusters and networks between science and industry; increasing participation of SMEs in the innovation process; innovation funding and provision of venture capital; education and training policies, and regulatory policies with regard to standardisation, property rights, innovation-oriented public procurement, as part of the creation of innovation-friendly framework' (Jaehrling, 2015:4-5.)

As we can see, some of the countries clearly identify key sectors and/or technologies, others define key thematic areas, but most of them combine the two. The following table summarises the main findings.

Table 5: Priority areas in innovation policies in QuInnE countries

Country	Sectors or technologies	Thematic priorities
United Kingdom	1) Big Data 2) Satellites 3) Robotics and autonomous systems 4) Synthetic biology 5) Regenerative medicine 6) Agri-Science 7) Advanced materials and energy storage	1) Nurture scientific talents 2) Invest in scientific infrastructure 3) Support research 4) Participate in the global sciences and innovation
Sweden	1) Health care 2) Pharma-Biotech 3) Energy systems 4) IT/Communication 5) Aviation and space technology	
Netherlands	1) Agri-Food 2) Horticulture and propagation materials 3) High-tech systems and materials 4) Energy 5) Logistics 6) Creative industry 7) Life sciences 8) Chemicals 9) Water	1) Knowledge exchange 2) Entrepreneurialism 3) Enhance skills of workers
Spain		1) Promotion of talents and employability. 2) Stimulus of excellence. 3) Boost of entrepreneurial leadership. 4)Promotion of R&D&I addressed to the challenges of the society
Germany	1) Digital economy and society 2) Sustainable economy and energy 3) Healthy living 4) Intelligent mobility 5) Civil security 6) Innovative world of work	1) Networking and transfer 2) Innovation amongst SMEs 3) Innovation funding and provision of venture capital 4) Innovation-friendly framework
France	no explicit sector or technology focus	1) Knowledge transfers 2) Innovative entrepreneurship 3) Governance of innovation policy
Hungary	1) Pharmaceutical industry, 2) Vehicle/auto industry, 3) ICT industry	

3.3 Role of stakeholders in designing innovation strategy: asymmetric pattern of stakeholders' involvement and leading edge position of Sweden, UK and Germany

Without exception, all national innovation policy review is stressing the need for the strategic or value added partnership between knowledge institutions (universities, research and training institutes), business community and government organisation (triple-helix model). However, in the design and development of the innovation strategy policy (i.e. preparation of bills, developing evidence materials) – besides general rhetoric on the importance of wide consultations with the actors of these communities during strategy preparation – only two countries, **UK and Sweden** (and – to a lesser extent – **Germany**) were able to implement it in practice. In the UK, the list of stakeholders participating in the policy formation is impressive (Wright, 2015:5-6):

- Innovate UK; Innovation NI, Innovation Wales, Scottish Enterprise;
- UK Research Councils;
- Catapult Centres (7 specialist centres aimed at bridging academia and businesses to support commercialisation of new technologies the specific areas of High Value Manufacturing, Transport Systems, Digital, Cell Therapy, Offshore Renewable Energy, Satellite Applications and Future Cities);
- UK Intellectual Property Office;
- ln England, four University Enterprise Zones (local partnerships between universities and business in Bradford, Nottingham, Bristol and Liverpool),;
- ln England,39 Local Enterprise Partnerships (LEPs via City/Growth Deals) with LEJT Network
- research and technology organisations;
- UK companies including start-ups, SMEs and large companies;
- Employer peak bodies including the Confederation of British Industry (CBI);
- (British) Trade Union Council (TUC) (51 affiliated unions and eight regional offices in England, Wales and Scotland), Scottish TUC, Welsh TUC, lrish Congress of Trade Unions – Northern Ireland Congress
- NESTA (UK innovation charity)
- Banks including the British Investment Bank (BIS, 2014a:51).

In addition, we have to mention the important role of writing 'evidence-based background papers' before the preparation of government bills, which may help very much to involve 'knowledgeable' stakeholders during the consultation. This process is also important in ensuring the necessary mechanisms for policy learning in the later phase of monitoring and evaluation of the policy implementation. As Izsák et al. rightly observed: 'Finding an optimal policy mix is not a one-time exercise but a continuous process that adjusts to the dynamics of innovation systems' (Izsák et al., 2014:5)

In **Sweden**, 'There is a Swedish tradition of basing legislation on a variety of parliamentary commission reports (SOU reports) and then sending draft legislation out for comments to a wider range of organizations and agencies, the so-called remiss process. There is a list of commission reports that this bill is based on, and then final 50 pages of the bill consists of annexes that summarize the commentaries received on various draft initiatives. These usually include state agencies and authorities, universities, civil society and environmental groups, unions and employers organisations, charity and religious organizations, and branch or sector organisations.' (Mathieu, 2015:3-4).

In **Germany** the Federal Ministry of Education and Research (BMBF) is primarily responsible for research policy, while the Federal Ministry of Economics and Technology (*BMWi*) is in charge of the innovation and technology policy. These policies and their implementation is evaluated on a yearly basis by a national expert commission (EFI) which is a central advisory board consisting of 20 experts from the areas of science, industry and civil society. This body is charged with developing proposals for the strategy's further development and implementation. In contrast to the previous advisory boards, the newest commission also includes representatives of the civil society (e.g. trade unions). Recently the government also seeks to initiate a broad social dialogue on the risks and opportunities associated with the digital economy which will serve as an input for a white book in 2016.

3.4 Implementing innovation strategies: policy tools

In **France** the most important policy tools are the fiscal ones, for example, different tax credits for research. This a longstanding tradition in France, it was first introduced in 1981 and has been recently extended by an innovation tax credit system, which is available for non R&D-based and non-

technological innovators also. Above these financial instruments, 'institutions to facilitate knowledge transfers from public research to business (such as the "Carnot Institute", the "societies for the acceleration of transfers"), or to help start-ups (such as "incubators") have also been put in place by the State' (Gautié, 2015:4). From 2004, competitiveness clusters were created to bring together private firms, research laboratories and educational establishments. State plays an important role in the finance of innovation, the share of public spending in the total R&D is 37% and reaches 50% if research tax is included.

Tax reduction is an important policy tool in the **Netherlands** also, but 'governing innovation networks' can be seen as the primary role of the government in the implementation of national innovation policy. This is achieved on the basis of the so-called innovation contracts signed by the main stakeholders involved in the innovation process (enterprises, universities and research institutions and other public bodies). Different ministries are the leading and coordinating partners in these contracts. The innovation budget consists of three main parts: national funds on knowledge and innovation (57%), sector contributions from ministries (40%) and European funds (3%).

Germany represents a unique case in Europe in many respects. The share of R&D spending has practically reached 3% of the GDP (2,97%), a target defined already by the EU Lisbon Strategy in 2000. On the other hand, Germany is among those few countries in which there are no tax incentives to promote innovation. Instead, the Federal Ministry of Education and Research (BMBF) and the Federal Ministry of Economics and Technology (BMWi) and the federal states launch direct R&D programmes which are 'the main channel to provide financial means to companies' (Jaehrling, 2015:2). These include financial supports for start-ups , subsidies for 'Business Angels' providing Venture Capital; financial aid for spin-offs from universities; public loans for high-tech-based start-ups. A new element of the innovation policy was the turn towards a 'mission-oriented' approach by defining a number of 'forward looking projects' on which future research, innovation and technology development should target.

In **Sweden** there are two main channels of the funding mechanisms of innovation. The first is a direct funding to certain prioritized areas and projects including block funding for universities. The second channel is allocated by four main research agencies: Swedish Research Council, The Swedish Research Council for Environment and Nature, Agricultural Sciences, Animals and Food, and Spatial

Planning, Sweden's Innovation Agency, and the Swedish Research Council for Health, Working Life and Welfare. As a business sector research institution, Research Institutes of Sweden Holding A/B aims to support commercialization of research findings. Another mechanism of promoting collaboration is to reward universities monetarily for engaging in collaboration with research money or block grants.

The **Spanish** innovation policy ('Strategy of Science, Technology and Innovation 2013-2020') defines four priority areas where state intervention is needed the most. The strategy assigns state programs and subprograms for each of these priority areas as follows:

Table 6: Priority areas, programs and sub-programs in the Spanish innovation strategy

Spanish Strategy of Science, Technology and Innovation 2013-20	*State Plan of Scientific, technical and Innovation 2013-16*
Promotion of talent and employability	State Program for the Promotion of talent and employability
Stimulus of excellence	State program of stimulus of scientific and technical research of excellence
Boost of entrepreneurial leadership	State program of entrepreneurial leadership in R&D&I
Promotion of R&D&I addressed to the challenges of society	State program of R&D&I addressed to the challenges of society
Programs	
Sate Program of promotion and incorporation of talent and its employability	• State subprogram of training • State subprogram of incorporation • State subprogram of mobility
Sate Program of encouragement of scientific and technical research of excellence	• State subprogram of generation of Knowledge • State subprogram for the development of emerging technologies • State subprogram for institutional strengthening • State subprogram of scientific and technical infrastructure and equipment
State Program of Business Leadership in R&D&I	• State subprogram of Business R&D&I • State subprogram of essential facilitating technologies • State subprogram of R&D&I oriented to the demands of the productive system
State Program of I&D&I focused in the challenges of society	• Health, demographic change and wellbeing • Food security and quality; Sustainable and

	productive agriculture, Natural resources, Marine and Maritime research. • Safe, clean and efficient energy • Intelligent, sustainable and integrated transport • Innovation and social changes • Economy and Digital Society • Security, protection and defense
Strategic actions	AE1. Strategic action in Health AE2. Strategic actions in Digital Economy and Society

Source: Munoz de Bustillo, R. – Grande, R., 2015:5

The different projects are run by the Centre for Industrial technological Development, CDTI, based at the Ministry of Economy and Competitiveness. In each of these subprograms there are different types of participation and financing instruments (grants and subsidies, financial credits, capital risk instruments , others such as tax incentives). The next table shows of the R&D budget administered by the CDTI.

Table 7: Distribution of CDTI financed projects

Type of project	Number of approved projects	Contribution CDTI (million €)	Total budget
R&D individual	860	461809	588361
R&D cooperative	48 (115)	45730	57066
FEDER *Innterconect*	132 (615)	129239	269273
Interfirm international	6 (10)	2031	3613
CDTI-Eurostars	25	5705	10304
Support Neotec	12	1762	2349
Sub total	10832	646276	930966
Direct line of innovation	174	174829	222808
Innvierte acquired compromises	1	11250	NA
Support of international initiatives	41	856	NA
Total	1299	833211	1153774

Source: Munoz de Bustillo, R. – Grande, R., 2015:6

In the **UK**, targeted financial supports (business loans, co-investment schemes and grants, advice to firms on how to access finance and the provision of tax incentives for investment in R&D) play a crucial role in promoting innovation primarily among SMEs and high growth firms. Priority is also given to funding and supporting a wider research base by encouraging multi-partner collaborations between researchers and business. The implementation of the policy is the responsibility of multiple actors, including 'collaboration between research institutions (primarily Research Councils (UK research councils and universities, but not limited to UK and University Enterprise Zones), networks (in particular the 7 Catapult Centres), private sector businesses (including SMEs) and charitable

organisations. The role of the UK government agencies is largely conceived as one where their role is to create an environment conducive to businesses to innovate.' (Wright, 2015:5)

In **Hungary**, the government plays a very similar role than in the UK, i.e. its primary aim is to create an innovation-friendly environment and framework. The innovation policy document distinguishes three types of policy tools as follows.

Table 8: Main Types of Innovation Policy Tools in Hungary

Direct instruments promoting RDI	**Indirect instruments promoting RDI**	**Other instruments**
Supply side tools (e.g. grants)	Financial tools (e.g. tax incentives)	Various types of risk capital (e.g. seed capital)
Systemic state intervention	Systemic state intervention	Systemic state intervention
Demand side tools (e.g. public procuement)	Other regulations (e.g. quality control)	State guarantee (e.g. new market development)

Source: Makó–Illéssy, 2015:7

4. Summary

Innovation policy has a relatively young tradition and became into the focus of policy makers only during the 1990's. To understand the priorities and policy tools of the various innovation policy strategies – both at EU and national level – it is necessary to identify their theoretical and methodological background. It is not a surprising coincidence that the first innovation policies in Europe were launched at a time when the first edition of the OSLO Manual (1990) was published – this theoretical and methodological guideline to supply with scientifically proved evidences innovation policy makers.

Literature dealing with innovation policies makes distinction between policies based on narrow and broad approaches. Both of them have strong theoretical implications. For example the narrow approach of innovation policy is focusing on technological innovations and non-technological innovations (i.e. marketing, organisational etc.) have secondary or residual importance. In addition radical nature is the decisive character of innovation. Knowledge management – in this narrow view of innovation – is dealing mainly with the scientifically supported and codified knowledge where the interpretative frame and skills are required (STI mode of knowledge management). In the narrow version of innovation policy, the market failure syndrome justifies and triggers state interventions (policy measures) to keep investment in R&D&I at the necessary level.

The broad innovation policy view stresses the co-evaluation of both codified and non-codified (tacit in nature) practical knowledge. Due to the uncertain and fluid nature of innovation, this approach indicates the interactivity (recursive character) of the innovation process characterised by complicated feedback mechanisms between numerous actors and institutions. In this case the non-codified and localised knowledge have crucial role (DUI-mode of knowledge management). Collective – organisational – learning process associated with this innovation approach varies from company to company, from region to region and even from country to country and is shaped by different kind of capitals (e.g. human, organisational, relations, social) resulting in differing learning capacity of social and economic actors. In this logic, the performance and quality of innovation policy is shaped by the historically evolved national innovation system. This system is embedded into the historical, social-ideological and economic environment and reflects various forms of path-dependencies (i.e. structural, ideological and cognitive ones). In the centre of the stylised model – elaborated by Fagerberg (2014) – of the national innovation system is the 'technology dynamics' which is the

outcomes of five – locally and globally influenced – processes of knowledge, skills, demand, finance and institutions.

Review of the EU-level innovation policies – surprisingly enough – indicated a relative stability of policy mixes. This result based on the analysis of the following five categories of policy instruments: 1. Public R&D, 2. Industry-sciences collaboration, 3. Knowledge and technology transfer, 4. Business R&D&I, 5. Tax incentives, 6. State backed venture capital funds. However, it is interesting to see in some QuInnE countries (e.g. France, UK and Netherlands) a shift from collaborative R&D&I into the direction of "commercialization of public R&D to speed of the transfer of innovation into the practice.

Analysing the national innovation policy reviews, this working paper presents the lesson on the issue such as:

1. Dominant innovation concept reflected in the national innovation documents.

2. Drivers/priorities in the innovation strategies.

3. Stakeholders' role in preparing innovation policy for the law makers.

4. Policy tools of the national innovation strategies.

The narrow, technological and radical form of innovation views are reflected in the various national innovation policies with the exception of Sweden and Germany. In relation with the priorities of innovation strategies, the patterns of sector versus intelligent infrastructure focus and their combinations were identified. In the majority of countries sectors was prioritised. However, in the cases of Spain, Germany and the UK combination of sector, intelligent infrastructure developments were stressed by the innovation policy makers. Without exception, all national policy reviews made remarks on the important role of stakeholders. However, only in two countries - UK and Sweden – were described the complex practice and the forms of involvement of the stakeholders. In the case of the UK, varieties of stakeholders were supplied with evidence-based background analysis. In Sweden, wider communities of organisations/agencies have opportunities to comment the draft legislative proposals – this is the so-called "remiss" process in the legislation procedure.

Evaluating the forms of policy tools described in the national innovation policy reviews, two main categories were mapped. Firstly the combined use of the fiscal tools (i.e. tax incentives) and direct government programs, and secondly variety of government programs without significant incentives. France, Hungary and Netherlands are belonging into the first country group, where differential tax incentives are used to create innovation friendly financial environment. In France, special institution was established to speed up the knowledge transfer from pubic to business community (e.g. Carnot Institute) together with the creation of the 'competitive clusters'. In the Netherlands, beside the tax incentives the special 'innovation contracts' between the key stakeholders (i.e. firms, universities-research institutes and other public bodies) are the vehicles to improve the innovation performance of the firms. In Hungary too, both direct instruments (e.g. grant to stimulate the supply side and public procurement to attract demand side etc.) and indirect tool (e.g. tax incentives) are used together with the other tools (i.e. various types of risk capital, state guarantee to get access into the new market, etc.)

In the second country group – represented by Germany, Sweden, Spain and UK - a variety of government programmes and agencies are operating with the ambition to increase the intensity of the innovation activity in the countries concerned. Germany represents the highest R&D spending and the federal government relying on the tools of direct R&D programs to improve innovation performance of the firms (e.g. supporting in general start-ups, but especially high-tech start-ups, university spin-offs etc.) In addition it is worth mentioning the so-called "forward looking projects". In Sweden, beside the direct government funding targeted to certain projects (e.g. block funding for universities) four national research agencies together with business sector research facilities are used to speed up the innovation activities. In Spain, the state selected four priority fields and numerous sub-programs within these priority areas.

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Annex I: Innovation policies: bills and strategy documents

Country	Bills	Strategy documents
France	Bill on Innovation and Research (1999)	**[1]** OECD (2014), *Reviews of Innovation Policy*, France, Paris **[2]** Beylat J-L., Tambourin P. (2013), *L'innovation, un enjeu majeur pour la France*, [Innovation, a major stake for France] Rapport pour le Ministère du Redressement Productif et pour le Ministère de l'Enseignement Supérieur et de la Recherche. **[3]** Lauvergeon A., *Un principe et sept ambitions pour l'innovation (Rapport de la commission Innovation 2030)*, (One principle and seven ambitions – report of the Innovation 2030 commission), La Documentation Française. **[4]** Une nouvelle donne pour l'innovation. Quatre axes stratégiques, quarante mesures (A new deal for innovation. Four strategic priorities, forty policy measures) **[5]** Plan d'action en faveur de l'innovation dans les services (Action plan for innovation in service activities)
Hungary	Bill 1414/2013 (VII.4.) National Research – Development and Innovation Strategy (2013-2020) www.kozlonyok.hu/nkonline/MKPDF/hiteles/MK13115.pdf	***Befektetés a jövőbe (Nemzeti kutatás-fejlesztési és Innovációs Stratégia) (2013-2020) (Investment into the Future – National Research – Development – Innovation Strategy – 2013-2020).*** **(**2013)Budapest: National Ministry of Economy - National Innovation Office
Netherlands	To the Top. Towards a new enterprise policyhttp://www.government.nl/government/documents-and-publications/parliamentary-documents/2011/02/04/to-the-top-towards-a-new-enterprise-policy.html	In the years 2014-2020, projects in the field of social innovation are related to activities at the local societal level, aiming to better re-integration and participation in the labour market: (NL) '*Kans voor gemeenten: sociale innovatie en transnationale samenwerking*'

Sweden	Bill on "Research and Innovation", October 2012. Ministry of Education [*Regeringens proposition 2012/13:30 Foskning och innovation*: http://www.regeringen.se/sb/d/15650/a/201368] Bill on National Innovation Strategy: Ministry of Education [*Regeringens proposition 2012/13:30 Foskning och innovation*: http://www.regeringen.se/sb/d/15650/a/201368]	
U.K.	"Our Plan for Growth: Science and Skils",(OK BIS), UK Parliament, 17th December 2014. https://www.gov.uk/government/publications/our-plan-for-growth-science-and-innovation.	
Spain	Act of Science, Technology and Innovation, STI, (*Ley 14/2011, de*	
Germany	Law on Venture Capital (2008)	BMAS[3] (2015a): Grünbuch Arbeiten 4.0. BMBF[4] (2015a): Berufsbildungsbericht 2015. BMBF (2015b): Bekanntmachung von Richtlinien zur Förderung von Maßnahmen für den Forschungsschwerpunkt "Arbeit in der digitalisierten Welt" BMBF (2014a): Bundesbericht Forschung und Innovation 2014 BMBF (2014b) New High-Tech Strategy (2014-) BMBF (2014c) Deutschlands Spitzencluster

[3] Bundesministerium für Arbeit und Soziales
[4] Bundesministerium für Bildung und Forschung

		BMBF (2014d): Industrie 4.0. Innovationen für die Produktion von morgen. BMBF (2012): Zukunftsprojekte der Hightech-Strategie (HTS-Aktionsplan) BMBF (2010) High-Tech Strategy 2020 (2010-2014) BMBF (2006) High-Tech Strategy (2006-2010) Forschungsunion / Acatech (2013): Recommendations for implementing the strategic initiative INDUSTRIE 4.0- Final report of the Industrie 4.0 Working Group MWIF NRW – Ministerium für Wissenschaft, Innovation und Forschung (2013): Forschungsstrategie Fortschritt NRW. Forschung und Innovation für nachhaltige Entwicklung 2013 – 2020