Measuring smartness of innovation policy

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Abstract

The "smart specialisation" is a concept introduced for enhancing innovation in the European Union (EU). Smartness lies in entrepreneurial discovery of areas of specialisations that best fit innovation potential of the territory. Smartness is studied at meso level as an area of horizontal overlaps between three domains of knowledge triangle: education, research, and innovation. Overlap is measured with correlation of evaluated policy instruments' impacts on three evaluation domains. Case study suggests that vertical and horizontal, or "dumb" and "smart" aspects of innovation policy are both important for policy success. This suggests a new policy concept of country's specialisation in innovation that is not merely smart but fully mesoscopic.

Challenge

The "smart growth" and the "smart specialisation" are concepts in new strategic approach (*Midtkandal and Sörvik*, 2012) introduced by European Commission for enhancing innovation as leading driver of welfare progress in EU (COM(2006)-604). The new concept replaces the traditional vertical silos approach (Degani, 2014) with only one way flow (Sjoer et al., 2012), from single sectoral challenge to single sectoral solution, neatly organized each in its own ministry or department, favouring particular technologies, fields and firms. Sector-based specialisation implies top-down approach in which country identifies a limited number of priority areas for knowledge-based investments and concentrates existing capabilities, assets, competences and comparative advantages with the aim to enhance innovative capacities. These materialise through linear progression from basic research to education and laboratory work, innovation and commercialisation. As a result, innovators, scientists and researchers often even exclude one other from the use of the innovation to appropriate larger fraction of the benefits (Foray and Goenega, 2013). The new concept therefore shifts deep understanding and changes mind-set (Lappalainen and Markkula, 2013) from silos to cross-organisation model which is based on both ways or circular connectedness (Degani, 2014) between sectors of innovation policy.

Smartness is an alternative strategy to old style sector-based specialisation. If you are small, you are not in a good position to benefit from concentration and returns to size and so you have to be smarter (Foray and Goenega, 2013). Smartness refers to learning process, where stakeholders play a key role in discovering areas of future specialisation from the bottom-up approach (COM(2006)-604). Smartness lies in innovative "entrepreneurial discovery" (Foray, 2013) of the specialisation that best fits specific potential of the territory, based on local assets and capabilities, regardless of whether the concerned territory is traditionally strong in innovation or weak, high-tech or low-tech (*Midtkandal and Sörvik*, 2012).

Smartness emphasizes horizontal logic (Foray and Goenega, 2013) of specialisation. It seeks for synergies between independent drivers of innovation and emphasises that its various sectors should support each other – only indirectly but strategically. Smartness of specialisation in innovation can be formalised with a concept of "knowledge triangle" (KT) as proposed by European Institute for Technology (EIT) in 2008 (see COM(2006)-604). The Triangle underlines the interaction between research (R), education (E) and innovation (I) as three main sectors, domains, pillars, drivers or capitals of a knowledge-based society (Schuch, 2013). Each sector brings forward essential concerns for innovation policy, which are specific for one sector individually and these concerns remain mostly ignored in other sectors. For instance, companies are primarily concerned with innovation because of higher profit and income; education sector in its core is constituted on autonomy; research sector is devoted to enhancement of predictive powers of knowledge (Lappalainen and Markkula, 2013). Separate missions of each knowledge domain justify vertical and sector-based organisation of innovation policy.

Therefore, smart innovation policy needs to be understood and governed along two "axes": the vertical one which is illuminating sectoral concerns (E, R or I), and the horizontal one which is presenting inter-sectoral overlaps between I, E and R as areas of policy "orchestration" (Sjoer *et al.*, 2012). Horizontal perspective is relevant because, despite contradictions in their core, E, R and I tend to stimulate and cross-fertilise each other (Carvalho, 2010). Smart specialisation and KT are two concepts that both highlight the importance of jointly fostering innovation in many independent but overlapping sectors, which also calls for paying due attention to the linkages between them (Lappalainen and Markkula, 2013). For instance, horizontal overlapping of I, E and R will give the companies opportunities to commercialise the most up-to-date research findings. In return, research organisations will benefit from additional incomes from commercialisation of their intellectual rights. Education will take advantage of linking learning with doing, providing students with better employment opportunities and furthering their professional competencies.

Pursuing smart (specialisation of) innovation is paramount challenge along both axes in EU, compared to its main competitors. In vertical direction, there is insufficient concentration of knowledge resources in poles of excellence. The policy aim is specialisation but also avoiding the government failures associated with the top-down bureaucratic technology choices (Foray and Goenega, 2013). Furthermore, in KT there is not only one vertical perspective but also many that shall be coordinated with their incompatible demands.

Barriers to horizontal smartness are also profound in EU. They stand in the way of spreading new knowledge (Mulgan, 2007) between three sectors of KT, between public and private stakeholders as well as between theory and practice. There is insufficient commercial exploitation of (publicly funded) research; insufficient trans- and inter-disciplinary research with insufficient focus on medium- and long-term social challenges; lack of innovative governance; cultural differences between science and private companies, legal barriers, as well as fragmented knowledge and technology markets.

When measuring smartness, we are not, of course, aspiring to find out how innovative the outputs, results (outcomes) and impacts of innovation policy really are but only how they, as they are, overlap and support each other. Traditionally, evaluation of innovation policy's impacts adopt a simplistic model of results based assessment, essentially trying to understand what happened as a result of interventions and then connecting this back to programme goals (Reid, 2010). Simplistic models that assume a direct-cause effect relationship, such as a return on investment of R&D funding, many times fail to represent the innovation appropriately (Reid, 2010). Linear theory of change in impact evaluation raises number of methodological issues when faced with complex social challenges. Insightful example is the attribution problem: how to assess a change in a policy variable caused by the intervention when change emerges from overlap between different independent causes. Causality cannot explain much in evaluation when asking complex questions. All one can usually find out is correlation between independent evaluation domains and this does not allow for strong and definite conclusions but only for weak and contextually valid ones. Another examples of basically the same difficulty linked to non-linearity are aggregation and integration problems in evaluation (Radej, 2013, 2014a).

In innovation policy, linear thinking must be replaced with complex one which is elaborated at meso level, since it allows for logical consistency between partly independent and partly interwoven structures of generating and applying knowledge (Zenker and Muller, 2008) that involve interactive, collaborative and thus non-linear thinking (Hirvikoski, 2013; Reid, 2010; RISS, 2011). We accordingly hypothesise that innovation policy should be implemented and its impacts evaluated in mesoscopic way that is partly in sectoral perspective ("dumb", vertical) and partly in intra-sectoral (smart, horizontal) perspective.

The second chapter presents "The three capital model" (3C; Radej, 2014a) as the mesoscopic approach to measuring smartness of innovation policy. The 3C model is abbreviated version of "The four capital model" of sustainable development (4C: economic, social, environmental, human; Ekins, 1992; Ekins and Medhurst, 2006). The difference between 3C and 4C approach is not essential in evaluation methodology. What is important is distinction between one (usually economic) and many, and thus between simple and complex approach.

The third chapter introduces experimental policy impact evaluation case study on which newly proposed methodology is tested. The fourth chapter presents evaluation results and the fifth discusses about them. This article concludes with recapitulation.

Model

Innovation policy have been traditionally evaluated using simplistic models in which challenges are presented with parallel vertical pillars of independent evaluation domains, in our case E, R, and I. The simplistic model is operationalised with three sets of independent evaluation criteria for each innovation sector separately – such as with innovation scorecards (IUS, 2011). This is effective approach for emphasising selected key aspects of innovation policy for each sector, such as patent activity, scientific papers' citation or number of PhD students in natural sciences. Yet this kind of evaluation cannot tell anything about policy smartness since the model is lacking even the slightest horizontal overlap between innovation sectors.

The European Institute for Technology (EIT) originally conceptualized KT in a systemic way, in which three pillars are connected with lines into triangle. Markkula (Lappalainen and Markkula, 2013) went step further and modelled KT with Sierpiński triangle, with smaller triangles embedded into larger triangle. This is, formally speaking, chaotic presentation (Radej, 2014b) where KT is modelled on lower level with three smaller triangles applied as fractals — a geometric figure that does not become simpler when you analyse it into smaller and smaller detail (Baranger, 2001). On the top of presentation he placed a triangle of horizontal "orchestration" that is connecting three domains of KT, not with lines or overlaps between them, but with scale invariant replication of the same, triangular form on all levels of evaluation.

What connects two models is that they are not complex, but simple (vertical, linear) or chaotic (horizontal, non-linear; Radej, 2014b) schematisations. Simple and chaotic approaches are nevertheless relevant since complex approach lies precisely between them. Complex understanding is modelled in hybrid way — as partly simple and partly chaotic system (Stacey, 2002), that shares characteristics of both: smart specialisation is partly ordered linear (sector based), and partly disordered non-linear (inter-sectoral) phenomenon.

Radej (2014b) proposed to present hybrid concept of complexity with Venn diagram (1880) and its three partly overlapping circles. Non-overlapping areas of Venn diagram present three pillars or integral domains of KT that are equally important for innovation policy, but vertically incommensurable. One cannot for instance aggregate detailed E, R and I impacts into an indicator of summary impact because they are not commensurable. They are expressed in different common denominators, like money, number of patents and employment, so they can be aggregated only partially and separately each in its own domain. On the other side, overlapping areas refer to inter-sectoral impacts that are hybrid in nature so they can be aggregated with correlation into summary indicator of impact. Presentation of complex structure with Venn diagram is appropriate since it combines opposite perspectives (sectoral vs. inter-sectoral) in coexistence without logical contradiction (Flores-Camacho *et al.,* 2007).

In selected case study we start evaluation of innovation policy's smartness with constructing conventional Leopold (1971) impact matrix which presents detailed impacts of each policy instrument on each evaluation criteria. In the second step, detailed impacts are partially aggregated by source (policy instruments) and area of impact (evaluation criteria) into Leontief (1970) square input–output matrix. It displays how three domains of KT impact each other in sectoral and in inter-sectoral way. In the next step, non-diagonally located inter-sectoral impacts are correlated in two phases: first as an overlap between two sectors (circles) and then in triadic overlap between three binary overlaps. Non-overlapping areas in Venn diagram evaluate sectoral aspect of innovation policy, while overlapping areas are explaining smartness of innovation policy.

Data

Mesoscopic approach has been tested in mid-term evaluation of selected innovation policy instruments that comprise many of the most transforming segments of KT in Slovenia from the aspect of their relevance, efficiency, effectiveness, and nine horizontal criteria (Table 1). Ministry for higher education, science and technology allocated almost 220 mil € in 2007–2011 while companies contributed additional 57 mil € in own financing, which together accounted to 0.8% of annual GDP (while R&R expenditure in 2010 reached 2.11% GDP; MK Projekt *et al.*, 2012). Eight instruments have been implemented as parts of two national Operational Programs — for Regional Development (RD) and for Human Resources Development (HRD):

- "Strategic research in companies" (SR; RD) co-finances developing knowledge, prototype or essential improvement on technological platform that enhances access to global market.
- "Centres of Excellence" (CE; RD) concentrates knowledge and strengthen partnership by financing establishment and management of centres, their research, costs of demonstration projects and investment in R&D equipment.
- "Competence Centres" (CC; RD) co-finances management and development of centres for accomplishing joint R&D, industrial research and experimental development.
- "Young researchers" (YR; HRD) finances R&D costs during study at master and PhD level.
- "Innovative Scheme" (IS; HRD) co-finances PhD students for costs of a tuition fee and attendance at international conferences.
- "Career Centres" (CA; HRD) finances Universities for connecting with R&D and companies and to improve students' access to labour market.
- "Bologna Process" (BP; HRD) aims at creating comparable University programs in EU (COM(2006)-604). Instrument finances reform of higher education programs.
- "Foreign professors and External experts" (FP; HRD) finances mobility between University, R&D institutions

Table 1: Leopold impact matrix for Slovenian innovation policy, on scale 1-5

Horizontal Evaluation Criteria		C1: Cost efficiency	G4: Regional balane	C6: Employment	C8: Business environment	G5: Gender equality	C7: Sustainability	C2: Natural environment	C3: Leverage	C9: Wider society
Policy Instruments	**KT***	**R**	**R**	**R**	**E**	**E**	**I**	**I**	**I**	
YR	R	2,7	3,0	3,5	3,3	3,0	5,0	2,8	n.r.	3,4
IS	R	2,6	n.r.	3,2	3,5	5,0	5,0	3,3	n.r.	3,4
CA	E	3,4	n.r.	3,8	2,9	2,5	5,0	3,8	1,0	3,4
BP	E	3,8	2,8	3,5	3,7	3,0	4,0	2,6	n.r.	3,9
FP	E	3,0	2,8	2,2	3,2	3,0	4,0	2,6	n.r.	2,9
SR, CE, CC	I	3,2	2,6	3,1	3,1	3,0	3,7	4,2	3,0	3,1

Source: MK Projekt et al. (2012).

Notes: n.r., not relevant; *, grouping columns and rows on three domains of KT.

and companies to stimulate transfer of knowledge, cooperation and exchange.

Evaluation drew from two data sources beside official statistics. The first was provided by extensive governmental monitoring system of input data, output and also for result indicators (only incompletely) for each instruments' operation (project, scholarship, visit…). In addition to this a set of differentiated questionnaires have been prepared for each type of beneficiary — students, professors, researchers, businessmen, project managers.

Each instrument was assessed against prescribed set of nine horizontal evaluation criteria (on five-level scale, prevailingly negative impact = 1; poor positive = 2; positive = 3; strong positive = 4; excellent = 5):

- C1: Cost efficiency — beneficiaries were questioned about diverse aspects of administrative management of operations.
- C2: Instruments' impacts on natural environment (questionnaire).
- C3: Leverage effect — how much private investment is attracted per euro of public investment (monitoring data).
- C4: Regional balance of impact on 12 Slovenian regions, assessed with comparison of allocated funds per capita (monitoring data and statistical data).
- C5: Gender equality, as representation of women in financed operations (questionnaire).
- C6: Employment criterion asks if the operation increases employment opportunities (questionnaire).
- C7: Sustainability criterion asks if achievements of the project can be maintained after completion of the operation (questionnaire).
- C8: Impact on business environment regarding multidisciplinary knowledge, new opportunities, and organisational change in companies (questionnaire).
- C9: Impact on wider society — local and family needs, SMEs, professional associations, research institutions, University (questionnaire).

All assessed impacts of eight instruments by nine criteria were organized into Leopold evaluation matrix. In the next step they were grouped by rows and columns to obtain Leontief matrix presenting intersectoral impacts between three domains of KT:

- Instruments grouped into R (first row of Leontief matrix): YR, IS; Criteria grouped into R (first column): C1, C4, C6 and C8.
- Instruments grouped into E (second row): CA, BP, FP; Criteria grouped into E (second column): G5 and G7.
- Instruments grouped into I (third row): SR, CE, CC; Criteria grouped into I (third column): C2, C3 and C9.

Grouping is not optimal since logical links between domains, instruments and criteria are in some cases weak. Two reasons stand behind this. Horizontal evaluation criteria (Table 1) have not been selected by evaluators. Besides, the policy instruments have not been modelled explicitly by the concept of KT. Matching between policy design and evaluation design is therefore not optimal. For this reason the evaluation of smartness can serve as a methodological experiment, whereas its policy findings in this respect remain indicative.

Results

According to output indicators, Slovenian innovation policy has been very successful in mid-term achievements (2007–2011): 2036 projects proposals were received, 71,5% approved and 7,4% already completed. Some 800 students have started their PhD studies. One-hundred foreign professors and experts were involved in University programmes. Almost 370 young researchers have been employed in companies or 85% more than planned for the whole period (to 2013), 47 innovations and 22 patents registered, both exceeding goals. Planned outputs for the entire period were achieved also in number of R&D projects in SME (100%), number of research hours in full time equivalent (900%!) and in private co-financing in supported projects (153%). These achievements are correlated with strong improvement in international statistical comparisons of main innovation indicators (IUS, 2011) where Slovenia is recognized as one of the fastest growing countries in the group of innovation followers.

Next, evaluators accomplished cross-sectional assessment of instruments' impacts on evaluation criteria. Results are presented in Leopold impact matrix (Table 1).

Leverage effect appears as poor horizontal indicator since majority of instruments did not demand private financing in implementation of operations. However, evaluation found that private financing is involved in all instruments at least in costs for preparation of project proposals that broadly accounted to 2% of allocated funds (or 7% of all private financing) and should also be taken into account, but with opposite rationale.

Excellent innovation policy impacts are mostly evident only in sustainability criteria, with some reservation for SR, CE, and CC (3,7). Results in majority of other evaluated criteria show only moderately favourable impacts. Impacts on regional balance are especially poor. This is problematic in light of aspirations for achieving territorial smartness of innovation policy. E, I and R are to a large extent concentrated in a small number of innovative regions, so that they increase differences between innovative and 'non-innovative' regions (but not between innovative regions). Regional concentration is strongly linked to prevailing technological character of innovation policy; 'non-innovative' regions often innovate in non-technological ways such as in new models of eco-businesses, in social economy and in cultural production, which are absent from instruments evaluated here. Thus to strengthen territorial smartness, evaluation pleaded for both more innovative design of regional policy and broader focus of innovation policy.

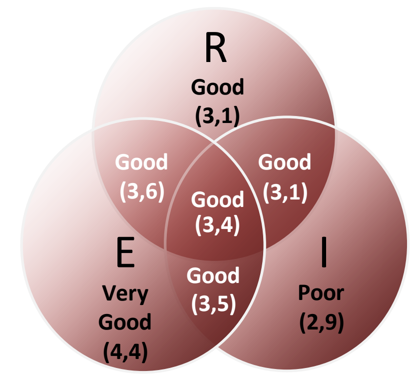
Instruments' vertical impacts — in sector-based perspective — are the most favourable for sector E (4,4; Table 2), whereas sector I stays observably behind (2,9), similarly also for R (3,1).

Horizontal overlaps between domains of KT are described in correlation matrix.

Table 2: Venn diagram of innovation policy's impacts, on scale 1–5

Leontief matrix			
	R	E	I
R	3,1	4,0	3,1
E	3,2	4,4	3,5
I	3,1	3,5	2,9

Correlation matrix			
	R	E	I
R	3,1	3,6	3,1
E	—	4,4	3,5
I	—	—	2,9



Source: Table 1.

E and R are correlated in strongest overlap (3,6).[1] E impacts R (3,2) regionally asymmetrically with poor contribution to improved business environment (Table 1), while R impacts E very favourably (4,0). Extent of inter-sectoral orchestration between E and I is assessed with 3,5. E is too weakly linked to private sector, whereas I is not providing sufficient guarantees to E for sustainable use of new research infrastructure (Table 1). The weakest overlap is between I and R (3,1). Impacts on sector I maintain lower regional balance, lower employment and not optimal cost efficiency. Impacts on R on the other side do not excel in efficiency and also suffer from weak employment effect (Table 1).

Overall smartness of innovation policy is assessed as good with 3,4. This summary indicator of overlap is obtained in Venn diagram as an average assessment of three binary overlaps.

Discussion

Despite excellence in KT has not been achieved in general yet, summary indicator of overlap between three domains is rather favourable pointing to smartness of (specialisation in)[2] Slovenian innovation policy from 2007 to 2011. Evaluation found that instruments have strongly enhanced cooperation between domains of KT, in particularly by RD's instruments, and especially CE. Institutions have also introduced new models of cooperation which changed stakeholders' behaviour, a clear sign for evaluation to recognise impact of policy interventions. Researchers have also changed their behaviour with initiating much stronger cooperation with companies.

Achieved smartness (3,4) is evaluated as favourable at least relative to non-overlapping, sector-based achievements (3,5), obtained as an average assessment for three pillars on diagonal of correlation matrix). Following theoretical elaboration we would expect different situation with observably stronger sectoral performance ("dumb") than inter-sectoral ("smart"). Overlaps are harder to achieve since they require new approaches to management, additional effort in coordination and developing partnership, consensus and synergies.

Achieved moderate smartness of Slovenian innovation policy is not really entirely surprising if we take into account rather specific context in which instruments were implemented — deep economic crises with close to 7% contraction in national GDP (2009–2011). Large public deficits linked to stabilisation of financial sector imposed austerity policy that shrunk public budgets of educational and research institutions. On the other side, it was increasingly hard for companies to provide funds needed to exploit new market opportunities linked to new technologies (POR 2011; Bešter and Murovec, 2010). This all led to enormous increase in number of projects that could not be implemented without public support. In this way, the Ministry has obtained strong leverage for overcoming sectoral barriers between three domains of KT and for decisive deepening inter-sectoral cooperation.

Yet, smartness of innovation policy needs to be read with caution amid observable weaknesses on the side of disappointing sectoral impacts, particularly for R and I. Very successful sectoral outputs have not been translated into very successful social-wide impacts (partly understandable because impacts emerge gradually over longer period of time). Overlaps between sectors are thus instituted on weak sectoral fundamentals and therefore vulnerable.

Favourable achievements in E are confirmed for Slovenia also in Competitiveness index (WEF, in EO, V/2011) and in OECD (2012). Sector R continues to lag behind in openness, in social responsibility in meeting societal challenges and in commercial exploitation of opportunities. Innovative companies still perform on lower level of productivity than average company nationally; share of the highest technology export remains at disappointing 5% (EO, May 2011); income from intellectual property rights remains very low (IUS, 2011). This among others suggested that innovation policy's impacts in companies could be strengthened in fundamentals by the means of conventional industrial and competitiveness policies.

[1] Correlation coefficient in statistics ranges from -1 (negative), absent (0) to +1 (positive). Correlation in Table 2 is expressed qualitatively from absent or negative (1), weakly positive to strongly positive (2–5). We are working with horizontal evaluation criteria which are by definition equally relevant for all policy instruments. In such case, absence or negative correlation are characterized as strategic problems because they wreck integrity of evaluated issue.

[2] Extent and direction of innovation policy's specialization is not measured here and remains addressed only indirectly through assessment of outcomes and impacts of policy instruments that enhance it, particularly in the case of RD instruments, YR and IS. Extent of specialization is reflected also in the assessment of sectoral achievements which are specialized by definition. More explicit address of specialization would be achieved with inclusion of indicators of specialization in Leopold matrix.

Evaluation suggests that sectoral weaknesses are linked to poor learning capacity by policy-makers about how mechanisms of innovation policy function in practice (weak theory of change), poor needs assessment of beneficiaries and market opportunities, not ambitious planning of goals and in general overshooting specific unit costs for goals achievement. One of the most systematically recurring criticism expressed by beneficiaries is that administrative management of instruments is too formalistic and meeting formal demands many times seems more important than progress in innovation (for RD in general, for YR and FP). Administrators at the Ministry are many times unwilling to adopt changes in operation even when it is obvious that improvements are feasible and justified. Beneficiaries opined that administrative management is many times unfriendly such as when calls for proposals were not announced, short application period and very demanding procedures, sometimes with weak support to applicants, sometimes with large share of justified objections, practicing long periods for funds reimbursement, and absence of prepayments. Beneficiaries were sometimes forced to accept role of passive followers of policy administrators and their understanding of innovation policy mission. This invoked opportunist behaviours in part of beneficiaries. This sort of "dumbness" in innovation policy arises superficially, as a result of overextended bureaucracy, it is not caused by narrow but nevertheless justified sector-based linear rationales in each KT domain.

In horizontal perspective it is noticeable (MK Projekt *et al.*, 2012) that overlap between instruments of RD and instruments of HRD is weaker than overlap between instruments of the same operational program. Evaluation pointed out to persisting barriers to horizontal synergies. The public research sector many times still poorly provides knowledge resources to companies in adequate quantity and quality (Foray and van Ark, 2008). WEF has observed that University programs also poorly serve needs of companies (in EO, IX/2011). Excessive disciplinary specialisation proceeds at the expense of diminishing trans-disciplinary approaches in research and training. OECD (2012) outlined problematic fragmentation of research field on small groups which cover broad spectra of activities and dispersed financing of research in Slovenia. By opinion of POR (2011), research continues to be systematically neglected at Universities and is usually understood as only supplementary activity. Universities and research institutes sometimes still consider companies as a separate, perhaps even an undesirable world, and similarly also many companies do not consider interaction with universities or other research organisations as a strategic input into their future (COM(2006)-604).

Transfer of knowledge from E and R into I is still weak (SVREZ, 2014). Achieved increased employment of researchers in companies is to a large extent linked to subsidies and could perish together with diminished public financing (POR, 2011). Flow of knowledge also needs to feedback from companies to E and R. In this regard, evaluation emphasised unused potential for involvement of experts from SR, CE and CC into E and FP for transferring their innovative experiences back to institutions of knowledge. For strengthening link from E to I, companies may need to be, according to evaluation, more involved into search for appropriate topic for PhD dissertations prepared under IS.

Imperative for strengthening horizontal overlap between domains of KT implies that innovation policy needs to be innovated with hybrid solutions. In our view relevant proposal in this regard is the concept of integrated education at a "research university" (Schuch, 2013). It makes the research-based learning the standard, educates graduate students as apprentice teachers and cultivates a sense of community of learners (Roumen and Ilieva, 2007). University involves students as co-creators of knowledge and as part of the innovation system (Lappalainen and Markkula, 2013). The students are equal partners, developing and creating new professional knowledge and skills while growing towards their own fullest potential as human beings (Hirvikoski, 2013).

Analogously, research organisations shall be strengthened especially in their intermediary function for enhancing their capacity to link new knowledge with social challenges. They have access to academic, mostly fundamental knowledge that they use and translate for the needs of their users (Zenker and Muller, 2008) in profit as well as in non-profit projects. In knowledge-based society, companies also need to enhance profitability in increasingly hybrid way — integrally with improving their social responsibility, environmental sustainability and ethical standards.

Finally, for smarter innovation policy, public sector innovation should be pursued in administration and organisation, in policy design and regulations, in service and goods delivery, in financial support and concepts (Foray and van Ark, 2008; Hollanders *et al*., 2013;). In EU, on average, two-thirds of government institutions introduced innovation in their operations during preceding 3 years (UNU-MERIT, 2011) — ranging from improved services to improved legislation — the latter being the strongest area of innovation in government. EC has introduced specific recommendations for simplification in administration, financing and implementation of Cohesion policy instruments.[3] Hollanders *et al*. (2013) estimated that companies that perceive an increase of 1 unit in the index of public administration are 13.4% more likely to use services for innovation. In addition, companies that use services for innovation are 27% more likely to innovate.

Conclusion

Policy smartness does not need to become foggy immeasurable concept, useful only for decorative political talk.

[3]http://ec.europa.eu/regional_policy/sources/docgener/informat/2014/simplification_sl.pdf

However, measuring it may require innovative approach. Old style output and result-based methodology in linear bottom-up or top-down approaches are only appropriate for assessment of specific and isolated concerns of sectors in achieving their fragmented goals, but they fail in evaluation of policy challenges that are complex in character and integrative in scope.

The case study confirms initially stated hypothesis. Measuring smartness of innovation is mesoscopic challenge since it comprises two orthogonal explanatory axes: vertical, in a sectoral perspective and horizontal between overlapping sectors of innovation policy. All sectors are equally important even though leading innovation processes in independent directions. The contradiction can be resolved at meso level of evaluation.

Foray (2013) explained that a too high level policy approach transforms policy into sectoral concern, but a too fine grained level transforms it into policy through which all projects of some merits will be funded where no specialisation can take place. The smartness in innovation policy shall be addressed at middle level and with mid-grained granularity (Foray and Goenega, 2013) just as it is suggested by triadic concept of KT. However, smartness is only an aspect of innovation challenge which suggests broadening the concept of specialisation in innovation, that is not merely smart but fully mesoscopic.

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SEA-EU-NET 2 – EU-ASEAN S&T cooperation

"SEA-EU-NET 2" is the second project that has been set up to expand scientific collaboration between Europe and Southeast Asia (SEA) in a more strategic and coherent manner. The four-year long project was launched in October 2012, involves 21 institutions from the two regions and is coordinated by the Project Management Agency at the German Aerospace Center (DLR). SEA-EU-NET 2 is deepening collaboration by:

- Continuing and intensifying the bi-regional dialogue between EU and ASEAN S&T policy makers on Senior Officials level as well as creating an annual exchange forum for researchers, innovation stakeholders, policy makers and private business to improve EU-SEA cooperation and exchange through the series of the ASEAN-EU Science, Technology and Innovation Days;
- Jointly tackling societal challenges in the fields of Health, Food Security and Safety, Metrology as well as Water Management with relevance to both regions by organising events, providing fellowships for SEA researchers and conducting studies on future collaboration potentials;
- Informing the Southeast Asian research community on the Horizon 2020 programme as well as increasing the level of Southeast Asian participation in Horizon 2020;
- Completing detailed analytical work on the current state of EU-SEA S&T relations and innovation potentials and developing recommendations on how to strengthen the relationship and feeding these into the official dialogue process; and
- Extending the dialogue on EU-SEA S&T cooperation to include a wide range of stakeholders by connecting to already existing networks and dialogues.

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