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RIS3 CONCEPT NOTE

MONITORING AND EVALUATION SYSTEM

AGÊNCIA NACIONAL DE INOVAÇÃO (PT)

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RIS3 concept note: Monitoring and Evaluation System

0. AIM OF THE CONCEPT NOTE

As advisor partner, ANI has tried to push for an active role in the development and implementation of conceptual frameworks of monitoring. The compilation of best practices per partners and the different policy instruments selected to showcase, revealed the need to introduce some conceptual harmonization as well as some guidance to support a more fruitful development and implementation.

Hence, ANI led the development of a "green book" on how to structure a monitoring and evaluation system. To further support the implementation, ANI has prototyped and approach to the Portuguese case.

1. INITIAL REMARKS

The European Union (EU) is a bold construction that aims to create a unified and seamless economic, financial and political area within Europe. One of the pillars for this process is the belief that all members stand to gain in this process and that Europe can be a world reference in competitiveness and, in particular, innovation. In the last decade, EU has set as a goal world leadership in innovation and devise a trajectory of growth and jobs supported in the knowledge economy.

The goal of becoming a beacon of innovation has been the focus of the Lisbon Agenda, defining correspondingly ambitious targets in terms of innovation inputs (e.g., GERD/GDP reaching 3% in 2010) towards which EU has, overall, failed in progressing to. This underachievement is closely linked with the lack of competitiveness that many European industries are facing and which translates into an unimpressive growth performance that stresses the need for a new model of competitiveness and innovation policies.

Although it must be acknowledged that innovation and competitiveness policies are structural policies that must be consistent and persevered across time in order to produce effects, EU has dwelled between paradigms. The most recent dwelling has been from the focus on Regional Innovation System as the framework for Cohesion Policy and the present domination of the Smart Specialization. Derived from the transatlantic productivity gap literature, smart specialization highlights the need for EU to concentrate resources on fewer areas in order to reach an optimal scale on R&D and innovation.

The Barca report (2009) highlighted the apparent inefficacy of EU competitiveness policies and presented, as one of the underlying reasons, the scattering of resources and the use of a general approach to target heterogeneous contexts, namely, regions (Foray, 2014, Kroll, 2015, Morgan, 2015, Lundström and Maenpaa, 2017). Since then, smart specialization has become a key element in regional innovation strategies across Europe, despite its lack of maturity (Foray et al. 2011). The underlying growing gap between the policy practice and the theory (Foray et al. 2009, Foray, 2014), increases the challenge of operationalizing a still blurry concept, namely, in terms of methodological approaches to the definition of priorities, the design of new governance models and the development of adequate monitoring and evaluation systems.

The development of such monitoring and evaluation systems is also challenging given that RIS3 is about transformative actions that foster structural changes which are long term (Raimondo, 2016). Hence, the monitoring system needs to couple short term dimensions which analysis can indicate hoe the strategy is being implemented and provide some insights on necessary minor adjustments, along with long term dimensions that respond to the actual purpose of RIS3 (EC, 2014), changing the competitiveness drivers and the playing field though transformative actions.

Considering that literature is still far behind practice also in terms of monitoring and evaluation strategies and systems of the RIS3, this concept note focusses on establishing the objectives underlying a monitor and evaluation system and proposing the architecture of a system based on 4 levels of monitoring:

implementation, first level results, structural change and long term impacts. Additionally, given that monitoring and evaluation are considered phase 6 in the implementation smart specialization guide published by the S3 and that regions are overall still trying to set-up and fine tune their system, we develop a first empirical assessment of the implementation of Portugal.

This concept note aims to assist regions in implementing a full fledges monitoring system architecture. In the course of the best practices identified by each Monitor RIS3 region, we have understood that the approaches were partial and based upon different perspectives of the RIS3 concept.

Hence, in order to harmonize the approaches and support the development of each partners' monitoring system, this concept note was produced to advise on how to use RIS3 concept in practice and a conceptual architecture for the partners' monitoring and Evaluation system of RIS3.

2. WHAT IS RIS3 FROM AN OPERATIONAL STANDPOINT

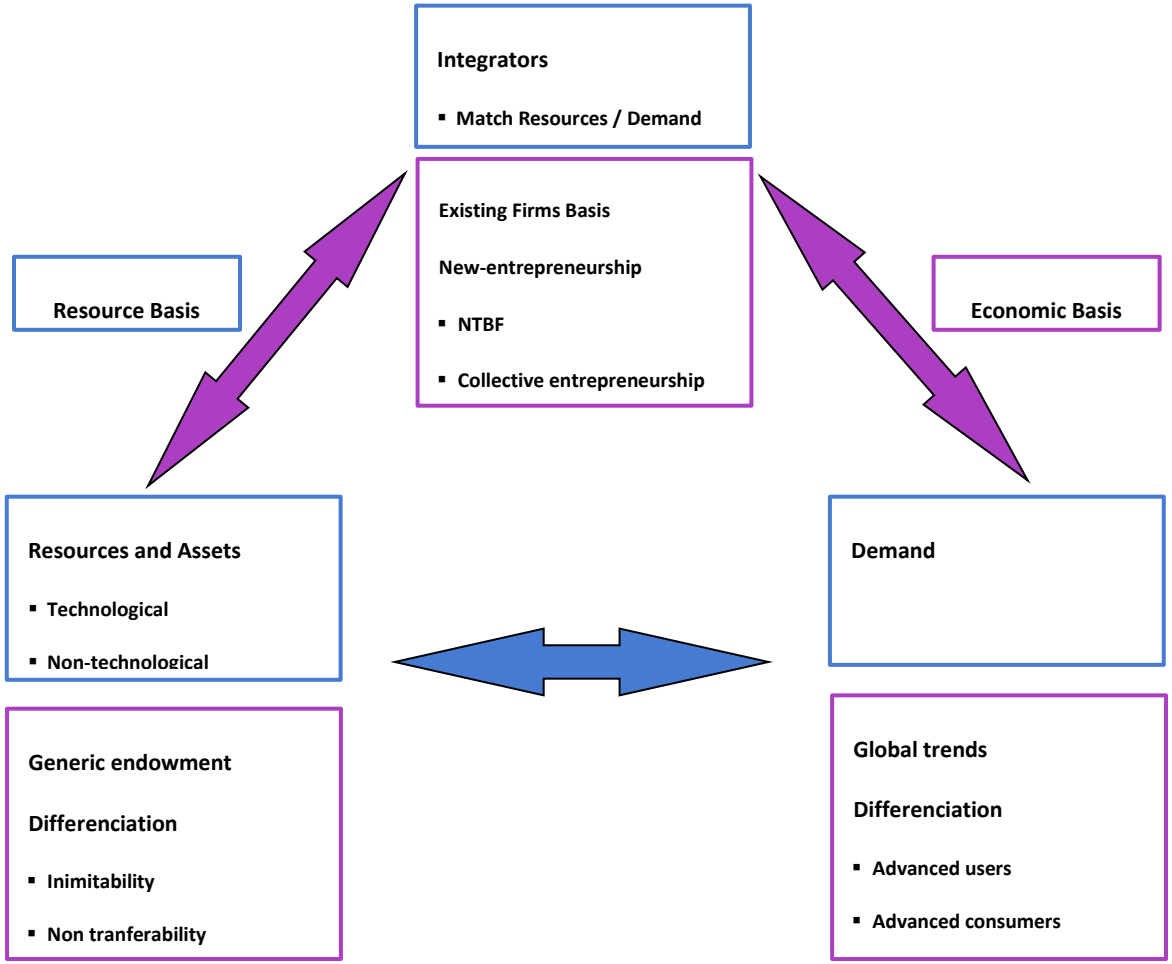
Operationalizing smart specialization and elaborating regional innovation strategies is a particularly challenging exercise. The blurriness of the concept is the first difficulty faced by policy makers and although the authors state the importance of the exercise being an "entrepreneurial discovery process", in the case of follower regions, it is necessary the coordination and even a "push" from the regional development agencies.

The second major difficulty is related on the practical way of diagnosing a region's potential, how to design policies in accordance with the RIS3 and how we can create a system of indicators and milestones adequate to monitor the outcomes of a smart innovation policy which is in essence a structural policy with long term effects not visible in the short term. This concept note aims to contribute to the first two of these issues, focusing on how to evaluate a region's potential and identify the smart specialization domains and how to design innovation policy that can implement the strategy in the context of a follower region.

As stated previously, smart specialization evolved from a sectorial perspective (vertical perspective) for a domain perspective (combination of vertical and horizontal perspectives). In the latter, a combination of technologically and market related activities (Iacobucci and Guzzini, 2016) and institutions explore inter and intra-spillovers, creating the necessary "biodiversity" that mutually reinforces their competitive advantages. The domains must be identified based on the existence or possible creation of an adequate scale of technological and non-technological resources and assets, based on the evaluation of the potential to develop a set of related (in technology and/or market) economic activities that integrate those resources and assets to produce innovative goods and services and construct competitive advantages and also based on the alignment with international demand trends which are determinants of the feasibility of each domain as one of smart specialization. This allows the matching of a static diagnostic perspective with a prospective exercise.

The following scheme aims to illustrate this rationale.

Figure 1: Operationalizing Smart Specialization



Relatedness and Connectedness are underlying elements of figure 1 in order to ensure a full exploitation of the knowledge bases as well as of intra and intersectoral spillovers since in a globalized economy, value chains are international and regional innovation policy must signal and foster the internationalization of the regional innovation system.

In what concerns Resources and Assets, each region must identify its distinctive potential and how this can translate into innovation. In operational terms, this still poses challenges in creating a unified operational framework that can better handle both technological and non-technological resources and assets based domains. Concerning technological resources and assets, these can be proxied as human capital, scientific publications and infrastructures (Lorentzen et al., 2011) which require the evaluation on their degree of inimitability and transferability to conclude on the sustainability of its domain, implying the focus on niches where region's may build a distinctive competitive positioning and be able to compete on retaining those assets and integrating them. In the case of non-technological resources and assets, these are endogenous and thus inimitable and non-transferable by nature. Some examples are natural resources (e.g. oil and gas) and cultural resources (symbolic capital associated with, for instance, UN World Heritage Sites).

Regarding Integrators, these combine and convert those resources and assets into innovative tradable goods and services, aligned with demand and the ability to build competitive advantages and gain control over the value chain. Integrators are a relevant part of this framework not only because they are the core of the innovation system, but also because they provide the matching between resources and assets and demand. In this case we must account for established sectors but also for the possibility of emerging ones. The appeal to concentrate funding and further focus innovation policies should also be flexible enough to assume risks and launch "wildcard" domains.

Finally, demand is relevant to determine if the specialization domain chosen is feasible. When evaluating each region's potential, regions may conclude that although there are resources and assets and possible integrators to innovate on them, these are misaligned with international

demand and hence, the domain is not feasible and public policy must act to recompose the resources and assets and induce structural change in integrators (e.g. Norte region had significant low qualified persons that sustained a low wage economy with low levels of innovation and value chain control. Nowadays, with the lowering of trade barriers to China, the demand for Portuguese products based only on cost is residual and such a strategy imposed a structural change process). The way to proxy demand, and hence also a big part of the prospective purpose inherent to the elaboration of a regional innovation strategy of smart specialization, also still requires some different approaches when analyzing domains of specialization based on technological and on territorial assets. In the case of the former, the presence and connectedness to advanced users is relevant. Advanced users are of utmost importance since they contribute to the definition of the trends for global demand and translate it into technological challenges to be addressed. Proximity demand is important to better understand these new trends and take advantage of possible first mover advantages. In the case of non-technological domains, some advanced users can be relevant, but other factors are also determinant to define international demand. In the following section, we present two applications to Norte region, one based on a technological domain (Health and Life Sciences) and the other on natural resources (Symbolic Knowledge and Tourism).

The above framework devises the space for innovation policy intervention, both acting on the three vertices and on fostering the interlinkages among them. For instance, innovation policy can reinforce or stimulate the re-composition of the knowledge base when it is misaligned with integrators and demand. On the other hand, innovation policy can promote structural change and the emergence of new sector when regions have resources and assets on which is possible to build a related variety of globally competitive economic activities, responding to demand opportunities. In the context of a follower region, public interventions are more pressing and broader in order to suppress bottlenecks and promote structural adjustment processes. In some cases, it may need to develop a completely new breed of entrepreneurs (e.g. deploying entrepreneurship support programs) and attract multinational companies to speed up this process. In other situations, public policy may only be necessary to reinforce the matching quality between resources and assets and the economic structure. In some cases, the advanced user can also be targeted by innovation

policy either by attracting a player that can generate a demand pull on both of the other vertices, or by directing public procurement when that advanced user is internal (e.g. Health System).

Nevertheless, there are some important issues to be dealt with when designing public policy. First of all, it is important to avoid the temptation of a radical shift in policy every time a new planning framework is proposed. Many of the ongoing policies have long term outcomes and its structural nature implies that results are only visible with a significant time lag. Persistence and coherence is important to produce results and this is a risk policy makers must bear in mind. Secondly, smart specialization implies picking winners. Although regions can devise a strategy that diversifies its strategic bets and hence the risk of lock-ins, smart specialization implies establishing preferences and incentives schemes that favor some domains and not others. This may generate pernicious crowding-out effects and also introduce rigidity in public policy. Innovation is about novelty and underlying it is uncertainty so, innovation policy cannot be forged so definitely and the incentives schemes must allow for wildcards (emerging areas where some support is advisable).

3. RIS3 MONITORING SYSTEM: STATE-OF-THE-ART

Smart specialization is a new conceptual approach to the design of territorially based innovation policy which, beyond the perspective of specialization and diversification within the cornerstone concept of related variety, introduces a new way of conceiving, implementing and governing innovation strategy and the management of the mobilized policy tools. In a way, the revolution is not the concept itself, but the inclusive approach that takes quadruple helix involvement to a different level, almost like in the Ancient Greece. This larger involvement allows for better strategy design, more accountability and makings co-responsible all the actors in what concerns the final outcomes of the policy. Hence, monitoring smart specialization is a major challenge in terms of implementation (Foray, 2014), especially considering that smart specialization encompasses

a new approach to innovation policy where the process of normative transformation of priorities, the functioning of the governance model and the monitoring and evaluation of the results of the transformative actions constitutes novelties in comparison to the traditional way of policy-making.

According to Gianelle and Kleibrink (2015), the monitor and evaluation system of RIS3 must provide an analytical feedback in what concerns the outcomes, the impacts and the effects of the implemented policies in order to support the revision and decision-making within the quadruple helix governance model. Hence, according to the same authors and also to Angelidou et al (2017), the system should perform a set of functions:

i. **Process:** analyze and assess the actual level of implementation which implies verifying that strategic priorities have been translated into effective normative and operational procedures, assessing that the mechanism to deploy the policy-mix are selective enough to effectively favor projects aligned with RIS3;
ii. **Monitor and evaluate:** provide long term analysis on the actual impacts of public policy, guiding the adjustments of the priorities selected, the design of new policy instruments and the fine tuning of the existing ones and clearly assess the outcomes of policy, in terms of structural change;
iii. **Accountability:** clarifying the rationale underlying the selection of priorities, the allocation of resources and the mobilization of policy tools, along with provide a clear picture on the actual relevance of each priority;
iv. **Support decision making** and the continuous revision of the strategy though the provision of thematic intelligence, evaluation tools and clear communication that support trust building and prolongs the engagement of actors.

Thus, a balanced monitor and evaluation system must couple an array of key quantitative indicators, in complement to a set of qualitative analysis system that can monitor the effective normative translation of the policy prescriptions into the policy mix. Both dimensions are crucial to the purposefulness of the monitoring and evaluation system, providing evidence to the actual efficacy of projects in achieving the foreseen goals as well as to induce a more result driven approach.

In the case of RIS3, designing an effective monitoring and evaluation system poses a new set of challenges. Since RIS3 is a continuous collective constructed strategic framework, policy is not easily translated in highly specified analytical model to support a theory of change that founds many evaluations and monitor systems (McCann and Ortega-Argiles, 2013). In this case, implementation proceeds an iterative process, assembling knowledge and evidence as it arises evolving and adjusting along course within a set of objectives:

- **Learning-and-acting:** providing just-in-time information to support the adjustment of the strategy and the policy-mix;
- **Trust-building** amongst stakeholders: considering that RIS 3 promotes a wide inclusive process of bottom-up strategy design, it is fundamental to keep actors engaged though a clear and transparent process;
- **Accountability:** complete clarity regarding the reaching or not of the intended goals, allowing to evaluate if outputs and outcomes indicate that structural change and specialization are on track.

In the case of RIS3, the difficulties in implementing such system surpass the issues of time lag and cause-consequence between the deployment of policies and its effects. Given that RIS3 proposes a new "philosophy" of strategy design and policy-making, it becomes important to monitor the process and inputs (e.g. allocated resources, effectiveness of the selection process) in order to understand how resources are being employed and absorbed, as well as to ensure the consistency of policy-making with the strategic goals.

McCann and Ortega-Argiles (2013) highlight that RIS3 implies a complex bargaining process between different stakeholders, different parties, different interest groups and different constituencies, making it harder to translate the vision and strategy into clear objectives to be targeted by innovation policy. This is crucial to a good policy design and the sequential structuring of a monitoring and evaluation system that allow the adequate framework of assessment McCann and Ortega-Argiles (2013).

As referred by Foray et al. (2009), RIS3 is a prominent example of practice leading theory and hence, monitoring and evaluation systems are still is an early dawn. Thus, when we review the literature for practical approaches to monitoring and evaluation systems, only a few examples arise. One such example is Piatkowski et al (2014) that provides an analysis of the Polish case. now being set-up. According to these authors, the implementation of smart specialization in Poland still faces some difficulties, with monitoring and evaluation being either not implemented at macro-regional level, or weakly implemented at regional level. Angelidou et al. (2017) analyze implementation in Greece presenting the state-of-the-art of implementation of the RIS3, pointing to difficulties in operationalizing effective governance models and monitoring and evaluation systems. A similar conclusion arises form McCann and Ortega-Argiles. (2016) in a article addressing the early experience of RIS3 implementation. Morgan (2015) and Capello et Kroll (2016) demonstrate the lack of papers addressing and operational perspective on smart specializing and the still shallowness of literature analyzing the implementation of RIS3 across the EU. Furthermore, most of these authors highlight the difficulties and delay in implementing RIS3 monitoring and evaluation system.

This concept note contributes to this literature, proposing a framework for the operationalization of the smart specialization monitoring and evaluation system and providing a first level analysis on the Portuguese case.

4. AN OPERATIONAL APPROACH TO MONITORING AND EVALUATION

4.1. The cornerstones of a monitoring and evaluation system

In this section we present a framework that we have been developing in Portugal to guide the implementation of the National Research and Innovation Smart Specialization Strategy (NRIS3) Strategy. In developing this framework, we considered the fact that RIS3 is a continuous iterative process that deals with structural adjustments. That means that the strategic framework aims at changing the structural profile of the innovation system which only occurs several years after policy deployment and is contingent on many factors. Furthermore, RIS3 conceptual approach is also about changing the way strategy is designed and policy implemented, bringing bottom-up approaches to a new level. But apart from that, RIS3 also presents challenges in the normative translation of the strategy into policy tools to ensure the effective operationalization of the strategy. That is to say that the first dimension to be monitored refers to the understanding on how the implementation of RIS3 is being executed from a process standpoint.

A second dimension comprises first level results on a core of 5 specific objectives underlying NRIS3 implementation. Firstly, we aim to assess the individual (the systemic impact is perceivable in a more long term basis and thus subject to evaluation in dimension 3) efficacy of policy tools (e.g. multiplier effect of subventions to R&D) though an incremental analysis. This first level assessment provides important analytics on the actual impacts of the different policy tools and how effective they are to reach the intermediate goals of NRIS3. Secondly, considering the fact that up until recently Portugal was a net payer to the Framework Programmes and that innovation is increasingly an international networking process, another specific objective of NRIS3 is to increase the participation of Portuguese R&D units and companies in the Framework Programme which would indicate the capacity of the innovation system to connect to other players outside the system, as well as indicate the quality of the capacity

building effort. A third specific objective in a follower country relates to the strengthening of the interconnection university-industry. This link is of utmost importance to the optimization of the innovation system. A fourth level relates to inter-firm cooperation. In this case, it is important to assess if the stimulus to inter-firm cooperation has been successful in creating consortia that can combine productive and technologic capabilities on a variable geometry. Finally, a fifth level of monitoring comprises an overall perception of the output in terms of increase in the absorptive capacity of Portuguese firms.

The third dimension to monitor regards structural change. On this aspect, the monitoring and evaluation system must combine an analysis on the integration with an evaluation of success in terms of actual structural change and increased specialization in Portugal. Regarding the first level, our proposal is that the monitoring and evaluation system should provide intelligence on the depth and positioning of Portuguese firms in the international value-chains, trying to perceive if changes were induced towards higher control and increased value-added positioning. A second level relates to structural change. Although it is still relevant to analyze the recomposition of the GDP in terms of the different economic activities, it is also relevant to the induced changes towards a more knowledge intensive economy. A third level comprises specialization and the dynamic analysis of shifted in the patterns of specialization though traditional indicators.

The final dimension relevant to the monitoring and evaluation system relates to the ultimate goals of NRIS3: growth, jobs (qualified), sustainability and the degree of innovation-readiness of the Portuguese innovation system though the improvement of contextual conditions and the increased sophistication of businesses.

Table 1. Dimensions of a Monitor and Evaluation system of the Portuguese NRIS3

Dimensions	Specific goals to monitor
Implementation	• Implementation of bottom-up continuous processes: entrepreneurial discovery • Selectivity of the selection procedures • Demand distribution • Alignment of the policy-mix with the structural objectives
First level results	• First level assessment (incremental and individual impact analysis) • Integration in international R&D consortia • Strengthen of University-Firms linkages • Reinforcing of inter-firms cooperation • Increased absorptive capacity
Structural change	• Value chain integration and positioning • Structural change

	• Specialization
Long Term Impacts	• Growth • Jobs (qualified, including PhDs hired by firms) • Sustainability • Innovation readiness (sophistication and ability to adapt)

In sum, our proposed monitoring and evaluation system encompasses 4 dimensions, to be accounted for on a macro perspective, but also per each specialization thematic priority.

4.2. An operational proposal

This section structures the operational framework for a monitoring and evaluation system of the RIS3, using the previously identified four dimensions and showcasing with an application to the Portuguese NRIS3.

4.2.1 Dimension 1: implementation

In this regard, monitoring an evaluation must assess, on one hand, if RIS3 is actually being implemented and if so, how effective it has been and, on the other hand, provide a first glimpse on the distribution of demand for the policy instruments. Thus, the first specific goal relates to the process

of operationalizing RIS3, namely, if the governance model is stabilized and working, if the bottom-up part of the process is being relevant and if it had impact on policy-making.

The second specific goal of monitoring intends to assess if projects aligned with the NRIS3 have, in fact, been prioritized in comparison to others. This requires an analysis on how relevant the weight of such criteria in the overall project's mark is, but also a notion on how many projects have been considered not aligned in order to understand if NRIS3 provides discrimination.

A third important goal is to provide an overview on demand. NRIS3 is the result of a bottom-up process where thematic priorities were identified. It is important to assess if those priorities were adequately defined and if, in fact, there is critical mass or new dynamics in the emerging sectors. Although this analysis is necessarily limited by the existing data and the reduced time elapsed, it still provides a first glance on each priority's performance. This analysis should combine a quantitative perspective along with a qualitative focus to provide insights for the stakeholders to adjust priorities and/or the policy-mix.

Table 2. Indicators to assess implementation

	Specific goals to monitor	**Proposed set of indicators**
Implementati	• Implementation of bottom-up continuous processes:	• State-of-play: overall process analysis on implementation • Participants in the entrepreneurial discovery process

	entrepreneurial discovery	• Changes in policy design

	• Selectivity of the selection procedures	• Selectivity and effectiveness of the project evaluation criteria
		  ○ Relative weight of the set of criteria related to NRIS3
		  ○ Percentage of projects considered not aligned

	• Demand distribution	• Distribution of projects per thematic priority and policy tool • Percentage of multi-domain projects • Qualitative analysis
	• Alignment of the policy-mix with the structural objectives of NRIS3	• Operational Programmes' input indicators

Finally, in the dimension of implementation, we must also account for the alignment of the policy-mix with the structural objectives of NRIS3. In this case, we can use the wide list of input indicators of each relevant Operational Programme.

4.2.2 Dimension 2: First Level Results

This second dimension of the monitoring and evaluation system intends to provide intermediate output indicators from which to derive insights on the necessary adjustments to the policy-mix and to the thematic priorities. Given this aim, the proposed framework of assessment responds to 5 specific goals. The first level of assessment intends to analyze the efficacy of the policy tools but also to account to differences in return across thematic priorities. In particular, using the data of the impact of projects, the system could provide an overview of the incremental impacts. The increased participation in H2020 and the valorization of results deriving from international R&D consortia is relevant t understand the international competitiveness of R&D.

The strengthening of University-Firms linkages is also crucial to the optimization of the innovation system, fluidizing the knowledge transfer. The policy-mix associated to RIS3 includes instruments designed to promote such links and thus this is a topic of great importance to monitor and evaluate. In complement, also the inter-firms cooperation is relevant to the implementation of RIS3. The lack of density of entrepreneurial networks along with the relative predominance of very small firms, implies that fostering cooperation between firms is fundamental to the construction of strong clusters and promote an innovation ecosystem.

Finally, within this monitoring dimension, innovation readiness is fundamental and the result of progressive capacity building, translated into the amplification of the absorptive capacity.

Table 3. Indicators to assess intermediate outputs

	Specific goals to monitor	Proposed set of indicators
First Level Results	• First level assessment (incremental and individual impact analysis)	• Incremental impact: multiplier effects
	• Integration in international R&D consortia	• Level and success of the participation in H2020 • Exploitation of the results of international R&D projects
	• Strengthen of University-Firms linkages	• Number of companies that collaborate with universities • Number of joint R&D projects (comparison with the previous programming period) • Joint PhD programmes (University-industry)
	• Reinforcing of inter-firms cooperation	• Number of consortia projects • Size and diversity of consortia

		• Cluster dynamics: collective efficiency actions
	• Increased absorptive capacity	• Ranking of absorptive capacity on the Global Competitiveness Report for

4.2.3. Dimension 3: Structural change

RIS3 is about structural change which is its ultimate goal. Either through specialization or diversification, the aimed change targets competitiveness. Hence, the first level of analysis relates to the value chain positioning and integration. The profile of the Portuguese industry is changing towards a higher relative concentration in conception and/or the market, reducing the relevance of production. Assessing clusters is also complimentary to the previous data, namely, in what concerns measuring the density of networks, the collective efficiency and hence, collective competitiveness.

The level of structural change aims to evaluate the effective changes in the innovation system elements, namely in terms of the increased qualification of firms proxied by the percentage of PhDs hired by firms, but also in terms of the relative weight of high technology/knowledge intensive sectors in the GVA. Other indicators like BERD/GERD also indicate the change in the innovation readiness and knowledge intensity of businesses. A third level of analysis relates to specialization and intends to measure concentration of economic activity and scientific resources in order to uncover the shift of patterns of the Portuguese system. Finally, assessing innovation readiness, based upon proxies, evaluates the success in changing the construction of competitive advantages based on innovation.

Table 4. Indicators to assess structural change

	Specific goals to monitor	Proposed set of indicators
Structural change	• Value chain integration and positioning	• Value chain evolution per thematic domain • Synergies with European projects (sequential projects) • Networking density (number of links) • Cluster and networks of firms for R&D (assessed through mobilizing projects)
	• Structural change	• % of PhDs hired by firms • High technology sectors in percentage of GVA • Return on investment in R&D • BERD/GERD
	• Specialization	• Specialization quocient • Index of scientific specialization (based on publications and also PhDs) • Index of patent specialization • Revealed comparative advantage (Balassa)

	• Innovation readiness (sophistication and ability to adapt)	• Business sophistication • Production process sophistication • Firms with R&D activities • Human capital on STEM

4.2.4. Dimension 4: Long Term Impacts

The ultimate goal of RIS3 is to create the conditions to sustain a steady and continuous increase in social welfare. For that, the outcomes in terms of growth and jobs are key levels of analysis. Nevertheless, it is increasingly important to consider sustainability as a competitiveness driver.

Table 5. Indicators to assess the long term impacts

	Specific goals to monitor	**Proposed set of indicators**
Long	• Growth	• Real GDP growth rate • Pace of convergence to EU average • Total factor productivity

	• Jobs (qualified, including PhDs hired by firms)	• Wage gap between ISCED levels • Distribution of employment per sector and knowledge/technology intensity • Average wage evolution
	• Sustainability	• GDP's energy intensity • Carbon intensity of GDP

5. AN EMPIRICAL APPLICATION TO PORTUGAL

The NRIS3 started implementation in 2015 in a conjuncture of acceleration of the Operational Programmes. Considering the normal elapsed time between opening project calls, project approvals, project implementation and first level results, this analysis is necessarily limited to the first dimension of the monitoring and evaluation system proposed, namely, "implementation".

The methodological approach to the following analysis combines a qualitative in depth analysis of the degree of implementation of the NRIS3 foreseen action plan, using publicly available information, as well as direct questioning to the responsible bodies for implementation. We also use data on approved projects until 30th of June of 2017 in the thematic objectives 1 and 3. We further take a closer look to a subset of projects in order to provide a closer qualitative analysis.

The levels of analysis concerning the alignment of the policy-mix with the structural objectives of NRIS3 and a qualitative analysis are out of the scope of this concept note which intend to contribute to the discussion of the system's architecture and provide an empirical first outlook, but not a in-depth analysis per domain.

5.1 Implementation of bottom-up continuous processes

5.1.1 State-of-play: overall process analysis on implementation

NRIS3 has been under implementation for the last two years following a very successful stage of strategy design and priorities identification. In what concerns implementation, the state-of-play is asymmetric. On one hand, the translation of the priorities of smart specialization into selection criteria has been successful and stakeholders have had to promote the adjustment of their projects in order to guarantee alignment with those priorities. Nevertheless, Portugal has been struggling in the governance model, in the policy-mix and in the monitoring and evaluation system. In what concerns governance, both the national structures and the regional structures have not completed the creation of the steering committees, neither of the working groups that should coordinate and guide the entrepreneurial discovery process. This is a transversal problem that start at national government coordination among the ministries involved and spreads out to the regional structures in charge of the operational programmes.

There is still significant parallel work that need to converge towards a RIS3 focus. Such an example is the independent definition of the National Research Agenda for 2030 and Cluster Policy. Although RIS3 upholds the co-forging of strategies, the research agendas for the next decade were defined solely by universities, not taking into account the RIS3 nor the business development strategies and market trends for the next decade. On the other hand, cluster policy has also been relaunched in a context outside the RIS3 process and in complete detachment from the

research strategies. Hence, it is fundamental to close these gaps and use the NRIS3 to bridge the knowledge production and the knowledge valorization systems, umbrellaing a converging strategy.

In what concerns the governance structures, the coordination and steering committees are still to be created or consolidated both at national and regional levels. This delay appears to be a result of a change of focus from strategy, towards speedy implementation of the operational programmes. In fact, although small teams have been created to run everyday assignments related to projects' evaluation and minor monitoring tasks, we can perceive problems in terms of coordination and stakeholders' engagement.

In terms of the policy-mix, there is no perceivable inn ovation or adjustment because of the NRIS3. A similar recipe is being applied to all priorities and there is no evidence of any thematic call being launched. The visibility of NRIS3 comes, in Thematic Objective 1, as a pre-condition to access funding and in Thematic Objective 3 as a preferred condition (discriminated in the selection criteria based on mere alignment, missing a clear quality/impact dimension). The lack of a thematic approach and of policy innovation present efficacy constraints to the strategy implementation and represents a major challenge for Portugal in the coming years.

Again, the very small scale of the teams in charge of RIS3 (1 person at national level, and between 1 to 3 FTE in each region) along with the vast array of priorities present a severe constraint on the capacity to continue to engage and dynamize the entrepreneurial discovery spaces and foster the continuing of bottom-up strategy design and policy-making.

Finally, the monitoring and evaluation system is still in a very early stage of implementation, being challenging to design a system that goes beyond a simple input and output static analysis that does not include the study of new and transitional dynamics within the innovation system.

5.1.2 Participants in the entrepreneurial discovery process

As stated before, the teams in charge of coordinating RIS3 in each region present clear constraints in terms of size and competencies' spectre that hampers the coordination and development of efforts tending to sustain the entrepreneurial discovery process along time. Considering this to be a new dimension of RIS3 and the fact that this large scale stakeholder involvement is a novelty, top-down stimulus and coordination is fundamental to the engagement of actors. As a result, having contacted all the regions and the national authorities, only the Centro region has implemented some attempts of entrepreneurial discovery with a positive impact in the design of the calls and in the fine tuning of some evaluation criteria.

5.1.3 Changes in Policy Design

The rationale of NRIS3 implies that, within the implementation, the policy-mix is to be adjusted to the specificities of each thematic priority. Furthermore, NRIS3 is also about innovating in the policy but the instruments mobilize in Portugal are the same as in the past. The only change was in the selection criteria, with no tailoring to each specific priority. This is one of the reasons that may condition, severely, the success of NRIS3 implementation. Hence, an overview of the policy-mix identified in the NRIS3 and the corresponding practical implementation in terms of calls highlights that no changes were introduced in the policy-mix. In fact, apart from the evaluation, no thematic calls were launched, in the absence of entrepreneurial discovery there was no fine tune to the existing instruments and there is a lack of evidence supporting any type of policy tool innovation. In thematic objectives 1 and 3, all instruments precede NRIS3 and come from the programming period 2007-2013.

5.2 Selectivity of the selection procedures

5.2.1 Selectivity and effectiveness of the project evaluation criteria

In this dimension, we pay a closer look on two levels. Firstly, the normative approach to NRIS3 selectivity which means monitoring how relevant is the alignment of projects with NRIS3 for their respective approval or dismissal. A second level comprises the effectiveness of the alignment qualitative methodology. In other words, we want to understand if NRIS3 was in fact a discriminant implying an important number of dismissals or, on the opposite, it had no impact in the final outcome of approvals.

5.2.1.1 Relative weight of the set of criteria related to NRIS3

In what concerns the relative weight of the selection criteria of projects, the following table summarizes, for the subset of typologies already launched, if the alignment with the NRIS3 is a pre-condition and the relative weight in the final mark.

Table 6. Relative weight of the set of criteria related to NRIS3.

Thematic Objective	Policy tool	Pre-condition	Weight in final mark
3 Firms (Non R&D)	Innovation	Y (for large companies) No (SME)	
	Entrepreneurship	N	**17%**
	SME capacity building	N	**19%**

	SME Internationalization	N	**35%**
3 **Firms (collective actions)**	Entrepreneurship support	N	**30%**
	Capacity Building	N	**11%**
	Internatuionalization	N	**9%**
	Knowledge Transfer	y	**11%**
1 **Research** **(Universities and Firms)**	Research Projects	Y	**6%**
	Joint Research Projects	Y	**6%**
	Integrated Research and Technology Programs	Y	**8%**
	I&DT (firms)	Y	**33%**

From the above analysis, it is clear that there was an effort to use NRIS3 as a real discriminating factor on projects approval, either cumulative as a pre-condition and selection criteria, or just as a selection criteria with an important relative weight in the final mark.

5.2.1.2 Percentage of projects considered not aligned

The analysis of the list of projects approved allows inferring that, as imposed by the ex-ante conditionality in the Partnership Agreement between Portugal and European Commission. To perform this analysis, we had to consider a subset of the list of submitted projects that covers the most

relevant policy instruments in terms of size of applications and investment regarding the thematic objective 1 investment priorities' as well as the most important typology of support in thematic objective 3.

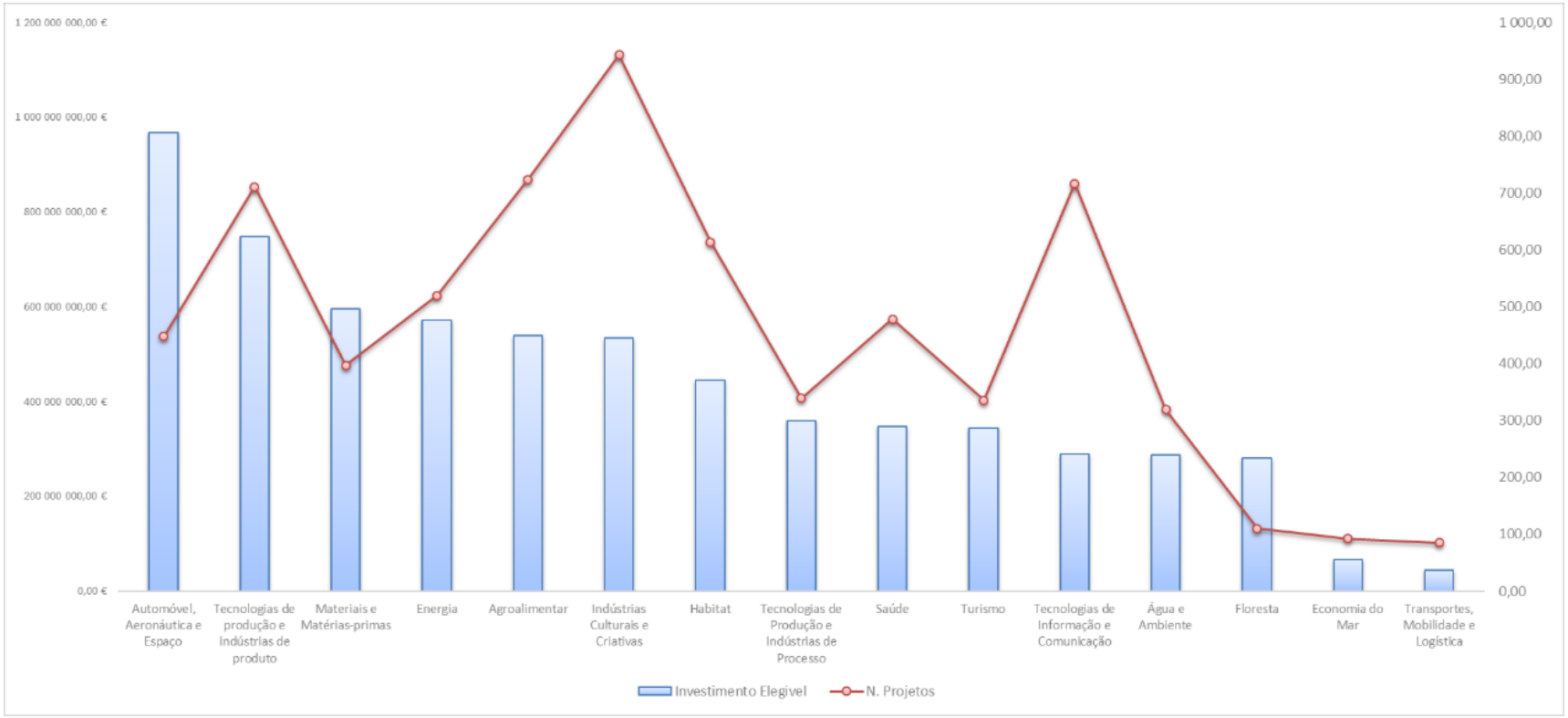
Considering this subset of 2179 projects, an average of 7,3% of the applications were considered not aligned. In thematic objective 1 all approved projects were, necessarily, aligned with the NRIS3 (national or regional priorities depending on the financing Management Authority). However, to understand the actual selectivity, we found that, under priority 1.1 (University Research Programs) of the OT1 around 13,3% of the submitted projects were considered not aligned where as in priority 1.2 (firms' R&D) around 3,4% of the projects were considered not aligned. In Thematic objective 3, under priority 3.3, around 15% of the projects are considered not aligned with RIS3 (Walendowski et al., 2017). Hence, overall, we observe that NRIS3 was relatively selective although some policy instruments present a low level of not aligned projects.

5.3 Demand distribution

Our sample of analysis comprises 7982 approved projects in thematic objectives 1 and 3 with analysis to the NRIS3 alignment. From the graphic 1, we can perceive that the distribution of approved projects follows the structural profile of the Portuguese economy with a strong relevance of industry. Considering this information, we must stress the relevance of the automotive cluster, but also production technologies. The development of advanced manufacturing technologies has had a boost associated with the technological upgrade of the consumer goods industries: we must also highlight some visible differences in project sizes. On creative and cultural industries (including textile, clothing and footwear), we find the highest number of projects as in ICT but a relative mid-size accumulated investment.

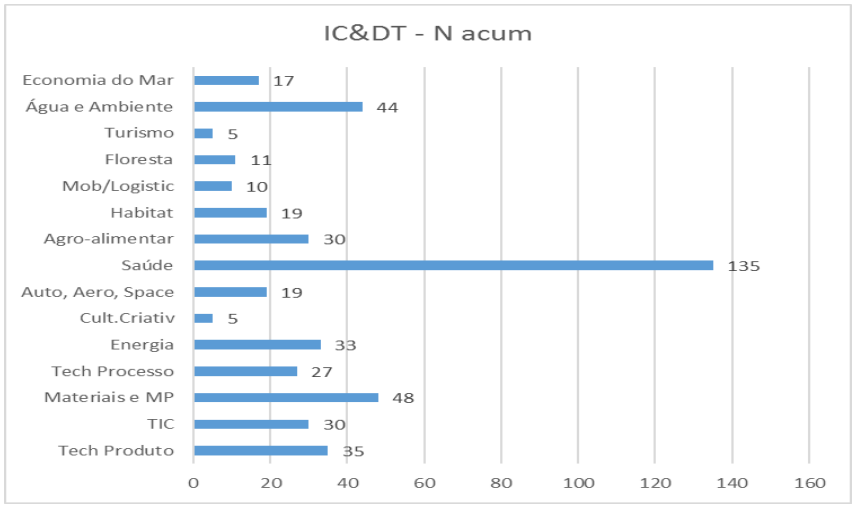
On the lower end, priorities such as the sea economy, forest and transports and mobility presented a relative weaker demand which may indicate that there is no critical mass, it may be necessary to reformulate the strategy or even eliminate this priority and or a specific policy-mix should be design to better suit the peculiarities of these specialization priorities.

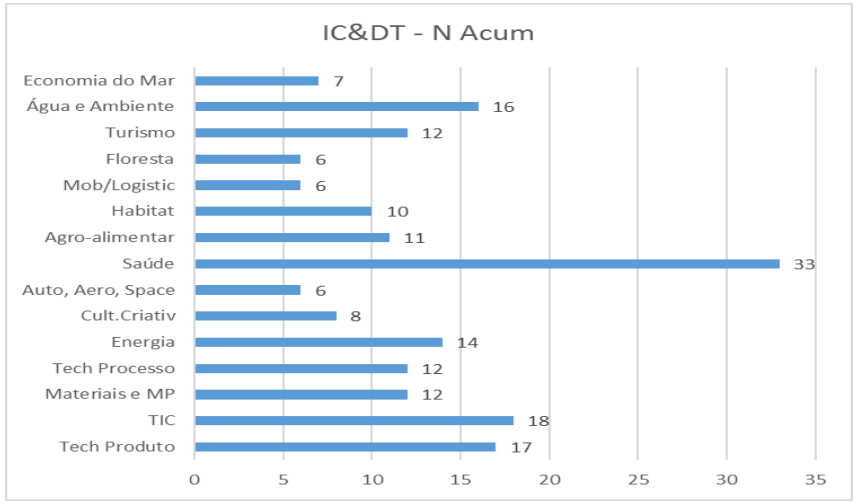
Graphic 1. Overall distribution of the approved projects per specialization thematic priority



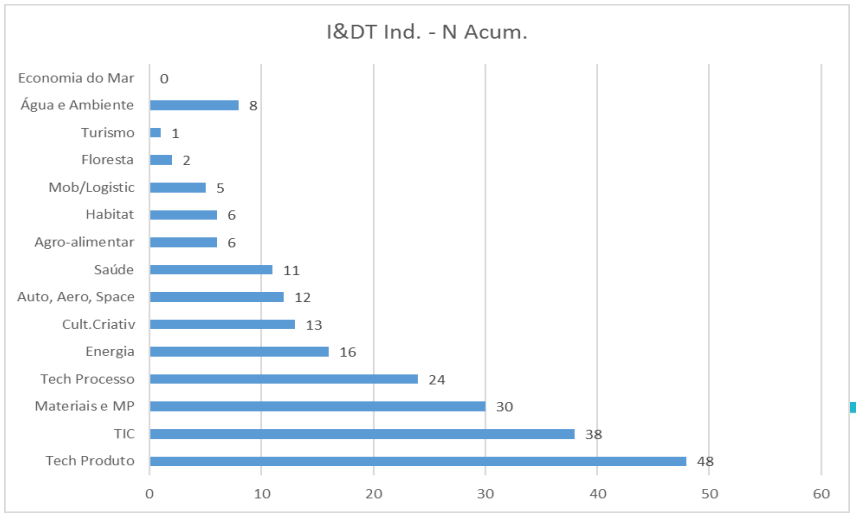
We must acknowledge that most projects (around 75%) present alignments with more than one domain. This analysis selected only the principal priority of alignment. The following analysis provides a quantitative and qualitative overview per specialization topic.

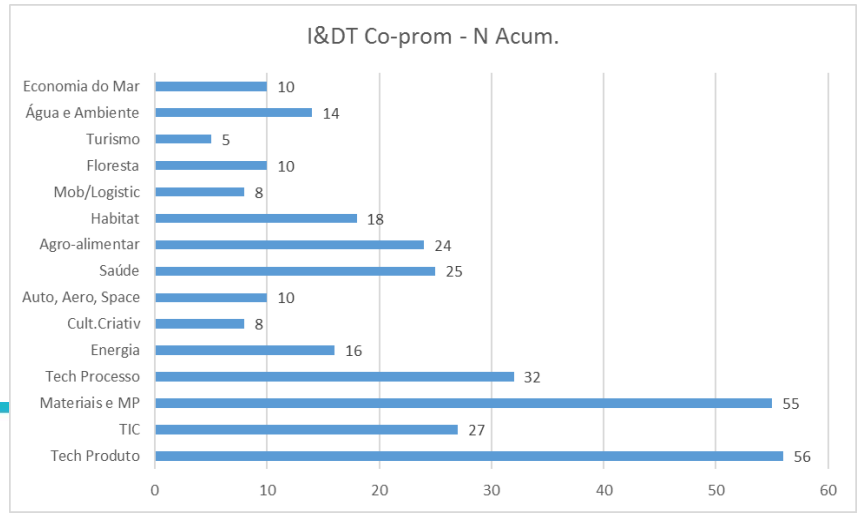
PI 1.1



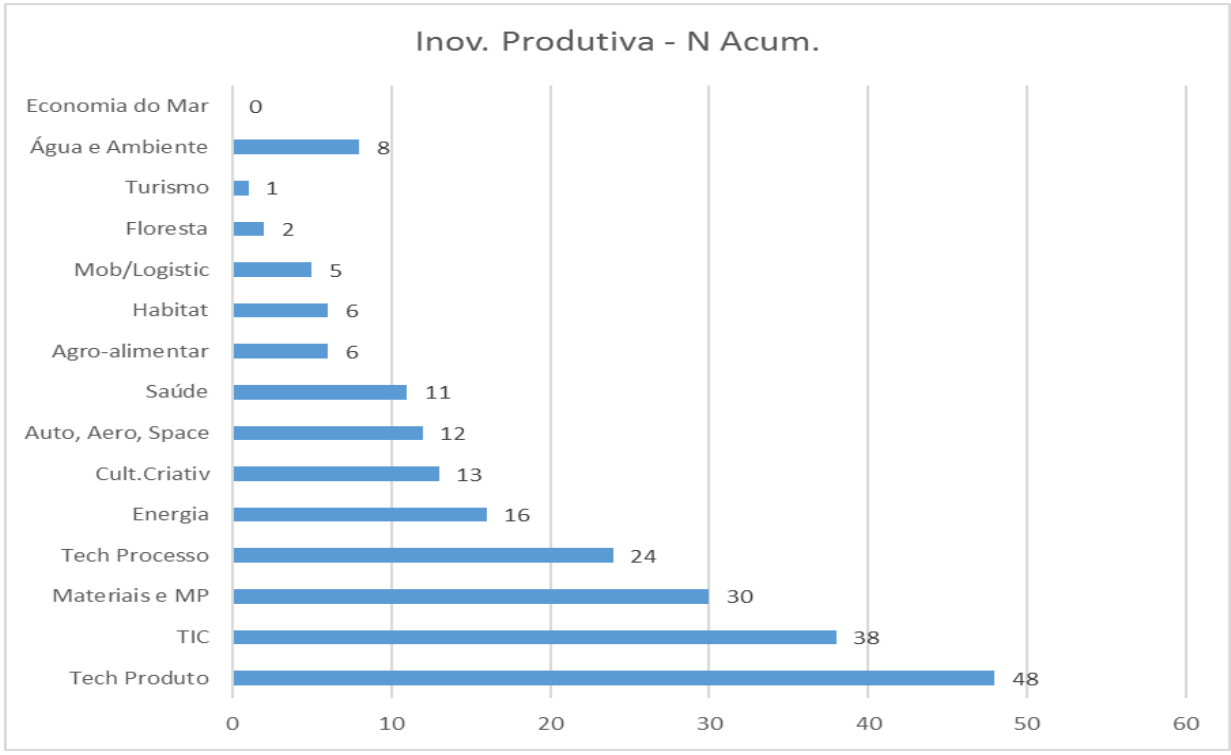


PI 1.2





PI 3.3


Inov. Produtiva - N Acum.
Economia do Mar 0
Água e Ambiente 8
Turismo 1
Floresta 2
Mob/Logistic 5
Habitat 6
Agro-alimentar 6
Saúde 11
Auto, Aero, Space 12
Cult.Criativ 13
Energia 16
Tech Processo 24
Materiais e MP 30
TIC 38
Tech Produto 48
0 10 20 30 40 50 60

6. FINAL REMARKS

Considering the significant gap between the fast-practical implementation and the emerging literature, this concept note proposes an architecture of a monitoring and evaluation system that covers 4 critical dimensions: implementation, first level results, structural change and long term impacts. The current stage of implementation constrains the possible empirical analysis to a process dimension.

References

Angelidou, M., Komninos, N., Isidoros, P., Artemis, P., Panagiotis, T. (2017). "Monitoring the Impact of Smart Specialisation Strategies Across EU Regions", ICEIRD, http://www.urenio.org/komninos/wp-content/uploads/2017/08/2017_ICEIRD-2017-monitoring_the_Impact_of_RIS3_Across_EU_Regions.pdf.

Barca, F. (2009) An Agenda for a Reformed Cohesion Policy, Brussles: European Commission.

Capello, R. and Kroll, H. (2016). "From theory to practice in smart specialization strategy: emerging limits and possible future trajectories", European Planning Studies 24(8): Regional Innovation Strategies 3 (RIS3): From Concept to Applications.

Foray, D. (2014) Smart Specialisation, London: Routledge.

Foray, D., David, P., & Hall, B. (2009). Smart specialization – The concept. Knowledge Economists Policy Brief 9, 100.

Gianelle, C. and Kleibrink A. (2015). "Monitoring Mechanisms for Smart Specialisation Strategies", S3 Policy Brief Series (Technical Report).

Kroll, H. (2015) Efforts to implement smart specialisation in practice. European Planning Studies 23(10), 2079-2098.

Lundström, N. and Maenpaa, A. (2017). " Wicked game of smart specialization: a player's handbook", European Planning Studies 25(8).

McCann, P. and Ortega-Argilés, R. (2013). Transforming European regional policy: A results-driven agenda and smart specialisation. Oxford Review of Economic Policy, 29(2), 405-431.

McCann, P. and Ortega-Argilés, R. (2016). Smart Specialisation: Insights from the EU Experience and Implications for Other Economies. Investigaciones Regionales – Journal of Regional Research 36, 279-293.

Morgan, K. (2015). Smart Specialisation: Opportunities and Challenges for Regional Innovation Policy. Regional Studies 49(3): Intermediaries and the Creative Economy.

Piatkowski, M., Szuba, T. and Wolszczak, G. (2014). Review of national and regional research and innovation strategies for smart specialization (RIS3) in Poland, World Bank 86527.

Raimondo E. (2016). What Difference Does Good Monitoring & Evaluation Make to World Bank Project Performance? Policy Research Working Paper 7726. World Bank.