

## THE DIGITAL PUSH TO THE REGIONAL SMART SPECIALISATION IN THE QUADRUPLE-HELIX FRAMES

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**Annotation:** *Contemporary digital technologies lead to globalization, help solve environmental problems, necessitate the emergence of new business models and create conditions for significant regional differences in the living standards of the population. A need arises to devise strategies for achieving a balanced and sustainable economic and social development of regions and for overcoming the existing intra-regional and inter-regional disparities.*

*In line, the Quadruple Helix Model of innovation recognizes four major actors in the innovation system: science, policy, industry, and society. In keeping with this model, more and more governments are prioritizing greater public involvement in innovation processes. The design, building and functioning of smart regions provides the opportunity to come up with effective solutions for optimal utilization and saving of energy, reduction of the consumption of non-renewable resources, control of environmental waste, ensuring sustainable development, optimization of the efficiency of urban systems, that leads to increasing the quality of life of the populations.*

**Key words:** *Entrepreneurial types, the Global Entrepreneurship Monitoring, Employment generation drives, promoting pro-employment entrepreneurs.*

### Introduction

In this paper the crossing points of the Quadruple-Helix model and the outlines of the sectoral specialization of the regional economies with their innovative potential and the priority guidelines for the development of scientific research and innovations will be outlined. A special focus will be on the digitalisation acting as a push factor for the processes.<sup>1</sup> The 2014-2020 period has put the regional and urban dimension at the very heart of Cohesion Policy. At least 50% of the ERDF resources for this period will be invested in urban areas. This could increase even further, later in the period. Around 10 billion euros from the ERDF will be directly allocated to integrated strategies for sustainable urban development. And about 750 cities will be empowered to implement these integrated strategies for sustainable urban development.

Given that investment in research and development (R&D) is one of the most important factors in enhancing technological progress and economic growth in developed and developing countries, many countries have steadily increased investment in national R&D programs for industrial technologies, fundamental science research, and education, infrastructure, and defense technologies. In addition, governments endorse R&D promotion

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<sup>1</sup> The field research partly is accumulated on the results of the IRISI („Indexing the Regional Innovative Levels in the Sectors of the Economy - scenario for the identified in the ISSS four priority thematic areas for smart specialization and their positioning towards the circular economy”) project financed under the Bulgarian National Scientific Fund.



policies to correct for potential market failure that is caused by R&D's positive externalities and the discrepancies between the social and private rates of return to R&D. Direct government R&D promotion policies such as subsidies and tax incentives for R&D, however, may only stimulate private R&D activities and expenditures to a certain level with limited effects. Moreover, a high R&D intensity<sup>1</sup> of a country cannot guarantee better innovative capabilities of universities, industries, and government. Rather, studies show that indirect R&D policies, including “university–industry spillovers, policies that foster human capital and networking/coordination support,” have strong relations with innovative R&D outputs.

### **The smart regional and urban focus**

There is a focus on five policy objectives around a (1) Smarter, (2) Greener, (3) Connected, and (4) Social Europe, and a new cross-cutting objective (5) to bring Europe closer to citizens by supporting locally developed investment strategies across the EU. Cohesion Policy will continue to support integrated territorial and local development strategies through various tools and empower urban authorities and territorial bodies in the management of the funds, while requiring strong local partnerships with relevant stakeholders. The urban dimension of Cohesion Policy will be strengthened, with 6% of the European Regional Development Fund dedicated to sustainable urban development strategies. There is also a new European Urban Initiative to support cities to innovate, access knowledge and understand policy, and support networking and capacity building.

Other promoters of ‘metromania’ – a label given by Morgan (Morgan, K., 2016) in some critics to the metro-centric economic policies that enforce agglomeration – include policy-makers (the Organisation for Economic Co-operation and Development (OECD), the European Union), consulting firms and popular media outlets. By now this rather narrow conceptualization of city-regions has been widely debated (Beel, D., 2016). Regulation, governance and agglomeration: Making links in city-region research. highlighting the need for academic and policy discussions on city-regions to take a more critical approach and articulate larger problematics (Kipfer, S., 2004).

This parallel body of thought, often referred to as progressive regionalism, represents the point of departure of the present paper. Progressive regionalism has reinvigorated the city-region debate by focusing especially on issues of social equity and sustainability, largely disregarded in the past. Introduction to symposium: Is progressive regionalism an actionable framework for critical planning theory and practice? Although we recognize its relative success, we argue that the progressive regionalism research programme is insufficiently developed to accommodate a systemic study and understanding of city-regions.

The present paper aims to overcome this deficiency by connecting with two other literature strands: regenerative development and collaborative governance. Whereas the former offers an aspirational agenda, the latter is a fundamental step for attaining these aspirations. This trilateral link can enrich the theoretical framework and help formulate a new methodological approach to the study of city-regions. We agree that there is a dire need to consider city-regions in all their complexity (Beel, D., 2016). Regulation, governance and agglomeration: For this reason, we adopt an interdisciplinary lens which can consolidate the normative claims and theoretical assumptions of what progressive city-regions might look like.

The various dimensions of urban life – environmental, economic, social and cultural – are interwoven and success in urban development can only be achieved through an integrated approach. Measures concerning physical urban renewal must be combined with those promoting education, economic development, social inclusion and environmental protection. It also calls for strong partnerships between local citizens, civil society, industry and various levels of government. Such an approach is especially important at this time, given the seriousness of the challenges European cities currently face, ranging from specific demographic changes to the consequences of economic stagnation in terms of job creation and social progress, and to the impact of climate change. The response to these challenges is critical for achieving the smart, sustainable, inclusive society envisaged in the Europe 2020 Strategy.

### **The quadruple helix and the digital put for the 4th H**

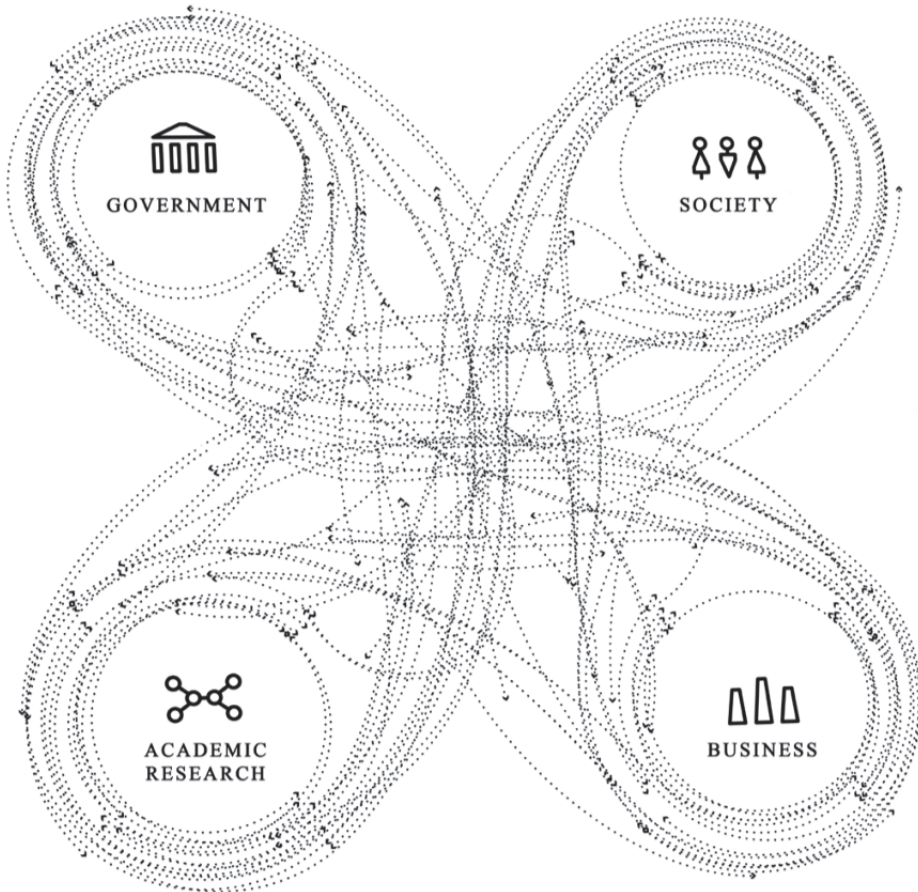
Scholars argue that important knowledge-based innovations, which are key to economic growth, occur when universities, industries, and government R&D institutions interact (i.e., co-operate and exchange knowledge) to find a solution for common problems. This interaction is known as an innovation process that includes knowledge creation and knowledge transfer. As in the empirical analysis of correlation<sup>2</sup> between R&D indicators quantitative R&D outputs, such as the number of scientific articles and patent grants, have positive relations with high R&D expenditures, while possible R&D network interactions among institutional actors in a country's R&D network interactions such as ‘knowledge transfer’ and ‘technology cooperation’ have strong direct relationship with scientific research level, innovation capacity, and national competitiveness.

This hints that innovation can be created by dynamic interaction among Triple Helix institutional actors: university–industry–government (U–I–G), as these interactions expand knowledge resources and improve the institutional actors' capabilities to create innovative products or technologies (Teece, 1992). For example, Malaysia can have relatively high firms' innovative capacity (6th) and scientific research level (15th) thanks to the active R&D interactions such as Rotational symmetry and the transformation of innovation systems in a Triple Helix of university–industry–government relations.

A market-oriented economy's transition to a knowledgebased economy increases the pressure of globalization because dynamics can be expected to change at the supra-national level. In this study, we argue that the conceptualization of this system in terms of a three-dimensional vector space as, for example, specified in the so-called Triple Helix of university–industry– government relations, provides the sufficient and necessary conditions for the specification of a mathematical model that can explain how technological trajectories can be formed between “double helices”, and how a self-regenerating system can be expected to develop at the global level of a Triple Helix.

We illustrate how the communication field generated by the interactions among the trajectories is sensitive to the order of the relations. Thus, (linear) symmetry is broken and innovation can be expected to emerge.

Fig. 1. The quadruple helix model



***Ref.: Schütz, F. et al., Co-shaping the Future in Quadruple Helix Innovation Systems: Uncovering Public Preferences toward Participatory Research and Innovation 2018.***

Until the 1990s, the basic premise underpinning most national innovation systems was that scientific findings and inventions would naturally lead to economic development and therefore societal advancement. The R&D community drove research trajectories in basic, applied, and industrial research, and members of the public played the part of passive innovation recipients. A new approach has gained in prominence over the last two decades, however. Research trajectories must be legitimized among relevant publics, aim at positive public impact, and be defined with the public's help. The expectation is that involving societal stakeholders and individual laypersons will help to re-align research trajectories with public preferences and lead to more welcome, sustainable, solutions.

The Quadruple Helix model was originally conceptualized by Elias Carayannis and David Campbell as a spiral with four strands. The adaptation (Figure 1) looks at the helix from above. It clearly demonstrates that the four core components of an innovation

system—academia, industry, government, and society—are not involved in unidirectional push-pull relationships, but rather in multi-layered, dynamic, bi-directional interactions. This highlights the role of society as a major actor in national innovation systems as well as the importance of actively integrating the public into innovation projects.

Today, involving the public in research, development, and innovation is the dominant paradigm both in international STI-policy and in innovation research. The concept forms the backbone of several national innovation policies, strengthening regional innovation systems and enabling better evaluation of research organizations and research proposals.<sup>5</sup> Collaborating with societal actors not only meets an established standard—cooperation and collaboration is the duty of every actor in an innovation system.

There are two major challenges to incorporating laypersons into the innovation process. Firstly, there is a methodological challenge: how can individuals effectively introduce their (public) perspective? And how can actors from academia, business, and government benefit from society's knowledge?

### **Conclusion**

In this paper key were the crossing points of the Quadruple-Helix model and the outlines of the sectoral specialization of the regional economies with their innovative potential; the priority guidelines for the development of scientific research and innovations will be outlined. A special focus will be on the digitalisation acting as a push factor for the processes.

Thus the key issue is on the bridge towards the regional smart specialisation and the digital Europe idea on boosting investments in: supercomputing, artificial intelligence, cybersecurity, advanced digital skills, and on ensuring a wide use of digital technologies across the economy and society. One practical pathway is in establishing and performance of the European Digital Innovation Hubs (supposed under the Digital Europe Programme). The EDIHs function is to be one-stop shops by providing access to technical expertise and experimentation as well as the possibility to “test before invest”. The EDIHs are to help companies improve business/production processes, products or services using digital technologies. They are to provide innovation services to the financing advice, training and skills for a successful digital transformation, and a certain environmental support to energy, consumption and low carbon emissions.

The “newly born” in the Bulgarian city of Burgas South East digital innovation hub was in a great extent validated with the research results of the IRISI („Indexing the Regional Innovative Levels in the Sectors of the Economy - scenario for the identified in the ISSS four priority thematic areas for smart specialization and their positioning towards the circular economy”) project financed under the Bulgarian National Scientific Fund. It is to focus on green mobility, logistics, supporting services to automotive supply chains, the blue economy with its recreational services and integrating the maritime chains of attractions. In parallel it may assist the biodiversity utilization, the smart carbon-neutral development, the resources efficiency solutions, and to the smart transportation systems.

Based on establishing facility for promoting the quadruple helix oriented towards the circular and blue economy in the regions, it will further develop regional expertise for the design and performance of big infrastructure interregional projects related with involvement of the society. Promoting youth mobility related to the quadruple helix among the countries in the regions with societal and scientific impact.



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