

THE RESEARCH AND INNOVATION OF SMART SPECIALISATION STRATEGIES: THE TRANSITION FROM THE TRIPLE TO QUADRUPLE HELIX

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ABSTRACT

This article suggests the Entrepreneurial Discovery Process (EDP) that underlies Research and Innovation Strategies for Smart Specialisation (RIS3) is not so much caught in the transition from the Triple to the Quadruple Helix, as rooted in a division within civil society. In particular, rooted in a division within civil society, over public trust in the EDP and around the democratic deficit of RIS3. Over public trust in the EDP and around the democratic deficit of RIS3 as a transgression, which centers attention on the participatory governance of science and technology, which is regressive in nature and whose knowledge economy seeks to overcome such limitations as part of the search for sustainable regional growth that serves civil society.

Keywords: *Regional Innovation, Smart Specialisation, RIS3, Entrepreneurial Discovery Process, Knowledge Economy, Democracy, Participatory Governance, Sustainable Regional Growth*

1. INTRODUCTION

After a brief review of the literature, this paper investigates the post-linear era of knowledge production by focusing attention on the EDP of Smart Specialisation Strategies (S3), in which the deployment of both the triple and quadruple-helix models offer guidance on the participatory governance of science and technology. The paper uncovers the social division within the deployment of this guidance by: (1) revealing the transgression of public trust by the triple-helix model; and (2) capturing the critical insights this regression offers into the democratic deficit that surrounds the governance of science and technology of the Quadruple Helix and which the EDP of RIS3 is unable to overcome. The paper then takes the opportunity to reflect on the prospect these emergent research and innovation strategies offer in terms of being more progressive. In particular, to be progressive in resolving this deep-rooted division in civil society, by way of a democratic restoration of public trust and through a participatory governance of science and technology.

2. OVERVIEW OF LITERATURE ON THE EDP OF RIS3

By 2010, the European Council aimed to make Europe “the most dynamic and competitive knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion, and respect for the environment” (Rodriguez et al.

2010: 11). To accelerate this transition, in 2005, the European Commission (EC) set up the Knowledge for Growth (K4G) Expert Group. This group of European economists operated as an independent advisory body and provided policy recommendations on how to develop research and innovation strategies able to move Europe towards a competitive knowledge-based economy (European Commission - Directorate-General for Research 2008; Knowledge for Growth Expert Group 2009). These recommendations were published between 2005 and 2009 as a series of policy briefs and reports¹. These publications offer policy advice on those issues that the EC need to address in order to pave the way for a competitive knowledge economy and introduce the concept of Research and Innovation Strategies for Smart Specialisation (RIS3). This emerges as a leading idea of the K4G Expert Group and is explained in detail in the policy briefs from Foray and Van Ark (2007) and Foray et al. (2009). As McCann and Ortega-Argiles (2015), Capello (2014) and Kroll (2015) all highlight, Smart Specialisation requires countries and regions across Europe to engage in an Entrepreneurial Discovery Process (EDP), which underlies the design of Smart Specialisation Strategies and that supports the implementation of research and innovation. Within this process of entrepreneurial discovery, the design and implementation strategies are perceived to emerge from a bottom-up collaborative learning process that is instrumental in pooling the place-based knowledge of local entrepreneurs engaged in research and innovation and identifying the “areas of specialisation” which are smart in sustaining the economic growth of regions (Foray et al. 2009; OECD 2013; Piatkowski 2015).

3. DEPLOYMENT OF BOTH THE TRIPLE AND QUADRUPLE-HELIX MODELS

The triple and quadruple-helix models both take a central stage in the EPD of RIS3. While the Triple Helix appears to be the model of choice for Joanneum Research and Austrian Federal Ministry of Science, Research and Economy (2012), recent statements by the EC’s Joint Research Centre (JRC) clearly recognizes the EPD needs a platform of stakeholders broader than university, industry, and government for RIS3 to be democratic in governing the science and technology that underpins such prioritizations as those which support regional economic growth (Foray et al. 2015). Bearing in mind the significance of this statement from the JRC, the following shall provide a synopsis of the Triple and Quadruple-Helix models of research and innovation strategies in the EPD and the initial insights this offers into RIS3.

3.1. The Triple-Helix model

Exponents of the Triple Helix (Etzkowitz and Leydesdorff 1997; Etzkowitz and Leydesdorff 2000; Leydesdorff 2005; Leydesdorff and Meyer 2006) find Mode 2 accounts of social change, cultural development and economic growth wanting and explain the differences between innovation systems (national and regional) in terms of possible arrangements. Under this knowledge-based regime, each system remains in endless transition. This does not mean anything goes, but that emerging systems should not be considered as yet another variation on the theme, i.e. as the EPD of either national or regional research and innovation strategies, because the interacting uncertainties which the reflexive instability any such Specialisation Strategy generates itself, does much to determine the prioritization of science and technology they reflect. As a result, the Triple Helix studies university-industry-government relations and offers a neo-evolutionary model of research and innovation (Leydesdorff and Deakin 2011). It also suggests there are three evolutionary functions cultivating the selection environments of both national and regional research and innovation: (1) intellectual capital of organized knowledge production; (2) wealth creation; and (3) reflexive control (Leydesdorff and Deakin 2011; Deakin and Leydesdorff 2014).

¹ See for example: Foray (2006); David and Metcalfe (2007); O’Sullivan (2007); and Marimon and Carvalho (2008).

Within the Triple Helix of this reflexive control, wealth creation and organized knowledge production, the EDP constitutes a broader platform of stakeholders from universities, industry and government that is not biologically inherited from an ecosystem, but which is socially constructed. Not inherited from an eco-system, but socially-constructed as the entrepreneurial discovery of a research and innovation strategy that is smart in the prioritization of a specialisation whose participatory governance of science and technology is able to sustain the economic growth of regions. This is the hallmark of organized knowledge production, which the Triple Helix model champions (Deakin 2014; 2015). In particular, the organized knowledge production, which the Triple Helix model champions as the research and innovation of Smart Specialisation Strategies and whose participatory governance of science and technology is able to sustain regional economic growth (Deakin and Reid 2016; Deakin et al. 2017).

3.2. The Quadruple-Helix model

The EC's Guidance Notes for RIS3 recognizes the need for a participatory governance of science and technology and champions the virtues of the Quadruple-Helix (Foray et al. 2012). The Quadruple Helix constructs what this model refers to as the social ecology of an EPD and the RIS3 of knowledge production (Carayannis and Campbell 2012). This model switches attention away from the universities, industry and government, that underpin the intellectual capital of organized knowledge production, and focuses instead on an EDP of a wealth creation which is able to support the reflexive control of RIS3. Which is to say, focuses instead on the EPD of wealth creation, which is able to secure the reflexive control of RIS3 as the user-centric communities of a democracy, whose participatory governance of civil society constructs an eco-system that is able to sustain the economic growth of regions (Carayannis and Rakhmatullin 2014). For the Quadruple Helix, the communities of users exhort reflexive control over the science and technology they produce knowledge of. In this model, user-communities are not only understood to be involved in the process of entrepreneurial discovery, but also able to shape new types of research and innovation strategies, which connect users with other stakeholders whose exchange of knowledge is distributed across universities, industry and government (Carayannis and Campbell 2010; 2012; 2014; Carayannis and Rakhmatullin 2014). This means the Quadruple Helix sees the role of these institutions not as the agents of any intellectual capital, or organized knowledge production, but instead as the media of a creative sector whose democratization of wealth creation allows the public to participate in the governance of science and technology as members of civil society.

3.3. Initial insights into the models

This synopsis offers some initial insights into the limitations of the Triple Helix and failure of this model to account for the democracy of any participatory governance within civil society (Deakin 2014; 2015; Deakin et al. 2017). In addition, it also serves to highlight the relationship between civil society, science and technology as a matter of particular concern. This concern occurs because unlike the Triple, the Quadruple-Helix model does not see any reference to the entrepreneurial discovery of a research and innovation strategy as particularly useful and as a result, tends instead to present the Triple Helix as an EPD dominated by the proprietary system of an elite university-industry axis (Carayannis and Campbell 2012; 2014). In that sense, a proprietary system of knowledge exchange, which is based on an elite university-industry axis that offers a corporate RIS3, assembled as the prioritizations of a Smart Specialisation whose reflexive control of democracy is based on anything but a participatory governance of science and technology. This goes some way to capture what distinguishes these two models of knowledge production. In particular, the fact they are not only models of entrepreneurial discovery, or research and innovation strategies, but the source of bottom-up and place-based regional and national policies which are constructed as the EDP of a RIS3 that is democratic.

The distinction between them, lying in the distance separating each of the respective model's interpretation of what is democratic from the other. In that sense, on the respective interpretation of whether-or-not this can rest on a proprietary system of research and innovation in a university-industry axis, whose strategy for Smart Specialisation is founded on pre-dominantly corporate priorities, or instead upon one which is civic in the sense that it allows user-communities to participate in the governance of science and technology as members of society which also exerts some measure of reflexive control over it. Given the social significance of the models and particular weight they each put on the democracy of this participatory governance, not to mention the virtues they both propose to engender in both scientific and technological terms, to merely caricature the division between the Triple and Quadruple Helix model's as the difference between say, the proprietary systems of knowledge economy and participatory governance of civil society, would do them an injustice. As too would any suggestion either one of them is sufficiently powerful to bridge such a deeply-rooted division by themselves. For any such claim would merely serve to exemplify how the ambiguities currently surrounding the entrepreneurial discovery of research and innovation strategies, not only run the risk of misrepresenting what Smart Specialisation stands for, but also ignoring the real consequences of the prioritizations selected to serve a knowledge economy whose deeply rooted social divisions bring any notion of reflexive control, democracy and user-communities in the participatory governance of science and technology into question.

4. UNCOVERING THE DEEP-ROOTED DIVISION

The reason for uncovering the division in the Triple and Quadruple-Helix models, is not to capture any errors in the conceptual schemas either one of them advances in relation to the EDP, or how these effect RIS3. It is instead done to reveal the deeply-rooted social division that underlies all of this and which surfaces as a lack of public trust in the participatory governance of science and technology and attempts made to meet the democratic deficit associated with the reflexive control of wealth created from that organized knowledge production which is of particular concern to both of them. In that sense, the lack of public trust in the EPD and democratic deficit in RIS3 associated with claims made about the virtuous nature of any participatory governance of science and technology. Moreover, and in spite of, what the Triple and Quadruple-Helix models each claim, that transgression of public trust and deficit in democracy, which user-communities perceive as being regressive in terms of that degree of reflexive control which the EPD exhorts over wealth creation and RIS3 prioritizes as the research and innovation of entrepreneurial discoveries related to an organization of knowledge production whose economy is only able to sustain regional growth at the expense of civil society. Given the weight that the statement "at the expense of civil society" takes as a reflexive control that transgresses public trust and which is regressive in terms of the democratic deficit this signifies, it is a matter that not only warrants further examination, but one which also calls for additional consideration as the basis of any bottom-up and place-based regional and national policies towards the EDP of a RIS3. Not only because at first sight this lack of public trust and democratic deficit is exactly what the Quadruple Helix is understood to offer as that knowledge economy which meets the governance challenge the Triple Helix leaves unresolved, but for the reason a closer examination of this model does also tend to bring this public trust and democratic deficit reading of the transition from the Triple to Quadruple Helix into question. For what such a "trust-deficit" reading of the transition tends to ignore is the fact those championing the Triple-Helix model do meet the governance challenge without putting so much critical distance between the intellectual capital of an organized knowledge production (Lombardi et al. 2012a; 2012b; Kourtit et al. 2014; Deakin and Leydesdorff 2014; Deakin 2014; 2015; Deakin and Reid 2016; Mora and Bolici 2016; 2017; Mora et al. 2017) and that democratization of the public which the Quadruple Helix calls for as a basis for user-

communities (Carayannis and Campbell 2012; 2014) to participate in the governance of science and technology as members of civil society. For what those championing this “Advanced Triple-Helix” model are all too aware of is that neither any democratization of the public, nor those user-communities which participate in the governance of science and technology is the exclusive property of any “ecology social media cultivates” to fill the trust-deficit, but instead attributes of that intellectual capital which underlies the organization of knowledge production surfacing in civil society. That intellectual capital which underlies the organization of knowledge production in civil society and surfaces in the economics of that wealth creation which any democratization of the public as user-communities exerts reflexive control over as a participatory governance system (Lombardi et al. 2012a; 2012b; Kourtit et a. 2014; Deakin and Leydesdorff 2014; Deakin 2014). The awareness of the link these attributes of knowledge production (democratization of the public as user-communities) have to civil society, science and technology and connection this in turn has to participatory governance, leads advocates of this Triple Helix-plus model to call not so much for the addition of another helix that is dedicated to the democratization of the public as user-communities which participate in the governance of science and technology, but instead an extension of the Triple Helix’s reach from the intellectual capital of organized knowledge production to the economics of wealth creation. Not just in terms of that process of entrepreneurial discovery which underpins the research and innovation of any emergent “knowledge economy”, but in a manner that also supports the priorities of RIS3 as a set of place-based, bottom-up regional and national policies for the reflexive control of democracy by a public whose status as user-communities means they do participate in the governance of science and technology (Deakin 2015; Deakin and Reid 2016). This way, vis-à-vis by way of the emergent properties of an entrepreneurial discovery process underpinning research and innovation and through the organization of knowledge production into an economy this supports as a process of wealth creation, it does become possible for the priorities such a Smart Specialisation lays down, to act as a set of bottom-up, place-based policies. Bottom-up, place-based policies that are not only able to underpin the reflexivity of a democracy now under the control of that public which would not otherwise exist as user-communities able to support any participatory governance of science and technology due to the status of them as members of civil society. This, the authors suggest, is the only way it becomes possible to get any equivalence between the entrepreneurial discovery process of the research and innovation strategies championed by the Triple and Quadruple Helix models of Smart Specialisation, not as any transgression of public trust, or democratic deficit that is regressive, but as the bottom-up, place-based regional and national policies of a public whose user-communities participate in the governance of science and technology which is progressive. Which is instead progressive by virtue of the fact RIS3 does not turn on a strategy able to merely inflict some semblance of control over a knowledge economy, but reflexive control of that democratization which the public is subject to and can participate in the governance of as the science and technology of a sustainable regional growth of nations.

5. REVEALING THE TRANSGRESSION

This transgression of public trust and regression into a democratic deficit is what manifests itself in the drive both the Triple and Quadruple Helix models exhibit towards some kind of reflexive control over the participatory governance of science and technology. As the discussions in the previous section serve to indicate, the public trust gap that has opened up as a democratic deficit, has significant implications for the Triple-Helix and Quadruple-Helix models in the sense which they serve to offer some insights into the nature of this shortfall. In that sense serve to offer some insights into the nature of this shortfall and which is not only seen as a transgression of them, but deficit of trust also regressive for society. Here, they are summarized in the interests of reaching beyond any formal critique of the models and towards

what might be best referred to as the dis-content with the transgression of public trust by the Triple Helix and regression of this into the democratic deficit of the Quadruple Helix. In this way, the dis-content, which circulates around this transgression can be revealed as a regression that relates to:

- a lack of trust from the public in the EDP that underlies research and innovation within university and industry and which surfaces as a gap between the knowledge economy this wealth creates and priorities such as Smart Specialisation sets for a reflexive control of democracy by that public which are left dis-empowered from any participation in the governance of science and technology as members of civil society seeking to sustain regional economic growth. The reason the public give for this democratic deficit being the participatory governance of science and technology does not tackle the major challenges which civil society confronts. In that sense does not tackle poverty, or combat deprivation and because of this, is either unethical or ecologically destructive. This also suggests the ethics of poverty, deprivation and ecological destruction, are ignored, because research and innovation is increasingly developed by trans-national corporations, whose intellectual property rights organize knowledge production in such a way the wealth created offers little opportunity for either the nation-state, or region to exert any reflexive control over this economy by the public as part of a democracy whose participatory governance sets the agendas for science and technology (the Triple Helix model);
- the democratic deficit within civil society which proposes it is the lack of opportunity which the public have to participate in the governance of science and technology as user-communities that is significant. Because it results in that public which constitute civil society being excluded access to: 1) consultations on how to tackle poverty, combat deprivation and overcome environmental destruction; 2) deliberations over the way wealth, prosperity and ecological reconstruction of the knowledge economy, can meet these challenges by way of the reflexive control it exhorts over such a democratization and through the participation of user-communities in the governance of science and technology able to sustain economic growth (Quadruple Helix model).

This transgression results because that trust which those seeking to meet the governance challenge by way of a democratization of the public and through user-communities that participate in a governance which civil society assume to be an abundant property of, is the very thing it lacks and falls short of. Which in that sense, civil society is assumed to be an abundant property and readily available, vis-à-vis something that can be openly sourced, but which in reality turns out to be that very thing organized knowledge production lacks. Which organized knowledge production lacks and falls short of, because the intellectual capital of wealth creation that it appropriates works to deny the public universal access to an entrepreneurial discovery process whose research and innovation is able to prioritize Smart Specialisation as the reflexive control of a democracy whose bottom-up, place-based regional and national policies are credible enough to close the trust-deficit and demonstrate this by including those who are otherwise left dis-empowered as user-communities. In that sense, credible enough for organized knowledge production close this trust-deficit by including those who are otherwise left dis-empowered as user-communities. Who are otherwise left dis-empowered as user-communities and excluded from that science and technology which the knowledge economy would mobilize to confront the major challenges the public face in tackling poverty, combatting deprivation and promoting an ecological reconstruction. Which the knowledge economy would otherwise mobilize to confront the major challenges the public face in tackling poverty, combatting deprivation and promoting an ecological reconstruction as part of a research and innovation strategy whose knowledge economy is able to re-prioritize Smart Specialisation by virtue of the user-communities this empowers to participate in the governance of science and technology.

By virtue of the user-communities that any such “re-prioritization of Smart Specialisation” empowers to participate in the governance of a science and technology whose organization of knowledge production does possess a sufficient degree of reflexive control for the abundance of intellectual capital which this process of entrepreneurial discovery creates, to clear any deficit and for this appropriation of wealth to sustain the regional growth of that democratization which the trust of the public either stands or falls (European Commission 2010; European Commission 2016; United Nations 2017).

6. CONCLUSIONS

This paper examines the EDP of RIS3 in organized knowledge production and suggests what this wealth creation represents as a process of reflexive control, is not so much caught in the transition from the Triple to the Quadruple Helix, as rooted in a division within civil society. With the European Commission’s Joint Research Centre no longer championing the research and innovation strategies of the Triple Helix as the model of choice and instead choosing to endorse the Quadruple Helix, the paper suggests there is a pressing need to understand this transition as the symptom of a deeply rooted social division. As the symptom of a deeply rooted division in civil society whose root cause lies in that lack of public trust, which is assumed to be an abundant property, but that on reflection is found to be the very thing in the process of democratization which there is a deficit of and the public lacks the power to change, even though public trust is fundamental in any attempt made to clear this democratic deficit, either by way of that participatory governance, which each of the models draw particular attention to, or the science and technology they both in turn highlight the significance of. While the literature on the EDP of RIS3 is silent on this matter, the paper suggests this trust-deficit results because simply calling for broader participation, as a way to meet any governance challenge fails to take account of the organized knowledge production that underlies the process of wealth creation and which surfaces as the reflexive control of a knowledge economy whose trust-deficit otherwise renders any bottom-up, place-based regional and national policies almost powerless to do anything about. We suggest that calling for broader participation is tantamount to asking someone else out with the normal sphere of influence, to fill the void in what is known about the bottom-up, place-based policies of an EDP able to set the priorities of Smart Specialisation. In this instance, that “someone else” being code for those who advocate a transition from the Triple to the Quadruple Helix. In particular, to a Quadruple Helix whose advocates in fact argue in favor of an EPD whose “collective learning” is partial, drawn from a narrow, not broad “pool of knowledge” and intellectual capital that is instead restricted, to the social media of the cultural sector, which rather than an extension of that university-industry axis which is understood to be needed for any reflexive control of the wealth this knowledge economy creates to be universal in granting the public access to such a democratization of RIS3. More specifically, to a knowledge economy that is universal in granting the public access to a democratization of RIS3, whose participation in the governance of those consultations over the inequalities of poverty, deprivation and environmental degradation and deliberations around wealth, prosperity and ecological reconstruction, is the very thing which hold out the prospect of this participatory governance being successful in closing that trust-deficit, which would otherwise persist. To be exact, closing the trust-deficit which would otherwise persist, by allowing user-communities to source crowds whose reflexive control of the knowledge economy is sufficiently universal for the university-Industry axis to restore trust and clear the democratic deficit, both by way of that participatory governance which this institutes and through that science and technology which communities use to sustain regional growth on behalf of civil society.

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