

Triple, Quadruple and N-Tuple Helices: The RIS3 and EDP of a Higher-Order Policy Model

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Abstract

In the past decade there have been a series of articles on the status of Triple, Quadruple and N-Tuple Helices. In responding to the most recent of these from Leydesdorff and Lawson Smith (2022), this article examines the respective status of the Triple and Quadruple Helix as the scientific basis of the Research and Innovation Strategies related to Smart Specialisation (RIS3) and as the foundation of the Entrepreneurial Discovery Process (EDP). In conducting this examination, the article draws attention to the strengths of the Triple Helix Model, the communication overlay, fourth selection environment and associated ecology of the meta-stabilisation it posits not as the Quadruple Helix, but N-Tuple helices of a higher-order policy model. That policy model which stands high in terms of the status it commands as a regime governing the transition to a next-order system. To a next-order system whose governing regime commands this heightened status as the model policy for nation-states to adopt in sustaining the economic growth of regions.

Keywords

EPD – Higher-order policy model – N-Tuple Helices – Next-order system – Organised knowledge production – Quadruple Helix – Regime – Regions – Sustainable economic growth – Triple Helix – RIS3

1 Introduction

Unlike the Double, the Triple Helix Model (Etzkowitz and Leydesdorff, 2007; 2010) is the scientific basis of numerous research and innovation strategies, be they founded by international bodies, nation-states, or regional authorities.

As McCann and Ortega-Argilés (2014) show, the Triple Helix Model stands as the scientific basis of research and innovation strategies found in nation-states across Europe. The nation-states of Germany, Austria, The Netherlands, Norway, Finland, Italy, Spain and Greece, all providing evidence of the Triple Helix Model as the scientific basis of Europe's latest Research and Innovation Strategy (European Commission 2014a; 2014b). That Research and Innovation Strategy which is known as Smart Specialisation and the Joanneum Research and Austrian Federal Ministry of Science, Research and Economy (2012), along with Mroczkowski et al. (2017), Virkkala (2017), Vogiatzis and Makios (2017), Giusti et al. (2019) and Knudsen (2020), all indicate is found in the regions of Westphalia (Germany), Baden-Württemberg (Austria), East Netherlands (The Netherlands), Oulun (Finland) Lombardy (Italy), Basque (Spain) and Corallia (Greece).

As all these studies note, the aim of this latest Research and Innovation Strategy is 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.

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As Capello (2014), McCann and Ortega-Argiles (2015) and Kroll (2015) point out, to meet this aim and make Europe “the most dynamic and competitive knowledge-based economy in the world”, the Commission expects the latest Research and Innovation Strategy on Smart Specialisation (RIS3) to engage nation-states in an Entrepreneurial Discovery Process (EDP). In that sense, engage nation-states in an EDP, which is instrumental in organising knowledge production as specialisations that are smart in the sense which they prioritise the sustainable economic growth of regions (Foray et al. 2009; Piatkowski 2015).

While the Triple Helix is the model of choice for regions such as Westphalia, Baden-Württemberg, East Netherlands, Oulun, Lombardy, Basque and Corallia, more recent statements on RIS3 from Forey et al. (2012), Uyarra et al. (2014), Kyriakou (2017) and Marques and Morgan (2017), draw attention to the need for the EDP to be grounded in an organisational structure whose knowledge

production is not limited to the triad of University, Industry and Government relations. Not limited to the triad of these institutional relations, but an organisational structure which instead extends knowledge production into the dynamics of an EDP whose helix is said to be either quadruple, or of a higher-order (increasingly referred to as N-Tuple).

2 Triple, Quadruple Helices and Higher-Order Policy Models

In many ways it is this debate on the virtues of the Triple and Quadruple Helix as the scientific basis of RIS3 and foundation of the EDP by the likes of Deakin et al. (2018) and Veldhuizen (2020), the article from Leydesdorff and Lawson Smith (2022) contributes to. The contribution these authors make is to the on-going discussions over the helical structure of organised knowledge production and relationship this in turn has to both the scientific basis of RIS3 and foundation of EDP as a higher-order policy model. Building on the earlier research of Leydesdorff (2012), Leydesdorff (2013) and Chung and Park (2014), the article from Leydesdorff and Lawson Smith (2022) states: “Our objective is to explain the potential generation of synergy in TH, QH, and higher-order policy models.”

If we take the higher-order policy models referred to as those relating to the helices of RIS3 and the EDP attending this, the question that remains is how, as “historical phenomena” does the article explain the potential synergy which exists between the Triple and Quadruple Helix in the structure of organised knowledge production?

The sections of the article on the “Triple Helix in context” and “Trajectories and regimes”, go some way to answer this. The section on the former outlines how the Triple Helix evolves as a structure of organised knowledge production. What the latter sketches out is the distinction the Triple Helix draws between phenomena as phenotypes of historical variations and selections that are not “given”. Not given but which are instead theoretically constructed as hypotheses on the novelty, wealth and control of organised knowledge production. Hypotheses on the novelty, wealth and control of organised knowledge production as an eco-system whose selections either continue to secure, vis-a-vis retain the same status, or evolve.

The section on “Triple and Quadruple helices”, accounts for “the complexity of the interactions among codes in the communications” associated with the structure of organised knowledge production and N-Tuple helices these relate to. This section draws particular attention to the “emerging network of communications” as the sub-dynamic of that “communication overlay” which

the authors propose close the “structural holes” highlighted by Burt (1992) in the Double Helix and Krackhardt, and Kilduff (2002) refer to as the triads of Simmelian ties. Those holes and triads the article suggests are linked with and connected to the social networks and cultural codes of a fourth selection environment that sit on top and which add to the ecology of the three institutionally carried functionalities of knowledge production: (i) novelty production (University), (ii) wealth generation (Industry) and (iii) normative control (Government).

Adding to the account of variation, selection and retention, the authors go on to explain how contrary to what Carayannis and Campbell (2010; 2012; 2014), say about the Quadruple Helix, such a communication overlay serves to not only account for historical variation, but the processing of it as the bottom-up sub-dynamic of a next-order system. This, we are advised by Leydesdorff and Lawson Smith (2022), occurs when the network is sufficiently populated for an evolutionary dynamic to overwrite the code of a historical variant. For what Leydesdorff and Lawson Smith (2022) suggest is that while history merely serves to account for variation, morpho-genesis is selective and relates to an eco-system which is structural and deterministic. In that sense, relates to the fourth selection environment of an eco-system whose structural determination occurs on top of and in addition to the interaction which it has with the dynamic of those functionalities organising knowledge production as a next-order system.

3 Organised Knowledge Production as a “Next-Order System”

This rendering of organised knowledge production as a “next-order system” is significant because it serves to demonstrate how the Triple Helix Model (Etzkowitz and Leydesdorff, 1997; 2000) provides an account of what the Quadruple Helix searches for (Carayannis and Campbell, 2010; 2012; 2014). It also serves to demonstrate how the Triple Helix Model’s inductive and recursive overlay of communication accounts for the fourth environment as the endogenous property of a morpho-genesis whose selective ecology is structural and deterministic.

This in turn goes some way to show how the Triple Helix Model accounts for the latency of the Quadruple in terms of the fourth environment that emerges from the morpho-genesis of the selective ecology and structural determination, which the Triple Helix, not Quadruple Helix Model provides the scientific basis of and foundation for. This is because for Leydesdorff and Lawson Smith (2022), the scientific basis of the Triple Helix Model is founded on the

social networks and cultural codes of that communication overlay which lie in the environment of the former's fourth selection mechanism. That selection mechanism whose compounding, strengthening and intensification of knowledge production is in turn accounted for by the Triple Helix Model as a meta-stabilisation which is said to be latent in the "media, creative sector and social ecology" of the latter as a Quadruple Helix.

The respective differences Leydesdorff and Lawson Smith (2022) identify between the Triple and Quadruple Models of organised knowledge production are highlighted further when seen in relation to the scientific basis of RIS3 and foundation of EDP as a higher-order policy model. This is particularly noticeable when looked at in relation to the scientific basis of RIS3 and foundation of EDP as the higher ordering of that policy model which the Triple Helix accounts for the communication overlay of. The communication overlay this model accounts for and unlike the Quadruple Helix, does not take either the media that creates it or social ecology which this cultivates as merely the phenomena of historical variation. In that sense does not take what either creates or cultivates it as given and something from which to break with and depart from.

It is perhaps this break with or departure from the theoretical construction and hypothetical status of the selective ecologies, as structural determinations associated with organised knowledge production, the article from Leydesdorff and Lawson Smith (2022) best serves to highlight the significance of. For what this Triple Helix inspired account of organised knowledge production offers is an insight into how the theoretically constructed and hypothetical status assigned to it by the model is literally taken as given by the Quadruple. This "given" also serves to highlight exactly what the Quadruple Helix breaks with and departs from. In that sense the tendency which this model unlike its counterpart, displays to offer little critical insight into either the structure, vis-à-vis shape, form or content of the helices they organise the productive qualities of. Which is to say, offer little critical insight into either that novelty production or wealth generation, which the Triple Helix does account for the organisation of, but the Quadruple Helix breaks with or departs from by limiting knowledge production to the media that creates it and social ecology which this cultivates as the N-Tuple helices of normative control.

Here the term N-Tuple is deployed strategically and in line with the open systems logic underpinning the Triple Helix. In that sense it is deployed tactically to retain the account of organised knowledge production, especially novelty production and wealth generation, offered by the Triple and to avoid the break with and departure from anything but the normative control of this which the Quadruple displays. This tactic allows for the communication

overlay of the former model to account for that which has previously been left latent. This is achieved by folding the media that creates novelty into the fourth selection environment and associated ecology which generates wealth from that meta-stabilisation which normatively controls any such manifestation as a structural determination of organised knowledge production. That manifestation which is structurally determinate in the organisation of knowledge production as the N-Tuple helices, RIS3 and EDP of a higher-order policy model whose productive qualities are novel in the sense which they generate the normative control that regulates this as the regime of a next-order system.

4 Accounting for the Social Networks and Cultural Codes of this Communication Overlay

Leydesdorff and Deakin (2009, 2011) and Deakin and Leydesdorff (2013) have sought to avoid the limitations of any such breaks with and departures from the helices of organised knowledge production. This has meant accounting for the morphologic genesis of the social networks and cultural codes attending the communication overlay they relate to. That is those networks and codes which are the endogenous properties of the Triple Helix Model and whose translation of Storper's (1997) "Technologies, Organisations and Territories" into the communication overlay, fourth selection environment, associated ecology and meta-stabilisation, is instrumental in creating the novelty production, wealth generation and normative control that not only account for, but which also cover the organisation of them as N-Tuple helices.

5 RIS3 and EDP of a Higher-Order Policy Model

The complexity of the interactions among the social networks and cultural codes of this territorialisation is explored further by Lombardi et.al (2012), Kourtit et al. (2013), Deakin (2014; 2015; 2018), Deakin and Reid (2018) and Deakin et al. (2018; 2020). Caragliu and Del Bo (2021) also explore how this organisation of knowledge production is novel in terms of the wealth generated from the N-Tuple helices. How in that sense these helices provide RIS3 with the EDP needed to not only secure the new Holy Trinity of "prosperity, health and well-being" but "Holy Grail" of "equity", which is also required from the normative control of that higher-order policy model which they relate to. That policy model which relative to others stands high in terms

of the status it commands as that regime which governs the transition to a next-order system. That next-order system which can in turn sustain the economic growth of regions, with more and better jobs, greater social cohesion and respect for the environment.

6 Concluding Discussions

The author of this article would suggest the Triple Helix model's social networking and cultural codification is significant because in accounting for the communication overlay, fourth selection environment, associated ecologies and meta-stabilisation of organised knowledge production, it serves to overcome the limitations of the Quadruple Helix by relaying where the novelty production, wealth generation and normative control lying between them rest in relation to the N-Tuple helices of that higher-order policy model which they both claim to know about. In this respect, it is suggested these networks, codes, environments, associated ecologies and stabilisations are significant because what such organisational structures claim to produce knowledge of rests on understanding:

- the Triple Helix is not only the site but origin of this gene. In that sense, not either the medium for or sign of something lying elsewhere: given and either to break with or depart from, but instead the endogenous property of a morpho-genesis, whose communication overlay, fourth selection environment, associated ecology and meta-stabilisation cover the organisation of knowledge production.
- it is this fourth selection environment, associated ecology and meta-stabilisation, that continues to secure, vis-a-vis retain the true status of the Triple Helix as a model of organised knowledge production which compounds, strengthens and intensifies the status of the novelty production, wealth generation and normative control this accounts for.
- the meta-stabilisation of these functionalities (novelty in the generation of wealth and norms controlling this) is what the N-Tuple helices, RIS3 and EPD account for the higher ordering of as a policy model. That is as a policy model which is of a higher order because it takes of the status of a regime.
- such a status results not from any escalation of the Triple Helix Model into a Quadruple, but instead structural determination of the fourth selection environment, associated ecology and meta-stabilisation attending the N-Tuple helices, RIS3 and EPD as a higher-order policy model. That policy model which stands high in terms of the status that it commands as a regime governing the transition to a next-order system which sustains the

economic growth of regions, with more and better jobs, greater social cohesion and respect for the environment.

- the cautionary tales from the likes of Forey et al. (2012), Uyarra et al. (2014), Kyriakou (2017) and Marques and Morgan (2017) are well noted but poorly based and ill-founded, as they tend to serve as a lesson on how to mis-read the Triple Helix Model by reducing all matters concerning the communication overlay of the fourth selection mechanism to those over either: the trust of the public in the novelty this produces and wealth it generates (Deakin et al (2018), or any democratic deficit attending the normative control higher policy models of this kind hold over the next order system (Veldhuizen, 2020). That is set any questions which occur over the meta-stabilisation covering the organisation of either novelty production, or wealth generation aside, in the interest of appropriating the N-Tuple helices, RIS3 and EDP as that normative control which can stand high in terms of the status any such policy model commands. In this instance, stand high in terms of the status they command as that regime which governs the transition to a next-order system.

Knowing this means those nation-states and regions of Europe who have retained a commitment to the Triple Helix should be able to revisit the communication overlay of the fourth selection environment. In that sense, revisit the overlay of the fourth selection and ecology associated with this as a meta-stabilisation which cover the N-Tuple helices such an organisation of knowledge production orders. The helices of organised knowledge production this orders not only as the scientific basis of RIS3, but also the foundation of an EDP. In that sense orders not only as the basis for (novelty production), but also the foundation (wealth generation) of a normative control from which a higher policy model can stand as a regime. Can stand as that regime which governs any transition to the sustainable economic growth of regions in a next-order system with more and better jobs, greater social cohesion and respect for the environment.

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