

RESEARCH ARTICLE

# Inclusive national innovation systems: rethinking institutions in the light of inclusion imperatives

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## Abstract

National innovation systems (NISs) have been important in the literature since the 1990s for highlighting the institutional performance of economies and promoting economic development. Inclusion in systemic innovation activities is an emerging area of research. However, the definition of inclusion within innovative activities remains unclear and is associated with numerous forms and characteristics depending on the context visited. Our work highlights the conceptual gap that exists around the notion of inclusive innovation by characterising three forms of inclusion in relation to innovation activities. We thus set out, in the form of a typology, three distinct framings which enable us to identify three different levels associated with specific institutional mechanisms and forms of inclusion. This typology makes it possible to identify appropriate innovation policies, depending on how inclusive innovation is characterised (low, medium, and high). It also helps to clarify the inclusive nature of innovation in NIS approaches.

**Keywords:** inclusion; innovation systems; institutions; public policy; typology

## Introduction

Work on inclusive innovation has developed in recent years to promote responsible and sustainable economic development (Heeks et al., 2014; Stilgoe et al., 2020). It is becoming clear that economic growth is no longer sufficient in itself; it must contain societal and environmental concerns (Chataway et al., 2014; Gupta and Vegelin, 2016). Inclusive innovation seeks to improve people's living conditions and create employment opportunities for the poor through the development of new products, services, processes, and business models to increase the resources of poor communities (UNDP, 2020). But while inclusive innovation has been adopted as a reflexive concept beyond a simple modernisation drive, the concept remains ambiguous and contested (Opola et al., 2021). Defined as an umbrella concept (Pansera and Owen, 2018), it is appreciated both as an objective to improve social and economic wellbeing (George et al., 2012) and also on the means and processes of innovation (Foster and Heeks, 2013). But it is still insufficiently visited (Opola et al., 2021; Mortazavi et al., 2021).

At the same time, work on national innovation systems (NISs) has been an established part of economic literature for over 40 years, analysing the institutional performance of an economy and understanding how a range of actors work together to create and disseminate new knowledge. While the initial aim of NIS was linked to notions of economic performance, it is now accepted that these systems should contribute to improving the economic development of populations (Lundvall et al., 2002). Inclusion in innovation systems is important for two reasons: it becomes an imperative and a foundation for the construction of these systems: it is a means of innovating and an objective for better

innovation. The systemic dimension is represented by an organisational and institutional dynamic, a veritable milestone in inter-actor innovation activities within the same territory. This dimension justifies the interest in considering innovation within interrelated institutions and organisations and not as a single final output.

Understanding ‘inclusion’ in NIS approaches is not easy. First, because the link between inclusive innovation and the NIS is recent, but above all because this link has been deployed on local scales focusing on the microeconomic dimensions of a final product (Kalkanci et al., 2019). The definition of inclusion in innovation activities has not been stabilised, but interest in the subject is strong (Brundenius, 2017).

So how can we define inclusion in the NIS? What are the different forms associated with inclusion and its institutional mechanisms in the NIS approach? Systemic innovation is characterised by institutions, which must also be inclusive. Institutions represent the ‘rules of the game’ (North, 1990) of innovation systems. They create incentives and opportunities for all individuals and are important for strengthening the wellbeing of grassroots communities (Patnaik and Bhowmick, 2020).

The idea of comparing NIS approaches with inclusive innovation will lead us to propose a typology characterising inclusion in innovation activities. To do this, we will use the triple and quadruple helixes (Etzkowitz and Leydesdorff, 2000, Carayannis and Campbell, 2009) as well as the inclusion scale of Heeks et al. (2013). The interest of our research is twofold: to present in conceptual form the declension of inclusive innovations in NIS work and to be part of the continuity of work on inclusive innovation systems (Arocena et al., 2018, Villalba-Morales et al., 2023). We then explore the links between NIS work and inclusion and propose a typology of inclusive innovations within NIS work based on three respective framings. Finally, we discuss the public policies to be followed before concluding.

## NIS and institutional performance

As a concept, an approach, an instrument, and an object, the NIS has been talked about in academic and institutional circles since the 1990s, as an economic policy tool for comparing technological performance. The NIS is a system of interconnected institutions which create, accumulate, and transfer the knowledge, skills, and artefacts which define the new technologies (Metcalfe 1995). Whatever the debates marking the flexibility of the concept according to the empirical field visited, the authors unanimously agree on the theoretical footprints on which the system is based: evolutionary and institutionalist theory, the latter two being complementary, within an economy based on knowledge and learning (Lundvall, 1992). Innovation systems are seen as complex configurations of institutions that propel the process of economic evolution (Harper, 2018). The notion of a system has been applied to several areas (sectoral, local, and regional). The national relevance of the national delimitation is linked to the nation-state system, which is undeniably coherent despite the free mobility of information, knowledge, finance, goods, and services. This does not prevent strong national differences between institutions, R&D investment, and technological performance (Nelson, 1993).

Academic debates on NIS have divided the concept into two very dual approaches: the broad approach and the narrow approach. Innovation is defined in a narrow way because the innovative dynamic is measured only in terms of formal activities linked to R&D and scientific activities (Nelson, 1993). The transition to a conceptualisation is made through a logic of proximity of different domains/sectors to be considered, which leaves the door open to extensive interpretations of the system: capabilities, skills, culture, customs, national traditions, and legislation. In this way, Lundvall et al. will no longer value the NIS as an instrument linked to technological performance, but as a tool for understanding economic development (Lundvall et al., 2002). This is the conceptualisation most accepted in the current literature (Casadella and Tah, 2017). It will incorporate the imperatives of inclusion.

### NISs and inclusion

Inclusive innovation is defined simply as ‘the inclusion within some aspect of innovation of groups who are currently marginalised’ (Foster and Heeks, 2013). Other definitions have been proposed more recently, as a form of innovation designed to develop mechanisms for businesses and other actors not only to provide affordability for the needs of low-income people but also to build their capacity and enhance their empowerment and wellbeing (Mortazavi et al., 2021). For their part, international organisations such as the United Nations (UN) emphasise the role of social innovation in tackling major challenges (i.e. the Sustainable Development Goals (SDGs)). In parallel, Johnson and Andersen (2012) explain inclusion through the recognition of broad innovation systems oriented towards economic growth and development, without specifying the actors and processes. They do, however, recognise the importance of tacit, uncodified, and local knowledge, as well as the importance of social relations within the system. On reading these definitions, a kind of conceptual gap emerges, marked by porous boundaries on which groups to include (actors), where to include them (spaces, institutions, and organisations), and how (mechanisms), in these innovation systems.

### *From sustainable NIS to inclusive NIS*

Inclusive NISs find their genesis in sustainable NISs. Understanding the role of innovations in and for sustainable development is not new and was analysed by Freeman in the 1970s (Perez, 2015). Subsequently, a plethora of concepts emerged: environmental innovations, low-carbon innovations, eco-innovation, and socio-ecological innovations (Franceschini et al., 2016), having in common the fact of finding technological, social, or institutional solutions to reduce the environmental impact of human activity (Chaminade et al. 2018). Green or sustainable NIS are made up of social, human, and natural elements and relationships that interact to produce, disseminate, and use new and economically profitable knowledge (Segura-Bonilla, 2003). They include resources that are easily reproducible (productive and intellectual capital) and those that are difficult to reproduce (natural and social capital) (Lundvall et al., 2002). But the sustainable nature of the innovation system built around sustainable development does not represent its inclusive nature. The perceived gap between the two concepts can be explained by the difference between conventional innovation systems geared towards growth and employment, and inclusive innovation systems geared towards the participation of excluded stakeholders in the innovation process (Villalba-Morales et al., 2023). Consequently, the multi-stakeholder character based on a decentralised and protean knowledge system will be the milestone of inclusive innovation in NIS.

### *Inclusion to limit the constraints of innovation on economic growth*

Innovation activities have contradictory effects on economic development. Coad et al. (2022) list all the dark sides of innovation, including the lack of consideration for product life cycles, and innovations generated by companies to evade certain regulations. Above all, innovation can reinforce inequalities through differences in income distribution. It can exert strong pressure on wage inequalities and unemployment, directly through competition on costs and job losses and indirectly through compensation for high wage costs and higher labour productivity. Furthermore, the existence of major inequalities in developing countries in terms of the balance of power, by region/country, the size of companies, the quality of infrastructures, and household incomes undeniably hampers the capacity of actors to innovate. Digital exclusion in rural areas is one example (Warren, 2007).

Inclusion will therefore become an imperative to limit the harmful effects of innovation on the population.

### *Inclusion objectives and actors*

Inclusion is increasingly used by civil society and politicians. It is inseparable from the way in which we conceive the type of society and wellbeing we want and the way in which we envisage 'living together' (Bouquet, 2015). Although there are many interpretations of the term 'inclusive' in the economic development literature (Gupta et al., 2015) and that the concept is constantly evolving (Bouquet, 2015), the three main areas of intervention that cut across the different interpretations are the fight against inequality, the inclusion of the excluded in the implementation of socio-economic policy, and the reduction of the gaps in human capabilities according to Sen (2000, 2003), which are largely the determinants of human life chances (Hongoro et al., 2022).

Inclusion concerns the entire population affected by some form of marginality: the poor or low-income individuals, women, the disabled, ethnic minorities, or informal entrepreneurs (Heeks et al., 2013). It aims to achieve equitable development (Heeks et al., 2013), economic and social cohesion (Piketti, 2020), a form of wellbeing (Foster and Heeks, 2013), and improved livelihoods (Altenburg and Pegels, 2012). These objectives are multidimensional, ensuring values, ethics, social justice, and cohesion. Intermediary actors are becoming key actors in inclusive innovation systems by promoting the dissemination of knowledge (producers' organisations and extension structures). These are 'inclusive intermediaries' or 'knowledge facilitators', such as agri-food companies, when they are capable of creating interactive learning spaces (Villalba-Morales et al., 2023), universities when they are able to interact with actors in the system (Arocena and Sutz, 2003), or finally a politician, a researcher or an agency, an association, or a network manager (Costamagna and Larrea, 2018). They may also be non-governmental organisations, associations or cooperatives, linked to civil society, which promote traditional and local knowledge, or informal agricultural entrepreneurs who develop private entrepreneurship (Diatta and Ndiaye, 2022).

### *Processes*

Inclusive innovation takes many forms on different scales. It can also be broken down into processes or problem-solving (Cozzens and Sutz, 2012).

The idea here is to understand how excluded categories innovate. The most representative forms in the literature are grassroots innovations, pro-poor innovations, BOP (bottom of the pyramid) innovations, or frugal innovations. While pro-poor innovations tend to represent product innovations targeting the needs of the poorest segments of society, frugal innovation refers more to an engineering process aimed at reducing the production costs of a particular good with the aim of marketing and mass-producing it in developing contexts (Bhatti and Prabhu, 2019, Nari Kahle et al., 2013). The excluded categories innovate not only through these engineering processes but also through local entrepreneurship, as a mechanism for reducing poverty in the long term (Prabhu, 2017, Radjou and Prabhu, 2015). Frugal entrepreneurs can then propose original solutions to meet the ignored or unsatisfied needs of consumers. Mechanisms of bricolage are also valued as processes of ingenuity and resourcefulness operated in contexts of scarcity. Bricolage consists of combining strategically existing resources to create opportunities (Baker and Nelson, 2005).

Inclusive innovation also represents the diversity of learning processes in a society, from formal knowledge to local knowledge. The diversity of learning processes linked to the dissemination and absorption of knowledge constitutes a 'learning culture' (Lundvall et al., 2002). The notion of culture implies social relationships and beliefs (Mokyr, quoted by Hodgson, 2022). This culture must be sufficiently widespread and diffused to be shared. A limited learning culture is at the root of low learning capacity and a failing institutional framework (Johnson and Lundvall, 2003).

### *Inclusive institutions*

Inclusive innovation implies 'inclusive' institutions, which form the basis of these innovation systems. Acemoglu and Robinson (2012) define 'inclusive' institutions (as opposed to 'extractive' institutions) as

key drivers of economic and political progress, including through formal property rights and liberal forms of democracy. These inclusive institutions are described both as a means of achieving inclusion and as an end in themselves. They are presented at the macroeconomic level as a model of governance, just as at the microeconomic level, where they are marked by power relations (Mosse, 2010). Without a well-stabilised definition, they will be circumscribed by work on inclusive NIS, where they will play a central role, while being (re)considered because of their protean nature, varying according to the context studied (Lundvall et al., 2002).

The inclusive nature of institutions linked to innovation processes calls for them to be redefined. New spaces, or institutional arrangements, designed to encourage interaction between the different actors involved in innovation, are emerging (Arocena and Sutz, 2000). The aim of learning spaces is to facilitate the dissemination of knowledge, ensure the fluidity of the knowledge base, and promote innovation. In developing countries, they are important for preserving indigenous and traditional knowledge. However, these spaces are often hampered by strong local constraints: lack of opportunities (and skills) (Arocena and Sutz, 2000), jurisdictional and governance ambiguities (Marshall and Dolley, 2019), and problem-solving in scarcity conditions (Srinivas and Sutz, 2006). In the context of developed countries, these will tend to be innovation networks, digital platforms built around knowledge communities (Primard and Soulier, 2018), or hybrid knowledge spaces in the form of *think tanks* (Karlsen and Larrea, 2021).

Inclusive innovations in NIS approaches are a reminder of the many levels, contexts, and forms at which they can be understood. A typology is needed to clarify the analysis of inclusion in the NIS and make it easier to interpret.

### A typology of inclusive NISs

In the mid-1990s, the NIS was (Etzkowitz and Leydesdorff, 1995) interpreted as a triple helix where the helices represent dynamic interactions between academia, industry, and government (Etzkowitz and Leydesdorff, 2000). This initial approach did not consider democratic or undemocratic models of public governance (Carayannis and Campbell, 2017) and ignored civil society. Carayannis and Campbell (2009) added a fourth helix showing the role of civil society. This helix considers the variety of formal and informal means of fostering social innovation (Nordberg et al., 2020). Civil society is important for innovation because interactions within the NIS depend on broad social participation (Etzkowitz, 2008). The interdependence between a wide range of actors can be very marked, particularly through informal connections to encourage trust and the co-construction of innovations (Cai et al., 2019). But this model also adds ‘media-based and culture-based public’ and ‘arts, artistic research and arts-based innovation’ to the fourth helix. The quadruple helix innovation model can therefore be seen as a model that incorporates the dimension of democracy or the context of democracy to promote knowledge, knowledge production and innovation (Carayannis and Campbell, 2009, 2012, p. 14). Finally, a fifth helix has been proposed to highlight the natural environments of society (Carayannis and Campbell, 2013).

All these models, through the helices, will enable us to move towards a proposed typology of inclusive innovation graduated into three respective framings and forming three degrees of inclusion in innovation systems. Our typology will also be proposed in the light of the inclusive innovation scale defined by Heeks et al. (2013). We have chosen a typology – explanatory, where only theoretical reflection will be developed with an underlying theoretical anchor (Chevalier, 2022).

#### *Framing 1 – Weak inclusion: democratic path innovation*

Weak inclusion means considering systemic innovation within a societal and macroeconomic framework that is democratically stable. Systemic innovation is *top-down*. Public policies guarantee a level of political stability that enables actors to carry out their innovation activities within a favourable institutional framework. Inclusion is linked to the nature of inclusive political institutions, that is,

democracy. This framing ties in with the arguments put forward by Acemoglu and Robinson (2012) in their book *'why nations fail'*, when they argue that inclusive institutions play in favour of innovation. Differences between institutions are therefore the main source of differences between countries in terms of economic growth and prosperity (Acemoglu et al., 2005). These arguments are also consistent with the quadruple helix model, in which democracy is a *precondition*. Democracy favours the development of actions leading to sustainable, intelligent, and inclusive growth while defending sustainable development (Carayannis et al., 2016). While the nature of institutions and their reliability are important, institutions here are primarily associated with a given governance model.

The quality of governance is going to be important in determining innovation processes, as are the different types of political levers associated with institutional practices such as persuasion practices, the involvement of public institutions in governance bodies, the establishment of constitutive rules, the definition of different roles and responsibilities, or even the methods of regulating authority, and the methods of sharing or controlling authority (Berthinier-Poncet, 2013). The democratic regime is a prerequisite for the constitution of the innovation system. There is a pervasive coevolutionary dynamic between (multi-level) innovation systems and (multi-level) political systems (Carayannis and Campbell, 2017). Thus, more broadly, the distribution of constitutive and instrumental freedoms are important constitutive elements of NIS (Lundvall et al., 2002). The state is the intermediary or public organiser that fosters connections between the key actors in an innovation system, while ensuring democratic stability. In this sense, the underlying institutional mechanisms will be linked to respect for or the establishment of democratic institutions. The principles of public governance are also consolidated by the quality of democratic institutions, that is, the establishment of a rule of law based on reliable institutions. Democracy and the reliability of institutions can be dissociated, as in some Latin American contexts, such as Brazil, where representative democracy is continuing its construction process despite failing institutions linked to Science and Technology (Cassiolato et al., 2014). In dictatorship contexts, the elites in power tend to rig institutional organisations to extract value for their own benefit, blocking any productive incentive. To avoid this, inclusive political institutions must therefore be democratic and pluralist (Andersen and Johnson, 2015).

In this framing 1, the degree of inclusion is low because inclusion is merely an objective of democratic stability supported by public institutions, consolidating a national innovation dynamic. Inclusion is a goal (democratic and of public governance), linked to the definition of an inclusive political institution (Acemoglu and Robinson, 2012) but going beyond a simple intention or abstract motivation, characterising level 1 of the inclusive innovation scale of Heeks et al. (2013).

### *Framing 2 – Medium inclusion: multi-actor and protean innovation*

This form of inclusion is represented in the fourth helix by civil society and its participation in the production and dissemination of knowledge. This form of inclusion is of the *bottom-up* type, considering a multi-stakeholder aspect. Potts (2018) has shown how in open innovation, entrepreneurial initiatives emerge from below within a broader framework of civil society institutions that give individuals the freedom to innovate and experiment. Inclusive initiatives are characterised when poor and marginalised communities can benefit from innovations (as an outcome: Harsh et al., 2018), but also when individuals can co-construct innovation processes (as a means: Patiño-Valencia et al., 2022). A growing body of work describes the shortcomings of top-down, expert-led approaches that marginalise the views of local stakeholders in the negotiation of social change (Macnaghten, 2020).

In this context, the importance of civil society is real, as previously detailed in the quadruple helix model. Informal institutions are also represented and produced in an internalised way by being endogenous to a community (Lipford and Yandle, 1997). Inclusiveness stems from the ability of these informal institutions to enhance the value of categories excluded from the innovation process. There are many examples of this in certain developing contexts where the state is failing. For example, local innovation systems can develop spontaneously with the empowerment of actors supported by private entrepreneurship (Diatta and Ndiaye, 2022). Innovation in scarcity conditions is often driven by

informal institutions that combine a shortage of resources with high knowledge capacities, ranging from pharmaceutical products to spare parts, motorbike assembly, and engineering (Srinivas and Sutz, 2006).

In addition, those involved in innovation activities will benefit to a greater or lesser extent from various opportunities. These opportunities are visible through inclusive economic institutions. Acemoglu and Robinson (2012) contrasted the definition of inclusive political institutions with inclusive economic institutions. Inclusive political institutions, described in framing 1, promote the development of inclusive economic institutions that encourage a broad segment of the population to participate in the economy. Inclusive economic institutions are linked to the defence of private property, the creation of public services, respect for free competition, and access to education for as many people as possible. The development of public services is underpinned by the implementation of social policies and a proactive commitment to combating unemployment and exclusion, and incentives to combat inequality and accessibility to financial services (Foster and Heeks, 2013), and health services (Zhang and Wu, 2019). Institutional mechanisms emanate both from the State, on a top-down scale, to deploy innovation policies in the 'broad' sense (by including multiple stakeholders and promoting the development of social, educational, or environmental policies), and on a bottom-up scale, through self-organised actions by civil society and contributing to the continuous improvement of learning and innovation dynamics. The inclusiveness of innovation does not depend solely on the dissemination of knowledge but also on active participation in innovation processes (Papaioannou, 2014). In China, broadening citizen participation in political life is a step towards a more effective innovation system (Yin et al., 2022). Innovation in Finland is based on the active participation of many members of civil society and the support of start-ups and young companies (Fagerberg and Hutschenreiter, 2020). On a regional scale, as in the Spanish Basque country, actions such as action research think tanks make it possible to create hybrid spaces where researchers and politicians work together (Karlsen and Larrea, 2021).

Inclusion is described as medium because it does not occur in all spheres of the economy, like a real 'learning culture'. Local knowledge is not considered, nor is the democratisation or decolonisation of knowledge present in certain contexts (Cummings et al., 2021). Initiatives are sectoral or local, preventing any global or societal transformation (Chaminade, 2020). However, inclusion does have a positive impact on the wellbeing of marginalised groups, defined as level 3 on the scale of inclusive innovation (Heeks et al., 2013), but this impact is partial and/or sectoral. It cannot be characterised on a society-wide scale. The processes (level 4) are multi-stakeholder and fuelled by an ongoing collective construction towards innovation 'in the broadest sense' supported by a range of knowledge institutions.

### ***Framing 3 – Strong inclusion: societal and transformative innovation***

Strong inclusion is societal inclusion. It represents the most accomplished form of inclusive institutions. First, because of the consideration it gives to its actors, and its multi-stakeholder approach, already visible in box 2. Second, because it is set up in such a way as to promote all forms of knowledge in the economy, within different given contexts. Innovation is transformative: it changes the lives of all individuals and is supported by an environment characterised by institutional drivers within given territories. At the micro level, companies have a culture of inclusion and constant learning: all forms of learning are legitimised, including those present within the informal sector. In this sense, Phiri et al. (2015) have highlighted the key role of the informal sector in devising inclusive solutions to promote its integration into the economy. They argue that the size of the informal economy is a significant indicator of the extent of exclusion in all its forms, especially in developing economies. The importance of traditional knowledge is also highlighted here. The OECD (2012) had already noted that inclusive innovation could facilitate the exploitation of traditional knowledge or the adapted use of modern technology that most people can afford.

A learning culture is potentially erected within this framing: the decolonisation of knowledge is considered to dismantle patterns of knowledge creation and use emanating from the colonial past. This

consideration can be appreciated through a systemic approach characterised by the fight against the different and interdependent inequalities in the knowledge system, strongly linked to coloniality (Cummings et al., 2021). From here, we can also appreciate the different trajectories leading to this societal learning culture, with the role of small businesses, formal education, informal education, lifelong learning, skilled and unskilled workers, creative spaces for knowledge diversity, and the role of women and individuals with disabilities for society (Foxley and Stallings, 2016). The role of universities is also important to show how they deal with exclusion in very heterogeneous contexts (Brundenius, 2017). They are essential in a context where learning capacities in relation to new technologies are a major challenge (Albuquerque et al., 2015).

An important point in relation to the propeller models is the consideration of the natural environment. As in the quintuple helix model (Carayannis and Campbell, 2017), the ecological transition addressed in the quintuple helix innovation system is ecologically sensitive. The quintuple helix sees environmental and ecological problems as new opportunities, identifying them as possible vectors to produce future knowledge and innovation. Ecology is also part of this learning culture, which will drive innovation processes towards this transition: transforming innovation systems at several levels to become more 'low carbon' requires broad social inclusion in learning, innovation, and structural change. The aim is not to reduce the environmental impact of a particular product or process or to ensure its substitutability, but to ensure social and, to some extent, economic wellbeing within planetary limits. The scale at which changes are analysed empirically is at the meso and macro levels, in relation to transformations in the system (Chaminade, 2020).

Societal commitment is broad. As in framing 2, it assumes that the multiple stakeholders are involved in the innovation process. But this commitment is the basis for a structural change, both by the stakeholders in question and by their desired participation in the innovation process or in the evaluation of public policies. The institutional mechanisms are both top-down and bottom-up: top-down because the political discourse is inclusive, marked by the implementation of holistic innovation policies, and bottom-up because the actors learn in a form of continuous learning culture: through learning spaces, through business networks, through innovation platforms where, in the Netherlands, they are driven not only by new forms of governance (more decentralised) but also by public-private partnerships, with new challenges to be considered in cutting-edge sectors (Fagerberg and Hutschenreiter, 2020). In other contexts, such as Italy, social enterprises are becoming real actors in the innovation process and in the development of the Italian NIS (Calderini et al., 2023). In Colombia, transformative innovation comes from considering, on a decentralised scale, innovation intermediaries and interactive learning spaces (Villalba-Morales et al., 2023).

This framing is in line with levels 5 and 6 of Heeks et al. (2013)'s scale of inclusive innovation: it lays down the conditions for societal impact (level 3), specifying processes through multipartism (level 4), and modifying inclusive structures (level 5) around a (political) discourse that is itself inclusive (level 6). Inclusion is profound and requires structural reform of existing innovation systems. However, this requires a change of culture and a long-term vision (Nunes and Cooke, 2021).

The three framings identified in Table 1 express the characterisation of inclusion in the systemic analysis of innovation. As summarised in Table 1, while framing 1 sees inclusion as a form of democracy and a model of governance, framing 2 focuses on informal institutions to enhance the value of excluded categories and on the development of public policies indirectly linked to innovation. Framing 3 offers a culture of societal learning through institutional and structural change. What remains to be considered is the impact of inclusive innovations on innovation policies.

### Impact of innovation policies on inclusive innovations

The notion of inclusive innovation always embodies a political dimension (Pansera and Owen, 2018). Public policies are relevant from the point of view of innovation systems, because they form part of the institutional framework that shapes the structure and dynamics of innovation systems (Villalba-Morales et al., 2023). But these systems must be set up in such a way as to benefit the entire population.



**Table 1.** Abstract of conceptual framings

	Framing 1 : Democratic path innovation	Framing 2 : Multi-actor and protean innovation	Framing 3 : Societal and transformative innovation
Actors	Public	Multi-stakeholder	Multi-stakeholder
Form of the inclusive institution in systemic innovation	Low	Medium	Strong
Institutions	Inclusive political institutions Formal institutions Governance	Inclusive political and economic institutions Formal: Mode of governance Informal: codes, references, reference values for assessing excluded categories	Inclusive political and economic institutions Formal: Mode of governance Informal: Societal legitimisation of informal institutions in innovation processes
Institutional mechanisms	Top-down process Democratic institutions	Top-down and bottom-up process Public policies indirectly linked to innovation (educational, social, and environmental) Support for a wide range of players representing civil society: cooperatives, mutual societies, associations, innovation intermediaries, etc.	Top-down and bottom-up process Transformative or mission- or actor-oriented public policies (transformation or reorientation) Recognition of indigenous knowledge and promotion of a learning culture Reconfiguration or reorientation of networks, skills, regulations and preferences around societal values
Strong points	Governance as a prerequisite for innovation processes	Important role of stakeholders in the innovation process Willingness of public authorities to implement social, educational, or environmental policies	Strong institutional drivers (formal and informal) to achieve systemic and societal inclusion Institutional change
Limits	Top-down approach Inclusion as the sole aim and purpose	Difficulty in understanding informal institutions in innovation processes Sector/local actions	A strong social commitment that is difficult to achieve
Inclusive innovation	Results	Means and results	Structural and transformative change

From there, public policies must evolve to foster innovation dynamics conducive to social inclusion. For governance to be inclusive, it must embrace the participation of all, particularly the marginalised, to make public policies effective and achievable. In all cases, the state must play an active role in building innovation capacity, both through resources and incentives. On the systemic aspect, about the multi-stakeholder approach, there is nevertheless the challenge of governance regarding the different interests and objectives. Some contexts are particularly complex in terms of governance because of jurisdictional ambiguity, the transition from formal to informal institutional arrangements, heterogeneous communities, the transfer of decision-making to concentrated authorities, and the rapid growth of informal market-based arrangements with few environmental incentives (Marshall and Dolley, 2019).

Public authorities are facilitators of inclusive innovation in various ways, but above all through regulatory intervention (Foster and Heeks, 2013). They produce results if their instruments are acceptable to society as a whole and if public order is maintained. The scope of the interventions thus depends on the nature of the instruments, which are very heterogeneous: from the regulatory aspect to the financial aspects, and often sector-based. But shortcomings in implementation are widely observable in certain contexts (Foster and Heeks, 2013), with environmental degradation without appropriate measures. Sometimes, even failing institutions are at the mercy of nepotism, corruption, political favours, and clientelism. As a result, it can be complex to measure and predict the influence of the state on innovation processes.

In framing 1, public policy tools are based on respect for the democratic framework, public governance, and public support for the NIS in the 'strict' sense of the term, that is, around Science and Technology. The establishment of a democratic framework goes hand in hand with the search for democratic stability (Méon and Sekkat, 2022). It can also correspond to democratic change: either through its emergence or its consolidation (Donni and Marino, 2020). In the case of democratic change, the political instruments are linked to the ability to hold elections, whereas in the case of democratic consolidation, it is the constitutional rules that will be assessed in the country (Ostrom, 2005). In Africa, increased political participation will have a positive impact on the democratisation process (Green, 2018), as will better institutions (protection of civil liberties or property rights) (Acemoglu et al., 2005). In a developed country context, electoral support will facilitate experimentation and innovation policies (Bernecker and Becker, 2021). In all cases, these instruments are far from uniform, and the persistence of armed conflicts, flawed elections, and coups d'état in Africa demonstrate the difficulty of moving towards this democratic framing (Guèye, 2009).

In framing 2, innovation policies are defended by supporting other forms of policy: social, educational, or environmental (Fernandes et al., 2022). Social policies combat social exclusion (Villalba-Morales et al., 2023). Policies to combat exclusion aim not only to protect society from the collective consequences of poverty but also to realise the fundamental rights of individuals faced with the individual consequences of poverty (Atkinson, 2008). Education policies are also important and are linked to innovation policies. They recognise the multiplicity of formal and informal learning processes that are necessary for the dynamics of innovation. Within formal or informal learning spaces, self-organised collective action (Ostrom, 2014) is promoted as a key feature of these spaces. This may involve setting up research and training institutions specialising in a promising sector, on the one hand, and economic enterprises, on the other, and getting them to interact (Haddad, 2010). It can also involve connecting the institutions that provide knowledge with the requirements of the labour market (Lam and Lundvall, 2006). Finally, within this framing 2, innovation policies offer instruments to facilitate institutional arrangements between a range of actors in society, for example, through academic projects of interest to productive activity, as well as by facilitating training programmes linked to the labour market. They also intervene by facilitating the objectives of sustainability in all sectors of the economy (Chaminade, 2020), as in China by promoting major transformation efforts in rural provinces, linked to technological change, and through a collaborative approach (Turok and Habiyaemye, 2020).

In framing 3, structural change or directionality is advocated. Directionality means promoting innovations that '*contribute to a particular direction of transformative change*' instead '*promoting all innovations as inherently desirable*' (Weber and Rohracher, 2012, p. 1042). A whole new sustainability

Table 2. Relevant instruments to proposed framings

Framing	Relevant instruments
Framing 1 Democratic path innovation	<p><b>Consolidation or democratic commitment: facilitating the development of NIS with reliable institutions and a stable democratic framework</b></p> <p>Right to vote, integrity of elections, freedom of political parties, election of government, access to justice, absence of corruption, civil liberties, effectiveness of Parliament, judiciary independence, media integrity, local democracy, direct democracy</p>
Framing 2 Multi-actor and protean innovation	<p><b>Indirect support for innovation: facilitating adoption and dissemination through cross-functional support</b></p> <p>Sectoral policies linked to innovation: educational (support for universities : universities of excellence, transformative universities, competitiveness clusters, interdisciplinary research centres, research parks, technology transfer, calls for projects, redefining supply), environmental (regulations, standards, R&amp;D programmes in the environmental field, environmental technology transfer programmes, setting up green clusters, training a workforce adapted to environmental professions), social (policies to combat unemployment, social experiments, combating inequalities (benefits), reducing poverty: benefits, social protection, etc.)</p> <p><b>Support for system creation or reorganisation for actors' group: cooperation and coordination between multiple actors</b></p> <p>Research-action, calls for projects, participation by citizens, civil society and users, technology parks, support for entrepreneurship, <i>think tanks</i> groups, agora</p>
Framing 3 Societal and transformative innovation	<p><b>Multidimensional and multi-level interventions:</b> support for multi-level governance: support systems for local public action systems, public-private partnerships, <i>innovation policy mix</i>, support for civil society organisations (users-citizens), spaces for experimentation, reflexivity, societal learning, start-up support programmes, support for transfer-network cluster initiatives</p>

paradigm (Villalba-Morales et al., 2023) is therefore being advocated to ensure that the UN's proposed SDGs are met. The *transformative innovation policy* (TPI) (Schot and Steinmueller, 2018), *system-wide orientation* (Grillitsch et al., 2019), or *radical institutional change* (Hinings et al., 2018) rely on a number of very specific sectors or actors in relation to the new socio-environmental challenges: the social and solidarity economy with social enterprises (Calderini et al., 2023), inclusive intermediaries (Villalba-Morales et al., 2023), spatial planning tools in relation to peri-urbanisation (Marshall and Dolley, 2019), and civil society and users (Schot et al., 2016). A wide range of instruments have been deployed, including spaces for social experimentation, private-public partnerships (Tahi et al., 2022), and recognition of citizenship and civil society organisations as stakeholders in the innovation process. In Sweden, the implementation of a policy mix with the valorisation of non-R&D aspects (such as public procurement as an instrument of innovation policy), coupled with the important role of public universities, shows the importance of the diversity of the actors considered (Fagerberg and Hutschenreiter, 2020). In this respect, the *policy mix* is a perfect compromise between developing disruptive innovation while aiming for broader change in socio-technical systems (Kivimaa and Kern, 2016). However, in developing contexts, such as in Costa Rica, policy mix instruments in TIP can also be compared to a pandemonium policy linked to weak implementation capacity and internal and external inconsistency between sectors and governance levels (Rodrigues-Barillas et al., 2024). Its implementation depends ultimately on the contexts in which it will be applied.

But transformative change involves not only building new, more sustainable production structures but also environments and markets for users, involving them more so that they can find new solutions to help shape investment decisions (Mazzucato, 2016). This is in line with the *mission-oriented innovation policy* (MOIP), which is built around several criteria, including societal relevance, with a search for realistic actions, mobilising collective co-construction on a bottom-up scale (Mazzucato, 2018).

However, the pitfalls of missions that are too top-down or bottom-up must be avoided (Mazzucato, 2018). Close to this proposal, Isaksen et al. (2018) instead propose a set of strategies based on actors, supporting entrepreneurs and innovation projects by companies and other stakeholders.

These two types of policy (TIP and MOIP) are achieved through a change in governance, which can be better appreciated on smaller scales, where, for example, action research groups can be proposed to guide these innovation policies (Karlsen and Larrea, 2021), or through multi-level governance (Calderini et al., 2023). However, this transformative framework does not always call for ‘transforming’ society through institutional change. It also aims to reorientate society around the construction and re-use of existing skills, networks, and institutions (Isaksen et al., 2021). It can thus involve ‘small victories’ that gradually include small changes in the practices and routines of the various actors (Bours et al., 2022).

Table 2 summarises all the tools proposed in relation to the framings. The evolution of innovation policies can take three forms: adding new instruments (superimposing), adding new objectives without changing the instruments (deriving), and adding instruments without changing the reasoning (converting) (Kivimaa and Kern, 2016). In our proposal, the framings can be superimposed, without being substitutable, insofar as framing 1 is a ‘prerequisite’ for innovation. Framings 2 and 3 complement each other. They can also be converted, based on the Kivimaa and Kern (2016) definition, insofar as they are not exhaustive.

## Conclusion

In this article, we aimed to contribute to a better understanding of inclusive innovations in systems approaches to innovation. We began by identifying NIS work in relation to the institutional performance of economies and analysing the links between inclusion and NIS. We then proposed to define an analytical framework to refine our understanding of inclusive innovations within NIS. Specifically, this analytical matrix enabled us to identify three main types of inclusive innovations based on a gradation of inclusion, on several levels. Not only has this typology made it possible to better clarify the inclusive institutions in the NIS work, but it has also drawn on multiple works (Heeks’ inclusion scale, Carayannis’ helices, and Acemoglu’s inclusive institutions) to structure it at a triple level. In this way, it has narrowed the conceptual gap observed in the notion of inclusive innovation and recalled the relevant policy tools for each framing.

The three proposed framings have made it possible to clarify inclusive innovations within systems approaches. However, there is no single best framing to value, except to consider the legitimacy of inclusion, which, in the last framing, is more accomplished than the other two, since it includes a new directionality, a structural and societal change. From an academic point of view, these framings have made it possible to understand the evolution of inclusive approaches in the light of economic development, exclusion, disadvantaged groups, and new societal challenges (Schot and Steinmueller, 2018). They therefore convince us of the need for multidisciplinary, holistic approaches, bringing together sociologists, historians, economists, and legal experts to make the most of heterogeneous forms of knowledge (Pohl et al., 2017). They also take us back to the diversity of capitalisms and the heterogeneity of the contexts visited (Amable, 2001).

In political terms, the idea is to be able to implement inclusive innovation policies according to the forms of inclusive innovation. The aim is to make the institutions involved in systemic dynamics function as real bridges between individuals, which is still a real challenge in the context of developing economies (Arocena and Sutz, 2000). Another objective is to move towards multi-partisanship within these innovation policies. This would involve the recognition of civil society, such as social enterprises (Calderini et al., 2023), as well as the participation of stakeholders linked to demand: consumers or end users (Parks, 2022).

There are also limitations to our study. First, there are methodological limitations. The proposed typology is static by nature. It simplifies the characterisation of the degree of inclusion of NIS by not being able to grasp their internal complexity, evolution, and hybridisation. The inclusive institutions

represented in inclusive innovation are particularly heterogeneous, depending as they do on the development trajectories (historical, social, colonial, and religious) of the territories studied. The typology may make them too rigid or simplistic if we do not consider the importance of the context in question. Finally, from a conceptual point of view, inclusive innovation is only as interesting as the meaning we give it. Not only does it take on many forms and objectives, making it complex to conceptualise, but the way it is perceived undoubtedly varies according to the level of development: positioning oneself at level 1 for certain contexts represents a major public governance effort. This raises issues of power within territories (Tartaruga et al., 2024). The idea is not only to freeze or label an area within an established framing but also to measure its efforts to move towards a more socially virtuous society: in other words, to move gradually from sectoral or local transformations towards more global transformations (Chaminade, 2020). Inclusive innovation also poses a debate on its intrinsic constraints: the co-construction that is possible for a design ‘for all’. This universal design raises the problem of the products it proposes, which are complex, sometimes not widely available and associated with the literature on frugal innovations, but above all, in connection with our proposal, on the possible co-construction, calling for different institutional arrangements and the remobilisation of actors and institutions that are often deficient in developing contexts. In this logic of co-construction, which is often perilous and associated with the path development of the territories, further analytical and explanatory work around inclusive innovation is still needed to inform academic research and the public policies to follow (Pansera and Owens, 2018).

## References

- Acemoglu D., Johnson S. and Robinson J. (2005). Institutions as the fundamental cause of long-run growth. In Aghion P. and Durlauf S. (eds.), *Handbook of Economic Growth*. Amsterdam: Elsevier, pp. 385–463.
- Acemoglu D. and Robinson J. (2012). *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*. New York: Crown Publishing Group.
- Albuquerque E., Suzigan W., Kruss G. and Lee K. (Eds.). (2015). *Developing National Systems of Innovation: University-Industry Interactions in the Global South*. Edward Elgar Publishing
- Altenburg T. and Pegels A. (2012). Sustainability-oriented innovation systems—managing the green transformation. *Innovation and Development* 2(1), 5–22.
- Amable B. (2001). Les systèmes d’innovation. In Mustar P. and Penan H. (eds), *Encyclopédie de l’innovation*. Economica. Paris.
- Andersen A.D. and Johnson B. (2015). Low-carbon development and inclusive innovation systems. *Innovation and Development* 5(2), 279–296.
- Arocena R., Göransson B. and Sutz J. (2018). Academic roles, evaluation, and development. In *Developmental Universities Inclusive Innovation Systems: Alternatives for Knowledge Democratization in the Global South*. London: Palgrave Macmillan, pp. 181–224.
- Arocena R. and Sutz J. (2000). Interactive learning spaces and development policies in Latin America, *DRUID Working Paper* 13/2000.
- Arocena R. and Sutz J. (2003). Understanding underdevelopment today: News perspectives on NSI. In *GLOBAL Network for Economic of Learning, Innovation and Competence Building Systems*, Brésil.
- Atkinson A.B. (2008). European Union social policy in a globalising context. In *Institutions For Social Wellbeing: Alternatives For Europe*. London: Palgrave Macmillan UK, pp. 15–32.
- Baker T. and Nelson R.E. (2005). Creating something from nothing: Resource construction through entrepreneurial bricolage. *Administrative Science Quarterly* 50(3), 329–366.
- Bernecker K. and Becker D. (2021). Beyond self-control: Mechanisms of hedonic goal pursuit and its relevance for wellbeing. *Personality and Social Psychology Bulletin*, 47(4), 627–642.
- Berthoinier-Poncet A. (2013). Gouvernance et innovation dans les clusters à la française: Le rôle stratégique du travail institutionnel. *Revue française de gestion* 3, 119–138.
- Bhatti Y. and Prabhu J. (2019). Frugal innovation and social innovation: Linked paths to achieving inclusion sustainably. In *Handbook of Inclusive Innovation*. Edward Elgar Publishing, pp. 354–376.
- Bouquet B. (2015). L’inclusion: approche socio-sémantique. *Vie sociale* 11(3), 15–25.
- Bours S.A., Wanzenböck I. and Frenken K. (2022). Small wins for grand challenges. A bottom-up governance approach to regional innovation policy. *European Planning Studies* 30(11), 2245–2272.
- Brundenius C. (2017). Challenges of rising inequalities and the quest for inclusive and sustainable development. In *Universities, Inclusive Development and Social Innovation: An International Perspective*, pp. 9–48.

- Cai Q., Ying Y., Liu Y. and Wu W. (2019). Innovating with limited resources: The antecedents and consequences of frugal innovation. *Sustainability* **11**(20), 5789.
- Calderini M., Fia M. and Gerli F. (2023). Organizing for transformative innovation policies: The role of social enterprises. *Theoretical insights and evidence from Italy. Research Policy*, **52**(7), 104818.
- Carayannis E.G., Barth T.D. and Campbell D.F. (2012). The Quintuple Helix innovation model: Global warming as a challenge and driver for innovation. *Journal of Innovation and Entrepreneurship* **1**, 1–12.
- Carayannis E.G. and Campbell D.F. (2009). ‘Mode 3’ and ‘Quadruple Helix’: toward a 21st century fractal innovation ecosystem. *International Journal of Technology Management* **46**(3–4), 201–234.
- Carayannis E.G. and Campbell D.F. (2017). Les systèmes d’innovation de la quadruple et de la quintuple hélice. *Innovations* **54**(3), 173–195.
- Carayannis E.G. and Campbell D.F. (2013). Mode 3 knowledge production in quadruple helix innovation systems: Quintuple Helix and Social Ecology, 1293–1300. In Carayannis E.G. (Editor-in-Chief), Dubina I.N., Seel N., Campbell D.F.J. Uzundis D. (Associate Editors), *Encyclopedia of Creativity, Invention, Innovation and Entrepreneurship*, New York, NY, Springer.
- Carayannis E.G., Campbell D.F. and Rehman S.S. (2016). Mode 3 knowledge production: systems and systems theory, clusters and networks. *Journal of Innovation and Entrepreneurship* **5**, 1–24.
- Casadella V. and Tah S. (2017). Capacités et politiques d’innovation dans les pays moins avancés: enseignements tirés du cas du Sénégal. *Innovations* **2**, 13–39.
- Cassiolato J.E., Matos M.P. and Lastres H.M. (2014). Innovation systems and development. In Currie-Alder B., Kanbur R. and Malone D.M., *International Development: Ideas, Experience and Prospects*. Oxford University Press.
- Chaminade C. (2020). Innovation for what? Unpacking the role of innovation for weak and strong sustainability. *Journal of Sustainability Research* **2**(1), e200007.
- Chaminade C., Lundvall B.A. and Haneef S. (2018). *Advanced Introduction to National Innovation Systems*. Elgar Publishing.
- Chataway J., Hanlin R. and Kaplinsky R. (2014). Inclusive innovation: An architecture for policy development. *Innovation and Development* **4**(1), 33–35.
- Chevalier T. (2022). Comment faire des typologies en politique comparée. *Revue internationale de politique comparée* **29**(4), 105–133.
- Coad A., Nightingale P., Stilgoe J. and Vezzani A. (2022). The dark side of innovation. In *The Dark Side of Innovation*. Routledge, pp. 1–11.
- Costamagna P. and Larrea M. (2018). *Facilitative Actors of Territorial Development. A Social Construction-Based Approach*. Bilbao, Spain: Orkestra–Basque Institute of Competitiveness, Deusto Foundation.
- Cozzens S. and Sutz J. (2012). *Innovation in Informal Settings: A Research Agenda*. IDRC, Ottawa, Canada, 1–53.
- Cummings S., Munthali N. and Shapland P. (2021). A systemic approach to the decolonisation of knowledge. In *The Politics of Knowledge in Inclusive Development and Innovation*, 65–79.
- Diatta J.N.E. and Ndiaye T.M.N. (2022). L’agrobusiness dans la vallée du fleuve Sénégal ou quand le système d’innovation impulse une trajectoire de transformation et de modernisation de l’agriculture. *European Scientific Journal* **18**, 35–50.
- Donni P.L. and Marino M. (2020). The role of collective action for the emergence and consolidation of democracy. *Journal of Institutional Economics* **16**(6), 831–862.
- Etzkowitz H. (2008). Removing barriers: Women in academic science, technology, engineering, and mathematics. *Contemporary Sociology* **37**(1), 24.
- Etzkowitz H. and Leydesdorff L. (1995). The Triple Helix–University–industry–government relations: A laboratory for knowledge based economic development. *EASST Review* **14**(1), 14–19.
- Etzkowitz H. and Leydesdorff L. (2000). The dynamics of innovation: from National Systems and “Mode 2” to a Triple Helix of university–industry–government relations. *Research Policy* **29**(2), 109–123.
- Fagerberg J. and Hutschenreiter G. (2020). Coping with societal challenges: Lessons for innovation policy governance. *Journal of Industry, Competition and Trade* **20**(2), 279–305.
- Fernandes A.J.C., Rodrigues R.G. and Ferreira J.J. (2022). National innovation systems and sustainability: What is the role of the environmental dimension? *Journal of Cleaner Production* **347**, 131164.
- Foster C. and Heeks R. (2013). Innovation and scaling of ICT for the bottom-of-the-pyramid. *Journal of Information Technology*, **28**(4), 296–315.
- Foxley A. and Stallings B. (Eds.). (2016). *Innovation and Inclusion in Latin America: Strategies to avoid the Middle Income Trap*. Springer.
- Franceschini S., Faria L.G. and Jurowetzki R. (2016). Unveiling scientific communities about sustainability and innovation. A bibliometric journey around sustainable terms. *Journal of Cleaner Production* **127**, 72–83.
- George G., Macgahan A.M. and Prabhu J. (2012). Innovation for inclusive growth: towards a theoretical framework and a research agenda. *J. Manag. Stud.* **49**(4), 661–683.
- Green A. (2018). Democracy and institutions in postcolonial Africa. *Journal of Institutional Economics*, **14**(2), 207–231.
- Grillitsch M., Hansen T., Coenen L., Miörner J. and Moodysson J. (2019). Innovation policy for system-wide transformation: the case of strategic innovation programmes (SIPs) in Sweden. *Res. Policy* **48**, 1048–1061.
- Guéye B. (2009). La démocratie en Afrique: succès et résistances. *Pouvoirs* **2**, 5–26.

- Gupta J. and Vegelin C. (2016). Sustainable development goals and inclusive development. *International Environmental Agreements: Politics, Law and Economics* **16**, 433–448.
- Gupta S., Beninger S. and Ganesh J. (2015). A hybrid approach to innovation by social enterprises: lessons from Africa. *Social Enterprise Journal* **11**(1), 89–112.
- Haddad S. (2010). Institutions et politiques publiques de soutien du système d'innovation de Tunisie. État des lieux. *Innovations* **3**, 137–156.
- Harper D.A. (2018). Innovation and institutions from the bottom up: an introduction. *Journal of Institutional Economics* **14**(6), 975–1001.
- Harsh M., Woodson T.S., Cozzens S., Wetmore J.M., Soumonni O. and Cortes R. (2018). The role of emerging technologies in inclusive innovation: the case of nanotechnology in South Africa. *Science and Public Policy* **45**(5), 597–607.
- Heeks R., Amalia M., Kintu R. and Shah N. (2013). Inclusive innovation: definition, conceptualisation and future research priorities. *Development Informatics Working Paper*, 53.
- Heeks R., Foster C. and Nogroho Y. (2014). New models of inclusive innovation for development. *Innovation and Development* **4**(2), 175–185.
- Hinings B., Gegenhuber T. and Greenwood R. (2018). Digital innovation and transformation: An institutional perspective. *Information and Organization* **28**(1), 52–61.
- Hodgson G.M. (2022). Culture and institutions: A review of Joel Mokyr's *A Culture of Growth*. *Journal of Institutional Economics* **18**(1), 159–168.
- Hongoro C., Adonis C., Sobane K., Scerri M., Kameri-Mbote P., Kabira N. and Van Rheede N. (2022). *Innovation for Inclusive Development and Transformation in South Africa* (p. 216). AOSIS.
- Isaksen A., Tödting F. and Trippel M. (2018). Innovation policies for regional structural change: Combining actor-based and system-based strategies. In *New Avenues for Regional Innovation Systems - Theoretical Advances, Empirical Cases and Policy Lessons*. Springer International Publishing, pp. 221–238.
- Isaksen A., Trippel M., Kyllingstad N. and Rypestøl J.O. (2021). Digital transformation of regional industries through asset modification. *Competitiveness Review: An International Business Journal*, **31**(1), 130–144.
- Johnson B. and Andersen A.D. (Eds.) (2012). Learning, Innovation and Inclusive Development: New perspectives on economic development strategy and development aid. Aalborg Universitetsforlag. *Globelics Thematic Report*, Vol. 2011/2012.
- Johnson B. and Lundvall B.A., (2003), National System of Innovation and Economic development, in Muchie M., Gammeltoft P., Lundvall B.A., *Putting Africa First: the making of African Innovation Systems*, Aalborg University Press. Denmark,
- Kalkanci B., Rahmani M. and Toktay L.B. (2019). The role of inclusive innovation in promoting social sustainability. *Production and Operations Management* **28**(12), 2960–2982.
- Karlsen J. and Larrea M. (2021). Action research as a methodology for the construction of territorial leadership. In *Handbook on City and Regional Leadership*. Edward Elgar Publishing, pp. 324–342.
- Kivimaa P. and Kern F. (2016). Creative destruction or mere niche support? Innovation policy mixes for sustainability transitions. *Research Policy* **45**(1), 205–217.
- Lam A. and Lundvall B.A. (2006). The learning organisation and national systems of competence building and innovation. In *How Europe's Economies Learn: Coordinating Competing Models*, pp. 109–139.
- Lipford J. and Yandle B. (1997). Exploring the production of social order. *Constitutional Political Economy* **8**(1), 37–55.
- Lundvall B.A. (1992). *National Innovation System, Toward a Theory of Innovation and Interactive Learning*. Londres: Pinter Publishers.
- Lundvall B.A., Johnson B., Andersen E.S. and Dalum B. (2002). National systems of production, innovation and competence building. *Research Policy* **31**(2), 213–231.
- Macnaghten P. (2020). *The Making of Responsible Innovation*. Cambridge University Press.
- Marshall F. and Dolley J. (2019). Transformative innovation in Peri-Urban Asia. *Research Policy* **48**(4), 983–992.
- Mazzucato M. (2016). From market fixing to market-creating: a new framework for innovation policy. *Industry and Innovation* **23**(2), 140–156.
- Mazzucato M. (2018). Mission-oriented innovation policies: challenges and opportunities. *Industrial and Corporate Change* **27**(5), 803–815.
- Méon P.G. and Sekkat K. (2022). A time to throw stones, a time to reap: how long does it take for democratic transitions to improve institutional outcomes?. *Journal of Institutional Economics*, **18**(3), 429–443.
- Metcalfe J.S. (1995). Technology systems and technology policy in an evolutionary framework. *Cambridge Journal of Economics* **19**(1), 25–46.
- Mortazavi S., Eslami M.H., Hajikhani A. and Väättänen J. (2021). Mapping inclusive innovation: A bibliometric study and literature review. *Journal of Business Research* **122**, 736–750.
- Mosse D. (2010). A relational approach to durable poverty, inequality and power. *The Journal of Development Studies* **46**(7), 1156–1178.
- Nari Kahle H., Dubiel A., Ernst H. and Prabhu J. (2013). The democratizing effects of frugal innovation: Implications for inclusive growth and state-building. *Journal of Indian Business Research* **5**(4), 220–234.

- Nelson R.R. (1993). *National Innovation Systems: A Comparative Analysis*. Oxford: Oxford University Press.
- Nordberg K., Mariussen Å. and Virkkala S. (2020). Community-driven social innovation and quadruple helix coordination in rural development. Case study on LEADER group Aktion Österbotten. *Journal of Rural Studies* **79**, 157–168.
- North D., (1990). *Institutions, Institutional Change and Economic Performance*, Cambridge University Press, Cambridge.
- Nunes S. and Cooke P. (2021). New global tourism innovation in a post-coronavirus era. *European Planning Studies* **29**(1), 1–19.
- Opola F.O., Klerkx L., Leeuwis C.W. and Kilelu C. (2021). The hybridity of inclusive innovation narratives between theory and practice: A framing analysis. *The European Journal of Development Research* **33**(3), 626–648.
- Organisation for Economic Co-operation and Development (OECD) (2012), *Innovation for development: A discussion of the issues and an overview of work of the OECD Directorate for Science, Technology and Industry*.
- Ostrom E. (2005). Doing institutional analysis digging deeper than markets and hierarchies. In *Handbook of New Institutional Economics*. Boston, MA: Springer US, pp. 819–848.
- Ostrom E. (2014). Do institutions for collective action evolve? *Journal of Bioeconomics* **16**, 3–30.
- Pansera M. and Owen R. (2018). Framing inclusive innovation within the discourse of development: Insights from case studies in India. *Research Policy* **47**(1), 23–34.
- Papaioannou T. (2014). How inclusive can innovation and development be in the twenty-first century? *Innovation and Development* **4**(2), 187–202.
- Parks D. (2022). Directionality in transformative innovation policy: Who is giving directions? *Environmental Innovation and Societal Transitions* **43**, 1–13.
- Patiño-Valencia B., Villalba-Morales M.L., Acosta-Amaya M., Villegas-Arboleda C. and Calderón-Sanín E. (2022). Towards the conceptual understanding of social innovation and inclusive innovation: A literature review. *Innovation and Development* **12**(3), 437–458.
- Patnaik J. and Bhowmick B. (2020). Promise of inclusive innovation: A Re-look into the opportunities at the grassroots. *Journal of Cleaner Production* **259**, 121124.
- Perez C. (2015). The new context for industrializing around natural resources: an opportunity for Latin America (and other resource rich countries). *Technology Governance and Economic Dynamics* **62**.
- Phiri M.Z., Molotja N., Makelane H., Kupamupindi T. and Ndinda C. (2015). Inclusive innovation and inequality in South Africa: A case for transformative social policy. *Innovation and Development* **6**(1), 123–139. <https://doi.org/10.1080/2157930X.2015.1047112>
- Piketti T. (2020). *Le capital au XXIème siècle*, points historiques, Paris.
- Pohl C., Truffer B. and Hirsch Hadorn G. (2017). Addressing wicked problems through transdisciplinary research. *The Oxford Handbook of Interdisciplinarity* **2**, 319–331.
- Potts J. (2018). Governing the innovation commons. *Journal of Institutional Economics*, **14**(6), 1025–1047.
- Prabhu J. (2017). Frugal innovation: Doing more with less for more. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences* **375**, (2095), 20160372.
- Primard K. and Soulier E. (2018). Connaissances et technologie dans les communautés d'innovation. *Systèmes d'information et management* **23**(1), 3–9.
- Radjou N. and Prabhu J. (2015). *Frugal Innovation: How to do more with Less*. The Economist.
- Rodrigues-Barilla M., Klerkx L. and Poortvliet P.M. (2024). Transformative policy mix or policy pandemonium? Insights from the climate Smart Agriculture policy mix in Costa Rica. *Environmental Innovation and Societal Transitions* **50**, 100791.
- Schot J., Kanger L. and Verbong G. (2016). The roles of users in shaping transitions to new energy systems. *Nature Energy* **1**(5), 1–7.
- Schot J. and Steinmueller W.E (2018). Three frames for innovation policy: R&D, systems of innovation and transformative change. *Research Policy* **47**(9), 1554–1567.
- Segura-Bonilla O. (2003). Competitiveness, systems of innovation and the learning economy: the forest sector in Costa Rica. *Forest Policy and Economics*, **5**(4), 373–384.
- Sen A. (2000). *Development as Freedom*. New York: Anchor Books.
- Sen A. (2003). *Un nouveau modèle économique, Développement, justice, liberté*. Paris: Odile Jacob.
- Srinivas S. and Sutz J. (2006). Economic development and innovation: Problem-solving in scarcity conditions. *CID Graduate Student and Postdoctoral Fellow Working Paper Series*.
- Stilgoe J., Owen R. and Macnaghten P. (2020). Developing a framework for responsible innovation. In *The Ethics of Nanotechnology, Geoengineering, and Clean Energy*. Routledge, pp. 347–359.
- Tahi S., Khlif W., Belghoul K. and Casadella V. (2022). Public-private innovation networks in services: Revisiting PPPs with servitization. *Technovation* **118**, 102336.
- Tartaruga I., Sperotto F. and Carvalho L. (2024). Addressing inclusion, innovation, and sustainability challenges through the lens of economic geography: Introducing the hierarchical regional innovation system. *Geography and Sustainability* **5**(1), 1–12.
- Turok I. and Habiaryemye A. (2020). Territorial collaboration: a novel way to spread prosperity. *Regional Studies* **54**(12), 1776–1786.



- United Nations Development Program (UNDP) (2020). La prochaine frontière: le développement humain et l'Anthropocène. Rapport sur le développement humain 2020.
- Villalba-Morales M.L., Castalnegra W.R. and Velasquez J.R., (2023). Configuration of inclusive innovation systems: Fonctions, agents and capabilities. *Research Policy* 52, 104796.
- Warren M. (2007). The digital vicious cycle: Links between social disadvantage and digital exclusion in rural areas. *Telecommunications Policy* 31(6–7), 374–388.
- Weber K.M. and Rohracher H. (2012). Legitimizing research, technology and innovation policies for transformative change: Combining insights from innovation systems and multi-level perspective in a comprehensive 'failures' framework. *Research Policy* 41(6), 1037–1047.
- Yin X., Chen J. and Li J. (2022). Rural innovation system: Revitalize the countryside for a sustainable development. *Journal of Rural Studies* 93, 471–478.
- Zhang F. and Wu F. (2019). Rethinking the city and innovation: A political economic view from China's biotech. *Cities* 85, 150–155.

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