Jakub Sukiennik
Wroclaw University of Economics and Business
Faculty of Economics and Finance, Poland
E-mail: jakub.sukiennik@ue.wroc.pl

Amalia Morales-Zumaquero
University of Málaga
Faculty of Economics and Business, Spain
E-mail: amalia@uma.es

Sławomir Czetwertyński
Wroclaw University of Economics and Business
Faculty of Economics and Finance, Poland
E-mail: slawomir.czetwertynski@ue.wroc.pl

GREEN TRANSITION FROM THE PERSPECTIVE OF NEW INSTITUTIONAL ECONOMICS

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Abstract

This paper examines the practical applicability of institutional harmonisation as an analytical tool for identifying the factors shaping the effectiveness of climate policy in the process of the green transition. The study adopts a conceptual and theoretical-analytical approach based on a critical and selective review of the literature and the conceptualisation of mechanisms of institutional influence. Institutional harmonisation is defined as the degree of compatibility among formal institutions, informal institutions, and enforcement mechanisms in relation to a specified public policy objective. The contribution of the paper is integrative: it combines institutional complementarity, the effects of transaction costs, regulatory uncertainty, and behavioural alignment within a single framework, without proposing a separate institutional theory. The analysis indicates that a higher degree of institutional harmonisation may strengthen regulatory effectiveness, whereas conflicts and inconsistencies among institutions weaken the implementation of climate policy. The proposed framework provides a basis for diagnosing institutional barriers to the green transition and for future empirical operationalisation.

Keywords: green transition, institutional harmonisation, climate policy, sustainable development, institutional system

1. INTRODUCTION

The relationship between economic growth and the use of natural resources was already being examined in the late eighteenth century. Malthus's (1798) essay, addressing the issue of the arithmetic growth of production alongside the geometric growth of the human population, is now regarded as the first scientific reflection on the use of natural resources in the process of economic growth. The problem of the efficiency of increasing food production within a given economy was later developed by Ricardo (1929) as the law of diminishing returns. Although this law constitutes a

core element of neoclassical economics, it was not until 1972, with the publication of the report for the Club of Rome on the limits to growth (Meadows et al., 1972), that it became the subject of global debate. This debate highlighted the risks associated with the uncontrolled exploitation of natural resources.

A milestone in this discourse was the report of the Brundtland Commission (1987), which defined sustainable development as a model of resource management that enables the needs of the present generation to be met without compromising the ability of future generations to meet their own needs. While the concept of sustainable development may be regarded as a normative ideal encompassing key dimensions of socio-economic order, it does not in itself constitute a direct programme of reforms aimed at transforming the economy in accordance with its principles. The issues raised in this context remain highly relevant today. Following the Rio+20 Conference (United Nations, 2012), the notion of the *green transition* entered widespread use as an operationalisation of the principles of sustainable development. Increasing pressure arising from climate change, environmental degradation, and the progressive depletion of natural resources has led to actions aimed at transforming national economies towards more sustainable models (Geels, 2018; Rockström et al., 2017; Barbier & Burgess, 2017).

The economic literature emphasises that the process of the green transition cannot rely solely on the development of low-carbon technologies and investments in renewable energy sources. This process requires an appropriate institutional system capable of ensuring the effective implementation of environmental and climate policies grounded in the principles of sustainable development (Scrieciu et al., 2013). From the perspective of decision-makers, formal institutions-such as environmental regulations, economic instruments of climate policy, and emissions trading systems-play a particularly important role, as they serve to internalise the environmental costs of economic activity (Farley et al., 2024). Key initiatives in this area include the United Nations Framework Convention on Climate Change (1992), further developed within the framework of the United Nations Conference on Sustainable Development, the Paris Agreement (2015), as well as regulatory actions undertaken by the European Union, such as the European Green Deal (2019), the European Climate Law (2021), and the Fit for 55 package (2021). These documents collectively form the institutional and regulatory framework of climate policy.

At the same time, research in New Institutional Economics (NIE) indicates that the effectiveness of regulation depends not only on its content but also on its relationship with other institutions that together constitute the institutional system (Sukiennik et al., 2022; Sukiennik et al., 2025). This approach focuses on how formal rules, informal norms, enforcement, and transaction costs jointly shape incentives and observable economic outcomes. From the NIE perspective, institutions represent the fundamental element shaping the behaviour of economic agents and the structure of incentives within the economy (North, 1990). These institutions encompass not only formal legal rules but also informal social norms, cultural values, and patterns of behaviour. The effectiveness of regulatory solutions depends, inter alia, on their complementarity with other institutions (Williamson, 2000). Formal and informal institutions may be mutually reinforcing, leading to institutional strengthening; alternatively, they may enter into conflict or competition, resulting in mutual weakening, the emergence of institutional tensions, and increased transaction costs (Sukiennik & Czetwertyński, 2025). Under conditions of insufficient institutional harmonisation, even well-designed formal institutions-such as environmental regulations-may prove ineffective or difficult to enforce.

In this context, the concept of *institutional harmonisation* becomes particularly relevant. It refers to a state of the institutional system in which the prevailing "rules of the game" are harmonised to a lesser extent (higher transaction costs, greater uncertainty, lower social acceptance) or to a greater extent (lower transaction costs, reduced uncertainty, higher social acceptance). From the perspective of the green transition, this issue is of particular importance. The introduction of new environmental regulations, climate policy instruments, or energy transition strategies aimed at

achieving the objectives of sustainable development requires changes within the institutional system, involving the adaptation of its existing structures to new regulatory frameworks. This process may encounter numerous barriers arising from conflicts of interest among different social groups, historically shaped institutional structures, or the phenomenon of path dependence (David, 2007). As a result, the practical implementation of solutions consistent with the principles of sustainable development may be hindered by a lack of harmonisation.

Despite the growing interest in the green transition in the economic literature, this process is relatively rarely analysed in the context of institutional harmonisation, which constitutes a research gap that this paper seeks to address. Accordingly, the aim of this paper is to demonstrate the heuristic and practical applicability of the concept of institutional harmonisation to enhancing the effectiveness of the green transition. The paper contributes by further developing institutional harmonisation as an analytical tool and by outlining its implications for the design and implementation of climate policies.

2. METHODOLOGY

This paper is conceptual and theoretical-analytical in nature and is grounded in research methods characteristic of the New Institutional Economics (NIE) approach. In this paper, "NIE methods" are understood as theory-driven conceptual analysis focused on institutions (formal and informal rules), enforcement, and transaction costs, combined with a critical and selective review of the relevant literature**.** Sources were identified through targeted keyword searches and backward reference tracing. The selection process prioritised three categories of sources: (1) foundational works in New Institutional Economics concerning institutions, transaction costs, and institutional change; (2) peer-reviewed studies addressing institutional complementarity, policy coherence, sustainability transitions, and climate governance; and (3) official international, European Union, and national policy documents used to illustrate different implementation settings. The search terms included combinations of "institutional harmonisation" or "institutional harmonisation", "institutional complementarity", "formal and informal institutions", "transaction costs", "green transition", "climate governance", and "policy coherence". Sources were included when they contributed directly to the definition of the proposed framework, the identification of its underlying mechanisms, or its application to public policy. Studies without a relevant institutional dimension were excluded. The selected literature was analysed thematically, with particular attention to formal and informal institutions, enforcement mechanisms, transaction costs, regulatory uncertainty, and behavioural alignment. The conceptual component is based on a method of critical literature review within the field of NIE, which enables a systematic presentation of the concept of institutional harmonisation. From the perspective of the stated research objective, this approach is necessary, as the concept requires further specification and adaptation to the selected analytical domain. This follows from the diversity of institutional forms.

Given that the focus of the paper is on the heuristic and practical applicability of the concept of institutional harmonisation in the process of the green transition, it is necessary not only to identify those factors that are relevant to this concept from the perspective of the transition, but also to undertake a theoretical attempt at its implementation. To this end, the paper develops theoretical and analytical considerations concerning the green transition process to date, combined with a set of more specific guidelines derived from the proposed concept of institutional harmonisation, which are necessary for its effective operation.

The paper contributes to the literature by proposing an analytical framework of institutional harmonisation that makes it possible to explain the mechanisms through which institutions affect the effectiveness of climate policies. Existing studies have largely focused on the design of climate policy instruments and on the macroeconomic effects of decarbonisation. Considerably less attention has been paid to the mechanisms through which formal environmental regulations

translate into economic practices and the day-to-day decision-making of market actors. The proposed approach addresses this gap by integrating the perspective of New Institutional Economics with the analysis of public policy effectiveness. The illustrative country cases presented in Section 6 serve as analytical exemplifications rather than empirical case studies and are intended to support the conceptual argument rather than provide empirical validation.

3. LIMITATIONS

Institutional harmonisation, which constitutes the central analytical construct of this paper, is inherently theoretical in nature. Its direct empirical measurement is limited; however, its indirect operationalisation in future empirical research is feasible. One approach that enables the analysis of the level of institutional harmonisation is comparative legal analysis, which allows for the identification of harmonisation between regulatory solutions and their implementation across different institutional systems.

A second possible research approach involves the use of proxy indicators reflecting the quality of institutions and the level of transaction costs in the economy. In this context, the level of institutional harmonisation may be analysed indirectly through indicators such as regulatory transparency, institutional stability, the effectiveness of law enforcement, and the predictability of public authorities' actions. In addition, future empirical work could approximate transaction-cost pressures through proxies related to administrative burden and compliance costs, regulatory uncertainty through proxies capturing the stability and reversals of policy frameworks, and behavioural alignment through survey-based or behavioural proxies of social acceptance and norm compliance.

In sum, the present analysis is conceptual and analytical in nature. It does not account for dynamic phenomena or detailed local conditions in a systematic or model-based way-such as political resistance or the specific adaptation costs faced by national institutional systems-which limits the possibility of quantitative verification. The study also does not consider economic conditions or cultural differences, which constitutes an important limitation with regard to the generalisability of the findings.

4. CONCEPTUALISATION OF INSTITUTIONAL HARMONISATION

Demonstrating the heuristic potential of the concept of institutional harmonisation, regardless of its field of application, requires the specification of a detailed theoretical framework. This follows from the fact that, within the perspective of New Institutional Economics (NIE), the scope of analysis extends beyond the narrow boundaries of mainstream economics. Consequently, factors that are abstracted from in the neoclassical framework are treated as having a significant impact. Furubotn and Richter (2005, pp. 505–506) emphasise that NIE builds upon the foundations of neoclassical economics by incorporating an institutional dimension, which is inherently multidimensional and not limited to a single type of institution.

The literature provides numerous definitions and interpretations of institutions, and no single definition is universally accepted in economic research (Gräbner & Ghorbani, 2019). Therefore, before institutional harmonisation can be conceptualised, it is necessary to specify how the principal categories of institutions are understood in this paper. The following discussion first defines formal institutions, then informal institutions, and finally the relationships among them that constitute the basis of institutional harmonisation.

4.1. Formal Institutions

In this paper, institutions are understood following North (1990), who defines them as the "rules of the game" in society that structure interactions among economic agents and reduce uncertainty in social relations. Institutions thus shape incentives, transaction costs, and the functioning of economic processes. North's definition is adopted because it focuses on the role of rules in structuring behaviour and enables a clear distinction between institutions and organisations. Institutions constitute the rules governing interactions, whereas organisations, such as ministries, regulatory agencies, courts, firms, and interest groups, are actors operating within those rules (North, 1990). Formal institutions are understood as codified and officially recognised rules, including constitutions, statutes, regulations, administrative procedures, property-rights arrangements, contractual rules, and formally adopted public-policy instruments. Their defining feature is that they are explicitly formulated and supported by legally authorised enforcement arrangements.

Williamson (2000) highlights the multi-level nature of the institutional order, encompassing both fundamental rules governing economic relations and more specific regulatory arrangements. In the context of the green transition, formal institutions include climate legislation, emission standards, carbon-pricing instruments, renewable-energy regulations, and administrative procedures related to environmental policy. Enforcement mechanisms are treated as analytically distinguishable from formal rules themselves. The adoption of a regulation does not automatically ensure its effective implementation, which also depends on monitoring, sanctioning, dispute-resolution, and administrative capacity. This distinction is particularly relevant to climate policy, where ambitious legal objectives may coexist with weak or inconsistent enforcement.

4.2. Informal Institutions

Ostrom (2005) emphasises that institutions include not only formal legal rules but also informal social norms shaping the behaviour of economic actors. In this paper, informal institutions are understood as socially shared and relatively durable norms, conventions, values, and expectations that are not primarily established or enforced through formal legislative procedures. This definition is adopted because it captures collectively shared rules that shape behaviour without formal codification, which is essential for analysing social acceptance and compliance in the green transition.

Informal institutions should not be equated with individual preferences or isolated attitudes. They emerge when particular expectations and patterns of behaviour become collectively recognised and repeatedly reproduced. They may include norms of cooperation, attitudes towards compliance, trust in public authorities, perceptions of fairness, and established conventions of economic conduct.

Informal institutions generally evolve more slowly than formal institutions (Williamson, 2000). Consequently, new formal rules may be introduced before corresponding social norms and behavioural expectations have adjusted. Such inconsistencies may result in limited acceptance, resistance, or attempts to circumvent regulation.

In the context of the green transition, relevant informal institutions include attitudes towards decarbonisation, social acceptance of environmental taxation, norms concerning energy consumption, trust in regulatory authorities, and perceptions of how transition costs should be distributed. Informal institutions may reinforce formal regulations when climate-policy objectives are perceived as legitimate or weaken them when the objectives conflict with established social expectations.

4.3. Institutional Interactions and the Concept of Institutional Harmonisation

Another important epistemological distinction between NIE and neoclassical economics is the explicit departure from methods based exclusively on the isolation of economic phenomena (Mäki, 1992). Explaining economic phenomena using the model of the so-called Robinson Crusoe economy (Robbins, 1932) allows for a simplification of the complex reality of economic life. This approach has clear analytical advantages and enables the formulation of general economic relationships (Lange, 1986), which underpin neoclassical economics.

However, empirical research on real-world phenomena requires a process of factualisation, implying a shift away from isolation towards a more holistic approach. Only within such a framework can emergent phenomena arising from the simultaneous interaction of numerous individual relationships be properly observed. While the microeconomic perspective in neoclassical economics tends to downplay the possibility of emergent phenomena due to methodological individualism (Blaug, 1992), the concept of institutional harmonisation necessitates a systemic perspective.

The distinction between formal and informal institutions introduced above should therefore not imply that these categories operate independently. Institutions function as components of a broader institutional system in which the consequences of an individual rule depend on its relationships with other rules, norms, organisations, and enforcement mechanisms. A formal regulation may produce different outcomes depending on whether it is compatible with other regulations, supported by administrative capacity, and reinforced by informal norms. The relationships between institutions - such as conflict or competition versus coherence and mutual reinforcement - constitute the starting point for analysing institutional harmonisation. This approach is based on examining a broader set of interdependencies and provides a more accurate representation of reality. Institutions do not operate in isolation but form complex networks of relationships within the institutional system. These relationships may take several forms. Institutional complementarity occurs when the operation of one institution increases the effectiveness of another. Institutional reinforcement occurs when formal and informal rules generate convergent incentives and expectations. Institutional conflict arises when compliance with one institution obstructs or increases the cost of compliance with another. Institutional competition may occur when different institutions provide contradictory behavioural incentives or alternative rules for addressing the same situation.

The literature emphasises that the relationships within the institutional system are important for the efficiency of economic processes (North, 1990; Sukiennik et al., 2017; Sukiennik et al., 2025). The importance of institutional interactions is particularly evident in areas of public policy requiring coordination across multiple sectors, including the energy transition and climate policy. In such cases, actions undertaken within different sectoral policies should be coherent and mutually compatible (Braams et al., 2024). Research on institutional relationships must also account for the influence of existing institutions, which may modify both the strength and direction of the intended effects of newly introduced or reformed rules. It may therefore be argued that one of the mechanisms supporting the proper functioning of the institutional system is harmonisation, understood as a process through which institutions complement and reinforce one another, thereby creating a coherent system of incentives for economic actors (Spijkerboer et al., 2019).

On this basis, institutional harmonisation is defined in this paper as the degree of compatibility among formal institutions, informal institutions, and enforcement mechanisms in relation to a specified public-policy objective. It represents a relational property of the institutional system rather than a separate category of institution. The proposed concept builds on, rather than replaces, established categories of New Institutional Economics. Its conceptual contribution lies in integrating institutional complementarity, enforcement mechanisms, transaction-cost effects, regulatory uncertainty, and behavioural alignment within a single objective-specific framework.

Unlike approaches focused primarily on individual institutions or particular policy instruments, institutional harmonisation directs attention to the compatibility of the institutional system as a whole in relation to a specified public-policy objective.

A higher degree of institutional harmonisation exists when formal rules, informal norms, and enforcement mechanisms are mutually compatible and reinforce one another in supporting the attainment of a specified objective. A lower degree of harmonisation exists when institutions conflict, compete, or create contradictory incentives. Institutional harmonisation should not be equated with institutional uniformity. Institutions do not have to be identical, centralised, or fully standardised in order to be harmonised. Institutional diversity may remain compatible with harmonisation, provided that the relevant institutions do not undermine one another and are capable of jointly supporting the specified policy objective. Similarly, institutional harmonisation is broader than the legal approximation of national regulations, since formally similar rules may operate differently depending on enforcement capacity and informal institutional conditions.

The concept is also objective-specific. An institutional system cannot be described as harmonised in the abstract, independently of the outcome being considered. The same configuration of institutions may support one public-policy objective while obstructing another (Zybała, 2024). For example, regulations facilitating investment in renewable energy may remain inconsistent with spatial-planning procedures, fiscal incentives, local norms, or existing energy-market arrangements. The assessment of harmonisation therefore requires the prior specification of the policy objective in relation to which institutional compatibility is being evaluated. In the present paper, this objective is the effective implementation of the green transition. Institutional harmonisation consequently concerns the extent to which formal climate regulations, informal norms, enforcement mechanisms, and related public-policy instruments jointly support the transformation towards a low-carbon and environmentally sustainable economy.

4.4. Analytical Framework and Operational Implications

On this basis, an analytical framework is proposed that provides a basis for a systematic assessment of the impact of institutional structure on the effectiveness of climate policies. The framework is based on the assumption that the level of institutional harmonisation constitutes a key mediating variable between the structure of the institutional system and the effectiveness of public policies. This relationship operates through three main mechanisms: (1) the reduction of transaction costs, resulting from decreased adaptation barriers and greater regulatory coherence; (2) the reduction of regulatory uncertainty, associated with the stability and predictability of the institutional system; and (3) the increased alignment of economic agents' behaviour with public policy objectives, resulting from the internalisation of norms and values that support formal regulations. For analytical clarity, this relationship may be summarised as a simplified conceptual pathway. However, such a representation should be understood as a heuristic device rather than an empirically verified model. The present study does not provide a quantitative verification of this relationship; instead, it identifies a set of theoretically grounded mechanisms through which institutional harmonisation may influence climate policy effectiveness. Possible operational proxies and empirical avenues for each mechanism are outlined in Section 3 (Limitations), rather than tested in the present paper. In this context, higher levels of institutional harmonisation may be expected to reduce transaction costs, decrease regulatory uncertainty, and strengthen behavioural alignment, thereby contributing to the effectiveness of actions aimed at sustainable development. This conceptual structure may serve as a basis for future empirical operationalisation.

5. THE PROCESS OF INSTITUTIONAL HARMONISATION AND THE GREEN TRANSITION

While an analytical tool based on the concept of institutional harmonisation enables the identification of the nature of interactions between institutions, the process of institutional harmonisation itself is a normatively oriented activity aimed at achieving desired outcomes. It consists in creating a coherent and mutually reinforcing system that supports the attainment of normatively defined objectives. In the context of the green transition, this refers to the implementation of climate policy goals and involves ensuring that environmental regulations, economic instruments, and other public policy mechanisms operate in a coordinated and complementary manner.

The establishment of coherent institutional frameworks-i.e. achieving the highest possible degree of institutional harmonisation-is essential, as the transition towards a low-carbon economy requires convergent actions across multiple sectors. The purpose of this section is to discuss the key mechanisms of the harmonisation process and their theoretical impact on transaction costs, uncertainty, and the effectiveness of climate policy implementation. This, however, requires defining criteria for determining when institutions can be considered harmonised.

First, institutional harmonisation occurs when formal regulations are socially legitimised, meaning that their objectives and underlying assumptions are consistent with the dominant values within society. In such a situation, compliance with regulations is perceived as socially desirable, and the costs associated with enforcement are relatively low. Informal institutions thus support, rather than undermine, regulatory objectives. Second, institutional harmonisation is reflected in the regulatory coherence of the institutional system, i.e. the consistency of regulations with one another. In such cases, there is no need for transitional regulations, frequent amendments, or ad hoc legal interpretations. Third, institutional harmonisation implies a high degree of alignment between the behaviour of economic agents and regulatory requirements, resulting from the complementarity of formal and informal institutions and the overall coherence of the institutional system.

A key mechanism of harmonisation in the green transition process is ensuring consistency across different areas of public policy. For example, policies that promote renewable energy sources should be aligned with infrastructure and spatial planning policies in order to avoid conflicts (Spijkerboer et al., 2019). Cross-sectoral coherence prevents situations in which support for green technologies is offset by misaligned regulations in other areas, such as subsidies for fossil fuels. The literature emphasises that climate policy requires the elimination of internal inconsistencies within public policies (Braams et al., 2024). Good practices include the establishment of common climate targets and coordination mechanisms within government structures, such as inter-ministerial committees for the transition, which facilitate policy synchronisation.

Harmonisation also requires effective implementation and enforcement mechanisms. These include, inter alia, strong supervisory institutions and sanctioning mechanisms, emissions reporting systems, and regular policy reviews. For example, the EU Emissions Trading System (EU ETS) provides a common carbon price signal across the European Union, supported by monitoring and verification mechanisms such as emissions audits applied in all Member States. Effective enforcement enhances compliance certainty, which in turn strengthens trust. The literature highlights that clear regulatory frameworks and consistent policy implementation mechanisms reduce opportunities for regulatory evasion and increase the effectiveness of climate policy (Oberthür & Dupont, 2021).

Mechanisms of harmonisation within Member States also include economic instruments such as carbon taxes, emissions trading systems, and climate funds. These instruments generate coherent price signals across the economy. For instance, the EU ETS, together with its planned extension through the Carbon Border Adjustment Mechanism (CBAM, 2023), represents an attempt to harmonise competitive conditions and carbon pricing between domestic and international markets. Research indicates that economic instruments, such as uniform carbon pricing

mechanisms, reduce regulatory barriers to investment in low-carbon technologies (Aghion et al., 2016).

Another element of harmonisation is financial coordination, which involves the creation of common funds and support instruments that finance the energy transition and improve access to capital (Campiglio et al., 2018). Research on the financial sector in Central and Eastern European countries indicates that financial conditions play an important role in industrialisation and manufacturing development (Svilokos et al., 2019). In the context of the green transition, this finding highlights the importance of aligning financial-sector conditions and capital-allocation mechanisms with climate-policy objectives. Examples include the European Fund for Strategic Investments (EFSI) and EU programmes financing climate-related projects. The scale and conditions of financing must be aligned with climate objectives in order to avoid gaps between policy declarations and access to funding. In practice, this entails, for example, prioritising low-carbon projects in national financing programmes and incorporating green criteria into fiscal policy. Such mechanisms ensure that investors perceive green projects as more stable, thereby reducing the cost of capital (Bolton & Kacperczyk, 2021).

A further component of institutional harmonisation is the development of social acceptance for the transition. This includes public consultations, information campaigns, environmental education, and transparent communication of climate policies. When society understands and accepts policy objectives, informal institutions reinforce formal rules. An example is social dialogue conducted prior to the implementation of major energy reforms, which increases trust and readiness for change. The literature indicates that harmonisation between formal regulations and prevailing social norms strengthens policy outcomes, whereas inconsistencies between them increase resistance and implementation costs (Geels, 2018).

In summary, from a theoretical perspective, achieving institutional harmonisation should directly enhance the effectiveness of the green transition. Coherent institutional frameworks reduce transaction costs, such as the time and resources required for economic agents to adapt to new rules. When regulations are consistent and predictable at both international and national levels, firms can plan investments without concern that unexpected regulatory changes will undermine their efforts. Empirical studies show that the stability of climate regulations and their coordination across sectors reduce investment risk (IEA, 2023). Conversely, a lack of harmonisation-such as frequent changes in carbon tax rates or legal ambiguity-leads to higher transaction costs, as firms must continuously adjust their strategies (Popp, 2019).

6. IMPLEMENTATION OF INSTITUTIONAL HARMONISATION

6.1. International Climate Governance Frameworks

There are numerous examples of how global and European Union (EU) solutions implement the principles of sustainable development. For instance, the Paris Agreement (UNFCCC, 2015) established a common platform in which participating entities committed to limiting global warming and to conducting regular reviews of progress. Although each country retains its own commitments, the system of periodic reporting supports the coherence of actions.

At the EU level, institutional harmonisation is promoted by the European Green Deal (European Commission, 2019), which sets a common objective of achieving climate neutrality by 2050. Similarly, the European Climate Law (European Parliament & Council, 2021) legally binds all Member States to this objective. The "Fit for 55" legislative package (2021) constitutes an example of coordinated regulation: it includes, inter alia, the tightening of the emissions cap within the EU Emissions Trading System (EU ETS), the extension of emissions trading to new sectors, and the introduction of the Carbon Border Adjustment Mechanism (CBAM, 2023), which aims to harmonise carbon pricing rules for imports. Collectively, these instruments create a common framework of

action: firms operating across different EU countries are required to comply with the same rules, thereby reducing uncertainty and ensuring a level playing field. The literature recognises that such instruments contribute to improving the internal coherence of EU climate policy (Braams et al., 2024; Spijkerboer et al., 2019).

6.2. National Climate Governance Frameworks

At the national level, an important dimension of institutional harmonisation is the alignment of national regulations with institutional frameworks developed at the international and EU levels. For clarity, the selected national examples discussed below are synthesised in Table 1, which summarises the main regulatory instruments, their links to EU climate policy, and the institutional features highlighted in the present analysis.

Table 1 Selected examples of national implementation of EU climate policy in the context of institutional harmonisation

Country	Link to EU / international climate policy	Key institutional aspect	Main implementation characteristics discussed in the paper
Poland	Alignment with EU climate objectives and directives	Harmonisation through the implementation of EU policy instruments	Transposition of EU directives; strategic anchoring in PEP2040; gradual implementation and reported political disputes
Spain	Alignment with EU climate policy and the Paris Agreement	Coherent regulatory framework and strengthened institutional coordination	Comprehensive legal framework setting binding targets and governance mechanisms
Croatia	Alignment with the EU acquis communautaire	Institutional adjustment through EU integration	Regulatory alignment during accession; adoption of a national low-carbon development strategy
Czech Republic	Alignment with the EU climate policy framework	Partial harmonisation within the energy sector	Slower pace of transition associated with the role of conventional energy sectors and ongoing debates on decarbonisation pace

Source: own elaboration based on Gobierno de España (2021), European Commission (2019, 2020, 2022), IEA (2021), Republic of Croatia (2020), and Ministry of Climate and Environment (2021).

This alignment determines the extent to which common climate policy objectives are effectively translated into domestic legal and institutional systems. This process involves the implementation of common climate policy objectives and instruments within national legal systems (Jordan & Adelle, 2012). In the case of Poland, such harmonisation is evident in the transposition of EU climate and energy directives into domestic law. Examples include the adaptation of regulations concerning renewable energy sources and the energy system to the requirements of Directive (EU) 2018/2001 (RED II) and the "Fit for 55" package. The strategic document *Energy Policy of Poland until 2040* (PEP2040) directly refers to the climate objectives of the European Union (Ministry of Climate and Environment, 2021), constituting a clear example of harmonisation.

In Spain, the harmonisation of national law with EU climate policy has been strengthened through the adoption of the Climate Change and Energy Transition Act (Ley 7/2021). This act establishes a comprehensive regulatory framework for the green transition, including legally binding national targets for greenhouse gas emission reduction, renewable energy development, and energy efficiency improvements, aligned with EU climate objectives and commitments under the Paris Agreement (Gobierno de España, 2021; Galera et al., 2023). In particular, the law sets a target of reducing greenhouse gas emissions by at least 23% by 2030 compared to 1990 levels, increasing the share of renewable energy in final energy consumption to 42%, and achieving a 74% share of

renewable energy in electricity generation. It also includes measures aimed at improving energy efficiency and achieving climate neutrality before 2050 (Gobierno de España, 2021). Beyond quantitative targets, the act introduces a multidimensional policy framework covering key sectors of the economy. It promotes renewable energy deployment and energy efficiency, regulates the transition away from fossil fuels, and supports the development of alternative energy sources. Furthermore, it includes provisions related to sustainable mobility, climate change adaptation, and the establishment of a just transition mechanism aimed at mitigating social and regional disparities. The law also strengthens institutional coordination, financial alignment with climate objectives, and the role of governance mechanisms, thereby enhancing the overall coherence of the institutional system (Galera et al., 2023).

In Croatia, institutional harmonisation was particularly evident during the process of EU integration and following accession. Croatia progressively aligned its regulations on environmental protection, energy efficiency, and emissions reduction with the EU acquis communautaire in the field of climate policy (European Commission, 2019). An example is the adoption of the national low-carbon development strategy (Republic of Croatia, 2020).

At the same time, the experience of some Member States indicates that a lack of full institutional harmonisation-manifested, for example, in delays in implementing climate policy-may lead to institutional tensions and increased costs of the energy transition. Such situations can be observed in countries of Central and Eastern Europe, where the transition has required profound restructuring of fossil fuel-based sectors. In Poland, a high share of coal in the energy mix persisted for many years, and the implementation of certain EU climate policy instruments was gradual and often subject to political disputes (European Commission, 2020). Similar tensions have also been observed in the Czech Republic, where the energy transition progressed more slowly than in many Western European countries due to the importance of the conventional energy sector and ongoing debates regarding the pace of decarbonisation (IEA, 2021; European Commission, 2022).

From a comparative perspective, EU Member States appear to exhibit varying levels of institutional harmonisation in the implementation of climate policy. Countries characterised by higher regulatory coherence, long-term policy stability, and stronger alignment between formal regulations and societal norms may face fewer institutional barriers in implementation, whereas countries experiencing greater institutional fragmentation may face higher coordination costs during the transition. In contrast, several Central and Eastern European countries, including Poland and the Czech Republic, tend to face greater challenges related to institutional fragmentation and reliance on fossil fuel-based energy systems, which may slow down the implementation of EU climate objectives. These differences suggest that the effectiveness of the green transition is not determined solely by the adoption of common EU-level regulations, but also by the extent to which national institutional systems are internally coherent and aligned with these frameworks.

7. DISCUSSION

The analysis indicates that the degree of institutional harmonisation - in the context of achieving the objectives of the green transition in the European Union-may be interpreted as a form of integration or, where harmonisation is low, fragmentation of the institutional system. The level of harmonisation thus translates into transaction costs at the scale of the EU internal market, the effectiveness of the common climate policy, and the degree of regulatory uncertainty. Moreover, the analysis leads to several key conclusions.

First, differences in the pace of regulatory implementation, non-uniform administrative standards, and uncertainty regarding the future direction of climate policy hinder investment planning and increase regulatory uncertainty. As a result, firms operating across different Member States are required to adjust their investment strategies to heterogeneous regulatory environments, which reduces the efficiency of the internal market and slows down the green transition process.

Recent DIEM research identifies a non-linear relationship between economic complexity and carbon dioxide emissions across European Union Member States, indicating that common environmental objectives operate within heterogeneous productive structures (Saucedo-Acosta & Carrillo-Ovando, 2026). From the perspective developed in this paper, this heterogeneity reinforces the need to align EU-level climate objectives with national institutional and productive conditions without weakening the coherence of the common policy framework.

Second, climate policies should be designed and implemented in a comprehensive rather than sectoral manner - this requires institutional coordination both across government departments and across levels of governance. Third, regulatory stability is crucial: governments should avoid frequent and abrupt legal changes that increase transaction costs. Fourth, it is advisable to invest in mechanisms that mitigate institutional conflicts, particularly between formal and informal institutions. This may include public consultations and educational campaigns aimed at ensuring that social norms support newly introduced regulations. Fifth, strengthening monitoring and enforcement institutions is recommended - for example, through independent environmental audits and sanctions for non-compliance with emission targets - which enhances policy credibility. Economic instruments, such as financial support for green technologies, should be coherent and predictable.

Institutional harmonisation is therefore of fundamental importance for the success of the green transition. In light of the analysis, the key mechanisms of harmonisation - namely regulatory coherence across different areas of public policy, effective enforcement, economic instruments, and mechanisms fostering social acceptance - operate in a complementary and mutually reinforcing manner.

8. CONCLUSION

The aim of this paper was to demonstrate the heuristic and practical applicability of the concept of institutional harmonisation to enhancing the effectiveness of the green transition process. The findings suggest that this concept offers a range of potential applications that are broadly useful for the design of public policy at various levels of governance, from the national to the global level.

From a theoretical perspective, institutional harmonisation highlights the need for a holistic approach to the empirical analysis of institutions within the broader context of the institutional system. In terms of its practical applicability, the concept developed in this paper identifies mechanisms that contribute to reducing transaction costs and increasing trust, thereby enhancing the effectiveness of implemented institutional solutions. In practice, institutional harmonisation fosters the creation of a more predictable regulatory environment, while also reducing regulatory uncertainty and transaction costs associated with the transition towards a low-carbon economy.

Future research on institutional harmonisation may focus on case study analyses- for example, comparing countries characterised by a high degree of institutional harmonisation with those in which the harmonisation process has been unsuccessful. It is also necessary to examine how changing political conditions affect the stability and durability of harmonised institutional systems. Despite these limitations, it can be reasonably concluded that the concept of institutional harmonisation possesses significant heuristic and practical potential, warranting further exploration in future research.

In summary, the analysis suggests that efforts aimed at achieving institutional harmonisation constitute an important factor that may increase the likelihood of a successful green transition.

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