Article

A View on Incumbent Peripheral Actors in Sustainability Transitions

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ABSTRACT

This article explores the role of incumbent peripheral actors (IPAs) in sustainability transitions. Unlike incumbent core actors, who are directly tied to the primary functions of a regime, IPAs are incumbent core actors in adjacent regimes, using their power and resources to systemically influence regime changes. IPAs, such as banks, universities and governmental agencies, play major roles by altering institutions within interconnected systems. We classify regime actors along dimensions of incumbency and their proximity to core activities, offering a nuanced understanding of their contributions and a definition of an IPA. This classification highlights the evolving roles of IPAs during transitions and their capacity to drive institutional change. While we assert that a typology of IPAs' characteristics remains elusive, we propose dimensions to characterize their contributions and roles in sustainability transitions. Finally, we develop a research agenda to explore the roles of IPAs, their evolution and their impact on institutional change.

KEYWORDS: sustainability; transitions; incumbent peripheral actor; pluralizing; roles; research agenda

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ABBREVIATIONS

ICA, incumbent core actor; IPA, incumbent peripheral actor

INTRODUCTION

In the context of sustainability transitions, it is noteworthy that actors who are not directly involved in the core of the transition can, nevertheless, wield significant influence and act as pivotal agents. For instance, municipalities in Finland wield considerable influence through land-use planning, a pivotal instrument in the energy transition that guides the development of the built environment [1]. Similarly, the private pension sector, in conjunction with financial institutions such as banks, plays a key role in steering investments towards sustainability transitions across multiple sectors in the Netherlands [2]. These actors

are pivotal in transitions due to their distinct capabilities and resources. This raises questions, including how these actors can be distinguished from other actors, how they can contribute to sustainability transitions and what role they can play in these transitions.

Transition scholars have traditionally focused on new entrants [3], who contribute to transitions by innovating in niches [4,5], after which existing regimes are entered and challenged. A regime, from a multi-level perspective, can be defined as "the locus of established practices and associated rules that enable and constrain incumbent actors in relation to existing systems" [6]. However, incumbent actors in transitions are receiving increasing attention [7–9]. This mainly focuses on actors directly involved in the core of the transition, for instance incumbent companies "being profit-seeking actors that are 'established' and 'positioned' in markets" [9]. Bosman [10] refers to these actors as "incumbents on the supply side". The focus in previous studies on these incumbent actors is comprehensible because they have a lot to lose and gain during transitions, and their interventions are often necessary to enable a sustainability transition [11–13].

However, Johnstone et al. [14] suggest that organisations other than companies can also be incumbents and define incumbents as those "that often have vested interests in maintaining the status quo rather than enabling transitions and will often act to strategically protect their privileged position". Moreover, Bosman [10] also distinguishes "peripheral incumbents", a type of incumbent he refers to as organizations involved in finance, distribution, regulation and facilitation in a regime. Not being incumbents directly involved in the core of the transition they have resources such as "power, finance, skills, influence" [15], which they can use both to play a role in defending a regime and supporting a regime change. They include, for example, financial institutions and their ability to direct transitions through investments or local authorities appointed to initiate and direct transitions on a regional level. They can also include governmental organizations. For instance, in the Netherlands, municipalities are designated by the national government as directors for a district-oriented approach to the energy transition in the built environment [16]. Hence, peripheral incumbents' influence and power can also be decisive in transitions.

This decisiveness of peripheral incumbents often contrasts with the lock-in role of incumbents directly involved in the core of the transition. Although recent studies show that these core incumbents do contribute to transitions [11–13], the greatest resistance often arises within their ranks [13]. After all, they have the greatest stakes in preserving the current regime due to vested interests, while the changes required to realize the adoption of new alternatives by the core incumbents in a regime are not possible without peripheral incumbents, such as financial institutions, knowledge organizations, regulators and legislators. Consequently,

peripheral incumbents can change institutions so that “the new” becomes more attractive. Hence, peripheral incumbents are also pivotal in transitions to facilitate the alignment of opposing core incumbents. It is therefore vital to focus on peripheral incumbents in relation to core incumbents and to gain a deeper insight into the role of these actors in transitions.

Our contribution in this article is three-fold. First, we explore the different types of incumbent actors contributing to sustainability transitions. We propose a categorization of these incumbent actors and expand existing studies by integrating different types of incumbent actors, their positions in and contributions to sustainability transitions. We respond to the viewpoint of Turnheim and Sovacool [15] that encourages pluralizing incumbencies in sustainability transitions. Furthermore, we explore the roles that peripheral incumbents take up when realizing their intended contributions in sustainability transitions. Finally, we offer guidance for further research with the objective of achieving a more profound comprehension of how peripheral incumbents contribute to sustainability transitions.

PLURALIZING REGIME ACTORS

While some definitions of incumbent actors seem to include all regime actors, most definitions contain boundary terms such as large size, high income, well-known, power, established, privileged, disproportionate influence and dominance [17]. This suggests that there must be some degree of power or privilege present in an actor to be labelled incumbent. This characterization resonates with Turnheim and Sovacool [15], who argue that incumbency or incumbent-like attributes in transition studies will likely be found in the magnitude of the power and privilege they hold. This article follows the widely held view that an incumbent actor is an actor who has a certain degree of power and privilege in a regime [9,18–20]. Furthermore, a certain degree of dependency exists between the stability of a regime and the incumbent actor.

While the “incumbent actor” definition is relatively well established and the focus of recent transition studies [8,19,21], the denomination of these actors varies. Some definitions refer exclusively to companies or industry actors which are established in regimes. For example, Geels [22] refers to these incumbent actors as actors with a role in “industry structures”, while Bosman [10] uses “incumbents on the supply side”. Others show a broader view and include industry associations and knowledge institutions. For instance, Kump [8] explicitly describes incumbency as broader and includes NGOs, education, knowledge organizations and trade unions. Turnheim and Sovacool [15] refer to “non-governmental actors, knowledge organizations, trade unions, user groups, and so on” as incumbent actors and recommend focusing attention on pluralizing incumbencies, including the multitude of incumbent actor types. Other authors e.g. Bosman [10] distinguish

peripheral incumbents as organizations involved in finance, distribution, regulation and facilitation in a regime. And, although they do not distinguish between (incumbent) regime actors and new entrants, Nijhof et al. [13] in their sustainable market transformation framework categorize regime actors as industry actors, government actors, NGOs, financial institutions and knowledge institutions. One is then left to believe that any organization with power in a regime is an incumbent actor, which does not facilitate differentiation among actors in sustainability transitions.

Therefore, we suggest the term “incumbent core actor (ICA)” to refer to the actors with a certain degree of power and privilege, i.e. incumbent, and directly connected to a regime’s core activity or transaction; for example, the materials supplier and the transaction with manufacturers (core in the manufacturing sector’s regime), the university and the transaction with students (core in the education sector’s regime), the hospital and the transaction with patients (core in the healthcare sector’s regime) and the municipality and the transaction with citizens (core in the public services’ regime in the Netherlands). This core incumbency can be multi-sided and situational, as in the energy transition in the built environment in the Netherlands that we use as an illustrative case throughout this article. It is imperative to acknowledge that the reasoning outlined for the illustrative case is not universally applicable to other situations in the Netherlands or elsewhere in the world. The political and social systems of countries vary significantly. Moreover, it is crucial to recognise that disparities can also be observed between different regimes within a single nation, for instance with regard to cultural nuances. However, the distinction we propose among actors in transitions can be applied in various contexts while the agency of these actors might differ.

Using the illustrative case, actors that can be distinguished as ICAs are, on the one hand, actors in the energy market—on the supply side, energy suppliers and network operators and on the demand side, housing associations and other real estate owners. On the other hand, we can distinguish actors in the installation and renovation market—from the real estate owners on the demand side to the construction, installation and renovation companies on the supply side. These actors can also be addressed as ICAs because they can ensure that homes both use less energy and generate energy. The question then emerges about the incumbent actors not directly connected to a regime's core activity or core transaction, thus being peripherally incumbent. The key distinction between a peripheral and a core actor is that a peripheral actor in the regime under consideration is not involved in core activities while being incumbent, and this actor is a core actor in another regime. For example, building on the illustrative case of the energy transition in the built environment in the Netherlands, large banks are ICAs in the financial sector but peripheral actors during the energy transition in the built environment and can be incumbent (having power and influence in the

energy transition). Similarly, universities are peripheral actors in the built environment (while holding significant power and influence and thus incumbent) and ICAs in the education sector. Furthermore, an ICA in a socio-technical regime may be a peripheral actor in another regime. To illustrate this point, one may consider the role of producers of multi-purpose technology, such as batteries and carbon capture technology, who have the capacity to contribute to a range of domains, including transport and agriculture [23].

Following Bosman [10], we distinguish these actors as peripheral and suggest addressing these incumbent actors that are not ICAs as "incumbent peripheral actors (IPAs)".

In summary, the classification of regime actors can be achieved along two dimensions. On the one hand, the degree of incumbency (first dimension) of an actor is contingent upon a certain degree of power and privilege within the regime. A regime actor can have significant power and influence (thus an incumbent actor) or limited power and influence in a given regime. We define the latter as a subsidiary actor. The second dimension relates to the distance from the core activity of the regime under scrutiny. This dimension is situational (so relative to the regime under scrutiny) and not normative, because an actor can be an ICA in a given regime while being an IPA in an adjacent regime. This leads to the view that four groups of regime actors can be distinguished as to whether an actor is incumbent or peripheral, as shown in Figure 1.

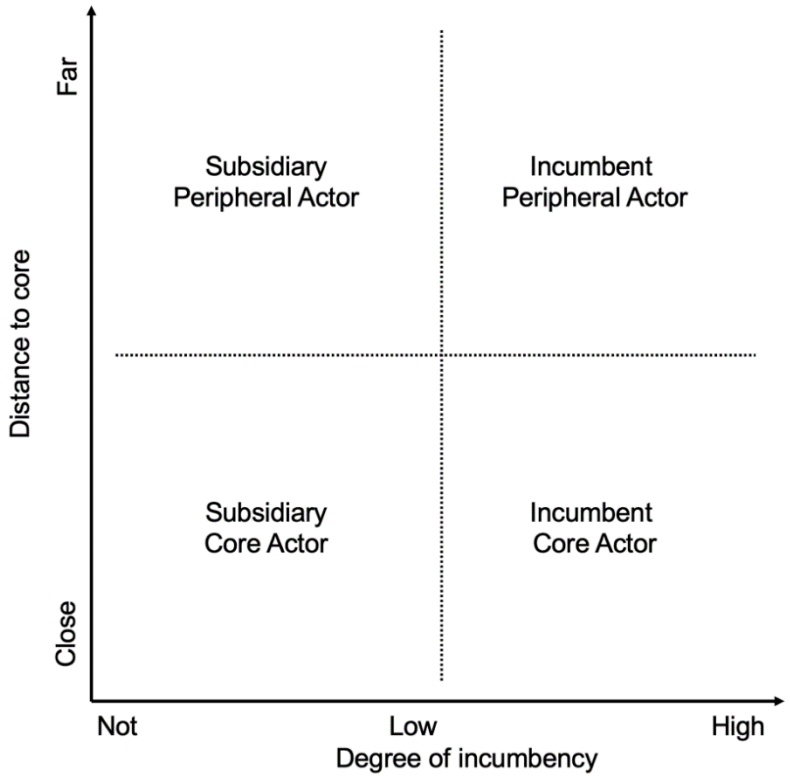

Figure 1. Classifying regime actors.

We illustrate this classification by further exploring the energy transition in the built environment in the Netherlands. In this transition, large construction and renovation companies, as well as regionally and nationally operating energy and network companies, can be defined as ICAs. These actors are involved in the core activities of the regime under scrutiny and hold significant power and influence. In contrast, while a local handyman company and a local energy cooperative are involved in core activities of the transition, they can be defined as subsidiary core actors, as they do not have sufficient power or influence to transform the regime, nor does the regime depend on these actors. Furthermore, it is possible to identify as IPAs large banks that support the activities of ICAs. Large banks are critical in the energy transition in financing real estate development but are not the primary bearers of the core activities of the built environment sector. Finally, trade associations are typically regarded as subsidiary peripheral actors, as they organize certain non-core activities of the built environment sector, such as sector dialogues, but they do not have the necessary power to influence to a large extent the energy transitions (and thus are not incumbent). Although the illustrative case is not directly transferable to other scenarios and geographical areas, it is reasonable to hypothesise that such patterns can also occur in different situations and countries.

IN SEARCH OF A TYPOLOGY OF IPAS

While ICAs have received increasing attention in the literature [11–13], exploration of the nature, contribution and roles of IPAs is nascent.

Contributions of IPAs to Sustainability Transitions

In contrast to a socio-technical approach, as employed by Schot et al. [24] and Bjerkan et al. [25], a socio-institutional approach in transition science is founded upon an understanding of profound systemic transformations within intricate social systems [26]. This approach defines a regime by three institutionalized dimensions through which transformative change occurs and which shape the social (sub)systems within the regime: culture (encompassing shared images, values and paradigms), structure (including institutional, economic and physical elements) and practices (such as routines, rules and behaviour). Fuenfschilling [27] also emphasises the importance of institutions and institutional change in sustainable transition research. Moreover, a socio-institutional approach aligns well with the utilisation of neo-institutional theory in transition science [27–29]. For instance, institutional entrepreneurship theory may be employed to study actor characteristics in transitions. Institutional entrepreneurship focuses on activities of actors who have an interest in changing or creating institutions [29]. The current research literature reveals that IPAs' contributions are clearly distinguishable along the aforementioned institutionalized dimensions. For example, in Bjerkan et al.'s [25] study,

the national energy agency, local authority and port authority are identified as legitimators and intermediaries and can be identified as IPAs. Also, it is demonstrated that these actors shape, among others, the world view (culture) and regulatory frameworks (structure). A similar discussion is presented by Nijhof et al. [13], who display the roles and responsibilities of actors during the phases of sustainable market transformation. These roles and responsibilities are also associated with changes in culture, structure and practices. IPAs' contributions are therefore likely to be categorized along these dimensions, related to how institutions emerge in regimes [27].

It is of significant importance for research on IPAs' role in transitions to gain an understanding of the ways in which IPAs can contribute to regime change. Consequently, while it appears that a typology of the characteristics of IPAs is currently elusive, it is feasible to characterize IPAs based on their contributions or potential contributions to the transformation of one or more institutionalized dimensions that constitute a regime.

Nature and Roles of IPAs

Most studies on pluralizing actors only focus on actor-related characteristics and their position in a transition, as, for instance, Fischer and Newig [30] show by identifying four actor typologies used in transition studies which can be applied to all actors: "a. Systemic typology: Multi-level perspective (niche, regime, and landscape actors), b. Institutional typology: State, market, civil society, c. Governance typology: Actors on the local governance level, actors on the regional governance level, actors on the national governance level, actors on the global governance level, d. Intermediaries". Furthermore, research has been conducted on the characteristics of the position of actors, including those we classify as IPAs. For instance, Schot et al. [24] distinguish five categories of position by energy users in transitions in an energy transition study: producers, consumers, legitimators, intermediaries and citizens. Utilizing these categories, a study by Bjerkan et al. [25] on actors in energy transitions at the intersection between Norwegian ports and transport systems demonstrates that an actor may engage in transitions through a variety of positions. In this study, the port authority assumes the roles of legitimator and intermediary, in addition to those of producer and consumer. The two relevant distinctive position types for IPAs have been defined by Schot et al. [24] as follows: "User-legitimators shape the values and worldview of niche actors, providing meaning, purpose and rationale for their activities. User-intermediaries create spaces for the appropriation, shaping and alignment of the various elements of emerging socio-technical systems, such as products, infrastructures and regulatory frameworks". These typologies provide insights into the nature and position of the actor within the transition. Nevertheless, it is

not possible to ascertain the actual role taken in a transition through their use or to differentiate between IPAs and ICAs.

Wittmayer et al. [31] posit that actors' transition roles can be identified and defined by examining the recognizable activities and attitudes of actors during transitions. In other words, it is necessary to determine how an actor acts and behaves during a transition. Nijhof et al. [13] adhere to this line of reasoning when outlining the roles and responsibilities of various actors in a given market. It should be noted that this outline illustrates the potential roles that various actors can assume in transitions. Ultimately, although actors possess capacities and unique resources to drive change, for instance knowledge (universities), resources (banks) and mandates (regulators), the selection or determination of transition roles is contingent upon the specific activities and attitudes of the actors in question, as observed in the context of a transition.

Recent studies pay attention to the supporting role of incumbent actors in transitions [6,15,19–21] in addition to their defensive role in transitions. Fischer and Newig [30] distinguish between an opposing, an indifferent and a supporting role for actors in transitions. Galvan et al. [21] distinguish actor roles between inert, resistant to change and supportive of transitions. According to Lahtinen [32], an incumbent actor can act to contribute to transitions through a reactionary, reformative or transformative role. The actor roles explored in these studies are presented in

1.

Table 1. Roles of incumbent actors explored in the literature on sustainability transitions.

Actor Roles	Source
Opposing	Fischer and Newig [30] argue that, traditionally, incumbents are expected to act as a counterforce to transitions.
Defensive	Turnheim and Geels [20]: "existing systems, which are defended by powerful incumbent actors (with vested interests and core capabilities in existing systems)".
Indifferent	Fischer and Newig [30] "These actors can become opposing forces when pushed unreasonably and too far".
Inert	Galvan et al. [21] "Inert and resistant to change".
Reactionary	Lahtinen [32] "The focus is on minimizing the negative impacts of its business by making compliance-driven changes within the existing environment".
Supporting	Fischer and Newig [30] posit that, traditionally, new actors are expected to play a supporting role in transitions. Galvan et al. [21]: "incumbents are also engaged in supporting the transition through, for example, their participation in niches".
Reformative	Lahtinen [32] "In this role, the company manages the triple bottom line, meaning that it is ready to improve the

	environmental, social, and economic aspects linked to its business".
Transformative	Lahtinen [32] "This role represents the company managing transitions toward system-wide, strong sustainability".

Finally, the roles of IPAs are not only activity-based but also situational. An actor may act as both an ICA and an IPA in a transition, depending on the regime being assessed. It can be reasonably assumed that the vast majority of organization types could act as IPAs, depending on the transition and regime being assessed and the degree of power and privilege the actor possesses in this regime. Therefore, it seems neither feasible nor useful to create a general typology of IPAs in transitions based on characteristics, as almost every type of organization would need to be included. Finally, a typology based on possible roles is largely situational because of its dependence on the degree of power and privilege in a regime and the actor's behaviour and attitude. Moreover, current research does not provide sufficient support to propose such a typology, as it does not differentiate IPAs from ICAs.

A Unique and Increasing Contribution of IPAs in Transitions

IPAs are defined as incumbent actors (so with a degree of power and privilege) that are not part of the core activity of the regime under scrutiny but (incumbent) core actors in other regimes that are intertwined with the given regime. In other words, an incumbent actor can assume a pivotal role in regimes where this actor is an IPA, using its power and privilege in the regime in which this actor is an ICA. Changes in regimes frequently depend on the dynamics of the functioning of underlying systems, part of the intertwined regime [33,34]. Hence, alterations are also necessary in these intertwined regimes. Building on the illustrative case of the energy transition in the built environment in the Netherlands, the Social Housing Guarantee Fund (*Waarborgfonds Sociale Woningbouw*), which guarantees social housing financing in the Netherlands, developed a special financing policy in 2016 for specific retrofit concepts, allowing housing associations to work with construction companies to further develop affordable retrofit concepts for guaranteed highly energy-efficient homes [35]. The necessity for this policy arose from the fact that the strict regulation of social housing in the Netherlands made it impossible for housing corporations to obtain the financing required for the further development of energy-efficient retrofit concepts on a large scale. The Social Housing Guarantee Fund (*Waarborgfonds Sociale Woningbouw*), as an IPA, played a pivotal role in the energy transition by temporarily changing institutions in an intertwined regime (the financial sector) in which this actor was an ICA.

Therefore, it seems reasonable to suggest that IPAs offer unique contributions to sustainability transitions and have the potential to facilitate transitions distinctively. They possess the capacity and unique

resources to drive change in intertwined regimes compared to ICAs, as they can bring adjacent knowledge (universities), resources (banks) and mandates (regulators) from the regime in which they are ICAs [13]. Using these distinctive attributes of IPAs renders them highly pertinent and valuable for transitions.

As sustainability transitions progress, the number of actors and actor types involved increases [13]. A transition is comprised of distinct phases, as outlined by Rotmans et al. [36] and Nijhof et al. [13]. At the outset, the emphasis is on identifying and developing niche solutions [22,26] or, as Nijhof et al. [13] indicate, alternatives that challenge the status quo. Consequently, the focus is on new entrants and supporting ICAs. In subsequent phases, the alternatives drive dynamism and transformative change in the regime. As a result, incumbent actors are increasingly involved in the process, as front-runners, connectors, topplers and supporters [37], as well as defenders of the current regime. Hence, the involvement of IPAs (as incumbent actors) increases. As the transition progresses, the objective is to alter the established norms and practices within the organizational structure, encompassing the distribution of power, the established rules and guidelines and the prevailing discourses [26]. Nijhof et al. [13] demonstrate the typical roles performed by different actor types as transitions progress: Local government can encourage experimentation, industry associations can influence the narrative by emphasizing the need for industry sustainability, banks and investment companies can enhance investment options by making investments easier, and knowledge organizations can increase the use of knowledge and skills by developing curricula for relevant courses. All these contributions are made by actors that can be characterized as IPAs.

Consequently, IPAs' contributions are distinct from those of ICAs due to the unique knowledge and resources from intertwined systems, and as sustainability transitions gain ground, the significance of diverse IPAs is likely to increase and the range of opportunities for IPAs to contribute to the transition expands.

A Research Agenda on IPAs

While there is a nascent body of literature exploring the nature and roles of IPAs, it remains fragmented and insufficient, especially regarding IPAs' roles in sustainability transitions. Therefore, we propose a research agenda centred around three themes to explore the nature and roles of IPAs in sustainability transitions.

Focus on unravelling the institutionalized dimensions that characterize IPAs

Building on Wittmayer et al. [31], IPAs are likely to have distinctive characteristics that are instrumental for their contributions and roles to sustainability transitions. We argue that it might be feasible and useful to further characterize IPAs based on their contributions or potential

contributions to transforming the institutionalized dimensions that constitute a regime: culture, structure and practices [26]. As mentioned before, this resonates with neo-institutional theory. Hoogstraten et al. [29] distinguish high-status and low-status actors and argue that a low-status actor with a peripheral position can foster institutional change because they benefit less from defending the existing system and because of their high status and resources in another intertwined system. However, at present, we have limited insight into the characteristics of IPAs and their contextualities. The ability to characterize an IPA in a regime is a prerequisite for conducting studies on the roles, agency and contributions of IPAs.

Focus on the roles played by IPAs in sustainability transitions

The current literature defines roles that apply to all incumbent actors [21,30,32], and these roles are situational. Furthermore, an IPA, and probably to a lesser extent also an ICA, can assume different roles during a transition. Building on the illustrative case of the energy transition in the built environment in the Netherlands, during the genesis of the initial iterations of affordable housing concepts, the function of the Social Housing Guarantee Fund as an IPA could be characterized as reformative or reactive. Only when the initial affordable housing concepts were ready for market entry and were adopted by housing corporations was the IPA able to leverage its authority and influence to assume a transformative role by facilitating the relaxation of financing options [35]. Therefore, IPAs' role in contributing to transitions may appear consistent over time but is situational and may change over time. Consequently, an actor can have multiple contributing roles during a sustainability transition. These roles may influence each other: A major role in one situation may support a lesser role in another. Hence, exploring the changing roles, whether or not by choice, and the mutual influence of roles can help refine the potential contribution of IPAs to sustainability transitions.

Focus on intertwined systems and role evolution using a systems perspective

A regime can consist of multiple intertwined systems, as, for example, in the built environment, where the installation and renovation markets are connected to each other and, among others, to the energy market, education and finance. Consequently, we argue that a given actor can be an IPA in one regime as well as an ICA in another regime during a transition. This makes the regime level applicable for research on IPAs. However, focusing on the system level, for example, by using the governance model of sustainable market transformation by Nijhof et al. [13], offers a wider range of possibilities for focusing on incumbent actors. It offers opportunities to unravel intertwined systems in a regime and provide a more precise focus. This perspective aligns with the multi-system dynamics approach, a concept that has recently attracted

increased interest [23]. This approach suggests that significant technological and institutional changes impact multiple systems. Building upon the earlier mentioned case, the installation, new construction, renovation and energy markets are intertwined systems within the regime. However, it should be noted that not every market is in the same phase of the energy transition. For example, the new construction market is ahead of the renovation market in the Netherlands. The construction of new homes connected to the natural gas network has decreased since there was no mandatory connection as of 1 July 2018, and new homes are being built without a gas connection as a starting point. Starting from a systems perspective, the opportunity arises to direct attention towards the installation, new construction, renovation or energy markets in a study, contingent upon the specific research question being investigated. The system perspective is also suitable for conducting in-depth and nuanced studies of the roles of IPAs in different phases of a sustainability transition in a specific market. For example, in light of evolving power dynamics during a transition or shifting interests towards institutional change, a bank as an IPA may find itself in a position to exert a significant transformative role during a given phase in the new construction market, while at the same time assuming a reformative role in the renovation market in another phase. Consequently, adopting a systems and phase perspective of sustainability transitions [13] could offer a robust and fruitful foundation for investigating IPAs, their mutual connections and their role evolution over time.

CONCLUSIONS

This article has investigated the role of IPAs in sustainability transitions. IPAs, characterized by their power and privilege within adjacent regimes, have unique capacities and resources to contribute to sustainability transitions. By distinguishing IPAs from ICAs, we challenge the traditional views of transition studies that primarily focus on either new entrants or ICAs. A key contribution of our article lies in the pluralization of regime actors along two dimensions: their degree of incumbency and their proximity to the core activities of a regime. This nuanced classification confirms the diversity of actors involved in transitions including IPAs. IPAs, though not central to the core activities of the regime under scrutiny, often wield significant influence by leveraging resources, knowledge and mandates from regimes in which they hold core positions. Our article also highlights the dynamic and situational roles of IPAs, which can evolve over the course of a transition. Unlike ICAs, whose roles may be relatively fixed within a regime, IPAs' contributions can vary depending on the phase of the transition and the interplay of power dynamics across interconnected systems. This situational adaptability shows the importance of understanding IPAs' roles in a systemic and temporal context. Moreover, our article emphasizes that IPAs can act as catalysts for change by introducing

innovations, redirecting resources and reshaping institutions to enable the adoption of sustainable practices.

Despite these insights, we acknowledge the challenges in defining and categorizing IPAs. The heterogeneity of these actors and the contextual nature of their roles complicate the development of a universal typology. We argue that a focus on the contributions, activities and attitudes of IPAs, rather than their static characteristics, offers a more practical approach to understanding their impact. The success or failure of transitions can be influenced by IPAs. They possess specific and distinctive characteristics that are not present in ICAs. However, there is considerable variety in the different characteristics of IPAs. Furthermore, these characteristics are not fixed but rather contextual and evolve over time during sustainability transitions. Awareness of these characteristics and a considered approach to their use and deployment can enhance the contribution of IPAs in transitions.

We conclude with a research agenda that explores the nature, roles and contributions of IPAs. Three key themes are proposed: unravelling the dimensions that characterize IPAs, exploring their multiple and situational roles and understanding their role evolution during transitions. Addressing these themes can provide insights to support IPAs' engagement in sustainability transitions.

DATA AVAILABILITY

No data were generated from the study.

AUTHOR CONTRIBUTIONS

Conceptualization, MC, AN, AvH and NC; Study design, MC; Investigation, MC; Writing—Original Draft Preparation, MC; Writing, MC and NC; Review & Editing, MC, NC, AN and AvH.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

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