Sociotechnical Transitions: Stakeholder Engagement to Sustainable Energy System

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Abstract

The energy industry is highly complex, dependent on significant infrastructure networks, and heavily shaped by policy intervention and regulation. The challenge of decarbonization and pollutions means that we need new policy thinking and market designs that put these challenges at the centre of decision-making across the whole system. The governance of complex processes, such as energy transitions, has hitherto primarily been approached along two lines. On the one hand, there have been calls for a broadening of the knowledge base that informs decisions. There are also calls for additional actors' enrolment than the incumbent policymakers, technocrats, and innovators. In this context, Stakeholder Theory would be the basis for energy transitions towards sustainability understanding, allowing to explore the relationship of multiple actors in the energy system. This conceptual article, based on an integrative literature review, proposes to develop a theoretical background to bring the Stakeholder Theory and Actor-Network Theory closer to the debate on energy transition drawing potential interests and stakeholders in this context. The paper has three parts: In the first, it deals with actors and transitions, in the second, it discusses how the stakeholder theory and the Actor-Network Theory complement each other; the third deals with the discussion and potential contributions as to which Actor is an Interested Party in Energy Transitions. This study based its analysis on a pragmatic perspective. In this sense, the influential actor will manage the critical relationships. In the Stakeholder Salience stakeholders can be considered from three different attributes: Power, legitimacy, and urgency. According to the performed discussion, it is possible to categorize the energy sector stakeholders in four different groups, namely: i) Market and Financial Resources; ii) Value Chain; iii) Political and Institutional; iv) Organized Civil Society. These four categories consent creating social, environmental, and economic value for the organization, to the extent that its interests can be made compatible with the organizational goals. As for how this contribution relates to the acceleration of SDG in times of crises, it addresses the importance of stakeholder theory to enhance cooperation regarding clean energy research and technology. It is recommended to deepen the research on energy transitions, drawing an overview to understand relations with stakeholders in the energy transition to a more sustainable system.

Keywords: Energy Transitions; Sustainability; Sociotechnical Transitions; Stakeholders; Actor-Network Theory.

1. Introduction

Sustainability confronts managers with tensions between complex economic, environmental, and social issues, requiring new coping strategies (Hahn et al., 2014; Almeida et al., 2015; Subramaniam et al., 2020; Alkon & Wong, 2020). The conceptual idea of sustainable development emphasizes the need to address economic, social, and environmental factors, preserving the needs of future generations (Matos & Silvestre, 2013). Current environmental problems, such as climate change, loss of biodiversity and depletion of resources (drinking water, fossil fuels, food, forests, etc.) bring with them social challenges (Geels, 2011). Sustainable development is a perennial process of progressive social change (Kemp et al., 2007).

Regarding sustainable development linked to the energy sector, the transitions to a low-carbon future are not only technical and economic, but also deeply social (Delina & Janetos, 2018; Subramaniam et al., 2020; Berry, 2020; Lieu et al., 2020; Alkon & Wong, 2020). Companies have limited space for unilateral manoeuvres in relation to the multiple factors involved in these transitions (Berkhout, 2002).

Changing existing configurations to more sustainable ones is one of the wishes of contemporary times (Berkhout, 2002; Smith et al., 2005; Burch, 2010; Geels, 2011; Silva et al., 2019). Organizations and technologies are incorporated into broader social and economic systems, so that sustainable development requires changes in socio-technical systems and social transformations in beliefs, values, and governance - which evolve with technological changes (Rip & Kemp, 1998; Kemp et al., 2007; Burch, 2010).

Addressing such problems requires profound structural changes, the so-called sociotechnical transitions, which can only be conducted with the involvement of multiple actors (Geels, 2011). Energy supply is an important sociotechnical system, with great impact in social development and quality of live. The interactions between planning and transitions involving sustainability are notably interdisciplinary (Carroli, 2018). Intensified by the release of the Brundtland Report (1987), sustainability thinking related to organizations and their impacts has evolved and several theories have been proposed seeking to explore this relationship. As examples, the following can be mentioned: Institutional Theory; Agency Theory; Ecological Theories; Corporate Social Responsibility, Corporate Sustainability and Stakeholder Theory (Dimaggio & Powell, 1983; Srikantia & Bilimoria, 1997; Jensen & Meckling, 1979; Scott, 1987; Chang et al., 2017). It should be noted that institutional sociological theory appears in many studies related to organizational changes and is concerned with the way organizations seek legitimacy from isomorphism (Dimaggio & Powell, 1983; Srikantia & Bilimoria, 1997; Tolbert & Zucker, 1999; Doh & Guay, 2006; Markard et al., 2012).

Valkenburg & Cotella (2016) say that the governance of complex processes, such as energy transitions, large infrastructural projects, or comprehensive spatial planning issues, has hitherto primarily been approached along two lines. On the one hand, there have been calls for a broadening of the knowledge base that informs decisions. There are also calls for additional actors' enrollment than the incumbent policymakers, technocrats, and innovators.

Stakeholder Theory is a large body of knowledge that focuses on simultaneously considering the interests of various stakeholders (Freeman, 1984; Donaldson & Preston, 1995; Frooman, 1999; Berman et al., 1999; Choi & Wang, 2009; Parmar et al., 2010; Barnett et al., 2020). In this context, the Stakeholder Theory, associated with Actor-Network Theory (ANT), would serve as a basis for understanding sociotechnical transitions towards sustainability in the energy sector, allowing to explore the relationship of multiple actors.

This paper proposes, based on an integrative literature review using the SCOPUS, Science Direct, ISI and AOM bases, the development of a conceptual framework to bring the Stakeholder Theory and Actor-Network Theory (ANT) closer to the debate on energy transition drawing potential interests and stakeholders in this context, presenting a theoretical contribution to academia (Whetten, 2003). The term "integrative" comes from the integration of opinions, concepts or ideas from the research used in the method (Botelho et al., 2011).

An integrative review summarizes the past of empirical or theoretical literature, to provide a more comprehensive understanding of a particular phenomenon (Broome, 2000; Whitemore & Knafl, 2005). As inclusion or exclusion criteria, articles that included the descriptors "stakeholder theory" or "Actor-Network Theory" or "ANT" were considered, since the proposal was for researchers to connect both. Above all, research written in English was considered. Conference papers were excluded, but books published on ANT were later integrated. We sought to use papers from peer-to-peer review journals, with major scientific attention according to SCimago classification.

After the selection of theoretical articles, papers on socio-technical transitions and energy transitions were added, to emphasize the importance of the multiple actors of these processes. Theoretical synthesis provide support to researchers to draw inferences on the topic. In the present case, we sought to relate studies on stakeholder relevance with the notion of actors extracted from ANT.

2. Actors and Transitions

The field of transition studies examines the transitions of the entire economy and the sector, as in the sectors of energy, transport, chemicals, manufacturing, agriculture, and tourism (Bergh et al., 2011). No social change happens randomly or linearly. It tends to be a multidimension and multifactor process. Transitions are fundamental changes that take place in the social system. In

our current era, transitions are theorized as fundamental changes in the social system to solve problems (Frantzeskaki et al., 2012). Sectors such as energy supply, water supply or transport can be socio-technical systems (Markard et al., 2012). To promote socio-technical transformations, there are a series of structural, financial, regulatory, economic, and informational barriers that need to be overcome (Martin & Rice, 2012).

A technological regime is the set of rules incorporated into a complex of engineering practices, technologies of production processes, product characteristics, skills and procedures, ways of dealing with artifacts and relevant people, ways of defining problems; all these elements instilled in institutions and infrastructures (Geels, 2004). Sociotechnical regimes are path-dependent, with strong historical and institutional influences (Geels, 2011; Hynes, 2016; Carroli, 2018). These elements are reproduced, maintained, and transformed by actors such as firms and industries, public policy makers, politicians, consumers, civil society, engineers, and researchers (Geels, 2011).

Societal transitions therefore involve multiple actors, changes in their institutions, values, technologies, interactions in various sectors and scales (Holtz et al., 2015). Actors play their role in changing scenarios. It is necessary to separate who the actors are and what their nature is for the best combination of interests to be made in favor of the objective to be achieved.

Stakeholders, understood as capable of influencing goals, can be categorized into primary and secondary, as owners and non-owners; as holders of capital or intangible assets; agents or acted; rights holders, contractors, or influencers. They may relate voluntarily or involuntarily to the organization; be their resource providers or economically depend on their activity (Mitchell et al., 1997).

The primary ones would have control over resources, in general, while the secondary ones cannot directly influence, but they must undertake collective actions to influence companies (King, 2008; Soule, 2012; Barnett et al., 2020). Freeman's (1984) initial work introduced the central problem of Stakeholder theory, but the conceptual contribution of Donaldson and Preston (1995) structured much of the discussion by introducing the normative domain, which concerns the way managers must deal with interested parties (Berman et al., 1999).

The theory goes beyond the purely descriptive observation that organizations have stakeholders (Donaldson & Preston, 1995). Studies have successfully shown that paying more attention to stakeholders improves an organization's performance (Berman et al., 1999; Hillman & Keim, 2001; Choi & Wang, 2009). This theory originally focused on managerial aspects, and subsequently evolved and branched out in different directions, including business ethics, strategic management, finance, accounting, marketing, and administration (Parmar et al., 2010). In the information age,

secondary stakeholders are increasingly empowered to publicly pressure organizations and politicians to adopt, for example, more sustainable attitudes (Grégoire et al., 2015).

The participation spaces of various stakeholders can be analyzed in relation to the functions they fulfill, such as co-producing knowledge for action, understanding contemporary transitions and exploring sustainable solutions for transitions (Frantzeskaki & Rok, 2018).

The future of energy is not free from cultural, political, and, economic influence, therefore, must be approached with cosmopolitan and plural lenses (Delina & Janetos, 2018). Different actors play roles in this transition scenario and there are power imbalances (Frantzeskaki & Rok, 2018). The energy transition is a fertile ground for exploring climate justice and equality issues, as energy policy is often approached from a technocratic point of view, without adequate addressing important social issues such as inequalities of power linked to policy and public policy making (Lieu et al., 2020).

In addition, energy consumers themselves have raised expectations of how they should be recognized by the energy company, especially regarding reciprocity, being stakeholders to be considered in this context (Olkkonen et al. 2017).

It is estimated that cumulative investments of more than fifty trillion US dollars in energy supply and efficiency will be needed by 2035 to achieve the goal of keeping global warming below 2 ° C - which suggests the importance of different traditional financing agents for investments in infrastructure, such as governments, private banks and other financial institutions, capital market investors (IEA, 2014; OECD, 2015a). Capital allocation and commitment decisions in the energy sector are increasingly shaped by government policy measures and incentives. In many countries, governments have a direct influence on investment in the energy sector, for example, through the maintenance of oil and gas reserves or the control of power generation capacity by state-owned companies (IEA, 2014).

In this scenario, it is worth highlighting the role of activists and the media as critics (Matos & Silvestre, 2013), as well as the interest of the whole society in the transition to a low carbon economy, since the best mass transportation in cities can reduce the congestion and air pollution, improving its quality for all; distributed renewable energy infrastructure projects can improve access to energy in developing countries ; in addition to stimulating innovation through technology transfer and international cooperation (OECD, 2012; OECD, 2015b). Biodiversity is also affected by the negative externalities of emissions of gases into the atmosphere (OECD, 2012), so that non-governmental organizations committed to preservation ideals have legitimate interests in the energy transition process.

Actants may indicate human and non-human actors, and in a network take up its silhouette by virtue of their relations with one another (Latour, 2012). It is important to establish among all actors involved who are the main stakeholders, the ones whose interests can foster or block transition processes. The analysis of the interests of the various stakeholders can be used to link political rationality to technical rationality, so that resources can be mobilized for effective progress, helping to solve complex problems (Bryson et al., 2002).

For all the above, assuming that all actors matter and should be considered, assuming, in addition, that there are the dimensions of interest and influence, the problem that presents itself, under ethical bases (Donaldson & Preston, 1995) - taking into account that no manager has inexhaustible resources and time and no organizational theory offers, in isolation, systematic answers to questions about identification and relevance of transition agents (Mitchell et al., 1997) -, it concerns the way of identifying stakeholders, defining their attributes and mapping them in the context of sociotechnical transitions towards sustainability in the energy sector.

3.   Stakeholder Theory & Actor-Network Theory: How do they complement each other?

It is fair to argue that all actors are potential stakeholders. The Stakeholder Theory reasons that all people or groups with legitimate interests that participate in an organization do so to obtain benefits and that, a priori, there would be no primacy of one set of interests and benefits over another (Freeman, 1984; Brenner & Cochran, 1991; Donaldson & Preston, 1995).

The word "stakeholder", as used now, appeared in an internal memo at the Stanford Research Institute in 1963 (Parmar et al., 2010). The foundation of the theory can be extracted from two basic questions, namely: What is the purpose of the organization? And what are your responsibilities to stakeholders? (Freeman, 1984; Freeman et al., 2004). These questions lead managers to articulate how they want to do business. It is a managerial theory, as it reflects and directs the action of managers. It is an idea about how business really works. It provides that for any business to be successful, it needs to create value for customers, suppliers, employees, the community, investors, shareholders, banks, and other people who hold capital. All together are responsible for something that none of them can create alone. You cannot view each stakeholder in isolation. The manager's job is to see how all these interests can be reconciled and conducted in the same direction, whether they are shareholders or non-shareholders of the company (Freeman, 1984; Bryson et al., 1985; Blair & Stout, 1999; Freeman et al., 2004; Sachs & Maurer, 2009).

Donaldson and Preston (1995) state that the Stakeholder Theory can be, and was, presented and used in several very different ways, involving very different evidence, criteria, and evaluation methodologies. There can be no confusion between the nature and purpose of the theory. These authors understand that each of the uses of the theory has its value, but that this differs depending on the

approach. There would be three different approaches or aspects in the light of the Stakeholder Theory, namely: Descriptive, instrumental, and normative.

The descriptive aspect of Stakeholder Theory reflects and explains the past, present and future states of organizations and their stakeholders. It is a simple description (Donaldson & Preston, 1995; Kaler, 2003). Brenner and Cochran (1991) use the Stakeholder Theory to describe the nature of the organization.

The instrumental aspect, from the point of view of Donaldson and Preston (1995), suggests implications from adhering to the principles and practices of interested parties for the purpose of achieving conventional corporate performance objectives in contrast to rival approaches, that is, if they pay attention the way in which support to the interests of stakeholders can meet the interests of the organization itself. And, in this sense, they indicate that a good part of the instrumental approach studies is of a quantitative nature, based on statistical data (ex.: Barton et al., 1989; Preston & Sapienza, 1990). The normative is the use of stakeholder theory to say what the "function" of companies should be and the "moral or philosophical guidelines" that they must follow in relation to their "operation and management" (Kaler, 2003).

The three approaches are not mutually exclusive, but they are aligned and can be supported (Kaler, 2003). For Donaldson & Preston (1995), the descriptive precision of the Stakeholder theory presupposes the truth of its central normative conception since it presupposes that managers and other agents consider the intrinsic value of the interests of the stakeholders. And the recognition of these moral values and obligations would provide the management of interests with their fundamental normative basis. The three aspects outlined by Donaldson & Preston (1995), being the central normative. Reflecting on the study by Donaldson & Preston (1995), Freeman (1999) states that his idea is rooted in a century-old philosophy of science, in which descriptive theory tells us what the world really is (in a sense of "it really is"). Descriptive stakeholder theory would describe how organizations manage or interact with stakeholders. The instrumental approach concerns the utilitarian view of means and ends, and the normative, in turn, translates a "must be", it would prescribe how organizations should treat each of their stakeholders.

In this 1999 article, Freeman (1999) states that the premises of his work "Strategic Management: A Stakeholder Approach", from 1984, were built on instrumental bases. For the author, stakeholder management is fundamentally a pragmatic concept. Regardless of the merit, the content of the organizational objectives, the effective company will manage the relationships that are important to it (Freeman, 1984; Freeman, 1999). For Freeman (1999), more instrumental and less theories are needed that declare merely managerial duties based on general principles. The costs of resolving conflicts involving stakeholders can be very high for the organization (Bettinazzi & Feldman, 2019). Within this pragmatic perspective, we see the need for a tool that allows us to identify which interests deserve to be the object of management. Mitchell, Agle & Wood (1997) work offers a solution.

In the Stakeholder Salience (or relevance) model proposed by Mitchell, Agle and Wood (1997), Stakeholders can be identified and considered from three different attributes, namely: Power; legitimacy and urgency. First, the authors describe the types of stakeholders that emerge from various combinations of the three listed attributes.

They claim that the Agency's economic theories, Resource Dependence and Transaction Cost Theory are particularly useful in explaining why power plays such an important role in the attention managers give to stakeholders (Mitchell et al., 1997). The power attribute can be divided into coercive (physical strength); utilitarian (material resources, financial resources, investments) and normative (symbolic resources).

The attribute of legitimacy in management, in turn, can be understood, in short, as the public perception about the actions of a certain organization or entity. Suchman (1995) identifies three primary forms of legitimacy: pragmatic, based on the public's self-interest; moral, based on normative approval; and cognitive, based on the scope of actions and assumptions. Moral legitimacy is connected to the strength of the arguments for adopting actions (Habermas, 1984).

 The urgency, in turn, concerns, according to Mitchel, Angle & Wood (1997), those whose demands are immediate, but only this emergency need is not enough to pressure the manager. From the combination of the three attributes (power, legitimacy, and urgency), seven categories can be logically analyzed. Not all combine the three attributes. Of the seven categories, three have only one attribute, three with two attributes and one with all attributes. With limited time and resources, managers cannot take care of the interests of those who do not have more than one attribute, since sometimes they cannot even identify them (Mitchel et al., 1997).

Regarding the maintenance of a close relationship with stakeholders, Jones et al. (2018) provide a model that illustrates, given a particular context and firm specific conditions, the incremental benefits of a close relationship capacity that may exceed the costs of a strategy used to develop and sustain this. A close relationship is a rare resource, difficult to imitate.

Verbeke & Tung (2013) propose adding a temporal dimension to stakeholder management theory and assess the implications thereof for firm-level competitive advantage. The authors point out distinct stages in a firm's life should be considered and that content and salience of stakeholder's claims may change over time. Effective stakeholder management must adapt to changes. A close relationship may help (Jones et al., 2018).

Concerning changes, social determinism arguments that technological changes and influences could be explained by social categories. Actor-Network Theory expands this understanding, affirming that any isolated perspective tends to fail. Not just social determinism, not just technological. What seems totally social is partly technological and vice versa. As can be seen, the interest of the stakeholder research resides, above all, in the organizational actors (collective persons) and human (individuals), although

the interference of several other elements in the paths taken by the socio-technical transitions is not unknown.

The Actor-Network Theory (ANT), in turn, presents itself as a good framework for analysis and discussion of the findings, since it is based on the perspective of Sociotechnical Systems (Socio-technical Systems or STS). ANT defends the free association of elements that are socially aggregated, whether social or technological (Latour, 2012).

The main feature of ANT is its focus on inanimate entities and their effects on social processes. For ANT, it does not matter whether the intervener is human or non-human. It has its origins in feminist-based studies in the field of medicine, which criticized and moved away from historically inherited dualisms, such as gender and professional interests. It became evident that the implicit recognition that artifacts are participants in social interaction did not become theoretically explicit. Non-humans need to be actors, not mere symbolic projections (Law, 1992; Prout, 1996; Latour, 2012).

The definition of an actor, in the light of ANT, is the source of an action, regardless of his human status or technological artifact (Cresswell et al., 2010). Thus, not only who chooses technology, but the technology itself can be considered an actor - for its handling features, or for the cost, it is selected and positioned. This intriguing notion admits that the artifact can exercise agency (Prout, 1996; Berg, 1999; Cresswell et al., 2010). The ANT brings a particular epistemological and ontological position, essentially considering a universe made up of networks, which can include humans, things, ideas, concepts, and all are considered actors in the network (Law, 1992; Prout, 1996; Cresswell et al., 2010; Latour, 2012).

As Stakeholders can be defined as a group or individual that can affect or is affected by the achievement of an organization's objective (Freeman, 2010) and this influence can be exercised in different ways, such as through the control of organizational resources, social movements, and even private policies (Barnett et al., 2020), the ideas from the ANT carry forward some concerns. How do we identify actor in the sociotechnical transition process – and specially in the energy transition process? Can any actor be a stakeholder in this context?

4.   Discussions and Contributions as to which Actor is an Interested Party in Energy Transitions

To provide some answers to the questions above, we start by addressing stakeholders and discussing the Mitchell, Angle & Wood (1997) salient model. Adopting a pragmatic perspective of stakeholder theory, we argue that the influential actor will manage the critical relationships.

The authors assume that the relevance of interested parties will be low, where only one of the attributes - power, legitimacy, and urgency - is perceived. The importance will be moderate when two attributes are perceived by the managers. And it will be high, in turn, when the three attributes are present. Thus, in the first case, there are Latent Stakeholders (Asleep; Discretionary and Demanding / Demanding); in the second, the Expectants (Dangerous; Dominant, Dependent) and, finally, the Definitive (Mitchell et

al., 1997). The table below summarizes the content of each typology, according to Mitchell, Agle & Wood (1997).

Typology	Attributes	Features
Sleeping Stakeholders	Power	They have the power to impose their will, but they have no legitimacy or an urgent demand. It is difficult to predict when they may become relevant.
Discretionary Stakeholders	Legitimacy	Their claim has legitimacy, but they do not have the power to interfere, nor an urgent demand. Without power or urgency, there is no pressure on managers to meet their demands.
Demanding / Demanding Stakeholders	Urgency	Irritating, but harmless. They have urgent demands, but the noise of urgency is not enough to remove management.
Dominant Stakeholders	Power and Legitimacy	They have legitimate demands and the power to act on their behalf. They can be expected to have some formal mechanism to provoke management (eg, influence on the Board of Directors; good relations with the government and control bodies).
Dangerous Stakeholders	Power and Urgency	They have no legitimacy or formal intervention mechanisms, but their power may be manifested in a coercive manner, which is dangerous for the organization (eg strikers, protesters).
Dependent Stakeholders	Urgency and Legitimacy	The power in this relationship is not reciprocal, but, given the legitimacy and urgency of the demands in question, it can be obtained through the intervention of another stakeholder or through the appeal to the organization's internal values.
Definitive Stakeholders	Power, Urgency and Legitimacy	Priority for the organization. When the demand of a stakeholder with power and legitimacy is urgent, the tendency is to immediately attend to their request, therefore, they are the definitive stakeholders.

Table 1 - Typologies and Characteristics of Stakeholders
Source: Adapted from Mitchell, Agle and Wood (1997).

Also, it is relevant to mention the investigation of Bocken et al. (2013) on how companies can create balanced social, environmental, and economic value through the more sustainable integration of sustainability into the core of their business. In their results, the authors introduce three forms of value - value captured, value lost (destroyed or wasted) and opportunities for value creation - and four main groups of stakeholders (environment, society, customers, and network actors). Considering that the literature tends to focus on one of the interested parties, neglecting others, to facilitate a view of the value of the various stakeholders, the authors present a tool with five concentric circles segmenting the various interests.

The circular shape proposed by Bocken et al. (2013), provides a systemic perspective of organizational value, encourages the consideration of the interests of multiple stakeholders, as well as the interrelation between those interests. Each segment represented in the diagram represents a group of stakeholders. The same tool was also presented in a simplified version, which groups the value of the lost or destroyed type and allows greater flexibility in mapping stakeholders.

From these premises, it is possible to start a discussion about stakeholders in the context of socio-technical transitions towards sustainability in the energy sector. The elaboration of a transition management strategy involves multiple actors (Loorbach & Rotmans, 2010). Once a general model has been established for assessing the relevance of interests and mapping stakeholders, it is important to contextualize this model for the study environment, namely: sociotechnical transitions towards

sustainability in the energy sector. From the categories addressed in the discussion of the problem brought up in section 2 of the article, in a pragmatic perspective (Freeman, 1999), considering the mapping of value from Bocken et al. (2013), the typologies extracted from Mitchell Agle & Wood (1997) are framed.

In transition processes, pioneers are actants needed operating within and outside existing power structures. A transition arena, in general, is a network in which a collective process takes place informally, unexpectedly, and unplanned. The precise identification of these actors takes place based on the concrete analysis of the strategic organizational objective to be achieved, the challenges that arise and interests combined in each process (Matos & Silvestre, 2013).

A possible representation of stakeholders would be a plan with the following configuration: At the top level, there would be the definitive stakeholders, the latent ones with power and the most relevant expectants since they boast power among one of their attributes (power and urgency or power and legitimacy). At the bottom, there would be latent stakeholders with only one attribute (urgency or legitimacy) and expectants with urgency and legitimacy - noting that the urgency of the organization does not always coincide with the urgency of its stakeholders.

According to the definitions of Power, Legitimacy and Urgency extracted from the literature (Mitchell et al., 1997; Suchman, 1995) and based on the engagement of the stakeholders that emerge from the theoretical review presented, it is possible to categorize the stakeholders of organizations operating in the energy sector in four different groups, namely: i) Market and Financial Resources; ii) Value Chain; iii) Political and Institutional; iv) Organized Civil Society. These four categories allow the creation of social, environmental, and economic value for the organization, to the extent that its interests can be made compatible with the organizational objectives. Each of these groups is divided into several interested parties, which are illustrated in figure 5, below.

It should be noted that in the first group, it is possible to include competition, banks and other financial institutions, majority shareholders, members of the board of directors and investors in general. As a value chain, there are corporate customers, their representatives and captive consumers, employees, employers and professional unions, suppliers, business partners and the scientific community itself. In the political and institutional category, government authorities, regulatory bodies, parliament and political parties, international institutions and the press are classified as stakeholders of companies in the energy sector. Still, in the group of organized civil society, there are social and territorial entities, such as NGOs and foundations, traditional communities, local community, community leaders and opinion makers, as well as educational institutions in general.
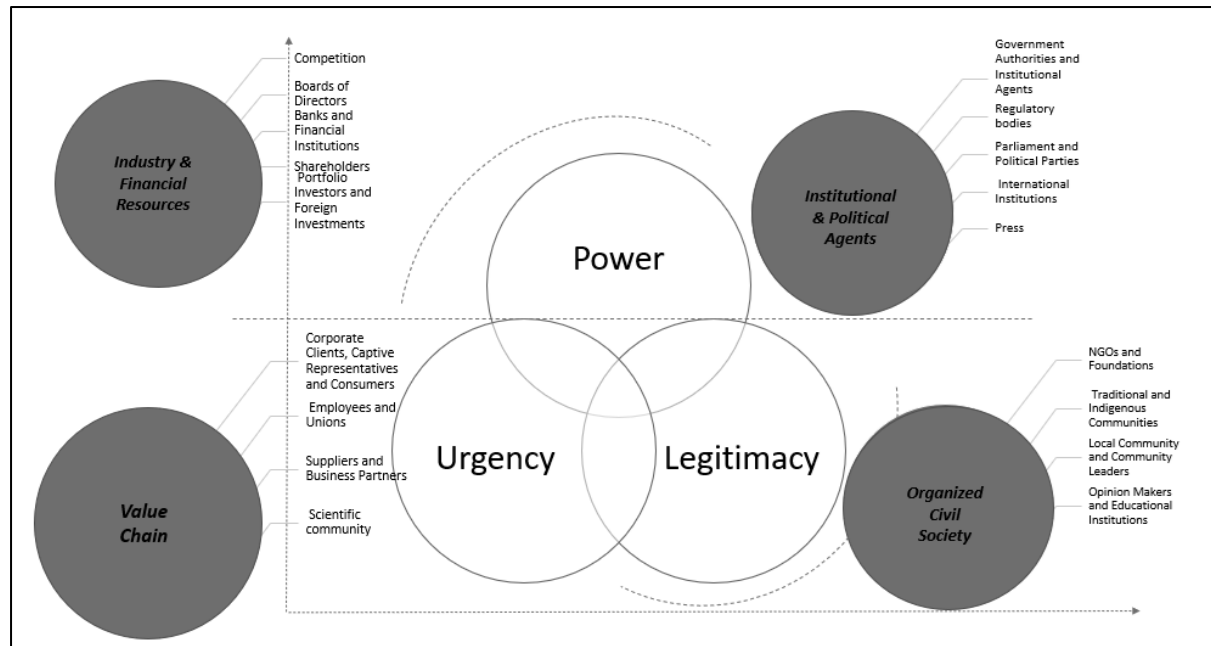
Figure 1 - Stakeholder classification
Source: The Authors (2020), based on Mitchell, Agle and Wood (1997).

It is possible to consider Latent Stakeholders as a group of secondary stakeholders in relation to the organization's objectives and Expectants and Definitors as primary Stakeholders. It is evident that such actors will be different depending on the context and the moment considered. In this sense, a possible categorization of typologies, based on the considerations above, would be exemplified in the table 2:

Typology	Stakeholder
Asleep	Banks; Development Banks and other financial institutions; International Markets
Discretionary	NGOs; Foundations
Demanding/ Demanding	Scientific community; Educational Institutions in general
Dominants	Government authorities; International Institutions; Regulatory bodies; Press; Industry; Energy generating companies in the traditional model.
Dangerous	Contributors; Unions; Corporate Customers and their representatives; Competition.
Dependents	Captive consumers; Traditional Communities; Local Communities; Community leaders; Opinion Makers; Niche Innovations (e.g.: new technologies or business models).
Definitive	Shareholders; Administrative Council; Investors; Institutional Agents in the Energy Sector.

Table 2 - Types and Categories of Stakeholders
Source: The Authors (2020), based on Mitchell, Agle and Wood (1997).

Due to the complexity of the context, it is inevitable that the different stakeholders have different interests (Freeman et al., 2004). Congregated objectives and different relationships can be driven by management, to create shared value, in a systemic way (Boken et al., 2013). Stakeholder involvement can contribute to the identification of problems not perceived, a priori, by the organization, as well as to offering creative solutions to these problems.

While it may sound controversial, ANT allows us to consider niche innovations as stakeholders in the transition process. Considering that the technology itself exerts an agency, it could exert pressure towards one or the other path to be adopted, either because it is better in qualitative terms, easier to implement or low cost, for example. Considering, however, that the level of niche is pressured by the

dominant technology, represented in the case of electricity by energy generating companies in the traditional model, niche innovations may have merit, that is, legitimacy in their positioning, but will depend on the power of another agent that drives them.

As the Mitchel, Agle & Wood (1997) Salient Model was built upon Stakeholder Theory, it does not consider point-blank a possibility of including non-human actors in each of the typologies. And, honestly, we suggest a further deepening of this theoretical approach that we sought to make in order to affirm that, for example, a certain innovative technology behaves as a dependent stakeholder and another that is already institutionalized as dominant.

5.   Conclusions

The Stakeholder Theory associated to ANT provide enough substrate for assessing the fabric of socio-technical transitions in the energy sector, since this process is complex, requiring the involvement of multiple actors with different interests. It is understood that the objective was achieved from the dialogue of the academic literature.

Not all actors are considered stakeholders at all stages of transition process. The involvement of the organization's stakeholders in the establishment of operational strategies is important, as it allows the company to anticipate problems that may arise when implementing its projects. The first step towards the success of an engagement strategy is the mapping of stakeholders. It is necessary, however, to consider that organizational objectives need to be prioritized. Not every interest can be equally addressed by the company.

This study based its analysis on a pragmatic perspective. The attributes of power, urgency and legitimacy make it possible to establish the relevance of stakeholder interests with the company's objectives as the focal point. It must be said that the theoretical model presented is not static. Considering that the business environment is dynamic, a company will need to constantly evaluate the scenarios and their relationships to reposition the stakeholders and make decisions based on the present moment.

It is important to point out that the stakeholder theory focuses on human actors and the actor-network theory allows us to consider non-human actors. In the case of technological and social transitions, this perspective is extremely relevant. A non-human actor can prove to be a real obstacle to the continuity of a certain process, especially when its functioning differs from what was initially envisaged or desired.

Regarding the limitations of the study, it is pointed out that with more time it would be possible to further characterize the typologies now launched. As a suggestion for future research, it is recommended, in the field of quantitative studies, the development of a study based on descriptive statistics to empirically verify the typologies presented in this research and validate the theoretical framework of the categories that emerged in this framework.

In the field of qualitative research, it is highlighted that the study of relations with stakeholders can benefit significantly from the analysis of cases, able to provide details of the dynamics present in a situation. For future studies it would be important to further deepen this relationship between human and non-human actors. In addition, even the prospect that a non-human actor could solve a social problem, however to what extent human actors would allow potential replacement of the role previously played by them? Thus, it is recommended to deepen the research on energy transitions in the real contexts, drawing an overview to understand the role of relations with actors in the process of transition to more sustainable energy models, also, to identify, specifically, which actors present themselves as stakeholders at each moment.

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