Energy Research & Social Science 91 (2022) 102696

Contents lists available at ScienceDirect

Energy Research & Social Science

journal homepage: www.elsevier.com/locate/erss

Perspective

Managing transition risk: Toward an interdisciplinary understanding of strategies in the oil industry

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ARTICLE INFO

Keywords:
International oil companies (IOCs)
Energy system transformation (EST)
Integrated energy companies (IECs)
Strategy
Business and management
Interdisciplinarity

ABSTRACT

How actors react to change is a crucial question for social scientists interested in global energy system transformation (EST). The global oil industry's response to the challenges associated with climate change and EST is a particular topic of discussion. Here, we argue for an interdisciplinary approach, bringing together insights from multiple disciplines within the social sciences that study oil companies, to further our understanding of what they are doing and why they are doing it. Although research on the political economy and socio-technical nature of EST has led to important insights, it tends to treat the global oil industry as a monolith with common interests and strategic objectives. We argue that the analytical and conceptual tools provided by the management and business literature can help unpack this 'black box'. We explain how this is the case by exploring some of these tools and applying them to a novel heuristic, the 'Transition Strategy Continuum' that helps categorise and analyse the emerging strategies of the publicly-traded 'International Oil Companies' (IOCs). As such, we respond to the call for interdisciplinarity raised in the inaugural issue of this Journal. Ultimately, we want social scientists working on energy to take serious insights from other fields of inquiry that help illuminate the complexities of the task of transformation ahead for the IOCs and other related stakeholders.

1. Introduction

How do actors behave and adapt in the face of change? This is one of the core questions that social scientists grapple with, and this journal has been a major venue for debates on this fundamental question in the context of energy transitions and climate change. This perspective adds to ongoing debates related to 'Energy System Transformation' (EST)—the structural change in the organisation of the global energy system necessitated by decarbonisation to mitigate climate change. We characterise this as a transition in the way that energy services are delivered; away from a system based on fossil fuel supply to one driven by electrification and renewable power generation, or clean energy, with increased energy efficiency at its heart ([1,2], p. 251).

We propose that social scientists need a more interdisciplinary understanding of the consequences of EST for the global energy industry. Here, interdisciplinarity is understood as the research mode that integrates techniques, tools, perspectives, concepts, and theories from multiple disciplines to advance understanding of issues and problems that require solutions beyond the scope of a single discipline ([3], p. 45; [4]). As Sovacool [5] described in this journal's inaugural issue, energy researchers tend to address the question of change from discrete disciplinary fields of inquiry—a concern that has been reiterated elsewhere more recently [6]. Hence, one of this journal's purposes is to "provide an interdisciplinary forum for the discussion of […] issues related to energy production and consumption" ([5], p. 26). Put differently, if the energy challenges facing society cut across many fields, a more interdisciplinary research practice is required to understand and, ultimately, manage them [4]. With this perspective, we seek to initiate a dialogue and facilitate the integration of analytical tools, concepts and theories from business and management scholarship into international political economy (IPE) and socio-technical transitions (STT) literature. All of these study energy systems and their transformations, without sufficiently engaging with one another at the empirical or conceptual level.

We address the need for an interdisciplinary analysis of a specific type of actor that will be affected significantly by EST, namely 'International Oil Companies' (IOCs, such as ExxonMobil, Shell or BP). Of course, different disciplines within the social sciences have their own points of focus. Yet, our call for interdisciplinarity stems from a perceived gap between energy politics/policy scholarship on the one hand—the primary focus of much of the IPE and STT scholarship—and

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https://doi.org/10.1016/j.erss.2022.102696
Received 18 February 2022; Received in revised form 9 May 2022; Accepted 9 June 2022
Available online 17 June 2022
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what companies think and do—captured by the business and management literature—on the other (see [7] for a similar critique).

When it comes to the IPE and STT literature, the conceptualisation of IOCs, as well as their reaction to change, is often quite reductionist. Fossil fuel 'incumbents' are considered a monolith, with common interests, ideas, narratives and long-term strategic objectives [8–13]. So far, only limited work in this field of study has focussed on IOCs' discrete transition strategies. Moreover, there is a research void when it comes to the impact of EST on National Oil Companies (NOCs) who have access to most reserves and are responsible for the bulk of production. Lastly, this literature does not seriously engage with key strategy concepts to understand how the oil industry itself grapples with the EST because of a tendency to focus on these companies' political behaviour. For example, their lobbying efforts, political financing schemes, and PR campaigns [14–16] (for an elaborate discussion of the difference between political and business behaviour of the firm, see Section 2).

At the same time, strategy, as a distinct field within business and management scholarship, mostly studies discrete companies or sectors, but largely fails to embed its characteristic business case study analysis within the broader (geo)political or socio-technical environment. Some business scholars have indeed acknowledged that they have been neglecting "our age's great issues" ([17], p. 952). In other words, the strategy literature, while interested in the energy sector [18–20], has largely failed to apply their concepts and analytical tools in the specific context of EST and the strategic trade-offs this creates for Big Oil in particular (for an attempt to fill this gap, see a recent joint-Special Issue of the *Journal of International Business Studies* and the *British Journal of Management*).

To broaden our understanding of the differentiation regarding timing, pace and nature of IOC transition strategies, and EST more broadly, we argue that bringing together insights and concepts from the STT and IPE literatures with those from strategy is long overdue. The IPE literature explores the reciprocal relationship between economic and political actors. It follows Susan Strange's ([21], p. 197) assertion that governments, companies, and markets are, in effect, three key players and that they cannot be separated when analysing "the oil business game." As states create economic structures of production and trade, they are in turn shaped by market and business processes that take place within these very same structures [22]. The STT research agenda identifies the fundamental components of low-carbon transitions and explores the interaction of elements of a socio-technical system (social, political, economic, technical, normative), across several levels of structuration (niche, regime, landscape) [23–26]. In essence, these literatures emphasise how political and social structures, as well as their interactions, are key factors in shaping energy markets and transitions.

The strategy literature highlights how companies operate, plan, and interact. It illuminates the intricacies of their long-term strategies and uncovers debates taking place *within* these companies. From a business perspective, the IOCs want to seize potential opportunities associated with EST by reducing risks and costs, anticipating regulation, and developing capabilities through novel ventures. They adopt strategic behaviour to increase their competitive advantage and ensure survival in the face of the existential threat posed by climate change mitigation.

Elsewhere, as an analytical heuristic, we have introduced the 'Transition Strategy Continuum' to capture the strategic risks and opportunities facing the IOCs, as well as the responses they formulate now that they are increasingly confronted with the challenges of EST [27]. Note that this is an ideal type, and as such, a simplification. Here, its purpose is to visualise the relative differences in IOCs' strategic dealings with EST. Here, we explore the Continuum's theoretical underpinnings and invite energy researchers from relevant social science disciplines to engage with our conceptual and analytical proposals. Given the urgency of the decarbonisation task at hand, a more eclectic analytical framework is required to bring a rapid transition to a just end.

In the remainder of this perspective, first we discuss the notion of EST and its implications for the global oil industry and the IOCs. This context is important as it highlights the context and 'bigger picture' that business and management scholars tend to ignore. Second, we explore how conceptual and analytical tools from the strategy literature allow us to capture the complexities of EST and how IOCs are strategising accordingly. Third, we then apply this to the Transition Strategy Continuum. In conclusion, we discuss the implications of such an interdisciplinary approach and suggest some possible future research directions.

2. Energy system transformation, risk, and the global oil industry

To limit temperature increases to 1.5° Celsius, as agreed in the Paris Agreement, CO_2 emissions must decline by 45 % by the end of this decade and will need to reach 'net-zero' emissions by 2050 [28]. This requires an annual decrease of 3.5 % in oil consumption and 4 % fall in production [29]. According to the International Energy Agency's (IEA) Net-Zero Scenario [30], this means ceasing all new development of oil and natural gas fields, coal mines, and coal mine extensions, while others have quantified that 58 % of global oil reserves must stay in the ground in a 1.5° Celsius scenario [31].

Although very ambitious, a broad range of developments—including climate policies, activist pressure, changes in investors' preferences, as well as technological innovations driving down the cost of clean energy alternatives—are all helping to accelerate the pace of a global Energy System Transformation (EST) [1]. We define the EST as a two-fold process. First, the 'low carbon energy transition' refers to the increasing share of energy demand being met by clean energy. Second, a parallel 'high carbon transition' refers to the decline in fossil fuel demand. Crucial to EST is the recognition that simply adding renewables to the energy mix is not enough, we need to decarbonise the energy system by replacing existing fossil fuel production, infrastructure, and consumption in a matter of decades [32,33].

So, what does this mean for the global oil industry? First, not all oil companies are the same, nor will they be affected equally. There is an important difference between the publicly traded IOCs and their (majority) state-owned rivals, National Oil Companies ('NOCs', the likes of Saudi Aramco, ADNOC or Gazprom). According to the IEA ([34], p. 6), the large IOCs account for only 12 % of oil and gas reserves, 15 % of production and 10 % of estimated emissions from industry operations, while NOCs account for well over half of global production and at least 60 % of reserves. In a world of "lowest for longest", some NOCs have other advantages. For example, the most commercially competitive and advanced NOCs (e.g., Saudi Aramco, ADNOC and Qatar Petroleum) have access to reserves with the lowest production costs and with the lowest carbon intensity in their home countries ([35,36,37], p. 7; [38], p. 81). This has led the IEA to suggest that OPEC countries' (and their NOCs) share of global oil production "will grow from around 37% in recent years to 52% in 2050" in a net-zero scenario [30]. On top of that, the IOCs have a higher risk of losing their 'social licence to operate' due to growing climate accountability pressures from the public, resulting, among others, in lawsuits and shareholder pressure [8,35].

Second, this creates significant *transition risks* for the IOCs that, if left unmanaged, will have severe repercussions. This refers to the financial risks resulting from the process of transition toward a low-carbon economy [39]. It will prompt a reassessment of the value of a large range of assets as costs and opportunities become apparent. This not only entails risks for the fossil fuel industry but for a wide range of other stakeholders, including the financial sector [39]. The notion of 'stranded assets' is therefore crucial to understand transition risks. Capital investment in oil (reserves, pipelines, refineries, etc.) could end up failing to be recovered over the operating lifetime of the asset because of reduced demand and reduced prices. According to the Carbon Tracker Initiative (CTI), up to US$32 trillion in fixed fossil fuel-related assets are at risk of becoming, at least partly, stranded [40]. In a bid to avoid this, in 2021, the total value of oil and gas assets up for sale across the industry stood at more than US $140 billion [41]; and that was before

Russia's invasion in Ukraine and the decision of multiple Western IOCs to abandon their Russian operations [42].

Third, the IOCs are now treating EST and transition risks as critical parts of their strategic decision-making. Here, strategy is understood as a company's actions to generate and sustain competitive advantage vis-à-vis competitors in the same market or industry ([43], p. 29; see also [44–50]. As Teece et al. ([49], p. 509) wrote: "the fundamental question in the field of strategic management is how companies achieve and sustain competitive advantage." In other words, it is about achieving a discrete set of long-term goals that allow a company to outperform its rivals (and retain its investors). The articulation of these goals and how to achieve them differs among the IOCs; let alone between NOCs and IOCs. While some IOCs are pursuing a strategic transformation away from their core oil and gas operations, others are doubling down on this core business.

In much of the IPE and STT research on the EST, however, oil companies—and with them, the fossil fuel industry as a whole—are often treated as a 'black box', whose internal workings are hidden or not readily understood. We identify three shortcomings of this scholarship. First, this black boxing is the result of a simplified conceptualisation of incumbency in socio-technical regimes, as well as a limited understanding of what businesses *are* and *do*. Oil companies, for example, are often portrayed as part and parcel of a monolithic 'historical bloc' (in neoGramscian terms) [9,12] or a 'techno-institutional complex' [51]. Second, the research focus is largely on how these incumbents resist, oppose, or contest technological innovations, social changes, or sustainable policy interventions [10] (for a critique, see [13]). Although we do not disagree with the contributions this scholarship has made, it would be constructive to examine those cases where IOCs engage in a more 'positive' way with EST. Third, the focus of much of this research has been on oil companies' political behaviour, or "the actions that have the objective or effect of shaping public policy or the policy preferences of other actors" ([6], p. 7). Common examples include lobbying, campaign financing, and PR campaigns, which have been well documented in the literature and may have led to this understanding of incumbents as 'villains' who resist and slow down transition efforts ([13], p. 181). But there is an important distinction between a company's political behaviour and its business behaviour [6,52]. The latter refers to a company's profit-seeking market activities including, but not limited to, production and sale of products, R&D, business model innovation, etc. [6]. Often, it is the disconnect between the two that leads to accusations of 'green washing' or failing to 'walk the talk' when promoting their green aspirations.

Here, it is this business behaviour that we are interested in. There is now a small but growing segment of social science energy research that is concerned with IOCs' business behaviour in the context of EST, particularly in terms of investment diversification. For example, Zhong and Bazilian [53] build a categorisation of strategies around IOCs' investment decisions, focussing on whether companies actively or passively diversify their business operations and the extent to which start-ups' services are integrated into the investment company's operations. Shojaeddini et al. [54] use two criteria to assess IOCs' involvement in energy transitions: i) the degree of investments in low-carbon technologies and ii) emissions intensity. Pickl [55] has sought to provide a more "holistic analysis" of IOC strategies. Again, however, the focus is on renewable investments, without paying attention to other criteria that could allow for a more comprehensive understanding of the elements that constitute IOCs' transition strategy. From a business and management perspective, Hartmann et al. [56] adopt a similar approach, although they also examine factors determining IOCs' investment decisions in specific countries or companies.

These studies do not always capture the different elements of a company's strategy, as they mostly focus on renewable investments. And when they do [57], they often lack theoretical grounding and serious engagement with the conceptual and analytical tools offered by the strategic management literature. For example, the studies on strategy classifications mentioned above do not engage with earlier work in strategy that explicitly conceptualised how businesses strategise and respond to climate change [52,58–61]. But the same goes for the strategy literature. For example, none of the articles in the aforementioned *JIBS-BJM* special issue engages with the key concept of 'transition risk' that has resonated so much in other scholarly, policy-making and even corporate circles in recent years.

Nevertheless, there are many conceptual tools in strategic management literature that are useful to analyse IOCs and the risk-return trade-offs they face. For example, the well-established scholarship on corporate diversification (and transformation) strategies explores drivers and barriers, the nature and extent of diversification, or performance outcomes for discrete companies [62,63]. We have structured the next section along the classic but seminal distinction in strategy literature between position-based and resource-based views on strategy ([64,65], pp. 42–46, [66]). Although we are aware—and make use—of the many theories, concepts and analytical tools that have since built on this work, we have chosen this approach as it helps us structure our analysis and provides an optimal starting position for the interdisciplinary dialogue that we seek to launch with this perspective.

3. Toward an interdisciplinary understanding of EST & transition strategies

In the previous sections, we have established what the EST means for the global oil industry, particularly for IOCs and their strategy. Here, we expand on the specific ways in which strategic management literature can help describe, analyse, and explain behavioural and strategy difference among the IOCs.

3.1. Strategic management: position-based vs resource-based view

As EST is changing the nature of (competition within) the global oil industry, the various IOCs are constantly strategising to maintain competitive advantage vis-à-vis their rivals. One common way of looking at strategy and competitive advantage, is by structuring it in two—often opposing—approaches: the position-based view (PBV) and the resource-based view (RBV). Both offer very useful insights to understand IOC transition strategies as they provide systematic ways of thinking about competitive advantage.

The first view on competitive advantage—strategy as *positioning* within a market—can be attributed to the seminal work of Michael E. Porter [46–48,67]. Porter's classic 'five forces' model describes how five industry-level forces—new entrants, substitute products or services, established rivals, consumers, and suppliers—determine the profit profile of an industry ([49], p. 511). Company-level strategy is constrained by the nature of an industry. So, this makes it a particularly useful analytical framework to understand competition on an industry level. A company can outcompete rivals if it creates greater value (i.e., customers perceiving the products and services offered as better or more relevant), create comparable value at lower cost (i.e. being cheaper), or, preferably, do both simultaneously.

What does this mean for oil companies in the context of EST? Porter's model can best be used to help the IOC find a position in the industry from which it can best defend itself against competitive forces or influence them in its favour. Today, IOCs are faced with risks across the five forces. The greatest perhaps being the threat of *substitute products and services* as low-carbon technologies are becoming increasingly cost-competitive. Transportation is a good example. In 2019, almost half (49.2 %) of all oil demand came from road transportation, the bulk of which is passenger vehicles driven by internal combustion engines (ICE) ([68], p. 39). This creates a large source of income for the oil industry. But this is going to change rapidly and fundamentally. In 2021, almost 9 % of all cars sold were electric, up from less than 1 % in 2016 [69]. By 2050, oil demand could be 21 million barrels per day less because of electric vehicles, compared to a global fleet entirely made up of ICE

vehicles [70].

Further, we have already signalled above how a specific category of established rivals, namely advanced NOCs from specific countries, hold a significant competitive advantage over the IOCs because of their larger reserves, lower production costs, lower carbon intensity of reserves, and the lack of public scrutiny. The PBV suggests that IOCs will have to enhance or defend their competitive positioning by, for example, creating products or providing services that exploit climate-related changes in demand (e.g. bringing down the carbon-intensity or absolute emissions of the oil products they sell) or by restructuring their activities as a whole to produce a genuine and sustainable competitive advantage. For example, by re-configuring business activities around profitable petrochemical and energy services branches of the company.

Building on this, Porter and Reinhardt [61] stressed that strategising requires 'inside-out' and 'outside-in' thinking. An example of the former is a company's understanding its impact on the climate. Multiple IOCs are doing this by, for example, putting strategies in place to reduce their Scope, 1, 2 and 3 emissions, although some chose to stop at scope 2 [27]. Outside-in thinking refers to how the changing climate, in its physical, regulatory, and financial manifestations may affect the nature of the business environment in which they are operating. Such 'outside-in thinking' provides an important contribution to the PBV in two ways. First, it explicitly considers the role of outsiders, e.g. governments and pressure groups, in determining competitive advantage. Coming back to the EV example, around the world, there is a regulatory push to ban the sale of ICE vehicles. This would expedite the decline of fuel demand for ICE vehicles. Second, it shows that the business environment is not static. In the context of EST, this means that "shifting temperature patterns and regulations […] can affect the availability of business inputs; the size, growth, and nature of demand; access to related and supporting industries; and the rules and incentives surrounding industry rivalry" ([61], p. 23).

This outside-in thinking is echoed in the emerging concerns around the physical and transition risks of climate change and EST. We have already defined transition risks, but the physical risks are the decrease in value of assets and the impacts on insurance liabilities due to climate change-related extreme weather events [60]. ExxonMobil, for example, recently for the first time explicitly warned its investors that it is evaluating climate change and energy system transformation "in the context of overall enterprise risk, including other operational, strategic, and financial risks" and that some of its assets are at risk of impairment ([71], p. 19). Its climate-related risk framework is discussed in its January 2022 energy transition strategy update ([72], p. 43). ExxonMobil's and other IOCs' engagement with physical and transition risks further reflects the growing recognition that the 'battle' for competitive advantage within the global oil industry takes place today in a *Schumpeterian* context of profound changes to the fundamentals of the business environment that, left unaddressed, will lead to their 'creative destruction' ([43], p. 38; [73]).

It is this recognition of market dynamism that marks the second perspective on strategy that we discuss here: the Resource-Based View (RBV). The RBV defines strategy as the logic of accumulating and, consequently, exploiting a company's resources. Resources are the tangible, intangible, or human assets that a company owns, controls, or has access to on a semi-permanent basis [20]. The RBV distinguishes itself from the PBV because of its assertion that market structures are inherently dynamic and by placing the emphasis on the capabilities of the company rather than wider market conditions.

In short, RBV proponents argue that in an increasingly unstable world, the possession and exploitation of its resource base allows the company to achieve and sustain competitive advantage, although this will only be the case if the resources it uses are valuable, rare, inimitable, and non-substitutable resources (VRIN) [44,45,50,74]. Thus, a company's resources, or its specific capabilities and assets function as the "fundamental determinants of company performance" ([49], p. 510). Applying this to the oil industry, it suggests that a company's distinctive competences, such as technical know-how (for example, in drilling techniques or project execution), organisational and management capabilities, company structure, strategic investment decisions, etc. are likely to be most helpful in determining its competitive advantage over others.

The 'dynamic capabilities' framework extends the RBV by addressing how resources can be created and how the existing stock can be refreshed in rapidly and fundamentally changing environments ([43], p. 29; [20]). Dynamic capabilities refer "to the company's ability to integrate, build, and re-configure internal and external competences to address a rapidly changing environment" ([49], p. 516; [75]). If a company possesses resources but does not constantly re-configure them, its returns may be short-lived. Dynamic capabilities are thus essential in an industry undergoing extremely rapid, fundamental changes that are posing existential threats to the survival of its constituents. Thus, they are particularly important in managing the radical uncertainty currently facing the oil industry.

Fig. 1 conceptualises the relationship between the RBV and PBV. It shows how according to the PBV, competition should be understood at an industry level, as company-level strategy is constrained by the nature of an industry. The RBV highlights how competitive advantage is determined at the company level, as individual companies deploy VRIN resources and dynamic capabilities. Importantly, both types of competition can co-exist, making the two approaches complimentary, rather than contradictory.

How do the RBV and dynamic capabilities provide a starting point for expanding our understanding of the oil industry? First, the advantage of the RBV and dynamic capabilities literature is that it helps to understand individual *company behaviour* as it explicitly acknowledges and studies the heterogeneity in terms of capabilities and resources at the company level within an industry. This opens the 'black box' of the industry. Second, by relying on the conceptual and analytical tools of the RBV and dynamic capabilities literature, it is possible to draw on examples from other industries in terms of what strategic interventions can help IOCs deal with their rapidly changing business environment. Third, as we see in the next section, the RBV is useful to determine which resources are deployed in the differing transition strategies.

4. Interdisciplinarity applied: the Transition Strategy Continuum

Elsewhere, we have introduced a novel interdisciplinary 'Transition Strategy Continuum' that, as a heuristic, helps assess and compare overarching oil business strategy in the face of the need for rapid

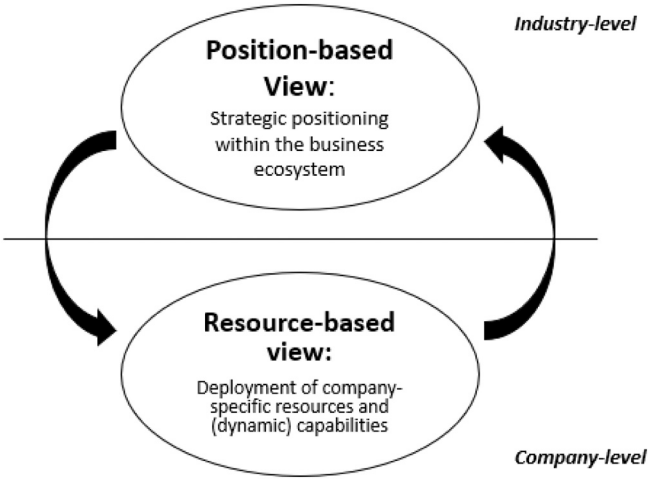

Fig. 1. The resource-based and position-based views on strategy
Source: Authors' creation.

decarbonisation and the management of transition risks [27]. This is an ideal typical representation of what such a differentiation of transition strategies can look like, as it is based on a limited number of variables. Adding more would increase the level of detail but here it serves an illustrative purpose.

Three distinct types of transition strategy are identified. At one end of the continuum there is a conservative 'Core Business' strategy where a company tries to maintain its position in global oil and energy markets. It continues to focus on oil and gas production as its main activities, but it is not a business as usual (BAU) strategy, as it seeks to double down on fugitive emissions, investing in offsetting, or carbon capture, utilisation and storage (CCUS). At the other end, there is a strategy of 'radical transformation,' which entails a complete overhaul of the oil-centred strategy. In between, we find a strategy—to varying degrees—of becoming an 'integrated energy company' (IEC), which entails a pivot away from a focus on producing oil and gas to providing a wider variety of energy services. This expansion into other domains—electricity, renewables, low-carbon-technologies, and bioenergy and carbon capture, use & storage (BECCS)—initially at least, does not always come at the expense of the core oil and gas activities of the prospective IECs (Fig. 2).

All three transition strategies necessitate the development and deployment of dynamic capabilities and other company resources. Here, we list a few examples, with a focus on the IEC and Core Business strategies, as Radical Transformation is currently not pursued by any IOC. Rather, it describes the, so far unique, transformation of the Danish Oil and Natural Gas company (DONG) into Ørsted—now one of the world's leading renewable energy companies. Of course, the ultimate logic of climate change mitigation suggests that this should be the destination for all oil and gas companies if their hope is to survive. Our aim here is to provide a broad analysis of these capabilities, how they can structure our understanding of IOC behaviour, and which (dynamic) capabilities and resource deployments are linked to specific transition strategy. Below, we give two examples of dynamic capabilities associated with an IEC strategy and one associated with a Core Business strategy.

First, according to Eisenhardt and Martin ([75], p. 1108), mergers and acquisitions (M&As) allow companies to re-configure their mix of resources by bringing in new capabilities from external sources. In a similar vein, joint ventures can bring together different sets of resources through intensive cooperation. Acquiring renewable energy and low-carbon technology companies and participating in joint ventures are strategic decisions often pursued by IOCs that are rapidly building their renewables businesses in a bid to become IECs. For example, in line with its objective to operate more than 150,000 electric vehicle (EV) charge points in Europe by 2025, in 2020, TotalEnergies acquired two businesses active in the field of charging infrastructure for electric vehicles. In a similar vein, BP acquired a stake in Lightsource, the largest solar developer in Europe, in 2017 and started a joint venture with Equinor in offshore wind in the US in 2021 [76]. But to reach its strategic target of 50 GW of renewable power generation capacity by 2050, more such deals will be needed. Accessing outside knowledge through M&As and joint ventures at an early stage of the transition may be crucial to achieving superior performance. It would be worthwhile to study how the recent wave of acquisitions and joint ventures in the oil industry is affecting competitive advantage in the sector.

A second example of resource deployment in dynamic business environments is that of 'ambidexterity' [77,78]. An ambidextrous company is one that establishes, aligns, and sustains the competencies, structures and cultures that, on the one hand, forward the interests and objectives of the mature business (for example, oil extraction), while, on the other, drive innovation in the emerging business (for example, renewables). Managing risks and opportunities in both the mature and emerging businesses requires different assets and capabilities. The purpose of ambidexterity is to allow for these different businesses to exist as separate organisational units, each with dedicated financial, human, and technological resources (although some resources are not 'created' but allocated away from mature ventures), while holding them together through a unified, overarching strategy ([19], p. 11). In short, ambidexterity is about governance structure and balancing the centralised and decentralised parts of the organisation. Although it should be noted that it is but one way to pursue so-called 'business model innovation' [79–81].

Furthermore, ambidexterity is also closely related to the notion of 'optimal distinctiveness' in strategy, which recommends companies to adopt a moderate level of innovation that helps it position "as different as legitimately possible" from others in the industry ([82], p. 94; [83]). Carefully balancing the trade-off between conformity (through the mature business) and differentiation (through the emerging business) should allow companies to achieve their strategic objectives.

As noted before, some IOCs—particularly the European ones like BP, Shell, TotalEnergies and Eni—have expressed their strategic intent to become integrated energy companies (IECs). They can clearly be seen as ambidextrous companies. They continue to have an obligation to manage their mature business of oil (and gas) production, with its emphasis on productivity, incremental improvement and short-term focus, while, simultaneously managing the new more entrepreneurial ventures in renewables and low-carbon technologies where competition is fierce, they have to move rapidly, and the horizon is longer-term.

Yet, ambidexterity creates evident trade-offs as resources are allocated away from mature ventures that may risk undermining a company's search for optimal distinctiveness [63]. Pickl [84] describes the trilemma that prospective IECs are facing as they seek to maintain profitable investments in their core business to generate cash, while having to diversify their operations into renewables and low-carbon technologies that may have a lower return on investment, while also maintaining shareholder value and dividends, all at the same time.

ExxonMobil, for example, has been criticised by some of its (activist) investors who maintain that governance failures have led to poor engagement with EST [85]. Shell too has been targeted by an activist shareholder campaign, accusing the company of pursuing an incoherent, conflicting set of strategies ([86], p. 5). The investor proposes that Shell split itself into separate business units, to be able to react more nimbly and effectively to market and environmental policy developments, leaving the door open for the creation of multiple standalone companies. In the weeks after BP's strategy announcement to become an IEC in August 2020, the company's shares fell to a 25-year low [87]. This also highlights the difficulty of satisfying multiple audiences at once, which is referred to in the strategy literature as 'stakeholder multiplicity' [82]. Eni, the Italian major, has acknowledged the potential difficulties of ambidexterity and optimal distinctiveness. It has announced that it will

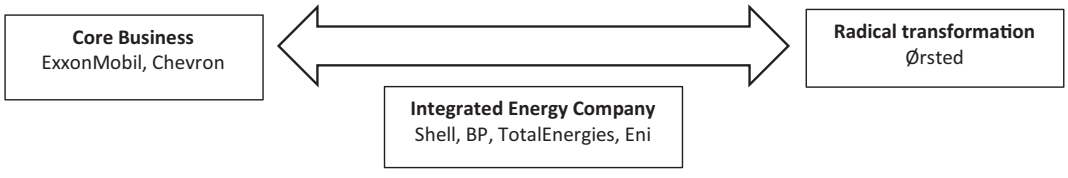

Fig. 2. The Transition Strategy Continuum
Source: [27].

launch an Initial Public Offering, as a standalone company, of its integrated retail and renewables businesses in 2022 [88].

A third example of dynamic capabilities is apparent among those IOCs pursuing a Core Business strategy. Helfat [89] has demonstrated how R&D in response to changing market conditions can be considered a dynamic capability in the oil industry by accumulating technological expertise [16]. This consideration sheds new light on ExxonMobil's expertise in CCUS, hydrogen and biofuels. The company expects opportunities to grow as policy support increases for these low-carbon solutions and is making specific and strategic investment decisions accordingly. In the December 2021 update of its Corporate Plan, the emphasis was explicitly on developing these branches of the company to further increase competitive advantage over its adversaries [90], unlike the European majors that are, among others, seeking to expand their renewable activities.

In sum, this section has introduced how different concepts and tools, and doubtless there are others, can be used to understand transition strategies. This further highlights the need for a focus on IOCs' business behaviour, alongside their political behaviour, to develop a deeper understanding of what IOCs are doing in the context of EST and why they are doing it.

5. Conclusions

In this perspective, we have highlighted the potential value of an interdisciplinary approach to the study of International Oil Companies' (IOCs) behaviour in the face of global energy system transformation (EST). Particularly when it comes to oil companies' business behaviour and their corporate transition strategies, where there has been a marked lack of effective engagement with these issues by STT and IPE scholars.

Only by infusing these fields of study with insights, tools and concepts from the strategic management literature, we can 'see', as social scientists, that there is a lot more to strategy than opposing and delaying change, while not denying that IOCs engage in such tactics. At the same time, IOCs are a heterogeneous group pursuing distinct goals, with a unique corporate culture and set of hard-to-copy resources and capabilities that they seek to employ to sustain competitive advantage over their competitors.

This perspective is an agenda setting exercise since the IOCs are only at the very early stages of transformation and detailed empirical analysis is challenging as it is aiming at a (fast) moving target. Made more complex by the global energy price crisis and the impact of the war in Ukraine. Nonetheless, we suggest that IOCs have access to and can deploy multiple dynamic capabilities in the face of EST, resulting in three different, albeit ideal typical, transition strategies: Core Business, Integrated Energy Company, and Radical Transformation. This highlights why the IOCs should not be treated as a monolith, but instead as a varied group of corporate actors engaging in distinct political *and* business behaviours.

How might we take this interdisciplinary approach forward? A first next step would be to consider the entire global oil industry ecosystem, including NOCs, some of the smaller IOCs (such as Repsol and Occidental Petroleum), E&P companies, and oilfield service companies. A structured comparison may be hampered by the different nature and objectives of these companies. Nonetheless, the overall challenge for all companies involved in the global oil industry remains the same: how should they prepare for and engage with energy system transformation, the broader context of climate change, and the associated transition risks?

Second, further case study research could examine *why* companies adopt different transition strategies. Conventional business strategy explanations would point to differences in company-specific competencies, dynamic capabilities, and market positioning. While political economy approaches would also refer to regulatory differences between jurisdictions in which these companies operate (or have their historical headquarters) and the role of IOCs as political actors within these polities. All potential explanations should be on the table, from a micro (company-) level assessment of the explanatory factors to macro-level, political economic one.

A third way forward would be to examine what happens as IOCs transition and divest carbon assets in order to avoid them becoming stranded. In whose hands will these assets end up? Will it be smaller, independent E&P companies, backed by private equity (subject to less public scrutiny and, potentially, with a worse environmental track record)? Or will it be Chinese NOCs looking to diversify China's ever-growing need for secure energy supply? This is an avenue of research that we are currently exploring.

Given the importance of the oil industry to the global (geo)political economy and the scale of the challenges that it faces, we maintain that there is great potential for wider engagement between business and management and energy research elsewhere in the social sciences. This perspective is offered as a starting point.

Declaration of competing interest

Mathieu Blondeel reports financial support was provided by UK Research and Innovation Energy Programme.

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