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How Theories of Organization Inform Transition Studies

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Abstract

In historical socio-technical transitions, organizations functioned as the principal drivers of transitions, invented the defining innovations, and created the cognitive and normative rules that led industries to embrace the innovation and associated behavior. Yet, despite their importance, the roles of organizations in transitions and, in particular, the processes that guide and coordinate their behavior, remain under-conceptualized in some transition frameworks, including the Multi-Level Perspective. In this paper we enrich this perspective by reviewing how prominent research traditions in organization science and management conceptualize organizational responses to the environmental changes that trigger transitions. Our review provides two guides for transition studies. Where the various theories agree, at least in a broad sense, we provide a theoretical model for transitions grounded in organization theory. In particular, we derive a transition typology that describes typical pathways depending on the nature of environmental change and the speed at which the transition is unfolding. Where the various theories disagree, the question becomes in which empirical contexts each of the organization theories applies best. Here, we provide a list of conditions and industry characteristics that suggest the use of one theory rather than another. In this way, our results enable more systematic analysis on the role of organizations in transitions and provide input for techniques such as agent-based and econometric modeling of transitions. We also answer to a broader call for input from organizational scholars to clarify the role of actors in transitions and extent recent work on how context leads to different transition typologies.

HOW THEORIES OF ORGANIZATION INFORM TRANSITION STUDIES

The Visible Hands that Drive Transitions

1. INTRODUCTION

The Multi-Level Perspective has a considerable following among transition scholars (Fuenfschilling & Truffer, 2014; Markard, Raven, & Truffer, 2012). It conceptualizes transitions as unraveling in networks of actors that interact with artifacts, technologies, and resources (Geels, 2011). These "socio-technical systems" are typically relatively stable due to sets of normative, and cognitive rules that orient and coordinate the behavior of the system's actors (Geels, 2004a, 2011; Kemp, 1994). They can become unstable due to environmental changes, which opens the door for innovations to transform the system. Transitions also attract increasing attention outside of academia. Inspired by the desired transition to a low carbon economy (Council of the European Union, 2006; European Commission, 2011) and by the embryonic transition to online education (Christensen & Eyring, 2011), the affected organizations want to understand how they can steer transitions in a favorable direction. Organizations, however, do more than merely steering transitions. In historical cases, organizations functioned as the principal drivers of transitions, invented the defining innovations, and created the normative and cognitive rules that led industries to view the innovation and the behavior to it as the default. When innovations such as General Motors' multidivisional form (Berle & Means, 1933; Chandler, 1977; Freeland, 1996) and Dell's build-to-order model (Gunasekaran & Ngai, 2005) made their way through last century's organizations, they changed not just the directly related organizations and industries, but also the wider societal context. Organizations in unrelated industries began to mimic their innovations, which affected not just themselves, but also their suppliers, customers, regulatory bodies and—eventually—even the social norms and expectations that guided their industries.

Yet, despite the important role of organizations in transitions (Geels & Schot, 2007; Rip & Kemp, 1998; Van der Vooren & Alkemade, 2012), the processes that guide and coordinate the behavior of organizations are under-conceptualized in the Multi-Level Perspective (see Safarzynska, Frenken, & Van den Bergh, 2012; Vasileiadou & Safarzynska, 2010). This has led to a lack of structure and consistency in the way the behavior of organizations is considered in transition studies. This is somewhat surprising, because this subject has seen extensive investigation in related research traditions within the field of organization science and management—some of which inspired the Multi-Level Perspective (Geels, 2011).

However, in the organization and management domain, prominent traditions such as the Behavioral theory of the Firm (Cyert & March, 1963), the Resource Based View (Barney, 1991; Wernerfelt, 1984), Resource Dependence Theory (Pfeffer & Salancik, 2003), Institutional Theory (DiMaggio & Powell, 1983; Meyer & Rowan, 1977), and Organizational Ecology (Hannan & Freeman, 1989) each have their own assumptions about the behavior of organizations. The large variety of theories, arguments, and unresolved theoretical debates lead to substantial ambiguity about the implications of organizational-level behavior for system-level change. In particular, it remains unclear how the environmental changes that feature so prominently in the Multi-Level Perspective influence the behavior of organizations and how this, in turn, ties into the relative stability of the system (Genus & Coles, 2008; Vasileiadou & Safarzynska, 2010).

In this paper we enrich the Multi-Level Perspective by reviewing how the aforementioned research traditions conceptualize organizational responses to environmental change. We explore how differences in the theoretical assumptions underlying these factors imply different transition processes and outcomes.

Our review provides two guides for future studies in transition research. First, where the various theories of organization agree, at least in a broad sense, we provide a theoretical model for transitions based in organization theory. In particular, we derive a transition typology that describes typical. Second, where the various theories of organization disagree, the question becomes in which empirical contexts each of the five organization theories

applies best. Here, we suggest conditions that suggest the use of one theory rather than another.

In this way, our results enable more systematic qualitative analysis on the role of organizations in transitions and can serve as input for other techniques such as agent-based modeling (Köhler et al., 2009; Van der Vooren & Alkemade, 2012) and econometric modeling of transitions (Vasileiadou & Safarzynska, 2010). We also answer to a broader call for input from organizational scholars to clarify the role of actors in socio-technical transitions (Geels, 2011; Markard et al., 2012) and extent recent work on how context leads to different transition typologies (e.g. Berkhout, Smith, & Stirling, 2004; Geels & Schot, 2007).

2. THE ROLE OF ORGANIZATIONS IN THE MULTI-LEVEL PERSPECTIVE

As a merger of Evolutionary Economics, Institutional Theory, and Science and Technology Studies, The Multi-Level Perspective conceptualizes transitions as unraveling in socio-technical systems, which consist of networks of actors that interact with artifacts, technologies, and resources under the guidance of semi-coherent sets of rules that are called "regimes[1]" (Geels, 2011; Kemp, 1994). These rules can be regulative, normative, and cognitive rules such as search heuristics, organizational routines, stocks of knowledge, scientific paradigms, guiding principles, regulations, shared expectations, norms, user practices, and user preferences (Geels, 2004a). Regimes guide and coordinate the behavior of actors because actors draw upon regime rules when they set their behavior. Every set of actors that shares a set of rules is associated with a unique regime that embodies those particular rules. Actors can, and often do, share rules with multiple groups and thus draw from multiple regimes. For example, most institutions of higher education organize their research and educational curriculum in a similar manner, based on content and subject matter, but there are strong within-group differences in their behavior with regards to attracting funding. While public institutions primarily attract funding from government sources, private institutions do not (Tolbert, 1985)—both institutions draw on the same regime to organize their research and education, but draw on different regimes to set their funding behavior. Because this is a rather typical situation, transition scholars often indicate that a socio-technical system is guided by a "patchwork" of partially overlapping regimes that they refer to as the "socio-technical regime[2]."

Regimes do not act in complete isolation of each other. Actors may draw upon multiple regimes and may be affected by the behavior of other groups of actors that operate under a different regime, which leads to conflicting demands (Fuenfschilling & Truffer, 2014; Raven, 2007a). However, repeated interaction between actors in a socio-technical system typically leads to increased alignment of the regimes that guide their behavior. The socio-technical regime may then become well aligned and tightly linked, such that it becomes internally consistent and it becomes difficult to change one of its regimes without affecting another. When this happens, the regimes will be continually reproduced by the groups of actors that draw upon them (Geels, 2004a). This results in a system that fluctuates around a stable configuration, although it may not be truly in equilibrium—rather, it develops along a stable trajectory (cf. Geels & Schot, 2007).

Socio-technical systems are embedded in a "socio-technical landscape" that constitutes their wider exogenous environment (Geels, 2004b). It is comprised of relatively rigid societal structures and slowly progressing trends such

[1] Regimes are defined inconsistently throughout the transition literature (Markard & Truffer, 2008; Smith et al., 2010). Some scholars include physical components such as actors (Verbong & Geels, 2007) and technological artifacts (Smith et al., 2005), while others exclude tangible components and define them as a set of semi-coherent rules (Geels, 2011). Our definition follows the latter approach and thereby remains conceptually similar to its meaning in Evolutionary Economics (Nelson & Winter, 1977). Conceptualizing regimes as guiding the behavior of the systems' actors also provides a solution to problem of defining the boundaries of regimes (see Genus & Coles, 2008), whilst retaining the ability to analyze regimes on different levels of aggregation (Markard & Truffer, 2008) and remaining consist with its meaning in other research traditions.

[2] The transition literature sometimes suggests that the regimes that make up the patchwork may be understood as "sub-regimes" (Diaz, Darnhofer, Darrot, & Beuret, 2013; Elzen, Geels, Leeuwis, & van Mierlo, 2011; Geels, 2011). However, because regimes can be associated with multiple socio-technical regimes, any notion of hierarchy may lead to ambiguity about the exact way the regimes are nested. We therefore distinguish between the patchwork of regimes and the actor-specific regimes by referring to the former as "socio-technical regimes" and to the latter as "regimes."

as societal values, political ideologies, and demographic trends, but can also represent environmental shocks such as destabilization of global currencies (Sirmon, Hitt, & Ireland, 2007) or wars (Geels, 2011). Although the landscape is beyond the direct control of system actors, it constitutes an additional source of structuration of their behavior by making some behavior easier than other behavior (Geels & Schot, 2007).

Landscape change, however, can also open the door for changes in the behavior of actors (Smith, Voß, & Grin, 2010). For example, jet aircraft manufacturers initially struggled to gain ground on piston-propeller aircrafts because their behavior was heavily constrained by the prevailing regimes (Geels, 2006). The Second World War, however, created specific demand for high-performance aircrafts, which formed an opportunity for jet aircraft manufacturers to experiment with novel technologies, free from the behavioral constraints of the mainstream regimes. The deviations from regime expectations enabled by such landscape developments may lead groups of actors to inject deviant rules in a regime, thereby loosening the alignment between the regimes that make up the wider socio-technical regime (Geels & Schot, 2007; Geels, 2002). When this misalignment becomes severe, the socio-technical regime no longer leads actors to uniformly reproduce it, which increases the amplitude and frequency of the system's fluctuations around its stable configuration.

These circumstances open a "window of opportunity" for actors to introduce technological novelties to invade the system, and induce a shift from one socio-technical regime to another (Geels, 2004a, 2004b; Rip & Kemp, 1998). Novelties arise in niches (Geels, 2006; Kemp, Schot, & Hoogma, 1998; Schot, 1998), which are spaces that are protected from the structuring pressures of the regime. This may be because they enable the organizations that occupy them to raise barriers to entry, to subject others to their market power (Tisdell & Seidl, 2004), or to benefit from public subsidies and strategic investments that are not available to others (Brown, Vergragt, Green, & Berchicci, 2003; Hoogma, Kemp, Schot, & Truffer, 2002). The sheltered nature of a niche allows actors that occupy it to experiment with novel technologies and behavior—niches can effectively act as an "incubation room" for novelty (Schot, 1998). According to the Multi-Level Perspective, niches are typically occupied by organizations that were not part of the initial system and that aim to replace the incumbent regimes with their own, thereby provoking a reconfiguration of the system that is favorable to them. In response, the incumbent organizations may attempt to suppress the niche players and stick to the old technology, thereby exerting a large influence on the transition process (Geels, 2005; Raven, 2007b).

In this conceptualization of transitions, the notions of regimes can give the impression that actors only play a minor role in the development of socio-technical systems (Genus & Coles, 2008; Smith, Stirling, & Berkhout, 2005). This impression is incorrect, because both the socio-technical regime and the system are a product of the behavior of actors. Although organizations are certainly not the only actors in a socio-technical system, they are arguably the most significant. They are the source of innovations as niche occupants, hold central positions in the networks of a socio-technical system, and produce and reproduce the regimes that guide industries. Organizations thus play a key role in transitions.

In the following section, we select the most appropriate research traditions for our review from amongst the contemporary theories of organization. We do so on the basis of a discussion of three underlying theoretical positions that are particularly relevant to the study of transitions and along which these theories vary.

3. THEORIES OF ORGANIZATION AND THE MULTI-LEVEL PERSPECTIVE

A myriad of theories finds copious use in organization science (McKinley, 2010). They share a lineage based on the rational views of the firm (Taylor, 1911; Weber, 1978) that dominated organizational theorizing at the brink of the twentieth century (Baum & Rowley, 2002). Subsequent theorizing has been highly divergent, as scholars drew inspiration from a variety of disciplines, ranging from economics, management, sociology and psychology to biology (Baum & Rowley, 2002). This fragmented disciplinary basis is reflected by the contemporary theories of organization (see McKinley, Mone, & Moon, 1999; McKinley, 2010), where it has lead to a wide variety of perspectives and

assumptions about organizational behavior that are relevant to the study of transitions. First, theories of organization have a different conceptualization of environmental change than the Multi-Level Perspective. Second, theories differ with regard to their claims about whether organizational behavior reflects internal processes rather than environmental processes (the "organization-environment balance"). Third, theories differ with regard to the claims that they make about the ability of organizations to successfully adapt their behavior to environmental change (the "adaptation-selection balance"). We will briefly reflect on each of these positions.

Different conceptualizations of environmental change. The Multi-Level Perspective makes a distinction between three types of organizational environments. First, there is the landscape, which is exogenous to the system and is beyond the immediate sphere of influence of organizations (Geels & Schot, 2007). Second, there is the socio-technical regime, which is enacted and reproduced by the actors in the system. Third, there are the other actors in the system with which a focal organization can interact. The regime and the other actors form the endogenous environment that can be influenced by the organizations in the system. In the Multi-Level Perspective, the initial trigger of a transition is typically a change in landscape conditions (Geels & Schot, 2007).

Theories of organization differ in their conceptualization of the environment. Some emphasize institutional factors (Scott, 2001), while other theories emphasize the role of the actors (Pfeffer & Salancik, 2003). They typically do not distinguish between the endogenous and the exogenous environment of the Multi-Level Perspective. This paper follows the approach of the Multi-Level Perspective and focuses on landscape change as the initial trigger of a widespread shift in the behavior of organizations.

Differences in the implied organization-environment balance. Another set of differences between theories of organizations revolves around the degree of autonomy that they grant to organizations. Some theories assume that the behavior of an organization reflects processes that occur within the organization (see Cyert & March, 1963), while other theories argue that its behavior is largely determined by factors outside of the organization (see Meyer & Rowan, 1977). Yet other theories take an intermediate position and argue that behavior is set at organizational-level (see Barney, 1991; Wernerfelt, 1984). A theory's position on this balance is important to the study of transitions for two reasons. First, a focus on the organization leaves room for organizations to make strategic choices, to pro-actively change regimes, or to introduce niche-innovations. It allows the source of a transition to originate from inside the socio-technical regime, rather than the landscape. Second, different positions on the organization-environment balance imply different degrees of uncertainty and heterogeneity. If organizational behavior is loosely tied to environmental conditions, then organizations are able to set their own (unique) response to landscape change. If organizational behavior is intimately tied to environmental conditions, organizations will respond in very similar ways.

Differences in the implied adaptation-selection balance. The contemporary theories of organization also differ strongly in degree to which they claim that organizations can intentionally—and systematically—change their behavior in such a way that they can survive environmental change (Lewin, Weigelt, & Emery, 2004). Strictly adaptive theories argue that this is possible, which requires several assumptions. First, the assumption that organizations can select an appropriate response to a given environmental change; second, that organizations can correctly implement the intended change; and third, that organizations are able to implement the change before further environment change makes them obsolete. Theories that argue strictly in favor of selection claim that one or more of these assumptions are unrealistic and that the dynamics of organizations must therefore reflect environmental selection. A theory's position in the adaptation-selection balance is important to the study of transitions, because it informs us about the composition of the organizational population after the transition. Adaptation implies that incumbent organizations are likely to survive a transition and that there is little room for new entrants. Selection implies that some organizations may survive by chance and that there is room for new entrants.

Our review covers a wide variety of positions in the organization-environment balance and the adaptation-selection balance through a selection of the most prominent theories of organization, namely the Behavioral Theory

of the Firm, the Resource-Based View, Resource Dependence Theory, Institutional Theory, and Organizational Ecology[3]. For each of these theories, we first summarize how they portray organizations as well as their foundational assumptions. Next, we appraise how they conceptualize the predominant behavior of the organizations in a socio-technical system under stable landscape conditions. This reflects the state of the socio-technical system prior to a landscape change. Lastly, we discuss their implications for how the predominant behavior of the organizations in a socio-technical system changes as a result of a considerable landscape change. These findings are summarized in Table 1, while a second table presents an overview of their implications for transition processes and outcomes.

3.1. Behavioral Theory of the Firm

The Behavioral Theory of the Firm portrays organizations as coalitions of individuals and functional groups that pursue individual goals. Because individuals and groups have heterogeneous goals and lack the same information, conflicts arise within the organization. This leads to the inevitable need to negotiate compromises. In a perpetual process of quasi-resolution of conflict, the members of the organization form sub-coalitions that vie for control over the organization (Stevenson, Pearce, & Porter, 1985). They then impose *"a series of independent aspiration-level constraints"* (Cyert & March, 1963: 117) on the organization, which they base on the performance of its competitors (social aspirations) (Greve, 1998; Massini, Lewin, & Greve, 2005) and its past performance (historical aspirations) (Lant, Milliken, & Batra, 1992; Lant, 1992). Because of this internal orientation, the Behavioral Theory of the Firm emphasizes internal dynamics over environmental dynamics.

Contemporary studies usually assume that a dominant coalition imposes a disproportionate influence on organizational aspirations (Hambrick & Mason, 1984; Pearce II, 1995). This coalition is intendedly rational in selecting goals and strategies, but does not behave in line with the maximization postulate of neoclassical theories. Instead, the Behavioral Theory of the Firm depicts its behavior as "boundedly rational"; the complexity of the situation and computational limits make it impossible to fully consider the utility of every possible action. The result is that organizations rely on heuristics (Argote & Greve, 2007); they look *"for a course of action that is satisfactory or 'good enough'"* (Simon, 1997: 119).

Arguments based on these assumptions are frequently combined with Evolutionary Economics and Organizational Learning. We therefore draw on insights from all three traditions, although our focus remains on the Behavioral Theory of the Firm.

Organizations in stable landscapes. During operation, organizations develop standard operating procedures or "routines" (Cyert & March, 1963; Gavetti, Greve, Levinthal, & Ocasio, 2012). Routines are *"the forms, rules, procedures, conventions, strategies, and technologies around which organizations are constructed and through which they operate"* (Levitt & March, 1988: 320). Over time, organizations tend to retain routines that satisfy their aspirations, that increase their reliability and efficiency, or that reduce the uncertainty they face (Becker, 2004). Similarly, they may imitate the routines of the organizations that they or their members come in contact with through consultants (Levitt & March, 1988), personnel movements (Biggart, 1977), or educational institutions (Heimer, 1985).

Routines entice organizations to repeat what has proven beneficial in the past and to search locally to further exploit their routines. Organizations therefore develop along unique trajectories. As organizations develop their set of routines, they internalize knowledge and develop absorptive capacity (Cohen & Levinthal, 1989, 1990). Absorptive capacity governs their ability to interpret and absorb new information, which enhances subsequent their learning.

The efficient exploitation of routines lead to the buildup of organizational slack—a *"pool of resources in an organization that is in excess of the minimum necessary to produce a given level of organizational output"* (Nohria & Gulati, 1996: 1246). Slack buffers organizations from landscape change and variations in performance (Cyert & March, 1963; Litschert & Bonham, 1978; Yasai-Ardekani, 1986).

Organizations in the wake of landscape change. Organizations initially choose to absorb landscape

[3] Organizational Ecology has been omitted from the current paper because of size limitations.

fluctuations with organizational slack, rather than to adapt their routines (Cyert & March, 1963; Litschert & Bonham, 1978; Yasai-Ardekani, 1986). Particularly if organizations are experienced, they are likely to employ routines that have proven successful in the past, even if they no longer match the current environment (Henderson & Clark, 1990; Starbuck, 1983). Absorbing changes only succeeds if landscape change is minor, because organizations eventually perform below aspirations if the change is large. When performance falls short, organizations change their routines and use non-local search processes to find solutions (Greve, 1998; Lant & Mezias, 1992). In the process, they seek and experiment with solutions outside the scope of their usual routines (Greve, 2003). Once organizations perceive a solution as "good enough," they attempt to implement it and abandon the search process (Cyert & March, 1963). Landscape change is thus an important source of new routines as, under stable conditions, internal processes primarily change existing routines (Zhou, 1993).

The success of an organization's search depends on three factors; (i) the amount of slack that it invests in the search (Cyert & March, 1963); (ii) its absorptive capacity, which allows its to interpret the information that results from the search (Cohen & Levinthal, 1990); and (iii) its ability to turn the information into novel solutions (Zollo & Winter, 2002). Yet even if organizations identify an appropriate solution, it often remains hard to implement it (Tripsas & Gavetti, 2000). The larger the distance between the current situation and the identified solution, the less likely organizations are to implement it successfully (Cohen & Levinthal, 1990). Although organizations can change some of their routines, it remains hard to change many routines at once (Tripsas & Gavetti, 2000). Moreover, organizations will also need to unlearn existing routines to adapt, which is difficult (Betsch, Haberstroh, Molter, & Glöckner, 2004; Cohen & Bacdayan, 1994; Tripsas & Gavetti, 2000). Adaptation therefore poses substantial risk to organizations, especially when they have a highly developed set of routines.

The learning incorporated in highly developed sets of routines further stacks the odds against the organizations that posses them. Although applied work commonly assumes that learning improves organizational performance (Schulz, 2002), research shows that it can harm performance (Miner & Mezias, 1996). Organizations sometimes overvalue conclusions drawn from recent experience and local situations and erroneously assume that particular actions caused a beneficial outcome (Levitt & March, 1988). But even when this is not the case, organizations may be led astray when they continually improve their current performance at the expense of routines that may become beneficial when landscape conditions change. Moreover, as an organization becomes increasingly adapted to the landscape, its absorptive capacity with respect to new landscape conditions decreases, thus hindering successful adaptation (David, 1985; Levinthal & March, 1993).

3.2. Resource-Based View

The Resource-Based View sees organizations as bundles of resources (Penrose, 1959)—the tangible and intangible assets organizations use to choose and implement their strategies (Barney, 2001; Wernerfelt, 1984). Contrary to traditional views that place the organization's product market approach at the heart of its competitive position, the Resource-Based View bestows this privilege upon the organization's unique resource endowment (Dierickx & Cool, 1989). Organizations strive to gain a competitive advantage by using valuable resources to *"conceive of or implement strategies that improve [their] efficiency and effectiveness"* (Barney, 1991: 106). However, resources only confer a sustainable competitive advantage when they are also rare, imperfectly imitable, and cannot be substituted with strategically equivalent resources that are not themselves rare or imperfectly imitable (Barney, 1991). Resources are managed by the organization's management, which has to deploy and develop resources in such a way that their (Amit & Schoemaker, 1993; Fahy, 2000; Lippman & Rumelt, 2003), which the theory a strong focus on the organization, rather than its environment.

Organizations in stable landscapes. The Resource-Based View assumes that organizations' resource endowments are highly heterogeneous (Peteraf, 1993; Wernerfelt, 1995: 172). This heterogeneity stems from variations in methods of information gathering, luck, managerial ability, technological know-how (Lewin et al., 2004), and uncertain

imitability (Rumelt, 1984). But organizations cannot afford to remain passive and merely exploit their current resources. To maintain their competitive advantage, they need to protect their resources by raising barriers to entry (Mahoney & Pandian, 1992; Rumelt, 1984).

Organizations improve their competitive positioning by acquiring new strategic resources (Amit & Schoemaker, 1993; Fiol, 1991) and by developing the capabilities to use their resources more effectively and efficiently (Teece, Pisano, & Shuen, 2007). However, changing resource endowments is time-consuming, expensive (Wernerfelt, 1995), and subject to strong path dependency. The new resources and capabilities that organizations can develop depend on its extant resources and the complementarities between them (Harrison, Hitt, Hoskisson, & Ireland, 1991; Pettus, 2001). Because initial resource endowments are heterogeneous, organizations therefore tend to differentiate from each other over time and seek to establish their own niche within the current strategic environment. In the process, their resource bases become increasingly reflect the contemporaneous landscape conditions.

Organizations rarely use their resources to their full extent (Pettus, 2001). Some of these resources can be traded on open markets, but others are costly or difficult to trade. Hence, organizations—especially those with broad resource bases—may decide to retain excess fungible resources that are subject to market failure for internal use (Montgomery & Hariharan, 1991). To do so, organizations will diversify into industries that have resource requirements similar to their own (Penrose, 1959). The more distant an organization's diversification, the less efficient resources are used (Montgomery & Wernerfelt, 1988). This implies that organizations cannot diversify indefinitely, because marginal rents will eventually reach zero (Peteraf, 1993).

Organizations in the wake of landscape change. Within the parameters of the Resource-Based View, the value of strategic resources is closely tied to conditions under which they are used. Resources can only provide an advantage while they allow the organization to exploit opportunities or neutralize threats in its environment (Barney, 1991). This means that landscape change can render strategic resources obsolete (Miller & Shamsie, 1996; Porter, 1991). Landscape change can therefore put incumbent organizations in a disadvantaged position compared to new entrants that possess resources that are valuable in the new landscape conditions (Miller & Shamsie, 1996; Rumelt, 1984; Thornhill & Amit, 2003). The very resources and capabilities that allowed organizations to survive their early years can become liabilities when the landscape changes. This implies that new entrants and incumbent organizations fail in different ways; new entrants fail when their resources are ill-suited to their landscape, while incumbent organizations fail because landscape change undermines their competitive advantage (Thornhill & Amit, 2003).

To survive in the long run, organizations need to adapt their resource base or its deployment to the new landscape (Sirmon et al., 2007), which gives the Resource-Based View an adaptive orientation (Lewin et al., 2004). The theory, however, places limits on the degree to which organizations can adapt. Changing resources endowments is a time-consuming process (Dierickx & Cool, 1989) and resources that provide sustainable competitive advantage are imperfectly imitable (Barney, 1991) and only mobile to a limited extent (Wernerfelt, 1984), making it hard to identify appropriate changes (Rumelt, 1984). In addition, organizations that control critical resources are unlikely to share them with competitors that do not have access to these resources, since this could compromise their own competitive position. Organizations that cannot access resources critical for survival will exit the focal market.

As such, landscape change can severely reduce organizational heterogeneity. However, it also changes the resource requirements to succeed as an organization (Abell, 1978; Robinson, Fornell, & Sullivan, 1992). This opens up opportunities for founding and new entry because, as resource relevance turns over, incumbents and new entrants are out on a more level playing field. Following landscape change, resource heterogeneity among entrants is high (Walker, Madsen, & Carini, 2002), making it likely that some entrants possess favorable resource endowments. The first successful movers may then rely on isolating mechanisms such as patents, reputation, switching costs, causal ambiguity, and skill development to isolate their resources, providing them with a distinct advantage over late entrants (Rumelt, 1984). The incumbent organizations, on the other hand, are then expected to create strategic entry barriers into the market to protect their own position and deter entry (Mahoney & Pandian, 1992).

3.3. Resource Dependence Theory

Resource Dependence Theory (Hillman, Withers, & Collins, 2009; Pfeffer & Salancik, 2003) shares many aspects with the Resource-Based View, but differs on two essential dimensions. First, it emphasizes that organizations strive for continued support, operational stability, and survival, rather than for competitive advantage (Lin, Peng, Yang, & Sun, 2009; Pfeffer & Salancik, 2003). Second, it focuses on the relationship between the organization and its environment, rather than on the organization itself (Lewin et al., 2004). The theory builds on two research traditions that previously remained disconnected; a tradition that focuses on the role that environments play in organizational structure, and a sociological tradition that focused on inter-organizational power relations (Wry, Cobb, & Aldrich, 2013). Resource Dependence Theory integrates them by positing that an organization's environment is comprised of other organizations that each have their own goals and that these organizations hold power over it in proportion to the indispensability of their resources in the attainment of its goals (Pfeffer & Salancik, 2003).

Organizations in stable landscapes. Managers attempt to reduce others' power over their organization by reducing environmental uncertainty and external contingencies (Hillman et al., 2009; Pfeffer & Salancik, 2003). Within the parameters of Resource Dependence Theory, they do so in several ways. First, organizations may attempt to grow and, in that way, increase their control over the resources of other organizations. Alternatively, organizations may attempt to absorb the organizations that they are most dependent on in their transactions (Campling & Michelson, 1998; Finkelstein, 1997; Pfeffer, 1972). This effect becomes more pronounced in highly concentrated industries because organizations have more power to negotiate better prices and, hence, have more to lose when transactions are constrained (Finkelstein, 1997). However, absorbing critical resource involves giving up substantial power, which is unlikely if power dependencies are imbalanced. Absorbing is thus more likely when power dependencies are mutual and balanced (Casciaro & Piskorski, 2005; Gulati & Sytch, 2007). In cases where absorbing resources is not feasible, organizations may form links with other organizations to decrease uncertainties (Pfeffer & Leong, 1977), which is particularly likely under intermediate industry concentration (Pfeffer & Salancik, 2003; Phillips, 1960). Lastly, organizations may diversify to buffer themselves against uncertainties that cannot be overcome (Hillman et al., 2009) or, in isolated cases, resort to political action to create a new regulatory environment that decreases their own dependencies and uncertainties. Over time, an organizational community will thus become a carefully managed network, wherein heterogeneous organizations are tightly linked to the organizations they rely on.

Organizations in the wake of landscape change. Environmental change poses organizations with substantial uncertainty about the reliability of their resource dependencies. Organizations will increasingly attempt to use the strategies outlined above to reduce their resource dependencies to minimize this source of uncertainty. The management of an organization needs to accurately identify the source of the most significant uncertainties and select the appropriate measures to minimize them. In this sense, Resource Dependence Theory has a strong adaptation perspective, since strategic choices allow the organization to adapt to its environment or enable the organization to control its environment to reduce uncertainty (Lewin et al., 2004). Larger organizations are more powerful and are therefore more likely to rely on the latter strategy, while smaller organizations are more likely to rely on the former. By the same token, more specialized organizations have more power over the organizations that depend on them and, as such, are more likely to attempt to control their environment rather than adapt to it.

On a population level this implies that the environmental change is not only exogenous, but that powerful key players in the population can influence, delay, and even resist change. They can increase their chances of survival by carefully timing the moment of change to their advantage. Thereby the organizations that are most likely to survive environmental change are those that are most powerful. Moreover, since they can time the moment of change, they can enter the new market as powerful players, and immediately deploy strategies to control new entrants.

3.4. Institutional Theory

Institutional organization theory posits that organizations reflect the "myths" of their environment rather than profit

maximizing behavior (DiMaggio & Powell, 1991; Meyer & Rowan, 1977; Zucker, 1983). They conform to contextual expectations of appropriate forms and behavior in an attempt to gain legitimacy and increase their probability of survival (DiMaggio & Powell, 1991; Drazin, Glynn, & Kazanjian, 2004). They thereby willingly conform to the dominant institutions—the "rules of the game" in a society (Kingston & Caballero, 2009; North, 1990). In doing so, organizations continually incorporate features that are considered *legitimate* in the wider institutional environment (Donaldson, 2006; Meyer & Rowan, 1977).

The focus on the environment lead early institutional theory to emphasize structure (Barley & Tolbert, 1997), which made the role of agency somewhat ambiguous (Battilana, Leca, & Boxenbaum, 2009; DiMaggio & Powell, 1991; Oliver, 1991; Scott, 2001). This ambiguity has seen extensive theoretical and empirical investigation in recent years (Dacin, Goodstein, & Scott, 2002; Peng, 2003), leading to a notable change in the dominant discourse in the literature; instead of speaking of institutional effects, scholars begun to speak of institutional processes (Scott, 2005). Under the new discourse, the rules, norms, and beliefs of actors are perceived as guided by institutional demands, rather than determined by them (Koelbe, 1995; Scott, 2005). Actors can—and do—initiate changes that contribute to institutional transformation. Thereby the focus shifts towards agency, although the strong emphasis on structure remains.

Organizations in stable landscapes. Institutional scholars expect organizations to become increasingly stable and homogenous (Meyer & Rowan, 1977)—a process they refer to as institutional isomorphic change. The degree to which it shapes the organizational landscape depends on the strength of several distinct environmental pressures. First, coercive pressures stem from the socio-political expectations and pressures exerted on an organization by the organizations upon which it is dependent (DiMaggio & Powell, 1983; Meyer & Rowan, 1977; Salancik, 1979; Townley, 1997). Second, mimetic pressures arise from imitative and habitual behavior in the face of uncertainty (DiMaggio & Powell, 1983; Galaskiewicz & Wasserman, 1989; Haunschild, 1994). When organizations are uncertain about their environment or their goals, they model themselves after organizations they perceive as successful or legitimate (Budros, 1997; DiMaggio & Powell, 1991; Fligstein, 1985; Greve & Taylor, 2000; Haveman, 1993; Oliver, 1991; Tolbert & Zucker, 1983). Lastly, normative isomorphic pressures result from *"the collective struggle of members of an occupation to define the conditions and methods of their work"* (DiMaggio & Powell, 1983: 152). Organizations within the same organizational field draw personnel from similar cognitive bases and employ similar methods of filtering personnel. Because of this, individuals in organizations carry similar normative rules and views about organization and professional behavior.

Organizations in the wake of landscape change. The conceptualization of organizational behavior as expectation conforming implies a static outcome—it cannot account for organizational change that diverges for contextual expectation (Holm, 1995; Seo & Creed, 2002). Homogeneity, however, only increases if expectations remain stable, but the homogeneity also ensures that expectations are reinforced, which implies that change is unlikely to occur. More recently, however, the institutional framework has begun to account for divergent organizational change by arguing that "institutional entrepreneurs" act as agents of change (DiMaggio & Powell, 1991). Institutional entrepreneurs introduce divergent changes such as new business models and organizational practices and actively contribute to implement them (Battilana et al., 2009). Landscape conditions, alongside the presence of multiple conflicting institutions, and the overall degree of institutionalization determine whether institutional entrepreneurs have the necessary degree of agency to act (Battilana et al., 2009).

Oliver (1991) framed this role of organizational agency as strategic behavior. Ranging from complete adherence to contextual expectations, through quiet nonconformance, to actively attempting to manipulate institutional processes, organizations do not merely act as they are told. In some cases, the rationales for strategic behavior are merely economic, but in most cases it occurs in interaction between (i) the degree to which organizational goals conflict with institutional requirements (Greenwood & Hinings, 1996; Oliver, 1991), (ii) the degree to which organizations face multiple conflicting institutional demands (Oliver, 1991; Seo & Creed, 2002), and (iii) the degree to which

organizations are dependent on the institutional constituents (Oliver, 1991; Salancik, 1979).

Strategic behavior, then, is induced through several processes. First, institutional practices can deviate so much from technologically efficient practices that decoupling them from the symbolic aspects of the organizations becomes infeasible (Seo & Creed, 2002). Second, political pressures can induce strategic behavior when the personal interests of organizational members deviate from institutional expectations. Third, social pressures for deviating behavior can arise when institutions no longer serve those who enact them (Oliver, 1992; Seo & Creed, 2002). Last, institutional contradictions can sometimes lead the involved actors to suddenly see the institutions as problematic, leading them to undertake action to enact institutional change (DiMaggio & Powell, 1991). Many of these pressures are likely to arise when an organizational field faces disruptive event (Hoffman, 1999). These are environmental changes such as technological change, changes in factor conditions, and changes in product demand (Ruttan & Hayami, 1984), but they can also be endogenous to a system (such as the depletion of a critical resource (Kingston & Caballero, 2009; Leblebici, Salancik, Copay, & King, 1991)). These triggering conditions lead to the situation in which institutional entrepreneurs find themselves drawn to strategic behavior. When this happens, they may find it easier to achieve consensus about slight deviations from contextual expectations than major deviations (Kingston & Caballero, 2009; North, 1990). Radical change is unusual, but when it occurs, it is revolutionary and affects the whole set of actors involved (Greenwood & Hinings, 1996; Seo & Creed, 2002).

4. INTEGRATION, COMPARISON, AND SYSTEM-LEVEL IMPLICATIONS

Table 1 presents the key characteristics and claims about organizational behavior of each of the theories of organization. As the table shows, the assumptions that underlie theories of organization differ strongly. Yet, despite these differences, their implications for transition studies are, in a broad sense, surprisingly similar. The overall transition typologies implied by these theories are quite consistent, as apparent from their implications as shown in Table 2.

TABLE 1 | Key theory characteristics and expected organizational behavior.

Theory	Behavioral drivers	Organization-environment balance	Adaptation-selection balance	Behavior in stable landscapes	Behavior in the wake of change
Behavioral Theory of the Firm	▪ Aspiration levels	▪ Intra-organizational—behavior flows from processes internal to organizations.	▪ Mixed—organizations search for beneficial adaptations, but slack buffers them from landscape change and internal processes limit their ability to implement and identify appropriate changes.	▪ Improve fit with the landscape by retaining successful routines. ▪ Accrue organizational slack.	▪ Use organizational slack to absorb minor changes. ▪ When performance drops below aspirations, organizations absorb slack to fuel search processes to adapt.
Resource-Based View	▪ Sustainable competitive advantage	▪ Organizational—behavior flows from organizations' resource endowments.	▪ Adaptive—organizations are able to adapt their resource base to changing conditions, although it is sometimes hard to acquire the necessary resources.	▪ Raise entry barriers to protect their own niches. ▪ Diversify into areas where excess resources provide a competitive advantage. ▪ Develop resources and capabilities along a unique trajectory to improve fit with the landscape.	▪ Actively adapt resource bases to the novel landscape conditions. ▪ Incumbents raise barriers to entry to deter new entrants. ▪ Niche players raise barriers to entry to ensure that their resources remain valuable.
Resource Dependence Theory	▪ Environmental uncertainties	▪ Organizations depend on their environment, but actively manage their dependencies to retain control of it	▪ Adaptive—organizations actively manage their external contingencies to retain control of their environment	▪ Organic growth to increase control over other organizations. ▪ Initiate mergers and acquisitions to reduce external contingencies. ▪ Form alliances with other organizations.	▪ Diversify to buffer from landscape change. ▪ Use political action to reverse or suppress change. ▪ Use power over other organizations to prevent impact of change.
Institutional Theory	▪ Legitimacy	▪ Environmental—behavior flows from environmental demands. Conflicting demands open avenues for variations in behavior.	▪ Mixed— the institutional environment determines who survives and who does not; only under specific conditions do organizations drive population dynamics.	▪ Homogeneity increases because organizational behavior converges on a set of stable expectations. ▪ Increasing institutionalization leads to conflicts between technical demands and expectations, opening the door to strategic behavior and endogenous change.	▪ Uncertainty about the landscape leads to mimetic behavior. ▪ Institutional entrepreneurs recognize and act upon the opportunity for non-conformance.

Where theories of organization agree—implied transition typologies. Taking the perspective of the Behavioral Theory of the Firm, incumbent organizations should only be expected to respond to landscape change once performance falls below aspiration levels. These levels are based on their historical performance as well as their competitors'. Both factors are directly affected when other organizations successfully occupy a new niche. Incumbent organizations will then use organizational slack to initiate a search for solutions, which, if successful, will further impact the performance of their peers. It can thus trigger a cascade of change in a socio-technical system. Institutional Theory provides further support for this prediction. Here, the argument is that incumbent organizations will initially leave the niche untouched. Instead, the uncertainties induced by changes in the socio-technical system will lead the incumbent players to rely increasingly on established practices. But once the organizations that occupy a niche manage to destabilize the very established practices themselves, the behavior of the incumbent organizations suddenly opens up. This leads to the proposition below.

Proposition 1: when organizations are able to develop through their early stages in a niche without affecting the performance of the incumbent organizations, the resultant transition will be discontinuous and will disfavor the incumbent organizations.

The Behavioral Theory of the Firm and the Resource-Based View also agree that, when a socio-technical regime has remained stable over a large period of time, then incumbent players are less likely to survive an eventual transition. When, according to the Behavioral Theory of the Firm, incumbent organizations do not experience landscape change regularly, they will increasingly adapt their routines to the stable conditions. Although they may build up substantial organizational slack, they will have a hard time adapting a large amount of routines at once. As such, they are unlikely to survive when the landscape eventually changes. Similarly, the Resource-Based View argues that organizations continually adapt their resource base to their environment. This is a time-consuming process but, given enough time, their resource base will become highly specific to their environment. Yet, when the environment changes, their resource base devaluates significantly. This leads to the proposition below.

Proposition 2: when a socio-technical regime has remained stable over a large period of time, old incumbent players are less likely to survive an eventual transition than when the regime has previously experienced frequent changes.

Where theories of organization disagree—fruitful lenses. Although the reviewed theories of organization provide, in many respects, similar predictions, there are cases in which their predictions conflict—as apparent from Table 2. This, however, does not imply that one or the theory is necessarily incorrect. These theories build on specific assumptions regarding the drivers and nature of the behavior of organizations to formalize the mechanisms that underlie transition processes. Even if we accept these assumptions, the degree to which they are reflected in transition outcomes and processes remains strongly tied to particular conditions and industry characteristics of the empirical context in which they are applied. The question thus becomes in which empirical contexts each of the four organization theories applies best.

The Behavioral Theory of the firm builds strongly on the assumption that organizations feature many internal coalitions. This leads to satisficing behavior and is an important factor in the problems that organizations with highly developed sets of routines experience when they attempt to change their routines. As such, the Behavioral Theory of the Firm is especially appropriate for application to socio-technical systems that are dominated by large organizations with many internal coalitions.

The Resource-Based View, on the other hand, builds strongly on the assumption that organizations feature heterogeneous resource bases that cannot easily be adjusted. This, however, requires that it is hard to observe what the exact contribution of particular resources is to the competitive advantage of an organization. As such, the Resource-Based View fits best with socio-technical systems that feature organizations with heterogeneous resource

bases and where it is hard to appraise the value of specific resources.

Resource Dependence Theory argues that powerful incumbent organizations attempt to minimize uncertainties by constraining niche organization, possibly through acquisition strategies. This is especially the case in socio-technical systems that encompass industries that have monopolistic power. In these cases, organizations that occupy a niche can only successfully achieve dominance in the system if they can forego dependence on organizations that are, themselves, very dependent on incumbent organizations that support a competing technology.

Institutional Theory, lastly, suggests that incumbent organizations will leave the niche largely untouched. Instead, the uncertainties induced by landscape change will lead the incumbent organizations to rely increasingly on established practices. As such, Institutional Theory provides an elegant explanation for the "sailing ship effect" (Gilfillan, 1935) that is regularly referred to in transition studies (Geels, 2005; Kemp et al., 1998; Raven, 2007b). Transitions, then, primarily result from the activities of the institutional entrepreneurs that occupy a niche. Only once their activities create insurmountable conflicts between the regimes that affect the behavior of the incumbent players, will the latter group adapt—albeit potentially too late. Seeing that this conceptualization of transitions builds strongly on the assumption that institutional expectations are relatively detached from specific actors and are widely agreed upon, Institutional Theory can most fruitfully be applied when a system is relatively well developed, is historically stable, and is characterized by a large number of organizations.

TABLE 2 | Suitable empirical context of theories and corresponding transition implications.

Theory	Implied transition process	Implied post-transition system	Suitable empirical context
Behavioral Theory of the Firm	▪ Incumbent organizations ignore the activities of niche players that do not directly affect their own performance. ▪ Incumbent organizations attempt to adopt the routines of niche players when the activities of niche players significantly affect their own performance. ▪ Incumbent organizations typically respond to niche activities at the same time.	▪ When organizations have been able to fully adapt to a set of static landscape conditions, the lack of absorptive capacity and unsuitable routines makes them unlikely to adapt to novel conditions. ▪ When environmental conditions have fluctuated historically, organizations will have retained routines that can cope with change. Thus, they are likely to do well even under novel conditions. ▪ Incumbent organizations are more likely to survive the transition when they have historically performed well because they can consume more slack in their search for solutions. ▪ In highly competitive industries, organizational slack is low. This makes incumbents unable to adapt.	▪ Socio-technical systems that are dominated by large organizations with many internal coalitions.
Resource-Based View	▪ Transition is slow if the resource bases of incumbent organizations do not support the new technology because they will attempt to deter entry by raising barriers to entry. ▪ Transition is fast if the resource bases of incumbent organizations can be used to exploit the new technology because it is attractive for them to diversify into the niche.	▪ To the degree that the new technology requires the same resources, incumbent organizations are likely to survive. ▪ If the transition proceed quickly, incumbent organizations are unlikely to survive because they cannot acquire the appropriate resources in time. ▪ Incumbent organizations with diverse resource bases are more likely to survive than organizations with specific resource bases.	▪ Socio-technical systems that feature organizations with heterogeneous resource bases and where it is hard to appraise the value of specific resources.
Resource Dependence Theory	▪ Powerful organizations use merger and acquisition strategies to reduce uncertainties arising from the niche. This will slow the transition.	▪ Incumbent organizations that occupied central positions in the pre-transition system are likely to survive the transition by absorbing the niche.	▪ Socio-technical systems wherein one or more organizations are strongly reliant on other organizations.
Institutional Theory	▪ When institutional entrepreneurs destabilize existing institutions, they trigger widespread change in incumbent organizations. ▪ Incumbent organizations initially respond to landscape change by increasing their reliance on the old regime.	▪ Incumbent organizations and new entrants both adhere to the same, new, regime.	▪ Socio-technical systems that are associated with strongly developed socio-technical regimes.

5. DISCUSSION AND CONCLUSION

This review only covers a subset of the contemporary research traditions and only a selection of the studies within each tradition. Many of the concepts within each tradition have seen substantial empirical investigation in recent years, which led to extensive refinements and introduced nuances into their role in the associated theories (e.g. organizational slack and institutional entrepreneurship). It is unfeasible to include these nuances in a review of the present scope. Although it is fair to say that this study sacrifices depth for the sake breadth, this seems to us an appropriate trade-off in consideration of the study's aims. To introduce the richness of theoretical view on the dynamics of organizations to transition scholars and to incorporate some of the insights of this domain into the study of transitions, a comprehensive overview seems preferable to a more detailed, but very limited one. Further research could, of course, draw attention to the nuances that we omitted and build upon the present study.

The results of this study can be used to explore a number of research avenues. First, our investigation of the role of organizations in indicates that the organizational-level underpinnings of transitions are complex. To improve our understanding of how the behavior of individual organizations aggregate to macro-level phenomena such as transitions, modeling methods such as agent-based modeling could be a promising avenue of research. Our results can serve as input for such models. The agent-based models may be used to verify of our results, or to uncover unexpected transition processes. Finally, they allow exploring if making different assumptions about organizational behavior indeed leads to different transition outcomes.

Second, researchers may wish to empirically assess the conditions under which each theory gives the most accurate representation of the observations. This will help to predict the outcome of a transition and gives policy-makers tools to accelerate the process when desired.

Our results show that organizations may respond differently to changing landscape conditions under different circumstances. Even though theories of organization work from different assumptions and emphasize different aspects of organizations, they have, in a broad sense, similar implications for transitions. First, that landscape dynamics may matter to transition outcomes even before they trigger a transition. Second, that the time that niche organizations are able to develop independently from the incumbent regime affects the subsequent transition process. And lastly, that the degree to which niche activities build upon regime activities matters greatly to the outcome of the transition.

Overall, these findings indicate that historical contingencies may play a strong role alongside the contemporaneous configuration of a socio-technical system in determining its response to a particular shift in landscape conditions.

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