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Working Paper 17-091



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**FLEXING THE FRAME:
TMT FRAMING AND THE ADOPTION OF NON-INCREMENTAL
INNOVATIONS IN INCUMBENT FIRMS**

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WORKING PAPER

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ABSTRACT

Why do incumbent firms so frequently reject non-incremental innovations? One reason is due to the firm's top management team's (TMT) lack of frame flexibility, i.e., an inability to expand the organization's categorical boundaries so as to encompass a wider range of emotionally resonate capabilities in the context of innovative change. For incumbent firms, we argue that the way the TMT cognitively thinks about, and emotionally frames, non-incremental innovation and organizational capabilities drives innovation adoption. We show that frame flexibility is both cognitive, through claimed beliefs and understandings, and emotional, through claimed appeals to feelings and aspirations. First, we reexamine an assumption that cognitive frames are static and suggest how they evolve to become flexible – via shifts in perceived categorical hierarchies and in the ability to reconcile incompatible organizational capabilities. Second, we theorize and attend to the role of emotional frames in innovation adoption. Thus, we advance a model that articulates how cognitive and emotional framing affects the likelihood of non-incremental innovation adoption and, over time, the breadth of the organization's innovation practices. We delineate these processes, as well as the internal and external contingencies that influence them, and offer directions for future research.

Keywords: innovation adoption, cognition, framing, emotional resonance

Innovations are the lifeblood of any organization and yet their adoption poses considerable challenges to incumbent firms (Christensen, 1997: 317; Gans, 2016; Henderson, 1993). By definition, non-incremental innovations are inconsistent with an organization's current product portfolio and business model (Henderson & Clark, 1990; Smith & Tushman, 2005) and engender threats that can hold the incumbent organization hostage to its past (Vuori & Huy, 2016). Top management teams (TMTs) often become mired in framing the innovation in terms of the organization's past, rather than the future (Gilbert, 2006). Because of these inertial forces, incumbents frequently fail as product classes evolve (Benner & Tushman, 2003).

Although scholars have documented numerous challenges attending the adoption of innovations, including resource allocation, technological demands, and business model incompatibilities (e.g., Danneels, 2011; Floyd & Lane, 2000), research on the TMT's ability to effectively frame a potential innovation has received less attention in spite of the recognized need for such work (see recent calls from Eggers and Kaplan, 2013; Helfat & Peteraf, 2015). A TMT's framing of a focal innovation (i.e., the bracketing of attention so as to simplify understanding, interpretation, and evaluation of that innovation for the organization in terms of its alignment with the strategic direction of the firm) (e.g., Giorgi & Weber, 2015), can play a pivotal role in the TMT's decision to adopt the innovation. The divergent fates of two firms – Blockbuster and Netflix – provide a useful illustration.

Prior to going bankrupt in 2010, Blockbuster's TMT framed online streaming, a non-incremental innovation, in ways that conflicted with the company's legacy strategy as a brick-and-mortar video rental service. In 2000, Netflix's CEO approached Blockbuster about forming a partnership to pursue an online streaming platform. However, he "got laughed out of the room"

(Satell, 2014:1) and the innovation was rejected by Blockbuster's TMT because they perceived it to be strategically incongruent with their existing business model (Newman, 2010).

By contrast, the TMT at Netflix was able to frame online streaming more flexibly as an extension of "entrainment subscription services," and thus, saw it as compatible with their current capabilities in DVD rentals. They did this by broadening their framing, so as to see a potential alignment between the innovation and organizational capabilities; and importantly, they cast the innovation as an organizational aspiration to provide consumers with "value, convenience, and selection" (O'Reilly & Tushman, 2016: 6). This flexibility in framing, reflected by cognitive expansion and emotional expressiveness, abetted the adoption of online streaming services and content production. Soon, Blockbuster's advantage disappeared (c.f. Rothaermel, 2001) as its TMT continued to frame the organization in terms of its legacy strategy, i.e., brick-and-mortar video rentals. Years later, Blockbuster's former CEO expressed his regret at the innovation framing: "I firmly believe that if our online strategy had not been abandoned, Blockbuster Online would have 10 million subscribers today, and we'd be rivaling Netflix for the leadership position in the internet downloading business" (Antioco, 2011: 1). It was as Eggers and Kaplan (2013: 317) observed: "[managers'] frames are stuck in an old understanding of the environment." Thus, we propose, it was framing that lacked strategic resonance that contributed to Blockbuster's inability to adapt to technological change.

The contrast between Blockbuster and Netflix raises questions of how and why some TMTs are able to frame target innovations more effectively so as to enhance their suitability with the organization's strategy. Researchers studying framing have shown that a foundational mechanism for frame effectiveness is its perceived alignment or resonance (Benford & Snow, 2000; Meyer & Höllerer, 2010), which can influence audiences and guide strategic direction

(Hardy, Palmer, & Phillips, 2000; Steyaert & Hjorth, 2008). Innovation adoption, because of its inherent uncertainty and equivocality (Weick, 1990), calls for effective framing if adoption is to achieve strategic resonance. Untested and unfamiliar non-incremental innovations, like most objects of framing, can elicit multiple, and even conflicting, meanings, particularly as the TMT positions the innovation in light of the firm's existing strategy, product portfolio, capabilities, and business model (Helfat et al., 2009; Hodgkinson & Healey, 2011). As Snow and colleagues (1986: 477, cited in Giorgi, forthcoming) point out, "many framings may be plausible, but (...) relatively few strike a responsive chord." Striking that responsive chord, or being strategically resonant, we argue, is key for effective framing by the TMT and, in turn, the strategic decision to adopt an innovation. As Eggers and Kaplan (2013: 313) observe, "Frames, therefore, shape the organization's dedication of scarce resources to one capability or another (Laamanen & Wallin, 2009). This resource allocation process is the central task of strategic management (Bower, 1970)."

Framing is the process of formulating interpretations "to locate, perceive, identify, and label" events or choices (Goffman, 1974: 21) to organize, clarify, and render understandable experience and guide decision-making (Cornelissen & Werner, 2014). Frames are "action-oriented sets of beliefs and meanings that inspire and legitimate activities" (Snow & Benford, 1988: 198) and have been widely applied to understand mobilization in social movement organizations (Lounsbury, Ventresca, & Hirsch, 2003), category emergence and change (Delmestri & Greenwood, 2016; Vergne & Wry, 2014), institutional change (Khaire & Wadhvani, 2010; Rao, Monin, & Durand, 2003), strategic reorientation (Fiss & Zajac, 2006), product development (Seidel & O'Mahony, 2014) and organizational change (Bartunek & Franzak, 1988; Reger, Gustafson, Demarie, & Mullane, 1994).

Frames are effective when they invoke meanings, categories, or beliefs that are especially salient to both internal and external organizational audiences. Frames achieve this via two main pathways: cognitive, through claimed beliefs and understandings; and expressive, through claimed appeals to feelings, aspirations, emotions or “passionate identification.” The first pathway – cognitive – has been recognized as important in the strategic management literature (Eggers & Kaplan, 2013); however, the latter – emotive – has been relatively neglected, but is an approach gaining scholarly attention (Giorgi, forthcoming; Voronov & Weber, 2016).

We seek to elaborate how framing influences the adoption of non-incremental innovations in incumbent firms. Our unit of analysis is the TMT because they are charged with reviewing and evaluating innovations for adoption, as well as addressing the challenges of, and making strategic choices about, innovation adoption (e.g., Gilbert, 2005; O'Reilly & Tushman, 2016; Sull, 1999). Our context is TMT decision-making about the adoption of non-incremental innovations (i.e., innovations that are inconsistent with current organizational strategy, product portfolios, or business models), because they challenge the TMT's existing mental models (Barr, Stimpert, & Huff, 1992; Weick, 1990) and necessitate fundamentally different framing and conceptualizations of organizational capabilities (e.g., O'Reilly and Tushman, 2016; Gans, 2016). Thus, it is a context in which TMT framing becomes especially salient and where its effectiveness has the potential to reshape the firm's core capabilities and innovation decisions.

We seek to make several contributions related to TMT framing and innovation adoption. First, we reconceptualize cognitive framing, which tends to be conceptualized as relatively static and immutable (Benford, 1997; Benner & Tripsas, 2012; Danneels, 2011), trapped by (Tripsas & Gavetti, 2000), or anchored to (Vergne & Wry, 2014), their extant cognition. This theorization is largely refuted by social movement studies (Benford & Snow, 2000) which allow for flexibility,

change, and adaptation in framing. Our theorization focuses on explaining flexibility in framing, via categorization and capability construction, in the consideration of innovations that can be construed as inconsistent with the incumbent organization's strategic focus or business models.

Second, we expand current notions of strategic framing beyond cognition to include emotions, a topic that is gaining in currency as an organizational concern (Voronov & Weber, 2016). Moreover, incorporating the role of emotions offers a way of addressing gaps in the literature (Eggers & Kaplan, 2013; Helfat & Peteraf, 2015), which has been faulted for its compartmentalization and lack of a unified theory (Eggers & Kaplan, 2013; Huff & Huff, 2000; Walsh, 1995). Accounting for emotional framing allows the possibility for contrasting sets of innovation and organizational capabilities to remain coupled with an emotionally engaged TMT articulation and narrative (Battilana & Dorado, 2010; Gardner, Anand, & Morris, 2008; Raisch & Tushman, 2016; Vuori & Huy, 2016). We suggest the likelihood of innovation adoption is accentuated if expanded cognitive frames emotionally resonate in the TMT. Although not all innovations may flourish, we argue that TMTs that build flexible cognitive frames, and couple these frames with emotional engagement, increase the likelihood of non-incremental innovation adoption.

Third, we bring to the literature on strategic decision-making about innovation adoption a deeper understanding of managerial framing. Innovation is a site ripe with potential for framing ambiguity, contestation, and resistance (Lavie, 2006; Weick, 1990). Building on existing research on cognitive framing in the context of innovation (e.g., Benner & Tripsas, 2012; Gavetti & Rivkin, 2007; Gilbert, 2006), we argue that frames can bend, flex and be more supple, so as to consider how even potentially competence-destroying technical innovations (e.g., Tushman & Anderson, 1986) can be hosted within existing organizational capabilities and the formal and

informal systems that form the organization's architecture (Gulati, Puranam, & Tushman, 2012; Nadler & Tushman, 1989). We acknowledge that broadened TMT cognitive framing must be coupled with complex, internally inconsistent capabilities and associated organizational architectures (Benner & Tushman, 2003; Raisch & Birkinshaw, 2008). Essentially, this issue pivots on the question of whether the TMT is capable of thinking about organizational architectures that are seemingly contradictory or paradoxical (e.g., Smith, 2014).

We develop a conceptual model to explain *how* TMT framing – both cognitive and emotional – affects the likelihood of non-incremental innovation adoption in incumbent firms. Our model advances a series of propositions that illuminate dimensions of TMT framing and its influence on adoption. In addition, we extend these effects over time, mapping the cyclical nature of this process. We conclude by discussing the implications of our conceptual model for theory, research, and practice.

INNOVATION ADOPTION AND TMT FRAMING IN INCUMBENT FIRMS: A CONCEPTUAL MODEL

An organization considers the adoption of a target innovation in order to seize competitive advantage of new market opportunities or to respond to non-routine change (Gopalakrishnan & Damanpour, 1997; Levinthal & March, 1993). Although they may not be universally novel, innovations are locally novel, being new and useful to the adopting firm (Amabile, 1988; Glynn, 1996; Kanter, 1983; Van de Ven, 1986). Innovations fall into three distinct types: incremental (Christensen, 1997; Dosi, 1982), architectural (Henderson & Clark, 1990), or discontinuous (Gatignon, Tushman, Smith, & Anderson, 2002). Incremental innovations are similar to the existing offerings in the firm's portfolio and thus build on, and extend, the organization's preexisting capabilities and knowledge bases. Incremental innovation is the least challenging of the three in organizational adoption, as it necessitates minimal

strategic or organizational change; thus, the need for TMT framing is lowest in this case.

Architectural innovations, by contrast, trigger substantial organizational changes when adopted. They reconfigure existing organizational components while leaving the core design concepts (and thus the basic knowledge underlying the components) untouched. Because architectural innovations require significant shifts in interfaces and linkages across product/service components, “some of what the firm knows is not only not useful but may actually handicap the firm” (Henderson and Clark 1991: 10, 13). Similarly, discontinuous innovations are challenging to adopt because they require new capabilities, processes, and knowledge that radically redefine and extend existing capabilities and technologies (Corso & Pellegrini, 2007) and with it, initiate deep-seated strategic and organizational change (Adner, 2012; Schilling, 2005).

Because the adoption of either architectural or discontinuous innovations require the firm to make substantial changes in knowledge, capabilities and associated architectures (Dewar & Dutton, 1986), they both present significant obstacles for incumbent firms and make more demands for TMT framing. Consequently, we group these two types of innovations – architectural and discontinuous – together under the umbrella of “non-incremental innovations.”¹

In contrast to incremental innovations, incumbent firms are less likely to adopt, or to incompetently adopt, non-incremental innovations (Henderson, 1993; Tushman & O'Reilly, 2002). For instance, incumbent firms such as Firestone (Sull, 1999), Smith Corona (Danneels, 2011), Polaroid (Tripsas & Gavetti, 2000), and Swiss watchmakers (Landes, 1983), struggled to manage non-incremental innovations because they provided the TMT “with options either to

¹ Because their adoption presents similar and significant tensions to adopting firms, we group the architectural and discontinuous types together under the umbrella of “non-incremental innovations” to make our theorization more parsimonious.

reinforce or destabilize a technological regime” (Benner & Tushman, 2003: 242). The decision to reinforce or destabilize the organization’s status is one that involves framing.

When TMTs in incumbent firms consider an innovation for adoption, they do so in the context of the legacy strategy of the firm and its business model. Whether a legacy strategy constrains or enables decision-making about innovation adoption, however, is in the province of the TMT’s construction of more or less flexible mental models (Barr et al., 1992): Generally speaking, strategic choices perceived to be consistent or aligned with the current organizational model are favored, while those that lie outside tend to be rejected. And yet, this model of strategic choice seems to limit the functioning of the TMT to a simple binary determination of whether (or not) a target innovation is consistent (or inconsistent) with a current strategic frame. We allow for an alternative option, that the TMT cannot simply take the strategic frame as given but, instead, bend, flex or adapt it to the potential adoption of a target innovation.

We advance a theoretical model (see Figure) proposing that the likelihood of organizational adoption of a non-incremental innovation is hinged to the TMTs’ framing of that innovation in the context of the firm’s legacy strategy. We conceptualize framing as consisting of two pathways – cognitive and emotional – that together affect the TMT’s review and evaluation of the target innovation. The core mechanism in framing effectiveness is that of flexibility, i.e., the TMT’s ability to bend or stretch existing conceptualizations, both cognitive and emotional, to appropriately align the innovation with the legacy organizational strategy and capabilities. Cognitive flexibility, we argue, results from the dual processes of re-categorizing the organizational order at a higher or more abstract level of classification, and of reconciling inconsistent organizational capabilities and architectures; greater cognitive flexibility results in expanded framing of the innovation. Emotional flexibility, we argue, results from a felt

alignment or passionate identification of the frame with organizational strategic goals or aspirations. We theorize that TMT flexibility in both cognitive and emotional framing leads to strategic resonance with the focal innovation; in turn, this should increase the likelihood of the TMT adoption of the innovation. Moreover, we theorize the reverse, i.e., TMT inflexibility in cognitive and emotional framing will decrease the likelihood of adoption. In addition, we propose that prior innovation adoption decisions accumulate over time to affect the organization's innovation profile and the TMT's capability to attend to non-incremental innovation. Next, we detail our model and offer propositions that articulate our core arguments.

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Cognitive Frame Flexibility via Re-categorization

In the strategic management literature, a cognitive frame refers to managerial mental maps (Barr et al, 1992), thought structures (Reger, 1990), schemata of interpretation (Gavetti & Rivkin, 2007), strategic frames (Huff, 1982), or more generally, “mental templates that individuals impose on the information environment to give it meaning” (Walsh, 1995: 281). Cognitive frames have been shown to be influential in several aspects of strategic decision-making, including capability development (Benner & Tripsas, 2012), search and evaluation (Gavetti & Levinthal, 2000), information processing (Cornelissen & Werner, 2014), and organizational change and innovation (Tushman and Anderson, 1986). Because senior teams process information collectively (Weick, 1993), their cognitive frames help them aggregate interrelated information (O'Keefe & Nadel, 1978) when faced with ambiguity (Barr et al., 1992).

A consistent theme that pervades this literature is that cognitive frames serve as an interpretive lens that help TMTs “filter” queues from their external environment and respond

accordingly (Eggers & Kaplan, 2013). Helfat and Peteraf (2015) offer a theoretical bridge from managerial cognition to the literature on dynamic capabilities, explicating how cognition serves as an important microfoundation of dynamic capabilities (e.g., Teece, 2007). They theorize that processes of sensing, seizing and reconfiguring dynamic capabilities are associated with a managerial cognitive capability – defined as “the capacity of an individual manager to perform one or more of the mental activities that comprise cognition” (Helfat and Peteraf, 2015: 835).

As such, a TMT’s decision to adopt a new innovation, with its associated capabilities, depends on whether their cognitive frame filters the capability as a potential threat or opportunity to the existing organization (Benner & Tripsas, 2012; Gilbert, 2005; Staw, Sandelands, & Dutton, 1981; Tripsas, 2009). Especially during periods of technological ferment, cognitive frames can get mired in legacy strategies and framings (Eggers & Kaplan, 2013) and, in turn, revert to overlearned behaviors (Staw et al., 1981). Danneels (2011) offered an example of such a threat frame in his account of Smith-Corona’s failure to adapt to the rise of desktop computing; he showed how the TMT was unable shift resources toward new capabilities because of an entrenched cognitive frame anchored to typewriters. Similarly, Tripsas and Gavetti (2000) demonstrated that prior managerial cognitive representations posed the primary challenge to innovation adoption at Polaroid. Gilbert (2006) illustrated how competing cognitive frames of threat and opportunity led to the collapse of several newspapers following the rise of online news. And, while these empirical cases suggest that cognitive frames may constrain innovation adoption, we argue the reverse: cognitive framing can enable innovation adoption, particularly when the TMT is capable of flexing or stretching the framing.

To begin, the TMT’s consideration of a focal innovation is situated in their understanding of the organization’s legacy strategy (Adner, 2012; Dosi, 1982) and existing cognitive framing

(Walsh & Glynn, 2008), as well as the firm's performance (Gavetti, Levinthal, & Ocasio, 2007; Greve & Taylor, 2000). Innovation adoption necessitates cognitive work by the TMT that is directed towards the symbolization, interpretation, and emotional reconciliation of the incumbent firm's past with its potential future, signaled by the innovation. We propose that the TMT bends its cognitive framing effectively by broadening its categorical claims to construe its strategy at a higher, superordinate or more abstracted level. This was evident, for instance, in Netflix's construal as an entertainment company and its adoption of an online streaming platform.

Rather than being fixed, such claims to the classification taxonomy can be supple in the hands of the TMT. The TMT can re-position the firm, moving it up or down in the taxonomic hierarchy, as "any object may be categorized at each of several different hierarchical levels" (Mervis & Rosch, 1981: 92). The TMT accomplishes this by matching the strategic framing of the firm to the cognitive referent that customers, partners, analysts, employees, or other audiences "automatically recognize" as being the epitome of a category (Santos & Eisenhardt, 2009: 649); this involves claiming the firm as a prototype or exemplar that best represents the category identified. Well-known examples of prototypical representatives are Amazon in online commerce and, at one time, IBM in computing. Both firms expanded upon an initial product offering (e.g., books, mainframes) to later serve as a representative of much larger category. Prototypes, however, are more than lists of particular framing attributes "but, rather, fuzzy sets" that encapsulate the key features of group membership (Hogg & Terry, 2000: 123).

Prototypical representativeness is gauged by how well an item fits its category (Mervis & Rosch, 1981), which has a bandwidth of acceptable variations among its members. This bandwidth affords the latitude for TMTs in claiming organizational membership at more superordinate or abstract categories as it furnishes the parameters for the ways in which the

cognitive frame can be stretched legitimately. The boundaries defined by prototypical representativeness set up the rules for categorical inclusion and exclusion at different categorization levels in a classification hierarchy; in effect, this makes the implications of adopting a non-incremental innovation more clear and visible for the strategic positioning of the firm. And so, Netflix's claim to being an online entertainment firm suggests a more abstract description than its prior claim as a DVD-by-mail subscription rental company.

Such framing flexibility is possible because categories are embedded in taxonomies, i.e. broader classification systems of meaning consisting of different, hierarchical levels of inclusion that range from superordinate to subordinate (Glynn & Navis, 2013). Mervis and Rosch (1981) define three key levels of vertical inclusion that describe classification hierarchies: (1) a basic level, consisting of the most typical and most used categories (e.g., perceiving an object as a table); (2) a subordinate level, located below basic level categories and having greater domain specificity and more concreteness (e.g., a dining room table; a bedside table; a coffee table); and (3) a superordinate level, located above the basic level and having lower domain specificity and greater abstractness (e.g., a piece of furniture). As an organization moves up the classification hierarchy, as for example, from subordinate to superordinate categorization (e.g., Amazon's shift from an online bookseller to online commerce retailer), prototype representativeness widens, to encompass all the subordinate categories that sit below it, thereby allowing more diversity in prototypicality at higher levels. Conversely, the prototype grows narrower as we move down the hierarchy to the subordinate level (e.g., sailboat maker Linjett's decision to shift from 'boat manufacturer' to 'custom sailing yacht' producer) (Adner & Snow, 2010).

In construing a strategic frame, the TMT makes two assessments: one, determining what the salient category is in the hierarchy, i.e., superordinate or subordinate; and two, assessing the

fitness of the firm as a prototype for that category. TMTs who engage in more flexible framing tend to categorically position the firm at a higher, more abstract level and to view a wider set of organizational offerings (or potential innovations) as fitting within that category. At these higher taxonomic levels, cognitive frames tend to be less domain-specific than at lower ones; this was illustrated, for instance, in Fuji's shift from the subordinate category of film to the superordinate category of "imaging and information" (Tripsas, 2009: 455)

Conversely, TMTs who engage in less flexible framing tend to strategically position the firm at a more subordinate level and to take a more limited or narrow view of what constitutes appropriate membership. This is evident, for instance, in Kodak's claims as a film company (Munir & Phillips, 2005) or Blockbuster's as a bricks-and mortar video rental retailer (O'Reilly & Tushman, 2016). At these lower taxonomic hierarchies, cognitive frames tend to be more domain specific, more concrete, and less flexible. Consequently, we propose:

P1a: TMTs who classify a non-incremental innovation as consistent with the representative prototype of a superordinate (more abstract) hierarchical category are more likely to adopt the innovation.

P1b: TMTs who classify a non-incremental innovation as consistent with the representative prototype of a subordinate (more concrete) hierarchical category are less likely to adopt the innovation.

Cognitive Frame Flexibility via Capability Reconciliation

Innovations can also vary in the extent to which they build on, fit with, and are commensurable with the firm's existing capabilities and associated architecture (e.g., Andriopoulos & Lewis, 2009; Cho & Hambrick, 2006; Raisch & Birkinshaw, 2008). As such, the second dimension of cognitive frame flexibility in our model defines how the TMT perceives the alignment between the non-incremental innovation and the firm's existing organizational architecture, i.e., the capabilities, roles, culture, and structures that form the organization's

formal and informal processes and structures (see Gulati et al., 2012; Nadler & Tushman, 1989) and, especially, how it can be reconciled with these capabilities and architectures (e.g., Greenwood & Hinings, 1993, 1996; Schreyögg & Sydow, 2010). Non-incremental innovations often rouse inconsistencies with the firm's existing capabilities (e.g., Kaplan & Tripsas, 2008; O'Reilly & Tushman, 2008); for example, some innovations may be perceived as contradictory to the exploitation of existing capabilities and technologies, whereas others can be associated with the exploration of new capabilities (Raisch & Birkinshaw, 2008).

An important site where the cognitive framing of core capabilities is made visible is in the various products or outputs produced by the organization, which “are perceived to be made up of discrete attributes, with each attribute having a distinct subjective value” (Sujan, 1985: 31). Across the portfolio, the organization's products or services may share few or many capabilities in common. Because the adoption of a non-incremental innovation, by definition, permits radically new capabilities to penetrate the firm, adoption decisions force debates about whether or not the innovation is reconcilable with existing capabilities and architectures. For instance, in the 1960s, incumbent Swiss watchmaking executives perceived quartz watch technology through a frame that pitted the adoption of integrated circuitry found in quartz watches against nearly 300 years of mechanical watchmaking prowess. As a result, most Swiss executives were unable to reconcile inconsistencies among the capabilities and architectures needed to produce both quartz and mechanical watches, and thus, failed to seize an emerging market for quartz technology (Landes, 1983). Alternatively, a cognitive frame that serves to bundle or “match” (Eggers & Kaplan, 2013) inconsistent organizational capabilities permits the TMT to reconcile and execute incremental as well non-incremental innovation via simultaneous exploitation and exploration (March, 1991; O'Reilly & Tushman, 2008).

Scholars have highlighted how the process of matching old and new capabilities with competing framings creates cognitive complexity and dissonance (Festinger, 1957; Tripsas, 2009). For instance, Gilbert's (2006) research on the digitalization of the newspaper industry questioned if competing cognitive frames could coexist. He argued that "response[s] to discontinuous [technological] change creates a cognitive paradox" and can only be resolved through "senior team frame integration" and by "embracing the competing frames" (Gilbert, 2006: 150). Because the adoption of non-incremental innovations often triggers ambiguous or competing tensions, TMTs who are able to develop a more flexible frame are more likely to reconcile and embrace contradictory innovations in a manner that accounts for "necessary paradox" (Smith, 2014: 1592). To account for these paradoxical inconsistencies, Smith (2014) found that effective TMTs attend to non-incremental innovations by rapidly shifting between decision-making and resource allocation processes. Likewise, Smith and Tushman (Smith & Tushman, 2005: 523) theorized that TMTs need to develop paradoxical cognition – "frames and processes that recognize and embrace contradiction" – which allows for the coexistence of contradictory capabilities and innovation agendas in the same organization. The need for senior managers to reconcile inconsistencies is not only a property of innovation adoption. Recent research on organizational hybridity (Battilana & Dorado, 2010; Battilana, Sengul, Pache, & Model, 2015; Besharov & Smith, 2014), for example, explicates a similar call for TMTs to reconcile competing organizational frames in service of doing good and doing well.

In sum, we posit that a TMT's ability to develop more flexible cognitive frames to reconcile inconsistent capabilities and architectures (Nadler and Tushman, 1989; Benner and Tushman, 2002) is central to non-incremental innovation adoption. The ability to attend to such internal inconsistencies is another aspect of cognitive frame flexibility. More formally, we posit:

P2a: TMTs who are able to reconcile inconsistent capabilities and architectures associated with the non-incremental innovation are more likely adopt the innovation.

P2b: TMTs who are unable to reconcile inconsistent capabilities and architectures associated with the non-incremental innovation are less likely adopt the innovation.

Cognitive Frame Expansion or Contraction

The two aspects of cognitive framing in our model are conjoined in construing how the TMT perceives a non-incremental innovation. We consider the interaction of the vertical dimension (categorization hierarchies) and the horizontal dimension (capability reconciliation) of cognitive frame flexibility, and their possible impacts on the TMT's adoption decision. The most clear-cut cases of interaction effects occur when the two dimensions act in concert, each amplifying the effects of the other. These cases are the two displayed on the diagonals of the Figure: expansion of the cognitive framing via more flexibility (top right cell; P3a) and contraction of frames via less flexibility (bottom left cell; P3b). Expansion occurs when the TMT holds a cognitive frame that includes a high level of classification and reconciles capability and architectural inconsistencies. While each dimension independently leads to more expanded frames, together they interact to amplify the expansion, and therefore, the likelihood of non-incremental adoption. Thus, the top-right corner illustrates the most flexible condition of cognitive framing to facilitate non-incremental adoption.

Several empirical studies offer glimpses to illustrate the interaction of both dimensions of cognitive frame expansion. For instance, Amazon expanded its hierarchal frame from being a web-based bookseller to “an online technology platform,” a superordinate category that was more abstract, superseding its original domains of business activity (Stone, 2013). At the same time, its TMT permitted novel capabilities and architectures related to cloud-based services to co-evolve that were inconsistent with those established when the company launched as an online

bookseller. Similarly, Post 9/11, the Federal Bureau of Investigation (FBI) recast its hierarchical frame as one of protection from criminal activities and, instead, as a “threat-based intelligence-led” agency. To complement this higher categorical framing, Gulati, Raffaelli and Rivkin (2016) illustrated how the FBI Director embedded new capabilities into local field offices that allowed for law enforcement and cyber-terrorism capabilities to coexist. And, Martha Stewart claimed a superordinate innovation frame in naming her business Martha Stewart Living Omnimedia to reflect a focus on “lifestyle” that could transcend specific domains of life and be disseminated across multiple media channels that each required novel capabilities to grow (e.g., magazines, books, television and radio programming and online activities) (Glynn, 2011; Glynn & Dowd, 2008). In all these cases, the TMT’s expanded both dimensions of their cognitive frame flexibly to become more abstract, blanketing a wide array of products, offerings, and missions. These expanded frames were each coupled to a set of inconsistent capabilities. Thus, we propose:

P3a: TMTs who classify a non-incremental innovation as consistent with the representative prototype of a superordinate category and build internally inconsistent organizational capabilities are more likely to adopt the innovation.

The second case of clear-cut interaction effects is just the reverse of expansion: cognitive frame contraction. Cognitive frame contraction occurs when the TMT construes the frame both in terms of a subordinate (more concrete) level of classification and perceives it as inconsistent with existing capabilities and architectures. Both of these aspects of cognitive flexibility – subordinate classification and irreconcilable inconsistencies among capabilities – independently lead to more concrete, domain specific, and sometimes fragmented cognitive frames. Together they interact to amplify a contraction of the TMT’s innovation frame.

For instance, when faced with the initial decision to explore online streaming, Blockbuster’s TMTs deferred to a subordinate classification as a brick-and-mortar video retailer

and was unable to embrace the capabilities and organizational architectures required to deliver the same content to their existing customers across multiple distribution channels. Similarly, Kodak executives struggled to move beyond a subordinate classification as “a film company” (rather than an imaging company) because they generally perceived digital film production possessed few capabilities related to chemical film processing (Swasy, 1997). We propose:

P3b: TMTs who classify a non-incremental innovation as consistent with the representative prototype of a subordinate category and do not build internally inconsistent organizational capabilities are less likely to adopt the innovation.

The off-diagonal boxes represent instances of cognitive framing where the two aspects are in a state of disequilibrium: the TMT’s categorization hierarchy is inconsistent with how they attend to capability inconsistencies. Such cognitive inconsistencies create uncertainty and reduce the probability of the non-incremental innovation’s adoption. This is evident in the case of Smith Corona (see Danneels, 2011), which originated as a typewriter company, but attempted to expand its hierarchical frame to become a “small business office supplier.” However, in spite of invoking the more abstract, superordinate category, the TMT continued to attend only to those capabilities associated with typewriter production and outsourced all other aspects of product development. The hierarchical frame at Smith Corona was intendedly abstract, but the TMTs inability to reconcile capabilities remained unaddressed. As demand for typewriters continued to slow, such cognitive disequilibrium facilitated the company’s eventual demise.

Similarly, when the TMT maintains a more concrete and subordinate hierarchical frame, but is able to reconcile the coexistence of multiple inconsistent capabilities, disequilibrium again ensues. This is evident in the case of Time Warner and TIME magazine. Although the TMT of Time Warner attempted to reconcile the inconsistent capabilities required to develop TIME magazine’s print and digital news content, they were unable to develop a hierarchical frame that

engendered a more abstract, superordinate level classification for TIME magazine alongside Time Warner's other media offerings in television and online media. As a result, TIME magazine was eventually spun-off, turning the magazine back into an independent property (Smith, 2016). The effect of this inconsistency was to embrace new capabilities, but to keep them localized in particular domains and without a more expansive frame to hold them together. Thus, when the framing of categorization hierarchies and capability inconsistencies are at odds with each other, a state of disequilibrium ensues. We propose:

P3c: TMTs who frame the non-incremental innovation in both expanded and contracted terms create ambiguity and inconsistencies that are associated with a lower likelihood to adopt the innovation.

Emotional Frame Flexibility

In addition to cognitive framing, a TMT's framing process also involves emotional elements (e.g., Giorgi, forthcoming; Huy, 2002; Vuori & Huy, 2016). In studying social movements, Robnett (2004: 195) identified a key role for emotions and, especially emotional resonance, i.e., "the degree of 'emotional harmony between ideology, practices...or frames.'" In particular, this research has shown that emotional arousal, displays, and identification are critical to change (Davis, Morrill, Rao, & Soule, 2008). Giorgi (forthcoming) explains that framing needs to achieve "emotional embeddedness in its institutional or organizational setting...[and] evoke emotions that are in line with a predominant institutional ethos...or an organization's culture." Emotional framing involves alignment between symbols and more enduring themes (Gamson, 1988) that make a non-incremental innovation feel emotionally engaging and sensible. Research on social movements (e.g., Thoits, 1989) has shown how cognitive frames elicit positive emotions when they resonate with participants' values, beliefs, and ideas and reinforce existing cultural narratives and understandings (Robnett, 2004: 197). Thus, organizations tend to

prescribe appropriate emotional aspirations and displays (Voronov & Vince, 2012; Voronov & Weber, 2016) that can induce change and adaptation.

Emotional framing can function to help resolve inconsistent sets of organizational capabilities, which typically trigger threat or rigid behaviors and internal inertial forces (e.g., Gilbert, 2006; Gupta, Smith, & Shalley, 2006) by linking a non-incremental innovation with an emotionally engaging and abstract competitive vision (e.g., Rotemberg & Saloner, 2000; Van den Steen, 2005). According to Fiske and Pavelchak (1986), when individuals are exposed to novelty, they assign “affective tags” to their evaluative appraisals. Dutton and Jackson (1987) demonstrated the relevance of such evaluative appraisals to strategic issue responses. Citing Fiske’s body of work (e.g., Fiske & Taylor, 1984), they noted how “Evaluative appraisals are the affective components of cognitions...[and] may attract people to become associated with an opportunity and repel people from becoming involved with an issue labeled a threat” (Dutton & Jackson, 1987: 82).

For example, Fuji’s TMT was able to articulate a vision rooted in a set of values associated with being a world-class “imaging and information” company (Tripsas, 2013). Ravasi and Schultz (2006) and Rindova, Dalpiaz and Ravasi (2011) demonstrated how framing anchored in opportunity narratives facilitated positive emotional responses to organizational change. Alternatively, Gilbert (2005) observed how incumbent print media firms failed to change organizational strategies in response to web media because of emotionally resonate threat perceptions that emerged from individual self-narratives. Such threat narratives have been shown to trigger affective responses related to avoidance (Gavetti & Menon, 2016) and passive-aggressive ambivalence (Ashforth, Rogers, Pratt, & Pradies, 2014).

Building on Selznick's (1957) notion of "infusing the organization with value", emotional framing enables a positioning of the non-incremental innovation in the context of the firm's history and normative values. Following this line of thought, we argue that the emotional framing associated with a non-incremental innovation will, in turn, affect the TMT's adoption decision. We propose:

P4a: When TMTs emotionally frame a non-incremental innovation in ways that expressively resonate with organizational aspirations, values or culture, they are more likely to adopt the innovation.

P4b: In the absence of TMT's emotional framing of a non-incremental innovation, TMTs are less likely to adopt the innovation.

When TMTs are able to attach an emotionally engaging aspiration to a non-incremental innovation, doing so permits, justifies, and contextualizes a more flexible cognitive frame. Thus, we theorize that cognitive and emotional frames are inextricably related to innovation adoption decisions. Relatedly, Rindova and Petkova (2007: 220) found that both emotional and cognitive factors influenced how early consumer adopters perceived the potential value of novel products and innovations, noting that that cognition and emotion were "intertwined in the process of forming perceptions of the value of a product innovation." We posit a similar interaction between cognitive and emotional frame flexibility among members of the TMT as they evaluate possible innovations. For example, the TMT at Ciba Geigy's Crop Protection Division justified their expansion from chemical products to chemical and biological products by associating the shift with their aspiration to "Keep Plants Healthy." This new expanded cognitive frame emotionally resonated with TMT's values and aspirations to improve the condition of the planet and the environment (O'Reilly & Tushman, 2016). Thus, we posit that framing flexibility is a function of both cognition and emotion. Absent TMT emotional engagement, the team is less likely to engage in the work necessary to execute the expanded cognitive frames. We propose:

P4c: Increased TMT emotional resonance will enhance the relationship between expansive cognitive framing and the likelihood of innovation adoption.

TMT Framing and Innovation Adoption Over Time

We include a feedback loop in our model (see Figure) that cycles back from a one-time decision to adopt (or not adopt) an innovation to capture the recurring rounds and cumulative effects of multiple adoption decisions over time. The recursive nature of our model accounts for the possibility that, over time, the TMT learns from prior successes and failures in making adoption decisions (Levitt & March, 1988; Starbuck & Milliken, 1988) to develop their capabilities for cognitive framing (and re-framing). Like other forms of organizational learning, we theorize that TMTs can develop, manage, and hone their ability to develop more flexible frames over time as one cycle affects the next (Helfat & Peteraf, 2015). Like other forms of capability development, we posit that TMTs can utilize “feedback from previous experience” to consider current options for innovation adoption (March & Olsen, 1976: 148).

Developing the TMT capability to manage the work of framing – and ultimately, the potential to effectively expand frames cognitively and emotionally – provides strategic flexibility. Such processes occur when TMTs leverage past experience to develop strategic capabilities and learn (e.g., Adler & Clark, 1991; Argote, McEvily, & Reagans, 2003; Argyris, 1976). For example, Weigelt and Sarkar (2009: 52) argue that firms “face knowledge hurdles when adopting a certain type of innovation, partly because adoption-enabling knowledge is experiential and based on learning.” The authors found that the adoption of electronic banking solutions among credit unions was facilitated by learning to exploit external knowledge through marketing efforts. More generally, several mechanisms have been shown to facilitate TMT learning as it relates to innovation adoption, including the willingness to experiment (Thomke,

1998; Weigelt & Sarkar, 2009), knowledge diversity (Fichman & Kemerer, 1997) and a culture that emphasizes participative decision-making (Hurley & Hult, 1998).

We argue that a TMT's ability to engage in more flexible framing is contingent on adaptive learning processes that foster TMT experimentation with more abstract cognitive frames that are anchored on an emotionally engaging aspiration. These processes are contingent on the TMTs general ability to develop capabilities important to organizational functioning and performance. Tushman and O'Reilly (2002) illustrated how at USA Today, after several attempts to implement digitized content in the context of print content, was able to articulate an expanded frame for the organization (e.g., "the world's leading news organization") and create a set of processes that permitted the organization to leverage its content across platforms in a way to enhance its brand. Alternatively, Time Warner and TIME magazine's inability to forge an expanded overarching frame to take advantage of leveraging its various brands stunted the ability of TIME magazine to stand alongside other digital and print media outlets. Without learning, frames are likely to be reinforced and unchanged over time.

In addition, the TMT's ability to engage in frame expansion is likely related to their ability to reach consensus on the appropriateness of adopting an innovation; because frame expansion (or contraction) furnishes a reference for adoption decisions, TMT consensus seems more achievable. Attewell's (1992: 6) work on accumulated learning highlights how TMTs develop knowledge contingent on "individual insights and skills becom[ing] embodied in organizational routines, practices, and beliefs that outlast the presence of the originating individual." Fiske and Pavelchak (1986: 196) illustrate how such recursive patterns can reinforce consensus building over time:

When certain decisions are made regularly, groups may develop consensual ways to categorize the entity.... Consensus on categorization may or may not emerge as a result

of group interaction, but lack of consensus would be most problematic if alternative views were evaluatively (rather than descriptively) inconsistent.

Finally, if the TMT is unable to develop more expansive frames, individual members are likely to maintain their individual interpretive schemes, akin to separate and distinct “thought worlds” that have been previously shown to prevent consensus on innovation adoption decisions (Dougherty, 1992). We posit that TMTs who develop the capability to manage cognitive framing more effectively over time are likely to learn from prior innovation adoption experiences and develop consensual mental models that promote learning and development. We propose:

P5: TMTs who attend to expanded frames over time are more likely to learn from their prior non-incremental innovation adoption experiences.

DISCUSSION AND IMPLICATIONS

Organizations continuously face decisions about whether or not to adopt innovations (e.g., Gupta et al., 2006). As technologies evolve, failing to innovate has a significant impact on a firm’s ability to compete (Abernathy, 1978; Anderson & Tushman, 1991). Often, however, organizations do not adopt an innovation, even when they have the organizational capacity to do so (e.g., Landes, 1983), or they develop innovations they cannot execute (e.g., Benner & Tushman, 2015; Christensen, 1997). These challenges are accentuated when the innovation violates a long-standing view of the organization’s strategy (Vuori & Huy, 2016), a prior history of success (O’Reilly & Tushman, 2008) or embedded institutional norms (Fox-Wolfgramm, Boal, & Hunt, 1998). Although these factors are important, we have argued that a distinct source of inertia is rooted in framing. Cognitive and emotional framing have largely been omitted variables in these accounts (Eggers & Kaplan, 2013; Giorgi, forthcoming; Vuori & Huy, 2016).

We advance a model revealing the role of framing in innovation adoption and explore how TMT frames affect the perceived “goodness of fit” and emotional resonance with non-

incremental innovations, which ultimately affects innovation adoption decisions. Moreover, we proposed that the effects of these processes accumulate over time, as the TMT's attention to, and reflection on, the individual adoption decisions builds capabilities for effective cognitive and emotional framing and broaden the diversity of innovations adopted by an organization. Our model has important implications for both theory and practice.

Theoretical Implications

Our primary goal is to strengthen the bridge between the domains of organizational strategy, innovation, and cognition. We believe our work advances theory and practice in a number of ways. First, we contribute to a rich stream of research on innovation adoption by theorizing how cognitive frames inform managerial choices about whether or not to adopt innovations. At key junctures in product class evolution, the movement toward a more expanded cognitive frame, and in turn, innovation adoption, may have survival value for the firm. For instance, at the closing of industry standards and/or at the initiation of non-incremental technical change, the ability to develop a more abstract cognitive frame relative to a new innovation permits TMTs to more accurately understand strategic options and permits members of the firm and external constituents to better understand and execute strategic shifts. When such strategic junctures occur, the ability of the TMT to cognitively reframe in more expansive terms is particularly important because it helps conceptualize technological shifts as connected with broader opportunities (as opposed to threats).

Second, we believe our treatment of cognitive frames affords new insights for cognition scholarship. We theorize that cognitive frames not may be static, but instead, may be flexible and mutable. Prior conceptualizations of cognitive frames have focused on frames "as 'things,' rather than on the dynamic processes associated with their social construction, negotiation,

contestation, and transformation” (Benford, 1997: 415 in Croteau & Hicks, 2003). Our theorization and application of cognitive flexibility attends to calls within the strategy literature to more fully account for *how* cognitive frames influence the competitive dynamics of strategic decision making within the firm (Helfat & Peteraf, 2015; Livengood & Reger, 2010). Our work exposes how cognitive flexibility via hierarchical categorization and capability reconciliation can influence a TMT’s adoption decisions. We posit that cognitive framing, like other dynamic managerial capabilities, requires “managing, or ‘orchestrating,’ the firm’s resources to address and shape rapidly changing business environments” (Teece, 2014: 328). More specifically, we explicate how a TMT’s cognitive frame influences strategic decision-making and that the active management of this process has substantial strategic value for the firm.

Third, we extend current notions of strategic framing to include a role for emotions. While cognitive framing of innovations and organizational capabilities is necessary, we argue it is not sufficient for TMT innovation adoption. We theorize that expanded cognitive framing must also be coupled with the TMT’s emotional engagement in the expanded frame. Thus, our model also addresses how “thinking” (cognitive framing) and “feeling” (emotional framing) interact to facilitate non-incremental adoption decisions.

Finally, we answer calls in the innovation literature to theorize the underlying micro-mechanisms underpinning how individuals and teams balance decision-making processes related exploration and exploitation (Gupta et al., 2006). When TMTs are able to develop a more flexible and expansive cognitive and emotional frame, it can function as a filter for guiding proactive change in either shaping dominant technological designs or initiating competence destroying technical change (Tushman & Anderson, 1986). Under a range of conditions, the infusion of organizations with appropriate meaning (Pfeffer, 1981; Selznick, 1957; Weick, 1979)

may be as strategically important as the content of strategy itself (e.g., Glynn, 2000). Similarly, recent work has exposed the salience of cognition and capability development (Eggers & Kaplan, 2013), highlighting the importance of aligning managerial beliefs with market opportunities. If so, those more traditional analytic strategic capabilities found within the TMT must be complemented with the ability to function as skilled cultural operators in managing cognitive framing, along with affect and emotion (e.g., Huy, 2002).

While our theorization focuses primarily on the relationship between innovation and framing, we do not mean to suggest that cognitive and emotional frames are the entire explanation for adoption. We recognize that other factors also influence TMT's adoption decisions. Technical factors, such as whether the innovation is competency-enhancing or competency-destroying (Tushman & Anderson, 1986), will certainly impact the TMT's willingness to engage in explorative innovation activity and consider new adoptions. Likewise, structural factors, such functional differentiation and team size have been shown to influence adoption decisions (Kimberly & Evanisko, 1981). Finally, institutional factors related to the "increased density of interaction, information flows, and membership identification" among members of the focal organization with other organizations in the field (DiMaggio & Powell, 1983: 148) have been shown to be influenced by additional normative, regulative, and socio-cognitive factors (Scott, 2008) that promote innovation diffusion.

We also acknowledge the boundary conditions of this work. Our conceptual model assumes that the adoption of an innovation is in the best interest of the adopting firm (e.g., Gopalakrishnan & Damanpour, 1997; Kimberly, 1981; Rogers, 1995). But this may not always be the case. Future scholars could explore the conditions, if any, where a more subordinate and concrete cognitive frame might be a viable and appropriate response. For example, some

scholars have studied successful incumbent firms that chose *not* to adopt the non-incremental innovation (e.g., Henderson, 1995; Raffaelli, 2013). Also, our model is agnostic about whether cognitive and emotional framing is managed differently depending on whether the new innovation originates from an exogenous or endogenous source. Parsing out the role that framing flexibility plays in these different types of circumstances could lead to additional theoretical insights. Finally, research that further explores the sequencing and interaction of emotional and cognitive framing in the context of innovation adoption could entice scholars from multiple domains to collaborate.

We sought to provoke new research that links innovation and cognition, especially for strategy and innovation scholars who have largely overlooked this relationship (Kaplan & Tripsas, 2008). Future researchers will be tasked with operationalizing and testing the various aspects of our model. Here we offer some initial ideas to advance empirical work. To begin, we envision many opportunities to model TMT frame flexibility. We could imagine, for example, that archival textual analysis of mission statements, company logos and annual reports will serve as viable sources of data (Eggers & Kaplan, 2013). Using methods such as linguistic category modeling (Semin & Fiedler, 1991) could be especially useful in tracking how the language in these data sources vary in level of abstraction (e.g., Reyt & Wiesenfeld, 2015). Alternatively, data related to the products and technologies that categorize legacy as well as the future may be most easily accessible through external company announcements of new products, services, patent filings, or alliance partnerships. Internal, archival sources of company data that report early stage research and development allocations may also prove suitable, especially for evaluating how framing flexibility influences the adoption of innovations that are incubated within the organization, but are never fully adopted.

We believe opportunities for empirical work are especially plentiful should scholars follow the historical evolution of firms that have adopted multiple innovations over time. 3M, for instance, was founded as a mining company but then made shifts into waterproof sandpaper, masking tape, Post-It notes, pharmaceuticals, and flexible circuits. Intel successfully moved from making memory to computer processors. Using archival data to track how a TMT frames evolve across multiple technological transitions could provide helpful insights. Drawing from Selznick's (1957) work on value infusion, emotional framing flexibility might be found in normative value claims associated with the organization's character or identity (e.g., Dutton & Dukerich, 1991), claims for consistency or continuity over time (e.g., Schultz & Hernes, 2013), and collectivity or integrity of the organization as a whole (e.g., Raffaelli & Glynn, 2015)

We believe that the study of innovation and frame flexibility is well suited for both qualitative and quantitative methods of inquiry. To date, the bulk of the innovation literature that accounts for cognition has been qualitative in nature (e.g., Danneels, 2011; Gilbert, 2006). Building on this tradition, we see the value of studies that use non-participant observation to follow how TMTs develop, maintain or shift cognitive frames when making innovation adoption decisions. Alternatively, more research employing mixed methods would also be beneficial. For example, scholars might pair qualitative work with generalizable quantitative models to evaluate patterns of frame flexibility over time (e.g., Eggers & Kaplan, 2009). Of particular interest would be to test for shifts in frames by industry or moments in history.

A helpful instrument to measure perceptions of the relationship between frame flexibility and strategy might be the series of overlapping circles employed by marketing and organizational identification scholars (e.g., Bergami & Bagozzi, 2000). These measures capture the degree of intersection between an individual's cognitive frame and that of the firm. Likewise,

scholars might also examine how TMTs sequence their attention to the central aspects of a specific cognitive frame compared to the innovation adoption decisions they make over time. Attention to frame flexibility at certain stages of a change effort may vary, for instance, depending on the stage of the organization's lifecycle or the type of technological shock the firm faces (e.g., exogenous or endogenous; discontinuous, architectural, or incremental).

Finally, an organization's performance context may affect the nature of frame flexibility. For example, organizations can proactively adopt innovations to initiate technological discontinuities for potential strategic gain (e.g., Adner, 2012; O'Reilly & Tushman, 2013) before they are forced to; alternatively, firms must sometimes move reactively, under performance shortfall conditions, to their competitor's strategic moves (e.g., Rosenbloom & Christensen, 1994; Siggelkow, 2001). The ordering of cognitive and emotional framing and innovation adoption may be contingent on whether the shifts are initiated opportunistically or reactively. It may be that those most effective proactive technological transitions will be initiated by shifts in framing followed by shifts in non-incremental adoption patterns. In contrast, reactive technological transitions will be initiated by shifts in frames followed by shifts in innovation adoption (e.g., Gulati et al., 2016). Future research looking into whether proactive or reactive innovation adoption decisions influence cognitive flexibility would be worthwhile. Scholars may also find value in examining whether the role of frame flexibility differs when firms adopt incremental, as opposed to non-incremental, innovations.

Managerial Implications

Ever more frequently, dominant designs shift and technological discontinuities require firms to adopt innovations (Benner & Tripsas, 2012). Product or service modularization and decreasing information processing costs accentuate these dynamics (Altman, Nagle, & Tushman,

2015; Lakhani et al., 2013), creating pressures for TMTs to redefine reframe their mental models while continuing to develop capabilities and product category variants. Maintaining clearly defined boundaries for product category membership is often associated with efficiency, productivity, and short-term performance (e.g., March, 1991; O'Reilly & Tushman, 2013) when conditions are relatively unchanging. Yet, at key junctures of change in a product class, at the closure of industry standards, and at competence destroying technical transitions, a concrete definition of the firm's innovation boundaries holds firms hostage to their past (Sull, 1999). We have shown that at firms like Kodak and Blockbuster, the TMT's cognitive frame lead them to code these transitions and external changes as threats. Such interpretations stunt the firm's ability to adapt to technical transitions.

In sharp contrast, if the TMT is able to articulate a more expanded cognitive frame, they are likely to be more creative in attending to, and dealing with, these transitions. Further, the articulation of a more abstract cognitive frame helps organization members understand and get emotionally engaged in the transformation. For example, Tushman and O'Reilly (2016) articulated how the Ball Corporation's aspiration to become a "world-class container firm" helped its TMT convince employees and external stakeholders of its moves from glass to metal to plastic containers over several decades. This ability to initiate, shape, and execute such cognitive and emotional transitions has important strategic ramifications.

Confronting a technological discontinuity is a difficult challenge for any TMT, but incumbent firms have been shown to successfully host non-incremental innovations and technological change (e.g., Boumgarden, Nickerson, & Zenger, 2012; Eisenhardt & Martin, 2000). While complex strategies and associated decentralized or ambidextrous structures are important (O'Reilly & Tushman, 2013; Siggelkow & Levinthal, 2003), the TMT's ability to pay

equal attention to the process and mechanisms of cognitive framing and emotional engagement may be just as critical.

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Figure: TMT Frame Flexibility and Innovation Adoption

