The Influence of Analysts on Innovation: An Evolutionary View of Evaluative Frames

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Abstract

Our process theory explains how securities analysts, as important intermediaries in public equity markets, both enable and constrain innovation in the firms they cover. We consider evolution in analyst "evaluative frames" – the categories, narratives, and schemas that underlie assessments of firms and explanations of stock valuations – to depict the shifts in analyst influence on different types of innovation. We describe mechanisms underlying the creation of new analyst frames sparked by nascent firms engaging in new to the world products, technologies, and business models, followed by processes of frame convergence and institutionalization. While new frames can enable non-incremental innovations in nascent firms, institutionalized frames constrain both new and established firms to incremental innovation in familiar products, technologies, and business models. Our theory suggests that analyst persistence in applying institutionalized frames can further dampen and even prevent non-incremental innovation in established firms, even when it is necessary for adaptation. Our theory addresses debates in prior literature about analyst influence on innovation and provides deeper insights into the influences of equity markets on firm innovation. Our work also suggests possible ways that firms pursuing innovation can seek to delay or prevent institutionalization in analyst frames to alleviate constraints from equity markets.

How analysts influence firms is an important question for management and strategy scholars. As intermediaries in public equity markets, analysts have a critical influence on firms' stock prices and strategic behaviors through their coverage decisions, forecasts of firm performance and stock price, commentary on firms' strategies and actions, and recommendations to buy, hold, or sell a firm's stock (Brauer & Wiersema, 2018; Graham, Harvey, & Rajgopal, 2005; Litov, Moreton, & Zenger, 2012). The important influence of analysts on the valuations and actions of publicly traded firms makes it critical to understand how analysts shape firm actions and the mechanisms that underlie these influences, as well as the dynamics of analyst influences on firms.

Innovation in firms is important; innovation is the "lifeblood" of organizations (Raffaelli, Glynn & Tushman, 2019), and is critical for the growth and success of firms, industries, and nations (March 1991; Solow, 1957; Tushman & Nelson, 1990). Despite a general understanding that innovation is beneficial, firms often face constraints on innovation. Prior work seeking to understand innovation and the challenges firms face often has focused on the *internal* organizational factors inhibiting innovation, such as the rigidities created by internal structures, processes, or capabilities (Benner & Tushman, 2002; Henderson & Clark, 1990; Leonard-Barton, 1992) or managerial cognition and framing (Benner & Tripsas, 2012; Kaplan & Tripsas, 2008; Raffaelli, et al., 2019; Tripsas & Gavetti, 2000). Such organizational tendencies can spur a focus on innovations that build incrementally on familiar products, technologies, and customers, and limit more distant search into novel domains.

However, recent research suggests that firms can and often do overcome the internal pressures that impede innovation, allowing them to pursue more distant innovations in new products focused on new knowledge or technologies. But this work also finds that even when firms do overcome internal barriers, they still may face *external* pressures that ultimately constrain their innovation efforts (Benner, 2010; Benner & Ranganathan, 2012; Theeke, Polidoro, & Fredrickson, 2018). Work on innovation has thus moved from a focus on internal organizational characteristics to considering how pressures from analysts, as important external stakeholders, shape firm innovation (e.g., Benner, 2010; Benner & Ranganathan, 2012; 2013; 2017; Beunza & Garud, 2007; Guo, Perez-Castrillo, & Toldra-Simats, 2019; He & Tian,

2013; Theeke et al., 2018). While some scholars have found that analysts dampen firm innovation and novelty through their coverage decisions or the content of their recommendations (e.g., Benner & Ranganathan, 2012; He & Tian, 2013; Theeke et al., 2018), other work highlights the positive influence of analysts on innovation (Guo et al., 2019), portraying analysts as supportive enablers of innovation, facilitating high stock prices for firms engaging in innovation in new technologies (e.g., Beunza & Garud, 2007). Thus, the literature presents contradictory answers to the question of how analysts shape innovation in the firms they cover.

Research that shows clearly that analysts, as important stock market intermediaries, can impede firms' efforts to pursue novelty and innovation does not explain why analysts then also seem to enable innovation in some firms, or the mechanisms that underlie these contrasting influences. The disparity in findings from prior research on analyst influence on innovation limits scholarly progress in broader debates such as the role that sell-side analysts play as intermediaries in public equity markets, or the effect of public equity markets on innovation.

In this paper, we take a step toward resolving these competing views, by theoretically examining the processes that underlie shifts in analyst influence on innovation in publicly traded firms. Combining ideas from prior work on analysts (Benner & Ranganathan, 2017; Beunza & Garud, 2007; Wansleben, 2012), we begin with the construct of analyst "evaluative frame" to depict the knowledge structures that analysts use in their work to assess firms and explain stock valuations. Analyst evaluative frames include the *category* that analysts attribute to a firm, the *narrative* they employ to explain how a firm's strategy and financial performance translate into its stock valuation, and the *schema* that codifies a narrative into quantitative metrics. We then describe specific mechanisms that underlie the evolution of analyst frames, from a phase of creation and variation in frames, to a phase of convergence and institutionalization. This evolutionary view is consistent with prior work on evolutionary processes that highlights phases of variation, selection, and retention and their underlying drivers (e.g., Aldrich & Ruef, 2006) or similarly, the mechanisms underlying variation and convergence (Grodal, Gotsopoulos, & Suarez, 2015). We further describe mechanisms that underlie how these phases of frame evolution change analyst influences

on innovation. Theorizing evolution in the knowledge structures that analysts use in their assessments of firms allows us to explain why analysts enable innovation in some cases but constrain it in others.

In the sections that follow, we first briefly review prior research on analysts and innovation. We then develop a process theory (Cornelissen, 2017),[1] an approach that allows us to explain how behaviors of analysts, investors, and firms themselves shape evolution of analyst evaluative frames, from a nascent phase of creation and variation to a phase of convergence and institutionalization. Our theory of evolution in analyst frames is shown in Figure 1. We begin with the arrival of a nascent public firm (shown in the upper left of the diagram), and specific mechanisms that underlie analyst creation of new evaluative frames: when the firm is engaging in innovation in new-to-the-world technologies, products, or business models, when the firm is promoting a narrative to distance itself from established firms and categories, and when it is generating high stock market valuations that are not explained by standard performance metrics, analysts are spurred to search for a new category, narrative, and schema as they undertake coverage. These efforts spark the creation of new analyst frames. Evolution in evaluative frames proceeds from phase 1 to phase 2 as analysts increasingly converge on an emerging dominant frame, and the frame becomes institutionalized. Convergence and institutionalization unfold as analysts adopt an increasingly accurate frame, as a firm begins to generate profits, as a firm's performance and stock price become increasingly predictable viewed through the frame, and as the firm emphasizes its conformance with the dominant, emerging frame. Our theory depicts the involvement of analysts, investors, and the firm itself in these processes. Following that, we explain how analyst influence on innovation differs for different types of firms, as analysts view firms through these new versus institutionalized frames (shown in Figure 2). The last combination in our model (in the lower left quadrant of Figure 2) presents an interesting case: the situation of established firms and new analyst frames, and the potential for frames to change as

[1] Following Cornelissen (2017: 3), we develop a "narrative theory…a process model that lays out a set of mechanisms explaining events and outcomes." This approach fits well with our aim of developing a theory that explains the mechanisms underlying the process of evolution in analyst frames, as well as the outcomes for firm innovation. We follow Davis & Marquis (2005: 336) in our definition of "mechanisms," considering them as "a set of interacting parts…an assembly of elements producing an effect not inherent in any one of them… the wheelwork or agency by which an effect is produced."

established firms pursue non-incremental innovation. Finally, we discuss the implications, contributions, limitations, and boundary conditions of our theory.

LITERATURE BACKGROUND

Sell-side securities analysts. Following prior research on analysts, our theory focuses on "sell-side" securities analysts (Bradshaw, 2011; Brauer & Wiersema, 2018; Brown, Call, Clement, & Sharp, 2015; Groysberg & Healy, 2013; Ramnath, Rock & Shane, 2008; Schipper, 1991; Wansleben, 2012). There are other types of financial analysts[2], but it is these sell-side analysts who function as important intermediaries in public equity markets (Li & You, 2015).

Analysts seek to provide accurate predictions of firm performance and stock price (i.e., firm valuation) for their buy-side investor clients (Brown et al., 2015). They produce regular detailed reports that include commentary on firms' strategies and financial performance, along with recommendations to buy, hold, or sell firms' stocks (Schipper, 1991). Analysts also engage in regular communications with executives and investors, participating in quarterly earnings conference calls and organizing "road shows" (Brown et al., 2015). Sell-side analysts are rewarded for their usefulness by their buy-side investor clients, through broker votes and Institutional Investor rankings (Groysberg & Healy, 2013; Brown et al., 2015).

A large body of research in accounting and finance has studied the inputs into – and accuracy of – analysts' earnings forecasts, including accounts of analyst activities and their influence on investor behaviors (Bradshaw, 2011; Brown, et al., 2015; Lin & McNichols, 1998; Womack, 1996). In management, the focus of research on analysts has instead been on analysts' reactions to – and influences on – firms' strategies and actions through coverage decisions or recommendations (e.g., Benner, 2010; Benner & Ranganathan, 2012; Litov, et al., 2012; Theeke, et al., 2018; Zuckerman, 1999; 2000; see Brauer & Wiersema, 2018 for a review). Research in these areas also has focused on opportunities for managers to influence analysts (e.g., Benner & Ranganathan, 2017; Busenbark, Lange, & Certo, 2017; Washburn & Bromiley, 2014; Westphal & Clement, 2008; Westphal & Graebner, 2010).

[2] Buy-side analysts work for large institutional investors and provide investment advice to their employers. They do not serve in an intermediary role in capital markets as sell side analysts do (Brauer & Wiersema, 2018).

Analysts and Innovation. Scholars have highlighted the importance of innovation for the growth and success of firms, industries, and nations and studied the factors that influence it (March, 1991; Solow, 1957; Tushman & Nelson, 1990). Broadly, innovation is often defined with respect to existing technologies, where "radical" or "discontinuous" innovations entail a shift to a new science or base of engineering knowledge in the core technology underlying products (examples include the shift in photography from chemistry-based silver halide film to digital technology, and from mechanical escapement to quartz technology in watchmaking), while "incremental" innovations entail product or process improvements that build on and refine a current technological trajectory (e.g., Abernathy & Utterback, 1978; Henderson & Clark, 1990). Scholars also have defined innovation with respect to a particular firm's current knowledge and capabilities, where exploitation refers to activities that extend current capabilities, while exploration involves search for knowledge or activities in new domains (March, 1991). Incorporating both the technological and organizational dimensions, we follow Raffaelli, et al., (2019), and use "incremental" innovation to refer to innovation that builds on a firm's current capabilities and activities in its technology, products, or business models, and "non-incremental" innovation to refer to all other types of innovation that are more distant. Non-incremental innovation therefore includes radical, discontinuous, and architectural innovation as well as new-to-the-world (for both nascent and established firms) and new-to-the-firm (for established firms) technologies, business models, or products. Researchers studying the challenges firms face in innovating have often focused on internal challenges as firms respond to different types of threatening innovations and technological changes in their environments. But recent work has increasingly focused on external sources of pressures on firm innovation, and more specifically, the influences of sell-side analysts on innovation, novelty, and firms' responses to technological change (Benner, 2010; Benner & Ranganathan, 2012; 2013; 2017; Beunza & Garud, 2007; Litov, et al., 2012; Theeke, et al., 2018). Research in accounting and finance also has taken up the topic of analyst influences on innovation (Acharya & Xu, 2017; Derrien & Kecskes, 2013; Guo, et al., 2019; He & Tian, 2013). This research is marked by divergent answers to the question of whether analysts support and enable versus constrain and dampen innovation. Our process theory,

describing how analyst frames evolve and the mechanisms that underlie their evolution, helps explain this puzzle, thereby providing deeper insight into how equity markets influence innovation.

EVOLUTION IN ANALYST EVALUTIVE FRAMES

Phase 1 - New Evaluative Frame Creation and Variation in Frames

Since sell-side analysts cover public firms, our starting point is the arrival of a nascent publicly traded firm.[3] Drawing from prior research relevant to our question, we describe the mechanisms arising from the behaviors of firms and investors that heighten the difficulty for analysts seeking to explain and predict the stock valuations of such firms, and that spark a phase of creation and variation in new evaluative frames: as a nascent public firm pursues innovation in new-to-the-world technologies, products, or business models, as it promotes a narrative emphasizing distance from existing firms and similarities to other nascent firms, and as it generates investor enthusiasm and high stock valuations despite a lack of profit. In these situations, analysts face challenges using existing evaluative frames to assess the firm, and they are spurred to engage in heightened search, sensemaking, and experimentation to identify a new evaluative frame that can explain the firm's valuation. We begin with the characteristics of individual nascent public firms that can spark analyst search and the development of new frames, and then further consider how the entry of multiple nascent firms with similar characteristics influences new frame creation.

Nascent public firms engaging in new products, technologies, or business models. As analysts initiate coverage and begin assessing a new firm, they ask "what type of firm is this?" When a nascent firm is engaging in new-to-the-world products, technologies, or business models, uncertainty is heightened (McDonald & Eisenhardt, 2020; Sanders & Boivie, 2004; Zuzul & Tripsas, 2020), and analysts face difficulty evaluating the firm using familiar categories, narratives, and schemas. In turn, as analysts seek to explain and predict firm financial performance, investor behaviors, and correspondingly, the firm's stock value, these challenges spur analyst search and experimentation with new comparisons, category labels, narratives, and schemas. By contrast, when a nascent public firm produces familiar

[3] Nascent public firms are not necessarily de novo firms; recently the median age of a VC-backed technology company at IPO is 12 years (Chernova, 2020). We thank an anonymous reviewer for the suggestion to clarify this.

products, employing familiar technologies and business models, it invites comparison with similar established firms. In those cases, it is likely that analysts seeking to provide accurate predictions of performance and stock price can adopt a familiar category, narrative, and schema for explaining and predicting the firm's stock performance, rather than developing a new evaluative frame.

For example, in the late 1990s, Amazon.com engaged in innovation involving the radically new Internet and new business models. Some analysts covering Amazon.com compared it to familiar retail bookstores like Barnes & Noble, while other analysts engaged in heightened search and experimentation and compared Amazon.com to high tech firms like Dell (Beunza & Garud, 2007). Ultimately the challenges that arose in explaining Amazon.com's stock price led analysts to create a new "Internet and New Media" category. In contrast, a new retailer entering during this period by establishing physical stores could be compared easily to other brick and mortar retailers, likely resulting in less analyst search and experimentation involving new category labels and narratives.

Nascent public firms promoting narratives that emphasize distance from established firms. Analysts also are spurred to create new evaluative frames as a nascent public firm emphasizes differences from established firms and categories in its communications with analysts, investors, and through other media. Past research has studied the "entrepreneurial narratives" that nascent firms invoke in their communications with investor and analyst audiences, and how these narratives influence investor behaviors and resources for firms (Aldrich & Fiol, 1994; Lounsbury & Glynn, 2001; Martens, Jennings, & Jennings, 2007). It is likely that the narrative a firm itself promotes about its activities and sources of value creation influences the narratives that analysts adopt as they seek to explain how the firm's investments and activities drive its stock value. More specifically, as a nascent firm's own narrative distances it from familiar categories, narratives, and schemas, analysts will be more likely to engage in search and experimentation with new frames. Analyst search and the creation of new frames are likely further spurred as a nascent firm not only distances itself from existing firms, but also compares itself to other nascent firms (Kennedy, 2008) that are engaging in non-incremental innovation. These situations create difficulties for analysts evaluating the firm who might otherwise attempt to locate the firm in a

familiar category and seek to apply familiar narratives and schemas. These challenges further spur the heightened search and sensemaking activities that underpin analyst creation of new evaluative frames.

For example, in addition to Amazon.com's engagement in the radically new Internet technology, CEO Jeff Bezos actively promoted a narrative where Amazon.com was distant from other book retailers like Barnes and Noble, and similar to high-growth tech firms (Kim, 2019). Bezos' narrative ultimately influenced an analyst who compared Amazon to Dell and other dot coms (Beunza & Garud, 2007), an influential alternative in explanations about Amazon.com's stock value. Uber's CEO similarly promoted the narrative of Uber as a technology company rather than as a transportation company (Vergne & Wry, 2014), further shaping the narratives adopted by analysts and investors (Damodaran, 2017).

Conversely, if firms emphasize similarities with familiar categories, narratives, and schemas, they likely gain the legitimacy benefits of alignment with established categories (Hargadon & Douglas, 2001; Hsu & Grodal, 2020; Navis & Glynn, 2010; 2011) and are less likely to spark analyst experimentation with new categories and narratives. For example, as Hsu and Grodal (2020) argue, although e-cigarette products incorporated a radically new technology for devices used for smoking, producers facilitated understanding and adoption of their products by initially designing products that appeared similar to traditional (combustible) cigarettes. Positioning products in comparison to the existing cigarette category helped consumers understand the audience for – and use of – new products, despite the radically new technology. Emphasizing similarities also sparked less analyst search, however, as these firms initially were included in reports by the securities analysts already covering the existing (stigmatized) tobacco industry (Hsu & Grodal, 2020). Thus, as a firm distances itself from existing categories, analysts are less likely to evaluate it in comparison with existing firms, and are more likely to engage in the experimentation, search, and sensemaking that give rise to a new evaluative frame.

Nascent public firms with high stock valuations and little profit. The potential for new frame creation is also influenced by the behaviors of investors. Specifically, challenges for analysts are greater when the nascent public firm they seek to cover is generating investor enthusiasm, indicated by high stock market valuations, but also is generating little profit. In this case, a firm typically lacks the current

earnings, dividends, or cash flows that are inputs into conventional discount model calculations of stock price, making it difficult to explain the firm's high valuation. Zuckerman (2004) characterizes shareholders in such stocks as "speculators," who invest for longer-term capital gains and stock price appreciation, contrasted with "investors," who purchase stocks based on firm financial performance and anticipation of an ongoing income stream offered by cash flows or dividend payouts (Zuckerman, 2004:414). Whereas understanding the likely behavior of "investors" involves calculating and predicting the intrinsic stock market valuations arising from expected income flows using standard discount models, understanding the behaviors of "speculators" entails the more difficult task of predicting "prevailing opinion" to understand the likely behaviors of existing and potential shareholders (Zuckerman, 2004:414).

Thus, in situations when a firm's stock valuation far exceeds the stock price predictions arising from models of discounted cash flows or dividends, suggesting that the investors in a firm's stock are "speculators," analysts face the difficult task of explaining the drivers of investor enthusiasm and corresponding stock price that cannot logically be accounted for using existing categories or traditional performance metrics. These challenges are particularly strong when a firm lacks any profits or cash flows, making it unlikely that the investor interest sparking high valuations arises from straightforward calculations of a predictable income stream. In such situations, analysts cannot easily apply existing schemas and are spurred to engage in greater search and sensemaking to understand – and craft a narrative that explains – the "market's" beliefs about the firm's stock value and drivers of enthusiasm.

Tesla (originally, Tesla Motors) provides an example of how new evaluative frames are spurred by a firm's high valuations despite a lack of profits. Analysts initiating coverage on Tesla began by comparing Tesla to other automobile producers, applying conventional auto industry discount models to value Tesla's stock. It is clear that analysts faced challenges explaining Tesla's stock valuation in the absence of profits or cash flows:

> Tesla has not previously generated a profit, and is expected to record a -$3.21/share bottom-line loss in 2012…. Tesla has yet to generate positive free cash flow… Valuation seems to price in a lot, keeping us neutral…. We believe there is an investment case to be made for Tesla…At the same time, current valuation seems to demand earnings growth beyond that which we would expect…" (Brinkman, et al., 2012:5).

As Tesla's high valuation persists even as it continues to lose money, analysts engage in greater search and sensemaking to understand its valuation. Analyst sensemaking activities include visits to the company, factory tours, buying and driving a Tesla car, and meetings with investors.

> We have driven a Tesla for seven months in preparation for this report, and after conducting investor meetings with the company last week, we're finally ready to take a stand… we wanted to do a thorough job of due diligence before making an actionable call (see exhaustive field notes from a recent non-deal roadshow starting on page 3)…we also wanted to experience what it was like to own a Tesla before changing our rating. Finally we also wanted to take the time necessary for 'feeling out' investor sentiment on the stock …With all of these tasks completed, we now feel confident to upgrade the stock to Overweight (Potter, 2017).

Analysts further conclude that Tesla does not "fit" as a traditional auto firm, and they experiment with new categories and labels (i.e., "Electric Vehicle"):

> Tesla is not any auto company. It is the only pure-play listed Electric Vehicle manufacturer…we believe it is inappropriate to value Tesla like a conventional [auto firm] and indeed the market does not do so (Galliers, et al., 2017).

Similarly, analysts were challenged to explain Amazon.com's $400 stock price in comparisons with other book retailers, especially given its lack of profits. This prompted the search for new comparisons to explain its high valuation (Beunza & Garud, 2007), resulting in a new Internet and New Media category.

Conversely, when a nascent public firm does generate earnings and cash flows, these financial performance metrics enable analysts and investors to adopt conventional discount models from finance to calculate predictions of intrinsic stock value (Zuckerman, 2004). In such cases, analysts also likely adopt familiar narratives about the link between the firm's performance and investor behaviors. Measurable profits and cash flows - and the increase in predictability of these performance metrics for a firm - further attract investors focused on financial performance metrics in their stock purchase decisions. In turn, this makes analyst reliance on traditional discount models even more reasonable and accurate, dampening the impetus for analysts to explore for new narratives and schemas.

In sum, analysts' activities to develop new evaluative frames are spurred by particular behaviors of nascent public firms and their investors that prevent analysts from explaining the valuation of these firms using established frames. Our arguments above point to three mechanisms that spark the creation of new analyst evaluative frames: As a nascent public firm engages in innovation in new technologies, products, or business models, distances itself from established firms and categories in its activities and narratives,

and generates investor enthusiasm and corresponding stock valuations that are difficult to explain using traditional financial performance metrics, analysts are likely to engage in the heightened search and sensemaking that underlie the creation of new evaluative frames. Moreover, as individual analysts search and experiment to provide a more accurate understanding of a nascent public firm, categorical comparisons, narratives, and schemas also are likely to differ across analysts (Damodaran, 2017), spurring variation in evaluative frames for a firm (McGough & Wingfield, 2000). Our arguments further suggest that when the situation is characterized by a combination of all three mechanisms, analysts are even more likely to engage in search to create new evaluative frames.

To this point we have considered how specific characteristics of an individual nascent public firm and its interaction with investors and analysts can lead to the creation of new evaluative frames. There are also situations when multiple nascent firms become public at the same time, i.e., involving the emergence of a nascent "industry." In such situations, particularly as these firms are engaging similarly in innovation in new technologies, products, or business models, distancing themselves from established firms and industries, and achieving high stock valuations, analysts are even more likely to engage in search to create new evaluative frames than they are in the case of a single firm. As more firms with these characteristics become publicly traded, there is likely greater interest from buy-side clients for the analyst's insight about multiple new public firms that are attracting substantial equity market attention, spurring analysts to engage in coverage of firms in the new, emerging industry and create new evaluative frames.

For example, Reingold & Reingold (2006) describes Daniel Reingold's experience as an analyst covering the new "telecommunications industry" that was created with the breakup of AT&T in 1984, involving the formation of the seven "Baby Bells" (the RBOCs).[4] This illustrates the emergence of a new industry category and the heightened analyst search to respond to investor needs:

> Every time a new industry came along, Wall Street staffed up with analysts, traders, and bankers to cover it. …Wall Street desperately needed people who could help investors figure it all out. So in the early 1980s the Street went on a hiring binge, recruiting practically everyone it could find with experience in both financial analysis and the telecom

[4] The "wireline telecommunications" category at the time included the "RBOCs" (the Regional Bell Operating Companies, or "Baby Bells," that resulted from the breakup of AT&T in 1984), as well as long-distance telephone service providers like MCI and Sprint.

> sector…. [analysts were] doing everything from analyzing the financial trends in an industry to interviewing top executives to gauging the impact of upcoming regulatory changes… (Reingold & Reingold, 2006: 39)

Phase 2 - Convergence and Institutionalization in Evaluative Frames

In phase 1, we described the mechanisms that underlie new analyst frame creation and variation; here we describe mechanisms underlying processes of convergence and institutionalization in analyst frames: as analysts observe each other and adopt an increasingly accurate frame, as a firm generates profits, as its stock valuation becomes increasingly predictable using a particular frame, and as the firm increasingly conforms to the expectations of a dominant frame. We consider the behaviors of investors, analysts, and the firm itself in these processes. We describe the mechanisms separately but see them as interacting and mutually reinforcing in their influences on processes of convergence and institutionalization in analyst frames. We focus first on the mechanisms underlying convergence and institutionalization in the evaluative frames applied to an individual firm, and then consider the influences of multiple firms.

Analysts adopting an increasingly accurate frame. Our first mechanism underlying the process of convergence in an evaluative frame unfolds as analysts observe each other, and as the frames promoted by particular analysts emerge as more influential and accurate in predicting a firm's stock valuation. As one or a few analysts provide a more compelling narrative and prediction, other analysts adopt the emerging dominant frame and abandon their own frames, reducing variation in frames, and spreading further convergence. An analyst promoting a more accurate and compelling narrative and schema also becomes more influential in shaping investor understandings and behaviors, improving the accuracy of the frame as investor behaviors increasingly both conform to - and are explained by - the narrative. In turn, as more analysts adopt the emerging dominant frame, and as a greater number of analysts using the same frame interact with a greater number of current and potential investors, the emerging frame further shapes actual investor understandings and behaviors, leading to greater accuracy in assessing a firm's value. We view this as an iterative process whereby influential analysts become increasingly accurate in their predictions of a firm's stock valuation, increasing their influence on investor behaviors as well as the

salience of the evaluative frame they promote, and sparking adoption by other analysts and investors, i.e., increasing convergence on the dominant frame (Lashinsky, 2000).

Prior work highlights related mechanisms that also can underpin analyst convergence on a dominant evaluative frame. Scholars have found that in situations of high uncertainty, analysts may herd, i.e., ignore their own private information and beliefs, and follow an emerging consensus view (Hong, Kubik, & Solomon, 2000). Convergence in views among analysts might also unfold through social psychological mechanisms such as social proof (Rao, Greve, & Davis, 2001) or pluralistic ignorance (Zhu & Westphal, 2011). Moreover, an analyst who persists in not adopting the emerging dominant frame faces risks of both deviating from an emerging consensus and being wrong, leading to career concerns (Hong, Kubik, & Solomon, 2000), and ultimately, greater conformance with the dominant frame.

Increasing profitability. A second mechanism influencing convergence and institutionalization unfolds when a firm begins to generate profits, making the link between firm financial performance and stock price clearer. Profit measures allow analysts and investors to shift away from the speculative "guessing" about the prevailing opinion on a stock (in the absence of profits), to using well understood financial metrics as inputs into calculations of stock price that rely on conventional discount models (e.g., Zuckerman, 2004; Brealey & Myers, 1984). As analysts rely increasingly on models based on profits, they are likely to curtail experimentation with competing narratives and schemas and settle on a narrower schema and set of metrics to evaluate the firm, corresponding with "how the emphasis shifts from stories to numbers as companies age" (Damodaran, 2017:231). With increasing profits, investors also can shift to using well accepted financial approaches for making stock price calculations and purchase decisions, and as they do so, the analyst's job of anticipating and explaining the market's beliefs about a stock's value becomes increasingly straightforward. Moreover, as a firm's financial performance and stock price become more predictable, the stock likely further attracts investors who value stocks for predictable income streams (as opposed to speculators interested in capital gains), further facilitating more accurate predictions of the behaviors of the type of investor holding the stock.

Increasing predictability of a firm's stock price. Our third mechanism, closely related to the previous mechanism, is the increasing predictability of a firm's stock price as a firm becomes profitable. Analysts codify narratives about the firm's valuation in performance metrics (i.e., the schema in our evaluative frame construct), and as they do so, they are able to directly test competing narratives, choose the most compelling explanation of stock price, and abandon others (Damodaran, 2017). Increasing certainty about the performance outcomes of the firm's activities and a clearer understanding of how firm performance metrics drive behaviors of current and potential investors reduces the range of possible narratives that can explain a firm's valuation. Repeatedly assessing the firm's stock performance against narratives and metrics allows analysts to narrow the set of frames that can accurately explain a firm's valuation, leading to increasing convergence on a particular frame.

The increasing accuracy of a particular frame in predicting a firm's stock price drives further institutionalization, as the most promising schema and metrics are codified, applied routinely, and further honed through repeated assessments of the firm. This becomes an ongoing iterative process of greater clarity and improved analyst ability to explain and accurately predict stock price, and subsequent adherence to - and incremental improvements in - the emerging dominant frame.

Firm conformance with the frame. Finally, the fourth mechanism underlying frame institutionalization arises from behaviors of the firm itself, as a firm seeking the benefits of analyst coverage and approval increasingly conforms (Zuckerman, 1999), in this case, with investor and analyst expectations that are embedded in an increasingly institutionalized frame. As a firm complies in its actions and performance outcomes, a firm's behaviors become more predictable and analyst assessments and predictions of stock price become even more accurate. Firm behaviors that align with investor and analyst expectations further reinforce the focus of these stock market participants on particular measures to assess firm behaviors (Aghion & Stein, 2008). Accurate predictions of investor behaviors and corresponding stock price contribute further to an increasingly strict evaluative frame. Managers conform both by adjusting firm behaviors to align with analyst performance expectations (e.g., earnings forecasts), and as they communicate with analysts about firm performance in terms that align with the schema and

metrics that are employed by analysts. For example, as analysts covering Qwest attended to cash flow metrics as the driver of firms' stock valuations, executives presented firm performance results using the same terms, indicating conformance by emphasizing the firm's actions to lower spending and maximize cash flow (Benner & Ranganathan, 2017:14):

> Our results this quarter reflect our priority of managing the business for free cash flow, including disciplined margin. (Management presentation, Qwest conference call, April 2009)
>
> …we will continue to improve productivity and attack the cost drivers of the business…Adjusted free cash flow for the quarter was $657 million, nearly a $200 million improvement from prior year levels. The biggest contributor to these results were lower capital spending where we remain disciplined. (Management presentation, Qwest conference call, July 2009)

In sum, our arguments above point to four mechanisms that underlie the processes of convergence and institutionalization in analyst evaluative frames. For an individual firm, the frame begins to converge as multiple analysts adopt an increasingly compelling and accurate narrative for explaining a firm's valuation. Convergence and institutionalization proceed as a firm begins generating a profit, and further, as investor behaviors and the firm's corresponding stock valuation become increasingly predictable viewed through the dominant frame. Institutionalization of the frame unfolds further as a firm seeking positive reactions increasingly conforms to the expectations of the converged, institutionalized frame.

Our arguments also suggest that the *speed* of convergence and institutionalization in analyst frames is shaped by the mechanisms we describe in our phases of evolution in frames. To the extent nascent public firms persist in new-to-the-world innovation and continue generating high valuations and little profit, i.e., forces that make their valuations difficult to explain and predict using standard discount models, analysts may continue experimenting, delaying the processes of convergence and institutionalization depicted in our second phase. Conversely, consistent with the mechanisms underlying our second phase, processes of convergence and institutionalization in frames are more likely to unfold and unfold more quickly as a nascent firm begins to generate predictable profits, attracts investors interested in predictable earnings and cash flows, and aligns its behaviors with analyst metrics and expectations.

Multiple nascent public firms and frame convergence

To this point, we have considered mechanisms that underlie the process of convergence on a single frame for evaluating an individual firm. Prior work also shows that analysts covering multiple similar

firms in the same industry category may adopt the same evaluative frame (e.g., Benner & Ranganathan, 2017; Zuckerman, 1999). Prior research and our theory suggest that a single evaluative frame could converge and apply to multiple firms either when nascent public firms arrive at the same time or when they arrive sequentially. In the former case, multiple nascent firms engaging in similar activities can become public at nearly the same time, marking the emergence of a nascent "industry." Analysts are likely to create new evaluative frames to understand multiple entering firms engaged in similar activities, as in the case of the new firms that became public with the breakup of AT&T. It also is clear that analysts subsequently converged on a frame to assess these firms in the "wireline telecommunications" analyst category (Benner & Ranganathan, 2017:6); analysts hold similar expectations for firms, across firms and analysts, i.e., maximizing cash flows and using the cash to pay dividends to shareholders.

> We like the company's projected ability to generate solid free cash flow…as well as the attractive 3.6% dividend yield. (Morgan Stanley reports on Verizon, April 9, 2002 and April 24, 2002).
>
> We anticipate that VZ [Verizon] should also be able to maintain its annual free cash flow generation (prior to dividends and share buybacks) of around $9bn per annum…As is the case with the other RBOCs, this remains VZ's key investment thesis. (Deutsche Bank report on Verizon, April 2003).
>
> We believe Verizon, like the other RBOCs, is well positioned in the long run to leverage its existing customer base (approx.. 51M retail access lines…) into strong cash flows. (Credit Suisse report on Verizon, January 2003).
>
> …We believe that as free cash flow expands, so will value attributable to equity. (Deutsche Bank report on Qwest, April 2003).

In the latter case, the process by which analysts apply the same evaluative frame for multiple firms unfolds sequentially, as a frame shaped by an earlier entrant is used to evaluate subsequent entrants that have similar characteristics.

In both cases, how a single frame applies to multiple firms likely further depends on whether the characteristics that firms share are more aligned with our phase 1 or our phase 2 mechanisms. If firms are similarly engaging in non-incremental innovation, distancing themselves from established firms, and generating hard to explain stock valuations, it is likely that convergence on a single frame will unfold more slowly, as analysts continue to experiment with categories, narratives, and schemas. Following the mechanisms in our theory to this point, convergence might unfold as one or more firms begins to generate profits and predictable financial performance, in turn further shaping expectations and conformance for

similar firms, leading to further convergence. Correspondingly, if a dominant frame has already become codified and institutionalized for evaluating an earlier entrant, convergence and institutionalization of a single frame applied to similar subsequent entrants may unfold more quickly, particularly as new entrants emphasize alignment with the existing frame, through their actions and communication.

While prior research on analysts has highlighted the categorical organization of analyst coverage and often considers firms in the same industry being evaluated similarly, recent work suggests that analysts may not necessarily converge on the same frame for evaluating firms even within the same industry category (Zuckerman, 2017; Paolella & Durand, 2016). It may be that once an industry category has been established, firms emphasize their differences from other firms in the same industry, rather than engaging in similar, conforming behaviors (Navis & Glynn, 2010), slowing or preventing convergence on the same frame for multiple firms. Our arguments about the creation of new evaluative frames, convergence in frames, or analyst influences on innovation (described in the next section), do not require analyst convergence on a single frame for assessing multiple firms.

THE INFLUENCE OF EVOLVING ANALYST FRAMES ON FIRM INNOVATION

In this section, we turn to innovation outcomes for firms, describing how different phases of evolution in analyst frames shape contrasting analyst influences on innovation (shown in Figure 2).

New Evaluative Frames Enabling Innovation in Nascent Firms

In phase 1, we described mechanisms that underlie analyst search, experimentation, and ultimately, the creation of new evaluative frames. Here we contend that as analysts create new evaluative frames to explain the stock values of nascent firms engaging in non-incremental innovation, they reduce uncertainty and information asymmetries, facilitating the flow of capital market resources that can enable and legitimate continued activities in non-incremental innovation undertaken by these firms. This is shown in the upper left quadrant of Figure 2. We describe these processes below.

Explaining the value of innovation. As analysts construct new evaluative frames to explain the value of nascent public firms engaging in non-incremental innovation, they help investors and other analysts categorize and assess these firms, increasing understanding of new technologies, products, or

business models. Since the new frame is being shaped specifically to understand a nascent firm engaging in non-incremental innovation, the emerging frame allows an analyst to structure explanations of the drivers of investor behaviors and the firm's current and future stock valuation arising from these non-incremental innovation activities. Emerging frames not only *explain* investor behaviors (and corresponding stock prices), they also *influence* the stock purchase behaviors of existing and potential investors, as "investors draw on analysts (critics) to learn about socially legitimated valuation" (Wansleben, 2012:16). In addition, in this early phase of frame evolution, as analysts search and experiment with different categories, narratives, and schemas to understand firm valuation, variation across analysts further supports variation in the types of non-incremental innovations that are enabled.

Below we illustrate examples of each of the three elements in our construct of evaluative frames, showing their role in analyst explanations and valuation of firms undertaking innovation. First, the evaluative frame includes a *category*, i.e., analysts' decisions about how to classify a new firm, the corresponding comparisons with other similar firms, and the category label, chosen to demarcate a set of similar firms and distinguish them from other types of firms. Categorization helps analysts shape investor understanding of a firm's valuation; as Vergne and Wry (2014:58) note, "by enabling commensuration, categories provide an anchor for making judgments about value and worth…" Particularly when a nascent firm does not clearly align with existing categories, categorization can entail creating an entirely new category and label to help investors make sense of such firms. We previously noted the example of the "Internet and New Media" category that analysts created to understand Amazon.com. In another example, analysts covering Uber highlight a brand new "ridesharing" industry category:

> We are initiating on UBER with an OUTPERFORM rating and $65 price target. The ridesharing industry has become one of the most transformational growth sectors of the global consumer market over the past five years with Uber establishing itself as the clear #1 player and in our opinion is paving a similar road to what Amazon did to transform retail/ecommerce and Facebook did for social media. (Arounian, et al., 2019).

Analysts further link the categorization of a firm with its valuation via a *narrative* or verbal explanation of a firm's valuation, specifically connecting the firm's activities to investor behaviors, i.e., the buying and selling behaviors that underlie a firm's stock value. Narratives are particularly important in these nascent phases for explaining firm performance, before there are specific performance metrics for

predicting valuation (Damodaran, 2017). In the example below, analysts promote narratives about the ridesharing industry and Uber in their efforts to make sense of and to explain Uber's high valuation.

> Does Uber become the next Amazon? [Uber] has the DNA to become a game changing consumer distribution ecosystem over the coming years…a core tenet of our bull thesis on Uber is around the company's ability to morph its unrivaled ridesharing platform into a broader consumer engine with Uber Eats, Uber Freight, and autonomous initiatives 'just scratching the surface' of the full monetization potential of this platform over the next decade. (Arounian, et al., 2019).

> …we are bullish on the stock as we see the vast global transportation market as poised for disruption, and Uber as the dominant player in the revolution... We expect ridesharing to have an impact on transportation similar to what the smartphone has done to communication. (Graham, et al., 2019).

Analysts also create and disseminate *schemas*, the third element in our definition of evaluative frames. Schemas are the metrics and models that attach numbers to the analyst's narrative about firm value. Quantifying the narrative about valuation facilitates analysts' stock price forecasts and recommendations, and in turn, helps investors identify specific drivers of firm valuation. The developing schema further allows tests of the credibility of unfolding narratives. For example, an analyst covering Uber provides specific metrics used to calculate Uber's current (and future) valuation:

> In our EBITDA-Driven Valuation, we project U.S. Ridesharing Gross Bookings, and Take Rates to 2028 (a 16% CAGR, and 21.5%, respectively) and apply management's long-term EBITDA Margin goal of 25% to U.S. adjusted net revenue for an estimated 2028E EBITDA of $3.9 Bn (see Exhibit 2). We apply a 15.7x EBITDA multiple to our estimate of Uber's 2028 EBITDA to derive Uber's forward Enterprise Value of $62Bn in 2028E. We selected a 15.7x EBITDA based on the average EBITDA Multiple history of a basket of profitable and mature consumer Internet stocks that are leaders in their respective categories. Our U.S. Gross Booking estimates are based on U.S. ridesharing market sizing and share research, which follows.... (Fitzgerald, et al., 2019).

Schemas involve the specific metrics that capture the firm activities and performance from those activities that analysts have identified as the drivers of stock price, and that are important quantitative inputs into analysts' models for forecasting stock valuation.

Thus, the elements of the evaluative frames that analysts create help them explain the innovation that a firm is undertaking, how these innovative activities drive stock valuation, and further, as we argue below, help reduce uncertainty and information asymmetries.

Reducing uncertainty and information asymmetries. As analysts categorize a firm and use narratives and schemas to explain a firm's non-incremental innovation, new business models, and stock valuation, they further reduce uncertainty about the link between the firm's activities and its stock price. Investors and managers learn about how a firm's activities influence investor behaviors and corresponding stock values. In this process, analysts are reducing information asymmetries, as investors

gain greater insight into the firm's investments and activities in non-incremental innovation. Prior research further shows that as information asymmetries and uncertainty are reduced, firms are rewarded with higher stock prices and lower costs of capital (Derrien & Kecskes, 2013; Guo et al., 2017; Litov et al., 2012; Mola, Rau, & Khorana, 2013). In this case, new evaluative frames specifically reduce uncertainty and information asymmetries for a firm undertaking non-incremental innovation, further reducing the costs of capital for these types of innovative firm activities.

Analysts' explanations of how a firm's investments and activities in innovation drive stock valuations also provide legitimacy that further enables a firm's engagement in – and shareholder support for – continued pursuit of non-incremental innovation. For example, in the case of satellite radio, analysts highlighted non-incremental innovations, such as "launching satellites" and "producing initial chipsets" (Navis & Glynn, 2010: 450), as the drivers of investor enthusiasm and increases in stock prices. It is likely that by doing so analysts further legitimized such activities, enabling continued investments in these non-incremental innovations. Similarly, as Henry Blodget's narrative explained Amazon's $400 stock price by comparing it to high tech firms (Beunza & Garud, 2007), it likely also further legitimized Amazon's continued innovation in the new domains of Internet retailing and other areas.

In addition, beyond the influences of the new evaluative frame on innovation in an individual firm, the creation of a new frame for evaluating a promising nascent firm may offer opportunities for other new firms that are moving toward becoming public. They might rely on the emerging innovation-enabling frame as a source of legitimacy underlying their own actions. The entry of additional new firms engaging in non-incremental innovation is a source of variation in our theory.

In sum, as analysts create and disseminate new evaluative frames that include a category, narrative, and schema, they help explain the firm's non-incremental innovation and drivers of stock price, reducing uncertainty and information asymmetries. These sensemaking actions facilitate positive capital market responses, further legitimating and enabling non-incremental innovation by nascent public firms.

Institutionalized Frames Constraining Innovation in Established and Nascent Firms

With our second phase of evolution in analyst frames, involving convergence and institutionalization, analysts increasingly constrain a firm to frame-conforming incremental innovation. As analysts coalesce on a dominant frame for evaluating the same firm and in some cases, for evaluating similar firms within the same industry category, evaluative frames become more rigid and stricter, and "boundary violations" become more salient (e.g., Ruef & Patterson, 2009). A firm's actions that comply with the expectations and prescriptions of an institutionalized evaluative frame receive positive evaluations, while actions that deviate become increasingly salient and invite negative analyst reactions. In turn, the firm actions that comply with expectations of a coherent, institutionalized frame involve incremental innovation, i.e., a continuation of existing products, technologies, and business models, while non-incremental innovation that departs from these expectations is likely to invite more negative analyst recommendations and assessments or dropped coverage, leading to stock price discounts and increased costs of capital (Benner & Ranganathan, 2012; Litov et al., 2012; Theeke et al., 2018; Zuckerman, 1999).

Amazon provides an example of the increasing constraints on an organization. A May 2022 tweet from Jeff Bezos recalls the negative reactions Amazon received from "Wall Street" as it ventured into what would become its "Amazon Web Services" business (AWS). This non-incremental activity departed from the expectations of investors and analysts corresponding with the view of Amazon as an Internet retailer. Investor and analyst negativity was indicated by the high number of sell recommendations and the 20% decrease in stock price (Business Week, 2006; cnbc.com, 2022).

As firms face negative analyst reactions and lower stock prices, they also face pressures to conform to analyst expectations (Zuckerman, 1999; 2000). Prior research argues and finds that in such situations, firms tend to seek ways to alleviate the penalties that arise from category deviance by changing strategies (Zuckerman, 2000), retreating from innovation to improve alignment with expectations (e.g., Benner & Ranganathan, 2012). Thus, pressures for conformance, and specifically the pressures that arise from negative assessments of innovation viewed through a phase of stricter frames, often can spur a continued

focus on incremental innovation in existing technologies, products, and business models (Benner & Ranganathan, 2012).[5] This is shown in the lower right quadrant of Figure 2.

Pressures from convergent, institutionalized frames not only constrain innovation in an established firm, they can also have a similar constraining influence on a nascent public firm. Specifically, as a nascent firm engages in familiar products, technologies, and business models, seeks to align itself with an existing category by comparing itself to established firms, and generates a profit, it is less likely to spark analyst search and more likely to be categorized in a familiar category and evaluated using a familiar narrative and schema. In turn, while there are clear benefits from fitting into existing, legitimated categories, the firm is likely also to face heightened pressures to align with the expectations of an existing frame, promoting incremental innovation, similar to the situation in established firms. We describe this in the upper right quadrant of Figure 2.

It is also likely that the constraints on an established or nascent firm are greater when analysts apply the same frame to evaluate multiple firms within the same industry. In those cases, although the frame is applied similarly to all firms, analysts may highlight a preferred firm, i.e., the firm that is most closely conforming with the frame, and this creates even greater pressures on other firms within the industry to similarly conform as they seek positive evaluations.

To this point, we have applied our model of evolution in analyst frames to understanding analyst influence on firm innovation in three situations: nascent public firms that spark new evaluative frames further enabling their non-incremental innovation, and both established firms and nascent public firms facing pressures for alignment with institutionalized frames that constrain firms to incremental innovation. Our theory of evolution in frames so far helps explain the puzzle that motivates our paper: how it is that analysts have both enabling and constraining effects on innovation, as well as the dynamics that underlie these shifts in their influence.

[5] Despite the clear evidence of pressures on Amazon arising from negative analyst ratings and decreased stock price in 2006, Amazon did not retreat from its new AWS business. As Bezos notes in 2022, the AWS business had revenues of $62 billion, and was a major contributor to Amazon's profitability. As we discuss in the last section in this paper, most firms would have difficulty resisting such pressures from Wall Street.

Established Firms and New Evaluative Frames

The last combination we consider in our theory is established firms and new evaluative frames (shown in the lower left quadrant of Figure 2). We consider the important question of whether and how, in response to behaviors of established firms, analysts might create new evaluative frames that enable non-incremental innovation as they do in the case of nascent public firms (in the upper left quadrant of Figure 2). We consider this possibility by revisiting the mechanisms that underlie the emergence of new evaluative frames from our first phase. We describe the pressures on established firms that can dampen and prevent non-incremental innovation, even when it is important for adaptation.

Established firms pursuing non-incremental innovation in new technologies, products, or business models. Our first mechanism sparking new evaluative frames in phase 1 is nascent public firms engaging in new-to-the-world technologies, products, or business models. Established firms often also undertake major innovations involving new technologies, products, and business models (Benner & Ranganathan, 2017; Eggers & Park, 2018). But prior research shows that analysts do not readily create entirely new frames to evaluate established firms, even when firms pursue non-incremental innovation and change that would seem to warrant a shift in how they are categorized and evaluated. Although Pepsi acquired the large fast food restaurant chain that included Taco Bell, Pizza Hut, and KFC, the firm continued to be evaluated by analysts as a "beverage" company (Zuckerman, 1999). Even when firms undertake fundamental changes in their corporate strategies, such as divesting legacy businesses (Feldman, 2016), suggesting the firm belongs in an entirely different industry category, analysts persist with pre-change classifications. Tripsas (2009) also showed that as "Linco" pursued an identity change - from a digital photography company to a flash memory media company - analysts that were already covering the firm continued to evaluate it in digital photography. While nascent firms like Amazon.com that emerged in the 1990s were considered "Internet and New Media" firms (Beunza & Garud, 2007), established firms that created websites at that time (thereby also engaging as dot coms) were not recategorized as "Internet" firms (Benner & Ranganathan, 2012). Research in settings of radical technological change further shows that when established firms respond to new technologies with major

changes that seem to warrant new categories or metrics, analysts tend to persist in how they evaluate the activities and performance of these firms. For example, Benner and Ranganathan (2017) show that analysts persisted in assessing Verizon using an "access line" metric corresponding with copper wire telephone technology that had become obsolete in light of Verizon's innovations in fiber-to-the-home technology. Benner & Ranganathan (2013) also show that even when a technological change led to firms from different industries (cable and telecommunications) engaging in the same (converging) product/market space, analysts tended not to recategorize firms. These studies suggest that even when established firms do engage successfully in non-incremental innovation that might warrant new frames, analysts are unlikely to update their frames or create new frames. This further suggests the potential for constraints imposed by institutionalized analyst frames to persist for established firms.

When established firms pursue new technologies, products, or business models, they often incur the negative analyst recommendations or dropped coverage that can push them to conform with existing frames and abandon non-incremental innovation. Given the uncertainty inherent in new technologies, products, and business models (McDonald & Eisenhardt, 2020; Zuzul & Tripsas, 2020), adoption and diffusion can take time and sustained investment, and performance results might not materialize immediately. In turn, negative reactions or a lack of coverage by analysts can lead to lower stock prices, CEO firings (Wiersema & Zhang, 2011) or the arrival of activist investors (Ahn & Wiersema, 2021), events that further reinforce the pressures on firms to abandon non-incremental innovation efforts, rather than sparking change in the frames analysts use to evaluate the firm.

For example, analysts covering Kodak were negative toward its investments in innovation in digital photography technology, and similarly, analysts covering Verizon were critical of its investments in innovation in the radically new fiber-to-the home technology (i.e., its FiOS offering). In both cases, analysts encouraged firms to abandon their innovative efforts (Benner & Ranganathan, 2012:218):

> Shareholders will revolt once the meager (and distant) potential returns from electronic imaging become clear…. We are eager to see shareholders' reactions when they realize how much of their money is squandered on "digital nonsense." (Prudential Securities, 1994)

> We are concerned about the economics of the FiOS initiative [Verizon's offering to respond to the technological change], but a pull-back on this could make us more constructive on the stock (Morgan Stanley, 2005–06).

In turn, as firms seek the benefits of analyst coverage, they face pressures to conform their behaviors with the expectations arising from analyst frames (e.g., Zuckerman, 1999; Litov, et al., 2012). Even in the cases where non-incremental innovation may be necessary for firm adaptation and success, firms may work to alleviate penalties by complying with pressures and retreating from the non-incremental innovation that invites negative evaluations or dropped coverage (e.g., Benner & Ranganathan, 2012). For example, Qwest initially undertook non-incremental innovation to address the technological change in telecommunications (similar to Verizon), but later retreated in response to pressures to abandon its investments and renew its focus on cash flows and dividend payouts (Benner & Ranganathan, 2017:8):

> Mr. Notebaert [Qwest's CEO] stressed that he did not believe Qwest would need to [spend] capital on a video build (like FiOS [Verizon's innovation in the new technology]) … and that he would impress upon a new CEO those sentiments. By not embarking on such a venture, Qwest would retain its strong free cash flow. (Credit Suisse, report on Qwest, August 2007)

> [I]n keeping with our philosophy of providing tangible returns to shareholders, we paid nearly $275 million in dividends in the first half of the year. On slide 18, you can see that adjusted free cash flow for the quarter was $657 million, up from $460 million in the same period last year. The majority of the improvement was the result of lower capital investment in the current quarter. (Management presentation, Qwest conference call, July 2009)

Thus, it appears that when non-incremental innovation is undertaken by established firms, it is less likely to spur analyst search and experimentation with new categories, narratives, and schemas than when it is undertaken by nascent public firms. Rigid analyst frames can make non-incremental innovation difficult, and firms may simply curtail their innovative efforts under pressures from equity markets.

However, it may be that when an established firm persists in its non-incremental innovation and when this persistence in innovation results in performance improvements that cannot be explained by existing narratives or schema, (i.e., performance does not simply decrease), that analysts might be spurred to search for new frames. For example, when Verizon's non-incremental innovation in fiber-to-the-home technology began to generate new revenue that could not be anticipated using current schemas, analysts began to search for – and were more willing to adopt – new performance metrics (Benner & Ranganathan, 2017). Thus, established firms' non-incremental innovation in new technologies, products, or business models might spur analyst search and sensemaking and change in frames, but possibly only when firms

are able to persist in non-incremental innovation activities until new performance benefits materialize. In the meantime, many firms will not be able to resist the pressures arising from negative reactions.

Established firms emphasizing distance from existing categories. The second mechanism underlying the creation of new evaluative frames from our first phase is nascent firms distancing themselves from existing categories and comparing themselves to other nascent firms. It may similarly be that as an established firm distances itself from its existing industry category and compares itself to new firms in its communications with analysts, it can spur a change in analyst frames. Such efforts might trigger renewed analyst search and sensemaking, leading to the creation of new frames. Moreover, established firms might similarly focus efforts on comparisons with nascent firms that have already sparked the creation of new analyst frames, as a means of shifting frames.

A dilemma for established firms, however, is that although change in analysts' evaluative frames might enable non-incremental innovation, alignment with the existing frame also confers legitimacy (Zuckerman, 1999). Indeed, Lounsbury and Rao (2004) argue that incumbents' incentives may be greater to prevent change in existing classification systems to provide a source of category stability. There clearly are risks for established firms emphasizing new endeavors that cause them to deviate from their existing categories. Analysts may simply find the firm more difficult to evaluate and drop coverage, harming stock value. Emphasizing distance from an established firm's existing category might make the firm's foray into new innovations even more salient and raise greater concerns about its novel activities.

Established firms with high valuations. The third mechanism triggering new evaluative frames in our first phase is when nascent firms have unusually high stock market valuations that cannot be explained using standard discount models based on financial performance metrics. Similarly, it seems that if investors become more positive about an established firm's stock as it engages in non-incremental innovation (resulting in stock valuations that are higher than analysts anticipate when relying on the current evaluative frame), analysts might be spurred to engage in search to understand the drivers of these unexpected investor behaviors. Prior research does not offer guidance into how or when this might happen. The anecdotal Amazon case above suggests that analysts did not see promise in Amazon's Web

Services business, reflected in the increase in "sell" recommendations on the stock. However, it may be that investors' views of a firm's stock can be shaped more directly by interactions between company executives and investors, in road shows and other presentations, and the resulting investor enthusiasm for an established firm's non-incremental innovations could lead to stock valuations that are not explained by current analyst frames. In turn, this might spur the analyst search and experimentation to create new frames, similar to the process we depict for nascent firms.

Thus, our arguments suggest that this fourth combination, involving established firms and new analyst frames, is relatively uncommon. Evidence from prior research suggests that once an evaluative frame has become institutionalized for understanding an established firm, it tends to persist, and it is rare for analysts to create new evaluative frames, even when a firm is undertaking non-incremental innovation. This may be because creating a new frame for an established public firm goes beyond analyst search and experimentation with possible new categories, narratives, and schemas; change also requires deinstitutionalizing an existing frame. A challenge is that an existing evaluative frame becomes institutionalized specifically because it has been valuable in guiding understanding of the link between firm performance and stock value and has influenced the stock purchase decisions of an analyst's buy-side investor clients. An analyst's evaluative frame for assessing an established firm therefore represents the agreed upon understanding of a firm's value that has been developed in interactions with executives and investors. The more a frame has been valuable in providing accurate forecasts and compelling explanations for a firm's stock valuation, the more reluctant an analyst may be to abandon existing models and metrics to search for new ones. Marked changes in the frame might harm an analyst's investor clients currently holding the stock. Thus, it may be that change in an established analyst frame requires higher valuations than can be explained with the existing frame, i.e., investors must first change their views of the value of an established firm, followed by analysts changing frames as they seek to explain increased valuations arising from investor interest. Creating new frames for evaluating established firms in such a situation may also be more difficult because, as we argue, one mechanism underlying frame institutionalization is the increasing use of standard discount models for stock pricing. Change in frames

then also may require abandoning straightforward discount models of stock price, and undertaking new efforts to understand the behaviors of "speculators," not explained by firm performance.

Moreover, if the application of an evaluative frame has extended beyond an individual firm to multiple firms within an industry, it is likely even more difficult for an individual firm's pursuits in non-incremental innovation to effect change in the frame. This is particularly the case if other firms in the industry continue to conform with the frame. In these cases, the "boundary violations" discussed in prior work (Ruef & Patterson, 2009) are heightened and more salient for an individual firm departing from an evaluative frame applied to the category of firms; the pressures on the individual firm to conform are likely to be even greater. For these reasons, it seems that the creation of innovation-enabling new frames is less likely for established firms.

Our suggestion that institutionalized analyst frames constrain innovation is not new; previously we described how institutionalized frames can constrain both nascent and established public firms to incremental innovation. However, in those situations, analysts may not be *dampening* non-incremental innovation that otherwise would occur. Instead, it may be that analyst influences align with and reinforce a firm's intended focus on familiar technologies, products, or business models. In contrast, in this situation it is clearer that the pressure for conformance arising from institutionalized frames can actively dampen or even prevent non-incremental innovation, even when established firms can successfully pursue novelty and search in new domains, and even when these activities appear imperative for adaptation.

DISCUSSION

Our process theory (Cornelissen, 2017) depicts the shifts in influences of sell-side analysts on different types of innovation in firms. We explain how analysts can have both enabling and constraining effects on innovation, and we describe mechanisms (Davis & Marquis, 2005) that underlie these differences. We begin with analyst evaluative frames, i.e., the category, narrative, and schema that analysts create and employ as they do their work assessing a firm's performance, predicting its stock valuation, and making stock recommendations. The underlying "generative mechanism" in our process theory (Cornelissen, 2017:5) is the evolution in these evaluative frames. We further describe mechanisms arising from the

behaviors of investors, analysts, and firms themselves that underpin the process of frame evolution, from an early phase of creation and variation to a subsequent phase of convergence and institutionalization. We explain how these phases in analyst frame evolution shape differences in analyst influence on innovation in different types of firms and in the same firm over time. Our theory of frame evolution (shown in Figure 1) begins with the arrival of a nascent public firm engaging in non-incremental innovation in new technologies, products, or business models, promoting entrepreneurial narratives to distance itself from established firms and categories, and generating a high valuation but lacking profits, making the firm's valuation difficult to explain with existing frames and standard discount models for pricing stocks. These "phase 1" mechanisms (shown at left in Figure 1) make new firms difficult to value using established frames, spurring analysts to search and experiment with new frames. Analysts build and disseminate these new evaluative frames in interactions with firms, investors, and other analysts. We then describe mechanisms underlying the "phase 2" shift toward convergence and institutionalization in an evaluative frame (shown at right in Figure 1), as analysts adopt an increasingly accurate and compelling frame, as a firm becomes more profitable and its stock price becomes increasingly predictable using the dominant frame, and as the firm reinforces conformance with the frame in its actions and communications.

In Figure 2, we show how analyst influence on firm innovation differs across these phases of evolution in evaluative frames. Analysts' activities to create new frames help make sense of the new to the world innovation pursued by nascent firms, explaining valuations, reducing uncertainty and information asymmetries, and lowering costs of capital, further legitimating and promoting the firm's engagement in non-incremental innovation. As frames become institutionalized, analysts shift to rewarding a firm's conformance with the institutionalized frame and penalizing deviations, constraining the firm to incremental innovation. These constraints apply to established firms as well as nascent public firms engaging in familiar products, technologies, or business models that invite comparison with established firms and frames. Finally, we consider how analysts influence innovation in established firms that again pursue non-incremental innovation, often to respond to major environmental changes. Analyst frames are likely to persist, now not only constraining, but actively penalizing and dampening non-

incremental innovation that otherwise might occur. We examine why the mechanisms underlying the creation of new evaluative frames may not readily apply to changing the institutionalized evaluative frame for an established firm. Thus, our theory allows us to illuminate the processes that underlie analyst influence on innovation and helps explain the contrasting findings documented in prior research.

We highlight some important and interesting implications of our theory. First, our process theory suggests key "turning points" (Cornelissen, 2017) in the shifting influences of analysts. In phase 1, an important driver of new frames, and therefore leeway for firm innovation, is the arrival of nascent public firms with high valuations, likely resulting from their successful IPOs and heightened media attention that spurs analysts to dedicate resources to evaluating new innovations and business models. In phase 2, a subsequent turning point occurs as a firm's activities and financial performance become more predictable, specifically when a firm begins generating profits that allow analysts and investors to shift to standard valuation models for predicting stock prices. The increasing reliability of standard discount models for predicting stock price narrows the set of possible narratives and schemas that explain a firm's performance and how it links with the firm's stock price; this also marks the start of analyst constraints on innovation. Thus, paradoxically, while predictable profitability for a nascent firm may be an explicit goal and an indicator of success and legitimacy (since business firms are expected to generate revenues at least in excess of their costs), achieving profitability may also accelerate the institutionalization of analyst frames and the hardened expectations that constrain a firm's future changes.

Second, our theory suggests that the influence of analysts on firm innovation is largely constraining, except in the fairly narrow condition of nascent public firms with particularly high valuations, where analysts are spurred to engage in search to create new evaluative frames, as described above. The other situations in our theory involve institutionalized frames with codified schemas, cases where analysts are more likely to reward conformance and constrain firms to incremental innovation, or even actively penalize and dampen firms' non-incremental innovation.

Our arguments further suggest that although analysts may enable non-incremental innovation in nascent firms more than they do in established firms, they do not necessarily support innovation in all

nascent public firms. Specifically, our model suggests that analysts are less likely to create new frames when nascent firms pursue familiar technologies, products, business models, and narratives that invite comparison with established firms and frames. Our theory also suggests that analysts are less likely to search and create new frames when a nascent public does not have an unusually high and difficult to explain stock valuation, even if it is engaging in non-incremental innovation. A further implication is that the main source of new evaluative frames and support for non-incremental innovation arises specifically from nascent public firms with high valuations resulting from their IPOs. This argument complements the literature on IPOs (see Certo, Holcomb, & Holmes, 2009 for a review). IPOs may be a key stage when securities analysts can most easily develop new evaluative frames, in part, because evaluating new firms engaging in new-to-the-world innovation does not require revisiting or abandoning existing frames. At the same time, the literature also highlights the continuous drop in IPOs in the US in the past two decades (Doidge, Karolyi, & Stulz, 2017; Gao, Ritter, & Zhu, 2013). This raises the question of whether, without the spark of high valuation IPOs, analysts and the public equity markets they intermediate will become an increasingly constraining force on innovation in public firms. Thus, overall, while analysts might encourage a flowering of new companies engaged in new to the world innovation, these companies, once successful, may not be allowed to subsequently engage in non-incremental innovation.

These ideas also highlight the potential for analysts to amplify and reinforce the belief, suggested by Schumpeter (1934), and echoed in current anecdotes and research, that while new firms are nimble and innovative, incumbent firms are inertial and struggle to respond to changes in their environments. We see equity market support for innovation in new public firms like Uber and Tesla, even as they struggle for profitability, while previously successful firms like Kodak and Verizon faced substantial pressures from investors and analysts to curtail innovation in new areas (e.g., Benner, 2010; Benner & Ranganathan, 2017; Zuckerman & Bandler, 2003). These ideas also echo life-cycle views of firms in finance, that as firms evolve to the "maturity" phase, they inevitably decline and should therefore simply exit or fail (e.g., Damodaran, 2017; Jensen, 1989). Such a view often does not consider that established firms do innovate

successfully, even undertaking radical innovation (Benner & Ranganathan, 2017; Eggers & Kaul, 2018; Eggers & Park, 2018; Schumpeter, 1942).

Finally, our argument that difficult-to-explain stock market valuations spur new analyst frames sheds light on the analyst's role as an intermediary. Although at times analysts directly influence investor views on stocks (Womack, 1996), they often interpret and explain a firm's stock valuation, the outcome of prior stock purchase behaviors by investors. Our theory in phase 1 highlights how part of the analyst's function is seeking explanations of the prevailing "market beliefs" on a stock, a task that becomes particularly important and also more challenging when investors are speculators interested in longer-term gains in stock price appreciation rather than in shorter-term returns (Zuckerman, 2004). In phase 1, sell-side analysts arrive as or after firms become public and investors and firm managers already hold narratives about the firm's valuation. At that point, as analysts engage in search to understand the existing market beliefs about a firm's stock, they mainly organize and disseminate the prevailing wisdom among investors and managers, rather than create it. However, while analysts may borrow narratives from others initially, ultimately analysts' frames are unique from those held by other audiences, such as customers or the media. Analysts work involves translating the narratives about firm valuation into specific metrics and quantitative forecasts of performance and stock price, via the schema in evaluative frames.

Contributions to Research

Our theory makes important contributions to research. First, we provide a more complete understanding of the influences of sell-side analysts on firm innovation. Some work has highlighted the constraints analysts impose on firms but has not considered how analysts might also enable innovation (e.g., Benner & Ranganathan, 2012; Theeke et al., 2018), while other work has described how analysts enable innovation, particularly for new firms, but generally has not considered their potential constraints (e.g., Beunza & Garud, 2007). Our longitudinal approach focusing on the mechanisms underlying evolutionary processes, different types of innovation, and different types of firms, provides a comprehensive understanding of the dynamics of analyst influences on innovation, explaining the conflicting findings in the literature, and depicting how analysts both enable and constrain innovation,

even for the same firm, over time. We suggest that the emerging knowledge structures that analysts provide as they develop evaluative frames to understand new firms engaging in new-to-the-world innovations further enable such innovation. Subsequently, as analysts become more certain and accurate in their predictions, and as a firm generates profits, becomes more predictable, and conforms to a frame to receive positive evaluations, frames harden and become institutionalized, evolving into persistent structures that reinforce the legitimacy of established firms' existing activities and enable incremental innovation, but reduce and even prevent non-incremental change.

Second, our work contributes more broadly to research on innovation. Innovation is important for growth and productivity in firms, industries, and nations (e.g., Solow, 1957; Tushman & Nelson, 1990). Although work in the innovation literature often focuses on internal organizational factors that constrain innovation (e.g., Benner & Tripsas, 2012; Henderson & Clark, 1990; Tripsas & Gavetti, 2000), more recent work explores analysts as important external constraints (e.g., Benner, 2010; Benner & Ranganathan, 2012; Theeke et al., 2018). While this work shows clearly that analysts constrain firm innovation, it does not explain why or how analysts can also enable innovation. Our work explains the dynamics of analyst influences on innovation and the mechanisms underlying these different influences on different types of firms. Analysts influence firms' access to capital markets, thereby directly facilitating or hampering the availability of critical resources for firm innovation. Our theory therefore offers important insights into mechanisms that shape firm innovation.

Our work also is related to prior research on the formation, evolution, and legitimacy of categories (e.g., Durand & Khaire, 2017; Kennedy, 2008; Navis & Glynn, 2010; Rosa, Porac, Runser-Spanjol, & Saxon, 1999; Ruef & Patterson, 2009; Zuckerman, 1999; 2000; 2004; 2017). Scholars in this literature generally have considered the interactions of producers and "audiences" broadly (i.e., customers, investors, analysts, and the media) in the emergence and legitimation of industry categories (e.g., Hsu, 2006; Hsu, Roberts, & Swaminathan, 2012; Lounsbury & Rao, 2004; Navis & Glynn, 2010; Ruef & Patterson, 2009). Since sell-side analyst coverage of publicly traded firms is organized by industry categories, the context of analysts has also provided a useful setting for empirical work on socio-cognitive

categories (Zuckerman, 1999). This work often considers analysts as one audience among many, and rarely centers attention directly on securities analysts and the distinct work that they undertake as intermediaries in equity markets. Analyst frames involve developing specific quantitative predictions of financial performance and stock price underlying stock recommendations. These measurable financial metrics go beyond the "evaluative schema" that are created by other types of audiences that have been studied in the literature on categories (e.g., Hsu, 2006; Hsu et al., 2012). It may be that as analysts repeatedly hone the models and metrics that produce quantitative predictions and forecasts, analyst frames become more susceptible to institutionalization and persistence than the evaluative frames of other audiences.

Implications for Practice

Our theory also suggests potential implications for practice. First, managers influence analyst evaluations through the types of innovation they undertake, as well as through the nature and content of their communications (Martens et al., 2007; Washburn & Bromiley, 2014; Westphal & Clement, 2008; Westphal & Graebner, 2010). In particular, both nascent and established firms seeking support for non-incremental innovation might benefit from communicating in ways that distance them from established firms and frames and engage analysts in creating the new frames that enable innovation.

Second, since the constraints on firm innovation that we describe arise from public equity markets, going private may allow established firms to undertake non-incremental innovation away from the prescriptions arising from institutionalized analyst frames. Established firms seeking to innovate might elicit more enthusiasm from involved and knowledgeable private investors who can accurately assess the longer-term value of an established firm's innovations. While the predominant image of private equity in the 1980s and 1990s was of hostile takeovers that sold off the assets of poorly performing conglomerates (e.g., Jensen, 1986; 1989), a more recent view is that privatization can address the information asymmetries between managers and investors that make novelty and innovation difficult to evaluate (Benner & Zenger, 2016), and enable valuable longer-term investments (Kaul, Nary, and Singh, 2018).

For example, as Dell – evaluated as a computer hardware manufacturer – pursued new technological areas outside of the declining market for its traditional laptop and desktop computer products, it faced negative reactions from investors and analysts, pressuring it to abandon investments. Michael Dell took the company private (De La Merced & Hardy, 2013), allowing innovation to occur outside of the public equity market. Thus, going private might allow firms to pursue non-incremental innovation that would otherwise trigger stock price discounts and analyst constraints in public equity markets. A further possibility is that as a private firm returns to the public equity market, its innovation and re-entry allows it to resemble a nascent public firm, spurring the investor and analyst interest and related mechanisms that give rise to innovation-enabling new frames.

Our theory also suggests that nascent firms with high valuations might benefit from delaying profitability, or avoiding conformance with a narrow frame, as a way to slow convergence and receive continued support for innovation. We see important examples of delayed profitability for firms like Tesla and Uber, as well as Amazon's history of communication with investors about low profitability expectations (Kim, 2019). Such firms have been slow to conform to expectations to become profitable, and they also seem to be less constrained in their innovation. While it seems likely that not all publicly traded firms can continue to survive as public firms without evidence that they can operate profitably, delaying profitability, particular for a firm with high valuations, may be a way to postpone the constraints of institutionalized frames.

Boundary Conditions, Limitations, and Future Work

We suggest many boundary conditions for our theory above. Our theory involves publicly traded firms. It may be that privately held firms have more opportunities for non-incremental innovation, depending on the interests of their owners. We also focus on sell-side analysts as market intermediaries; we do not consider the role of other types of financial or industry analysts. We have outlined the factors that promote convergence and institutionalization of analyst frames, and it is clear in evidence from prior research that such frames are constraining for many firms. But there may be instances where frames do

not necessarily converge or become institutionalized in the constraining ways we propose, for reasons we have not considered, and firms enjoy more leeway in innovation.

Our work has limitations that offer opportunities for future work. Although we describe and provide examples of the specific components of evaluative frames, including the category, narrative, and schema, we have theorized about evolution in frames largely as a constellation of these elements. It may be that different components of the frame evolve differently with one playing a more prominent role in some phases of evolution. For example, we suggest that narratives are important in nascent phases, as analysts, investors, and managers construct understandings of new firms engaging in novel technologies and products, before firms have measurable performance. Schemas, involving the models and metrics that describe how firms' performance will be evaluated, likely become more prominent as frames become institutionalized, and as firms increasingly report earnings and other performance measures, and may be the most critical element in the codification and persistence of frames. Future research could explore these different elements of evaluative frames and how they evolve differently and give rise to different influences on firms.

Future research also can more fully explore the effectiveness of different types of manager-analyst communication. We proposed that firm communication with analysts to distance themselves from existing categories is a mechanism underlying the development of new evaluative frames. A large body of work has explored impression management tactics that managers use to influence stakeholder audiences, including analysts (Busenbark, et al., 2017; Washburn & Bromiley, 2014; Westphal & Clement, 2008; Westphal & Graebner, 2010). This work has studied firms generally, not distinguishing between different stages of evolution in analyst frames. But the effectiveness of different tactics is likely to shift as firms and analyst frames evolve. Research could examine the impression management tactics managers use to emphasize conformance with frames versus the tactics they use to change analysts' frames and the outcomes of these efforts. Finally, future work can fruitfully extend these ideas with empirical tests of the mechanisms and outcomes we propose, as well as explore additional ways that managers can delay or prevent the constraints of narrow analyst frames and frame convergence.

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Figure 1 – Evolution in Analyst Evaluative Frames

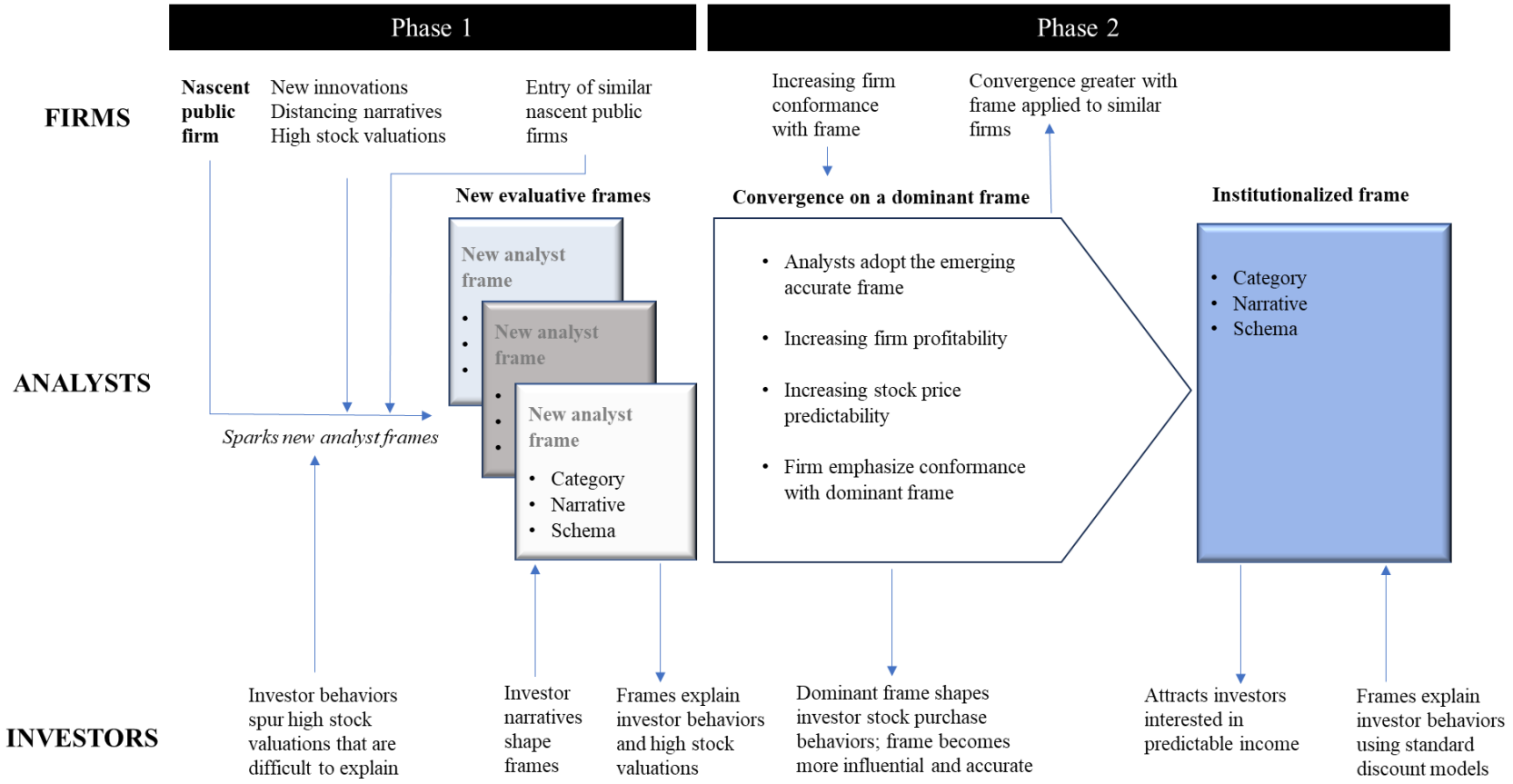
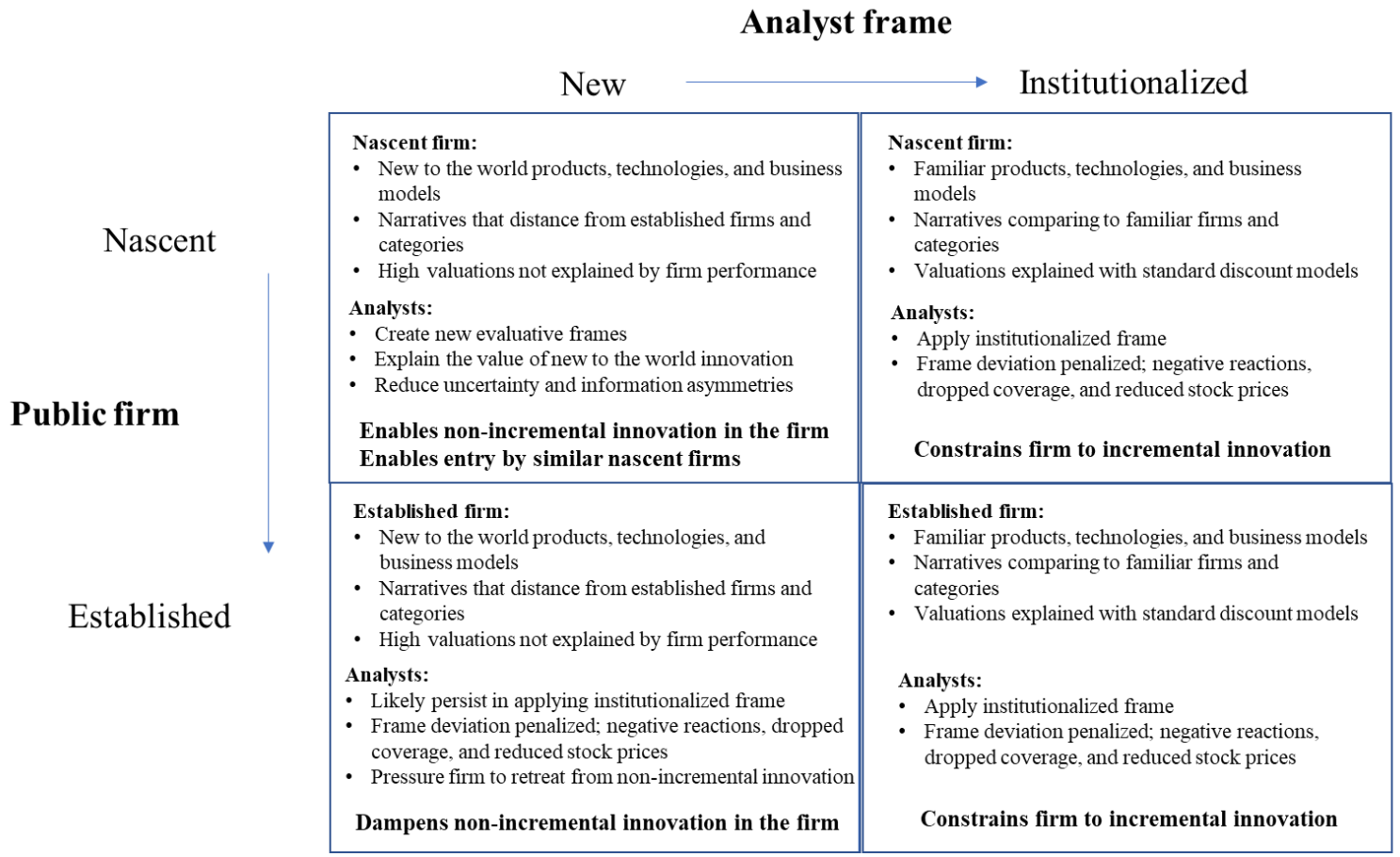


Figure 2 – Analyst Frames and Firm Innovation



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