

VALUE FROM GESTALT: HOW SEQUENCES OF COMPETITIVE ACTIONS CREATE ADVANTAGE FOR FIRMS IN NASCENT MARKETS

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Research on competitive dynamics and hypercompetition has demonstrated the importance of firm competitive actions for disrupting industry positions and gaining competitive advantage. The effects of competitive actions in disequilibrium environments, such as nascent markets, however, have not been examined. In this paper, we argue that under conditions of high ambiguity, firms can gain competitive advantage from the Gestalt properties present in the sequences of their competitive actions. Such properties, we argue, facilitate investor sensemaking and influence their valuations. Drawing on psychological research on pattern perception and holistic information processing, we investigate the effects of four Gestalt properties—simplicity, predictability, grouping, and motif—on investor valuations of new firms competing in the nascent markets that emerged around the commercialization of the Internet in the mid-1990s. We find support for our arguments that the dynamic properties of action sequences provide firms with advantages and that simplicity, grouping, and motif are associated with increases in the market value of high-ambiguity firms, but not of low-ambiguity ones. Our study advances research on competitive advantage by developing both theory and methods for studying how the dynamic, holistic properties of firms' competitive actions contribute to competitive advantage under varying levels of ambiguity. Copyright © 2010 John Wiley & Sons, Ltd.

INTRODUCTION

A growing body of research within strategic management has focused on the role of competitive actions as means for firms to create competitive

advantage for themselves and undermine the competitive advantages of competitors (Chen, 1996; D'Aveni, 1994; Ferrier, Smith and Grimm, 1999; Ferrier, 2001). Rooted in the Austrian view of markets as disequilibrium systems, this research emphasizes that competitive advantage is temporary and dynamic, as it derives from the streams of competitive actions that firms carry out to disrupt the market positions of competitors and improve their own. Scholars working from this perspective have demonstrated that the characteristics of firms'

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competitive actions and the responses of their rivals influence profitability (Chen and Miller, 1994; Miller and Chen, 1994; 1996; Smith *et al.*, 1991; Young, Smith, and Grimm, 1996), relative market share (Ferrier, 2001; Ferrier *et al.*, 1999), market value (Bettis and Weeks, 1987; Ferrier and Lee, 2002; Lee *et al.*, 2000), and firm reputation (Basdeo *et al.*, 2006).

Research on hypercompetition has similarly argued that firms can seize temporary advantages over rivals through aggressive competitive actions characterized by strategic surprise, speed, and simultaneous and sequential thrusts (D'Aveni, 1994). Consistent with this view, empirical studies show that a wide range of established industries have experienced 'a hypercompetitive shift' characterized by a sharp increase in competitive activity, greater volatility in industry profitability, and higher rates of turnover in market share leadership (Ferrier *et al.*, 1999; Thomas, 1996; Thomas and D'Aveni, 2010; Wiggins and Ruefli, 2005).

While these two streams of research have challenged prevailing notions of sustainable competitive advantage derived from the protection of industry positions and resource endowments (cf. Rumelt, Schendel, and Teece, 1991), they have focused on the temporary advantages resulting from the disruption of competitive positions in established industries. Smith and DiGregorio (2002), however, have argued that the effects of competitive actions on competitive advantage vary by type of environment. In relatively stable environments, competitive actions contribute to advantage by generating novel possibilities that unsettle the consensus about how products and activities create value. In contrast, in disequilibrium ambiguity-ridden environments, competitive actions contribute to advantage by helping 'participants form a momentary consensus' amidst otherwise disparate opinions (Smith and DiGregorio, 2002: 139). These arguments suggest the importance of investigating how competitive actions affect competitive advantage in environments that differ in levels of ambiguity.

The goal of our study is to begin to shed light on this question by examining how competitive action sequences affect investor valuations of firms associated with different levels of ambiguity in nascent markets. We focus on nascent markets because they are environments in which 'lack of clarity about the meaning and implications of particular events or situations' (Santos and

Eisenhardt, 2009: 644) generates varying levels of ambiguity. Ambiguity is distinct from uncertainty, which refers to the inability to predict probabilities for specific outcomes (Davis, Eisenhardt, and Bingham, 2009). Ambiguity, in contrast, presents market participants with problems of interpretation and understanding, and not only of prediction. As a result, observers' interpretations and evaluations can determine firms' access to resources to a large extent. This point has been frequently underscored by research on legitimacy, which emphasizes that competition in nascent markets is essentially competition for favorable interpretations and evaluations of key audiences (Aldrich and Fiol, 1994; Lounsbury and Glynn, 2001; Rindova, Petkova, and Kotha, 2007).

Building on these ideas, we develop new theory and methods for studying the effects of the dynamic properties of firms' competitive actions on investor valuations. We draw on psychological research on pattern perception that shows that lack of control—as in the case of high-ambiguity situations—motivates individuals to seek and perceive patterns (see Whitson and Galinsky, 2008 for a review). Further, research shows that people rely on salient Gestalt properties to make sense of streams of unfolding events (Ariely and Carmon, 2000; Ariely and Zauberman, 2000). Gestalt properties are those that 'depend on the interrelations among component parts' (Kimchi, 1992: 35) and that are, by definition, relational.¹ We extend these ideas to the domain of competitive actions and advantage by theorizing how the Gestalt properties present in sequences of competitive actions may stimulate pattern perception, defined as 'the identification of a coherent and meaningful relationship among a set of stimuli' (Whitson and Galinsky, 2008: 115). We argue that the interpretation of the set of stimuli defined by a firm's competitive actions as meaningful is likely to result in higher investor valuations.

We test our arguments in the context of firms competing in the nascent markets generated by the opening up of the Internet for commercial use in 1995, as this event led to 'the confluence of computing, electronics, and telecom industries' and 'the emergence of numerous nascent markets' (Santos and Eisenhardt, 2009: 645). We find support for our argument that the Gestalt properties

¹ Gestalt characteristics have also been described as configural, collative, or emergent.

of sequences of competitive actions are associated with higher valuations of firms associated with high levels of ambiguity, but not of firms associated with low levels of ambiguity. These findings suggest that the orchestration of competitive moves to stimulate pattern perception may be an important mechanism for creating competitive advantage in high-ambiguity environments.

In the next section of this paper, we summarize the findings of research of competitive dynamics and hypercompetition in established industries and articulate how our approach differs from and extends this research. We then develop specific hypotheses about the effects of Gestalt characteristics of action sequences on investor evaluations. We proceed with a discussion of our methods and findings and their implications for research and practice.

THEORETICAL DEVELOPMENT AND HYPOTHESES

Dynamic competition and temporary advantages in established industries

Based on the Austrian school of economics that views competition as a dynamic process in which firms continually take actions to outperform each other (Jacobson, 1992; Kirzner, 1973; Schumpeter, 1934), hypercompetition and competitive dynamics researchers have been investigating the relationship between firms' competitive activities and their shifting competitive advantages. The effects of competitive actions on performance and advantage have been examined at three levels of analysis. Early research focused on action-reaction dyads to understand how characteristics of individual competitive actions affected the likelihood, speed, and type of competitive response, and with what effects on firm performance (Chen and MacMillan, 1992; Chen, Smith and Grimm, 1992; MacMillan, McCaffery, and Van Wijk, 1985; Smith *et al.*, 1989). Subsequent research focused on the aggregate effects of competitive actions, described as action repertoires (Ferrier *et al.*, 1999; Miller and Chen, 1994, 1996). Most recent research has shifted attention to uninterrupted sequences of competitive actions that constitute competitive attacks (Ferrier, 2001; Ferrier and Lee, 2002).

A number of these studies have considered variables related to two Gestalt properties on which

we focus in this study: predictability and simplicity. In terms of predictability, research conducted at the action-response level of analysis has examined *action radicality*—defined as the extent to which an action departs from previous norms and/or surprises rivals—and has found it to be positively related to a delay in rivals' responses (Chen and MacMillan, 1992; MacMillan *et al.*, 1985; Smith *et al.*, 1989) and to the initiating actor's performance (Chen and Hambrick, 1995; Smith *et al.*, 1991). At the repertoire level of analysis, studies examining *competitive repertoire inertia* (Miller and Chen, 1994) and *strategic persistence* (Audia, Locke and Smith, 2000) capture lack of change and, therefore, predictability in a firm's competitive actions. These studies also show a negative relationship between predictability and performance. Overall, past research suggests that predictability is negatively related to competitive advantage in established industries.

In terms of simplicity, *competitive repertoire simplicity* has been found to be negatively related to several measures of firm performance, including revenue (Miller and Chen, 1996), market share gain (Ferrier *et al.*, 1999), and sales growth and profitability (Ferrier and Lyon, 2004). In contrast, competitive repertoire complexity has been found to be positively related to firm reputation (Basdeo *et al.*, 2006), which is positively related to performance (Roberts and Dowling, 2002). At the level of competitive attack, *competitive attack complexity* has been shown to have a curvilinear relationship with market share gains (Ferrier, 2001) and stock returns (Ferrier and Lee, 2002). The majority of past research, therefore, suggests a negative relationship between increasing levels of simplicity and performance.

The research reviewed above, however, focuses on the effect of actions *on competitors*, as the relationship between competitive activity and competitive advantage is assumed to depend on competitive response. Whereas this approach effectively captures the mechanisms for building temporary advantages by making established industries more hypercompetitive, it may not explain how competitive actions contribute to competitive advantage in nascent markets, where the relevant competitors, technologies, and product features are usually poorly understood. In the next section, we discuss the distinctive characteristics of nascent markets as competitive domains and develop our

theory about how sequences of competitive actions may contribute to advantage in such domains.

Competitive dynamics and temporary advantage in nascent market environments

Scholars investigating the formation of nascent markets suggest that the dynamics of competition in such environments differ from those in established environments. Santos and Eisenhardt (2009) argue that strategists competing in nascent markets face considerable challenges in understanding cost functions, strategically valuable competencies, interorganizational relationships, and the overall industry logic that guides action. Thus, in contrast to established markets, where existing categories provide templates for evaluation and action, participants and audiences in nascent markets need to actively make sense of firms' actions in order to make resource allocation decisions. These characteristics of the competitive dynamics of nascent market environments define the scope conditions for our theoretical arguments as applying to contexts where audiences are actively making sense of firms' strategies and where institutionalized logics, categories, and templates provide limited guidance for interpretation and action.

Under such conditions, we argue, the dynamic properties of firms' sequences of competitive actions provide audiences with the relevant cues for forming impressions about a firm's strategy, as well as for comparing it to other firms competing in the same environment. Firms' competitive actions therefore serve as a dynamic mechanism for *firm-specific reduction of ambiguity*. This action-based, firm-specific ambiguity reduction should provide a firm with competitive advantages because it would increase the willingness of key audiences to allocate resources to the firm. If this is the case, it is important to understand what characteristics of action sequences may contribute to firm-specific ambiguity reduction. We address this question next.

Perceptual effects of Gestalt properties

High ambiguity poses a problem of interpretation because it results from a lack of understanding and/or consensus regarding the applicability of available knowledge. How might the observable sequences of a firm's competitive actions help audiences resolve this knowledge problem?

Work in several areas of the psychology of perception provides inputs to developing an answer. First, research on pattern perceptions suggests that a lack of control results in 'seeing and seeking patterns.' because pattern perception 'is a compensatory mechanism designed to restore feelings of control' through cognitively effortful integration of diverse data (Whitson and Galinsky, 2008: 115). Audiences facing high-ambiguity contexts in nascent markets are likely to experience lack of control and to engage in compensatory pattern perception. Second, research shows that individuals integrate information in unfolding sequences of events by attending to salient Gestalt properties (Ariely and Carmon, 2000; Ariely and Zauberman, 2000; Einhorn and Hogarth, 1986). An important characteristic of Gestalt properties is that they are not present in the component parts of the stimulus; therefore, their effects cannot be derived from observing the component parts in isolation. Precisely because they integrate the parts in a perceived *whole*, Gestalt properties increase the *processing fluency* and the ease of interpretation of a stimulus. According to Mishra, Mishra, and Nayakankuppam (2006: 542), 'the whole can be processed more fluently than its parts because wholes have Gestalt properties that parts do not have.' Third, by increasing processing fluency (Lee and Labroo, 2004), Gestalt properties stimulate positive evaluations. Across a variety of studies processing fluency has been consistently associated with positive evaluations (Lee and Labroo, 2004; Reber, Winkeilman, and Schwarz, 1998; Whittlesea, 1993).

While the debate about the relative effects of parts/components and wholes/Gestalts on perception and information processing remains alive and vibrant in psychological research (Kimchi, 1992; Treisman, 1986), the idea that Gestalt properties affect the perception and evaluation of unfolding sequences of events has found applications in a variety of areas, including judgments of personal experiences (Ariely and Carmon, 2000), performance appraisals (Reb and Cropanzano, 2007), and valuing and spending money (Mishra *et al.*, 2006). In the administrative sciences, some of these processes have been associated with sensemaking (Kiesler and Sproull, 1982; Weick, 1995), pattern recognition (Simon, 1972; Simon and Kotovsky, 1963; Simon and Sumner, 1968), and alertness to competitive patterns and entrepreneurial opportunities (Baron, 1998; Kirzner, 1973; O'Driscoll

and Rizzo, 1985). We extend these arguments to the study of competitive actions and competitive advantage and argue that the Gestalt properties of action sequences facilitate pattern perception and positive evaluation of firms in high-ambiguity contexts. Note that these arguments do not imply that the Gestalt properties affect the accuracy of perception; rather, these properties affect processing fluency which, in turn, engenders positive evaluations (Lee and Labroo, 2004).² Positive investor evaluations provide firms with competitive advantage in access to resources relative to rivals whose action sequences do not exhibit such Gestalt properties.

Gestalt properties in action sequences

Drawing on the core ideas of classical Gestalt theorists, like Koffka (1935) and Wertheimer (1923), and the more recent extensions of this early work to holistic information processing (Navon, 1977; Kimchi, 1992), we propose four Gestalt properties—simplicity, predictability, grouping, and motif—as having the potential to positively affect investor evaluations of firms. We represent each property in the set of diagrams below using letters—analogue to different types of competitive actions—to depict a sequence of actions unfolding over time. We use letters *a* through *e* in a generic sense (i.e., they have no meaning) to illustrate the Gestalt properties that emerge from the relationships among these actions in the particular sequence. The relational properties of the sequence are defined and illustrated by both its composition (i.e., the number of letters of each type represented) and structure (i.e., the order and timing of these letters).

Simplicity

The diversity and structure of the elements that form the stimulus affect the extent to which it is perceived as either simple (and clear) or complex (and confusing). Simple stimuli contain readily identifiable core patterns or tendencies. They

enable observers to *grasp* a pattern without having to understand all relationships among all constituent elements.³

Figure 1a depicts a complex stimulus, whereas Figure 1b depicts a simple one. The sequence in Figure 1a averages two to three occurrences of five different letters. Such sequences has a lower processing fluency than the sequence depicted in Figure 1b, which also comprises 13 letters but is dominated, by multiple occurrences of the letters *a* and *c*. To the degree that simple sequences are easier to grasp and processing fluency evokes positive evaluations, we expect that action sequences that exhibit such simplicity will be associated with more positive investor evaluations than complex ones. Note that this expectation is the opposite of the observed relationship between simplicity and performance in established industry and is contingent on high levels of perceived ambiguity. These arguments lead us to hypothesize that:

Hypothesis 1: For firms associated with high ambiguity, simple action sequences will be associated with higher investor valuations.

Predictability

The predictability or unpredictability of a stimulus depends on the extent to which the elements of a whole sequence exhibit across-time structural similarity. Figures 2a and 2b graphically illustrate the concepts of predictability and unpredictability. In each figure, the firm's competitive action sequences are differentiated by time period. This creates a within-firm, across-time comparison of sequences.

In Figure 2a, the difference in both the composition and order of elements that make up the focal firm's observed actions between time 1 and time 2 depict a relatively unpredictable sequence. In contrast, the general pattern of the sequences depicted in Figure 2b appears repetitious and, therefore, recognizable across time periods (despite minor

² While prior research has emphasized the effects of stimulus familiarity on processing fluency, research also shows that any characteristics of a stimulus that facilitate its perception or comprehension can enhance processing fluency (Lee and Labroo, 2004).

³ We note that the concept of simplicity in Gestalt theory is distinct from the use of the term simplicity in sciences, such as chemistry and biology. In the sciences, simplicity refers to undifferentiated structure or composition; in contrast, in Gestalt theory simplicity refers to characteristics of structure and composition that promote quick grasping of a pattern or tendency. This use of the term is consistent with its common use, in which it refers to 'freedom from intricacy' (www.dictionary.com).

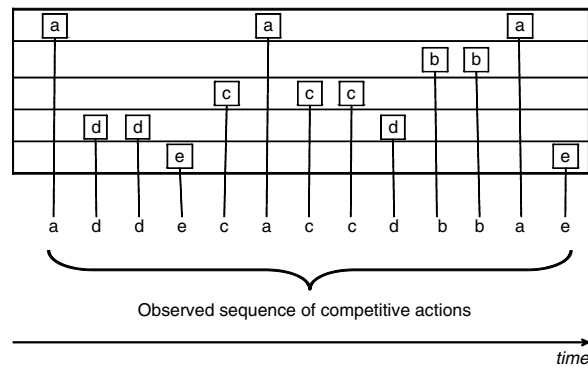


Figure 1a. Action sequence complexity

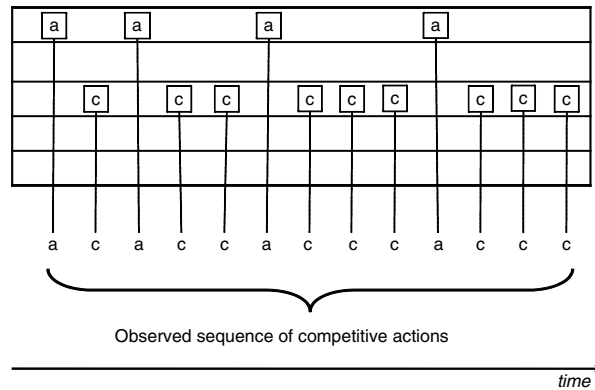


Figure 1b. Action sequence simplicity

variations). Hence, Figure 2b represents a relatively predictable pattern.

Stimuli that exhibit across-time structural similarity enable observers to extend or extrapolate partial sequences to construct larger ones because they

expect the observed order of elements to continue in subsequent periods (Ariely and Carmon, 2000). Therefore, stimuli that exhibit across-time structural similarity have greater continuity and facilitate pattern perception and sensemaking. Thus, in

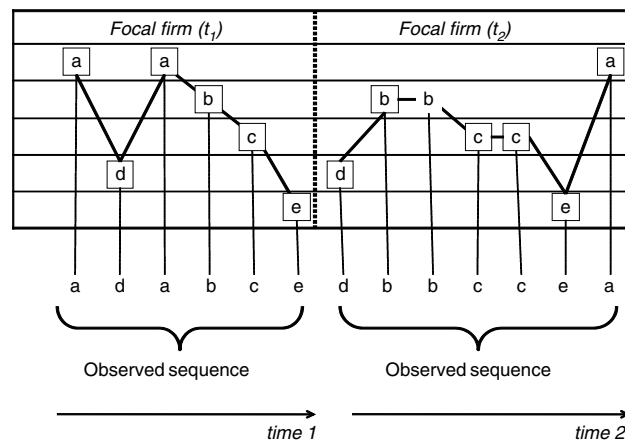


Figure 2a. Action sequence unpredictability

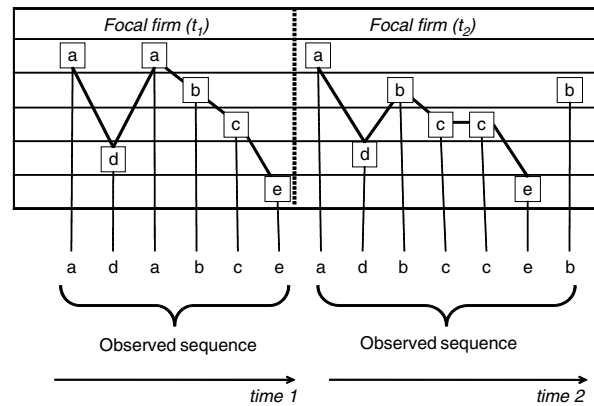


Figure 2b. Action sequence predictability

a departure from research that has found a negative relationship between predictability and performance in established industries, we expect that for high-ambiguity firms, more predictable sequences will be associated with higher valuations. More formally, we hypothesize that:

Hypothesis 2: For firms associated with high ambiguity, predictable action sequences will be associated with higher investor valuations.

Grouping

A fundamental process in pattern recognition is the grouping of stimuli that occur in proximity (Simon, 1972). Research in cognitive psychology and learning suggests that observers tend to use simple rules to interpret complex, sequential stimuli and give primacy to observed elements that are temporally, spatially, or ordinally contiguous (Einhorn and Hogarth, 1986; Levitt and March, 1988). Without the ability for humans to *chunk* complex stimuli, the process of information acquisition, interpretation, recall, and utilization would be unwieldy (Graybiel, 1998; Miller, 1956). Drawing from these ideas, we refer to the ordinal proximity among individual competitive actions in a sequence of actions as *grouping*. Figures 3a and 3b illustrate this pattern structure. Figure 3a exhibits weak grouping, as only the b-b and c-c pairs show ordinal proximity. By contrast, the sequence in Figure 3b illustrates a strong grouping of elements. For instance, there are two groupings represented by the e-c-a triad. Also, there are two groupings of

the a-c pair, both of which are either fully or partially nested in the e-c-a grouping. Finally, there are three groupings of the b-d pair.

Gestalt psychologists suggest that grouping is guided by proximity among elements and proximity—ordinal, temporal, or otherwise—affects the perception of an observed stimulus as a whole (Pomerantz, Sager, and Stoeber, 1977). Consistent with these ideas, we expect that actions that exhibit grouping as they appear in ordinal proximity are more likely to be interpreted in combination, as parts of an overall strategy. While each action may provide investors with different information about the firm's strategy, ordinal proximity among them may lead investors to process them as a whole. By facilitating holistic information processing, grouping may increase investor confidence that they grasp the overall strategy of the firm, leading them to value it more highly. Therefore, we hypothesize that:

Hypothesis 3: For firms associated with high ambiguity, grouping within action sequences will be associated with higher investor valuations.

Motif

Research on the psychology of pattern perception suggests that stimuli also vary in the degree to which they are seen to be orderly and disorderly (Berlyne, 1965) as a function of the stability of the inner structure formed by their elements. We refer to the underlying structural orderliness within a sequence of actions as *motif*. Figures 4a and 4b illustrate this concept.

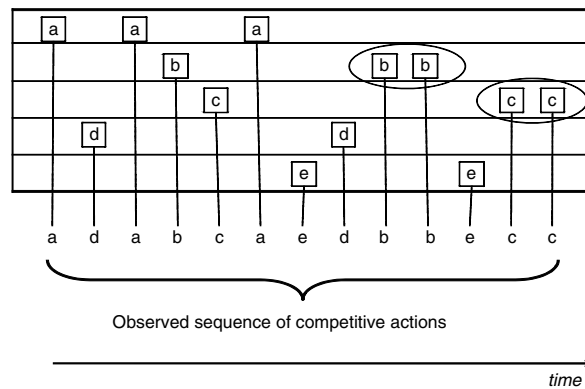


Figure 3a. Weak action sequence grouping

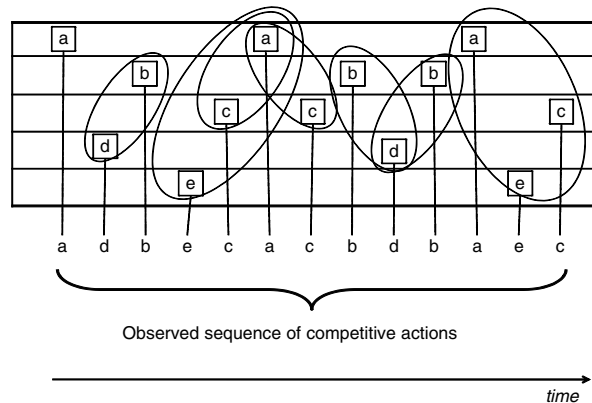


Figure 3b. Strong action sequence grouping

Each figure depicts a sequence of 13 competitive actions. Using sequence analysis techniques, we can calculate the extent to which a given letter (i.e., an action type) tends to occur consistently near the beginning or end of a sequence. This is called a *precedence score*. The sequence depicted in Figure 4a yields a range of the variance in the precedence scores for each letter that cluster near zero, indicating an absence of ordinal tendencies among them. This suggests that the sequence, overall, lacks orderliness or motif. In contrast, the sequence in Figure 4b depicts a broad variance of precedence scores for each letter. Specifically, letters *a* and *d* have average precedence scores nearer to -1.0 (and low variance), indicating that these letters tend to occur near the beginning of the sequence; in contrast, letters *e* and *c* have precedence scores nearer to 1.0 (and low variance), suggesting that these letters tend to occur at the end of observed sequences. Letter *b* has high variance in average precedence scores clustered

near zero, suggesting no ordinal tendency. Based on the variance in these precedence scores, the overall sequence exhibits a clear underlying order, or motif, that can be expressed as $a - d - e - c$, with *b* interspersed throughout the sequence somewhat randomly.

We borrowed the concept of motif from music theory, where it refers to a group of notes that are recognizable as a whole and express a definite melodic idea. A motif or phrase may appear repeatedly throughout a musical piece and may be played faster or slower, or in a different key, yet still retain its recognizability (Peretz, 2001). Research also finds that observers (even infants) are able to recognize recurring patterns in combinations (of musical notes) (Melen and Wachsmann, 2001). Further, recurring combinations of notes that form a motif generate greater recall and more positive evaluations (Deliege, 2001; Melen and Wachsmann, 2001). Extending these ideas to the perception of patterns in sequences of competitive

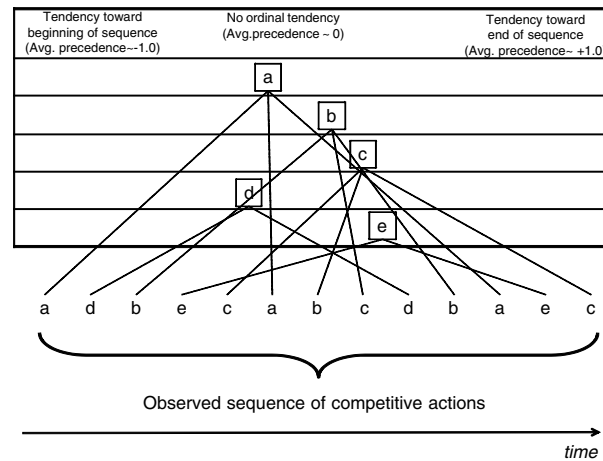


Figure 4a. Weak action sequence motif

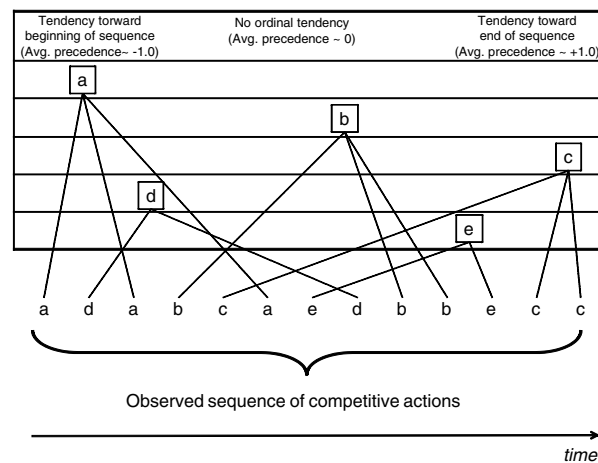


Figure 4b. Strong action sequence motif

actions, we expect that the presence of an underlying motif may facilitate investors' sensemaking about the underlying strategic logic and the overall strategy of a firm and to engender higher valuations of it. Therefore, we hypothesize that:

Hypothesis 4: For firms associated with high ambiguity, action sequences that exhibit motif will be associated with higher investor valuations.

METHOD

Research setting and sample

We chose the setting of emerging markets that surrounded the opening of the Internet for commercial

activity in the mid-1990s as the empirical setting for our study because prior research has identified that in this setting 'the confluence of computing, electronics, and telecom industries,' coupled with many innovations (e.g., distributed computing, electronic messaging, and Internet commerce) led to 'the emergence of numerous nascent markets' (Santos and Eisenhardt, 2009: 645). Investor valuations in this sector also revealed multiplicity of interpretations and high levels of debate about the value of different firm strategies (Amit and Zott, 2001; Pollock and Gulati, 2007).

Within this context, we used the first published (September 1998) *Internet World* listing of the 50 largest pure Internet firms that were publicly traded on NASDAQ and the New York Stock Exchange. We used this list to preserve the period-specific,

contemporaneous view of key competitors in those nascent markets that media categorized and presented to audiences as *pure Internet* (see Kennedy, 2008, for a discussion of the role of the media in competitor identification in nascent markets). A cross-validation of the *Internet World* list using the *Edgar* database indicated that the list contained 82 percent (50 out of 61) of all pure Internet firms that had become public prior to its publication in September 1998. Missing accounting data led to the exclusion of 10 firms. Our observation period begins with the first Internet IPO in the first quarter of 1995 and ends with the publication of the listing of the top Internet firms in *Internet World* in the third quarter of 1998.

Within this time period, we tracked the actions of each firm in each quarter from the time of its IPO until the end of the observation period. This process generated a sample of 362 firm-quarter observations. Measuring variables in quarterly intervals rather than in annual intervals is appropriate because the emergence period on which we focus is short and creates a dynamic environment in which firms make rapid changes in their strategies (Rindova and Kotha, 2001).

To collect data on competitive actions, we used all press releases issued by each of the 40 firms in our sample. We chose press releases as a source of information regarding strategic actions because past research has found that investors respond to action announcements, rather than to whether these actions are actually implemented (Westphal and Zajac, 1998). To ensure comprehensiveness in data collection, we used multiple wire services from the Lexis/Nexis online database: *PRNewswire*, *Business Wire*, *the Associated Press Service*, *M2Presswire*, *Newsbyte News Service*, *Canadian Newswire*, and *Gannett News Service*. When multiple sources reported the same action, only the first report was used. The coding of the press releases yielded a unique database of 2,087 actions.

Consistent with competitive dynamics research (cf. Smith, Ferrier, and Ndofor, 2001), we used structured content analysis and categorized the firms' actions in the following categories: new product/service introductions, communication and branding actions, alliances, distribution agreements, and acquisitions. To increase the granularity of the analysis, we further distinguished between content, technology, and marketing alliances, and

coded as *stakeholder actions* those actions that the firms explicitly designated as directed to a specific stakeholder audience. The resulting eight categories were used to code the 2,087 actions identified in the press releases by one of the authors. Another author coded a subsample of 400 randomly selected actions, which constitute approximately 20 percent of the total actions. The two coders agreed 88 percent of the time, indicating high levels of agreement (Miles and Huberman, 1984). The initial differences between the coders were resolved in discussions and consensus was reached. Table 1 describes the eight action types and provides total levels and examples for each action type in our sample.

To capture the firm-specific ambiguity associated with the firms in our sample, we collected data on quarterly earnings-per-share (EPS) forecasts by financial analysts from the *Institutional Brokers Estimate System* data (I/B/E/S data). This data set contains all forecasts made by analysts following firm stocks and forms the basis of market consensus calculations. Missing or insufficient analyst forecast data reduced the sample to 337 firm-quarter observations.

Dependent variable

Market value

Market value data were collected from the *Compustat* database and operationalized as share price multiplied by the number of outstanding shares on the last date of each quarter for which the competitive actions were tracked. The market value of the firm on the last day of the quarter captures all available information about the firm for the time period. It is the most forward-looking measure of the firm's value, as it captures investors' expectations about its future value-creating potential based on all actions undertaken in the time period.

Independent variables

Gestalt properties

We used sequence analysis to create measures for three of the four Gestalt properties. Sequence analysis is appropriate for our theoretical approach because it centers on examining entire sequences of events or units and not simply the individual data points (Abbott and Tsay, 2000). Within

Table 1. Action categories, definitions, and examples

Action type	Definition	Examples
New product and service introductions Total in sample: 637	Introduction of new product and site features and services.	<ul style="list-style-type: none"> • AOL introduces Download Sentry. • Excite launches Webcrawler. • Concentric launches high-speed DSL services.
Content alliances Total in sample: 234	Partnership with another company for using its content or for creating new content jointly.	<ul style="list-style-type: none"> • AOL to use Warner Brothers' cartoon productions • PC Quote to provide stock quotes for CNET's Snap!
Technology alliances Total in sample: 151	Partnership with another company for using its technology or for developing new technology jointly.	<ul style="list-style-type: none"> • Broadvision with Verisign to integrate authentication technology into Broadvision's 1-1 software. • Harris will integrate VASCO Data Security's Access Key II? technology into CyberGuard. • Amazon donates profits from Christopher Reeve's book to his foundation.
Stakeholder actions Total in sample: 240	Actions explicitly oriented to a specific stakeholder group, such as customer support, employee relations, investor relations.	
Comarketing alliances Total in sample: 63	Partnership with another company to jointly sell products and services through each other's channel.	<ul style="list-style-type: none"> • OpenText and NetSys Technology Group announce a partnership for Scandinavia. • CyberGuard and EDS enter a joint marketing agreement.
Communication and branding Total in sample: 124	Efforts to create awareness and associate certain meanings with the firm, such as promotional campaigns, sponsoring thematic events, and retaining advertising agencies.	<ul style="list-style-type: none"> • AOL launches first TV branding campaign. • Snap! selects Saatchi and Saatchi to be its agency of record. • Amazon.com announces \$100K online competition for the greatest tale ever told, with the participation of John Updike. • DoubleClick acquires Quebec's Soussy Network.
Acquisitions Total in sample: 126	Agreements to buy entire firms or subsidiaries of firms.	
Distribution arrangements Total in sample: 512	Agreements with an outside company to distribute the focal company's products or services.	<ul style="list-style-type: none"> • CKS Group and Interwoven announce reseller agreement to support enterprise Web production. • Amazon to offer services through AOL's Web site.

sequence analysis, we used two specific techniques: optimal matching analysis and gamma analysis. Optimal matching analysis compares sequences to one another to identify them and to determine the extent to which they are similar and how they change over time (Holmes, 1995; Sankoff and Kruskal, 1983). Optimal matching analysis calculates the *Levenshtein distance score*, or degree of dissimilarity, between two sequences. It does so by accounting for the need (or cost) to insert, delete, and/or substitute elements—known as INDEL costs—of one sequence to transform or match it exactly with the other (Sankoff and Kruskal, 1983). The *Levenshtein distance score* is then calculated as the proportion of INDEL costs to the total number of elements in the referent sequence. It ranges from zero to 1.0. The more similar two sequences are to one another, the fewer

the insertions, deletions, or substitutions (distance scores near zero); the more differentiated or dissimilar the sequences, the higher the INDEL costs (distance scores near 1.0).

Gamma analysis (Pelz, 1985) captures the extent to which elements of a particular type tend to precede one another and the extent to which they are separated from one another. More specifically, gamma analysis produces Goodman-Kruskal's (1963) gamma, which measures the proportion of events of type *A* in a sequence that precede (or follow) type *B* events, type *C* events, and so on. From the resultant matrix of pair-wise gamma values for all events in the sequence, the *precedence score* for a given element type is calculated as the mean of all of its pair-wise gamma values (Holmes, 1995; Holmes and Sykes, 1993). The precedence score ranges from −1.0 to 1.0 and

measures the general location of a given event type in the overall sequence. Precedence scores near -1.0 indicate that the element tends to occur early in the sequence, whereas scores near 1.0 indicate that the element occurs later in the sequence. The *separation score* for a given type of element is calculated as the mean of the absolute value of its pair-wise gamma values (Holmes, 1995; Holmes and Sykes, 1993). Separation scores range from zero to 1.0 ; values near 1.0 indicate that a given element generally tends to be widely separated from other element types in the sequence, whereas values near zero indicate that the element tends to occur contiguously or is otherwise grouped with other elements.

Simplicity

Consistent with prior research, we used a Herfindahl-type index to measure the extent to which a firm's pattern of actions carried out in a given quarter consisted of a broad or narrow range of action types (Ferrier *et al.*, 1999; Ferrier, 2001; Basdeo *et al.*, 2006). First, we calculated the ratio of actions in each of the eight action categories to total actions. Then, to account for the weighted distribution of actions carried out across categories, we squared each action-type proportion. Next, we summed the squared proportions to arrive at a measure for action sequence simplicity. Simplicity ranges from zero to 1.0 ; a score near 1.0 indicates a simple sequence, whereas a score nearer to zero indicates a complex one.

Predictability

We used the *Levenshtein distance* score from optimal matching analysis described above to measure the extent to which a firm's sequence of actions was similar to or dissimilar from its sequences in other quarters (Abbott, 1990; Ferrier, 2001; Sabherwal and Robey, 1993; Sankoff and Kruskal, 1983).⁴ A low distance score indicates that the firm's action sequences exhibited continuity and were, therefore, predictable from one time period to the next, whereas a high score indicates low continuity from quarter to quarter and therefore

an unpredictable sequence. In our analysis, we reversed the directionality of the scores (multiplying by -1.0) so that a high score indicates a more predictable pattern of action sequences.

Grouping

We used the *separation score* from gamma analysis to measure the extent to which an action of a given type occurred in close ordinal proximity to each other type of action. As noted above, low average separation scores indicate that actions are typically carried out in close ordinal proximity to other actions; that is, they typically are grouped together. High scores indicate that actions are typically carried out in relative isolation from other actions and, therefore, are not grouped. To calculate the extent to which the entire sequence exhibits grouping, we calculated the mean of the separation scores across all action types. High scores indicate that the sequence contains elements that were not ordinally proximate to one another; low scores indicate that the sequence exhibits groups of actions. We reversed the direction of the scores (multiplying them by -1.0) so that higher scores indicate higher levels of grouping among actions in a sequence.

Motif

For this measure, we used the *precedence scores* from gamma analysis, which capture the extent to which a given individual action typically preceded or lagged other actions in sequential order. To determine the extent to which the entire sequence exhibits internal structuredness, we calculated the variance of the averages in the pair-wise precedence scores across all action types. Averaging across action types indicates the relative position—beginning or end—in the overall sequence in which the particular type of action appears. Variance in average precedence scores captures the ordinal specificity and stability of elements in a sequence. Low variance scores indicate that a sequence exhibited a particular order among its elements—some actions typically occurred nearer to the beginning of the sequence (average precedence scores near -1.0) or nearer to its end (scores near $+1.0$). High variance in separation scores indicates that actions of any type had an equal/random chance of being early or late in the sequence, thereby suggesting a lack of a general

⁴ Because this measure required that we establish one quarter of observation to generate the initial comparison point (at t_0), 75 firm-quarter observations (across the entire set of firms) were lost, resulting in a sample of 262 firm-quarter observations available for our analysis.

ordinal structure to the sequence.⁵ We reverse-scored this measure to better reflect the motif construct.

Level of ambiguity

Because we theorized that competitive actions are a mechanism for reducing firm-specific ambiguity and the hypothesized relationships would hold under conditions of high ambiguity and not under conditions of low ambiguity, we created measures to capture *the firm-specific ambiguity perceived by market participants*. Whereas data capturing investor perceptions directly are not available, the earnings per share (EPS) forecasts of financial analysts provide an excellent proxy for the level of ambiguity that market actors perceived with regard to specific firms *at the time of the study*. To the degree that financial analysts are market actors with above-average levels of firm evaluation expertise, they should experience less ambiguity and, therefore, should be less prone to pattern perception, making it harder for us to obtain results consistent with our theoretical arguments and providing a more stringent test for our theory.

We operationalized ambiguity using the variance in EPS forecasts issued by the set analysts that cover each firm using comparable available information to evaluate its expected future cash flows and ultimately financial return potential (Zuckerman, 2000). A high level of variation in analyst forecasts indicates a high level of ambiguity associated with a given firm, as even an expert audience exhibits multiplicity and divergence of interpretations about it; in contrast, low variance is indicative of low levels of firm-specific ambiguity.

We constructed our measure by first calculating the standard deviation in EPS forecasts for each firm in each quarter and then coding each firm-quarter as either above or below the median level of the standard deviation. For each firm in our sample, we obtained, on average, 8.3 analysts' forecasts in each firm-quarter, with a minimum of three and a maximum of 24. We used the median, rather than the mean, in order to split the sample evenly between relatively high-

and low-ambiguity conditions. We treated firms as being associated with either a low- or high-level of ambiguity, based on whether its analyst EPS forecasts were more often in the high-variance or the low-variance group. For example, if a firm was in our sample for seven quarters, and in at least four of those quarters the standard deviation of the EPS forecasts of analysts covering it exceeded the median level in EPS variance for all firms in our sample, then the firm was assigned to a subsample of firms associated with a high-ambiguity condition. This measure distinguishes between high- and low-ambiguity firms based on the prevalence of convergence or divergence in analysts' earnings forecasts. The two instances, where the forecasts were evenly split, were assigned to the low-ambiguity condition. Through this procedure, we were able to capture differential levels of firm-specific ambiguity in nascent markets that have been *generally* considered to be high-ambiguity environments.

Control variables

Accounting measures of firm assets and performance

We controlled for the effects of accounting measures of performance that account for firm value according to financial valuation models (Ohlson, 1995), including the firm's equity (BVE), net income before taxes and extraordinary items (Earnings), quarterly sales (Sales), and cash/cash equivalents.

Market effects

We also controlled for the overall market effect by using the percentage change in the NASDAQ Index, as most of the firms in our sample were listed on the NASDAQ stock exchange. In addition, because we argued that properties of action sequences, rather than market categories, affect investor evaluations in high-ambiguity conditions, we included dummy variables for the market categories, within which *Internet World* has listed the firms in our sample.

Action content

We controlled for the content of a firm's strategy using a count of the total number of strategic actions of each type described in Table 1 that the

⁵ Here, we are concerned with the distribution of separation scores for each action type, not the value of the averages of the scores themselves. In other words, we test for the *presence* of a motif or pattern, not the specific nature of the motif or pattern of action. Future research could explore how specific patterns are related to performance.

firm had taken. Our approach to capturing the content of a firm's strategy is consistent with the view of strategy as a pattern of actions and investments over time (Mintzberg and Waters, 1985), a coordinated series of actions (MacCrimmon, 1993), and simultaneous and sequential set of many actions (D'Aveni, 1994.)

Analytical approach

Our analysis is based on a cross-sectional, time series panel data set consisting of firm-quarter observations for quarters prior to September 1998, for which the firms in our sample were public. We match the quarter-to-quarter changes in market value to firm actions undertaken during the corresponding quarters. This approach is operationalized through the analysis of first differences in the dependent variable. Differencing is appropriate because initial mixed-model results yielded first-order autoregressive estimates near unity, suggesting that first differences are uncorrelated and can be analyzed by using conventional ordinary least-squares regression models. To standardize for scale differences in the observed variables, we estimate quarter differences using percentage differences calculated as $[(MV_t - MV_{t-1}) / MV_{t-1}]$. The accounting and market factor controls were all transformed to percentage changes to standardize scale disparities.

To assess the effect of accounting measures on firm valuations, we used a model proposed by Ohlson (1995) positing that the market value of a firm is a linear combination of accounting information: book value, earnings, net income, sales, and cash. To this model, we added the market effects reflected in general market conditions (NASDAQ) and market category membership. We then ran a second model (Model 2) that assessed the potential valuation effect of different types of actions. Retaining only the significant variables from the control model (Model 1) and the action-types model, we then tested our theoretical model, capturing the effects of Gestalt properties in action sequences (Model 3). We repeated these analyses in the low-ambiguity condition (Models 4–6).

RESULTS

Table 2 provides the descriptive statistics and the correlation matrix for all variables in the study.

The results from our analyses are presented in Table 3.

Model 1 in Table 3 shows the effects of the control variables in the high-ambiguity condition, showing that only the changes in firms' earnings (%Ch Earnings) and the overall trend in the stock market (%Ch NASDAQ) have significant positive effects on investor valuations.⁶ Model 2 (the baseline model) introduces the effects of the actual content of a firm's strategy by adding the counts of the different types of competitive action carried out by the firm in a given quarter. None of the action types has significant effects on investor valuations per se, and the overall model shows a slight decline in the adjusted- R^2 .

Model 3 tests of our hypotheses, evaluating the effect of the Gestalt properties of the action sequences on investor valuations under high-ambiguity conditions. This theoretical model shows a significant increase in the adjusted- R^2 ($F = 0.5714$) ($p < 0.001$) from 0.18 for Models 1 and 2 to 0.28, and provides a strong support for our arguments that, under conditions of high-ambiguity, the presence of Gestalt properties in firms' sequences of actions are associated with positive investor evaluations, thereby providing firms with competitive advantages.

The results in Model 3 also provide support for our hypotheses relating specific Gestalt properties to investor evaluations. Hypothesis 1 predicted that action sequence simplicity will be positively related to investor valuations of firms that compete in the high-ambiguity condition. The regression coefficient for action sequence simplicity in Model 3 is significant ($p < 0.01$) and in the hypothesized direction, supporting Hypothesis 1. Hypothesis 2 predicted a positive relationship between action sequence predictability and investor valuations. The regression coefficient for action sequence predictability in Model 3 is in the hypothesized direction, but only marginally significant ($p < 0.1$). Hypothesis 2, therefore, is not supported. Hypothesis 3 predicted that grouping in action sequences is positively associated with investor valuations of firms in the high-ambiguity condition. As reported in Model 3, the positive and

⁶ As a robustness check, we reran the control model using the current SIC codes of the focal firms to examine whether the lack of significance of market categories might be driven by the idiosyncratic categories used by *Internet World*. The market categories defined by current SIC codes had no significant effects either.

Table 2. Descriptive statistics and correlations

	Mean	S.D.	1	2	3	4	5	6	7	8	9
1%Ch market value	-4.49	51.55	1.000								
2%Ch BV equity	21.71	280.39	0.009	1.000							
3%Ch NASDAQ	3.12	9.39	0.434**	-0.020	1.000						
4%Ch earnings	15.25	755.85	0.145**	0.002	0.024	1.000					
5%Ch sales	0.28	1.39	0.023	0.005	0.020	-0.010	1.000				
6%Ch cash	0.46	2.26	0.158**	0.184**	0.049	-0.007	0.102*	1.000			
7 New products	2.07	1.94	0.092	0.005	-0.023	0.007	-0.020	-0.035	1.000		
8 Stakeholder actions	0.77	1.06	0.117*	-0.049	0.054	-0.023	0.014	-0.029	0.221**	1.000	
9 Communication	0.38	0.65	0.063	0.071	-0.047	0.022	-0.020	0.122*	0.245**	0.093	1.000
10 Content alliances	0.78	1.81	0.042	-0.009	-0.093	-0.110*	-0.017	0.025	0.271**	0.035	0.043
11 Technical alliances	0.47	0.73	0.054	0.039	0.119*	-0.059	0.035	0.136*	0.105*	0.078	0.143**
12 Co-marketing alliances	0.16	0.43	-0.044	-0.025	-0.024	-0.060	0.004	-0.050	-0.071	0.037	-0.026
13 Acquisitions	0.41	0.92	0.025	0.060	-0.134*	-0.029	-0.024	-0.052	0.063	0.174**	0.033
14 Distribution agreements	1.58	1.97	0.022	0.106*	0.023	-0.008	-0.050	0.030	0.226**	0.172**	0.279**
15 Action sequence simplicity	0.44	0.22	0.152**	0.041	-0.024	-0.061	0.057	0.099	0.260**	0.341**	0.297**
16 Action sequence predictability	0.75	0.17	0.039	0.007	0.033	0.109	-0.056	-0.034	-0.187**	-0.013	-0.087
17 Action sequence grouping	0.42	0.15	-0.127*	-0.040	-0.033	0.019*	0.021	-0.018	-0.227**	-0.218**	-0.118*
18 Action sequence motif	0.60	0.13	0.160**	0.051	0.035	-0.060	-0.013	-0.003	0.271**	0.217**	0.130*
19 EPS forecast variance	0.53	0.50	0.022	0.046	0.034	0.028	-0.057	0.002	0.278**	0.148**	0.075

	10	11	12	13	14	15	16	17	18	19
10 Content alliances	1.000									
11 Technical alliances	-0.044	1.000								
12 Co-marketing alliances	0.055	-0.043	1.000							
13 Acquisitions	0.056	-0.041	-0.023	1.000						
14 Distribution agreements	0.023	0.251**	-0.024	0.002	1.000					
15 Action sequence simplicity	0.153**	0.276**	0.177**	0.136*	0.307**	1.000				
16 Action sequence predictability	-0.115*	0.015	0.122*	0.053	-0.068	0.112*	1.000			
17 Action sequence grouping	0.033	-0.172**	-0.114*	-0.043	-0.269**	0.378**	-0.035	1.000		
18 Action sequence motif	0.009	0.157**	0.105*	0.030	0.280**	-0.373**	0.034	-0.968**	1.000	
19 EPS forecast variance	0.143**	-0.049	-0.075	0.047	-0.073	-0.081	-0.120*	-0.052	0.023	1.000

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 3. Effects of the Gestalt properties of action sequences on changes in firm market value

	High-ambiguity condition			Low-ambiguity condition		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<i>Controls</i>						
%Ch earnings	0.189**	0.191**	0.231**	−0.098		
%Ch sales	0.119			−0.039		
%Ch cash	0.063			0.198**	0.195**	0.187**
%Ch BV of equity	−0.025			0.046		
%Ch NASDAQ	0.378***	0.426***	0.364***	0.561***	0.558***	0.565***
Market category 1	0.148			−0.053		
Market category 2	−0.014			—		
Market category 3	—			0.095		
Market category 4	0.132			—		
Market category 5	0.043			−0.032		
Market category 6	0.017			−0.016		
Market category 7	−0.116			−0.039		
Market category 8	—			0.045		
Market category 9	0.037			0.200**	0.173*	0.196*
<i>Action Types</i>						
New products		0.038			0.086	
Stakeholder actions		0.029			0.090	
Communication		0.155*	0.131 [†]		−0.064	
Content alliances		0.146 [†]	0.117		−0.081	
Technical alliances		−0.019			−0.048	
Co-marketing alliances		−0.038			−0.039	
Acquisitions		0.058			0.108	
Distribution agreements		0.031			−0.059	
<i>Action Sequences</i>						
Simplicity			0.200**			0.039
Predictability			0.124 [†]			0.004
Grouping			0.451*			−0.151
Sequence motif			0.570**			−0.180
N	141	141	141	121	121	121
adjusted R ²	0.179	0.181	0.28	0.335	0.349	0.354
F change	3.876	1.376	4.936	6.704	0.937	0.185
Significance of Change in:	0.000	0.171	0.000	0.000	0.489	0.964

All coefficients are standardized

[†] p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001

significant coefficient for action sequence grouping ($p < 0.05$) suggests support for this hypothesis. Finally, Hypothesis 4 predicted a positive relationship between the presence of motif in action sequences and investor valuations. As indicated by the positive and significant coefficient ($p < 0.01$) for action sequence motif in Model 3, the results suggest support for Hypothesis 4, as well.

To test that the hypothesized relationships hold only in the high-ambiguity condition (as stated in our hypothesis), we replicated the analyses for the firms operating in the low-ambiguity condition. These results are reported in Model 4 (control model), Model 5 (baseline model), and

Model 6 (including the Gestalt properties of action sequences). The control model, Model 4, shows that changes in cash and changes in the NASDAQ are significantly and positively related to changes in firm valuation. In Model 5, one type of strategic action—stakeholder actions—exhibits a significant positive relationship with investor valuation. Model 6 shows that, in contrast to the results obtained in the theoretical Model 3, there is no significant relationship between any of the action sequence properties and investor valuations. Investor valuations for low-ambiguity firms appear to be strongly driven by the overall market trend.

As a further robustness check, in analyses not reported here, we also tested our theoretical model

in the full sample of firms, equating all nascent markets surrounding the initial commercialization of the Internet to a high-ambiguity context (as suggested by prior research). We found that although significant overall, the model was inferior to the theoretical Model 3, and only motif and grouping had a significant positive relationship with investor valuations.

DISCUSSION AND CONCLUSIONS

In this study, we bring together ideas from research on competitive dynamics and hypercompetition and the psychology of perception to investigate how the characteristics of firms' sequences of competitive actions contribute to competitive advantage in highly ambiguous contexts through their effects on investor valuations. Theoretically, our study was motivated by the fact that competitive dynamics and hypercompetition have emerged as important paradigms for understanding dynamic aspects of competition in established industries, but the effects of competitive actions in nascent markets have received limited attention. Nascent markets have attracted growing attention by scholars of strategy (King, 2007; Sirmon, Hitt, and Ireland, 2007), entrepreneurship (Aldrich and Fiol, 1994; Hitt and Reed, 2000), the social construction of markets (Kennedy, 2008; Porac *et al.*, 1995; Rindova *et al.*, 2007; Santos and Eisenhardt, 2009; Zuckerman, 2004), and behavioral finance (Ofek and Richardson, 2003).

We argued that understanding how firms gain advantages in nascent markets requires novel theoretical approaches because the competitive dynamics in such markets differ from those in established industries. Specifically, the lack of understanding and/or consensus regarding the applicability of existing knowledge templates and categories generates varying levels of ambiguity that audiences need to resolve in order to make resource allocation decisions. Pragmatically, we were motivated by the need for better understanding of the mechanisms through which firms gain advantageous access to resources early in the evolution of industries and markets.

In pursuit of these goals, we combined ideas from research on competitive dynamics and psychology of perception and advanced one central theoretical argument: that under conditions of high ambiguity, the Gestalt properties present in the

sequences of firms' competitive actions enhance the processing fluency and perceived interpretability of firm strategies in the eyes of key audiences. As a result, the Gestalt properties present in competitive action sequences can provide firms with competitive advantages in access to resources. We theorized and tested the effects of four such Gestalt properties on investor valuations. Our empirical results provide general support for this overarching theoretical argument, as well as specific support for the hypothesized positive effects of simplicity, grouping, and motif on investor valuations of firms operating in the high-ambiguity condition.

These findings make several important contributions to research on competition in nascent markets. First, although our findings are consistent with our theory, they represent a departure from the findings of prior research. Table 4 summarizes our findings and compares them to the theory and findings in prior research on competitive dynamics and hypercompetition.

As it can be observed in Table 4, prior research has investigated several variables that capture the predictability and simplicity of competitive actions and has found that both properties tend to be negatively related to firm performance in established industries. In our high-ambiguity condition, however, simplicity was positively associated with increases in firm market value; predictability was only marginally significant, but its effect was in the hypothesized direction. We believe that this difference is due to the fact that, in established industries, the competitive implications of an action (or a set of them) tends to be well understood; their performance consequences then depend on the speed and nature of competitor responses. In contrast, in high-ambiguity contexts, the meaning and implications of actions and combinations of actions need to be made sense of; their performance consequences, therefore, to a large extent, depend on the interpretations and evaluations of audiences.

The distinction between the effects of competitive actions on competitors versus stakeholder audiences is important and merits further research attention because the effects of competitive actions on rivals and on stakeholder audiences might be at odds at times. Whereas in established industries firms benefit from competing aggressively (Ferrier, 2001; D'Aveni 1994, 1999), in nascent markets they may need to balance the need to surprise rivals with the need to be understood and accepted

Table 4. Summary of findings vis-à-vis prior research in established market contexts

ESTABLISHED MARKET CONTEXTS		NASCENT MARKET CONTEXTS		
Action sequence constructs in hypercompetition and competitive dynamics research	Effect on advantage	Gestalt properties of action sequence investigated in this study	Low-ambiguity	High-ambiguity
Predictability/unpredictability		Predictability		
<ul style="list-style-type: none"> • <i>Action radicality</i> (MacMillan, McCaffrey, and van Wijk, 1985; Smith <i>et al.</i>, 1989; Chen and MacMillan, 1992) • <i>Repertoire inertia</i> (Miller and Chen, 1994) • <i>Strategic persistence</i> (Audia, Locke, and Smith, 2000) 	Positive	Sequence of actions that exhibit across-time structural similarity that enable observers to extend or extrapolate partial sequences to construct larger ones	n.s.	Positive, marginally significant
Simplicity/complexity		Simplicity		
<ul style="list-style-type: none"> • <i>Simplicity</i> associated with action repertoires based on few types of actions (Miller and Chen, 1996; Miller <i>et al.</i>, 1996; Ferrier, Smith, and Grimm, 1999; Ferrier and Lyon, 2004) • <i>Complexity</i> associated with thrust of actions that aggressively hits rivals from multiple directions (D'Aveni, 1994) 	Negative	Sequence of actions with readily identifiable tendencies	n.s.	Positive, significant
One-two punch		Grouping		
A simultaneous combination of actions that harasses, stuns, and disrupts rivals (D'Aveni, 1994). Reflected in the construct of:		Sequence of actions carried out in close temporal or ordinal proximity	n.s.	Positive, significant
<ul style="list-style-type: none"> • <i>Competitive attack</i> (Ferrier, 2001; Ferrier and Lyon, 2004) 	Depends on properties of attack	Motif	n.s.	Positive, significant
		Sequence of actions that exhibits internal orderliness based on a stable structure		

by stakeholder audiences. Future research focusing on the interpretational effects of competitive actions is needed to clarify the extent to which such trade-offs exist and what their performance consequences may be.

More generally, our theory and findings speak to the importance of developing understanding of the relationship between competitive actions and advantage that is contingent on the characteristics of different market environments (also, see Smith and DiGregorio, 2002). For example, as can be observed in Table 4, the Gestalt properties of action sequences have markedly different associations with the investor valuations of high-ambiguity and low-ambiguity firms. This result holds despite the fact that all firms in our sample operated in the relatively ambiguous context of the nascent markets that emerged around the early commercialization of Internet-based technologies. Future research, therefore, should conduct more direct comparisons between firms competing in nascent markets and those competing in established industries. We expect that established industries disequilibrated by novel entrepreneurial actions (Smith and DiGregorio, 2002) or aggressive strategic thrusts (D'Aveni, 1994) represent other competitive arenas where the perceptual effects of the characteristics of competitive action sequences contribute to temporary competitive advantages (see Rindova, Bercerra, and Contardo, 2004, for a related discussion).

Second, our theory and findings also emphasize the need for studies that examine competitive actions as a stimulus for interpretation and basis for evaluation of a firm's strategy, above and beyond the conventional view that competitive moves are directed toward rivals' competitive positions (cf. Ferrier, 2001). Future research should consider more systematically the differences between the effects of single actions viewed as signals of a particular strategic disposition (Porter, 1980) and the interpretational effects of multiple actions viewed holistically, as elements of a manifest strategy. Instead of examining stock market reactions to the signal that each action a firm undertakes sends to the market (Bettis and Weeks, 1987; Lee *et al.*, 2000), our theoretical and empirical approach emphasizes the holistic effects of sequences of actions that communicate an overarching strategic logic (Wiggins and Ruefli, 2005).

To the best of our knowledge, our study is the first to empirically investigate the effects of

grouping of actions and motif (see Table 4). The methodological approach we develop should facilitate future research that endeavors to understand competitive actions as complex informational stimuli. Our measures of predictability extend previous work on this issue by using sequence analysis to generate precise intertemporal comparisons (Abbott, 1990; Ferrier, 2001). Further, our measures for grouping and motif represent an original application of methods from music perception (Deliège, 2001) and behavioral biology (e.g., Sankoff and Kruskal, 1983, who studied sequences in bird songs) to capture unobservable attributes that may affect perceptions in ways that are not necessarily conscious. We hope that our measurement approach stimulates the ideation of new constructs and new measures that can capture deep, hidden meaning or structure in a variety of phenomena yet to be explored in strategic management.

Future research in this direction, however, should continue to heed our argument that Gestalt properties do not necessarily enable investors to make *more accurate* predictions about the future prospects of a firm. Instead, they may enable pattern perception and the associated sense of regaining of interpretative control. While pattern perception does not reduce ambiguity objectively, it may reduce the subjective experience of it sufficiently for actors to take action. Like the proverbial map in Weick's story about the lieutenant who led his troops through the Alps using a map of the Pyrenees (Weick, 1995), the Gestalt properties of a firm's action sequences may reduce firm-specific ambiguity sufficiently for audiences to be willing to provide the firm with greater access to resources. These arguments suggest that investors' search for patterns and meaning might benefit some firms in the short run (providing them with temporary competitive advantages), but it also might generate suboptimal resource allocations to new technologies, as resource allocation decisions are triggered by potentially irrelevant characteristics of information stimuli.

The issue of the nature of the advantages derived from action patterns—whether short-term and temporary, or long-term—also merits further research attention. Our theory and results suggest that the direct effects of action patterns are likely to be temporary, as they are contingent on high levels of firm-specific ambiguity. However, similar to D'Aveni's (1994) argument that even if a series

of actions do not create long-term advantage in themselves, they can add up to long-term strategic dominance, we would expect that the temporary advantages derived from the attributes of competitive actions can alter the long-term competitive positions of firms. For example, at the end of the study period, Amazon.com—one of the companies in our sample—was valued at \$4.64 billion, ‘...about equal to its two biggest brick-and-mortar rivals, Barnes and Noble and Borders Group, combined’ (Scism and Buckman, 1998: C4). Merrill Lynch analyst Jonathan Cohen argued that this valuation ‘is completely disconnected’ from the company’s operating prospects, because ‘Amazon is not a technology company, it is not a software company, and it should not enjoy a valuation that is even remotely related to such high-profit-margin companies’ (cited in Scism and Buckman, 1998: C4). Yet investors’ perceptions about Amazon.com at that time provided it with financial resources that helped its emergence as a leader in electronic commerce over the next decade. This example highlights how interpretation-based temporary advantages in fast-moving nascent environments can have substantive effects on the future growth potential of firms. Such advantages may contribute to the selection of winners by providing some firms with superior access to financial resources at a critical time in the evolution of an industry (see Noda and Collis, 2001, for a detailed discussion of these long-term effects of temporary initial advantages). Therefore, we believe that studies investigating the interplay between competitive actions, audience interpretations, and firm performance are important for advancing research on temporary advantage.

Finally, our findings also have implications for future research on nascent markets, as they expand the inquiry on the effects of ambiguity on firm performance in such markets. In a departure from past research that has studied nascent markets as generally characterized by high levels of ambiguity, we theorize and operationalize ambiguity at the firm level of analysis. Our measure of ambiguity based on the actual judgments of a relevant expert audience distinguishes between higher and lower levels of ambiguity across firms from the perspective of actual market audiences. The measure appears to distinguish effectively among these conditions, as we find theoretically predictable differences in

the relationships between competitive actions and investor valuations for firms associated with different levels of ambiguity. These findings call for more granular, firm-specific, audience-based measures of ambiguity in future research on nascent markets.

Future research should also seek to capture how local differences in audience interpretations might generate different competitive contexts for firms that *appear* to operate in the same market, defined objectively. Because nascent markets inherently involve multiplicity and divergence of interpretations (Santos and Eisenhardt, 2009; Smith and DeGregorio, 2002) and because such perceptions affect the flow of resources to firms, nascent markets can represent highly rugged and dynamic landscapes. In such landscapes, temporarily converging or diverging perceptions of ambiguity can lead firms to find themselves in differentially valuable market positions over relatively short periods of time. These ideas suggest the need for detailed field studies of firms competing in nascent markets that capture the specificity of their competitive landscapes. They also make a strong case for greater integration of research on sensemaking and interpretation within the study of competition and advantage.

Limitations

In conclusion, we would like to highlight some of the limitations of our study that provide opportunities for future research. First, the opening of the Internet for commercial use triggered a highly unusual confluence of technology, entrepreneurship, investor speculation, and customer excitement that ultimately resulted in the *Internet bubble* in the late-1990s. Whereas our data were collected specifically to span the early, *pre-bubble* period (between 1995 and the third quarter of 1998), the conditions that characterize the sector may still be highly unusual, thereby limiting the generalizability of our findings. Future research should explore our ideas in other nascent markets, associated with the commercialization of other major radical technological innovations, such as nanotechnology, renewable energy, mobile communication, or the biologics or nutraceuticals sectors of the pharmaceutical industry. Second, in an effort to avoid the bubble effect, we constrained our data collection to the third quarter of 1998,

thereby limiting our observations to a relatively short period in the life of our firms. While our choice was consistent with our interest in temporary advantages, we believe that it is important for future research to explore the longitudinal effects of the characteristics of firms' competitive actions, including their effects on sustainable advantage. Third, our study examined the patterns exhibited in competitive actions carried out by the firm over time. However, we did not explicitly theorize about or measure time. We used time to establish the temporal *order* of actions in a given sequence. Prior research in competitive dynamics has fruitfully explored time-explicit concepts, such as action-to-response time (Chen and MacMillan, 1992; Lee *et al.*, 2000; Yu and Cannella, 2007) and the duration of the firm's multi-action attack on rivals (Ferrier, 2001). Future research that explores the temporal structure of action sequences would be quite valuable for advancing this line of inquiry. Fourth, we focused only on one perceptual mechanism through which the sequence characteristics of firm action may affect perception and interpretation—Gestalt properties. Within this category, we focused on the effects of four specific properties. However, action sequences might affect many other aspects of perception, Gestalt and otherwise. For example, one can envision how another Gestalt-type of effect, known as *figure/ground* may emerge, if highly salient early actions anchor perceptions about a firm in a particular configuration (the figure), thereby reducing the attention given to subsequent actions that may convey different information (the ground) (see Rindova *et al.*, 2007 for a discussion of patterns of interpretation of the early actions undertaken by Amazon.com, Barnesandnoble.com, and CDNow in the emerging e-commerce category). Future research investigating the various effects of action sequencing on strategic outcomes can make important contributions to research on dynamic strategies and market process.

CONCLUSION

Bringing together ideas from research on competitive dynamics and hypercompetition and the psychology of perception, in this paper we develop new theory and methods for studying how holistic, Gestalt properties of firms' sequences of competitive actions contribute to competitive advantages

in highly ambiguous contexts. Our findings suggest that specific, sometimes hidden characteristics of the inner structure of sequences of competitive actions may affect investors' subjective experiences and the valuations of firms competing in such contexts. These findings make an important contribution to strategy research that views perception and interpretation as core elements of market processes. Further, by integrating ideas from strategy research on dynamic competition and areas of study that focus on the subjectivity of human perception and judgment, our study exhibits the theoretical pluralism required to advance theories of strategic process (Pettigrew, 1992; Van de Ven, 1992). We hope that this study stimulates further interest in the study of competitive advantage as a dynamic process involving dynamic action patterns and their subjective interpretations.

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