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Incremental revolution: Organizational change in highly turbulent environments

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Abstract. Established models for understanding organizational change processes seem inadequate for explaining changes undergone by organizations facing highly turbulent environments. We propose an alternative model that depicts change as constant regeneration rather than revolutionary episodes. We then propose a set of structures and processes that facilitate this constant regeneration.

Key words: Organizational change, turbulent environments.

Introduction

One of the greatest challenges for firms operating under highly turbulent conditions is managing the process of constant innovation and change (Brown & Eisenhardt, 1997; Chakravarthy, 1997). Constant innovation and change is necessary for firms whose product offerings move rapidly through product generations (Iansiti & MacCormack, 1997). Firms which fail to manage their innovation and change processes and thereby miss the next cycle of innovation face adverse consequences in terms of product obsolescence leading to declining market share (Brown & Eisenhart, 1997).

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Existing models of change do not help us readily understand the continually changing organization. While providing researchers with an in-depth understanding of incremental changes in periods of convergence and radical changes in periods of transformation, existing models have little to say about how organizations use seemingly incremental changes to achieve large-scale realignments of competitive resources. Yet, recent exploratory research on firms operating under conditions of rapid growth and change indicates that firms operating in such environments face the challenge of managing continual organizational change.

In this paper we are primarily concerned with large-scale change that realigns an organization's resources with its external environment by effecting changes in the content of a firm's strategy or environmental and organizational changes necessary for the implementation of the change in strategy content (Rajagopalan & Spreitzer, 1997, p. 49). This type of change is significant and can be likened to what has been variously termed as revolutionary (Tushman & Romanelli, 1985; Gersick, 1991) or discontinuous change. Our paper reviews existing organizational change models. We then propose an emerging model of organizational change that suggests that large-scale organizational realignments result not from extraordinary efforts but from continuous small-scale adjustments, not from a carefully designed effort but from a process of incremental transformation. Unlike established models of large-scale change in which an intended outcome is specified before implementation begins, in our model the outcome emerges from a series of seemingly trivial small-scale changes that enable a firm to adapt to its environment. These firms do not set out to implement transformational change; it occurs as a result of the day-to-day activities demanded by the changing competitive market place. The model also addresses the question of how firms can facilitate the occurrence of these small-scale changes. We propose that they do so by implementing a set of specific structures and processes, thereby linking organizational practices to the ability to achieve necessary large-scale change.

Theory

Turbulent Environments

In their seminal work on organizations and environments, Emery and Trist (1965) classify four types of environments on two dimensions, dynamism and complexity. The environment type which was found to be most dynamic and complex is called a "turbulent field". Turbulent fields are dynamic processes in which significant variance in the component firms arises from the environment itself (Emery & Trist, 1965). This suggests that, unlike traditional models of strategic management where the dynamic properties arise from the interaction or rivalry among component organizations, in turbulent fields, it is the interactions of the entire system, or organizational field, which lead to gross levels of organizational uncertainty.

Recent empirical work in the strategic management literature examines the effects of envi-

ronmental turbulence on industries (Chakravarthy, 1997; Craig, 1996), and on organizations and their processes (Eisenhardt & Tabrizi, 1995; Iansiti, 1995). One of the principal findings of these works is that firms, which are operating in turbulent industries, must manage continual organizational change (Brown & Eisenhardt, 1997; Chakravarthy, 1997). In a related research stream, D'Aveni (1994) characterizes rapidly changing environments as "hypercompetitive". He suggests that in a hypercompetitive environment, the frequency and aggressiveness of dynamic movement by the industry players continues to increase, creating a condition of constant disequilibrium and change. Products in this environment have rapidly changing technologies, which lead to extremely short design and product life-cycles. Markets have a high rate of new firm entry, repositioning, and exit as industry boundaries are redefined as diverse industries merge (Yoffie, 1997). D'Aveni, (1994) suggests that there are four key areas of dynamic strategic interaction in which competitive advantages are created and/or eroded: (1) price/cost and quality positioning, (2) competition to create new know-how and timing, (3) stronghold protection and invasion, (4) competition based on deep pockets and the creation of even deeper pocket alliances.

Existing Models of Large-Scale Organizational Change

Researchers working in several different literature streams, including strategic management, organizational theory and social psychology, have developed models of large-scale organizational change. These models represent a wide range of questions which address the phenomenon of such change including:

- Do organizations undertake large-scale change?
- When do organizations undertake large-scale change?
- What effects does large-scale change have on organizational performance?
- How do large-scale changes unfold in organizations?

Depending on the literature stream and the research questions, research on organizational change may focus on the content of the change (Haveman, 1992) or the internal workings of the change process (i.e., Bartunek, 1984; Gersick 1994). It may focus on a population of organizations, such as Haveman's (1992) study of the California savings and loan industry or on a specific organization. Much of the strategic management research on large-scale change has tended to focus on distinguishing large-scale from incremental change and on examining the antecedents and outcomes of strategic change (Haveman, 1992; Romanelli & Tushman, 1994; Tushman & Romanelli, 1985). It falls under what Rajagopalan and Spreitzer's (1997) review of the strategic change literature term the rational lens model for understanding strategic change. People are largely absent from this approach. The environment typically acts as a catalyst for change rather than a factor in the unfolding of the change process. Environmental shocks or jolts (Meyers, Brooks & Goes, 1990; Tushman & Romanelli, 1985) create a crisis which forces an organization to reconsider its existing ways of doing business and shape the content of the change rather than the change process. This literature also tends to link strategic change to organizational performance or sur-

vival (Haveman, 1992) although results have been inconclusive (Rajagopalan & Spreitzer, 1997). Because it examines large populations of organizations with the individual organization appearing as the traditional “black box”, this research stresses the content and organizational consequences of strategic change rather than the mechanics and processes of strategic change implementation.

Cognitive approaches (Rajagopalan & Spreitzer, 1997) to large-scale change, on the other hand, address the mechanics and processes of large-scale change implementation while largely ignoring the performance consequences of the change. They propose that change occurs when one set of beliefs (or cognitive frame) is substituted for another (Barr, Stimpert & Huff, 1992; Bartunek, 1984, 1993; Isabella, 1990; Lau & Woodman, 1995; Webb & Dawson, 1991). They emphasize questions such as, how change schemata influence an individual’s attitude toward change (Lau & Woodman, 1995); how conflict promotes or hinders organizational change (Bartunek, 1993; Bartunek & Reid, 1992); how senior management provides organizational members with a new vision of reality which these members can adopt (Gioia & Chittipeddi, 1991; Gioia, Thomas, Clark & Chittipeddi, 1994; Pondy & Huff, 1985) or how the cognitive maps of managers evolve over the course of a strategic change (Barr, Stimpert & Huff, 1992; Isabella, 1990).

In contrast to the rational approach’s external macro focus, the cognitive approach looks almost exclusively inward to the individual organization. Given an environmental trigger, which precipitates a crisis in the organization (Bartunek & Louis, 1988), researchers have looked at how managers’ understandings of issues evolve within an organization. In this body of research, the external organizational environment is viewed as one source of managerial cognition (Buchko, 1994) that affects organizational actions and outcomes by triggering changes in the cognitive maps used by managers to make decisions. Similarly, the internal organizational environment is seen as a relevant context as well which shapes the unfolding of the change process. For example, Bartunek and Reid (1992) demonstrate that existing patterns of organizational behavior, in this case conflict resolution patterns, shape organization members’ perceptions of the proposed change and the change process. Unlike the rational stream’s approach, the cognitive stream gets well inside the black box to specify how large-scale change occurs through an interpretive mechanism by which managerial causal maps are changed, leading to changes in actions. If the rational stream tells us the when, what and so what of large-scale change, the cognitive approach helps us understand the interpretive how and why.

A third approach, termed the learning lens approach (Rajagopalan & Spreitzer, 1997) falls in between the cognitive and rational approaches to understanding strategic change. It introduces the individual manager and managerial actions to the process (Burgelman, 1983, 1994; Child & Smith, 1991; Lant & Mezias, 1990; Wooldridge & Floyd, 1990). This approach studies the interplay of environmental change and managerial action to examine how the change process and its content unfold across time, giving rise to an understanding of how context affects both the direction and the process of strategic change through action.

Although these approaches to understanding large-scale change differ significantly in areas such as questions asked, unit of analysis, and theory base they seem to share one fundamental underlying assumption – that organizations change in one of two mutually exclusive ways. The

two types of change may be termed incremental and revolutionary or transformational change. Change that reinforces the existing organizational alignment is incremental (Dewar & Dutton, 1986) while change that transforms organizational resource alignments is revolutionary. Research on large-scale change has tended to assume that such change is inevitably revolutionary in nature and that incremental and revolutionary change processes operate independently (Abernathy & Clark, 1985). Large-scale change is typically crisis-driven, triggered by an external event. Achieving large-scale change is viewed as a difficult, discontinuous process, which is inherently painful.

In contrast to the popular approach adopted in the strategic management literature, we argue that this either/or approach to understanding how organizations change may not be appropriate to explain the constant processes of innovation and change in some organizations. We believe that organizations which are operating in a highly turbulent environment are in a constant state of change in which revolutionary and incremental forces interact to produce a type change that appears to be neither purely adaptive nor purely revolutionary (Benning, 1994). We also believe that specific organizational routines or processes can facilitate the introduction and acceptance of dramatic change. Most change models begin with an agreed-upon need to change and direction for that change. The change process may be said to begin when some change agent, whether it be a consultant, a CEO or other powerful person within the organization, introduces a new direction for the organization and then attempts to bring the organization along. We believe that, for organizations operating in highly turbulent environments, the recognition of the need to change and the emergence of a new direction for the organization is a more *organic* process, potentially arising in different parts of the organization out of the every day work of organization members (March, 1981).

A few researchers have questioned the inevitability of the revolutionary nature of large-scale change as well as the assertion that the two types of change processes operate independently. March (1981) suggests that dramatic changes in organizations do not necessarily have dramatic explanations, and implies that large-scale reconfigurations of organizational resources could result from routine processes. Ginsberg (1988) argues that strategic reorientations may occur incrementally, appearing revolutionary only in hindsight, when a group of seemingly adaptive decisions is perceived to have resulted in a dramatic realignment of strategic orientation, internal activities and external needs. Bartunek (1993) suggests that periods of continuity and change are not mutually exclusive and states that «continuity along some dimensions may be crucial for second-order change in others» (Bartunek, 1993, p. 342). Pondy and Huff (1985) provide empirical support for this argument in their explanation of a school district's domain shift through the routines of existing administrative processes. They found that dramatic forces did not adequately explain the significant domain change represented by the district's decision to computerize its curriculum. Instead, the school superintendent used existing administrative mechanisms and careful choice of language to frame the decision as ordinary and adaptive rather than discontinuous. Burgelman's (1994, p. 25) study of strategic business exit at Intel also supports this observation as it describes how middle managers' everyday actions gradually transformed that company "from a 'memory'

company into a ‘microcomputer’ company”. Similarly, Dougherty’s (1992) study of organizational renewal through product innovation supports our argument that the day-to-day work of the organization can actually drive significant organizational change, even in the absence of a deliberate effort to implement major change.

A Model of Continuous Organizational Change

In contrast to the previous models of organizational change, we propose a model of continuous organizational change that suggests that there is a direct link between small-scale and large-scale change. This link has not been adequately explored in management research to date, despite the theoretical and empirical work that suggests that it may provide additional insights into the way organizations operating in turbulent environments actually undergo large-scale change.

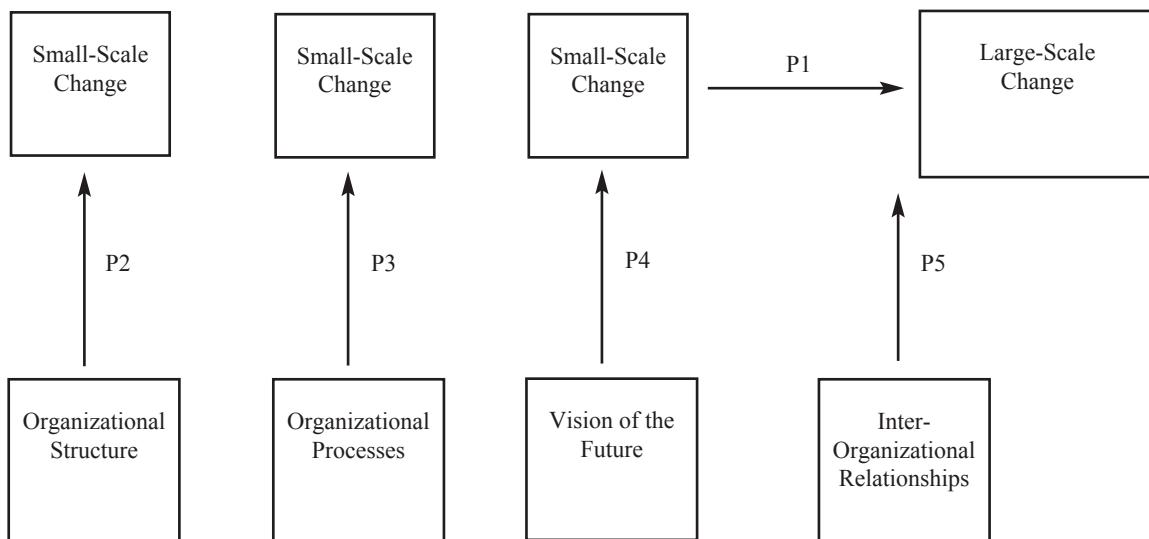


Figure 1. Incremental Transformation

Our model also suggests four possible organizational characteristics that facilitate the implementation of small-scale change. These are crucial to the model because we argue that organizations in turbulent environments achieve the changes necessary to compete in these environments, not by designing and implementing large-scale change but by creating and managing organizations where rapid small-scale changes work to make large-scale change possible. The possibility of large-scale change is effectively incorporated into the basic organizing structures and processes of the organization. Organizations that are most likely to successfully achieve the large-scale changes potentially demanded by the ever-changing environment will be those that facilitate small-scale change. We have termed this process of large-scale change incremental transformation. Based on our review of the literature, we have identified four characteristics of the incrementally transforming organization: a moderated organic structure; flexible product development processes; an ongoing vision of-the-future, and vertical and horizontal interorganizational relationships.

Proposition one: Organizations operating in turbulent environments which are able to achieve continuous small-scale change will be more likely to achieve large-scale changes.

Organizational Characteristics

Organizational Structure

How firms should organize themselves to fit their task environment has been a central question in organizational research for the past thirty years (Lawrence & Lorsch, 1969; Galbraith, 1973). One compelling reason for the continued interest in fit is that the organization of work is a domain over which managers feel they have direct control. Burns and Stalker (1961) studied the organizational structures of a diverse sample of approximately twenty industrial firms in the United Kingdom. They found that firms had two basic structures, mechanistic and organic. Mechanistic structures are bureaucratic, characterized by task specificity and vertical communication. In a mechanistic structure, workers focus on their individual task, leaving the overall coordination of individual tasks to upper management. The technical methods for accomplishing each individual task are well known and clearly defined. Workers are governed by instructions from their superiors, who understand the appropriate actions. In a bureaucracy, information flows up, through a series of filters, and instructions and decisions flow down through a succession of amplifiers (Burns, 1963). This structure is found in firms operating in relatively stable environments, and is prized for its efficiency.

In contrast, organic organizational structures are fluid. Organic structures are found in firms that, due to their unstable operating conditions, have been unable to break problems down and distribute them among specialists in the hierarchy. In an organic structure, individuals are charged not only with their own job, but also with an understanding of how their job fits into the organization

as a whole. Organic structures are credited with opening up channels of communication, thereby facilitating the creation of new and novel ideas. As such, they are found in firms that are operating in rapidly changing environments and are prized for their flexibility.

Recently, researchers have found evidence that firms with successful new product portfolios have adopted a *moderated organic structure* or semi-structures (Brown & Eisenhardt, 1997). Firms with a moderated organic structure strive for *partial order*. Traditional organic structures, while flexible, were found to be chaotic (Brown & Eisenhardt, 1997). The move away from the purely organic structure towards a moderated organic structure reflects the recognition that organizations need both flexibility and efficiency to survive in turbulent environments. This mix is achieved by moving towards a structural middle ground, which combines the benefits of hierarchy, such as defining priorities and maintaining accountability, with the enhanced communication benefits of the organic structure. In a moderated organic structure, individuals clearly understand their part of the process and aim all actions toward ensuring that their portion of the project is completed on time and within the prescribed perimeters. Yet, individuals are also charged with knowing how their project part connects to the overall project. Hence, individual project decisions are made based on their impact on the whole organization. From an organizational change perspective, firm structure must be sufficiently rigid so that change can be organized while not so rigid that it cannot occur (Brown & Eisenhardt, 1997).

Proposition two: Small-scale change is more likely when firms which are operating in turbulent environments adopt a moderated organic structure which combines elements of organic and mechanistic structures.

Organizational Processes: New Product Development

The new product development process is one important way in which organizations adapt themselves to their operating environments (Dougherty, 1990; Eisenhardt & Tabrizi, 1995). The literature on new product development focuses on the structures and process through which the firm's innovation process is managed (Ancona & Caldwell, 1992; see Brown & Eisenhardt, 1995, for a comprehensive review). Much of this work examines new product development in the context of large companies, established industries, and relatively benign environments (Clark & Fujimoto, 1991; Hayes, Wheelwright & Clark, 1988; Womack, Jones & Roos, 1990). The prescriptions drawn from this stream of new product development literature include the benefits of (1) increased up-front planning, (2) integrating suppliers into the development process, and (3) using overlapping development stages to achieve shorter development cycles. In contrast, a new model of product development for firms operating in highly ambiguous environments is emerging. This new model stresses uncertainty in the design and implementation process, and tries to manage that uncertainty through the use of frequent customer contact (Iansiti & MacCormack, 1997), multiple product design iterations (Eisenhardt & Tabrizi, 1995; Leonard-Barton, 1995), extensive design

testing (Iansiti & MacCormack, 1997), frequent milestones for communication and project reassessment (Cusumano & Selby, 1996; Eisenhardt & Tabrizi, 1995), and a flexible yet structured team approach (Brown & Eisenhardt, 1997). This new model stresses the futility of up-front planning under highly uncertain conditions and proposes an alternate vision of the new product development process that emphasizes process speed and flexibility.

Process speed, or faster time to market, has taken on increased importance due to its link to product profitability. In a study of high technology products Vesey (1991) found that products that were within budget but were six months late in entering the market earned thirty-three percent less over a five-year period than they would have if they had been introduced into the market on-time. This is in contrast with on-time, over-budget product introductions that only had a four percent reduction in earnings over the same five years. In addition, longer development times are associated with lower productivity and waste due to an increase in peripheral activities, changes and mistakes (Clark & Fujimoto, 1991).

Process *flexibility* has been suggested as another other critical outcome variable for firms operating in rapidly changing environments. Flexibility is broadly defined as the ability to change or react with little penalty in time, cost or performance (Upton, 1995). Volberba (1996) classifies flexibility on two dimensions, variety and speed. He proposes the concept *strategic flexibility*, which he defines as having both high variety and high speed. Strategic flexibility is flexibility with respect to changes in the nature of the organization's activities. It is necessary when the organization faces unfamiliar situations, needs to react quickly, and has no established routine to manage the necessary changes. In these situations, firms dismantle current strategies, and engage in new, unfamiliar activities. For example, a change in government regulations or a rival's competitive offerings may motivate the firm to move into new, untested product-markets. The new product development model based on time-to-market has not been subjected to extensive, rigorous empirical testing. To date, only one empirical test of specific emerging model components has been conducted, by Eisenhardt and Tabrizi (1995). Using shorter development time as their outcome variable, they examined seventy-two new product development projects and found evidence that the existing model of product development was not consistent with the processes undertaken in firms operating in environments characterized by rapid change.

Despite its prominence in the literature on organizational responses to turbulent environments, strategic flexibility has not been used as an outcome variable in the empirical research on new product development processes. This may be a reflection of the difficulty in both defining and then quantifying flexibility. Flexibility has also had limited use as an outcome variable outside the new product development literature. One example where flexibility was used was in the work on social networks in biotechnology firms by Liebeskind, Oliver, Zucker and Brewer (1996). They found increased organizational learning and organizational flexibility when biotechnology workers used their social networks.

Proposition three: Small-scale change is more likely when firms which are operating in turbulent environments adopt a new product development process which emphasizes both development speed and process flexibility.

Vision-of-the-Future

Recent research on how firms respond to rapidly changing environments suggests that organizational leaders must not only have a strong understanding of current market conditions, but they also need to develop, and then articulate, a clear sense of their vision-of-the-future (Brown & Eisenhardt, 1997). Developing and then articulating a vision-of-the-future, while long recognized as an important activity of upper management, has emerged as a critical strategic tool for managers operating in turbulent environments. Vision-of-the-future suggests that top management has a perspective on the future course of the firm, thus providing the organization with some much-needed stability.

While the value of having a future vision seems clear, the process through which organizational leaders develop their vision-of-the-future is less well known. Traditional strategic management literature discusses the use of up-front planning as one way in which managers build a road map for the future (Ansoff, 1965). Recent literature on organizational processes in turbulent environments suggests that strategic planning is unsuitable for turbulent environments (Eisenhardt & Tabrizi, 1995). Given the pace of change, by the time the strategic plan is implemented, it is obsolete.

Developing a vision-of-the-future implies that organizational leaders develop both an inward focus on firm processes and an outward focus on the anticipated changes in the market or technology. Current thinking posits that managers conduct organization-wide experimentation and prototyping to develop their vision-of-the-future. Firms experiment by incorporating small changes into their core products. These changes are tested in peripheral markets to determine if they warrant inclusion in the next core product generation.

Organizations also rely heavily on internal and external customers for testing and input about future products and process ideas. Internal employees have long been used as a way in which to test new product ideas for both high and low technology products before they are released. For example, before Microsoft introduced its Internet product, Microsoft Explorer, it put the product up on its Intranet and instructed employees to “play with it” (Iansiti & MacConnack, 1997, p. 113). This is similar to a common practice in Gillette, where men are instructed to go to work unshaven so they can test new shaving products on either side of their face (Leonard-Barton, 1995).

External customers are also important for firms when testing new ideas about the future of a new product or technology. High technology products are generally released in a Beta version to external lead users who test them extensively before the products are released for sale to the public. These lead users are often vocal customers whose product applications push the new product’s technology to the limits of its performance in their applications.

Another way that organizational leaders develop a vision-of-the-future is to rely on industry experts. In a larger organization, these experts may be internal to the organization such as technology or marketing gurus. In smaller firms, internal expertise may not be available, and so organizational leaders seek out the expert opinions of industry consultants. In either scenario, organizational leaders are trying to determine the future trajectory of both the market and the technology. For example, when Internet development firms executives attended a Massachusetts Software Council Inter@ct breakfast where Internet experts were panelists, these managers were using probing as a technique to develop, and/or ratify their future vision of both the Internet marketplace and its future technology.

Proposition four: Small-scale change is more likely when firms which are operating in turbulent environments develop a vision-of-the-future which is based on experimentation, prototyping and testing of new products on internal and external customers by probing using internal and external industry experts.

Interorganizational Relationships

Interorganizational relationships, and in particular, strategic alliances have been the subject of numerous studies in the strategic management literature (Oliver, 1990). Widely prescribed as the antidote to numerous organizational maladies, interorganizational relationships are most helpful to firms that need access to resources that are not available internally. Interorganizational relationships can be broadly divided into two categories: (1) vertical relationships formed in the context of the firm's extended value chain, and (2) horizontal relationships among firm rivals. In traditional strategic management theories, inter-firm alliances are rivalry reduction mechanisms (Porter, 1980). Using Porter's framework (1980), vertical relationships, such as those between customers and suppliers, create power asymmetries that place the firm in a less advantageous position with respect to its external value-chain participants. The prescription from the traditional strategic management literature is for firms to maintain arms-length relationships with their customers and suppliers, thereby avoiding dependence and increasing the firm's bargaining power with respect to price.

Yet, recent work on customer-supplier relationships in the marketing literature suggests that firms reap performance benefits when they form relational exchanges with their suppliers. Heide and John (1990) studied the relational exchange between electronic manufacturers and their downstream customers. They found a positive relationship between relational exchange and transaction specific assets under conditions of technological uncertainty. In a related study, Fink, Hatten, Dant, and Edelman (1996) found that firms in the paper industry which were competing under conditions of high technological uncertainty received enhanced performance benefits from forming relational exchanges with their process control equipment suppliers.

It has also been proposed that firms operating in highly turbulent environmental conditions

will receive enhanced performance benefits from forming horizontal interorganizational relationships with rival firms competing in the same product-markets. Traditional strategic management literature predicts that horizontal interorganizational relationships will result in industry-wide rivalry reduction and a corresponding reduction in the individual firm's competitive activity. Rivalry reduction stems from inter-firm communication that increases as rivals cooperate. This increased communication leads to collusion, such as price fixing, which enhances firm's profits thereby reducing firm risk with respect to new industry entrants. Firms can reduce their overall competitive activity, charge higher prices, and reap higher profits while reducing their overall market risk, when they form interorganizational relationships with their competitive rivals. New theories, based on the Austrian school of economics, suggest that firms use horizontal cooperative mechanisms with rivals (e.g., joint product development) for mutual benefit as a means to escalate their individual competitive activity (D'Aveni, 1994). In contrast to traditional strategic management theories, the Austrian school predicts that horizontal organizational relationships will have a positive impact on the firm's competitive activity because they provide firms with access to external resources that are unavailable within the boundaries of the organization. Given the pace of change and the rapid obsolescence of know-how in high uncertainty environments, firms may be ill-advised to invest in developing internal capabilities when those capabilities can be accessed externally.

Proposition five: Small-scale change is more likely when firms that are operating in turbulent environments form vertical and horizontal interorganizational relationships.

Conclusion

Our work follows Gersick's (1994) suggestion on the appropriate direction for future research on organizational change. She suggests that the empirical evidence of the past decade has firmly established that firms adapt and change. A more productive venue for organizational change research moves away from work that examines whether or not firms change and towards answering the question of "when and how organizations steer successfully through changing environments" (Gersick, 1994, p. 11). Our change model offers a new perspective on large-scale organizational change. We posit that, for firms in highly turbulent environments, large-scale change is achieved, not by a predetermined organizational effort, but instead through a series of small-scale changes. Organizational change no longer follows a well-defined path where outcomes are known *a priori*. Instead, our model suggests that the desired large-scale change is unknown, making the process of innovation and change more like a "highly uncertain path through foggy and shifting markets and technologies" (Eisenhardt & Tabrizi, 1995, p. 91).

We then examine four *characteristics* of the incrementally transforming organization. We posit that firms are more likely to undergo continual small-scale change when they (1) adopt a

moderated organic organizational structure thereby reaping the benefits of both organic and mechanistic organizational forms, (2) focus simultaneously on both speed and flexibility in their new product development processes, (3) articulate a vision-of-the-future that is developed and enhanced through a series of continual iterations which involve probing and experimentation, and (4) extensively use both horizontal and vertical interorganizational relationships to gain access to external resources which are unavailable inside the boundaries of the organization.

Our review of the organizational change literature clearly suggests the need for an expanded theory of large-scale change that explains ways in which firms continually change and innovate. We offer our paper as a first attempt in that direction. The propositions presented above provide a starting point for additional research on large-scale change in organizations operating in turbulent environments. Longitudinal case studies would clarify and refine the proposed link between small-scale and large-scale change (PI). Case studies would also yield valuable insights into the relationships between our proposed organizational characteristics and small-scale change. This would facilitate the development of testable hypotheses and instruments designed to examine these relationships over a broader sample base. Empirical research that examines the processes by which firms operating in turbulent environments undergo large-scale change would provide an enhanced understanding of the interaction between internal organizational change mechanisms and external turbulent environments. As environments grow more turbulent, increasing our knowledge of how firms change under these conditions will fill an existing gap in the academic literature on organizational change.

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Resumo. Os modelos existentes de mudança organizacional revelam-se inadequados para explicar as mudanças que enfrentam as organizações a operar em ambientes altamente turbulentos. Neste artigo propomos um modelo alternativo que concebe a mudança como uma regeneração constante em vez de um conjunto de episódios revolucionários. Em seguida sugerimos um conjunto de estruturas e processos que facilitam esta regeneração constante.

Palavras-chave: Mudança organizacional, ambientes turbulentos.