ORGANIZATIONAL CULTURE AND PERFORMANCE IN HIGH-TECHNOLOGY FIRMS: THE EFFECTS OF CULTURE CONTENT AND STRENGTH[1]

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ABSTRACT

Organizational researchers have long debated the meaning and consequences of organizational culture but the relationship between culture and organizational performance is still not well understood. Conventional wisdom suggests that a strong culture that aligns members' behavior with organizational objectives should boost performance. A more recent view is that, because strong cultures are associated with greater adherence to routines and behavioral uniformity, they are less effective than weaker culture firms in dynamic environments. Both views fail to recognize that culture as a construct encompasses three dimensions: the content of norms (e.g., teamwork, integrity), how forcefully they are held by organizational members (its intensity), and how widely members agree about the norms within the organization (consensus). We hypothesize that strong cultures will boost performance in dynamic environments if a norm of adaptability is intensely held *and* cultural norms are widely shared among members. We find an additive interaction such that firms characterized by higher cultural-norm consensus and intensity about adaptability perform better than those characterized by lower consensus, lower intensity about adaptability, or both. We discuss the theoretical implications of differentiating between the content of cultural norms and their strength.

Like many social scientists, organizational researchers have been interested in the role of culture in organizational life and by some estimates have generated more than 4600 articles on the topic (Hartnell, Ou, & Kinicki, 2011). Significant debates emerged during the 1980's and 1990's as organizational culture became a management fad (e.g., Abrahamson, 1996; Peters & Waterman, 1982). Academic debates focused on whether culture should be viewed from a materialist or ideational perspective, whether it is a unitary or distributed construct, and how it should be assessed and studied (e.g., Schneider, 1987). Unfortunately these debates have failed to resolve several key theoretical questions about organizational culture.

One of the most important yet least understood questions is how organizational culture relates to organizational performance. Researchers initially favored a direct positive relationship, speculating that certain types of cultures led to better financial performance (e.g., Barney, 1986). The logic was that the clarity derived from salient shared norms that are strongly enforced among members would promote greater strategic alignment and goal attainment in strong-culture firms (e.g., Tushman & O'Reilly, 2002). For example Denison and Mishra (1995) studied five firms and linked organizational culture attributes such as adaptability to growth and profitability, and both Kotter and Heskett (1992) and Gordon and DiTomaso (1992) found that firms emphasizing adaptability and change in their cultures were more likely to perform well over time, though the specific reasons for this relationship are unclear. But other research found inconclusive relationships between organizational culture and performance (e.g., Cameron & Freeman, 1991; Wilderom, Glunk, & Maslowski, 2000).

Many have concluded that the link between organizational culture and firm performance lacks consistent and compelling support (e.g., Detert, Schroeder, & Mauriel, 2000; Hartnell, Ou, & Kinicki, 2011). In an effort to resolve these inconsistencies, some researchers have suggested

that the relationship between culture and organizational performance is contingent on environmental conditions. One argument is that strong-culture firms may gain advantages in stable environments but, because of the corresponding social control that promotes conformity among members, they may perform worse or less reliably in dynamic environments and during periods of change (Sørensen, 2002; Van den Steen, 2005). Since many organizations operate in dynamic environments, this view suggests that strong cultures may reduce a firm's performance.

Our goal in this paper is to resolve the inconsistencies in our understanding of the organizational culture-performance relationship by offering two conceptual and one methodological advance. First, previous research has blurred a critical distinction between a culture's strength and its content. Second, researchers have often failed to recognize two distinct aspects of culture strength: the degree to which members agree about cultural norms (consensus) and the force (intensity) with which certain norms are held (O'Reilly, 1989; Jackson, 1966). We suggest that the contradictions in prior research can be resolved by recognizing that, even in dynamic environments, organizations that have intensity around a certain kind of cultural-norm – one that promotes non-uniform behaviors and adaptability in particular – and which are characterized by higher consensus among members about cultural norms, may perform better than those characterized either by lower consensus, lower intensity, or both. Further, methodologically, we provide a way to separate the measurement of culture content from culture strength.

We begin by defining organizational culture in terms of shared behavioral norms and elaborating on these two conceptual clarifications. We then test these ideas in a sample of large, publicly traded high-technology firms, and finally we discuss the theoretical implications of

these conceptual and methodological advances for understanding the organizational culture-performance relationship.

PARSING ORGANIZATIONAL CULTURE: CONTENT, INTENSITY AND STRENGTH

Culture has been identified as a pattern of shared assumptions, beliefs, and expectations that guide members' interpretations and actions by defining appropriate behavior within an organization (e.g., Fiol, 1991; O'Reilly & Chatman, 1996). A key unifying element of this definition is the shared nature of culture (e.g., Quinn, & Rohrbaugh, 1983; Ravasi & Schultz, 2006). Researchers have agreed less, however, about the explicitness of organizational culture, with some viewing culture as mostly tacit and implicit (e.g., Schein, 1985) and others focusing on its observable behavioral manifestations (e.g., Chatman, 1991; Carroll & Harrison, 1998).

We focus on cultural norms, which are shared expectations about appropriate behaviors that emerge from an organization's values (O'Reilly & Chatman, 1996). Norms are socially created standards that help group members interpret and evaluate various events and actions. Cultural norms typically form around behaviors that are significant to a group such as how to interact with one another and prioritize objectives (e.g., Bettenhausen & Murninghan, 1991). Cultural norms help people solicit and attend to the information and behaviors that are likely to be valued or useful within the organizational context (e.g., Ashford & Northcraft, 1992).

Distinguishing Culture Strength from Culture Content

Culture Content. Culture content refers to the substance of the culture – the actual attitudes and behaviors that characterize an organization's norms. For example, cultures can support risk-taking and cooperation (Smith, Collins, & Clark, 2005), meritocracy (Castilla & Benard, 2010), or stability and predictability (Beugelskijk, Koen, & Noorderhaven, 2006).

Theoretical debates about culture have often involved disagreements about culture content. In reviewing these debates, Harrison and Carroll (2006: 9) concluded that "criticisms of the culture concept commonly consist of criticisms of the content approach, especially its emphasis on shared content."

This conclusion highlights a problem that often arises in discussions of culture: content is frequently confounded with the amount of consensus about a cultural-norm. This has happened because the shared nature of cultural norms makes it difficult to separate agreement about norms from the substance of the norms that characterize it. The very idea of identifying culture in terms of its content presumes that cultural norms are viewed similarly enough among members that they can be accurately represented as a single agreed-upon profile. And most definitions of organizational culture imply that cultures in which members do not agree about norms cannot be aggregated or represented in unified terms and may only be amenable to "meta" content descriptions such as "the culture is fragmented" (e.g., Martin, 1992; Saffold, 1983).

Despite this conceptual challenge, we suggest that it is both possible and important to differentiate among culture content (the substance of the cultural norm), intensity (the force with which cultural norm are held), and consensus (the extent to which members agree about an organization's cultural norms) to better understand the link between culture and performance. Next, we offer a more precise conceptualization of culture, first by distinguishing between culture strength and content, and then by identifying consensus and intensity as distinct aspects of culture strength.

Differentiating Culture Strength and Content: Behavioral Conformity and Uniformity

Research examining how situations are psychologically construed is useful for understanding culture strength. Situational strength has been defined in terms of the implicit or

explicit cues about the desirability of potential behaviors. Situational strength is posited to result in psychological pressure on an individual to engage in or refrain from particular courses of action; this pressure is thought to reduce relevant behavioral variance and attenuate subsequent trait–outcome relationships (Meyer, Dalal, & Hermida, 2010: 122).

Psychologists have observed the impact of strong versus weak situations on behavior (e.g., Fleeson, 2007; Mischel, 1977) and developed criteria for assessing a situation's strength. A situation is considered strong when it induces conformity; that is, it "…leads all persons to construe the particular events the same way" (Mischel, 1973: 276). Conversely, weak situations are ambiguous; they are neither collectively encoded nor do they generate or reward similar expectations or behavior. Many have argued that strong situations need also to be distinctive and identifiable so that people can reliably predict cause-effect relationships (e.g., Kelley, 1967; Meyer et al., 2010), but we suggest that this confuses a situation's content with its strength. This is because content is more identifiable for some norms, but a norm's strength – represented partly by the extent to which people agree about its relative importance – is independent of its substance.

As an example, consider two organizational cultures, both of which are considered strong but which differ in how identifiable and distinctive they are in terms of behavioral manifestations. The first is Apple, which has cultivated a culture that emphasizes secrecy with great consistency and comprehensiveness across organizational practices. For instance, employees working on particular projects must go through a maze of security doors, each of which requires them to swipe their badges until they finally enter a numeric code to reach their own office. These workspaces are monitored with security cameras, and employees working in the most critical product-testing rooms are required to cover devices with black cloaks and to

turn on a red warning light when devices are unmasked so that everyone knows to be extra-careful. Employees who leak information to the outside world are tracked down and fired. And, Apple's founder and former CEO, the late Steve Jobs, exuded secrecy even risking violating SEC disclosure rules by withholding information about serious health issues while he was CEO (Stone & Vance, 2009). The importance of secrecy at Apple would be hard for anyone, inside or outside the company, to misunderstand.

Contrast the clarity of the secrecy norms at Apple with other norms that induce divergent, unique, or individualistic behaviors such as the norm in some organizations in which members "agree to disagree." An example is the emphasis on "constructive confrontation" at Intel, which fosters what founder and former CEO Andy Grove called "ferocious arguing and disagreement about ideas in the pursuit of new knowledge" (Grove, 1996: 84). Similarly, Agilent's CTO reveals how their culture encourages members to challenge current practices: "We make it clear that it's about everybody questioning the status quo and looking to do something better than what's been done before" (Jaruzelski, Loehr, & Holman, 2011: 14). At Intel and Agilent, the norm to which members conform fosters highly variant, non-uniform behavior. This makes it more difficult to determine whether members actually have a strong norm to disagree or challenge the status quo, or instead, whether they simply disagree about many norms including the value of disagreeing and challenging current practices. Intel's and Aligent's cultures are strong but they are less distinctive because of the variation in behaviors that correspond to the norms of constructive confrontation and questioning the status quo.

These examples suggest that differentiating between behavioral uniformity and conformity can provide deeper insight into strong situations. Conformity consists of bringing different people's interests into agreement, correspondence, or harmony. In contrast, uniformity

exists when people are not simply in harmony, but identical to one another in terms of interests, attitudes, and behaviors. Thus, while uniformity in behavior cannot exist without conformity, people can, for instance, conform to a norm to be willing to experiment but do so in highly divergent, non-uniform ways (Chatman, 2010). This distinction is important because observers could misinterpret the behavioral variation associated with "challenging the status quo" or "agreeing to disagree" as a sign of a weak culture when in fact the cultural norm itself is strong but the behavioral manifestations of that norm are highly variable.

This insight has two important implications for studying organizational culture. First, it suggests that rather than requiring distinctiveness or uniformity, a cultural norm can be deemed strong simply if members interpret it similarly and conform to it regularly – even if conforming takes the form of divergent behaviors. Second, it suggests that assessments of organizational culture have conflated norms that generate uniform behaviors with norms to which members conform but which generate non-uniform behaviors. Equating these two types of norms leads to erroneous conclusions about whether the culture is strong or weak. Thus, the distinction between culture content and strength is essential for accurately understanding an organization's culture. We turn next to a more comprehensive definition of culture strength and why this two-part definition is important for theories of organizational culture.

Culture Strength: Consensus <u>and</u> Intensity. Researchers have offered a variety of definitions of culture strength. Those from the industrial-organizational (I/O) psychology tradition define culture strength in terms of the degree of agreement about a specific organizational characteristic across members (e.g., Schneider, Salvaggio, & Subirats, 2002). Researchers have typically focused on one or two culture dimensions such as orientation toward customer service or safety climate (e.g., Luria, 2008; Schneider, 1987). These scholars typically

measure culture or climate strength as the inverse of the variance in questionnaire responses across work groups within companies (e.g., Denison, 1990; Gordon & DiTomaso, 1992). This approach equates culture strength with the extent to which members agree about a particular norm that characterizes their organization.

Though some management scholars have defined culture strength in terms of agreement or, more precisely, consensus versus deviance (e.g., Martin, 1992; Trice & Beyer, 1993), others have also considered intensity. For example, O'Reilly and Chatman (1996: 166) defined a strong culture as one in which "a set of norms and values that are widely shared and strongly held throughout the organization." Measurement has not, however, reflected this dual focus and has instead tended to loosely reflect the intensity aspect of culture strength. For example, Burt Gabbay, Holt, & Moran (1994) and Sørensen (2002) re-analyzed Kotter and Heskett's (1992) landmark study of 207 *Fortune 500* firms. The data set included outsiders' responses to three items that were intended to represent a strong corporate culture, including the extent to which managers in the firm commonly spoke of their company's style or way of doing things; whether the firm had made its values known through a creed or credo and made consistent attempts to get managers to follow them; and the extent to which the focal firm had been managed according to long-standing policies and practices other than those just of the current chief executive officer. As Sørensen (2002: 78) noted, these indicators did not assess norm consensus: "Kotter and Heskett's measurement strategy leads a firm to be characterized as having a strong culture if other actors in its industry associate the firm with a unique and common way of doing things, relative to other firms in the industry…This culture strength variable does not directly measure the extent to which there is consensus within the firm however."

One of the appealing aspects of the management approach as compared to the I/O psychology approach is that it considers the overall profile of cultural norms rather than just assessing one or two aspects of culture. Since culture is multidimensional, omitting important attributes that characterize the organization in appropriately comprehensive and relevant terms is a primary threat to conducting valid culture research (Chatman, 1989). Thus, focusing only on agreement about one norm can lead to errors in estimating how much culture consensus actually exists across multiple relevant norms. This is important because an organization characterized by high consensus on one norm but low consensus on all others is likely quite different than one in which members agree about a comprehensive set of norms that characterize their organization (Caldwell, Chatman, & O'Reilly, 2008). In particular, members would not be as likely to align their behavior around a single shared norm if there was a lack of general consensus across a set of norms due to less overall commitment to the organization (e.g., O'Reilly & Chatman, 1986) and less cohesion among members (e.g., Horne, 2004). Further, it is less likely that members would sanction norm violators if there was only one norm on which they agreed compared to organizations in which consensus existed among a larger system of norms (e.g., Horne, 2001). At the very least, an organization characterized by consensus on only one norm would likely be characterized by unaligned sub-groups (e.g., Boisnier & Chatman, 2003). Therefore, we focus in this study on norm consensus across a comprehensive set of culture norms.

For a culture to be strong, then, organizational members must share a common set of expectations about appropriate or inappropriate attitudes and behaviors and these must, in turn, be consistently valued and reinforced across divisions and management levels (O'Reilly, Chatman, Caldwell, Self, & Lapiz, 2010). In some organizations members exhibit consensus about norms, but no intensity. For example, an organization in which members understand what

top management values but attach no strong approval or disapproval to these beliefs or behaviors can be characterized as having high consensus but low intensity, or a vacuous culture. Alternatively, an organization may exhibit high intensity but no consensus such that some sub-groups care deeply about certain norms that are different from those that are intensely held by other sub-groups. For example, a given norm, such as being detail-oriented, can be positively valued in one group (e.g., manufacturing or accounting) and negatively valued in another (e.g., R&D or strategic planning). Such cultures can be characterized as "warring factions." Thus, a failure to share the central norms or to consistently reinforce them may lead to vacuous norms, conflicting interpretations, or to micro-cultures that exist only within subunits.

We suggest that neither the I/O psychology approach nor the management approach is complete because culture norms vary on two essential dimensions: norm agreement, or the degree of consensus with which norms are shared among members, and norm intensity, or the force with which key norms are held, manifested in the amount of approval or disapproval attached to an expectation. Organizational norms are shared definitions of the way people do, or should, behave and serve as a normative source of social influence (e.g., Miller, Monin, & Prentice, 2000). And, it is only when both intensity around one or two central norms and consensus about a comprehensive set of norms exist that an organization can be characterized as having a strong culture (O'Reilly & Chatman, 1996).

We also suggest that an organization does not have to embrace very many norms intensely to have a culture characterized by high intensity. Typically only one or two central norms characterize strong-culture firms (e.g., O'Reilly, 1989). What is critical is that these norms are so intensely held that members of the organization are willing to tell one another when they

are not living up to a core belief, such that norm enforcement is predictable and consistent (e.g., Bernhard, Fehr, & Fishbacher, 2006; Sherif, Harvey, White, Hood, & Sherif, 1961).

Finally, the distinction between consensus and intensity is related to our previous discussion of culture content and strength in two ways. First, consensus represents a structural property of a norm, and it is possible to consider this aspect of cultural strength without any consideration of the content of the organization's norms; that is, the degree to which a norm is widely shared can be considered separately from its content. Second, norms that are intensely held are likely to emerge as highly salient and identity-defining. Thus, to understand the impact of culture, it is important to distinguish norm content from norm intensity and consensus. A strong culture exists when there is both intensity around one or two key norms and broader consensus about a comprehensive set of norms.

Next we discuss how taking account of the content of a norm for adaptability and the culture's strength, or the combination of intensity with which the adaptability norm is held and the extent to which organizational members agree about a comprehensive set of norms, can resolve previous conceptual and empirical inconsistencies in understanding the relationship between culture and organizational performance.

THE ADAPTABILITY CULTURAL NORM AND ORGANIZATIONAL PERFORMANCE

Researchers have disagreed about how strong cultures affect performance. Some have viewed cultivating a strong culture in which members agree and feel intensity about norms as a potential path to aligning employees with an organization's strategic priorities (e.g., Tushman & O'Reilly, 2002). Consensus and intensity about certain norms increase a group's efficiency and free members to concentrate on non-routine challenges (e.g., Hackman & Wageman, 2005). The

existence of strong group norms and their predictable enforcement can increase a group's felt distinctiveness, commitment, and longevity (e.g., Rucker, Polifroni, Tetlock, & Scott, 2004).

On the other hand, some have been skeptical of the notion that a strong culture boosts performance, particularly in dynamic environments. Most notably, Sørensen (2002) found that strong-culture firms gained an advantage in static environments through greater reliability in bottom-line financial outcomes, but that having a strong culture was associated with less reliable and ultimately weaker financial results when operating in turbulent environments.

Sørensen (2002) theorized that strong cultures lead to consistency in performance by increasing employee consensus and willingness to endorse organizational goals, reducing uncertainty through goal clarity, and increasing motivation. Further, he argued that this social control leads to greater consistency and reliability in performance. But, in volatile environments, those in which technology and macro-economic conditions are changing rapidly, he found that the very consistency that boosted firm performance in static environments appeared to constrain a firm's ability to adapt to new strategic challenges and reduced its performance.

In a more psychologically based version of this perspective, others have argued that strong cultures can induce cognitive and behavioral uniformity among group members (e.g., Nemeth & Staw, 1989; Staw, 2009) because groups tolerate less deviation as cohesion among members intensifies (e.g., Kaplan, Brooks, Shesler, King, & Zaccaro, 2009). Nemeth and Staw (1989) argued that ambiguity is needed to promote the behavioral variation essential for creativity in organizations. If people are free to express any ideas they wish without fear of ridicule or reprisal from other members of their group, they will generate more creative solutions (e.g., Forster, Friedman, Butterbach, & Sassenberg, 2005). Strong norms can induce people to choose to adopt the dominant perspective or at least affirm it in the presence of their peers.

Further, as Nemeth and Staw (1989) note, this tendency may be exacerbated in organizations, where "one of the most significant psychological tendencies is a strain toward uniformity, a tendency for people to agree on some issue or to conform to some behavioral pattern" (p. 175).

This perspective presents organizational researchers with an apparent paradox: strong cultures are at once a coordinating mechanism but they also purportedly limit behavioral variation and this rigidity becomes particularly problematic when competitive environments are dynamic and demand change. At the heart of this paradox lies a limited consideration of the variation in culture content that can occur among strong-culture organizations. Distinguishing between the variations in content among strong-culture organizations could resolve conflicting perspectives about the culture-performance relationship. Next, we examine how organizations in which members agree about the relative importance and unimportance of a larger set of norms, but also intensely embrace a norm emphasizing adaptability, can boost performance in dynamic environments by cultivating non-uniform behavior.

Conforming to an Adaptability Norm: Increasing Behavioral Variation

How might an organization's culture promote variation in behaviors that permit the discovery of new ways of learning and problem solving? One direct way this can occur is through the adoption of norms that promote creativity and adaptability. For instance, Hargadon and Sutton (1997) have described how IDEO, the well-known product design firm, is characterized by strong norms for creativity and implementation that result in the firm being "routinely innovative." Khazanchi, Lewis, and Boyer (2007) make a similar observation, noting that to develop innovation a culture needs to promote both flexibility and control. In a study of 759 firms, Tellis, Prabhu, and Chandy (2009) found that radical innovations were more likely to emerge when an organization's culture had a higher risk tolerance, was future-oriented, and

promoted cannibalizing existing products. Thus, when a culture is characterized by behaviors such as risk taking, a willingness to experiment, taking the initiative, and being fast moving, the strong normative order may promote what appears to outsiders to be non-uniform behaviors— but which actually arises from adherence to a norm that promotes adaptability and learning (e.g., Baer & Frese, 2003; Caldwell & O'Reilly, 2003).

Adaptability is a construct that encompasses innovation but is defined more broadly. Innovation, as typically used, often refers to technical advances in products or processes: conventionally, innovation has been defined as the introduction into an applied setting of something that is new (Caldwell & O'Reilly, 2003). As such, innovation is a narrower construct in that it does not include the broader set of actions required for an organization to adapt to environmental changes. For example, it would be possible for an organization to be "innovative" in terms of product or process, but also fail to adapt. Thus, innovation is more internally driven and concerned with value creation while adaptation is more concerned with a firm's viability and reacting to external market conditions and exogenous change (e.g., Galaskiewicz & Bielefeld, 1998; Moon, Quigley, & Marr, 2012). Indeed, Hannan and Freeman, (1977) conceptualized adaptation as an organization's ability to remain relatively intact through its life cycle (and the life cycle of its relevant population of firms).

Adaptability is, thus, an important cultural variable. In his seminal book, Schein (1985) proposed that culture addresses two fundamental issues confronting organizations: the need to adapt to external changes, and the need to provide internal integration. To promote adaptation, the norms that define an organization's culture need to promote flexibility, risk taking, and experimentation within the firm. Several studies have shown that cultures emphasizing these norms and values can enhance organizational innovation and adaptation in the marketplace

(Bueschgens, Bausch, & Balkin, 2010; Jassawalla & Sashittal, 2002; Khazanchi, Lewis, & Boyer, 2007).

This focus on adaptability may explicitly contradict the argument that culture exerts a homogenizing effect on behavior since behavior associated with divergent thinking and implementing new products or processes may vary dramatically across actors and situations (Goncalo & Duguid, 2012). Further, this may be how organizations derive the purported advantages of strong cultures even in rapidly changing situations (e.g., Flynn & Chatman, 2001). Groups that successfully cultivate adaptability typically permit members to express themselves in wide-ranging behaviors, and this freedom of expression helps groups to fully explore divergent solutions to a problem (e.g., De Dreu & West, 2001). At a psychological level, a cultural focus on adaptability can stimulate novel outcomes by attaching social approval to activities that facilitate group creativity and implementing new ideas (e.g., Chatman, Polzer, Barsade, & Neale, 1998).

Compared to strong-culture organizations emphasizing norms that promote behavioral uniformity, those cultivating adaptability are more likely to recognize environmental volatility and discover alternative routines (e.g., Deshpande, Farley, & Webster, 1993; Gordon & DiTomaso, 1992). They are also more likely to recognize the value of hiring people whose beliefs challenge the organization's dominant mindset (Sutton, 2002). Indeed, the claim that homogeneity engendered by the selection process limits creativity (e.g., Schneider et al., 2002) is dubious because selection processes can also deliberately favor hiring people who are open to new circumstances and diverse (e.g., Flynn & Chatman, 2003). Further, organizations can be ambidextrous, simultaneously competing in mature and emerging technologies and markets, by designating different alignments and cultures across "explore" and "exploit" units (Gupta, Smith,

& Shalley, 2006; O'Reilly & Tushman, 2008). In instances like this, an organization's culture may be strong but characterized by a lack of behavioral uniformity or what some researchers have labeled "contextual ambidexterity" (Gibson & Birkinshaw, 2004).

As our discussion above implies, organizations that emphasize adaptability may perform better in dynamic environments. A consistent focus on behaviors that cultivate trial-and- error experimentation and being opportunistic may promote an organization's ability to take advantage of change over time, even when the environment is changing rapidly. Encouraging risk-taking and divergent behavior could help strong-culture organizations avoid becoming overly reliant on organizational routines and failing to learn, two tendencies that are associated with the performance disadvantages of strong cultures (e.g., Sørensen, 2002; Staw, 2009). Cultivating a strong culture of adaptability may result in better performance than relying on the general heterogeneity in beliefs that would emerge in weaker or fragmented cultures. This is because members of strong cultures focused on adaptability are more likely to recognize that environmental change is always imminent, and yet also remain highly committed to their organization's survival (e.g., Levinthal, 1991; O'Reilly & Chatman, 1986).

Consistent with this logic, several studies have explored how a culture that intensely values adaptability may enhance organizational performance. Khazanchi, Lewis, and Boyer (2007) examined 271 manufacturing plants and found that greater value congruence among members about flexibility and control was associated with faster and more complete implementation of a new process technology. Flexibility encouraged worker empowerment and creativity while control aided in the implementation of the new ideas. Other studies of culture and adaptability have emphasized the seemingly paradoxical need to promote both exploration, or coming up with new product or process ideas and market opportunities, and exploitation, or

implementing those new ideas in order to improve performance inherent in adaptability (e.g.,
Denison, 1990; Gibson & Birkenshaw, 2004; Gordon & DiTomaso, 1992; Jassawalla &
Sashittal, 2002; O'Reilly & Tushman, 2008).

Taken together, we suggest that resolving the inconsistencies in our understanding of the
culture-performance relationship requires deconstructing culture by considering culture content,
consensus, and intensity as distinct constructs. Specifically, we predict that,

> *Hypothesis 1: Organizations whose cultures exhibit high levels of norm consensus and*
> *intensity around a norm of adaptability will perform significantly better over time in*
> *turbulent environments. Specifically, norm consensus and intensity about adaptability*
> *will interact such that firms that are high on both will perform better over time than will*
> *those that are high on norm consensus but low on adaptability intensity, low on norm*
> *consensus and high on adaptability intensity, and low on both norm consensus and*
> *adaptability intensity.*

Deconstructing culture requires conceptual and methodological advances. First, culture
content and strength (consensus and intensity) need to be evaluated by an organization's insiders,
because an intensely held adaptability norm may foster more non-uniform behavior and insiders
are in a better position to understand the meaning of non-uniform behaviors associated with
adaptation than are outsiders. Second, culture strength needs to be objectively assessed across a
comprehensive set of norms. Rather than asking members to report explicitly on the strength of
their culture, which can induce social desirability biases, assessments of consensus and intensity
would ideally be based on objective statistical analyses of consensus about the relative
importance of a comprehensive set of norms. Assessing a comprehensive set of norms will reveal
both members' level of consensus about the tradeoffs that are typically made in their

organization as well as which norms are most intensely held. We adopted these approaches in the study we designed to test our hypothesis, described below.

METHOD

Research Design and Sample

There were three components to our research design. First, we updated the Organizational Culture Profile (OCP) (O'Reilly, et al., 1991) and used it to identify specific dimensions of organizational culture. Second, based on these results we focused on the effects of adaptability as a salient culture dimension. Finally, we investigated the joint effects of a culture that supports adaptability and the overall consensus about the culture on organizational performance. We used informants from companies in the computer hardware and software industries to explore dimensions of culture and test our hypothesis. We focused on companies in these industries because the competitive challenges and the pace of technological advancements make the ability to adapt to technology and market changes particularly important (e.g., O'Reilly & Tushman, 2008).

We used two samples. One set of companies consisted of large publicly traded high-technology firms headquartered in the U.S., and the other set were smaller privately held high-technology firms headquartered in Ireland. We combined the two samples (n=68 firms) to identify the dimensions of organization culture. Since objective performance data were not available for the privately held firms, we tested the overall hypothesis using just the sample of publicly traded U.S.-based firms.

U.S. Firm Sample. We identified 60 firms to participate in this study using the following criteria: The firms were publicly traded, U.S.-headquartered, had their primary operations in the high-technology sector (hardware, software, internet services - SIC 35xx, 36xx, 38xx, 73xx; GIC

Sector 45; S&P Economic Sector 940), and concurrently employed a minimum of 20 alumni from three focal West Coast business schools.

Alumni of these business schools provided culture assessments of their employing organizations using the revised OCP. In fall 2009, we sent prospective informants an email inviting them to participate in an online survey assessing their organization's current culture. We specified that informants' culture assessment responses were confidential and would not be identified to their employers, and that the study results would not identify their organizations by name. We received a total of 835 culture assessments from informants in 54 of the 60 firms, and we included those responses in the factor analysis described below. Eighty-nine percent of the 54 firms are included in the list of the *Fortune 1000,* representing the largest American firms, and collectively they generated 75% of the total revenue from high-technology *Fortune 1000* firms in 2009. Twenty-eight percent of the informants were female and their average tenure with the focal firm was 7.23 years, with 24% having worked at their focal firm for more than 12 years. All had earned a Bachelor's degree or higher and seventy-four percent of informants had earned an MBA.

The period of the study for our hypothesis test was three years from 2009-2011, considered highly volatile for much of the U.S. economy, and particularly for the high-technology sector. For example, the Chicago Board of Options Exchanges' volatility index (VXN) for the tech-heavy NASDAQ sector showed many significant spikes during the period.[2]

Irish Firm Sample. To broaden the sample of organizations used in assessing culture dimensions in technology firms, we invited 22 high-technology firms headquartered in Ireland to

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[2] VXN is the price volatility on 30-day options for NAASDAQ-100 stocks, which included 70% of the firms participating in our study. It measures implied uncertainty about firm's near-term performance in the sector since there is a higher demand for put options when uncertainty rises.

participate in the study. The firms ranged in size from 25 to more than 2,000 employees ($\underline{x}$ = 304.3, s.d. = 480.8) and in age from 7 to 64 years ($\underline{x}$ = 27.1, s.d. = 17.9). We obtained contact information for employees who had been with the firm at least two years from a senior executive from each firm. Of the 229 employees invited to serve as organizational informants (using a similar email as for the U.S. firm sample), 198 (86%) completed the OCP assessment for their firm. Twenty-one percent were female; the average tenure was six years at the focal firm ($\underline{x}$ = 5.89, s.d.= 3.28); 12% had worked at the firm for more than 12 years; and 17% had MBA degrees (72% had BA/BS equivalents or higher). These responses were combined with those from the U.S. sample for exploring the dimensions of culture.

Independent Variables: Assessing Culture Consensus and Adaptability Intensity

We updated the OCP (Chatman, 1991; O'Reilly et al., 1991) to assess culture consensus and the intensity of the adaptability norm in our sample organizations' cultures. The OCP uses a profile comparison approach based on a Q-sort method to provide a quantitative, semi-idiographic assessment of an organization's culture. The OCP consists of 54 norm statements (e.g., fast-moving, being precise) that emerged from a review of academic- and practitioner-oriented writings on culture and were selected to provide a wide-ranging and inclusive set of descriptors (e.g., O'Reilly, et al., 1991). In the two decades since the development of the original OCP item set, a variety of business and environmental factors have affected the salient aspects of organizations' cultures (e.g., Judge & Cable, 2006; Sarros, Gray, Densten, & Cooper, 2005; Sheridan, 1992). Obvious examples include shifts in customer service models (e.g., Berman, 2011) and financial failures (e.g., Gasparino, 2009). Therefore, we modified or replaced 16 of the original items to make the item set more timely, relevant, and comprehensive. We retained the 54-item distribution structure and deleted original items that were highly redundant, did not

discriminate in past research, or did not load clearly on the OCP factor structure, replacing them with new or modified items. We then conducted factor analyses, described below, to identify the underlying culture dimensions measured by the OCP.

The email invitation sent to informants included a link to the online OCP assessment. Informants were presented with a definition of culture ("those things that are valued and rewarded within your company – that is, the pattern of beliefs and expectations shared by members, and their resulting behaviors"). They were then prompted to sort the 54 value statements that are *most characteristic and uncharacteristic of your organization's culture* by assigning them into one of nine categories labeled from 1 = "Most Uncharacteristic" to 9 = "Most Characteristic," placing fewer items in the extreme and more items in the middle categories. (The required distribution was 2-4-6-9-12-9-6-4-2.)

Culture Consensus. We calculated culture consensus as the similarity in relative rankings of the 54 OCP attributes among informants from each firm. We first averaged firm informants' Q-sorts (factor scores generated for each individual respondent) and then compiled them into firm profiles by averaging across informants within each firm. We assessed consensus using a variation of the Spearman-Brown general prophecy formula (Caldwell & O'Reilly, 1990; Chatman, 1991) which indicates how similar each firm member's rankings of the set of items is to the total firm profile, essentially estimating how likely it is that the same profile would emerge if everyone in the firm, rather than this sample, had Q-sorted the OCP items. Twelve of the U.S. firms had too few informants to calculate a meaningful Spearman-Brown coefficient. Of the remaining 42 firms, three were acquired subsequent to our original culture data-collection period (2009), and an additional six had not reported FY2011 performance by the end of our 2011

performance data-collection period (April 2011 for FY2011)[3]. These 33 firms, which we used to test our hypothesis, are well-known with recognizable brands, products, and services, with all but one included in the *Fortune 1000,* and collectively represent 63% of the total 2009 revenues generated by technology related *Fortune 1000* companies. The mean consensus score for the 33 firms with reported FY2011 performance was .40 to .97 ($\underline{x}$=.85, s.d.=.12).

Intensity of the Adaptability Cultural Norm. Consistent with the processes used in developing the original OCP, we conducted a principal components analysis with varimax rotation to derive the factor structure of the revised OCP (n=1033). We began the principal components analysis with all 54 items and eliminated items that loaded on a single-item factor or loaded highly on more than one factor. We derived a seven-factor solution including 43 of the OCP items that explained 43 percent of the total variance. All of the final items loaded above .40 on one factor and had cross-loadings on other factors of less than .30. The seven-factor solution was readily interpretable, consistent with a scree plot. Each factor had an eigenvalue over 1.0. The seven factors were labeled Adaptability, Collaborative, Results-Oriented, Integrity, Customer-Oriented, Detail-Oriented, and Transparency. These factors overlap substantially with the original factor analyses of the OCP (O'Reilly, et al., 1991), with the differences between the old and new dimensions primarily being attributable to the modified items (e.g., customer-oriented, transparency). Table 1 shows the rotated component matrix including each item's factor loadings.

Insert Table 1 Here

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[3] It is worth noting that our analyses of FY2010 financial performance, with fiscal-year reporting periods spanning the same date ranges (06/2010 to 05/2011) resulted in the same pattern of outcomes as for the FY2011 results reported here.

We derived orthogonal factor scores for the seven factors for each informant. Culture profiles for the firms in the final sample were created by averaging the factor scores across informants within each firm on each of the seven factors. Thus, each firm is measured on seven independent attributes of culture. We measured the intensity with which an organization held the adaptability norm by averaging informants' standardized factor score on that dimension within each firm (individual-level: x=0.08, s.d.=0.99, range= -2.45 to 2.36; firm-level: x=0.1, s.d.=0.64, range= -0.86 to 1.51). We used these firm-level measures for all subsequent analyses.

Establishing Construct Validity of the Adaptability Cultural Norm. To assess the construct validity of cultural adaptability we related each firm's cultural prioritization of adaptability to their emphasis on adaptability in their annual reports, and to the change in their research and development investments over the study period. We describe each below.

<u>Emphasis on Adaptability in External Communications</u>. Annual reports provide a rich source of data for text-based content analysis providing clues about the firm's assumptions, beliefs, values, priorities, and intentions (Bowman, 1984; Schein, 1985). We expected firms that differentially value adaptability to mention it more frequently in their 10-K reports. We assessed the number of adaptability-related words that each company included in its fiscal year 2010 10-K report as a measure of the extensiveness of adaptability related communications, using the Linguistic Inquiry and Word Count (LIWC) approach (Tausczik & Pennebaker, 2010). LIWC is a text analysis program used to demonstrate relationships between word use patterns and thought processes, emotional states, intentions, and motives in individuals and groups. We created a defined list of target words and word stems to identify adaptability and synonyms (e.g., adapt*, creat*, novel*, innovat* -- where asterisks * represent a wildcards such that the words creative, creativity, and creativeness would all be recognized). The text from a digital

copy of each company's 10-K report was analyzed using this custom dictionary to count the total number of adaptability-related words used ($\underline{x}$ = 66.34, s.d. = 29.84).

Research and Development Investments. Another way of corroborating an organization's focus on adaptability to changing environmental conditions is to observe the intensity of their efforts to develop new technologies, processes, and products (e.g., Katila & Ahuja, 2002; Cohen, 1995). Therefore, we examined each firm's change in research and development (R&D) expenses. We recorded R&D expenses for fiscal year 2011 ($\underline{x}$= \$2217 MM, s.d.= \$2425 MM) using Compustat North America Financials Annual. In models predicting 2011 R&D expenses, R&D expenses for 2009 were included in the model to measure changes as a function of the intensity of the adaptability norm.

Dependent Variables

Change in Financial Performance. Each firm's total revenue ($\underline{x}$= \$33,915 MM, s.d.= \$43509 MM), net income ($\underline{x}$= \$4705 MM, s.d.= \$6730 MM), and operating cash flow (OCF) ($\underline{x}$= \$6662 MM, s.d.= \$11447 MM) for the 2011 fiscal year (FY2011) were obtained from Compustat North America Financials Annual. We calculated OCF using the same method as Sørensen (2002: 79) ["annual sales less the sum of cost of goods sold, selling, general, and administrative expenses, and the annual change in inventory"]. Taken together, these indicators represent a firm's ability to generate sales and make effective use of resources.

In models predicting financial outcomes, the equivalent 2009 metric was included in the model as we were interested in changes in performance as a function of the adaptability intensity and norm consensus within the culture. We conducted the analyses using both original and logged versions of the dollar-value variables. Since the pattern of results was the same, we report only the original (dollar-value) outcomes.

Control Variables

We controlled for a set of variables that could influence culture and performance. First, even though the sample firms were in the high-technology industry, we identified each firm's sector as software, hardware, or a combination, using SIC codes, from Compustat North America. Firms with SIC 35xx (Industrial and Commercial Machinery and Computers), 36xx (Electrical and Electronic Equipment Except Computers), or 38xx (Instruments and Related Products) were coded as Hardware (variable "SW" = 0), whereas those with SIC 73xx (Business Services) were coded as Software (variable "SW" = 1). To determine whether a company was involved in a mixture of hardware- and software-oriented production, each company's fiscal year 2009 business segments (as reported in the 10-K) were analyzed. Companies that derived more than one-third of their revenue from their non-primary sector (as determined by SIC) were coded as Mixed (variable "HWSW Mix" = 1).

We also controlled for firm size using the log of the number of employees in fiscal year 2009, gathered from Compustat North America. We included two indicators of firm age in our regression equations: number of years since founding and number of years since going public, gathered from company reports and SEC filings; however, we dropped these indicators because they never changed our results and were highly correlated with firm size.

RESULTS

Means, standard deviations, and correlations among study variables are presented in Table 2. Before testing the overall hypothesis, we present the results of the construct validity tests of our culture adaptability measure in Table 3. As expected, the intensity of the adaptability norm is significantly and positively related to both public communications of adaptability in 10-K reports (β=.52, p<.05), and growth in R&D expenditures over the three-year period (β=.18,

p<.01). Interestingly, none of the other six culture dimensions were significantly related to either of these variables.

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To test our overall hypothesis, that intensity of adaptability and consensus about the organization's culture will interact additively in explaining variance in firms' financial growth, we used hierarchical regressions, entering the control variables in the first step, standardized values for the intensity of the adaptability norm and overall consensus about the culture in the second step, and the product of the standardized values for intensity and culture consensus in the third step. Table 4 shows the results of these analyses predicting 2011 net income, 2011 revenue, and 2011 operating cash flow.

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Across the three dependent variables we found that industry type was not related to any of the financial outcome measures. Company size was significantly related to change in 2011 net income (β=.69, p<.01), 2011 revenue (β=.22, p<.05), and 2011 operating cash flow (β=.34, p<.05). Not surprisingly, the amount of 2009 revenue was strongly related to 2011 revenue (β=.77, p<.01) and 2009 cash flow was strongly related to 2011 cash flow (β=.76, p<.01). Firms' 2009 net income was not significantly related to 2011 net income.

As predicted in our hypothesis, neither the main effect of intensity of the adaptability norm nor overall consensus about the culture independently predicted change in 2011 net income (intensity – [β=.11, p>.1]]; consensus [β=.19, p>.1]) or 2011 operating cash flow (intensity – [β=.01, p>.10]; consensus [β=.11, p>.10]). Intensity of the adaptability norm was positively

related to change in 2011 revenue ($\beta=.12$, $p<.05$) but consensus about the culture was not ($\beta=.06$, $p>.10$).

Consistent with our hypothesis, the interaction of intensity of the adaptability norm and overall consensus about the culture was related to the three financial outcome variables. As shown in the final models on Table 4, neither the intensity of the adaptability norm nor consensus was independently related to the financial outcome measures; however the interaction between the two was positively related to 2011 net income ($\beta=.37$, $p<.05$) and 2011 revenue ($\beta=.12$, $p<.05$), and marginally related to 2011 operating cash flow ($\beta=.20$, $p<.10$). Figure 1 shows the shape of these significant interactions, which is similar across the three financial indicators. After controlling for industry, company size, and previous performance, 2011 financial performance was highest when the norm for adaptability was intensely held and there was high consensus about the overall norms comprising the organization's culture, thus supporting our hypothesis. Analysis of the simple slopes generally confirmed this pattern. Both net income and revenue showed similar results. Among firms with high consensus about the culture, those firms with an intense norm for adaptability performed significantly better than did those with a less intense adaptability norm (2011 net income: $t=2.05$, $p<.05$; 2011 revenue: $t=2.25$, $p<.05$). A similar pattern existed, albeit less strong, for operating cash flow; when consensus was high an intense norm for adaptability was associated with higher levels of operating cash flow ($t=1.59$, $p<.10$).

Although not a specific part of our hypothesis, when the consensus was low a different although somewhat weaker pattern emerged. As Figure 1 shows, the slopes for the low consensus firms were all negative. For those firms, performance was lower among those with an

intense norm for adaptability compared to those with a less intense norm. (2011 net income: t=-1.51, p<.10; 2011 revenue: t=-1.54, p<.10; operating cash flow: t=-1.72, p<.05).

DISCUSSION

For some time, researchers have advanced conceptual arguments about how strong group and organizational cultures stifle creativity, innovation, and adaptability (e.g., Goncalo & Staw, 2006; March, 1991; Nemeth & Staw, 1989). Using Kotter and Heskett's (1992) data, Sørensen (2002) showed that strong cultures promoted consistent financial performance in stable periods, but in dynamic environments their performance became less reliable. Our research shows that, in contrast to these earlier claims that strong cultures necessarily boost performance or that they constrain performance by reducing reliability in turbulent environments, there is a third possibility: that a strong culture, characterized by high consensus about a comprehensive set of norms and that intensely emphasizes a norm of adaptability, is positively associated with organizational performance and even financial growth in turbulent environments.

Using an updated version of the Organizational Culture Profile we found support for the hypothesis that organizations whose cultures exhibited higher levels of consensus and intensity around a norm of adaptability performed significantly better over a turbulent three-year period. We demonstrated these effects in the context of the high-technology industry, which is marked by rapid technological change. Thus, by considering both culture strength and content, and developing a more differentiated approach to culture strength, we offer an updated view about the role of strong cultures in organizational performance, one that may explain the lack of consistency in previous research attempting to understand the organizational culture-performance relationship.

We generated these insights by focusing on two conceptual and one methodological contribution to understanding organizational culture. We distinguished culture strength from its content and considered both, in contrast to prior research which has often blurred the two. We also recognized two aspects of culture strength: the degree to which members agree about cultural norms (consensus) and the force or intensity with which certain norms are held.

This approach improves on previous research in two ways. First, compared to research that only considers one or two culture attributes that are presumed to be stronger or more relevant than other norms, we explicitly measured the intensity of the adaptability norm. We also considered members' consensus about the arrangement of a comprehensive set of culture norms, making our culture consensus measure similar to that used in personality research in which the whole person is considered in terms of the idiographic organization of their traits (e.g., Weiss & Adler, 1984). In this case, we captured the whole culture.

In redefining culture strength in terms of consensus and intensity, our analyses generated only one main effect out of six possible. This paucity of main effects is consistent with previous research that has failed to show a strong direct link between organizational culture and firm performance (e.g., Cameron & Freeman, 1991; Sørensen, 2002). The pattern of significant interaction effects in predicting increases in financial performance over the three-year period, however, suggests the need to consider both culture consensus and intensity to understand the relationship between culture strength and culture performance, particularly in turbulent environments. Thus, a second contribution of this study is that it directly assesses consensus and intensity rather than relying on outsider's views of a culture's distinctiveness.

Our main finding, that norm consensus and intensity about adaptability interacted such that firms that were high on both increased their financial performance more over the three-year

period than did those firms characterized by high norm consensus but low adaptability intensity, low norm consensus and high adaptability intensity, and low norm consensus and low adaptability intensity, was confirmed and suggests two revised interpretations of past research. First, Sørensen's (2002) finding that having a strong culture led to less reliable performance in turbulent environments can be reinterpreted. Since Kotter and Heskett's (1992) data set was likely comprised of a subset of strong-culture firms with norms that emphasized uniform behavior and also a subset that emphasized strong norms associated with non-uniform behavior such as adaptability, the two subsets of strong-culture organizations likely varied significantly in their performance. And, since the content of cultural norms was not assessed, the ability to gain insight into the role of culture in affecting performance is reduced in these studies. Interestingly, although Sørensen did not mention it, Kotter and Heskett (1992) acknowledged that a number of the strong culture organizations in their sample did emphasize adaptability, concluding: "Our research shows that even contextually or strategically appropriate cultures will not promote excellent performance over long periods unless they contain norms and values that help firms adapt to a changing environment." (p. 142). Our findings underscore the importance of explicitly assessing the culture content of strong culture firms.

Second, Kotter and Heskett's data set relied on outside observers to assess focal firms' cultures. Since the outward manifestation of an intensely held adaptability norm could be a lack of behavioral uniformity, outside observers may have been particularly susceptible to errors in determining if non-uniform behavior is a sign of a weak culture or, instead, an intensely held norm of adaptability. Future research should investigate directly whether insiders and outsiders perceive a culture that emphasizes adaptability less similarly than one which emphasizes other norms.

In addition to reinterpreting past research, two novel findings arose from parsing culture into the three dimensions of content, intensity, and consensus. First, though our prediction was supported regarding the combination of high consensus and high adaptability intensity resulting in the greatest performance growth over the three-year period, we did not make specific predictions regarding which combination of these culture strength dimensions would result in the *least* performance growth. A symmetrical logic would suggest that the lowest growth should correspond to lower adaptability intensity and lower consensus in the culture (a "weak" culture). But our findings suggested that culture consensus was a critical moderator of the relationship between adaptability intensity and financial growth such that across the three financial indicators, lower culture consensus decreased performance in firms that emphasized *higher* adaptability rather than lower adaptability. This suggests that intensity about adaptability, in the context of lower consensus about culture more generally, results in less growth. It is possible that this result emerged because a broader lack of consensus resulted in uncoordinated attempts within some firms to adapt to changing circumstances. Future research might design specific studies to better understand the theoretical underpinnings of the consequences of cultures characterized by lower overall consensus and high intensity about adaptability.

Second, we found some evidence that firms that had less intensity about adaptability were not as affected in their performance over the study period by the overall level of consensus in their culture. This suggests that culture agreement may matter less for firms that de-emphasize adaptability, possibly because conformity to a set of norms may serve as an organizing framework helping an organization avoid devolving into anarchy when adaptability and the associated non-uniform behaviors are intensely embraced. Future research might examine the

extent to which this pattern is the same for firms characterized by other culture content dimensions.

Implications of the Adaptability Norm

Adaptability is a particularly intriguing cultural norm because of its implications for conformity versus uniformity in behavior. Specifically, adaptability may "protect" firms that have high levels of consensus about their culture across a broad set of attributes from becoming overly-inertial and relying on common routines that prevent it from identifying and adapting to environmental changes. Thus, cultures characterized by high levels of consensus, a typical way that culture strength has been defined and tested, can constrain financial growth or promote it, depending on the content of the norms that are intensely held. A culture characterized by an intense focus on adaptability, in the present study, was associated with specific behavioral norms like being willing to experiment, being innovative, being quick to take advantage of opportunities, risk taking, initiative, and fast moving. Taken together, these behaviors are likely associated with less uniformity in behavior and yet, the high consensus in culture increases coordination among the less uniform behaviors such that members are still aligning their non-uniform behaviors with their organization's overall strategic objectives.

With regard to construct validity, organizations in which the adaptability norm was more intensely held were also more likely to mention innovation-related words and concepts in their 10-K reports one year later, and had significantly increased their R&D investments a year later. The varying nature of these two indicators points to the breadth of potential manifestations of the adaptability norm. For example, R&D spending is distant both in concept and measurement from the adaptability norm, especially given that it is typically determined by many factors (e.g.,

Teece, Pisano, & Shuen, 1997). Future research might explore other manifestations of adaptability particularly at the individual level (e.g., Staw & Boettger, 1990).

Limitations and Future Directions

We intentionally focused on a single industry in this study to hold constant a number of potential alternative hypotheses and, importantly, conduct a specific test of how strong-culture firms perform as they face a similarly turbulent environment. As we noted, the data collection period was volatile economically as well as technologically. Though this period offered a relevant test of our hypothesis, overall history effects may have influenced the extent to which the adaptability norm was related to subsequent performance, suggesting that an even longer time horizon could be useful. Further, previous research has shown that organizational culture content is more similar within an industry than between industries (e.g., Christensen & Gordon, 1999; Siew & Yu, 2004). Thus, including firms from just one industry may reduce the range on culture content and – especially important for this study – the extent to which adaptability relates to performance. In this way, future research might undertake analyses of additional industries to see if the present findings generalize.

One of the strengths of the OCP approach is that consensus and intensity are determined objectively. That said it would be interesting to understand the extent to which objective estimates of culture strength correlate with subjective assessments of strength (e.g., asking informants directly about consensus and intensity).

Finally, future research might work to uncover the sources of cultures that embrace adaptability. Given the apparent performance advantages of emphasizing the adaptability norm in the context of high cultural consensus, understanding how and when adaptability emerges

would be useful. Sources such as CEO personality, founding principles (e.g., Baron, Hannan & Burton, 2001) and key organizational events may be worth investigating.

Conclusion

This study offers evidence that a strong culture is not necessarily a disadvantage in turbulent environments. Instead, whether culture strength is an advantage or disadvantage depends on both the content and strength of the culture. Firms with higher levels of consensus across many norms, as well as an intensive emphasis on adaptability which may promote conformity without the inertial effects of uniformity, performed better financially over a volatile three-year period.

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Table 1

Factor Analysis - Rotated Component Matrix

	Components (Factors)						
Factor Number:	1	2	3	4	5	6	7
Factor Name:	Adaptability*	Collaborative	Results-Oriented	Integrity	Customer-Oriented	Detail-Oriented	Transparency
Variance Accounted for:	9.3%	8.3%	7.0%	6.0%	5.0%	4.4%	3.2%
Predictability	0.63	(0.05)	(0.19)	(0.09)	0.05	(0.03)	0.00
Being Innovative	(0.61)	0.05	(0.06)	0.10	0.08	0.01	(0.10)
Being Quick to Take Advantage of Opportunities	(0.51)	(0.17)	0.12	(0.26)	0.17	(0.15)	(0.00)
Being Willing to Experiment	(0.63)	(0.03)	(0.21)	(0.09)	(0.05)	(0.10)	0.04
Risk Taking	(0.66)	(0.23)	0.01	(0.10)	(0.02)	(0.13)	(0.03)
Being Careful	0.66	0.01	(0.29)	(0.12)	(0.05)	0.13	(0.11)
Taking Initiative	(0.50)	(0.05)	0.17	(0.07)	(0.08)	(0.00)	0.07
Fast-moving	(0.54)	(0.16)	0.18	(0.33)	(0.18)	(0.11)	(0.06)
Avoiding Conflict	0.44	0.37	(0.23)	(0.15)	(0.14)	(0.14)	(0.16)
Making Your Numbers	0.48	(0.22)	0.35	(0.09)	0.20	(0.19)	0.08
Being Team Oriented	0.04	0.66	0.00	0.06	0.05	0.04	(0.08)
Being Supportive	0.10	0.48	(0.30)	0.12	(0.02)	(0.03)	0.01
Being Aggressive	(0.12)	(0.62)	0.21	(0.26)	(0.10)	(0.10)	(0.12)
Confronting Conflict Directly	(0.17)	(0.51)	0.11	(0.01)	(0.09)	0.18	0.15
Cooperative	0.08	0.59	(0.19)	0.03	(0.08)	(0.11)	(0.05)
High Levels of Conflict	0.18	(0.59)	0.02	(0.37)	(0.14)	(0.03)	(0.00)
Working in Collaboration with Others	(0.02)	0.69	(0.04)	(0.03)	0.08	0.01	0.07
Being Competitive	0.03	(0.41)	0.31	(0.15)	0.11	(0.06)	(0.16)
Being Easy Going	0.22	0.34	(0.52)	(0.08)	(0.18)	(0.12)	(0.14)
Being Calm	0.36	0.25	(0.46)	(0.04)	(0.08)	(0.20)	(0.05)
Action Oriented	(0.19)	(0.11)	0.45	(0.14)	(0.26)	(0.05)	(0.15)
Achievement Oriented	0.10	(0.13)	0.51	(0.05)	(0.14)	(0.10)	(0.05)
Having High Expectations for Performance	(0.16)	(0.07)	0.57	(0.08)	0.01	0.08	0.06
Being Results Driven	0.11	(0.12)	0.63	(0.08)	0.07	0.01	0.05
Having High Ethical Standards	0.10	0.19	(0.12)	0.75	0.08	(0.06)	(0.00)
Being Honest	(0.03)	0.05	(0.07)	0.72	(0.04)	(0.04)	(0.03)
Having Integrity	0.05	0.17	(0.03)	0.78	0.04	(0.05)	(0.00)
Listening to Customers	0.04	0.08	0.01	0.06	0.76	(0.00)	(0.07)
Being Customer Oriented	(0.05)	0.09	(0.03)	0.05	0.77	(0.03)	(0.05)
Being Market Driven	0.14	(0.10)	0.21	(0.16)	0.51	(0.29)	(0.08)
Being Analytical	0.12	0.02	0.10	(0.10)	(0.26)	0.49	0.10
Paying Attention to Detail	0.10	(0.04)	0.01	(0.04)	(0.09)	0.68	(0.11)
Being Precise	0.28	(0.20)	(0.11)	(0.13)	(0.13)	0.52	(0.03)
Emphasizing Quality	0.02	0.01	(0.16)	0.09	0.28	0.51	(0.16)
Sharing Information Freely	(0.09)	0.36	0.01	0.15	(0.06)	(0.08)	0.45
Individual Goals Are Transparent	0.15	(0.09)	0.03	0.07	(0.15)	0.04	0.57
Putting Org's Goals Before Unit's Goals	0.08	(0.05)	(0.14)	(0.16)	0.01	(0.10)	0.58
Being Tolerant	0.23	0.29	(0.36)	0.18	(0.19)	(0.28)	(0.19)
Being Reflective	0.14	0.04	(0.39)	(0.11)	(0.02)	0.12	0.15
Security of Employment	0.11	(0.02)	(0.31)	0.09	(0.21)	0.01	(0.28)
Urgency	(0.20)	(0.23)	0.33	(0.28)	(0.25)	(0.11)	(0.16)
Learning from Mistakes	(0.27)	0.02	0.04	0.12	0.12	0.37	0.24
What You Know Matters More Than Who You Know	(0.16)	(0.02)	0.08	0.25	(0.11)	0.17	0.24

* Note: Items for the factor Adaptability were reverse-scored after factor scores were computed to make interpretation more straightforward.

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 8 iterations.

Table 2

Means, Standard Deviations, and Correlations among Study Variables[a]

	Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	Software																					
	0 = Hardware	55%																				
	1 = Software	45%																				
2	HWSW Mix			-0.65 **																		
	0 = Not Mixed	42%																				
	1 = Mixed	58%																				
3	Log Employees FY 2009	9.92	1.41	-0.08	0.17																	
4	Culture: Adaptability	0.16	0.65	-0.23	0.19	0.16																
5	Culture: Collaboration	-0.05	0.62	0.32 *	-0.35 *	0.03	-0.17															
6	Culture: Results	-0.03	0.59	-0.08	0.20	0.15	-0.16	-0.19														
7	Culture: Integrity	0.06	0.56	-0.18	-0.03	0.25	-0.08	0.22	-0.25													
8	Culture: Customer	0.00	0.57	-0.07	0.10	0.25	-0.09	0.09	0.05	0.08												
9	Culture: Detail	0.11	0.63	0.04	0.09	-0.15	-0.03	-0.28	-0.07	-0.06	-0.14											
10	Culture: Transparency	-0.10	0.55	0.06	0.07	-0.09	-0.21	-0.13	-0.10	0.09	-0.11	0.26										
11	OCP Reliability	84.83	11.64	0.08	0.13	0.05	-0.02	0.13	0.14	0.10	-0.20	-0.17	0.22									
12	Adaptability Words in 10-K	66.34	29.84	-0.06	0.28	0.07	0.50 **	-0.22	0.22	-0.30	-0.14	0.04	-0.17	0.22								
13	R&D FY 2009	1,652	1,883	0.06	0.14	0.62 **	0.08	-0.15	0.24	0.16	0.12	-0.09	-0.11	0.27	0.20							
14	R&D FY 2011	2,217	2,425	0.01	0.14	0.63 **	0.19	-0.16	0.25	0.23	0.14	-0.14	-0.06	0.27	0.28	0.96 **						
15	Net Income FY 2009	2,716	4,537	-0.11	0.16	0.65 **	0.25	-0.03	0.27	-0.07	0.23	0.00	-0.13	0.08	0.24	0.36 *	0.37 *					
16	Net Income FY 2011	4,705	6,730	-0.02	0.17	0.60 **	0.19	-0.09	0.20	0.19	0.05	0.06	-0.20	0.23	0.19	0.74 **	0.75 **	0.46 **				
17	Revenue FY 2009	24,338	37,634	-0.03	0.14	0.83 **	-0.02	0.05	0.39 *	0.15	0.30	-0.09	-0.03	0.04	0.13	0.49 **	0.48 **	0.68 **	0.56 **			
18	Revenue FY 2011	33,915	43,509	-0.06	0.22	0.87 **	0.10	0.03	0.35 *	0.16	0.27	-0.13	-0.07	0.11	0.14	0.51 **	0.53 **	0.69 **	0.71 **	0.96 **		
19	OCF FY 2009	3,553	6,696	0.20	0.23	0.65 **	0.15	0.02	0.27	-0.05	0.14	-0.01	-0.18	0.15	0.23	0.45 **	0.41 *	0.61 **	0.56 **	0.79 **	0.79 **	
20	OCF FY 2011	6,662	11,447	-0.06	0.34	0.73 **	0.17	-0.01	0.15	0.06	0.12	-0.02	-0.16	0.23	0.24	0.45 *	0.49 **	0.60 **	0.73 **	0.77 **	0.87 **	0.84 **

† p<0.10

* p<0.05

** p<0.01

[a] Financial variables are stated in millions (USD).

Table 3

Equations Establishing Adaptability Norm Construct Validity[a]

Variable \ Step	Adaptability Words in 10-K		R&D Expenditures FY 2011	
	1	2	1	2
Software	0.34	0.46	-0.09	-0.07
HWSW Mix	0.54 †	0.55	-0.12 †	-0.17 **
Log Employees FY 2009	-0.04	-0.11	0.06	0.05
R&D FY 2009			0.95 **	0.94 **
Culture: Adaptability		0.52 *		0.18 **
Culture: Collaboration		0.08		-0.03
Culture: Results		0.25		0.05
Culture: Integrity		0.05		-0.02
Culture: Customer		-0.15		0.03
Culture: Detail		-0.03		-0.02
Culture: Transparency		-0.17		0.08 †
r^2	0.12	0.45	0.94	0.97
r^2 change		0.32		0.03
F change		1.75		3.02 *
F-ratio	1.32	1.70	109.40 **	61.09
D.f.	3, 37	10, 30	4, 28	11, 21

† p<0.10
* p<0.05
** p<0.01
[a] Entries represent standardized coefficients.

Table 4

Equations Predicting Financial Performance[a]

Variable \ Step	Net Income FY 2011			Revenue FY 2011			OCF FY 2011		
	1	2	3	1	2	3	1	2	3
Software	0.11	0.07	0.01	0.06	0.05	0.03	-0.29	-0.30	-0.34 *
HWSW Mix	0.10	0.01	0.02	0.10	0.06	0.07	-0.14	-0.17	-0.18
Log Employees FY 2009	0.51 **	0.52 **	0.69 **	0.17	0.12	0.22 *	0.27 *	0.26 *	0.34 *
Net Income FY 2009	0.14	0.10	-0.02						
Revenue FY 2009				0.80 **	0.85 **	0.77 **			
OCF FY 2009							0.76 **	0.76 **	0.76 **
Culture: Adaptability		0.11	-0.02		0.12 *	0.05		0.01	0.13
OCP Reliability		0.19	0.24		0.06	0.08		0.11	-0.07
Intx: Adapt. * OCP Rely.			0.37 *			0.12 *			0.20 †
r^2	0.39	0.43	0.53	0.93	0.95	0.96	0.79	0.80	0.83
r^2 change		0.05	0.10		0.02	0.01		0.01	0.03
F change		1.04	4.85 *		4.08 **	5.30 **		0.74	3.79 †
F-ratio	4.45 **	3.32 **	3.96 **	95.21 **	78.82 **	79.49 **	25.94 **	17.21 **	16.94 **
D.f.	4, 28	6, 26	7, 25	4, 28	6, 26	7, 25	4, 27	6, 25	7, 24

† $p < 0.10$

* $p < 0.05$

** $p < 0.01$

[a] Entries represent standardized coefficients.

Figure 1

Graphed Interactions Predicting Financial Performance

Net Income FY 2011

Revenue FY 2011

Operating Cash Flow FY 2011