

This article was downloaded by: [Levi Nieminen]

On: 14 September 2012, At: 12:36

Publisher: Psychology Press

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



## European Journal of Work and Organizational Psychology

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/pewo20>

### Diagnosing organizational cultures: A conceptual and empirical review of culture effectiveness surveys

Daniel Denison<sup>a</sup>, Levi Nieminen<sup>b</sup> & Lindsey Kotrba<sup>b</sup>

<sup>a</sup> International Institute for Management Development, Lausanne, Switzerland

<sup>b</sup> Denison Consulting, Ann Arbor, MI, USA

Version of record first published: 28 Aug 2012.

To cite this article: Daniel Denison, Levi Nieminen & Lindsey Kotrba ( ): Diagnosing organizational cultures: A conceptual and empirical review of culture effectiveness surveys, *European Journal of Work and Organizational Psychology*, DOI:10.1080/1359432X.2012.713173

To link to this article: <http://dx.doi.org/10.1080/1359432X.2012.713173>



PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.tandfonline.com/page/terms-and-conditions>

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae, and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

## Diagnosing organizational cultures: A conceptual and empirical review of culture effectiveness surveys

Daniel Denison<sup>1</sup>, Levi Nieminen<sup>2</sup>, and Lindsey Kotrba<sup>2</sup>

<sup>1</sup>International Institute for Management Development, Lausanne, Switzerland

<sup>2</sup>Denison Consulting, Ann Arbor, MI, USA

This review traces the development of survey research methods within the organizational culture tradition and focuses specifically on those instruments that measure the aspects of culture that are related to organizational effectiveness. Our review suggests that the reliability and validity of most instruments in this category is quite limited. This review outlines the recommended logic for the development and validation of culture effectiveness surveys and identifies three key challenges for future culture researchers to address: (1) the confirmatory testing of nested models, (2) the guidelines for aggregating data to the organizational level, and (3) the establishing of criterion-related validity. Using data from the Denison Organizational Culture Survey, we present an empirical illustration of the three challenges identified above and conclude by considering limitations and opportunities for future research.

**Keywords:** Cross-level analysis; Organizational culture; Organizational effectiveness; Scale validation; Survey.

Since the early days of organizational culture research, scholars interested in the impact of culture on organizational effectiveness have faced a dilemma: Case studies and theoretical models are plentiful, but many of the core measurement issues required to do comparative research on culture and effectiveness have remained relatively undeveloped. Nonetheless, over the past decade the number of instruments has grown significantly (Jung et al., 2009), and research on the link between culture and effectiveness has continued to develop (Hartnell, Ou, & Kinicki, 2011; Lim, 1995; Siehl & Martin, 1990; Wilderom, Glunk, & Maslowski, 2000). In a recent review, Sackmann (2011) identified 55 empirical studies, 45 of which had been published during the last decade. Importantly, the review also traces growing evidence supporting the direct effects of organizational culture on organization-level financial performance and effectiveness.

Given the progress that has occurred in the culture-effectiveness domain and with no signs of declining interest for the foreseeable future (Ashkanasy,

Wilderom, & Peterson, 2011; Sackmann, 2011), it is crucial that methodological research keeps pace with the field's substantive development. The goals of this study were to closely examine the set of instruments that have been advanced to better understand the culture-effectiveness relationship and to highlight the key issues and gaps in the research that has been conducted to establish their reliability and validity. Accordingly, our focus in this study was on *effectiveness profiling* instruments. By assessing facets of culture directly linked to organizational effectiveness outcomes, surveys of this type are the most direct, diagnostic assessments of organizational culture. However, prior reviews suggest that relatively little attention has been paid to their systematic evaluation (Ashkanasy, Broadfoot, & Falkus, 2000). It is critically important that this limitation be addressed in order to clarify the current state of measurement in the culture-effectiveness domain, as well as to clarify the appropriate set of methodological considerations that future studies should attempt to satisfy.

---

Please address all correspondence to Daniel Denison, International Institute for Management Development, Chemin de Bellerive, 23, Lausanne, Switzerland 1001. Email: denison@imd.ch

The authors gratefully acknowledge the support for this work provided by IMD Business School in Lausanne, Switzerland and by Denison Consulting in Ann Arbor, MI, USA.

This article begins by presenting an overview of the use of survey instruments within the organizational culture research tradition and examines the role of surveys in the investigation of the link between organizational culture and effectiveness. Next, we summarize the conclusions of several key methodological reviews and provide an update, focusing specifically on effectiveness profiling surveys. Based on our update, we identify and describe several key considerations that must be addressed in the validation process: (1) the confirmatory testing of nested models, (2) the guidelines for aggregating data to the organizational level, and (3) the establishing of criterion-related validity. The final section provides an empirical illustration of our approach to each of these challenges using archival data from the Denison Organizational Culture Survey.

### MEASURING THE CHARACTERISTICS OF ORGANIZATIONAL CULTURES

*Organizational* culture was first described by Elliott Jaques in his 1951 book, *The Changing Culture of a Factory*. Jacques invoked *culture*—described as informal social structures—as a way to explain the failure of formal policies and procedures to resolve the unproductive dynamic between managers and employees at the Glacier Metal Company. Andrew Pettigrew (1979) reintroduced the concept to the field by pointing to culture as the “social tissue” that contributes to collective sense making in organizations (p. 574). Informal social structures and collective sense making are still reflected in modern definitions of organizational culture. Schein’s (1992) definition of culture is probably the most widely accepted, but nearly all organizational scholars agree that the core content includes the values, beliefs, and assumptions that are held by the members of an organization and the way in which they guide behaviour and facilitate shared meaning (Alvesson, 2011; Denison, 1996; Smircich, 1983). The potential for multiple cultures (or *subcultures*) within a single organization is also generally acknowledged in definitions (Martin, 1992; Martin & Meyerson, 1988).

Measurement perspectives on organizational culture have evolved greatly over time. Early scholarship reflected the anthropological origins of the culture concept and therefore emphasized qualitative, ethnographic research methods (Rousseau, 1990). Similarly, culture was conceptualized mainly from an emic perspective, in which cultures are viewed as unique, rather than etic perspective, in which cultures are viewed as comparable. Hence, the historical and epistemological forces guiding early scholarship mainly discounted the possibility that organizational cultures could be studied within a nomothetic

framework using standardized survey instruments (Martin & Frost, 1996; Martin, Frost, & O’Neill, 2006; Trice & Beyer, 1993). The culture–climate “debate” also shaped researchers’ thinking about the appropriateness of surveys, with methodological preference seen as one factor in differentiating culture, as a *qualitative* tradition, from climate, as a *quantitative* tradition (Denison, 1996; Ostroff, Kinicki, & Tamkins, 2003).

More recently, these “culture wars” have given way to a more eclectic, multi-method perspective among culture researchers (Ashkanasy et al., 2011; Hofstede, Neuijen, Ohayv, & Sanders, 1990; Ostroff et al., 2003; Rousseau, 1990; Sackmann, 2006). For comparative research, surveys most often provide the foundation for quantitative assessment and cross-organization comparison (Xenikou & Furnham, 1996). Additionally, surveys are less resource intensive than clinical or ethnographic methods, can provide normative information about an organization’s culture, facilitate the benchmarking and organizational change process, and allow for direct replication (Ashkanasy et al., 2000; Cooke & Rousseau, 1988; Tucker, McCoy, & Evans, 1990).

Researchers have generally acknowledged two main limitations of survey methodologies: their inability to access “deeper” cultural elements such as symbolic meaning, semiotics, and fundamental assumptions (Rousseau, 1990; Schein, 1992; Smircich, 1983; Van Maanen, 1988), and their use of a priori content—predefined, standardized questions—which may fail to capture the most relevant aspects of culture in a given situation. In addition, the survey approach also assumes that respondents’ perceptions of the culture are meaningful when aggregated to the group level (Sackmann, 2006). Thus, culture surveys are most appropriate when the focus is on the “observable and measurable manifestations of culture”, such as values and behavioural norms, and when the research purpose calls for making comparisons across organizations using the same set of culture concepts (Ashkanasy et al., 2000, p. 132). In her review, Sackmann (2011) describes how the wide variety of survey instruments used makes it difficult to establish clear patterns across studies, instead creating “a rather broad and colorful picture of the link between different culture dimensions and performance measures” (p. 196). This diversity is a healthy form of pluralism, but it also represents several challenges.

### Theoretical diversity: the wide-ranging content of organizational culture

Most culture surveys assess specific behavioural norms and values to characterize an organization’s culture (Ashkanasy et al., 2000). These specific norms

and values are grouped into meaningful themes or *dimensions*, and often integrated into a model that describes the interrelationship among those dimensions. But surveys differ significantly in their nominal categorizations of the content of culture. Ott (1989) revealed 74 unique dimensions, and van der Post, de Coning, and Smit (1997) identified 114! Beyond the superficial differences in labelling, several studies have sought to determine the conceptual overlap of culture dimensions across surveys (Delobbe, Haccoun, & Vandenberghe, 2002; Detert, Schroeder, & Mauriel, 2000; Ginevičius & Vaitkūnaitė, 2006; Xenikou & Furnham, 1996).

For example, Xenikou and Furnham (1996) used a quantitative approach to test the convergent validity of the dimensions of the Organizational Culture Inventory (OCI; Cooke & Lafferty, 1989), the Culture Gap Survey (Kilman & Saxton, 1983), the Organizational Beliefs Questionnaire (OBQ; Sashkin, 1984), and the Corporate Culture Survey (Glaser, 1983). Their findings showed that the 30 dimensions clustered into six factors. Detert et al. (2000) expanded on this study by examining the dimensional overlap among 25 culture frameworks. The resulting model included eight broadly defined themes. These studies provide support for the idea that the dimensions assessed by different culture surveys can often be described in terms of a simpler set of higher order culture dimensions. Higher order frameworks seem particularly useful in light of the difficulty of accumulating research findings based on different survey instruments (Sackman, 2011). Xenikou and Furnham also suggest that the broad themes identified in their research may provide a useful basis for developing new scales. Ashkanasy et al. (2000) describe some of the tradeoffs between simple and more complex models.

One possible solution to this dilemma may be the use of “nested” factor structures, in which survey results are interpretable at more than one level of specificity. First-order dimensions can be specific enough to facilitate clear statements about behavioural norms and values, whereas the higher order factors are broad enough to allow conceptual linkages to other instruments and theoretical models. Examples of culture surveys with a nested structure include Cooke and Lafferty’s (1989) OCI, Woodcock and Francis’s (1989) Organizational Values Questionnaire, and the Denison Organizational Culture Survey (Denison & Neale, 1996).

### The importance of research purpose

Differences in the content of the instruments often reflect the specific purpose of the research (Rousseau, 1990). For example, Ashkanasy et al. (2000) distinguished between *typing* and *profiling* instruments.

Typing instruments categorized organizations into mutually exclusive culture types. For example, the competing values framework identified four types of cultures—clans, adhocracies, hierarchies, and markets (Quinn & Rohrbaugh, 1981). Ashkanasy and his colleagues critiqued the typing approach, arguing that it could lead to overly simplistic, stereotypical views of culture. Furthermore, the proposition that culture types are discrete has not received much empirical support. A recent meta-analysis by Hartnell et al. (2011) demonstrated moderate to strong positive interrelationships among descriptors of culture. These authors concluded that, “the CVF’s culture types in opposite quadrants are not competing or paradoxical. Instead, they coexist and work together” (p. 687).

Consistent with these findings, profiling instruments describe culture using a set of nonorthogonal dimensions within a profile. Organizations can be high or low on each dimension assessed, and the pattern of scores across dimensions provides a complex representation of an organization’s culture. Ashkanasy et al. (2000) identified three types of profiling instruments, each with a unique research purpose. Person–culture fit measures are designed to understand the value congruence between an individual and the organization and better understand how these factors influence individual-level outcomes such as effectiveness and turnover (e.g., O’Reilly, Chatman, & Caldwell, 1991). Descriptive measures focus on differences in organizational cultures without defining the impact that these differences have on organizational effectiveness. Effectiveness instruments capture cultural differences that can help to explain differences in the effectiveness of organizations (Sparrow, 2001).

Descriptive instruments typically focus on the internal reliability and validity of the survey measures. In addition to this form of validity, effectiveness instruments must also demonstrate that the dimensions are linked to organizational effectiveness. Thus, effectiveness measures are generally more focused than descriptive measures, retaining only those dimensions with a strong theoretical or empirical linkage to effectiveness outcomes (Ginevičius & Vaitkūnaitė, 2006; van der Post et al., 1997). Effectiveness instruments are also normative. Purely descriptive instruments may remain value-neutral, but effectiveness instruments must be rooted in a theory of how specific behavioural norms and values lead to higher effectiveness.

### Reliability and validity

Several authors have reviewed the reliability and validity of culture surveys (e.g., Ostroff et al., 2003; Sackmann, 2006; Scott, Mannion, Davies, &

Marshall, 2003; Walker, Symon, & Davies, 1996). Ashkanasy et al. (2000) reviewed a sample of 18 culture surveys, finding that evidence of reliability and validity was generally lacking for most instruments. No evidence was found for 10 of the instruments, and two others reported only minimal support. Only two instruments—the Organizational Culture Profile (O'Reilly et al., 1991) and the OCI (Cooke & Lafferty, 1989)—were supported in all evidence types reviewed. Among the three effectiveness surveys reviewed, two possessed no evidence of reliability or validity and the third possessed minimal evidence. Overall, the most common evidence type was criterion-related validity (available for 33% of surveys) and the least common was consensual validity (available for 22% of surveys).

More recently, Jung et al. (2009) presented a comprehensive review of 70 culture instruments, 48 of which were quantitative survey measures. The results showed that evidence was available for only a minority of the key reliability and validity criteria by which culture survey are evaluated. For example, 60% of all “judgements”—across all surveys reviewed and all evaluative criteria considered—indicated that no statistical analyses could be located, 27% of judgements fell into the marginal or mixed support category, and 13% of all judgements indicated that an adequate level of evidence had been attained. Across all surveys, predictive validity was reported for 54% of surveys, and internal consistency was reported for 46% of surveys. The

least commonly reported type of evidence included test–retest reliability and convergent/discriminant validity. These types of evidence were available for only 10% of surveys.

### LINKING CULTURE AND EFFECTIVENESS: A REVIEW OF EFFECTIVENESS PROFILING MEASURES

For this review, we identified six effectiveness surveys from prior reviews and three additional surveys from our review of the recent literature. Instruments were reviewed according to the criteria of validity described by Jung et al. (2009). Table 1 describes the structure of the nine instruments and summarizes reliability evidence. Table 2 summarizes validity evidence.

This review shows more research evidence for effectiveness instruments than identified by Ashkanasy et al. (2000), but it also points to several problematic trends. Five of nine instruments had little or no research following the initial publication, including the three reviewed by Ashkanasy et al. (i.e., OBQ, Organizational Values Questionnaire, and Organizational Culture Survey or OCS) and two others—the OASIS Culture Questionnaire (Cowherd & Luchs, 1988) and the Organization Assessment Survey (OAS: Usala, 1996a, 1996b). Aside from the two studies we located—one by Muldrow et al. (2002) reporting use of the OAS as part of a culture change

TABLE 1  
Summary of reliability evidence for culture effectiveness profiling instruments

<i>Instrument</i>	<i>Structure</i>	<i>Internal consistency<sup>a</sup></i>	<i>Test–retest</i>	<i>Aggregation</i>
Denison Organizational Culture Survey (Denison & Neale, 1996)	60 items, 12 dimensions, 4 traits	> .70 (Fey & Denison, 2003); .88 to .97 (Gillespie, Denison, Haaland, Smerek, & Neale, 2008)	n/a	Adequate $r_{wg}$ , ICC(1), and ICC(2) (Gillespie et al., 2008)
OASIS Culture Questionnaire (Cowherd & Luchs, 1988)	33 items, 5 dimensions	n/a	n/a	n/a
Organizational Assessment Survey (Usala, 1996a)	100 items, 17 dimensions	n/a	n/a	n/a
Organizational Beliefs Questionnaire (Sashkin, 1984)	50 items, 10 dimensions	.35 to .78 (Xenikou & Furnham, 1996)	n/a	Low within-organization variance (Sashkin & Fulmer, 1985)
Organizational Culture Survey (van der Post et al., 1997)	97 items, 15 dimensions	.79 to .93 (van der Post et al., 1997)	n/a	n/a
Organizational Culture Survey Instrument (Harris & Moran, 1984)	99 items, 7 dimensions	n/a	n/a	n/a
Organizational Values Questionnaire (Woodcock & Francis, 1989)	60 items, 12 values	n/a	n/a	n/a
Questionnaire of Dimensions of Organizational Culture (Ginevičius & Vaitkūnaitė, 2006)	48 items, 12 dimensions	n/a	n/a	n/a
Value Performance Index (Schönborn, 2010)	105 items, 13 dimensions	.71 to .94 (Schönborn, 2010)	n/a	n/a

References shown in italics are unpublished sources. <sup>a</sup>Values shown indicate lower and upper bounds of alphas reported across dimensions or factors.

TABLE 2  
Summary of validity evidence for culture effectiveness profiling instruments

<i>Instrument</i>	<i>Dimensionality</i>	<i>Convergent/discriminant validity</i>	<i>Cross-cultural application</i>	<i>Predictive validity</i>	<i>Sensitivity to change</i>
Denison Organizational Culture Survey (Denison & Neale, 1996)	Factor analytic support for indexes (Bonavia, Gasco, & Tomás, 2009; Fey & Denison, 2003; Taylor, Levy, Boyacigiller, & Beechler, 2008); factor analytic support for second-order model (Gillespie et al., 2008)	Leadership (Block, 2003); commitment (Taylor et al., 2008); knowledge management, org. structure, strategy (Zheng, Yang, & McLean, 2010)	Asia, Australia, Brazil, Japan, Jamaica, and South Africa (Denison, Haaland, & Goelzer, 2003); Russia (Fey & Denison, 2003); Spain (Bonavia et al., 2009)	Longitudinal evidence linking culture to sales and customer satisfaction (Boyce, 2010); cross-sectional with "hard" performance metrics (Denison, 1984; Denison & Mishra, 1995; Gillespie et al., 2008); cross-sectional with perceived effectiveness outcomes (Denison et al., 2003; Fey & Denison, 2003)	Longitudinal study of 95 car dealerships (Boyce, 2010)
OASIS Culture Questionnaire (Cowherd & Luchs, 1988)	n/a	n/a	n/a	Case study demonstrating link between culture gap scores and profitability (Cowherd & Luchs, 1988)	n/a
Organizational Assessment Survey (Usala, 1996a, 1996b)	Factor analytic support (Usala, 1996a, 1996b)	n/a	n/a	n/a	Two case studies demonstrating change over time (Muldrow, Buckley, & Schay, 2002)
Organizational Beliefs Questionnaire (Sashkin, 1984)	n/a	Other culture questionnaires (Xenikou & Furnham, 1996)	n/a	n/a	n/a
Organizational Culture Survey (van der Post et al., 1997)	Factor and content analysis (van der Post et al., 1997)	Job satisfaction, personality (Liebenberg, 2007; Strydom & Roodt, 2006); mentoring (Rieker, 2006)	Australia (Erwee, Lynch, Millett, Smith, & Roodt, 2001)	15/15 dimensions correlated with financial performance composite (van der Post, de Coning, & Smit, 1998)	n/a
Organizational Culture Survey Instrument (Harris & Moran, 1984)	n/a	n/a	n/a	n/a	n/a
Organizational Values Questionnaire (Woodcock & Francis, 1989)	n/a	n/a	n/a	n/a	n/a
Questionnaire of Dimensions of Organizational Culture (Ginevičius & Vaitkūnaitė, 2006)	EFA with little support for dimensional structure (Aydin & Ceylan, 2008, 2009; Ginevičius & Vaitkūnaitė, 2006)	Employee satisfaction (Aydin & Ceylan, 2008; Ginevičius & Vaitkūnaitė, 2006)	n/a	2/4 factors correlate with overall performance index (Ginevičius & Vaitkūnaitė, 2006); 10/10 dimensions correlate with perceived performance composite (Aydin & Ceylan, 2009)	n/a
Value Performance Index (Schönborn, 2010)	EFA to define dimension structure (Schönborn, 2010)	n/a	n/a	7/13 dimensions correlated with dichotomous performance composite (Schönborn, 2010)	n/a

References shown in italics are unpublished.

intervention with two government agencies and the previously described study of the OBC's convergence with other culture surveys (Xenikou & Furnham, 1996)—research interest in these five instruments seems to have halted altogether.

Research interest appears to have been somewhat stronger for the OCS (van der Post et al., 1997). The OCS was developed through an extensive literature review and synthesis of 114 dimensions of culture. A preliminary version of the survey, including 169 items along 15 synthesized dimensions, was administered to 408 employees from eight organizations. Item reliability analyses were used to reduce the total number of items to 97. Factor analysis of these items supported the presence of 15 correlated factors (van der Post et al., 1997). A second study by van der Post et al. (1998) provided evidence of criterion-related validity between the OCS dimensions and financial performance in 49 organizations. Unfortunately, few details regarding the factor analysis, the sampling methods, the number of survey respondents, and the aggregation of culture scores were provided in the second study. Furthermore, this second study relied on two or three managers per organization to provide a representative assessment of the organization's culture.

Four studies have used the OCS since its development. Erwee et al. (2001) used the OCS, which was developed in South Africa, with a sample of 326 managers from the Australian Institute of Management. Based on their analysis of reliability, the authors concluded that the OCS was valid in the Australian context. But an exploratory factor analysis and an alpha coefficient of .99 supported a single-factor solution rather than the 15-factor solution proposed by van der Post et al. (1997). More recent studies by Strydom and Roodt (2006) and Liebenberg (2007) have used the OCS to link employee satisfaction and affect with perceptions of organizational culture. One additional individual-level study by Rieker (2006) linked the OCS dimensions to the quality of formal mentorship relationships in two US Airforce organizations.

Clearly, additional research is needed to establish the validity of the OCS and clarify the number of factors. The high internal consistency and single-factor solution reported by Erwee et al. (2001) call into question whether multiple concepts are indeed measured (Boyle, 1991). The model's predictive validity also requires a larger and more representative sample than that reported by van der Post et al. (1998). The OCS also raises questions about validity at the aggregate level. With the exception of the original study by van der Post et al., none of the other studies assessed organizational culture at the aggregate level. They focused on individuals' perceptions of organizational culture.

Two other instruments reviewed were in early stages of development and validation. The

Questionnaire of Dimensions of Organizational Culture developed by Ginevičius and Vaitkūnaitė (2006) is based on a comprehensive review of the dimensions from other instruments that were correlated with effectiveness outcomes. The authors used the 12 dimensions and 48 items from their review to produce the final instrument. A preliminary factor analysis based on individual respondents from 23 organizations supported a four-factor model, and correlational analyses provided mixed support for the four factors predicting subjective performance ratings and employee satisfaction. Subsequent studies by Aydin and Ceylan (2008, 2009) reported significant positive correlations between overall culture and employee satisfaction, and between dimensions of culture and perceived organizational effectiveness.

The Value Performance Index (VPI; Schönborn, 2010) was constructed to assess the three levels of culture specified by Schein (1992). The initial survey with 135 items was administered to 2873 managers from 46 companies in three European countries. Based on an exploratory factor analysis, 13 dimensions were identified. Correlational analyses demonstrated significant predictive relationships with a dichotomous composite index of financial performance for seven of the 13 dimensions. As with Ginevičius and Vaitkūnaitė's (2006) instrument, the VPI has significant potential as a predictive tool, but also underscores several key challenges that warrant further attention, including the use of individual rather than organization-level analysis and the use of manager-only samples that may not be representative of the total organizations studied.

The final instrument reviewed in our update is the Denison Organizational Culture Survey (DOCS; Denison & Neale, 1996). Based on the amount of research that the DOCS has generated, it is clear that this instrument has advanced well beyond the initial stages of scale development. Reviewing the high volume of unpublished dissertations and technical reports—we count over 30 dissertations alone—is beyond the scope of this manuscript, so we have focused primarily on the published research in our discussion in this article.

## The Denison Organizational Culture Survey

The development of the DOCS occurred in tandem with the development of a theory linking four key cultural traits to organizational effectiveness: involvement, consistency, adaptability, and mission (Denison & Mishra, 1995). These traits, presented in Table 3, grew from a line of research by Denison and colleagues that combined qualitative and quantitative methods to examine the cultural characteristics of high and low performing organizations (Denison, 1984, 1990; Denison et al., 2003;

TABLE 3  
Definitions of culture traits and indexes from the DOCS

---

*Effectiveness traits and corresponding index definitions*

---

**Involvement** concerns the personal engagement of individuals within the organization and reflects a focus on the internal dynamics of the organization and on flexibility.

*Empowerment*—Individuals have the authority, initiative, and ability to manage their own work. This creates a sense of ownership and responsibility towards the organization.

*Team orientation*—Value is placed on working cooperatively towards common goals for which all employees feel mutually accountable. The organization relies on team effort to get work done.

*Capability development*—The organization continually invests in the development of employees' skills in order to stay competitive and meet ongoing business needs.

**Consistency** refers to shared values, and efficient systems and processes and reflects an internal and stable focus.

*Core values*—Members of the organization share a set of values which create a sense of identity and a clear set of expectations.

*Agreement*—Members of the organization are able to reach agreement on critical issues. This includes both the underlying level of agreement and the ability to reconcile differences when they occur.

*Coordination and integration*—Different functions and units of the organization are able to work together well to achieve common goals. Organizational boundaries do not interfere with getting work done.

**Adaptability** refers to employees' ability to understand what the customer wants, to learn new skills, and to change in response to demand. The focus of adaptability is external and flexible.

*Creating change*—The organization is able to create adaptive ways to meet changing needs. It is able to read the business environment, react quickly to current trends, and anticipate future changes.

*Customer focus*—The organization understands and reacts to their customers and anticipates their future needs. It reflects the degree to which the organization is driven by a concern to satisfy their customers.

*Organizational learning*—The organization receives, translates, and interprets signals from the environment into opportunities for encouraging innovation, gaining knowledge, and developing capabilities.

**Mission** refers to an organization's purpose and direction, and reflects a focus external to the organization and on stability.

*Strategic direction and intent*—Clear strategic intentions convey the organization's purpose and make it clear how everyone can contribute and "make their mark" on the industry.

*Goals and objectives*—A clear set of goals and objectives can be linked to the mission, vision, and strategy, and provide everyone with a clear direction in their work.

*Vision*—The organization has a shared view of a desired future state. It embodies core values and captures the hearts and minds of the organization's people, while providing guidance and direction.

---

Denison & Mishra, 1995; Fey & Denison, 2003). These studies support the idea that the highest performing organizations find ways to empower and engage their people (*involvement*), facilitate coordinated actions and promote consistency of behaviours with core business values (*consistency*), translate the demands of the organizational environment into action (*adaptability*), and provide a clear sense of purpose and direction (*mission*).

These four individual characteristics have a long history among organizational researchers interested in the characteristics of high performance organizations (e.g., Katz & Kahn, 1978; Kotter & Heskett, 1992; Lawler, 1986; Mintzberg, 1989; Selznick, 1957; Spreitzer, 1995, 1996). In Denison's model, these traits are organized into a framework that draws on both classic and contemporary theories of the dynamic tensions underlying organizational functioning and effectiveness (Denison & Spreitzer, 1991; Katz & Kahn, 1978; Lawrence & Lorsch, 1967; Parsons, 1951; Quinn & Cameron, 1988). As Schein (1992) has noted, effective organizations need to solve

two problems at the same time: external adaptation and internal integration. The dimensions of stability and flexibility and internal and external focus are used to frame these four concepts in a way that captures how organizations balance these dynamic tensions. For example, *mission* and *consistency* provide support for stability, whereas *adaptability* and *involvement* provide support for flexibility (Denison & Mishra, 1995).

This framework is based on the same dimensions as the competing values framework (CVF) advanced by Quinn and colleagues (Quinn & Cameron, 1988; Quinn & Rohrbaugh, 1981), but maintains a few important differences. One key difference is that the CVF, originally developed as a leadership framework, has led primarily to assessments of culture *types*, in contrast to the DOCS's use of a *profile* approach. This key choice has several implications. The CVF is designed to identify the organizational type, whereas the trait model developed by Denison and colleagues focuses on the *balance* among cultural elements. Their model proposes that it is not only possible for an

organization to display strong internal *and* external values and the capabilities for both stability *and* flexibility, but that the most effective organizations are those that display “full” profiles as indicated by high levels of all four traits (Denison, 1990).

Another important difference is the second-order measurement model. Each trait is assessed by three indexes, each of which operationalizes a specific facet of the trait at the measurable level of manifest behaviours and values. The survey consists of 60 items or five items per index. With the second-order model, information is provided at two levels of abstraction. The indexes are designed to measure 12 understandable and actionable content areas (e.g., team orientation, customer focus, goals and objectives), whereas the traits organize these concepts into broader principles that are portable across organizational contexts and support the theoretical grounding of the model and instrument (Denison & Mishra, 1995).

The link between the culture measures and effectiveness outcomes was central in the early development of the survey. Qualitative research helped focus attention on the cultural characteristics of effective organizations and helped to develop the quantitative measures. The earliest research focused mainly on the *bottom-up* aspects of culture and their connection to bottom-line financial performance metrics (Denison, 1984). These concepts evolved into the *involvement* and *consistency* traits. Further qualitative research helped balance these internal traits, leading to the addition of the externally focused traits of *mission* and *adaptability*. Denison and Mishra (1995) provided the first empirical test of these four traits with data from 764 organizations. This study provided initial evidence of the predictive validity of the four culture traits with a variety of performance indicators and also supported the idea that different cultural traits influence different aspects of effectiveness. Profitability outcomes were strongest in stable cultures with a strong sense of mission and consistency, and growth outcomes were strongest in flexible cultures with high levels of involvement and adaptability. No other effectiveness profile that we could find has established differential prediction of effectiveness outcomes.

More recent studies have demonstrated predictive validity across industry and national boundaries. Gillespie et al. (2008) and Boyce (2010) showed a link to customer satisfaction and sales growth over time among home construction firms and franchise car dealerships. Fey and Denison (2003), Denison et al. (2003), Denison, Lief, and Ward (2004), and Bonavia et al. (2009) examined the survey’s validity with organizational samples from nine countries outside the USA. For example, comparisons between Asian organizations and “the rest of the world” indicated similar mean levels and predictive patterns between the indexes and effectiveness outcomes, although the

authors also provided examples of how the expression of specific values and behaviour can vary somewhat across contexts (Denison et al., 2003). A second study comparing US and Russian organizations demonstrated the importance of all four traits in both contexts but also indicated that flexibility and involvement were more highly correlated with overall perceptions of effectiveness than was mission in the dynamic Russian environment (Fey & Denison, 2003). Together, these studies provide initial evidence that the DOCS has been translated to several other languages and applied with similar support for reliability and validity. Nonetheless, there are of course many unresolved issues regarding application in different national contexts.

Despite the strong empirical support for the validity of this survey there are also a number of “gaps” in the evidence. Several of the studies applied different versions of the current 60-item DOCS (Denison & Mishra, 1995; Fey & Denison, 2003). Gillespie et al. (2008) and Kotrba et al. (2012) have presented the best evidence of the second-order factor solution, providing evidence of a good fit to the data. Several of these studies also used single-respondent samples or manager-only samples (Fey & Denison, 2003; Denison & Mishra, 1995). Although the literature reveals many studies that rely on a small number of respondents (e.g., Birkinshaw, Hood, & Jonsson, 1998; Delaney & Huselid, 1996; Delery & Doty, 1996; Geringer & Hebert, 1989), it raises obvious questions about the representativeness of these samples and cannot capture the level of agreement throughout the organization.

This discussion has identified three key challenges for diagnostic assessments of organizational culture. First, they must pass a psychometric test to make certain that individual respondents can discern the underlying structure proposed by the theory. Second, the respondents within each organization must show a high level of agreement in order to claim that organizational characteristics are being measured. And third, the organizational level characteristics must show a close link to the organizational level outcomes suggested by the model. Next, we evaluate the DOCS with respect to these considerations.

### AN EMPIRICAL ILLUSTRATION OF THE THREE KEY CHALLENGES

This section presents a set of analyses based on data from 160 companies from a variety of industries and geographic locations. These organizations completed the DOCS between 1997 and 2001. The organizations in the sample were generally large, ranging from 10 organizations with more than 200,000 employees to 11 organizations with fewer than 1000 employees.

The annual revenue also varied, ranging from 11 with more than 50 billion US dollars to seven with under 100 million US dollars. A number of smaller private firms were also included. In total, 35,474 individuals completed the DOCS, with at least 25 respondents sampled per organization. Response rates ranged from 48% to 100%, with an average of 60%, well

within the range recommended in the management literature (Baruch, 1999). The specific samples drawn from each organization varied. Some organizations surveyed all members and others surveyed specific divisions, locations, and levels. Table 4 summarizes the organizational characteristics and demographics for individuals in the final sample.

TABLE 4  
Demographic characteristics of organizational and respondent sample

<i>Organizational category</i>	<i>n</i>	<i>% of sample</i>	<i>Demographic category</i>	<i>n</i>	<i>% of sample</i>
<i>Country</i>			<i>Age</i>		
Australia	3	1.9	<20	22	0.1
Canada	5	3.1	20–29	3,006	8.5
France	2	1.3	30–39	8,034	22.6
Germany	4	2.5	40–49	7,680	21.6
Great Britain	8	5.0	50–59	3,650	10.3
India	2	1.3	>60	283	0.8
Japan	5	3.1	No response	12,799	36.1
The Netherlands	2	1.3	<i>Gender</i>		
Norway	1	0.6	Male	14,104	39.8
Sweden	1	0.6	Female	8,369	23.6
Switzerland	8	5.0	No response	13,001	36.6
United States	119	74.4	<i>Educational level</i>		
<i>Industry</i>			High school	2,059	5.8
Basic materials	23	14.4	Some college	3,983	11.2
Consumer cyclical	19	11.9	Associate degree	1,910	5.4
Consumer staples	22	13.8	Bachelor's degree	7,231	20.4
Health care	17	10.6	Some graduate work	1,894	5.3
Energy	1	0.6	Master's degree	4,115	11.6
Financials	17	10.6	Doctoral degree	710	2.0
Capital goods	17	10.6	Other	266	0.7
Technology	25	15.6	No response	13,306	37.5
Pharmaceuticals	1	0.6	<i>Function</i>		
Communication Services	10	6.3	Finance and accounting	2,033	5.7
Utilities	7	4.4	Engineering	1,863	5.3
Transportation	1	0.6	Manufacturing and production	1,928	5.4
<i>Employee population<sup>a</sup></i>			Research and development	1,548	4.4
Fewer than 1000	11	7.2	Sales and marketing	5,083	14.3
1000 to 5000	26	17.0	Purchasing	864	2.4
5001 to 10,000	12	7.8	Human resources	917	2.6
10,001 to 20,000	16	10.5	Administration	1,031	2.9
20,001 to 50,000	30	19.6	Support staff	1,973	5.6
50,001 to 100,000	28	18.3	Professional staff	1,820	5.1
100,001 to 200,000	20	13.1	No response	16,414	46.3
More than 200,000	10	6.5	<i>Organizational level</i>		
<i>Organizational revenue<sup>b</sup></i>			Nonmanagement	9,018	25.4
Under \$100 million	7	5.3	Line management	4,960	14.0
\$100 million–\$1 billion	17	13.0	Middle management	4,765	13.4
\$1 billion–\$5 billion	35	26.7	Senior management	1,031	2.9
\$5 billion–\$10 billion	14	10.7	Executive/Senior Vice President	280	0.8
\$10 billion–\$20 billion	15	11.5	CEO/President	71	0.2
\$20 billion–\$30 billion	18	13.7	Owner	12	0.0
\$30 billion–\$50 billion	14	10.7	No response	15,337	43.2
More than \$50 billion	11	8.4	<i>Years with organization</i>		
			Less than 6 months	1,042	2.9
			6 months to 1 year	1,432	4.0
			1 to 2 years	2,315	6.5
			2 to 4 years	3,093	8.7
			4 to 6 years	2,017	5.7
			6 to 10 years	2,952	8.3
			10 to 15 years	2,998	8.5
			More than 15 years	5,989	16.9
			No response	13,636	38.4

<sup>a</sup>Information on employee population was unavailable for seven organizations. <sup>b</sup>Information on organizational revenue was unavailable for 29 organizations.

Surveys with missing data on any of the 60 items were excluded from this analysis. All items used a 5-point Likert-type scale ranging from 1 = “strongly disagree” to 5 = “strongly agree”. Respondents also rated the organization on the following six dimensions of effectiveness relative to similar companies: sales/revenue growth, market share, profitability/ROA, quality of goods and services, new product development, and employee satisfaction. These items were rated on a 5-point Likert-type scale ranging from 1 = “low performer” to 5 = “high performer”. Although less attractive than objective indicators, past researchers have demonstrated that subjective measures of organizational effectiveness can be useful proxies for objective sales or profitability data (Baer & Frese, 2003; Guthrie, 2001; Wall et al., 2004).

### The confirmatory testing of nested models

We considered two key pieces of evidence to test the nested models. First, we examined the internal consistency of the 12 indexes to determine if the 5-item subsets held as reliable scales. Second, we used confirmatory factor analysis to see if the pattern of relationships between the observed variables and latent traits support the hierarchical structure of the proposed model.

Table 5 presents the results for the first step in the analysis. Alpha coefficients for the indexes ranged from .70 to .85 indicating an acceptable level of internal consistency (Nunnally, 1978). Item-total correlations exceeded .50 for over two-thirds of the 60 items in the survey. Item 15 from the *capability development* index (“Problems often arise because we do not have the skills necessary to do the job”) showed an unusually low item-to-total correlation of .23. This negatively worded item was retained because (1) the alpha coefficient for the index itself still reaches an acceptable level of .70, and (2) the item was judged to have adequate content validity based on its fit with the definition provided for this index. Table 6 presents the correlations between indexes. Values ranged from .45 to .74 with an overall mean correlation of .59.

Next, a second-order confirmatory factor model was tested using the 60 items from the DOCS as observed variables, the 12 indexes as first-order factors, and the four higher order traits as second-order factors. Figure 1 presents the second-order model with the best fit to the data. Item loadings generally fell in the .60 to .75 range, indicating considerable shared variance within those items intended to measure the same underlying concepts. Second-order factor loadings (indexes loading on traits) and intercorrelations range from the low .70s to the mid-.90s, indicating overlap in the variance explained by the first-order factors (indexes) and

TABLE 5  
Alpha coefficients and descriptive statistics for the DOCS

Dimension	Index	Item-total			
		Item correlation	Mean	SD	
Involvement	Empowerment $\alpha = .76$	1	.43	3.94	0.81
		2	.59	3.13	1.01
		3	.57	3.11	1.07
		4	.56	3.24	0.98
		5	.51	3.13	1.04
	Team orientation $\alpha = .82$	6	.56	3.53	1.00
		7	.70	3.47	1.02
		8	.61	3.31	1.06
		9	.63	3.46	1.01
		10	.54	3.24	0.98
	Capability development $\alpha = .70$	11	.43	3.39	1.03
		12	.54	3.31	0.95
		13	.56	3.45	1.05
		14	.56	3.62	.98
		15	.23	3.30	1.08
Consistency	Core values $\alpha = .71$	16	.47	3.13	1.03
		17	.39	3.34	0.94
		18	.61	3.47	1.01
		19	.36	3.74	0.94
		20	.51	3.84	0.92
	Agreement $\alpha = .74$	21	.54	3.42	0.94
		22	.41	3.50	0.94
		23	.60	2.94	0.91
		24	.47	3.09	0.96
		25	.50	3.15	0.97
	Coordination and integration $\alpha = .78$	26	.43	3.22	1.00
27		.60	3.03	1.00	
28		.62	2.70	0.98	
29		.53	3.01	1.08	
Adaptability	Creating change $\alpha = .76$	30	.59	3.20	0.93
		31	.56	2.82	1.04
		32	.53	3.29	0.99
		33	.61	3.37	0.96
		34	.46	2.82	0.99
	Customer focus $\alpha = .74$	35	.48	3.21	0.87
		36	.57	3.34	0.91
		37	.60	3.48	0.93
		38	.49	3.01	1.03
		39	.53	3.44	1.01
	Organizational learning $\alpha = .74$	40	.36	3.57	1.00
		41	.52	3.34	0.98
42		.52	3.04	1.04	
43		.46	2.79	1.08	
Mission	Strategic direction and intent $\alpha = .86$	44	.46	3.73	0.93
		45	.56	2.76	1.02
		46	.70	3.63	0.99
		47	.51	3.24	0.96
		48	.75	3.48	0.96
	Goals and objectives $\alpha = .80$	49	.80	3.44	1.00
		50	.67	3.29	1.15
		51	.60	3.24	0.92
		52	.56	3.38	0.97
		53	.58	3.70	0.86
	Vision $\alpha = .79$	54	.56	3.67	0.91
		55	.60	3.37	0.97
		56	.63	3.05	0.98
57		.65	3.32	1.00	
		58	.41	2.59	0.99
		59	.60	3.02	0.99
		60	.60	3.10	0.93

$N = 35,474$ .

TABLE 6  
Correlation matrix for the indexes of the DOCS

Indexes	1	2	3	4	5	6	7	8	9	10	11
1. Empowerment											
2. Team orientation	.74										
3. Capability development	.64	.66									
4. Core values	.61	.61	.57								
5. Agreement	.63	.65	.61	.64							
6. Coordination and integration	.61	.63	.55	.57	.65						
7. Creating change	.57	.58	.57	.47	.58	.60					
8. Customer focus	.49	.50	.48	.45	.49	.48	.54				
9. Organizational learning	.65	.66	.65	.58	.66	.63	.65	.54			
10. Strategic direction and Intent	.58	.58	.58	.58	.57	.58	.56	.50	.61		
11. Goals and objectives	.61	.61	.59	.60	.60	.61	.57	.52	.63	.74	
12. Vision	.60	.60	.60	.57	.61	.62	.61	.52	.68	.73	.71

$N = 35,474$ . All correlations are statistically significant,  $p < .01$ .

strong relationships between second-order factors. Model fit was evaluated using several fit indices, including RMSEA (Hu & Bentler, 1998), GFI (Jöreskog & Sörbom, 1989), NFI (Bentler & Bonnett, 1980), and CFI (Bentler, 1990). These results are also presented in Figure 1.

In general, these values indicate good fit for the second-order model, with RMSEA, NFI, and CFI values meeting recommended guidelines. GFI was slightly lower than the recommended cutoff, but the collection of indices as a whole suggest that the model closely fits the data. We also tested two alternative models, to confirm that this second-order model provided the best fit. The first alternative model excluded the 12 first-order factors—the culture indexes—so that the 60 items were forced to load directly onto the four latent traits. The second alternative model forced 60 items to load directly onto a single latent factor, eliminating the four culture traits. As shown in Figure 1, both of these alternative models produced a worse fit, indicating that the second-order hierarchical model represents the best fit with the data.

### Evidence for aggregation to the organizational level

Aggregating individual responses to create an organizational-level variable requires that those ratings are sufficiently homogeneous (Dansereau & Alutto, 1990; Klein et al., 2000). Several statistical methods are available for assessing the homogeneity of responses within groups (Peterson & Castro, 2006), such as a within and between analysis (WABA; Markham, Dansereau, Alutto, & Dumas, 1983),  $r_{wg}$  for single item measures or  $r_{wg(j)}$  for multiitem measures (James, Demaree, & Wolf, 1984), and indices of reliability such as ICC(1) and ICC(2) (Shrout & Fleiss, 1979). As is routinely reported in the culture domain, we focus on agreement and reliability statistics (e.g., Gillespie et al., 2008; Kotrba

et al., 2012).  $r_{wg(j)}$  was computed for each organization as a function of the five items in each index of the DOCS and based on deviation from the uniform response distribution (Lindell, Brandt, & Whitney, 1999). Values greater than .70 have generally been recognized as sufficient response consistency to justify aggregating individual responses to the group level (Klein et al., 2000). ICC(1) and ICC(2) were computed as omnibus indexes of intraorganizational reliability at the index level. ICC(1) indicates the proportion of total variance attributable to organization membership, and ICC(2) indicates the extent to which organizations are reliably differentiated by the measure (Bryk & Raudenbush, 1992).  $F$ -values from random effects one-way ANOVAs provide a statistical significance test for the ICC(1) values.

The agreement and reliability indices for each index of the DOCS are shown in Table 7. Mean  $r_{wg(j)}$  across organizations and culture indexes ranged from .85 to .89. The  $r_{wg(j)}$  values observed for individual organizations all reached the recommended minimum, but ranged quite a bit from the mid-.70s to the mid-.90s. ICC(1) ranged from .06 to .10 across culture indexes indicating that between 6 and 10% of the variance in culture ratings can be accounted for by organization membership. Corresponding  $F$ -values demonstrated that this proportion of variance was statistically significant in all cases ( $p < .001$ ). ICC(2) ranged from .93 to .96, demonstrating high reliability for the organization-level means on each index. These results support the aggregation of individual ratings of culture to the organization level.

These results also suggest that positioning interrater agreement as a *threshold* to justify aggregation is somewhat misguided. Our results suggest that nearly all of the organizations met the minimal criteria to justify aggregation. Nonetheless, there are still significant variations between the organizations. Thus, internal consistency may be more important to consider as a *variable* rather than as a *threshold*.

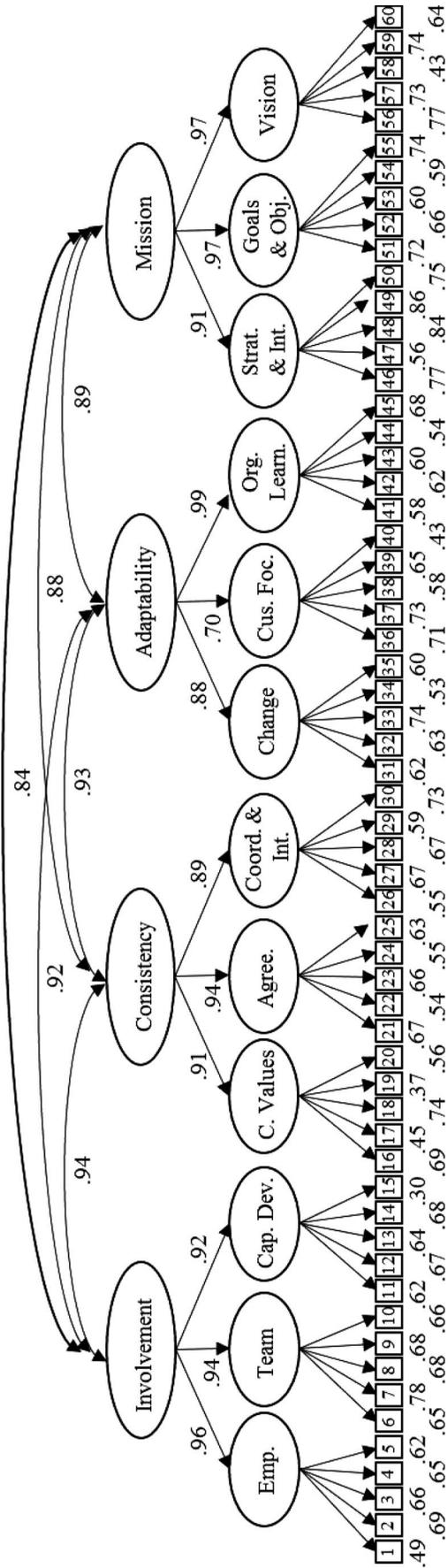


Figure 1. Factor structure of the DOCS. Item loadings, second-order factor loadings, and trait intercorrelations are shown. All loadings and intercorrelations are significant,  $p < .01$ . The 12 culture indexes (from left to right) are: empowerment, team orientation, capability development, core values, agreement, coordination and integration, core values, agreement, coordination and integration, creating change, customer focus, organizational learning, strategic direction and intent, goals and objectives, and vision. Model fit was best for the second-order factor solution here,  $\chi^2(1692) = 122,715.83, p < .01, GFI = .88, NFI = .98, CFI = .98$ , and RMSEA = .04. The chi-square and fit indices for the first alternative model specifying four first-order trait factors were:  $\chi^2(1704) = 157,276.98, p < .01, GFI = .85, NFI = .98, CFI = .98$ , and RMSEA = .05. Comparison to the second-order model shown here indicated significantly worse fit as evidenced by a significant change in chi-square,  $\Delta\chi^2(12) = 34,561.15, p < .001$ , higher RMSEA (.05 vs. .04) and lower GFI (.85 vs. .88). The second alternative model specifying a single latent factor resulted in a further decline in model fit and indicated poor fit overall,  $\chi^2(1710) = 173,663.25, p < .01, GFI = .78, NFI = .78, CFI = .79$ , and RMSEA = .06.

In addition, as Kotrba et al. (2012) have shown, internal consistency can be an important measure of culture strength that is closely linked to performance.

**Evidence of criterion-related validity**

Criterion-related validity holds special importance for effectiveness profiling instruments. In this section, we evaluate the criterion-related validity of the indexes from the DOCS as organization-level predictors of effectiveness using subjectively rated indicators. Analyses of objectively defined effectiveness outcomes have been presented in a number of the aforementioned studies. Correlations between the culture indexes and ratings of sales growth, market share, profitability, quality of products and services, new product development, and employee satisfaction are presented in Table 8. As the table shows, most of these validity coefficients were statistically significant at the .01 level and had magnitudes of at least .30. The strongest relationships were observed between

culture measures and employee satisfaction, with correlations ranging from .42 to .79 (mean  $r = .63$ ). Slightly weaker correlations were observed for organizational ratings of new product development (mean  $r = .37$ ), quality (.36), sales growth (.26), and profitability (.25). The weakest relationships were observed for culture predicting ratings of market share, with correlations ranging from .04 to .26 (mean  $r = .13$ ). When the six effectiveness indicators were combined into a unit-weighted composite, correlations between the culture indexes/traits and effectiveness ratings ranged from .44 to .68 (mean  $r = .58$ ). Overall, these results support previous studies demonstrating positive linkages between the DOCS culture indexes and aspects of organizational effectiveness. It is important that this evidence be weighted alongside prior studies with objective effectiveness criteria, given that correlations based on same-source raters are known to be inflated to a degree by common method variance (Spector & Brannick, 1995).

TABLE 7  
Descriptive statistics and aggregation evidence for the indexes of the DOCS

<i>Index</i>	<i>Mean</i>	<i>SD</i>	<i>Mean <math>r_{wg(j)}</math></i>	<i>Min <math>r_{wg(j)}</math></i>	<i>Max <math>r_{wg(j)}</math></i>	<i>ICC(1)</i>	<i>ICC(2)</i>	<i>F-value</i>
Empowerment	3.31	0.71	.87	.74	.94	.10	.96	25.32
Team orientation	3.40	0.77	.86	.73	.95	.08	.95	19.99
Capability development	3.41	0.69	.86	.75	.94	.08	.95	18.85
Core values	3.50	0.66	.88	.73	.94	.08	.95	21.31
Agreement	3.22	0.66	.88	.81	.94	.07	.94	17.96
Coordination and integration	3.03	0.73	.86	.78	.95	.09	.95	21.62
Creating change	3.10	0.69	.87	.75	.95	.06	.94	16.18
Customer focus	3.37	0.69	.87	.76	.95	.06	.93	15.33
Organizational learning	3.13	0.71	.86	.74	.96	.06	.94	15.89
Strategic direction and intent	3.41	0.82	.85	.67	.95	.08	.95	20.91
Goals and objectives	3.47	0.69	.89	.77	.96	.08	.95	20.10
Vision	3.30	0.67	.87	.74	.94	.08	.95	19.51

$N = 35,474$ . All  $F$ -values are statistically significant,  $p < .001$ .

TABLE 8  
Correlations between the DOCS and indicators of organizational effectiveness

<i>Trait/index</i>	<i>Sales growth</i>	<i>Market share</i>	<i>Profit</i>	<i>Quality</i>	<i>New product</i>	<i>Employee satisfaction</i>	<i>Overall performance</i>
Involvement	.24**	.13	.23**	.39**	.41**	.79**	.61**
Empowerment	.20*	.11	.21**	.37**	.36**	.74**	.57**
Team orientation	.17*	.11	.20*	.32**	.36**	.70**	.51**
Capability development	.33**	.16	.26**	.41**	.43**	.77**	.65**
Consistency	.20**	.12	.28**	.42**	.26**	.62**	.58**
Core values	.20**	.15	.27**	.36**	.21**	.52**	.53**
Agreement	.26**	.13	.29**	.43**	.32**	.66**	.60**
Coordination and integration	.11	.07	.21**	.36**	.17*	.53**	.48**
Adaptability	.29**	.10	.24**	.34**	.45**	.66**	.60**
Creating change	.35**	.13	.24**	.31**	.49**	.63**	.57**
Customer focus	.21**	.08	.16*	.31**	.27**	.42**	.44**
Organizational learning	.20*	.04	.21**	.27**	.39**	.65**	.54**
Mission	.36**	.19*	.31**	.38**	.47**	.62**	.68**
Strategic direction and intent	.40**	.26**	.32**	.38**	.53**	.55**	.66**
Goal orientation	.26**	.15	.27**	.35**	.39**	.57**	.60**
Vision	.34**	.10	.29**	.34**	.41**	.66**	.65**

$N = 155$ . \* $p < .05$ , \*\* $p < .01$ .

As in past research, these results also show that some features of organizational culture are better predictors of specific effectiveness criteria than others (Denison & Mishra, 1995; Gillespie et al., 2008). The pattern of correlations observed here indicates that the internally focused traits *involvement* and *consistency* are generally better predictors of operating performance such as quality and profitability, whereas the externally focused traits *mission* and *adaptability* are generally better predictors of sales growth. Similarly, *mission*—and particularly, *strategic direction and intent*—was the only significant predictor of market share. Other noteworthy trends were that new product development was least strongly correlated with the *consistency* trait, and *involvement* was clearly the strongest predictor of employee satisfaction. Together, these findings indicate that the aspects of culture assessed within the DOCS likely contribute to overall organizational effectiveness in complementary ways.

## DISCUSSION

Perspectives on the measurement of the cultures of work organizations have shifted over time (Martin et al., 2006). Researchers and practitioners have adopted surveys as a useful tool for understanding the behaviours and values that characterize an organization's culture. Growing evidence of the link between culture and bottom-line performance also supports the role of surveys in culture research (Sackmann, 2011). The value of surveys in the diagnostic process also supports the more practical objectives of organizational development and change by serving as a means of feedback and benchmarking. Effectiveness profiling instruments are the type of culture surveys most directly aligned with these applications (Ashkanasy et al., 2000).

This review assessed the progress in the development and validation of instruments in this category. Despite the lack of continued research interest for five of the nine instruments, many of their key concepts have been borrowed or adapted by the four remaining instruments. Ginevičius and Vaitkūnaitė (2006) and van der Post et al (1997) in particular have synthesized the dimensions of other culture surveys. In contrast, the approaches taken by the two remaining instruments represent a blend of inductive and theory-driven components (Denison & Neale, 1996; Schönborn, 2010). This approach allows the researchers to draw more direct connections between their measurement models and the theories from which they follow, which will be increasingly important as more theory-based perspectives emerge over time.

Criterion-related validity has always been a central concern in this literature. Despite recent progress, the

limitations are familiar ones. The need for more longitudinal research, better effectiveness measures and more of them, larger and more representative samples of organizations, and cross-cultural validation remain at centre stage. Researchers will still need to address these issues in future studies, and this will strengthen the evidence presented for observed relationships between survey ratings of culture and effectiveness outcomes. At the same time, a handful of the other limitations identified reflect specific and perhaps underappreciated considerations in the validation of effectiveness instruments.

## Generalizability across contexts

Unlike descriptive approaches to measuring culture, the diagnostic approach generally leads to an inference about cultural effectiveness without necessarily considering all of the possible contingency factors. Showing that a predictive relationship exists in a single context is a major achievement. Nonetheless, effectiveness instruments ought to be able to demonstrate that the culture–effectiveness relationship is robust across a range of contexts. Support can be demonstrated through a variety of strategies that test measurement and predictive equivalence across national cultures, industries, or types of organizations (Vandenberg & Lance, 2000).

The stream of research cited for the DOCS illustrates some of the complexity involved in cross-cultural comparative work. For example, these studies have demonstrated that while the culture concepts assessed retain similar meanings across national settings, the specific manifestations of these concepts can differ (Denison et al., 2003). This suggests that effectiveness instruments may need to be versatile enough to accommodate information about culture at varying levels of specificity. The second-order framework underlying the DOCS provides one possible solution. The same line of research also indicates that although all four traits contribute to organizational effectiveness across national cultures, the rank ordering of traits in terms of the magnitude of predictive relationships also varies somewhat across cultures and contexts. Thus, generalizability is clearly a multifaceted issue that requires a programmatic research effort in order to fully elucidate the boundaries.

## Multilevel considerations

Another set of issues has to do with the shift from individuals to organizations as the primary unit of analysis (Chan, 1998). Several studies cited in our review committed an atomistic fallacy by inferring organization-level relationships on the basis of regressions or correlations with individuals (Diez-Roux, 1998). Unfortunately, this type of evidence

does little to substantiate criterion-related validity for an organizational assessment. Instead, an appropriate test involves examining the relationships between aggregated culture ratings and firm-level effectiveness criteria. There are a number of methods available for handling multilevel data including the approach illustrated here (Bliese, Halverson, & Schriesheim, 2002). Whichever analysis strategy researchers adopt, there are two main points of interest: first, demonstrating that individual ratings can be used to represent the overall culture of organizations in a valid and reliable manner, and second, testing the culture-effectiveness linkages at the organization level.

## CONCLUSION

In conclusion, our review has identified a total of nine published survey instruments whose objective is to diagnose organizational cultures by assessing those values and behavioural norms that are most directly related to organizational effectiveness. The review indicated a number of problematic trends and remaining gaps in the types of reliability and validity evidence that support these instruments, underscoring the need for additional methodological research. Each of the “active” instruments reviewed appear to be in varying stages of development and evidence gathering, and research on several others appears to have fallen off. Our review also identified the DOCS as the most well-researched effectiveness instrument to date. We therefore provided a more in-depth discussion of the background, strengths, and limitations that differentiate this particular instrument from other culture effectiveness surveys. And finally, our empirical illustration helps to clarify several key challenges extracted from our review, while attempting to close some of the remaining gaps found for the DOCS.

## REFERENCES

- Alvesson, M. (2011). Organizational culture: Meaning, discourse, and identity. In N. Ashkanasy, C. Wilderom, & M. Peterson (Eds.), *The handbook of organizational culture and climate* (2nd ed., pp. 11–28). Thousand Oaks, CA: Sage.
- Ashkanasy, N., Broadfoot, L., & Falkus, S. (2000). Questionnaire measures of organizational culture. In AN. Ashkanasy, C. Wilderom, & M. Peterson (Eds.), *The handbook of organizational culture and climate* (2nd ed., pp. 131–162). Thousand Oaks, CA: Sage.
- Ashkanasy, N., Wilderom, C., & Peterson, M. (2011). Introduction to the handbook of organizational culture and climate, second edition. In N. Ashkanasy, C. Wilderom, & M. Peterson (Eds.), *The handbook of organizational culture and climate* (2nd ed., pp. 3–10). Thousand Oaks, CA: Sage.
- Aydin, B., & Ceylan, A. (2008). The employee satisfaction in metalworking manufacturing: How do organizational culture and organizational learning capacity jointly affect it? *Journal of Industrial Engineering and Management*, 1, 143–168.
- Aydin, B., & Ceylan, A. (2009). The role of organizational culture on effectiveness. *Ekonomika A Management*, 3, 33–49.
- Baer, M., & Frese, M. (2003). Innovation is not enough: Climates for initiative and psychological safety, process innovations and firm performance. *Journal of Organizational Behavior*, 24, 45–68.
- Baruch, Y. (1999). Response rate in academic studies—A comparative analysis. *Human Relations*, 52, 421–438.
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107, 238–246.
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88, 588–606.
- Birkinshaw, J., Hood, N., & Jonsson, S. (1998). Building firm-specific advantages in multinational corporations: The role of subsidiary initiative. *Strategic Management Journal*, 19, 221–241.
- Bliese, P. D., Halverson, R. R., & Schriesheim, C. A. (2002). Benchmarking multilevel methods: Comparing HLM, WABA, SEM, and RGR. *Leadership Quarterly*, 13, 3–14.
- Block, L. (2003). The leadership-culture connection: An exploratory investigation. *Leadership and Organization Development Journal*, 24, 318–334.
- Bonavia, T., Gasco, V. J., & Tomás, D. B. (2009). Spanish adaptation and factor structure of the Denison Organizational Culture Survey. *Psicothema*, 21, 633–638.
- Boyce, A. S. (2010). *Organizational climate and performance: An examination of causal priority*. Unpublished dissertation, Michigan State University, Lansing, MI.
- Boyle, G. J. (1991). Does item homogeneity indicate internal consistency or item redundancy in psychometric scales? *Personality and Individual Differences*, 12, 291–294.
- Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical linear models for social and behavioural research: Applications and data analysis methods*. Newbury Park, CA: Sage Publications.
- Chan, D. (1998). Functional relations among constructs in the same content domain at different levels of analysis. *Journal of Applied Psychology*, 83, 234–246.
- Cooke, R., & Rousseau, D. (1988). Behavioral norms and expectations: A quantitative approach to the assessment of organizational culture. *Group and Organizational Studies*, 13, 245–273.
- Cooke, R. A., & Lafferty, J. C. (1989). *Organizational culture inventory*. Plymouth, MI: Human Synergetics.
- Cowherd, D. M., & Luchs, R. H. (1988). Linking organization structures and processes to business strategy. *Long Range Planning*, 21, 47–53.
- Dansereau, F., & Alutto, J. (1990). Levels of analysis issues in climate and culture research. In B. Schneider (Ed.), *Organizational climate and culture* (pp. 193–236). San Francisco, CA: Jossey-Bass.
- Delaney, J. T., & Huselid, M. A. (1996). The impact of human resource management practices on perceptions of organizational performance. *Academy of Management Journal*, 39, 949–969.
- Delery, J., & Doty, D. (1996). Modes of theorizing in strategic human resource management: Tests of universalistic, contingency, and configurational performance predictions. *Academy of Management Journal*, 39, 802–835.
- Delobbe, N., Haccoun, R. R., & Vandenberghe, C. (2002). *Measuring core dimensions of organizational culture: A review of research and development of a new instrument*. Unpublished manuscript, Université catholique de Louvain, Belgium.
- Denison, D. R. (1984). Bringing corporate culture to the bottom line. *Organizational Dynamics*, 13, 4–22.
- Denison, D. R. (1990). *Corporate culture and organizational effectiveness*. New York, NY: Wiley.

- Denison, D. R. (1996). What IS the difference between organizational culture and organizational climate? A native's point of view on a decade of paradigm wars. *Academy of Management Review*, 21, 619–654.
- Denison, D. R., Haaland, S., & Goelzer, P. (2003). Corporate culture and organizational effectiveness: Is there a similar pattern around the world? *Advances in Global Leadership*, 3, 205–227.
- Denison, D. R., Lief, C., & Ward, J. L. (2004). Culture in family-owned enterprises: Recognizing and leveraging unique strengths. *Family Business Review*, 17, 61–70.
- Denison, D. R., & Mishra, A. (1995). Toward a theory of organizational culture and effectiveness. *Organizational Science*, 6, 204–223.
- Denison, D. R., & Neale, W. S. (1996). *Denison organizational culture survey*. Ann Arbor, MI: Aviat.
- Denison, D. R., & Spreitzer, G. (1991). Organizational culture and organizational development: A competing values approach. *Research in Organizational Change and Development*, 5, 1–21.
- Detert, J. R., Schroeder, R. G., & Mauriel, J. J. (2000). A framework for linking culture and improvement initiatives in organizations. *Academy of Management Review*, 25, 850–863.
- Diez-Roux, A. V. (1998). Bringing context back into epidemiology: Variables and fallacies in multilevel analyses. *American Journal of Public Health*, 88, 216–222.
- Erwee, R., Lynch, B., Millett, B., Smith, D., & Roodt, G. (2001). Cross-cultural equivalence of the organisational culture survey in Australia. *Journal of Industrial Psychology*, 27, 7–12.
- Fey, C., & Denison, D. R. (2003). Organizational culture and effectiveness: Can an American theory be applied in Russia? *Organization Science*, 14, 686–706.
- Geringer, M., & Hebert, L. (1989). Control and performance of international joint ventures. *Journal of International Business Studies*, 20, 235–254.
- Gillespie, M., Denison, D., Haaland, S., Smerek, R., & Neale, W. (2008). Linking organizational culture and customer satisfaction: Results from two companies in different industries. *European Journal of Work and Organizational Psychology*, 17, 112–132.
- Ginevičius, R., & Vaitkūnaitė, V. (2006). Analysis of organizational culture dimensions impacting performance. *Journal of Business Economics and Management*, 7, 201–211.
- Glaser, R. (1983). *The corporate culture survey*. Bryn Mawr, PA: Organizational Design and Development.
- Guthrie, J. P. (2001). High-involvement work practices, turnover, and productivity: Evidence from New Zealand. *Academy of Management Journal*, 44, 180–190.
- Harris, P. R., & Moran, R. T. (1984). *Managing cultural differences*. Houston, TX: Gulf.
- Hartnell, C. A., Ou, A. Y., & Kinicki, A. (2011). Organizational culture and organizational effectiveness: A meta-analytic investigation of the competing values framework's theoretical suppositions. *Journal of Applied Psychology*, 96, 677–694.
- Hofstede, G., Neuijen, B., Ohayv, D., & Sanders, G. (1990). Measuring organizational cultures: A qualitative and quantitative study across twenty cases. *Administrative Science Quarterly*, 35, 286–316.
- Hu, L. T., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods*, 3, 424–453.
- Jaques, E. (1951). *The changing culture of a factory*. London, UK: Tavistock.
- James, L. R., Demaree, R. G., & Wolf, G. (1984). Estimating within-group interrater reliability with and without response bias. *Journal of Applied Psychology*, 69, 85–98.
- Jung, T., Scott, T., Davies, H. T., Bower, P., Whalley, D., McNally, R., & Mannion, R. (2009). Instruments for exploring organizational culture: A review of the literature. *Public Administration Review*, 69, 1087–1096.
- Jöreskog, K. G., & Sörbom, D. (1989). *LISREL 7: A guide to the program and applications*. Chicago, IL: SPSS Publications.
- Katz, D., & Kahn, R. (1978). *The social psychology of organizations*. New York, NY: Wiley.
- Kilman, R. H., & Saxton, M. J. (1983). *The Kilman-Saxton culture-gap survey*. Pittsburgh, PA: Organizational Design Consultants.
- Klein, K. J., Griffin, M. A., Bliese, P. D., Hofmann, D. A., Kozlowski, S. W. J., James, L. R., et al. (2000). Multilevel analytical techniques: Commonalities, differences, and continuing questions. In K. Klein & S. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations* (pp. 512–553). San Francisco, CA: Jossey-Bass.
- Kotrba, L. M., Gillespie, M. A., Schmidt, A. M., Smerek, R. E., Ritchie, S. A., & Denison, D. R. (2012). Do consistent corporate cultures have better business performance? Exploring the interaction effects. *Human Relations*, 65, 241–262.
- Kotter, J., & Heskett, J. (1992). *Corporate culture and performance*. New York, NY: Free Press.
- Lawler, E. (1986). *High involvement management*. San Francisco, CA: Jossey-Bass.
- Lawrence, P., & Lorsch, J. (1967). *Organization and environment: Managing differentiation and integration*. Boston, MA: Harvard University Division of Research.
- Liebenberg, J. S. (2007). *Factors influencing a customer service culture in a higher education environment*. Unpublished dissertation, Rand Afrikaans University, South Africa.
- Lim, B. (1995). Examining the organizational culture and organizational performance link. *Leadership and Organization Development Journal*, 16, 16–21.
- Lindell, M. K., Brandt, C. J., & Whitney, D. J. (1999). A revised index of interrater agreement for multi-item ratings of a single target. *Applied Psychological Measurement*, 23, 127–135.
- Markham, S. E., Dansereau, F., Alutto, J. A., & Dumas, M. (1983). Leadership convergence: An application of within and between analysis to validity. *Applied Psychological Measurement*, 7, 63–72.
- Martin, J. (1992). *Cultures in organizations: Three perspectives*. New York, NY: Oxford University Press.
- Martin, J., & Frost, P. (1996). Organizational culture war games: A struggle for intellectual dominance. In S. Clegg, C. Hardy, & W. Nord (Eds.), *Handbook of organization studies* (pp. 599–621). Thousand Oaks, CA: Sage.
- Martin, J., Frost, P., & O'Neill, O. A. (2006). Organizational culture: Beyond struggles for intellectual dominance. In S. Clegg, C. Hardy, T. Lawrence, & W. Nord (Eds.), *The Sage handbook of organization studies* (2nd ed., pp. 725–753). Thousand Oaks, CA: Sage.
- Martin, J., & Meyerson, D. (1988). Organizational cultures and the denial, channeling and acknowledgment of ambiguity. In L. Pondy (Ed.), *Managing ambiguity and change* (pp. 93–125). New York, NY: Wiley.
- Mintzberg, H. (1989). *Mintzberg on management*. New York, NY: Free Press.
- Muldrow, T. W., Buckley, T., & Schay, B. W. (2002). Creating high-performance organizations in the public sector. *Human Resource Management*, 41, 341–354.
- Nunnally, J. (1978). *Psychometric theory*. New York, NY: McGraw-Hill.
- O'Reilly, C., Chatman, J., & Caldwell, D. (1991). People and organization culture: A profile comparison approach. *Academy of Management Journal*, 34, 487–516.
- Ostroff, C., Kinicki, A. J., & Tamkins, M. M. (2003). Organizational culture and climate. In W. C. Borman, D. R. Ilgen, & R. J. Klimoski (Eds.), *Handbook of psychology: Industrial and organizational psychology, Vol. 12* (pp. 565–593). Hoboken, NJ: John Wiley & Sons.
- Ott, J. S. (1989). *The organizational culture perspective*. Pacific Grove, CA: Brooks-Cole.

- Parsons, T. (1951). *The social system*. London, UK: Routledge & Kegan Paul.
- Peterson, M. F., & Castro, S. L. (2006). Measurement metrics at aggregate levels of analysis: Implications for organization culture research and the GLOBE project. *Leadership Quarterly*, 17, 506–521.
- Pettigrew, A. M. (1979). On studying organizational cultures. *Administrative Science Quarterly*, 24, 570–581.
- Quinn, R., & Cameron, K. (1988). *Paradox and transformation: Toward a theory of change in organization and management*. Cambridge, MA: Ballinger.
- Quinn, R., & Rohrbaugh, J. (1981). A competing values approach to organizational effectiveness. *Public Productivity Review*, 5, 122–140.
- Rieker, D. J. (2006). *An evaluation of how organizational culture can perpetuate a formal mentoring relationship*. Unpublished thesis, Air Force Institute of Technology, Wright-Patterson Air Force Base, OH.
- Rousseau, D. M. (1990). Assessing organizational culture: The case for multiple methods. In B. Schneider (Ed.), *Organizational culture and climate* (pp. 153–192). San Francisco, CA: Jossey-Bass.
- Sackmann, S. A. (2006). *Assessment, evaluation, improvement: Success through corporate culture*. Gütersloh, Germany: Bertelsmann Stiftung.
- Sackmann, S. A. (2011). Culture and performance. In N. Ashkanasy, C. Wilderom, & M. Peterson (Eds.), *The handbook of organizational culture and climate* (2nd ed., pp. 188–224). Thousand Oaks, CA: Sage.
- Sashkin, M. (1984). *Pillars of excellence: Organizational beliefs questionnaire*. Bryn Mawr, PA: Organizational Design and Development.
- Sashkin, M., & Fulmer, R. (1985). *Measuring organizational excellence culture with a validated questionnaire*. Paper presented at the Academy of Management, San Diego, CA.
- Schein, E. (1992). *Organizational culture and leadership* (2nd ed.). San Francisco, CA: Jossey-Bass.
- Schönborn, G. (2010). Value performance: On the relation between corporate culture and corporate success. *Journal of Psychology*, 218, 234–242.
- Scott, T., Mannion, R., Davies, H., & Marshall, M. (2003). The quantitative measurement of organizational culture in health care: A review of the available instruments. *Health Services Research*, 38, 923–945.
- Selznick, P. (1957). *Leadership in administration*. Evanston, IL: Row & Peterson.
- Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin*, 86, 420–428.
- Siehl, C., & Martin, J. (1990). Organizational culture: A key to financial performance? In B. Schneider (Ed.), *Organizational climate and culture* (pp. 241–281). San Francisco, CA: Jossey-Bass.
- Smircich, L. (1983). Concepts of culture and organizational analysis. *Administrative Science Quarterly*, 28, 339–358.
- Sparrow, P. (2001). Developing diagnostics for high performance cultures. In C. Cooper, S. Cartwright, & C. Earley (Eds.), *The international handbook of organizational culture and climate* (pp. 85–106). New York, NY: Wiley.
- Spector, P. E., & Brannick, M. T. (1995). The nature and effects of method variance in organizational research. In C. L. Cooper & I. T. Robertson (Eds.), *International review of industrial and organizational psychology* (pp. 249–274). Chichester, UK: Wiley.
- Spreitzer, G. (1995). Psychological empowerment in the workplace: Dimensions, measurement, validation. *Academy of Management Journal*, 38, 1442–1466.
- Spreitzer, G. (1996). Social structural characteristics of psychological empowerment. *Academy of Management Journal*, 39, 483–504.
- Strydom, A., & Roodt, G. (2006). Developing a predictive model of subjective organisational culture. *Journal of Industrial Psychology*, 32, 15–25.
- Taylor, S., Levy, O., Boyacigiller, N., & Beechler, S. (2008). Employee commitment in MNCs: Impacts of organizational culture, HRM and top management orientations. *International Journal of Human Resource Management*, 19, 501–527.
- Trice, H. M., & Beyer, J. M. (1993). *The culture of work organizations*. Englewood Cliffs, NJ: Prentice Hall.
- Tucker, R. W., McCoy, W. J., & Evans, L. C. (1990). Can questionnaires objectively assess organizational culture? *Journal of Managerial Psychology*, 5, 4–11.
- Usala, P. (1996a). *Clerical/technical study technical report: Psychometric analysis of the organizational assessment items: Work unit experiences and organizational experiences scales*. Unpublished technical report by the US Office of Personnel Management, Personnel Resources and Development Center, Washington DC.
- Usala, P. (1996b). *Psychometric analysis of the organizational assessment items: Work unit experiences and organizational experience scales*. Unpublished technical report by the US Office of Personnel Management, Personnel Resources and Development Center, Washington DC.
- Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, 3, 4–70.
- van der Post, W. Z., de Coning, T. J., & Smit, E. M. (1997). An instrument to measure organizational culture. *South African Journal of Business Management*, 28, 147–168.
- van der Post, W. Z., de Coning, T. J., & Smit, E. M. (1998). The relationship between organizational culture and financial performance: Some South African evidence. *South African Journal of Business Management*, 29, 30–41.
- Van Maanen, J. (1988). *Tales of the field*. Chicago, IL: University of Chicago Press.
- Walker, H., Symon, G., & Davies, B. (1996). Assessing organizational culture: A comparison of methods. *International Journal of Selection and Assessment*, 4, 96–105.
- Wall, T. D., Michie, J., Patterson, M., Wood, S. J., Sheehan, M., Clegg, C. W., & West, M. (2004). On the validity of subjective measures of company performance. *Personnel Psychology*, 57, 95–118.
- Wilderom, C. P., Glunk, U., & Maslowski, R. (2000). Organizational culture as a predictor of organizational performance. In N. Ashkanasy, C. Wilderom, & M. Peterson (Eds.), *The handbook of organizational culture and climate* (2nd ed., pp. 193–209). Thousand Oaks, CA: Sage.
- Woodcock, M., & Francis, D. (1989). *Clarifying organizational values*. Aldershot, UK: Gower.
- Xenikou, A., & Furnham, A. (1996). A correlational and factor analytic study of four questionnaire measures of organizational culture. *Human Relations*, 49, 349–371.
- Zheng, W., Yang, B., & McLean, G. (2010). Linking organizational culture, structure, strategy, and organizational effectiveness: Mediating role of knowledge management. *Journal of Business Research*, 63, 763–771.

Original manuscript received October 2011

Revised manuscript received July 2012

First published online August 2012