Isaksen, S. G. (2023). Assessing the work environment for creativity and innovation: building on Mathisen and Einarsen's review (2004). Creativity Research Journal, 35(2), 227-253. https://doi.org/10.1080/10400419.2022.2112837

Assessing the work environment for creativity and innovation: Building on Mathisen and Einarsen's Review (2004)

Scott G. Isaksen
BI-Norwegian Business School
The Creative Problem Solving Group – Buffalo

Abstract

This article was stimulated by a review of instruments assessing creative and innovative social environments (Mathisen and Einarsen, 2004) seventeen years ago. This stands alone as the only published, comprehensive, comparative review of multiple instruments aimed at this conceptual space. Although this review provided an important contribution to the literature, there are a number of critical conceptual issues that should be considered when reviewing assessments of this kind. This article raises these issues and points out their relevance when developing, evaluating, or applying instruments – and applies these issues to the instruments included in the review. Further, the aim was also to provide updated information on the Situational Outlook Questionnaire, as there were a few potential misunderstandings contained within the Mathisen and Einarsen review. Finally, numerous criteria are offered for those creating or choosing to use measures of the work environment, climate, or culture that promotes organizational creativity and innovation.

Key Words

Creative Climate, Innovative Climate, Work Environment for Creativity and Innovation

This article has been accepted for publication in *The Creativity Research Journal on 12/13/21*
https://doi.org/10.1080/10400419.2022.2112837

Introduction

Establishing work environments conducive to creativity and innovation is a current and compelling issue for those who study, work in, and lead organizations. A wide variety of surveys have reported that senior executives consistently rate innovation, and its requisite creativity, as a top strategic priority (Capozzi, Gregg, & Howe, 2010; Lichtenberg, Woock, & Wright, 2018). Understanding and establishing work environments that support creativity and innovation continues to be a pressing issue that can help organizations deal effectively with increasing levels of change, complexity, and competition. Yet, there is a paucity of literature that aims at reviewing instruments and assessments of the work environment for creativity and innovation.

The preponderance of literature on the assessment of creativity focuses more on the assessment of creativity in people, the creative process, and creative products and outcomes (e.g. Plucker, Makel, & Qian, 2019; Puccio & Murdock, 1999; Said-Metwaly, Van den Noortgate, & Kyndt, 2017; Treffinger, et. al. 2002). Very few sources have provided integrative or comparative reviews of instruments that measure the work environment for creativity and innovation. Moultrie and Young (2009) compared the Amabile and Ekvall models for assessment by developing their own survey. Dubina (2013) provided a short (six-page) encyclopedic overview of six instruments that assessed the climate for creativity and innovation. Mathisen and Einarsen (2004) is the only published comparative and substantial review of multiple instruments that aim to measure creative and innovative environments in organizations. Their review has also been (and continues to be) widely cited in the literature as such (e.g. Diliello, Houghton, & Dawley, 2011; Newman, Round, Wang, & Mount, 2020; Puccio & Cabra, 2010). The paucity of literature that focuses on the assessment of the creative place underscores the prominence of the review provided by Mathisen and Einarsen (2004).

My intention is to build on their review (referred to as 'the review' or 'the reviewers') in four ways. First, defining, conceptualizing and theorizing precedes operationalization – the development and application of instruments. The review did offer a rationale for the conjoint treatment of creativity and innovation – two key constructs on one side of the intersection. Yet, the review did not include definitions or distinctions among work or social environments, climate or culture. I hope to add some reflections on both sides of the intersection: creativity and innovation, as well as work environment, organizational climate and culture.

Second, another purpose of this article is to layer into consideration key questions relating to improving construct clarity by asking: What are the instruments attempting to measure; How do they do the measurement; and where did the measure come from? I will add this perspective to the review of the five assessments provided in 2004.

Third, this article will update and improve upon the review of both the Creative Climate Questionnaire (CCQ) and the Situational Outlook Questionnaire (SOQ). The reviewers chose to consider these two instruments conjointly, and this article will treat them independently and addressing some of the potential misunderstandings that may have resulted. I will also provide further elaboration on the development, psychometrics, reliability and validity of the SOQ.

Finally, I will offer some key criteria for developing and choosing instruments that purport to measure the work environment, climate, or culture for organizational creativity and innovation.

What are the instruments attempting to measure?

Approaching the measurement of the environment within organizations for creativity and innovation requires integration of the intersection of two broad, complex, multi-level, and multi-faceted domains of literature. Each domain includes distinct streams of literature. There are

distinct streams for both creativity and innovation. There are also independent literatures for work environment, organizational climate, and organizational culture. As such, the epistemological and ontological challenges abound. As Argyris (1958: p. 501) asserted: "Anyone who conducts research on human behavior in organizations is always faced with the problem of ordering and conceptualizing a buzzing confusion of simultaneously existing, multilevel, mutually interacting variables."

Further, the literature related to the various streams included on both sides of this intersection is both flourishing and fragmented. This raises real challenges for both conceptualizing and operationalizing this complex arena. The growth of literature related to the work environment has already been illustrated by a review conducted by Kuenzi and Schminke (2009), who noted a three-fold increase in articles published on organizational climate during 2000-2008 compared to all of the 1990's. To illustrate how this literature is both flourishing and fragmented, I conducted a search using the Oria database (October 27, 2020) and it yielded 7,242,203 sources when I searched for 'work environment.' The search for just 'organizational culture,' yielded 2,648,888 sources, and for 'organizational climate,' 1,800,248 sources were found. From the four and one-half million sources on either climate or culture, I found only 2,036 sources that combined both constructs.

The search generated 1,023,650 sources on 'creativity,' and 6,950,666 for 'innovation.' When I searched for those sources that related to both creativity and innovation only 11,649 sources resulted from among the nearly eight million results. Less than 8,000 sources combined all the related constructs (creativity, innovation, work environment, organizational climate and organizational culture) Previous reviews of literature have also acknowledged this fragmentation and lack of integration (e.g. Crossan & Apaydin, 2010; Hon & Lui, 2016).

To build on the review, I will first turn our attention to the literature on work environment, climate and culture. Then, I'll build on more recent literature concerning the relationship between creativity and innovation.

Work environment, climate and culture

The organizational work environment is an inclusive and broad construct and includes all aspects of the organizational context. The importance of considering the organizational context has been highlighted by Johns (2001; 2006; 2018). Johns (2006: p. 386) defined context as "…situational opportunities and constraints that affect the occurrence and meaning of organizational behavior as well as functional relationships between variables."

There is a substantial amount of scholarly literature relating to the work environment within organizations (e.g. Cannon & St. John, 2007; Cooper, Patel, & Thatcher, 2014; Garret & Holland, 2015). Within this broad stream of literature there is a large and growing body of research that focuses distinctly on organizational climate (e.g. James, et. al., 2008; Kuenzi & Schminke, 2009; Randhawa & Kaur, 2014). A separate stream directed at organizational culture has also been extensively reviewed (e.g. Chatman & O'Reilly, 2016; Giorgi, Lockwood, & Glynn, 2015; Peterson, 2010; Schein, 2017).

Climate and culture researchers hold distinct disciplinary foundations and history, employ different methods of inquiry, and make diverse theoretical assumptions about what is important to consider (e.g. Ashkanasky, Wilderom, & Peterson, 2000; Glisson & James, 2002; Ostroff, Kinicki, & Tamkins, 2003; Rentsch, 1990). Yet, some scholars have attempted to view organizational climate and culture as two related ways of understanding the work environment (e.g. Ehrhardt, Schneider, & Macey, 2014; Zohar & Hofmann, 2012). Again, numerous reviews are available that examine the overlap of organizational climate and culture (e.g. Beus, Solomon, Taylor, &

Esken, 2020; Ostroff, Kinicki, & Muhammad, 2013). Schneider, González-Romá, Ostroff, and West (2017: pp. 468-469) provided an example of how these two 'sibling' constructs can be defined. They defined climate as:

... a summary perception derived from a body of interconnected experiences with organizational policies, practices and procedures (e.g., from leadership and HR practices, and so forth) and observations of what is rewarded, supported, and expected in the organization with these summary perceptions becoming meaningful and shared based on the natural interactions of people with each other.

They defined culture as:

... the shared values and basic assumptions that explain why organizations do what they do and focus on what they focus on; it exists at a fundamental, perhaps preconscious, level of awareness, is grounded in history and tradition and is a source of collective identity and commitment.

These current definitions reflect an emerging consensus within the broad arena of the work environment literature. Culture and climate are related, yet culture reflects a deeper construct and is defined as values, beliefs, and traditions, reflecting the deeper foundations of the organizations – it's what the organization values. Climate reflects shared meaning of perceived behavior and is defined as recurring and observable patterns of behavior that characterize life within the organization or team – it's what people experience.

In their comprehensive review of theory, research, and practice of the general work environment literature, Ehrhardt, Schneider, and Macey (2014) pointed out that progress has been made taking two complementary approaches. The first has been a general, omnibus, or molar approach which tries to capture the total meaning of organizations to people. The other has been a focused or facet-specific approach – focusing more on the strategic and desired outcomes of the organization like service, safety, diversity, or others. The facet-specific approach addresses the question: Work environment for what? Schneider (1975) and Schneider and Reichers (1983) argued that since there are many different types of environments, it was more productive to take a

facet-specific approach. My interest is on understanding and measuring the facet-specific work environment for creativity and innovation.

Creativity and Innovation

Some writers use the terms creativity and innovation interchangeably, yet most academics have made distinctions between them despite their similarities (e.g. Mumford & Gustafson, 1988; Shalley & Gilson, 2004; Shalley, Zhou, & Oldham, 2004). Although creativity and innovation are distinct constructs, there is an emerging consensus that creativity is about generating ideas (more associated with divergence) and innovation focuses on execution, implementation, and commercialization of these ideas (more associated with convergence). For example, Amabile & Pratt (2016: p. 158) defined creativity: "as the production of novel and useful ideas by an individual or small group of individuals working together." They defined innovation: "as the successful implementation of creative ideas within an organization."

Some scholars conceive creativity and innovation as 'close cousins' when considering the journey of ideas within organizations (e.g. Gilson & Litchfield, 2017; Perry-Smith & Mannucci, 2017). Yet, there is still a great deal of controversy regarding how creativity and innovation should be defined (e.g. Acar, Burnett, & Cabra, 2017; Runco & Jaeger, 2012; Zhou, Song, Wang, & Wu, 2017).

Going forward, and from a practical relevance point of view, it may be more promising to challenge this rather simplistic distinction and dig deeper into the complex interplay between creativity and innovation. Some models portrayed organizational innovation as a series of linear stages or steps and limited the relevance of creativity to only a few of these. It seems more reasonable to consider the innovation journey as complex, dynamic, nonlinear and unpredictable (e.g. Dooley & Van de Ven, 1999; Van de Ven, 2017). The journey demands cycles of divergence

and convergence (Dooley & Van de Ven, 2016). For example, within this nonlinear and iterative cycle, creativity may be integral to coming up with suggestions and ideas to overcome numerous barriers and maximize certain opportunities along the way (e.g. Acar, Tarakci, & van Knippenberg, 2019; O'Shea and Buckley, 2007).

Dul and Ceylan (2014: p. 1256) asserted that: "Creativity is required at all stages of the development process, from the generation of new product ideas to their commercialization." The complex interplay between creativity and innovation within organizations should foster more nuanced definitions and move beyond a rather simplistic dichotomy. This shift in definitional perspectives will also have an impact on scholar's mental models and, consequently, foster more deliberate investigations as to how the work environment influences the dynamic interplay between creativity and innovation. For example, Keum and See (2017) found that the influence of hierarchy differed depending on the stage of the innovation journey. It had negative effects on idea generation, but somewhat positive effects on screening and selection.

Rosing, et. al. (2018) provided further support for a more nuanced interplay between creativity and innovation by studying the temporal pattern of creativity and implementation within 76 project teams. Teams engaged in creativity throughout the entire life cycle of the projects. Innovative teams refrained from focusing on implementation too early, but gradually increased this emphasis over the course of the project.

In a state of the science article, Anderson, et. al, (2014: p. 1298) provided an integrative definition of creativity and innovation that views both of these constructs as integral parts of the same process:

Creativity and innovation at work are the process, outcomes, and products of attempts to develop and introduce new and improved ways of doing things. The creativity stage of this process refers to idea generation, and innovation refers to the subsequent stage of implementing ideas toward better procedures, practices, or products. Creativity and innovation can occur at the level of the

individual, work team, organization, or at more than one of these levels combined but will invariably result in identifiable benefits at one or more of these levels of analysis.

The main point is that scholars who are interested in assessing the work environment for creativity and innovation should delineate their main intended focus. Without this clarity, it will be nearly impossible to understand how the work environment influences the different types of required behavior involved in the full idea journey.

Call for Conceptual Clarity

The burgeoning yet fragmented literature within this intersection challenges integration. Researchers and scholars must be aware of, and integrate, diverse streams of literature in order to fully conceptualize, and then operationalize, these insights in order to provide valuable information to further effective measurement. Scholars who approach this intersection need to address conceptual clarity in order to adequately measure and assess the work environment for creativity and innovation.

Obtaining conceptual clarity is a requisite precursor to measuring anything – definition precedes measurement. As Suddaby (2010: p. 352) asserted: "Construct clarity allows us to build on prior research by providing the research community with a common language…an essential prerequisite for a community of scholars interested in the same or similar phenomena to exchange ideas and build knowledge."

Isaksen, Hoßbach, and Neyer (2019; In Preparation) examined 173 conceptual models, and their sources, in order to identify similarities and differences as to how scholars defined the core constructs related to the work environment, climate or culture for creativity and innovation. They found that 44% of the scholars failed to define either climate or culture, and few (11.5%) differentiated climate from culture. Many scholars left it to the readers to apply their own

definitions of these constructs (res ipsa loquitor) or used the terms interchangeably. These scholars were generally much better at defining creativity and innovation, and evidently much less familiar with the literature on work environment, climate or culture.

If the intention is to measure the work environment for creativity and innovation, then we should respond to Amabile's (1988) call to embrace the complexity of that construct and comprehensively include all relevant aspects within the broad social context of organizations that influence creativity and innovation. This would ensure an improved level of content validity for the assessment. If the aim was to measure the climate for creativity and innovation, then we should expect that the dimensions adequately reflect the scope of shared perceptions of observed patterns of behavior. If the aim was to assess the culture for creativity and innovation, then the scope of the measure would include the deeper aspects of values, assumptions, history, etc. of the organization.

Scholars can proceed with developing a measurement model once good definitions are in place. The need to ensure congruence between the conceptual space of the measurement model and the actual assessment of those constructs is well established (e.g. MacKenzie, Podsakoff, & Jarvis, 2005; Polites, Roberts, & Thatcher, 2012; Sullivan & Ford, 2010). Challenges to accomplishing this abound when we approach a complex, multi-dimensional, and transdisciplinary topic like measuring the work environment for creativity and innovation.

For example, Isaksen, Hoßbach, and Neyer (2019) found there were two distinct communities approaching the broad and inclusive topic of the work environment. The creativity scholars focused mainly on the individual and group levels of analysis, included psychological or social psychological concepts, and focused more on climate. The innovation scholars primarily focused on the intra and extra-organizational levels of analysis, macro-oriented and economic

concepts, concentrated more on culture, and more frequently included aspects of the external environment within their conceptualizing. A key implication of this finding underscores the challenge of obtaining a complete, integrated or holistic picture of this intersection.

Conceptualizing and theorizing are inextricably linked. Kaplan (1964, pp. 52-53) asserted that "…theorizing and concept formation go hand in hand…proper concepts are needed to formulate a good theory, but we need a good theory to arrive at proper concepts." Isaksen, Hoßbach, and Neyer (In preparation) found 126 discrete and explicit theoretical foundations for the conceptual models they examined within this space. A quarter of the models did not provide a theoretical foundational source. Once again, there were differences in the theoretical underpinnings between the creativity and innovation communities, particularly when it came to the most influential theories. For example, the creativity-climate community frequently identified Amabile's (1983) componential model as a source for their conceptualizing. The innovation-culture community often cited the Resource-Based View of the Firm (Barney, 1991) as their most influential theoretical foundation. Those scholars who deliberately chose to concentrate on both creativity and innovation generally based their models on open and multi-level systems theories. Within this family of theory, the most influential framework was the interactionist perspective on creativity (Woodman, Sawyer, & Griffin, 1993).

Given the diversity of theoretical and conceptual underpinnings of this topic, it is not likely that we will reach consensus or standardize conceptualizing within this domain anytime soon. However, we can certainly work toward improved clarity if we take on board a few simple recommendations. First, those who develop instruments in this area should read and review the pertinent literature on both sets of streams (creativity and innovation – and work environment, climate and culture). Second, they should provide explicit definitions for all the key constructs

they intend to operationalize, again based on both sets of related literature streams. Third, instruments should be based on explicit theoretical and conceptual rationale for the underpinnings of the measures they develop and the dimensions upon which they focus. This would go a long way to enable better comparison and use of assessments. It would also allow for the appropriate development, testing, elaboration, or support for conceptual models and theories upon which the instruments are based.

How do we do the measurement?

There are a variety of methods to assess the constructs and variables within this intersection, and they can be described as quantitative, qualitative, or mixed methods. There has been some historical controversy about quantitative versus qualitative methods when it comes to approaching the work environment (see: Asif, 2011; Denison, 1996). Most instruments within this domain take a quantitative or enumerative approach. As such, there are a number of key issues that should be considered. Among these are: the actual dimensions or variables to measure, the ontological approach taken for the design of the instrument, and the issue of levels of analysis and aggregation.

Diversity of Dimensions within the Intersection

Mathisen and Einarsen (2004) provided a listing and definition of each of the dimensions for four assessments included within their review. In addition, a great deal of work has been done to identify characteristics or dimensions of an organization's work environment that stimulate or inhibit creativity and innovation (e.g. LaPierre & Giroux, 2003; Newman, Round, Wang, & Mount, 2020; Oldham & Baer, 2012; Uzkurt, Kumar, & Ensari, 2013). The result has been the identification of a broad, inclusive, and complex array of dimensions (Dzulkifli & Noor, 2012).

Hunter, Bedell, and Mumford (2005) identified 45 different conceptualizations of the climate for creativity with each presenting numerous overlapping dimensions. Their analysis of

the various dimensions proposed by each of these conceptualizations resulted in a taxonomy containing 14 key dimensions. Hunter, Bedell, and Mumford (2007) applied these 14 dimensions to conduct a meta-analytic review in order to determine the relationship between the dimensions and various indices of creative performance. They (Hunter, Bedell, & Mumford, 2007: p. 85) concluded that:

Climate assessments were found to evidence a sizable, nontrivial relationship with creative achievement across studies. These effects were found to hold for both subjective appraisals and for more objective appraisals focusing on the production of innovative products.

If we define the climate for creativity as observed and consistent patterns of behavior and interaction that characterize life in the organization, then some of the dimensions identified by Hunter, Bedell, and Mumford (2007) would clearly fall within that conceptual boundary. Others would not. For example, they defined one of the 14 dimensions as intellectual stimulation, and it was operationally defined as the perception that debate and discussion of ideas (not persons) is encouraged and supported within the organization. This is clearly something that members of an organization could observe as a quality of behavioral interaction. On the other hand, they defined resources as the perception that the organization has, and is willing to use, resources to facilitate, encourage, and eventually implement ideas may be more challenging for members to observe directly. The existence of adequate resources is clearly an aspect of the work environment, but may not fit the bounded definition of climate per se. Yet, the actual use of the available resources could be an observed behavior. Further clarity regarding the definitional scope of the definition of the dimension would be needed.

Another commonly identified dimension within the work environment is leadership behavior. Ekvall and Ryhammar (1998; 1999) asserted that it was a key precursor to climate. This assertion is supported by numerous literature reviews (e.g. Newman, Round, Wang, & Mount,

2020). It is clear that leadership behavior influences the climate for creativity directly and indirectly – through the manifestation of many other elements within the work environment (Isaksen, 2017; Isaksen & Akkermans, 2011; Swinnen, Teirlinck, & Isaksen, 2019). It should be included as a dimension of the work environment, but the two concepts of leadership and climate should be considered independently, particularly within the bounded definition of climate provided above. Ostroff, Kinicki, & Muhammed (2013: p. 652) indicated:

Leadership and climate are distinct constructs and blurring of boundaries between the two constructs muddles the construct space and potential nomological network…Our perspective is that the constructs of leadership and climate should be treated separately, and the behaviors and styles of supervisors should be viewed as triggers or antecedents of climate.

Those scholars who create measures, or those who are evaluating options for assessment, should consider the degree to which there is coherent agreement between the intended scope of measurement (definition) and the dimensions that are actually assessed. We would expect measures of the work environment to be much more broadly inclusive of a wide variety of dimensions. We should also expect that measures of climate would be based on a clear conceptual boundary, and that the characteristics included within the assessment fit within that definition. Similar guidance should apply to measuring organizational culture. Progress in assessing the work environment for creativity and innovation will be impeded should we simply use all these terms inter-changeably.

Fifteen years after making their appeal for improved clarity regarding the number of dimensions to be included within the construct of creative climate, Hunter and colleagues indicated: "…one of the most pressing issues surrounding an accurate and precise definition of climate is reaching consensus on climate dimensionality" (Hunter, Farr, Heinen, & Allen, 2020: 142).

Objectivistic versus Subjectivistic Approaches

Ekvall (1987; 1989), among others (e.g. Ashforth, 1985; Diesing, 1966; Fuza, 2017), pointed out that there are two ontologically and epistemologically different conceptions of climate or work environment. The first is the objectivistic (or realistic) approach within which the climate exists independently of the members' perceptions of the observed recurrent patterns of behavior and interaction. Those taking this approach see organizational members as observers or reporters of the climate.

The second approach is referred to as subjectivistic (or phenomenological). Those taking this approach consider climate residing in the heads of organizational members and as shared and prevailing perceptions of psychologically important aspects of the work environment. These contribute to a shared composite view (or cognitive map) of the climate. Members are considered carriers or creators of the climate.

These two approaches influence the assumptions of those creating instruments, the way they develop items to assess the various dimensions under consideration, as well as the efficacy of aggregation efforts (Chan, 1998; Wallace, et. al., 2013). Both approaches generally manifest themselves in surveys and questionnaires, yet the way they construct the items may differ. For example, taking the objectivistic approach, items may be worded: "people here…". Taking a subjectivistic approach, the items may be worded: "I believe…". The way items are worded can influence the degree to which they are appropriate for any particular level of analysis (e.g. Arthur, Bell, & Edwards, 2007; van Mierlo, Vermunt, & Rutte, 2009), and their ability to be aggregated and interpreted (e.g. Al-Ababneh, 2020; Klein, Conn, Smith, & Sorra, 2001).

Those who develop climate measures would be well served to be explicit about their definition of the key constructs and specify the key ontological assumptions they have made.

Further, they should be consistent in designing their items to reflect their chosen theoretical perspective. This would also be helpful to those who are comparing or making choices among climate instruments.

Levels of Analysis – Aggregating Results

Most instrumentation involves having individuals complete the measure, whether they take a subjectivistic or objectivistic approach. Some measures move their level of analysis from the individual to the team or organizational level for interpretation or application. This raises the issue regarding how should climate be considered: Is it an attribute of the individual or the organization? Scholars have proposed making a clear distinction between individual psychological climate and organizational climate (e.g. Guion,1973; James and Jones,1974).

What emerged from this debate was an approach called composition theory of aggregate climate (James, Demaree, & Wolf, 1984; Joyce & Slocum, 1984). A related, and more recent approach, is referred to as climate strength (e.g. Dickson, Resick, & Hanges, 2006; Perrigino, Chen, Dunford, & Pratt, 2021; Van Vianen, De Pater, Bechtoldt, & Evers, 2011). It was feasible to aggregate individual perceptions if there was evidence of a high degree of consensus or strength of agreement. This led to the development and use of a variety of statistical techniques to assess within-group interrater agreement (e.g. Burke & Dunlap, 2002; James, Demaree, & Wolf, 1993). There is still some controversy regarding the use of these approaches (e.g. Kessler, 2019), yet their use is rather ubiquitous.

Instruments designed to measure the work environment, climate, or culture should be designed at their appropriate level of analysis, and provide a rationale for, and evidence of the efficacy for aggregation. Yet, the advice offered by James and Jones (1974: 1108) should take

precedence: "Only after the conceptual boundaries of organizational climate are spelled out should the measurement and operationalization become matters of major concern."

Etiology: Where did creativity and innovation measures come from?

It is helpful to know what a measure's original need or purpose was that caused its development when comparing or selecting instruments. What problem did it aim to solve? Answers to this question provides some hints regarding how it can be appropriately applied and how it may fit a specific purpose. As Runco and Jaeger (2012, p. 92) indicated: "Good research is integrated into the larger field, citing what came before, in addition to its originality and utility."

The historical roots of taking a facet-specific and multi-disciplinary approach to understanding the organizational milieu for creativity can be traced, in part, to a unique seminar convened at the University of Chicago's Graduate School of Business in 1962, to explore the factors that foster or impede creativity within organizations (Steiner, 1965). Sixteen eminent scientists, scholars, and executives presented their research and points of view on the topic. In the summary volume, Stein (1965, p.155) presented his preliminary research to support taking a transactional approach in this way:

Creativity is a process that occurs in an individual who exists in a social context. Both the complete understanding of the creative process and the increased probability of accurate predictions as to who will and will not manifest creative behavior, therefore, depend on our knowledge of the individual's environment, his psychological characteristics, and the transactions between the two.

Andrews (1965; 1975; Peltz & Andrews, 1966) conducted one of the earliest facet-specific empirical research programs into the creative work environment. They studied the social and psychological factors influencing the creative process of 115 research scientists. They found that intelligence and creative ability were poor predictors of innovative productivity. Andrews (1975) found that the output of these scientists was influenced by: seeing themselves as having

opportunities and responsibility for innovating, exercising relatively large amounts of influence in decision-making, perceiving their supervisory and collegial relationships as positive and their employment as stable, and having a low degree of perceived interference from administrative supervisors.

An important insight from this foundational work was the cumulative effect of these four factors. If none of these conditions were present, the correlation with creative and innovative output was -.97. As one, two, three, and four factors were present the correlations were -.40, -.19, -.07, and .55, respectively. Although many shared the widely-held belief that simply selecting those with high intelligence and creative ability was sufficient to produce innovative productivity – the key was to provide an appropriate fit within their setting (see also: Cummings, 1965). Further, there were multiple elements involved in providing these conditions. It is now quite clear that "…contextual factors often do not act independently" (Agars, et. al., 2012, p. 282).

By the mid 1960's the topic of the climate for creativity was becoming rather central for many creativity researchers. This was highlighted by the Seventh National Research Conference hosted in 1966, with a clear focus on the climate for creativity (Taylor, 1972). It was clear, a long time ago, that the social context that supports creativity and innovation was complex, and that there would be many inter-relationships among the factors operating within the work environment.

The Innovation Climate Measures

Mathisen and Einarsen (2004) included two instruments that were focused on innovation. Their review included a description of the dimensions, as well as some of the psychometric, reliability, and validity information for each of the measures. To supplement the information provided in review, I will provide an overview of the origins, the extent to which the core constructs were

defined, as well as the way the items were constructed (objectivistic or subjectivistic) for four of the assessments reviewed.

Siegel Scale of Support for Innovation (SSSI). This instrument was developed by Siegel and Kaemmerer (1978) and was initially designed to measure five dimensions of climate for innovative organizations based on early experiences in a mental hospital and university graduate program. They clearly specified their focus was on climate and defined its meaning. Siegel concluded that both organizations shared certain common dimensions relating to fostering innovation. He was a clinical psychologist whose early work focused on introducing innovation within the field of mental health (Siegel & Colarelli, 1964; Colarelli & Siegel, 1966). The developers of the SSSI applied a series of studies using high school teachers and students within both traditional and innovative schools to test their measure. Siegel and Kaemmerer (1978: p. 554) provided the following short but clear definitions: "…an innovative organization was defined as one that fosters the creative functioning of its members. A traditional organization was defined as one that is not specifically oriented toward fostering the creative functioning of its members." The final in the series of studies yielded three dimensions: support for creativity, tolerance of differences, and personal commitment. The SSSI was designed to assess perceived support for innovation at the organizational level of analysis, and the resulting three dimensions seem commensurate to a climate for innovation. They did not provide support for aggregating to this level of analysis.

The items that comprise these dimensions were presented in a variety of ways. Some contain multiple phrases and concepts (i.e. "Members of this organization realize that in dealing with new problems and tasks, frustration is inevitable; therefore it is handled constructively.") Some require respondents to provide an opinion at a subjective level (i.e. "This organization is open and responsive to change.") Other items focused on the respondent as a referent (i.e. "I

mostly agree with how we do things here.") Although the authors were explicitly aware of the contrasting objective-subjective approach, the items seem to be designed as a mixture of both.

Scott and Bruce (1994) utilized a modification of the SSSI in their study of innovative work behavior to assess the climate for innovation. They chose not to use the personal commitment scale due to its failure to distinguish between innovative and traditional organizations. Also, they considered commitment as an outcome rather than a dimension of climate. As a result they included some items from the Support for Creativity and Tolerance for Differences scale of the SSSI, as well as other items related to the purpose of their study. Quite a few studies have applied the Scott and Bruce Climate for Innovation Scale (e.g. Jung, Chow & Wu, 2003; Khalili, 2016).

Team Climate Inventory (TCI). The TCI was developed by Anderson and West (1996; 1998) and was designed to address the need for an instrument to measure the proximal work-group level of the climate for innovation. The instrument is founded on a four-factor theory of the facet-specific climate for innovation primarily derived from earlier research and literature. For example, Anderson, Hardy and West (1990) highlighted the efforts of a program of research initiated in 1985, designed to address fundamental questions about innovation at work. The aims included identifying: factors that help or hinder innovation; what distinguishes high and low innovation within work groups; among others.

The TCI is clearly and explicitly anchored on innovation, and the developers published comprehensive reviews linking innovation with climate at the group level of analysis (e.g. Anderson, 1992; Anderson & King, 1993; King & Anderson, 1990; West, 1990). They provided definitions of the core constructs. The foundational research was conducted within the context of healthcare teams within the British National Health Service (West & Anderson, 1992; 1996; West & Wallace, 1991).

Each of the four major scales are broken down into subscales with multiple items and all the scales appear to be commensurate with the core constructs. The 1996 version of the TCI contained 44 items, the 1998 version contains 61 items. Four items from the SSSI were integrated into the TCI. Some of the items ask the respondent for a phenomenological or subjective opinion (e.g. How clear are you about what your team's objectives are?). Other items ask the respondent to make observations about patterns of behavior (e.g. People keep each other informed about work-related issues.). Anderson and West (1996) provided some examples of application of the TCI on two teams, but no information was available to support aggregation of the individual results.

The TCI has been translated in numerous languages (e.g. Mathisen, Torsheim, & Einarsen, 2006; Tseng, Liu, & West, 2009). The TCI has been, and continues to be, the subject of ongoing research (e.g. Hülsheger, Anderson, & Salgado, 2009; Stollberger, West, & Sacramento, 2019; Xu, Liang, & Wang, 2019).

The Creative Climate Measures

Three creative climate measures were included in the review. The KEYS assessment, the Creative Climate Questionnaire (CCQ), and the Situational Outlook Questionnaire (SOQ). Mathisen and Einarsen (2004) treated the CCQ and SOQ conjointly. For the purposes of this article, the SOQ will be treated in a separate section.

Work Environment Inventory (WEI) and KEYS: Assessing the climate for creativity. The precursor to the KEYS assessment was the WEI, and both are based on Amabile's componential model of creativity (Amabile, 1983). A key element of her model, and the main idea behind the development of the assessments, was that task motivation can be strongly affected by the work environment (Amabile & Sensabaugh, 1985a; 1985b).

The WEI stems from a research project initiated in 1983, that included 120 R&D scientists from more than two dozen organizations from multiple countries. Interviews were conducted and analyzed to identify organizational stimulants and obstacles to creativity (See Amabile & Gryskiewicz, 1987; Burnside, Amabile, & Gryskiewicz, 1988). Later, scales were developed to measure eight stimulants and four obstacles within the work environment for creativity (Amabile & Gryskiewicz, 1989). Amabile and Gryskiewicz (1988: p. 501-502) described the aim of this work:

Our long-term goal is to develop a reliable and valid method for assessing the environment in any R&D lab, indicating how particular individuals in that lab would be affected by that environment and suggesting specific approaches for improving the creativity climate.

The WEI originally consisted of 135 items, with 100 requiring a numerical response, and others providing for open-ended written responses. The current refinement of the WEI (KEYS) includes 78 items for five stimulants and two obstacle scales, as well as two criterion scales.

KEYS is designed to approach both creativity and innovation, which are both described and defined. It is unclear regarding whether the intention is to approach the overall work environment or climate. Amabile, Conti, Coon, Lazenby, and Herron (1996: p. 1155) indicated that: "KEYS was designed to assess perceptions of all of the work environment dimensions that have been suggested as important in empirical research and theory on creativity in organizations." The stated instructions to participants define current work environment as "…the day-to-day social and physical environment in which you currently do most or all your work" (Amabile, et. al., 1996: p. 1165). Yet, the Center for Creative Leadership's web site promotes KEYS as a survey that assesses the climate for creativity and innovation.

The dimensions included within KEYS clearly relate to the work environment for creativity and innovation. However, if the full context or work environment within organizations is the

intended scope of the measure, it does not cover the full range of dimensions that should be included (e.g. structure, size, space, organizational culture, etc.). Some of the items treat the respondent as an observer of objective climate (e.g. People are encouraged to solve problems creatively in this organization). Others require participants to make a subjective judgment (e.g. My supervisor serves as a good work model). The intention to treat the respondent objectively or subjectively is unclear.

KEYS has been translated into numerous languages (e.g. Mostafa, 2005; Tseng & Liu, 2011; Vveinhardt & Ganusauskaite, 2021). The KEYS assessment has been (and continues to be) the subject of ongoing research (e.g. Lee & Yoo, 2020; Ramos, Figueiredo, & Pereira-Guizzo, 2018; van Esch, Wei, & Chiang, 2016).

The Creative Climate Questionnaire (CCQ). The origins of the CCQ stem from Ekvall's three decades of studying suggestors and suggestion systems within organizations (Ekvall, 1966; 1971; 1976; 1995) prior to turning his attention to the work environment for creativity and innovation. Ekvall focused his initial attention on the characteristics and attributes of the individuals who provided suggestions in the 1950's and 60's, but eventually came to the understanding of the importance of the work environment in supporting extra-role creative behavior in organizations. Then, in the later 70's and early 80's began delving into the available literature of the work environment, climate, and culture for creativity and innovation (e.g. James & Jones, 1974; Payne & Pugh, 1976; Schein, 1985; Schneider, 1975). He was already well aware of (and contributed to) the creativity and innovation literature at that time (Ekvall, 1972; 1981; 1984; 1988; Ekvall & Parnes, 1989), but deliberately focused his search on the streams of literature related to climate, culture, and the work environment.

Ekvall (1987) conceived of climate as an attribute of the organization that exists independently of organization members' perceptions and apperceptions, yet acknowledged that measurement can be accomplished by treating members as observers of this reality. In an earlier publication, Ekvall stated: "It is possible to study climate on the basis on these individual perceptions. But, this is not the same as saying that climate is the perceptions" (Ekvall, 1983: p. 5). He offered detailed conceptual and theoretical foundations for these and other issues (Ekvall, 1989; 2001).

Ekvall's (1983) first iteration of the CCQ stemmed from the development of a theoretical framework and conceptual model of the organizational social system based on the available literature. Ekvall (1996: p. 105) defined climate as:

…an attribute of the organization, conglomerate of attitudes, feelings and behaviors which characterize life in the organization, and exists independently of the perceptions and understandings of the members of the organization.

He also defined and differentiated climate from other constructs within the social system of the organization such as structure and culture.

Ekvall (1983) initially identified four main variables as associated with a creative climate. The first was mutual trust and confidence that reflected support for ideas and open relationships. The second was challenge and motivation reflecting commitment to the organization's goals and activities. The third was freedom to seek information and take initiative. The final variable was called pluralism in views, knowledge and experience reflecting the exchange of opinions and ideas.

Ekvall, Arvonen, and Waldenström-Lindblad (1983) examined the results from Ekvall (1983) and constructed another version of the CCQ that assessed seven factors of climate. These included: Challenge, Support for Ideas, Trust, Freedom in the organization, Freedom in the job, Dynamism, and Tension. Sjölander (1983) conducted further factor analysis from these results

and identified ten factors within the CCQ. For example, the tension dimension was separated into two factors: Conflict and Debate. This version included 50 items and was applied in a program of research program sponsored by The Swedish Council of Personnel Administration; FArådet and The Swedish Council for Management and Work Life Issues (Ekvall, Arvonen & Nyström, 1987). The dimensions of the CCQ clearly relate to the bounded definition of climate Ekvall provided.

The items of the CCQ treat respondents as observers of the climate (e.g. The work here is stimulating and generates new ideas; There is often heated debate here). The psychometrics and evidence of reliability and validity was summarized within two Swedish technical manuals (Ekvall, 1992; 2001), and another in English (Ekvall, 2004). Since 2007, Ekvall and I summarized the conceptual and historical foundations of both the Swedish CCQ, the English CCQ translations, and the SOQ (Isaksen & Ekvall, 2007; 2015a). We also summarized the detailed steps involved in developing the original Swedish CCQ, its translations, and the development of the SOQ (Isaksen & Ekvall, 2007; 2015b).

The early research on the Swedish CCQ established the ability of the 10 climate dimensions to distinguish between innovative and stagnated organizations and departments (Ekvall, 1991; 1993; 1996; 1997a & b; Ekvall & Tångeberg-Andersson, 1986; Mohamed, 1995). Studies were also conducted to determine the relationships between the CCQ and measures of organizational and national culture (Abdullah, Chik, & Deen, 2006; Bavec, 2009; Zin, Richardson, & Adam, 2002).

The Swedish CCQ has also been applied, to a large extent, within the Scandinavian healthcare system. The CCQ was applied to examine working conditions, patient satisfaction, and quality of daily life in healthcare facilities (Lövgren, Rasmussen, & Engstrom, 2002; Norbergh, Hellzén, Sandman, & Asplund, 2002; Hellzén, Kristiansen, & Norbergh, 2004). The dimensions

of the Swedish CCQ have been applied to examine the relationship between job strain and the creative climate in home care services (Fallahpour, Borell, Sandberg, & Boström, 2020; Lundström, Graneheim, Eismann, Richter, & Åström, 2005; Sandberg, Borell, Edvardsson, Rosenberg, & Boström, 2018). Sellgren, Ekvall, & Tomson (2008) examined the relationship amongst leadership behavior, job satisfaction, and climate for creativity with nurse managers. The CCQ dimensions were also able to distinguish between types of settings for adults with autism spectrum disorders (Benderix, 2009).

Ekvall's CCQ was also applied outside the healthcare industry. Sundgren, Dimenäs, Gustafsson, and Selart (2005) examined a path model for organizational creativity within pharmaceutical research and development using creative climate as a dependent variable. It has also been widely applied to examine the effects of climate on the effective introduction organizational innovations for technology (e.g. Arvisson, Johansson, Ek, & Akelsson, 2006), new approaches to healthcare (e.g. Carifjord & Festin, 2015), and general capabilities to produce innovative outcomes (e.g. Björkdahl 2011). It has also been productively applied to examine the introduction of innovation to service-oriented retailers (Olsson, Paredes, Johanssen, Roese, & Ritzén, 2019), as well as forest-based Nordic manufacturers (e.g. Björkdahl & Börgsson, 2011). Further, it has been applied to help understand the nuances of goal clarity versus ambiguity for innovation within the research and development context (Stetler & Magnusson, 2015).

The Situational Outlook Questionnaire (SOQ)

The SOQ started out as a direct translation into English of Ekvall's ten dimensional CCQ, so it is understandable that scholars would treat both measures conjointly. However, some meaningful structural and methodological changes occurred following the initial translation that warrant an independent presentation of the SOQ.

Collaboration with Ekvall

We chose to collaborate with Ekvall on the CCQ for a number of reasons. First, and foremost, his work fell clearly within the research mission of our academic program. We had conducted numerous impact studies of creative problem solving (CPS) to examine what was really working within organizations that provided training (see: Isaksen & Treffinger, 2004). We had already discovered that everyone did not bring the same thing to CPS, or needed the same things from CPS. That led to the cognitive styles project (see: Isaksen, 2004) to further examine what works for whom? These efforts lead to some major improvement and changes to CPS, yet, as we continued to conduct impact studies we were learning that folks who were trained were identifying aspects of their work environment that helped and hindered their application. As a result, our (Isaksen, 2020b; Isaksen, Puccio, & Treffinger, 1993; Isaksen, Stein, Hills, & Gryskiewicz, 1984) guiding research question became: what works, for whom, under what circumstances?

Ekvall had already established a working relationship with Sid Parnes (the founder of our academic program), and was invited to visit our center. During his visits in the early 1980's he had the opportunity to present his work on the CCQ. We chose to collaborate with Ekvall due to the degree to which he provided conceptual and theoretical clarity in attempting to understand the climate for creativity and innovation. He provided clear definitions and distinctions that were consistent with the expanding literature, as well as a clear conceptual model that located climate as a key intervening variable that could be approached at multiple levels of analysis. The instrument itself was designed to enable examination at multiple levels of analysis, and was consistent with the notion of referent shift (Chan, 1998; Van Mierlo, Vermunt, & Rutte, 2009; Wallace, et. al., 2013). The items were designed to treat respondents as observers of the climate (i.e. items were phrased "People here…). His conceptual model was the first to locate climate as

an intervening variable that could be influenced by numerous antecedent variables (such as leadership, organizational culture, resources, etc.) and then influence numerous organizational outcomes (well-being, levels of innovation, etc.). Ekvall identified leadership behavior as one of the key antecedents to climate, and conducted numerous investigations to explore the impact of leadership on the climate for creativity (Ekvall, 1991; Ekvall & Arvonen, 1991; Ekvall & Ryhammar, 1999).

Ekvall embraced an engaged and pluralistic approach to research and practice (Van de Ven & Johnson, 2006) by working to close the gap between theory and application. In addition to his academic professorship, he worked for decades with communities of practitioners and scholars to integrate what was known at the time. He demonstrated his interest in both rigor and relevance, and shared a series of detailed studies (published, and non-published) and manual with us that demonstrated substantial evidence to support the CCQ. For us, it was clear that the CCQ would offer great value to our research mission, as well as to our outreach practice.

Ekvall was also open to close collaboration in formulating research, providing input on further development, and a willingness to help us reshape his original conceptual model (Ekvall, 1983). For example, Ekvall (1983; 1996; 1997) shared his original conceptualization of organizational climate with us, and then worked with us to update his model with a few additional elements, including the external environment (Isaksen, Lauer, Ekvall & Britz, 2001).

Another example of the collaborative efforts focused on Ekvall's willingness to translate his original technical manual (Ekvall, 2001) and include the extensive psychometric, reliability, and validity information in a new English technical manual that also included similar information on the SOQ (Isaksen & Ekvall, 2007). This created a resource that included results from numerous unpublished dissertations and theses, as well as many published articles on both the CCQ and SOQ

to be summarized in one place. It also represented a major advancement to the earlier technical manual on just the SOQ (Isaksen, Lauer, Murdock, Dorval, & Puccio, 1995).

This new technical manual was subjected to external review (Sample, 2010: p. 550), and the summary concluded:

Ekvall, Isaksen, and associates make a strong argument for the effect of organizational climate on change, creativity, and innovation. The developers of the SOQ provide a solid foundation for the theory, nature, and context for change, including a useful distinction between an organization's climate and culture. The history for the identification of dimensions and items for the SOQ, and its predecessor the CCQ, are supported by more than adequate attention to reliability, validity, and related analysis.

Since then, a revised and updated series of technical resources became available for free digital download from soqonline.net. The current annotated bibliography contains over 67 dissertations and theses, more than 183 selected and published articles and chapters, as well as additional scholarly literature (Isaksen, 2020a), and is available to anyone who's interested.

Initial Translation

The current version of the SOQ is the seventh in the series. Following its initial translation from Swedish in 1986, we collected data from 416 subjects, and then examined item distributions, item to scale correlations, internal reliability, intercorrelations among the dimensions, as well as exploratory factor analysis. This analysis provided the basis for improving the wording of the items in an effort to be true to the original and move toward linguistic relativity of the translation (Casasanto, 2016; Van de Vijver & Hambleton, 1996) In 1989 and 1991, we followed the same procedure with a sample of 1844 and 1297 subjects respectively.

Fusion of Dimensions

Analysis of results from 6,390 subjects by 1995, resulted in reducing the number of factors from ten to nine. One of Ekvall's original 10 dimensions was called dynamism and liveliness, and after

a number of factor-analytic investigations, many of the items on that scale, along with the challenge and motivation scale seemed to coalesce on a larger factor which we named challenge and involvement, which integrated the conceptual content of the two previous dimensions. The items for this scale were culled based on the strength of their loading on this redefined dimension. These efforts were summarized in great detail in a thesis (Cabra, 1996), our technical manual (Isaksen, Lauer, Murdock, Dorval, & Puccio, 1995), and in later versions of the technical manual and other publications (Isaksen & Ekvall, 2007; 2015 a, b, c; Porter, 2010).

Later research identified challenge and involvement to be conceptually and empirically related to job engagement (Macey & Schneider, 2008; Schaufeli & Salanova, 2011). Lofquist, Isaksen**,** and Dahl (2018) conducted a multi-method study applying the SOQ and the UWES9 measure of work engagement (Schaufeli, Bakker, & Salanova, 2006). The UWES9 measures vigor (the level of energy, resilience, and willingness to invest effort), dedication (sense of significance of one's work, feeling inspired and challenged), and absorption (being immersed in one's work). All eight positive dimensions of the SOQ correlated significantly with work engagement, and conflict correlated negatively and significantly. As expected, the strongest relationship was found with the challenge and involvement dimension of the SOQ (r =.71, p <.0001).

Climate and Work Environment

The second major transformation included broadening the instrument from being a measure of the nine dimensions of climate to an assessment of the work environment for creativity and innovation. While conducting an applied study using the third version of the translation, one of the respondents wrote a long note on the paper version he had been sent to complete. He indicated that he knew what we were trying to assess, but that the questions were missing some important aspects of his work environment.

Fortunately, one of our faculty members had expertise in qualitative research, and she helped to design and develop three open-ended questions enabling respondents to identify aspects of their work environment that help them be creative, hinder their creativity, and offer concrete suggestions for improving their work environment. The narrative responses to these three questions can be analyzed qualitatively to provide clear practical implications for making positive change (see Isaksen, 2007b; Isaksen & Tidd, 2006). The analysis also allows the identification of salient factors within the specific context of the assessment, as well as further elaboration on the nine dimensions of climate.

In addition to the practical value of the narrative results, we were able to build a substantial database that included both the numeric and narrative data. This permitted cross-site analysis of the narrative responses (e.g. Sobieck, 1996; Dutcher, 1997). Generally, the narrative results were shown to provide elaboration regarding the nine dimensions, but also identified numerous factors within the work environment that fell outside our definition of climate.

This qualitative work created an opportunity to revisit the conceptual model for both the CCQ and SOQ. Since subjects could identify any salient aspect of their work environment in response to the open-ended questions, we could use this data to see how well the conceptual model included factors that were relevant within a wide variety of settings (see: Geurts, 2009). The results from examining the narrative results from 958 participants in multiple diverse organizations and industries showed that we were, in fact, missing some key elements from the work environment for creativity and innovation (Isaksen, 2013; 2017). For example, physical space, or aspects of team structural or process characteristics were not included. This work resulted in a modified conceptual model (see Figure One) to help guide future research and practice.

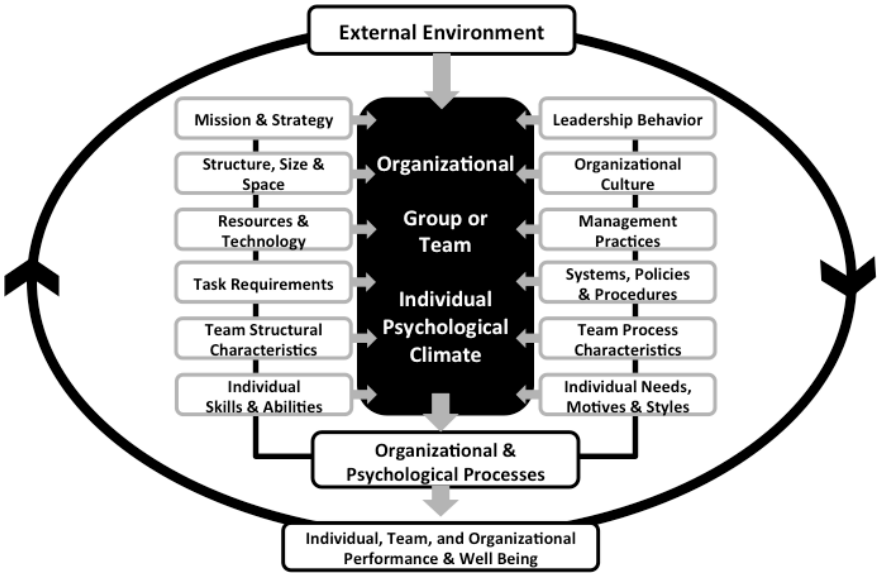

Figure One: A Climate-Centric Model for Organizational Creativity and Innovation

The addition of the narrative open-ended questions provided an unique opportunity to build on the quantitative results from the climate dimensions and provide deeper insight into other aspects of the work environment. This has led to a series of multi-method studies (e.g. Hoßbach, 2019; Lofquist & Isaksen, 2019; Lofquist, Isaksen & Dahl, 2018; Swinnen, Teirlinck, & Isaksen, 2019).

SOQ Psychometrics

Further refinements were conducted in 1998, 2001, and 2009 with samples of 1,111; 4,730; and 3,491 subjects respectively. Detailed reporting of the psychometrics, samples, as well as research studies on reliability and validity, were reported in Isaksen and Ekvall (2015b). The psychometric results reported here were conducted on a sample of 20,907 subjects. This includes multiple samples of convenience, rather than a single random sample from 335 applications of the SOQ. For the 14,638 subjects reporting their gender, 5,747 were female (39.3%), and 8,891 were male

(60.7%). For the 14,391 subjects reporting their age, the average was 42 years old, with a range from 18 to 81.

The 53 items are scored on a scale from zero (not at all applicable) to three (applicable to a high degree) and scores for each dimension are multiplied by 100 to produce a final result that ranges from zero to 300. Table 1 presents the name of the dimension, its definition and sample items, as well as its mean, range, standard deviation, standard error of the measure, and its Cronbach's Alpha.

Table 1: Dimensions of the SOQ

SOQ Climate Dimension	Definition and Sample Items	Mean	Range	SD	Sem	Alpha
Challenge/ Involvement	The degree to which people are involved in daily operations, long-term goals, and visions. High Challenge/Involvement implies better levels of engagement, commitment, and motivation. **Sample Items:** People here take a sincere interest in their work. People here feel deeply committed to their jobs.	223	0-300	54.4	19.3	.88
Freedom	The degree of independence shown by the people in the organization. High levels of Freedom imply more perceived autonomy and ability for individual discretion. **Sample Items:** People here make their own choices about their daily work. People here feel free to set their own priorities.	176	0-300	57.7	23.1	.84
Trust/ Openness	The emotional safety in relationships. In high Trust/Openness situations people feel more comfortable sharing ideas and being frank and honest with each other. **Sample Items:** People here believe in and trust each other. People here keep their commitments to each other.	182	0-300	61.0	29.1	.79
Idea-Time	The amount of time people can, and do, use for elaborating new ideas. When Idea-Time is high people can explore and develop new ideas that may not have been included in the original task. **Sample Items:** People here take time to test new ideas. Time is available to explore new ideas here.	146	0-300	62.4	22.0	.87
Playfulness/ Humor	The spontaneity and ease displayed within the workplace. Good-natured joking and laughter and a relaxed atmosphere (lower stress) are indicators of higher levels of Playfulness and Humor. **Sample Items:** People here exhibit a sense of humor. A playful atmosphere prevails here.	184	0-300	63.9	22.0	.88
Conflict	The presence of personal and emotional tensions (a negative dimension – in contrast to the debate dimension). When Conflict is high people engage in interpersonal warfare, slander and gossip, and even plot against each other. **Sample Items:** There is a great deal of personal tension here. The atmosphere is filled with gossip and slander.	86	0-300	67.6	25.4	.86

Idea-Support	The way new ideas are treated. In a high Idea-Support situation people receive ideas and suggestions in an attentive and professional manner. People listen generously to each other. **Sample Items:** People here receive support and encouragement when presenting new ideas. People generally share their ideas here because they are listened to and encouraged.	191	0-300	63.6	20.5	.90
Debate	The occurrence and open disagreement between viewpoints, ideas, experiences, and knowledge. In the Debating situation many different voices and points of view are exchanged and encouraged. **Sample Items:** Many different points of view are shared here during discussion. People here often discuss different points of view.	193	0-300	57.7	20.1	.88
Risk-Taking	The tolerance of uncertainty and ambiguity. In a high Risk-Taking climate people can make decisions even when they do not have certainty and all the information desired. People can and do "go out on a limb" to put new ideas forward. **Sample Items:** People here feel as though they can take bold action even if the outcome in unclear. People here can move forward here even in the face of uncertainty.	153	0-300	57.7	25.7	.81

The mean for the conflict dimension is generally lower than that of the other dimensions, given that it is a negative dimension. Both conflict and debate dimensions relate to the existence of tension, yet conflict focuses on personal tension and debate focuses on idea tension. We consider these as two faces of tension within organizational climate (Isaksen & Ekvall, 2010).

Table 2 presents the intercorrelations of the nine dimensions of climate. As expected, conflict is negatively correlated with the other eight positive dimensions. The pattern of correlations illustrate that the dimensions share some degree of relationship with the concept of creative climate.

Table 2: Intercorrelations of Dimensions

SOQ Climate Dimension	1	2	3	4	5	6	7	8	9
Challenge/Involvement	1.00								
Freedom	.47	1.00							
Trust/Openness	.64	.39	1.00						
Idea-Time	.52	.49	.42	1.00					
Playfulness/Humor	.58	.41	.53	.50	1.00				
Conflict	-.45	-.17	-.53	-.25	-.37	1.00			
Idea-Support	.70	.48	.62	.64	.62	-.44	1.00		
Debate	.53	.44	.44	.50	.49	-.19	.65	1.00	
Risk-Taking	.55	.55	.46	.58	.50	-.18	.65	.59	1.00

All correlations are $p \leq 0.001$

Iterative exploratory factor analyses (EFA) have identified that the 53 items coherently reduce to nine independent factors (e.g. Dackert & Carlsson, 2007; Isaksen, Lauer, & Ekvall, 1999; Isaksen, 2007a; Porter, 2010; Sample, 2010). The current EFA, presented in Table 3, utilized principal component analysis with a Promax rotation shows that the nine factors account for 61.2% of the variance. The rotation converged after seven rotations. Six of the 53 items co-load beyond .30 on other factorial components.

Two studies have conducted confirmatory factor analysis on the SOQ. Isaksen and Aerts (2011) conducted a confirmatory factor analysis with 225 samples of convenience (N=7,345) resulting in an adequate fit of the nine-dimensional model (χ^2 (1238)=17,568, *GFI*=.88, *AGFI*=.87, *TLI*=.89, *NFI*=.89, and *RMSEA*=.047). Swinnen, Teirlinck and Isaksen (2019) conducted a confirmatory factor analysis with a sample of 180 aerospace engineers and also reported adequate fit of the nine-dimensional model (χ^2=2404.7, *GFI*=.87, *AGFI*=.85, *TLI*=.90, *CFI*=.91, and *RMSEA*=.05).

Evidence of Reliability and Validity of the Climate Dimensions

The climate dimensions assessed by the English translation of the CCQ, and the SOQ have been shown to have adequate levels of internal reliability and stability over time (Isaksen & Ekvall, 2007; 2015a; 2015b; Isaksen, Lauer, & Ekvall, 1999). The dimension have been applied on the individual level as psychological climate (Isaksen & Lauer, 1999), team or group climate (Al-Beraidi & Rickards, 2003; Ekvall, 1993; Isaksen & Lauer, 2002), as well as the organizational level of analysis (Isaksen & Ekvall, 2010). These and other studies have demonstrated the ability to productively aggregate individual responses. More recently, the dimensions have also been applied at a national level of analysis (Hodge, 2021).

Table 3: Principle Component Analysis (Promax Rotation)
SOQ Version 7

Theoretic Dimensional Items	Component								
	1	2	3	4	5	6	7	8	9
Challenge/Involvement 1	.64								
Challenge/Involvement 2	.75								
Challenge/Involvement 3	.86								
Challenge/Involvement 4	<.30						.41		
Challenge/Involvement 5	.74								
Challenge/Involvement 6	.62								
Challenge/Involvement 7	.87								
Conflict 1		-.77							
Conflict 2		-.81							
Conflict 3		-.84							
Conflict 4		-.79							
Conflict 5		-.72							
Conflict 6		-.74							
Playfulness/Humor 1			.84						
Playfulness/Humor 2			.57						
Playfulness/Humor 3			.90						
Playfulness/Humor 4			.77						
Playfulness/Humor 5			.92						
Playfulness/Humor 6			.61						
Idea-Time 1				.36			.35		
Idea-Time 2				.32				.31	
Idea-Time 3				.86					
Idea-Time 4				.97					
Idea-Time 5				.88					
Idea-Time 6				.92					
Freedom 1					.83				
Freedom 2					.76				
Freedom 3					.67				
Freedom 4					.79				
Freedom 5					.61				
Freedom 6					.66				
Debate 1						.60	.34		
Debate 2						.82			
Debate 3						.83			
Debate 4						.69			
Debate 5						.62	.		
Debate 6						<.30	.64		
Idea-Support 1							1.03		
Idea-Support 2							.95		
Idea-Support 3							.75		
Idea-Support 4							.75		
Idea-Support 5							.84		
Risk-Taking 1								.47	
Risk-Taking 2								.75	
Risk-Taking 3								.74	
Risk-Taking 4							.31	.48	
Risk-Taking 5								.80	
Trust and Openness 1									.88
Trust and Openness 2									<.30
Trust and Openness 3									.85
Trust and Openness 4									.31
Trust and Openness 5	.42								<.30
Eigenvalues	17.40	3.90	2.25	2.23	1.82	1.62	1.27	1.08	0.99
% Variance Accounted for by Factors	32.84	7.36	4.25	4.02	3.43	3.06	2.39	2.03	1.86

The dimensions have successfully differentiated organizational levels of innovative productivity (e.g. Bertels, Kleinschmidt, & Koen, 2011; Ekvall, 1996; Nasurdin, Ling, & Hou, 2014; Shanker, Bhanugopan, & van der Heijden, 2017). The dimensions have also shown positive relationships to higher sales volumes, market share, profitability, and greater impact from implementing new social and technical systems (like self-managed teams), in addition to implementing more complex work designs (e.g. Davis, 2000; Firenze, 1998; Porzse, Takacs, Csedo, Sara, & Fejes, 2012).

Further, the dimensions have also been linked to perceived support for creativity within organizations (Biekart, 2014; Erickson, 2010; Knox, 2003; Isaksen & Lauer, 2001). The dimensions correlate significantly, and in expected directions, with the Survey of Creative and Innovative Performance (Puccio, Treffinger, & Talbot, 1995), as well as an earlier version of KEYS - the Work Environment Inventory (Ryhammar, 1996).

Since organizational innovation and creativity imply transformation and change, the dimensions have also been linked to climate that supports organizational change and transformation (e.g. Douglas, Muturi, Douglas, & Ochieng, 2017; Lofquist, & Isaksen, 2019), and organizational capacity to support entrepreneurship (Abbasinezhad, 2017), organizational resilience (Mafabi, Munene, & Ahiauzu, 2015), and the ability of organizations to cope with the complexities of knowledge-intensive industries (Lone, et. al., 2014).

Feedback on the dimensions has demonstrated ability to help organizations make improvements in their ability to produce technological innovation (Abdel-Razek & Alharbi, 2017) and increase the effectiveness of organizational scenario planning (Chermack, Coons, Nimon, Bradley & Glick, 2015). The dimensions have provided insight into the relationships among creative climate, knowledge-sharing, and innovative work behavior within start-ups. Munir & Beh

(2019) found that a creative organizational climate affects knowledge-sharing, which ultimately affects innovative work behavior. Two integrative reviews of the literature provide support for the intervening nature of the dimensions between strategic human resource practices and innovative organizational performance (Iqbal, 2019; Loewenberger, 2013). The intervening nature of the dimensions of creative climate was also supported by Zubair, Bashir, Abrar, Baig, & Hassan (2015). They found that creative climate acted as a partial mediator between employee participation in decision making and managers' encouragement of creativity on employee creativity.

Although the origin of the dimensions was the facet-specific area of organizational creativity, innovation and change, it has been applied to examine numerous other related constructs, such as organizational citizenship behaviors (e.g. Turnipseed, 1994; Turnipseed & Turnipseed, 2013), well-being (e.g. Rasulzada & Dackert, 2009), levels of collaboration (e.g. Bushart, 2015), job satisfaction (e.g. Yee, Pink, & Sern, 2014), a firm's competitiveness (e.g. Zain & Kassim, 2012), and job engagement (e.g. Lofquist, Isaksen, & Dahl, 2018). A study conducted by Talbot, Cooper and Barrow (1992) demonstrated that lower scores on the positive dimensions of climate (as well as a higher score on the negative dimension of conflict) were associated with higher levels of stress arising from relationships with others within the same organizations. Similar findings were reported within the health care industry (Sandberg, Borell, Edvardsson, Rosenberg, & Boström, 2018). A series of studies found significant differences on the dimensions for best versus worst-case work situations (Isaksen, Lauer, Ekvall, & Britz, 2001; Isaksen & Aerts, 2011; Hoßbach, 2019).

The dimensions have also demonstrated relevance to learning. Aliberti, and Paolino (2018) found that the creative climate dimensions were linked to learning and transfer of training,

particularly within work environments characterized by technological learning. Allen and Zeisler (2015) have applied the dimensions to military leadership training. Cirella, Canterino, Guerci, and Shani (2016) found that the dimensions were related to cognitive, structural, and procedural learning mechanisms. The dimensions of creative climate were also found to be related to collaborative learning (Hong, Chang, & Chai, 2014) and to an organizational learning culture (Ismail, 2005; Sundgren, Dimenäs, Gustofsson, & Selart, 2005). In a study of 15 English secondary schools, McLellan and Nicholl (2013) found that the dimensions of creative climate were able to distinguish differences in perceptions of the students versus their teachers. Students did not see their classroom climates as conducive to their creativity, but their teachers did.

Going Forward

Currently, the Mathisen and Einarsen (2004) review is the only one available that provides a comparative review of multiple assessments aimed at measuring the work environment for creativity and innovation. From a practical point of view, the need has never been greater. The pandemic has demanded higher levels of organizational resilience, sped up the digital transformation, and, among other factors – has changed the nature of the workplace. Given the importance of this topic for current and future research and practice, we would expect that new measures will be developed and applied. In fact, a number of new measures have been produced since the review (e.g. Licul, & Jurisevic, 2020; Mayflield & Mayfield, 2010; Rao, & Weintraub, 2013; Remneland-Wikhamn & Wikhamn, 2011; Zheng, Jin, & Ma, 2009). In addition to new measures, others have modified or shortened scales of existing instruments (e.g. Chen, Gong, Song, & Wang, 2021; Kivimaki & Elovainio, 1999; Tri, Nga, & Sipko, 2019). We will surely need future comprehensive reviews of existing measures.

Secondary sources like reviews are a good place to start, yet scholars and practitioners ought to seek out and review primary sources. The reviewers offered four criteria for selecting the assessments for their review. I build on theirs, and offer the following nine criteria for those who may conduct those reviews, and for those who may develop measures, or need to choose to apply an instrument for research or practice. These are not meant to be exhaustive, nor are they mutually exclusive.

Does the measure…

Provide clear bounded definitions and conceptualizations?

The operationalization of measures aimed at understanding or impacting the work environment for creativity and innovation should be based on clear conceptualization and definition, which would also be based on clear, deeper, theoretical foundations. We should expect that measures of the work environment for creativity and innovation would comprehensively assess dimensions of climate, culture, and other variables within the broader work environment that are likely to affect creativity and innovation. Likewise, measures of culture for creativity and innovation would assess deeper constructs like values, beliefs, and shared assumptions. Finally, measures of creative climate would assess dimensions that reflect the shared perceptions of patterns of observed behavior related to creativity and innovation.

Fit the purpose of the application?

Having the benefit of clear definitions and boundaries allows improved decision making about the development or use of any assessment. For example, if your interest is focused more on creativity, then knowing that the measure is designed based on that construct may ensure a better fit for your purpose. Similarly, if the interest is more on climate, rather than on the broader construct of work environment, knowing that the measure is aimed at climate rather than on culture provides

improved fit for your purpose. Decision making may also be enhanced by knowing why the measure was developed in the first place.

Contain items consistent with the approach implied by definitions?

Depending on whether the developers of the instrument see the climate, culture, or work environment as something that exists objectively, or as something that resides in the perceptions of the respondents, the items should be phrased appropriately. The way the items are worded (their referent) can make a difference in how well they can be aggregated. The design of the items should be commensurate to the constructs and the key assumptions about how the participants are to be treated. Moving in this direction will surely serve to clarify the creative climate construct.

Have adequate evidence regarding its psychometric characteristics?

The literature surrounding creative climate measures should include evidence of item performance and distributions, item to scale correlations and internal reliability results, inter-dimensional correlations, error, information on age and gender differences, as well as exploratory and confirmatory factor analysis.

Have evidence of reliability?

There are two main types of reliability: one focuses on stability over time (test-retest), and the other refers to internal reliability (item and dimension consistency). Given that instruments designed to measure creative climate can approach rather dynamic contexts, it may be challenging to present evidence of long-term stability over time. If the creative climate measure is applied in relatively stable environments it may be more plausible. It is also possible to demonstrate parallel reliability applying different forms of the same assessment. Evidence of internal reliability of creative climate assessments and the scales they include should be considered a key requirement.

Have evidence of validity?

Once an instrument demonstrates reliability, we need to know that it measures what is purports to measure. It is important to consider that validity is not an absolute or fixed quality of any measure – it is a matter of degree. Validity is not a unitary concept – there can be a variety of kinds of evidence (e.g. face, predictive, concurrent, content, discriminant, and convergent). It requires an on-going program of research and an accumulation of evidence over time by the instrument developers and contributions from other researchers. Similarly, measures of creative climate should be able to demonstrate practical usefulness and application as well.

Have evidence regarding aggregation?

Many measures ask individuals to complete the instrument, and then combine those individual results at the team, divisional, or organizational levels of analysis. The climate for creativity is a multi-level construct, so instruments should provide evidence that they are capable of successful aggregation or inter-rater reliability.

Have a technical manual?

Measures of creative climate should be supported by a written, and comprehensive technical manual that contains a summary of all the information identified above. In addition, manuals can also provide a variety of other technical resources to support the effective application of the instrument.

Interpretive support?

Manuals, or other sources, may also provide relevant norms or benchmarks to support interpretation and analysis of the results from the measures of creative climate. They may also be supplemented by additional resources to assist in providing feedback, in addition to resources and mechanisms to assist in a variety of applications.

Conclusion

There are a number of reasons that the work environment for creativity and innovation is likely to remain a key topic for scholars and practitioners. It is possible for organizations to find ways to attract and select talent, yet they will not benefit from having that talent if the work environment does not allow for unleashing their creativity. Organizations can develop and provide world-class creativity training and innovation processes, yet people will not be able to apply their learning or engage in the processes if the work environment does not support their efforts. Organizational strategies and vision statements that emphasize the importance of innovation and growth will not be materialized unless the work environment enables the generation and execution of creative initiatives and ideas.

We will continue to need measures that are conceptually and theoretically grounded, empirically sound, and practically useful. When it comes to assessing the work environment for creativity and innovation, a great deal of work remains to be accomplished. First, and foremost, we need improved conceptual clarity. This is particularly true when it comes to the issue of climate and culture. Creativity and innovation researchers who are relatively unaware of the vast literature regarding work environment, climate and culture may consider this merely an issue of semantics. It is clearly much more than that. Clearly specifying and defining what we are measuring is a core prerequisite for developing or reviewing instruments, and influences the number and kind of dimensions to include, and the best approach to item design.

It is surprising that we have not seen the emergence of another comprehensive review of instruments designed to measure this space over the last seventeen years. So much literature has been published in this area and new instruments and modifications of existing measures have been introduced and applied. Our science will not advance as it should without some degree of

appropriate convergence surrounding the nomological network for the work environment for creativity and innovation. Progress toward that end will be limited unless there is improved efforts at synthetic coordination.

References

Abbasinezhad, A. (2017). The relationship between creative climate and entrepreneurship with a mediating role of employee empowerment. *International Journal of Economic Perspectives, 11,* 717-726.

Abdel-Razek, R. H., & Alharbi, F. B. (2017). Assessment of technological innovation climate in organizations. *Journal of Innovation Management, 5,* 34-54. http://creativecommons.org/licenses/by/3.0

Abdullah, H. S., Chik, R., & Deen, R. (2006). Influence of cultural orientation on perceived organizational creativity climate: An exploratory study of two steel plants in Malaysia. *Asian Academy of Management Journal, 11,* 51-72.

Acar, O. A., Tarakci, M., & van Knippenberg, D. (2019). Creativity and innovation under constraints: A cross-disciplinary integration. *Journal of Management, 45,* 96-121. https://doi.org/10.1177%2F0149206318805832.

Acar, S., Burnett, C., & Cabra, J. F. (2017). Ingredients of creativity: Originality and more. *Creativity Research Journal, 29,* 133-144. https://doi.org/10.1080/10400419.2017.1302776.

Agars, M. D., Kaufman, J. C., Deane, A., & Smith, B. (2012). Fostering individual creativity through organizational context: A review of recent research and recommendations for organizational leaders. In M. Mumford (Ed.), *Handbook of organizational creativity* (pp. 271-291). New York: Academic Press.

Al-Ababneh, M. M. (2020). Linking ontology, epistemology and research methodology. *Science & Philosophy, 8,* 75-91.

Al-Beraidi, A., & Rickards, T. (2003). Creative team climate in an international accounting office: an exploratory study in Saudi Arabia. *Managerial Auditing Journal, 18*, 7 – 18.

Aliberti, D., & Paolino, C. (2018). Being absorbed in technological learning environments: Distraction, boredom, and the effects of a creative climate on learning and training transfer. In A. Lazazzara, R. Nacamulli, C. Rossignoli, & S. Za (Eds.), *Organizing for digital innovation* (pp. 189-197). Singapore: Springer.

Allen, D. C., & Zeisler, S. (2015). An educational climate for innovation at the U.S. Army War College. *Leader to Leader, 76,* 27-34.

Amabile, T. M. (1983). The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology, 45,* 357-376. https://doi.org/10.1037/0022-3514.45.2.357.

Amabile, T. M., (1988). A model of creativity and innovation in organizations. *Research in Organizational Behavior, 10,* 123-167.

Amabile, T.M., Conti, R., Coon, H., Lazenby, J., & Herron, M. (1996). Assessing the work environment for creativity. *Academy of Management Journal, 39,* 1154-1184.

Amabile, T. M., & Gryskiewicz, S. S. (1987). *Creativity in the R&D laboratory*. Greensboro, NC: The Center for Creative Leadership.

Amabile, T. M., & Gryskiewicz, S. S. (1988). Creative human resources in the R&D laboratory: How environment and personality affect innovation. In: R. L. Kuhn (Ed.), *Handbook for creative and innovative managers* (pp. 501-524). New York: McGraw-Hill.

Amabile, T. M., & Gryskiewicz, N. D. (1989). The creative environment scales: Work environment inventory. *Creativity Research Journal, 2,* 231-253.

Amabile, T. M., & Pratt, M. G. (2016). The dynamic componential model of creativity and innovation in organizations: Making progress, making meaning. *Research in Organizational Behavior, 36,* 157-183. https://doi.org/10.1016/j.riob.2016.10.001.

Amabile, T. M., & Sensabaugh, S. J. (1985a). *Some factors affecting organizational creativity: A brief report. Paper presented at the Creativity Innovation and Entrepreneurship Symposium.* George Washington University.

Amabile, T. M., & Sensabaugh, S. J. (1985b). High creativity vs. low creativity: What makes the difference? In S. S. Gryskiewicz, & R. M. Burnside (Eds.), *Blueprint for innovation: Proceedings of creativity week VIII* (pp. 43-55). Greensboro, NC: The Center for Creative Leadership.

Anderson, N. R. (1992). `Work group innovation: A state-of-the-art review'. In: D. M. Hosking, & Anderson, N. R. (Eds.), *Organizational change and innovation: Psychological perspectives and practices in Europe* (pp. 127-138). London: Routledge.

Anderson, T. M., Hardy, G., & West, M. (1990). Innovative teams at work. *Personnel Management, 22,* 48-53.

Anderson, N., Potocnik, K., & Zhou, J. (2014). Innovation and creativity in organizations: A state-of-the-science review, prospective commentary, and guiding framework. *Journal of Management, 40,* 1297-1333. https://doi: 10.1177/0149206314527128

Anderson, N.R., & King, N. (1993). Innovation in organizations. In C.L. Cooper & I. T. Robertson (Eds.), *International review* of *industrial and organizational psychology,* 8, 1-34. London: John Wiley.

Anderson, N. R., & West, M. A. (1996). The team climate inventory: Development of the TCI and its applications in teambuilding for innovation. *European Journal of Work and Organizational Psychology, 5,* 53-66.

Anderson, N. R., & West, M. A. (1998). Measuring climate for work group innovation: Development and validation of the team climate inventory. *Journal of Organizational Behavior, 19,* 235-258.

Andrews, F. M. (1965). Factors affecting the manifestation of creative ability by scientists. *Journal of Personality, 33,* 140-152.

Andrews, F. M. (1975). Social and psychological factors which influence the creative process. In I. A. Taylor & J. W. Getzels (Eds.), *Perspectives in creativity* (pp.117-145). Chicago: Aldine.

Argyris, C. (1958). Some problems in conceptualizing organizational climate: A case study of a bank. *Administrative Science Quarterly, 2,* 501-520. https://doi.org/10.2307/2390797.

Arthur, W., Bell, S. T., & Edwards, B. D. (2007). A longitudinal examination of the comparative criterion-related validity of additive and referent-shift consensus operationalization of team efficacy. *Organizational Research Methods, 10,* 35-58. https://doi: 10.1177/1094428106287574

Arvidsson, M., Johansson, C. R., Ek, A., & Akselsson, R. (2006). Organizational climate in air traffic control: Innovative preparedness for implementation of new technology and organizational development in a rule governed organization. *Applied Ergonomics, 37,* 119-129.

Ashforth, B. E. (1985). Climate formation: Issues and extensions. *Academy of Management Review, 10,* 837-847.

Ashkanasky, N. M., Wilderom, C. P., & Peterson, M. F. (Eds.), (2000). *Handbook of organizational culture and climate.* Thousand Oaks, CA: SAGE.

Asif, F. (2011). Estimating the impact of Denison's (1996), What is the difference between organizational culture and organizational climate? A native's point of view on a decade of paradigm wars. *Journal of Business Research, 64,* 454-459. https://doi:10.1016/j.jbusres.2010.03.004

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17,* 99-120.

Bavec, C. (2009). On the creative climate and innovativeness at the country level. *Proceedings of the Rijeka Faculty of Economics*, *University of Rijeka, Faculty of Economics ,27(1)*, 9-30.

Benderix, Y., Nordstrom, B., Nyberg, P., & Sivberg, B. (2009). Staff members' views of the work climate in sheltered homes for adults with autism spectrum disorders. *Nordic Journal of Nursing Research, 29,* 38-41.

Bertels, H. M. J., Kleinschmidt, E. J., & Koen, P. A. (2011). Communities of practice versus organizational climate: Which one matters more to dispersed collaboration in the front end of innovation? *Journal of Product Innovation Management, 28*, 757-772. https://doi:10.1111/j.1540-5885.2011.00836.x

Beus, J. M., Solomon, S. J., Taylor, E. C., & Esken, C. A. (2020). Making sense of climate: A meta-analytic extension of the competing values framework. *Organizational Psychology Review, 10,* 136-168. https://doi: 10.1177/2041386620914707

Biekart, E. A. (2014). *Supporting creativity in organizations: Research considering predictors of perceived and expressed support for creativity in organizations.* (Unpublished thesis). Utrecht University, The Netherlands.

Björkdahl, J., & Börjesson, S. (2011). Organizational climate and capabilities for innovation in forest-based Nordic manufacturing firms. *Scandinavian Journal of Forest Research, 26*, 488-500. https://doi: 10.1080/02827581.2011.585997

Burke, M. J., & Dunlap, W. P. (2002). Estimating interrater agreement with the average deviation index: A user's guide. *Organizational Research Methods, 5,* 159-172.

Burnside, R. M., Amabile, T. M., & Gryskiewicz, S. S. (1988). Assessing organizational climates for creativity and innovation: Methodological review of large company audits. In Y. Ijiri, & R. L. Kuhn (Eds.), *New directions in creative and innovative management: Bridging theory and practice* (pp. 169-185). Cambridge, MA: Ballinger.

Bushart, R. (2015). *Examining the relationship between collaborative relationships and organizational innovation with the third party logistics industry.* Doctoral Dissertation. Northcentral University.

Cabra, J. F. (1996). *Examining the reliability and factor structure of the Climate for Innovation Questionnaire.* (Unpublished master's thesis). International Center for Studies in Creativity: State University College at Buffalo, New York.

Cannon, A. R., & St. John, C. H. (2007). Measuring environmental complexity: A theoretical and empirical assessment. *Organizational Research Methods, 10,* 296-321. https://doi:10.1177/1094428106291058

Capozzi, M. M., Gregg, B., & Howe, A. (2010). *Innovation and commercialization.* New York: McKinsey Global Surveys.

Carifjord, S., & Festin, K. (2015). Association between organizational climate and perceptions and use of an innovation in Swedish primary health care: A prospective study of an implementation. *BMC Health Services Research 15,* 364-391. https://doi:10.1186/s12913-015-1038-2

Casasanto, D. (2016). Linguistic relativity. In N. Riemer (Ed.), *Routledge handbook of semantics* (pp. 158-174). New York: Routledge.

Chan, D. (1998). Functional relations among constructs in the same content domain at different levels of analysis: A typology of composition models. *Journal of Applied Psychology, 83,* 234-246.

Chatman, J. A., & O'Reilly, C. A. (2016). Paradigm lost: Reinvigorating the study of organizational culture. *Research in Organizational Behavior, 36,* 199-224. http://dx.doi.org/10.1016/j.riob.2016.11.004

Chen, L., Gong, Y., Song, Y., & Wang, M. (2021). From creative environment to administrative innovation: Creation and implementation in top management teams. *Journal of Creative Behavior, (early view)* http://doi/: 10.1002/jocb.475

Chermack, T. J., Coons, L. M., Nimon, K., Bradley, P., & Glick, M. B. (2015). The effects of scenario planning on participant perceptions of creative organizational climate. *Journal of Organizational and Leadership Studies, 22,* 355-371. https://doi:10.1177/1548051815582225

Cirella, S., Canterino, F., Guerci, M., & Shani, A. B. (2016). Organizational learning mechanisms and creative climate: Insights from an Italian fashion design company. *Creativity and Innovation Management, 25,* 211-222.

Colarelli, N. J., & Siegel, S. M. (1966). *Ward H: An adventure in innovation.* New York: P. Van Nostrand.

Cooper, D., Patel, P. C., & Thatcher, S. M. (2014). It depends: Environmental context and the effects of fault lines on top management team performance. *Organizational Science, 25*, 633-652. https://doi: org/10.1287/orsc.2013.0855

Crossan, M. M., & Apaydin, M. (2010). A multi-dimensional framework of organizational innovation: A systematic review of the literature. *Journal of Management Studies, 47,* 1154-1192. https://doi: 10.1111/j.1467-6486.2009.00880.x

Cummings, L. (1965). Organizational climates for creativity. *The Academy of Management Journal, 8,* 220-227.

Dackert, I. & Carlsson, I. (2007). Creative organizational climate: Testing Ekvall's ten-dimensional model. Paper presented at *The XIIIth European Congress on Work and Organizational Psychology - Sustainable Work: Promoting Human and Organizational Vitality*, Stockholm, Sweden.

Davis, T. (2000). *Global innovation and growth survey*. London, UK: PricewaterhouseCoopers.

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.

Dickson, M. W., Resick, C. J., & Hanges, P. J. (2006). When organizational climate in unambiguous, it is also strong. *Journal of Applied Psychology, 91,* 351-364. https://doi: 10.1037/0021-9010.91.2.351

Diesing, P. (1966). Objectivism vs. subjectivism in the social sciences. *Philosophy of Science, 33,* 124-133.

Diliello, T. C., Houghton, J. D., & Dawley, D. (2011). Narrowing the creativity gap: The moderating effects of perceived support for creativity. *The Journal of Psychology, 145,* 151-172.

Dooley, K. J., & Van de Ven, A. H. (1999). Explaining complex organizational dynamics. *Organization Science, 10,* 358-372. https://doi.org/10.1287/orsc.10.3.358.

Dooley, K. J., & Van de Ven, A. (2016). Cycles of divergence and convergence: Underlying processes of organizational change and innovation. In A. Langley, & H. Tsoukas (Eds.), *The SAGE handbook of process organization studies* (pp. 574-590). SAGE Reference.

Douglas, J., Muturi, D., Douglas, A., & Ochieng, J. (2017). The role of organizational climate in readiness for change to lean six-sigma. *The TQM Journal, 29,* 666-676. https://doi.org/10.1108/TQM-04-2017-0046

Dubina, I. N. (2013). Measuring organizational climate for creativity and innovation. In: Carayannis E. G. (Ed.), *Encyclopedia of Creativity, Invention, Innovation and Entrepreneurship* (pp. 1238-1244). New York: Springer.

Dul, J., & Ceylan, C. (2014). The impact of a creativity-supporting work environment on a firm's product innovation performance. *Journal of Product Innovation Management, 31,* 1254-1267. https://doi.org/10.1111/jpim.12149.

Dutcher, A. (1997). *Understanding the relationship between creative climate and leadership practices.* Unpublished Master's Project. The Center for Studies in Creativity, Buffalo State University College.

Dzulkifli, B., & Noor, H. M. (2012). Assessing the organizational climate towards developing innovative work behavior: A literature review. In *Proceedings of the 3rd international conference on business and economic research* (pp. 1487-1497). Bandung, Indonesia.

Ehrhardt, M. G., Schneider, B., & Macey, W. H. (2014). *Organizational climate and culture: An introduction to theory, research, and practice.* London: Routledge.

Ekvall, G. (1966). *Industrial suggestion schemes: Studies concerning their psychological background*. Stockholm, Sweden: The Swedish Council for Personnel Administration.

Ekvall, G. (1971). *Creativity at the place of work: A study of suggestors and suggestion systems in the Swedish mechanical industry*. Stockholm, Sweden: The Swedish Council for Personnel Administration.

Ekvall, G. (1972). *A study of two creativity tests*. Stockholm, Sweden: Swedish Council for Personnel Administration.

Ekvall, G. (1976). Creativity at the place of work: Studies of suggestors and suggestion systems in industry. *Journal of Creative Behavior, 10*, 52-54.

Ekvall, G. (1981). *Creative problem solving methods in product development: A comparative study.* Stockholm: FArådet – The Swedish Council for Management and Work-Life Issues.

Ekvall, G. (1983). *Climate, structure and innovativeness of organizations: A theoretical framework and an experiment* (Report 1). Stockholm, Sweden: FArådet - The Swedish Council for Management and Work-Life Issues.

Ekvall, G. (1984). *Kreativitet pa bredden: En bok on förslagsverksamhet (A broad view of creativity: A book on proposed activities).* Stockholm: Svenska Institute för Förslags Verksamet.

Ekvall, G. (1987). The climate metaphor in organization theory. In B. M. Bass, P. D. Drenth, & P. Weissenberg (Eds.), *Advances in organizational psychology: An international review* (pp. 177-190). Newbury Park: SAGE.

Ekvall, G. (1988). *Förnyelse och friction: Om organization, kreativitat, och innovation*. (*Renewal and friction: About organization, creativity, and innovation*). Stockholm, Sweden: Natur och Culture.

Ekvall, G. (1989). Organisatiecultuur: Modelgril, theoretische uitbouw en paradigma (Organizational culture: Fad, theory extension and paradigm). In P. J. Drenth, H. K. Thierry, & C. J. Wolff (Eds.), *Nieuw handoek a&o psychologie* (3rd ed.) (pp. 471-508) (New handbook of work and organizational psychology). Houten: Bohn, Stafleu, Van Loghum.

Ekvall, G. (1991). Change-centered leaders: Empirical evidence of a third dimension of leadership. *Leadership & Organization Development Journal, 12*(6), 18-23.

Ekvall, G. (1992). *Formular Organisationsvarderingar – Manual (Manual for Organizational Values on the CCQ).* Stockholm: Ekvall Organisationspsykologi.

Ekvall, G. (1993). Creativity in project work: A longitudinal study of a product development project. *Creativity and Innovation Management, 4*, 152-159.

Ekvall, G. (1995). Participation and creativity: New forms of suggestion schemes in Sweden. *Creativity and Innovation Management, 4,* 152-159.

Ekvall, G. (1996). Organizational climate for creativity and innovation. *European Journal of Work and Organizational Psychology, 5,* 105-123.

Ekvall, G., (1997a). The creative-innovative organizational climate: Research, measurements, and applications. In S. Dorabjee, C. E. Lumley, & S. R. Walker (Eds.), *The effect of corporate culture on the success of research and development* (pp. 9-15). Surrey UK: Center for Medicines Research International.

Ekvall, G. (1997). Organizational conditions and levels of creativity. *Creativity and Innovation Management, 6,* 195-205.

Ekvall, G. (2001). *Manual till Formular A: Arbetsklimatet (Manual for Form A: The working climate).* Available from the author. Stockholm, Sweden.

Ekvall, G. (2004). *Creative organizational climate: Validity of the concept and of a measurement tool – The creative climate questionnaire (CCQ).* Stockholm, Sweden: Ekvall Organisationspsykologi.

Ekvall, G., & Arvonen, J. (1991). Change-centered leadership: An extension of the two-dimensional model. *Scandinavian Journal of Management, 7*(1), 17-26.

Ekvall, G., Arvonen, J., & Nyström, H. (1987). *Organisation och innovation* (*Organization and innovation*). Lund, Sweden: Studentlitteratur.

Ekvall, G., Arvonen, J., & Waldenström-Lindblad, I. (1983). *Creative organizational climate: Construction and validation of a measuring instrument* (Report 2). Stockholm, Sweden: FArådet - The Swedish Council for Management and Work-Life Issues.

Ekvall, G., & Parnes, S. J. (1989). Creative problem-solving methods in product development: A second experiment. In T. Rickards, & S. Moger (Eds.), *Creativity and Innovation Yearbook 2* (pp. 122-142). Manchester, UK: Manchester Business School.

Ekvall, G., & Ryhammar, L. (1998). Leadership style, social climate, and organizational outcomes: A study of a Swedish University College. *Creativity and Innovation Management, 7,* 126-130.

Ekvall, G., & Ryhammar, L. (1999). The creative climate: Its determinants and effects at a Swedish university. *Creativity Research Journal, 12*, 303-310.

Ekvall, G., & Tångeberg-Andersson, Y. (1986). Working climate and creativity: A study of an innovative newspaper office. *Journal of Creative Behavior, 20,* 215-225.

Erickson, D. R. (2010). *The climate for nursing creativity and risk-taking: A magnet environment versus non-magnet environment.* (Unpublished doctoral dissertation). University of Oklahoma Graduate College: Norman OK.

Fallahpour, M., Borell, L., Sandberg, L., & Boström, A. M. (2020). Dementia care education targeting job strain and organizational climate among dementia care specialists in Swedish home care services. *Journal of Multidisciplinary Healthcare, 13,* 85-97.

Firenze, R. J. (1998). *A study of performance improvement strategies of manufacturing and service organizations.* Indianapolis, IN: The ILMC Center for Manufacturing and Service Excellence.

Fuza, A. F. (2017). Objectivism/subjectivism in scientific articles from different fields. *Alpha, 61,* 629-656. http://doi.org/10.1590/1981-5794-1711-4

Garret, R. P., & Holland, D. V. (2015). Environmental effects on the cognitions of corporate and independent entrepreneurs. *Small Business Economics, 45,* 369-381. https://doi: 10.1007/s11187-015-9636-2

Geurts, M. (2009). *An examination of the model for organizational change, innovation and creativity* (Unpublished master's thesis). Hogeschool-Uniersiteit Brussel, Brussels, Belgium.

Gilson, L. L., & Litchfield, R. C. (2017). Idea collections: A link between creativity and innovation. *Innovation: Organization & Management, 19,* 80-85. http://dx.doi.org/10.1080/14479338.2016.1270765

Giorgi, S., Lockwood, C., & Glynn, M. A. (2015). The many faces of culture: Making sense of 30 years of research on culture in organization studies. *The Academy of Management Annals, 9,* 1-54. http://dx.doi.org/10.1080/19416520.2015.1007645

Glisson C., & James, L. R. (2002). The cross-level effects of culture and climate in human service teams. *Journal of Organizational Behavior, 23,* 767-794.

Guion, R. M. (1973). A note on organizational climate. *Organizational Behavior and Human Performance, 9,* 120-125.

Hellzén, O., Kristiansen, L., & Norbergh, K. G. (2005). Living in a group dwelling: How do residents spend their time in a psychiatric group dwelling? *International Journal of Nursing Studies, 41,* 651-659.

Hoßbach, C. (2019). *Organizational climate for creativity: Exploring the influence of distinct types of individual differences.* Wiesbaden, Germany: Springer Gabler.

Hodge, T. A. (2021). *Retrospective and prospective examination of climate creation for national creativity and innovation.* Unpublished Ph.D. Dissertation. University of the Virgin Islands.

Hon, A. H., & Lui, S. S. (2016). Employee creativity and innovation in organizations: Review, integration, and future directions in hospitality research. *International Journal of Contemporary Hospitality Management, 28*, 862-885. https://doi.org/10.1108/IJCHM-09-2014-0454

Hong, H-Y., Chang, Y-H., & Chai, C. S. (2014). Fostering a collaborative and creative climate in a college class through idea-centered knowledge-building. *Instructional Science, 42,* 389-407. https://doi: 10.1007/s11251-013-9289-y

Hülsheger, U. R., Anderson, N., & Salgado, J. F. (2009). Team-level predictors of innovation at work: A comprehensive meta-analysis spanning three decades of research. *Journal of Applied Psychology, 94,* 1128–1145. https://doi.org/10.1037/a0015978

Hunter, S. T., Bedell, K. E., & Mumford, M. D. (2005). Dimensions of creative climate: A general taxonomy. *Korean Journal of Thinking and Problem Solving, 15,* 97–116.

Hunter, S. T., Bedell, K. E., & Mumford, M. D. (2007). Climate for creativity: A quantitative review. *Creativity Research Journal, 19,* 69-90.

Hunter, S. T., Farr, J. L., Heinen, R. L., & Allen, J. B. (2020). Integrating creative climate and creative problem solving. In M. D. Mumford, & E. M. Todd (Eds.), *Creativity and innovation in organizations* (pp. 137-160). New York: Routledge.

Isaksen, S. G. (2004). The progress and potential of the creativity level-style distinction: Implications for research and practice. In W. Haukedal, & B. Kuvaas (Eds.), *Creativity and problem-solving in the context of business management* (pp. 40-71). Bergen, Norway: Fagbokforlaget.

Isaksen, S. G. (2007a). The Situational Outlook Questionnaire: Assessing the context for change. *Psychological Reports, 100,* 455-466.

Isaksen, S. G. (2007b). The climate for transformation: Lessons for leaders. *Creativity and Innovation Management, 16,* 3-15.

Isaksen, S. G. (2013). Managing for innovation: Examination of a climate-centric model for organizational creativity. *Kindai Management Review, 1,* 41-58.

Isaksen, S. G. (2017). Leadership's role in creative climate creation. In M. D. Mumford, & S. Hemlin (Eds.), *Handbook of research on leadership and creativity* (pp. 131-158). Cheltenham, UK: Edward Elgar.

Isaksen, S. G. (2020a). *Research literature on the CCQ and SOQ: An annotated bibliography* (3rd ed.). Orchard Park, NY: The Creative Problem Solving Group, Inc. (Available as a free PDF download from SOQonline.net)

Isaksen, S. G. (2020b). Unleashing creative talent in organizations – Linking learning and creativity through creative problem solving. In M. D. Mumford & E. M. Todd (Eds.), *Creativity and innovation in organizations* (pp.339-392). New York: Routledge.

Isaksen, S. G. & Aerts, W. S. (2011). Linking problem-solving style and creative organizational climate: An exploratory interactionist study. *The International Journal of Creativity & Problem Solving, 21,* 7-38.

Isaksen, S. G., & Akkermans, H. J. (2011). Creative climate: A leadership lever for innovation. *Journal of Creative Behavior, 45,* 161-187.

Isaksen, S. G., & Ekvall, G., (with contributions from Akkermans, H., Wilson, G. V., & Gaulin, J. P.) (2007). *Assessing the context for change: A technical manual for the SOQ – Enhancing performance of organizations, leaders and teams for over 50 years* (2nd ed.). Orchard Park, New York: The Creative Problem Solving Group.

Isaksen, S. G., & Ekvall, G. (2010). Managing for innovation: The two faces of tension in creative climate. *Creativity and Innovation Management, 19*, 73-88.

Isaksen, S. G., & Ekvall, G. (2015a). *Conceptual and historical foundations of the Situational Outlook Questionnaire®: A technical resource for the SOQ.* Orchard Park, NY: The Creative Problem Solving Group, Inc. (Available as a free PDF download from SOQonline.net)

Isaksen, S. G., & Ekvall, G. (2015b). *Development of the Situational Outlook Questionnaire®: A technical resource for the SOQ.* Orchard Park, NY: The Creative Problem Solving Group, Inc. (Available as a free PDF download from SOQonline.net)

Isaksen, S. G., & Ekvall, G. (2015c). *Psychometrics of the current version of the Situational Outlook Questionnaire®: A technical resource for the SOQ.* Orchard Park, NY: The Creative Problem Solving Group, Inc. (Available as a free PDF download from SOQonline.net)

Isaksen, S. G., Hoßbach, C., & Neyer, A-K. (August, 2019). *Mental model mayhem: Conceptualizing the work environment for creativity and innovation.* A paper for presented at the Academy of Management Annual Meeting in Boston.

Isaksen, S. G., Hoßbach, C., & Neyer, A-K. (In preparation). *Moving beyond mental model mayhem: Conceptualizing the work environment for creativity and innovation.* Under review.

Isaksen, S. G., & Lauer, K. J. (1999). Relationship between cognitive style and individual psychological climate: Reflections on a previous study. *Studia Psychologica, 41*, 177-191.

Isaksen, S. G., & Lauer, K. J. (2001). Convergent validity of the Situational Outlook Questionnaire: Discriminating levels of perceived support for creativity. *North American Journal of Psychology, 3*, 31-40.

Isaksen, S. G., & Lauer, K. J. (2002). The climate for creativity and change in teams. *Creativity and Innovation Management Journal, 11*, 74-86.

Isaksen, S. G., Lauer, K. J., & Ekvall, G. (1999). Situational Outlook Questionnaire: A measure of the climate for creativity and change. *Psychological Reports, 85,* 665-674.

Isaksen, S. G., Lauer, K. J., Ekvall, G., & Britz, A. (2001). Perceptions of the best and worst climates for creativity: Preliminary validation evidence for the Situational Outlook Questionnaire. *Creativity Research Journal, 13*, 171-184.

Isaksen, S. G., Lauer, K. J., Murdock, M. C., Dorval, K. B., & Puccio, G. J. (1995). *Situational Outlook Questionnaire: Understanding the climate for creativity and change (SOQ) - A technical manual.* Buffalo, NY: Creative Problem Solving Group, Inc.

Isaksen, S. G., Puccio, G. P., & Treffinger, D. J. (1993). An ecological approach to creativity research; Profiling for creative problem solving. *Journal of Creative Behavior, 27,* 149-170.

Isaksen, S. G., Stein, M. I., Hills, D. A., & Gryskiewicz, S. S. (1984). A proposed model for the formulation of creativity research. *Journal of Creative Behavior, 18,* 67-75.

Isaksen, S. G., & Tidd, J. (2006). *Meeting the innovation challenge: Leadership for transformation and growth.* Chichester, UK: Wiley.

Isaksen, S. G., & Treffinger, D. J. (2004). Celebrating 50 years of reflective practice: Versions of creative problem solving. *Journal of Creative Behavior, 38,* 75-101.

Ismail, M. (2005). Creative climate and learning organization factors: Their contribution towards innovation. *Leadership & Organization Development Journal, 26*, 639 – 654.

Iqbal, A. (2019). Strategic human resource management approaches and organizational performance. *Journal of Advances in Management Research, 16,* 181-193. https://doi: 10.1108/JAMR-11-2017-0104

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.

James, L. R., Demaree, R. G., & Wolf, G. (1993). r_{wg}: An assessment of within-group interrater. *Journal of Applied Psychology, 78,* 306-309.

James, L. R., & Jones, A. P. (1974). Organizational climate: A review of theory and research. *Psychological Bulletin, 81,* 1096-1112.

James, L. R., Choi, C. C., Ko, C-H., McNeil, P.K., Minton, M. K., Wright, M. A., & Kim, K. (2008). Organizational and psychological climate: A review of theory and research. *European Journal of Work and Organizational Psychology, 17,* 5–32. https://doi: 10.1080/13594320701662550

Johns, G. (2001). In praise of context. *Journal of Organizational Behavior, 22,* 31-42.

Johns, G. (2006). The essential impact of context on organizational behavior. *Academy of Management Review, 31,* 386–408.

Johns, G. (2018). Advances in the treatment of context in organizational research. *Annual Review of Organizational Psychology and Organizational Behavior, 5,* 21-46. https://doi.org/10.1146/annurev- orgpsych- 032117- 104406

Joyce, W. F., & Slocum, J. W. (1984). Collective climate: Agreement as a basis for defining aggregate climates in organizations. *Academy of Management Journal, 27,* 721-742.

Jung, D. I., Chow, C., & Wu, A. (2003). The tole of transformational leadership in enhancing organizational innovation: Hypotheses and some preliminary findings. *The Leadership Quarterly, 14,* 525-544.

Kaplan, A. (1964). *The conduct of inquiry: Methodology for behavioral science.* Chandler Publishing.

Kessler, S. R. (2019). Are the costs worth the benefits? Shared perception and the aggregation of organizational climate. *Journal* of *Organizational Behavior, 40*, 1046-1054. https://doi: 10.1002/job.2415

Keum, D. D., & See, K. E. (2017). The influence of hierarchy on idea generation and selection in the innovation process. *Organizational Science, 28,* 653-669. https://doi.org/10.1287/orsc.2017.1142.

Khalili, A. (2016). Linking transformational leadership, creativity, innovation, and innovation-supportive climate. *Management Decision, 54,* 2277-2293. https://doi: 10.1108/MD-03-2016-0196

King, N., & Anderson, N. (1990). Innovation in working groups. In M. A. West, & J. L. Farr (Eds.), *Innovation and creativity at work: Psychological and organizational strategies* (pp. 81-100). Chichester, UK: Wiley.

Kivimaki, D.M., & Elovainio, M. (1999). A short version of the team climate inventory: development and psychometric properties. *Journal of Occupational and Organizational Psychology, 72,* 241-246.

Klein, K. J., Conn, A. B., Smith, D. B., & Sorra, J. S. (2001). Everyone in agreement? An exploration of within-group agreement in employee perceptions of the work environment. *Journal of Applied Psychology, 86,* 3-16.

Knox, S. (2003). *Time travel and role maps: A pilot initiative in Creative Problem Solving.* (Unpublished master's thesis). Royal Roads University: Victoria, British Columbia.

Kuenzi M., & Schminke M. (2009). Assembling fragments into a lens: A review, critique, and proposed research agenda for the organizational work climate literature. *Journal of Managemen*t, *35,* 634–717. https://doi: 10.1177/0149206308330559

LaPierre, J., & Giroux, V. (2003). Creativity and work environment in a high-tech context. *Creativity and Innovation Management, 12,* 11-23.

Lauer, K. J. (1994). *The assessment of creative climate: An investigation of Ekvall's Creative Climate Questionnaire.* (Unpublished master's thesis). International Center for Studies in Creativity: State University College at Buffalo, New York.

Lee, Y., & Yoo, S. (2020). Individual profiles and team classes of the climate for creativity: A multi-level latent profile analysis. *Creativity and Innovation Management, 29,* 438-452. https://doi: 10.1111/caim.12371

Lichtenberg, J., Woock, C., & Wright, M. (2018). *Ready to Innovate: Are educators and executives aligned on the creative readiness of the US workforce?* Washington, DC: The Conference Board Research Report R-1424-08-RR.

Licul, N., & Jurisevic, M. (2020). The perception of creative classroom climate in elementary school students: Comparison of regular and enriched visual arts classes. *High Ability Studies,* https://doi: 10.1080/13598139.2020.1855124

Lofquist, E. A., & Isaksen, S. G. (2019). Cleared for takeoff? A snapshot of context for change in the Norwegian air traffic management organization – Avinor. *The Journal of Applied Behavioral Science, 55*, 277-305. https://doi: 10.1177/002188631983211

Lofquist, E. A., Isaksen, S. G., & Dahl, T. J. (2018). Something fishy: Exploring change, job engagement, and work environment of the Norwegian Directorate of Fisheries. *Journal of Change Management, 18,* 281-303. https://doi.org/10.1080/14697017.2018.1466823

Lone, J. A., Bjorklund, R. A., Osterud, K. B., Andersson, L. A., Hoff, T., & Bjorkli, C. A. (2014). Assessing knowledge-intensive work environments: General versus situation-specific instruments. *European Journal of Work and Organizational Psychology, 23,* 469-482. https://doi.org/10.1080/1359432X.2012.750449

Loewenberger, P. (2013). The role of HRD in stimulating, supporting, and sustaining creativity and innovation. *Human Resource Development Review, 12,* 422-455. https://doi: 10.1177/1534484313494088

Lövgren, G., Rasmussen, B. H., Engström, B. (2002). Working conditions and the possibility of providing good care. *Journal of Nursing Management, 10,* 201-209.

Lundström, M., Graneheim, U., Eismann, M., Richter, J., & Åström, S. (2005). Influences of work climate for experiences of strain. *Learning Disability Practice, 8,* 32-38.

Macey, W. H., & Schneider, B. (2008). The meaning of employee engagement. *Industrial and Organizational Psychology, 1,* 3–30.

MacKenzie, S. B., Podsakoff, P. M., & Jarvis, C. B. (2005). The problem of measurement model misspecification in behavioral and organizational research and some recommended solutions. *Journal of Applied Psychology, 90,* 710-730. https://doi: 10.1037/0021-9010.90.4.710

Mafabi, S., Munene, J. C., & Ahiauzu, A. (2015). Creative climate and organizational resilience: The meditating role of innovation. *International Journal of Organizational Analysis, 23,* 564-587. https://doi.org/10.1108/IJOA-07-2012-0596

Mathisen, G., & Einarsen, S. (2004). A review of instruments assessing creative and innovative environments within organizations. *Creativity Research Journal, 16,* 119-140. http://dx.doi.org/10.1207/s15326934crj1601_12

Mathisen, G. E., Torshein, T., & Einarsen, S. (2006). The team-level model of climate for innovation: A two-level confirmatory factor analysis. *Journal of Occupational and Organizational Psychology, 79,* 23-35. https://doi: 10.1348/096317905X52869

Mayfield, M., & Mayfield, J. (2010). Developing a scale to measure the environment perceptions: A questionnaire for investigating garden variety creativity. *Creativity Research Journal, 22,* 162-169. http://dx.doi.org/10.1080/10400419.2010.481511

McLellan, R., & Nicholl, B. (2013). Creativity in crisis in design and technology: Are classroom climates conducive for creativity in English secondary schools? *Thinking Skills and Creativity, 9,* 165-185. http://dx.doi.org/10.1016/j.tsc.2012.11.004

Mohamed, M. Z. (1995). Innovation implementations in Malaysian firms: Process, problems, critical success factors and working climate. *Technovation, 15,* 375-385.

Mostafa, M. (2005). Factors affecting organizational creativity and innovativeness in Egyptian business organizations: An empirical investigation. *Journal of Management Development, 24,* 7-33. https://doi: 10.1108/02621710510572326

Moultrie, J., & Young, A. (2009). Exploratory study of organizational creativity in creative organizations. *Creativity and Innovation Management, 18,* 299-314. https://doi: 10.1111/j.1467-8691.2009.00536.x

Mumford, M. D., & Gustafson, S. B. (1988). Creativity syndrome: Integration, application, and innovation. *Psychological Bulletin, 103,* 27-43.

Munir, R., & Beh, L-S. (2019). Measuring and enhancing organizational creative climate, knowledge sharing, and innovative work behavior in startup development. *The Bottom Line, 32,* 269-289.

Nasurdin, A. M., Ling, T. C., & Hou, K. B. (2014). The influence of organizational creative climate on product innovation: A study of Malaysian manufacturing firms. *International Journal of Economics and Management, 8,* 40-69.

Newman, A., Round, H., Wang, S., & Mount, M. (2020). Innovation climate: A systematic review of the literature and agenda for future research. *Journal of Occupational and Organizational Psychology, 93,* 73-109.

Norbergh, K-G., Hellzén, O., Sandman, P-O., & Asplun, K. (2002). The relationship between organizational climate and the content of daily life for people with dementia living in a group dwelling. *Journal of Clinical Nursing, 11*, 237-246.

Oldham, G. R., & Baer, M. (2012). Creativity and work context. In: M. D. Mumford (Ed.). *Handbook of organizational creativity* (pp. 387-420). San Diego: Academic Press.

O'Shea, D., & Buckley, F. (2007). Towards an integrative model of creativity and innovation in organizations: A psychological perspective. *The Irish Journal of Psychology, 28,* 101-128.

Olsson, A., Paredes, K. M., Johansson, U. Roese, M. O., & Ritzén. S. (2019). Organizational climate for innovation and creativity: A study in Swedish retail organizations. *The International Review of Retail, Distribution, and Consumer Research, 29, 243-261.* https://doi.org/10.1080/09593969.2019.1598470

Ostroff, C., Kinicki, A. J., & Tamkins, M. M. (2003). Organizational culture and climate. In I. B. Weiner (Ed.), *Handbook of psychology* (pp. 565-593). New York: Wiley.

Ostroff, C., Kinicki, A. J., & Muhammad, R. S. (2013). Organizational culture and climate. In I. B. Weiner, N. W. Schmidt, & S. Highhouse (Eds.), *Handbook of psychology – Industrial and organizational psychology – Volume 12* (pp. 643-676). Hoboken, NJ: Wiley.

Payne, R. L., & Pugh, D. D. (1976). Organizational structure and climate. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology* (pp. 1125-1172). Chicago: Rand McNally.

Peltz, D. C., & Andrews, F. M. (1966). *Scientists in organizations: Productive climates for research and development.* New York: Wiley.

Perrigino, M. B., Chen, H., Dunford, B. B., & Pratt, B. R. (2021). If we see, will we agree? Unpacking the complex relationship between stimuli and team climate strength. *Academy of Management Annals, 15,* 151-187. https://doi.org/10.5465/annals.2019.0067

Peterson, M. F. (2010). Organizational culture and organization theory. In: N. M. Ashkanasy, C. P. Wilderon, & M. F. Peterson (2011). *The handbook of organizational culture and climate* (2nd ed.) (pp. 415-422). Thousand Oaks, CA: SAGE.

Perry-Smith, J. E., & Mannucci, P. V. (2017). From creativity to innovation: The social network drivers of the four phases of the idea journey. *Academy of Management Review, 42,* 53-79. http://dx.doi.org/10.5465/amr.2014.0462

Plucker, J. A., Makel, M. G., & Qian, M. (2019). Assessment of creativity. In J. C. Kaufman & R. J. Sternberg, (Eds.), *Cambridge handbook of creativity* (pp. 44-68). Cambridge University Press.

Polites, G. L., Roberts, N., & Thatcher, J. (2012). Conceptualizing models using multidimensional constructs: A review and guidelines for their use. *European Journal of Information Systems, 21,* 22-48.

Porter, J. (2010). Review of Situational Outlook Questionnaire. In R. A. Spies, J. F. Carlson & K. F. Geisinger (Eds.), *The eighteenth mental measurements yearbook* (pp. 546-548). Lincoln, NE: Buros Institute of Mental Measurements.

Porzse, G., Takacs, S., Csedo, Z., Sara, Z., & Fejes, J. (2012). The impact of creative organizational climate on the innovation activity of medical devices manufacturing firms in Hungary. *European Journal of Business and Management, 4,* 1-12.

Puccio, G. P., & Cabra, J. F. (2010). Organizational creativity: A systems approach. In J. C. Kaufman & R. J. Sternberg (Eds.), *The Cambridge handbook of creativity* (pp. 145-173). Cambridge: Cambridge University Press.

Puccio, G. J., & Murdock, M. C. (Eds.), (1999). *Creativity assessment: Readings and resources.* Buffalo, NY: The Creative Education Foundation Press.

Puccio, G. J., Treffinger, D. J., & Talbot, R. J. (1995). Exploratory examination of relationships between creativity styles and creative products. *Creativity Research Journal, 8,* 157-172.

Randhawa, G., & Kaur, K. (2014). Organizational climate and its correlates: Review of literature and proposed model. *Journal of Management Research, 14,* 25-40.

Ramos, M. A., Figueiredo, P. S. & Pereira-Guizzo, C. (2018). Antecedents of innovation in industry: The impact of work environment factors on creative performance. *Innovation & Management Review, 15,* 269-285. https://doi.org/10.1108/INMR-05-2018-0032

Rao, J., & Weintraub, J. (2013). How innovative is your company's culture? *MIT Sloan Management Review, 54,* 29-37.

Rasulzada, F., & Dackert, I. (2009). Organizational creativity and innovation in relation to psychological well-being and organizational factors. *Creativity Research Journal, 21,* 191-198. https://doi: 10.1080/10400410902855283

Remneland-Wikhamn, B., & Wikhamn, W. (2011). Open innovation climate measure: The introduction of a validated scale. *Creativity and Innovation Management, 20,* 284-295. https://doi: 10.1111/j.1467-8691.2011.00611.x

Rentsch, J. R. (1990). Climate and culture: Interaction and qualitative differences in organizational meanings. *Journal of Applied Psychology, 75,* 668-681.

Rosing, K., Bledow, R., Freses, M., Baytalskaya, N., Lascano, J. J., & Farr, J. L. (2018). The temporal pattern of creativity and implementation in teams. *Journal of Occupational and Organizational Psychology, 91,* 798-822. http://doi:10.1111/joop.12226

Runco, M. A., & Jaeger, G. J. (2012). The standard definition of creativity. *Creativity Research Journal, 24,* 92-96. http://dx.doi.org/10.1080/10400419.2012.650092

Ryhammar, L. (1996). *Kreativ funktion, percept-genetisk rekonstruktion och organisatoriska forutsattningar for kreativ verksamhet (Creative function, percept-genetic reconstruction and organizational conditions for creative activities).* Doctoral dissertation. Lund, Sweden: Lund University Press.

Said-Metwaly, S., Van den Noortgate, W., & Kyndt, E. (2017). Approaches to measuring creativity: A systematic literature review. *Creativity: Theories-Research-Applications, 4,* 238-275. http://dx.doi.org/10.1515/ctra-2017-0013

Sample, J. (2010). Review of Situational Outlook Questionnaire. In R. A. Spies, J. F. Carlson & K. F. Geisinger (Eds.), *The eighteenth mental measurements yearbook* (pp. 548-550). Lincoln, NE: Buros Institute of Mental Measurements.

Sandberg, L., Borell, L., Edvardsson, D., Rosenberg, L., & Boström, A-M. (2018). Job strain: A cross-sectional survey of dementia care specialists and other staff in Swedish home care services. *Journal of Multidisciplinary Healthcare, 11,* 255-266.

Schaufeli, W. B., & Salanova, M. (2011). Work engagement: On how to better catch a slippery concept. *European Journal of Work and Organizational Psychology, 20,* 39–46. http://dx.doi.org/10.1080/1359432X.2010.515981

Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire: A cross-national study. *Educational and Psychological Measurement, 66,* 701–716. https://doi: 10.1177/0013164405282471

Schein, E. H. (1985). *Organizational culture and leadership*. Hoboken, NJ: John Wiley & Sons.

Schein, E. H. (2017). *Organizational culture and leadership* (5th ed.). Hoboken, NJ: John Wiley & Sons.

Schneider, B. (1975). Organizational climates: An essay. *Personnel Psychology, 28,* 447-479.

Schneider, B., González-Romá, V., Ostroff, C., & West, M. A. (2017). Organizational climate and culture: Reflections on the history of the constructs in the Journal of Applied Psychology. *Journal of Applied Psychology,* 102, 468-482. http://dx.doi.org/10.1037/apl0000090

Schneider, B., & Reichers, A. E. (1983). On the etiology of climates. *Personnel Psychology, 36,* 19-39.

Scott, S. G., & Bruce, R. A. (1994). Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of Management Journal, 37,* 580-607.

Sellgren, S. F., Ekvall, G. & Tomson, G. (2008). Leadership behavior of nurse managers in relation to job satisfaction and work climate. *Journal of Nursing Management, 16*, 578–587. https://doi:10.1111/j.1365-2934.2007.00837.x

Shalley, C.E., & Gilson, L.L. (2004). What leaders need to know: A review of social and contextual factors that can foster or hinder creativity. *The Leadership Quarterly*, *15,* 33–53. https://doi: 10.1016/j.leaqua.2003.12.004

Shalley, C. E., Zhou, J., & Oldham, G. R. (2004). The effects of personal and contextual characteristics on creativity: Where should we go from here? *Journal of Management, 30*, 933-958. https://doi: 10.1016/j.jm.2004.06.007

Shanker, R., Bhanugopan, R., van der Heijden, B. (2017). Organizational climate for innovation and organizational performance: The mediating effect of innovative work behavior. *Journal of Vocational Behavior, 100,* 67-77. http:doi.org/10.1016/j.jvb.2017.02.004

Siegel, S. M., & Colarelli, N. J. (1964). Gaining more from research experiences. *Psychiatric Services, 15,* 666-670.

Siegel, S. M., & Kaemmerer, W. F. (1978). Measuring the perceived support for innovation in organizations. *Journal of Applied Psychology, 63,* 553-562.

Sjölander, S. (1983). *Innovation management: Idehantering och förnyelse I företage* (Idea management and renewal in companies). Malmö, Sweden: Liber.

Sobieck, M. A. (1996). *Examination of cross-site narratives responses on the CIQ and SOQ*. Unpublished Master's Thesis. The Center for Studies in Creativity, Buffalo State University College.

Stein, M. I. (1965). Several findings of a transactional approach to creativity. In G. A. Steiner (Ed.), *The creative organization* (pp. 155-168). Chicago: The University of Chicago Press.

Steiner, G. A. (Ed.), (1965). *The creative organization.* Chicago: University of Chicago Press.

Stetler, K. L. & Magnusson, M. (2015). Exploring the tension between goal clarity and ambiguity in goal setting for innovation. *Creativity and Innovation Management, 24,* 231-146. https://doi: 10.1111/caim.12102

Stollberger, J., West, M. A., & Sacramento, C. A. (2019). Innovation in work teams. In P. B. Paulus, & B. A. Nijsad (Eds.), *The Oxford handbook of group creativity and innovation* (pp. 231-266). Oxford: Oxford University Press.

Suddaby, R. (2010). Construct clarity in theories of management and organization. *Academy of Management Review, 35,* 346-357.

Sullivan, D. M., & Ford, C. M. (2010). The alignment of measures and constructs in organizational research: The case of testing measurement models of creativity. *Journal of Business Psychology, 25,* 505-521. https://doi: 10.1007/s10869-009-9147-8

Sundgren, M., Dimenäs, E., Gustofsson, J., & Selart, M. (2005). Drivers of organizational creativity: A path model of creative climate in pharmaceutical R&D. *R&D Management, 35*, 359-374.

Swinnen, M., Teirlinck, P., & Isaksen, S. G. (2019). Leadership support for innovation: The intervening role of the climate for creativity. *Kindai Management Review, 7,* 78-98.

Talbot, R., Cooper, C., & Barrow, S. (1992). Creativity and stress. *Creativity and Innovation Management, 1*, 183-193.

Taylor, C. W. (1972). *Climate for creativity: Report of the seventh national research conference on creativity.* New York: Pergamon Press.

Treffinger, D. J., Young, G. C., Selby, E. C., & Shepardson, C. (2002). *Assessing creativity: A guide for educators.* Storrs, CT: National Research Center on the Gifted and Talented.

Tri, H. T., Nga, V. T., & Sipko, J. (2019). Predicting overall staff's creativity and innovative work behavior in banking. *Management and Marketing – Challenges for the knowledge society, 14,* 188-202. https://doi: 10.2478/mmcks-2019-0013

Tseng, H-M., & Liu, F-C. (2011). Assessing the climate for creativity (KEYS): Confirmatory factor analysis and psychometric examination of a Taiwan version. *International Journal of Selection and Assessment, 19*, 438-441.

Tseng, H-M., Liu, F-C., & West, M. A. (2009). The team climate inventory: A psychometric test on a Taiwanese sample of work groups. *Small Group Research, 40,* 465-482. https://doi: 10.1177/1046496409334145

Turnipseed, D. (1994). The relationship between the social environment of organizations and the climate for innovation and creativity. *Creativity and Innovation Management, 3*, 184 - 195.

Turnipseed, P. H., & Turnipseed, D. L. (2013). Testing the proposed linkages between organizational citizenship behaviors and an innovative organizational climate. *Creativity and Innovation Management, 22,* 209-216.

Uzkurt, C., Kumar, R., & Ensari, N. (2013). Assessing organizational readiness for innovation: An exploratory study on organizational characteristics of innovativeness. *International Journal of Innovation and Technology Management, 10,* 1-26. https://doi: 10.1142/S0219877013500181

Van de Ven, A. H. (2017). The innovation journey: You can't control it, but you can learn to maneuver it. *Innovation: Organization & Management, 19,* 39-42. https://doi.org/10.1080/14479338.2016.1256780

Van de Ven, A. H., & Johnson, P. E. (2006). Knowledge for theory and practice. *Academy of Management Review, 31,* 802-821.

Van de Vijver, F. & Hambleton, R. K. (1996). Translating tests: Some practical guidelines. *European Psychologist, 1,* 89-99.

Van Esch, E., Wei, L. Q. & Chiang, F. F. (2016). High-performance human resource practices and firm performance: The mediating role of employees competencies and the moderating role of climate for creativity. *The International Journal of Human Resource Management, 29,* 1683-1708. https://doi.org/10.1080/09585192.2016.1206031

Van Mierlo, H., Vermunt, J. K., & Rutte, C. G. (2009). Composing group-level constructs from individual-level survey data. *Organizational Research Methods, 12,* 368-392. https://doi: 10.1177/1094428107309322

Van Vianen, A. E., De Pater, I. E., Bechtoldt, M. N., & Evers, A. (2011). The strength and quality of climate perceptions. *Journal of Managerial Psychology, 26,* 77-92. https://doi: 10.1108/02683941111099637

Vveinhardt, J., & Ganusauskaite, A. (2021). Cross-cultural adaptation and reliability evaluation of the Lithuanian version of the KEYS questionnaire. *Independent Journal of Management and Production, 12,* 1188-1202. https://doi: 10.14807/ijmp.v12i4.1378

Wallace, J. C., Edwards, B. D., Paul, J., Burke, M., Christian, M., & Eissa, G. (2013). Change the referent? A meta-analytic investigation of direct and referent-shift consensus models for organizational climate. *Journal of Management, 42,* 838-861. https://doi: 10.1177/0149206313484520

West, M. A. (1990). The social psychology of innovation in groups. In: M. A. West & J. L. Farr (Eds.), *Innovation and creativity at work: Psychological and organizational strategies* (pp. 309-333). Chichester, UK: Wiley.

West, M. A., & Anderson, N. R. (1992). Innovation, cultural values and the management of change in British hospitals. *Work and Stress, 6,* 193-210.

West, M. A., & Anderson, N. R. (1996). Innovation in top management teams. *Journal of Applied Psychology, 81,* 680-693.

West, M.A., & Wallace, M. (1991). Innovation in health care teams. *European Journal of Social Psychology*, *21*, 303–315.

Wikström, B., Ekvall, G., & Sandström, S. (1994). Stimulating the creativity of elderly institutionalized women through works of art. *Creativity Research Journal, 7*, 171-182.

Woodman, R. W., Sawyer, J. E., & Griffin, R. W. (1993). Toward a theory of organizational creativity. *Academy of Management Review, 18,* 293-321.

Xu, X., Liang, L., & Wang, H-J. (2019). How to build your team for innovation? A cross-level mediation model of team personality, team climate for innovation, creativity, and job crafting. *Journal of Occupational and Organizational Psychology, 92,* 848-872. https://doi: 10.1111/joop.12277

Yee, W. F., Pink, L. S., & Sern, M. L. (2014). The effect of a psychological climate for creativity on job satisfaction and work performance. *International Journal of Economics and Management, 8,* 97-116.

Zain, M., & Kassim, N. M. (2012). The influence of internal environment and continuous improvement on firms' competitiveness and performance. *Procedia: Social and Behavioral Sciences, 65,* 26-32. https://doi: 10.1016/j.sbspro.2012.11.086

Zain, M., Richardson, S., & Adam, M. N. (2002). The implementation of innovation by a multinational operating in two different environments: A comparative study. *Creativity and Innovation Management, 11,* 98-106.

Zheng, J. J., Jin, S. H., & Ma, G.Y. (2009). The measurement of organizational innovation climate and its moderating effect in the relationship between employees' innovation ability and innovation performance. *Acta Psychologica Sinica*, *41,* 1203-1214. https://doi: 10.3724/SP.J.1041.2009.01203

Zhou, J., Song, L. J., Wang, X. M., & Wu, J. (2017). Is it new? Personal and contextual influences on perceptions of novelty and creativity. *Journal of Applied Psychology, 102*, 180-202. http://doi.org/10.1037/apl0000166.

Zohar, D., & Hofmann, D. A. (2012). Organizational culture and climate. In S. W. Kozlowski (Ed.), *The Oxford handbook of organizational psychology* (pp. 643-666). Oxford: Oxford University Press.

Zubair, A., Bashir, M., Abrar, M., Baig, S.A. and Hassan, S.Y. (2015) Employee's participation in decision making and manager's encouragement of creativity: The mediating role of climate for creativity and change. *Journal of Service Science and Management, 8,* 306-321. http://dx.doi.org/10.4236/jssm.2015.83033