

Setting a Climate for Creativity In Sourcing Teams: A Measurement Scale for Team Creativity Climate

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Abstract

Creative sourcing strategies, designed to extract more value from the supply base, have become a competitive, strategic differentiator. To fuel creativity, companies install sourcing teams that can capitalize on the specialized knowledge and expertise of their employees across the company. This article introduces the concept of a team creativity climate (TCC) - *team members' shared perceptions of their joint policies, procedures, and practices with respect to creatively develop sourcing strategies* – as a means to address the unique challenges associated with a collective, cross-functional approach to develop value-enhancing sourcing strategies. Using a systematic scale development process that validates the proposed concept, the authors confirm its ability to predict sourcing team performance, and suggest some research avenues extending from this concept.

Keywords: sourcing teams; creativity; work-unit climate; scale development

1. Introduction

Driven by competitive pressures, sourcing strategies constantly seek ways to satisfy customer demands and mitigate supply risk at lower costs (AT Kearney, 2011; Eltantawy and Giunipero, 2013). Developing such value-enhancing strategies is complex (Ellis et al., 2010; Wu and Pagell, 2011) and demands substantial creativity and innovative problem solving (Giunipero et al., 2005; O'Brien, 2012). According to a recent industry survey (State of Flux, 2013), nearly 70% of buying companies have installed sourcing teams to formulate and implement creative sourcing strategies and thereby attain superior business performance (Hardt et al., 2007). These teams pool the problem-solving capabilities and specialized knowledge of employees from different functional backgrounds (Englyst et al., 2008). For example, at Target, sourcing is a cross-functional process and a competitive differentiator in its retail environment (*Forbes*, 2015). This enables a more accurate challenging of product specifications and the underlying business need of the purchase. Due to its cross-functional sourcing approach, a large multinational oil company, for instance, was thus able to realize that the actual need was not a bigger tank to store more cooling water for one of their drilling platforms, but in fact a new well. The purchase specifications were changed accordingly and focused on drilling a new well at the platform itself, a far cheaper and faster option than buying a bigger water tank that needs to be refilled regularly by using an expensive vessel. Sourcing teams hence offer several potential benefits, such as reduced task completion time (Monczka et al., 2008), lower purchasing prices (Johnson et al., 2002), improved innovation outcomes (Schiele, 2010), better identification and creative resolution of problems (Giunipero et al., 2005), and improved bottom-line results (AT Kearney, 2011).

However, it also is becoming increasingly clear that many sourcing teams fail to reach their full potential or meet general management expectations (Driedonks et al., 2014; Moses and Ahlstrom, 2008). In a recent market survey (Deloitte, 2014), more than half of

participating Chief Procurement Officers (57%) believed their teams were incapable of delivering unique, effective solutions to current sourcing challenges. A major reason for this failure might be the widespread use of top-down instructions (i.e., formal sourcing processes, templates, and protocols), which are inadequate for guiding sourcing teams in the relatively new task of formulating creative, value-enhancing strategies (Kauffmann et al., 2014; Monczka et al., 2010). For example, Englyst et al. (2008) criticize extant sourcing team research for not providing concrete guidance or investigating the specific processes that govern creative problem solving and effective team functioning. Understanding how an atmosphere conducive to creativity originates from the bottom up, within sourcing teams, instead may enable such teams to focus their attention more directly on the creative processes needed to develop creative, value-enhancing sourcing strategies.

In our attempt to do so, we seek theoretical guidance from emerging team climate research. The concept of climate implies the shared perceptions of team members toward the policies, procedures, and practices that will be rewarded and supported in a specific work setting (Zohar and Tenne-Gazit, 2008). It thus provides a means to capture the collective sensemaking process by which individual team members derive information about relevant role behaviors that are expected of them, to attain strategically-focused outcomes as a team (Schneider et al., 1992). In sourcing teams, a current challenge is to rely less on formal sourcing protocols and deploy creativity as a relevant role behavior, instead. That is, sourcing teams appear to provide impactful means to attain breakthrough sourcing strategies (Pagell, 2004; Trent and Monczka, 1994), but little research conceptualizes or measures how creative processes and behaviors unfold in these teams (Driedonks et al., 2010; Englyst et al., 2008; Moses and Ahlström, 2008). Within this study, we draw on work-unit climate research to conceptualize the creativity climate in sourcing teams, develop a valid, reliable measurement instrument to assess the creativity climate in sourcing teams and test its impact on sourcing

team performance. With this approach, we aim to contribute to extant literature in two important ways.

First, we conceptualize team creativity climate (TCC) as a facet-specific work-unit climate that can reveal how individual members collaboratively develop creative solutions to sourcing challenges. With the notable exception of Driedonks et al. (2014), scholars have ignored behavioral theory perspectives on how sourcing teams perform. Climate research offers an appropriate lens to examine how team members' perceptions of or experiences in the immediate work environment influence a work group's creative endeavors (Hunter et al., 2007). From this theoretical grounding, we develop a measurement scale that can capture creative work-unit climates in sourcing teams. To the best of our knowledge, prior sourcing literature has not offered a measurement scale for creative behavior in teams. Following a systematic scale development process (Churchill, 1979; DeVellis, 1991; Netemeyer et al., 2003), we develop a one-dimensional measurement scale, using expert interviews and survey data collected from a sample of 120 sourcing professionals. In compliance with established scale development protocols, we conduct an empirical test of discriminant and convergent validity, reliability, and the unidimensionality of the target construct.

Second, we provide evidence of the predictive power of the newly developed scale for sourcing team performance; extant literature lacks evidence about the precise impact of creative team work on sourcing performance. We draw on previous research that demonstrates an inextricable link between team-level climates and strategically-focused output (Schneider et al., 1992). Because TCC can hence theoretically be related to relevant output, such as the extent to which sourcing strategies are truly creative, it offers the potential of contributing to bottom-line results. We correlate team members' ratings of the creativity climate with their team leaders' ratings of the teams' creative performance, using the leaders as experts in the domain of interest who can use their subjective judgment to assess the

appropriateness of the solution for fulfilling business unit or corporate objectives (Amabile, 1996; Amabile and Pillemer, 2012).

In the next section, we offer a conceptualization of TCC and how it relates theoretically to the creative performance of sourcing strategies. Following a two-stage scale development process, we subsequently derive a measurement scale for the TCC construct. After formulating, purifying, and pretesting the scale items, we validate our construct as well as its impact on sourcing performance with data from a sample of 52 sourcing teams. We conclude with a discussion of the theoretical and managerial implications.

2. Conceptual Background

The complex and competitive sourcing environment requires sourcing teams to look for solutions off the beaten paths (Giunipero et al., 2005). Given the multi-dimensionality of sourcing effectiveness, decision-makers have to seek a delicate balance between cost, value and risk (Driedonks et al, 2010). This new sourcing reality has led to a call for more creativity and innovative problem-solving in the procurement profession in general and within sourcing teams in particular (Deloitte, 2013). For several years, companies have relied on a multitude of creative methods, trainings and processes advocated by consultants or experts of applied creativity (e.g. Synectics: Gordon, 1961; Lateral Thinking: De Bono, 1985; Intuition: Mintzberg, 1998; TRIZ: Terninko, Zusman and Zlotin, 1998). Intended to facilitate the development of novel and meaningful solutions to problems, their validity has been contested by creativity scholars (see e.g. Sternberg and Lubart, 1999). According to Puccio and colleagues (2006), this abundance of creative methods might have contributed to the view that the field of creativity is imbalanced towards application and lacks scientific rigor. In an attempt to build a stronger theoretical foundation for empirical research on the applied nature of creativity, we thus set out to shed light on more fundamental aspects of creative problem-

solving in work groups, such as sourcing teams.

Contemporary research increasingly distinguishes between creativity as an output (i.e., how novel and useful the idea is) and creativity as a process (i.e., how the idea is achieved). While scholars agree that more attention is needed to elucidate the creative process by which individual members produce creative outcomes at the team level (Anderson et al., 2014; Mumford, 2000), the approaches taken to explicate this process are varied. Drazin et al. (1999) stipulate a process-oriented *sensemaking perspective* to describe employees' participation in creative behavior, focused on "how individuals attempt to orient themselves to, and take creative action in, situations or events that are complex, ambiguous, and ill defined" (p. 287). In contrast, Zhang and Bartol (2010) adopt a behavior-oriented approach and use an *engagement perspective* to argue that the extent to which employees engage in creativity-relevant methods or processes – such as problem identification, information searching and encoding, and idea and alternative generation – is decisive for attaining creative outcomes. Haslam et al. (2013) adopt a *social identity perspective* to explain the eminent role of teams in stimulating and shaping creative acts and determining the reception or judgment of individual team members' ideas. A shared social identity motivates people to rise to creative challenges and provides a basis for recognizing certain forms of creativity among team members. On a similar note, studies on *work-unit climates* examine how people's perceptions of or experiences in the immediate work environment influence the work team's creative endeavors (Hunter et al., 2007). The theoretical foundation for climate formation recognizes that team climates originate from the bottom up within teams and thereby shape team members' behavior. Hackman's (1987) model of group effectiveness similarly posits that the process by which team-level climates arise is dynamic in nature, such that the construction of shared meaning occurs through team member interactions. As a proxy for the creative sensemaking process among sourcing team members, climate constructs qualify as

team-level process variables that can explain how collective, creative behavior translates into creative solutions (Anderson et al., 2014). Therefore, the *climate perspective* offers an appropriate lens for conceptualizing the collective sensemaking process that occurs during creative sourcing teamwork. Adopting this team process focus, and in line with previous conceptualizations of facet-specific climates, we define TCC as *team members' shared perceptions of their joint policies, procedures, and practices with respect to creatively develop sourcing strategies*.

When people must perform work activities as a team, the notion of climate might provide a missing link between management-related factors and desired outcomes (Anderson et al., 2014). According to Katz and Kahn (1978), climate is the result of a distinct pattern of individual team members' collective beliefs that are developed through interaction with their social environments. As climate research evolved, scholars have introduced distinct climate constructs for varying contexts and levels of analysis (Schneider et al., 2013), including customer service (Schneider et al., 1998), safety (Zohar, 1980), and innovation (Scott and Bruce, 1994) climates. Climates directed at a specific goal or activity (e.g., creativity) and at a specific level (e.g., team) thus offer highly proximal measures of the process by which team members develop a sense of "the way we do things around here" (Schneider et al., 1996, p. 12). Scholars argue that these facet-specific climates can better capture the phenomenon of interest and its relationship with any particular outcome than generic or organizational climates (Zohar and Luria, 2005; Zohar and Tenne-Gazit, 2008). Therefore, we opt for a facet-specific description of a work-unit climate to understand how individual sourcing team members might derive meaning from their participation in the collective creativity and interactions with one another to devise appropriate business solutions (Hoegl et al., 2003). Although climate perceptions arise from individual team members, they can be aggregated to the team-level, to form a construct of shared perceptions (Baer and Frese, 2003). In line with

the referent-shift consensus model, the within-group consensus of the lower level units, operationalized as within-group score agreement, serves to specify and validate the construct's meaning and relevance for higher-level units (Chan, 1998). The conceptual justification for aggregating individual scores to a higher unit of analysis stems from the underlying socialization processes and interaction by which collective beliefs or shared perceptions form and get communicated to members of a group (e.g., Anderson and West, 1998; Lindell and Brandt, 2000).

An important contribution of this study is that we make creativity the focal facet of work-unit climates in sourcing teams, by focusing on the process by which sourcing team members collectively develop creative, value-enhancing sourcing strategies. According to Amabile (1996), creativity is commonly defined as the production of novel and useful ideas in any given domain. It is seldom the result of an individual employee's efforts. Instead, increasing managerial and theoretical support emphasizes the importance of shared perceptions. In particular, as strategic sourcing has emerged primarily as a team responsibility (State of Flux, 2013; Trent, 2004), creativity results largely from collaborations within collectives (Anderson et al., 2014; Driedonks et al., 2010; Fisher et al., 2005; Fisher and Amabile, 2009). A team perspective on sourcing strategy development increases solution flexibility and quality, because it pools more broad and deep functional knowledge and skills (Englyst et al., 2008). The precondition for spotting breakthrough and creative ideas for sourcing strategies is that team members have open minds and exhibit their willingness to gain a deeper understanding of the sourcing category, internal stakeholders, suppliers, supply markets, supply chain risks, and opportunities (Driedonks et al., 2010; Monczka et al., 2010; O'Brien, 2012). Against this background, the challenge of developing value-enhancing sourcing strategies as part of a team becomes evident: Team members must accommodate or overcome contrasting viewpoints, different ways of doing things, and silo thinking to arrive at shared mental models (Zhang and

Bartol, 2010). Only then is it possible to develop collaborative, creative sourcing strategies that contribute to a company's top and bottom lines. Sharing ideas, communicating viewpoints, and discussing positions with a myriad of organizational stakeholders are crucial tactics to develop a shared perception of the problem or task that the team confronts, as well as its possible resolution and corporate-level implications. The notion of climate thus constitutes a counter draft of the potential inefficiencies and conflicts that can arise within a work team. In other words, the presence of strong team climates might be indicative of the fact that power issues, political behavior, and information asymmetries are overcome.

Facet-specific work unit climates correlate strongly with many numerous output criteria of interest (De Jong et al., 2004; Patterson et al., 2005; Zohar and Luria, 2004). Previous research has shown that climate constructs are appropriate for predicting creative performance (e.g., Si and Wei, 2012) or general firm performance (e.g., Baer and Frese, 2003). In a similar fashion, a sourcing team's creative climate is likely to relate to relevant output, such as the extent to which the sourcing strategy is creative and enhances value. Because value-based sourcing constitutes a relatively new field for sourcing professionals, assessments of creative and value-focused sourcing strategies demand holistic measures to evaluate their success (Monczka et al., 2010). Established key performance indicators (KPIs), such as working capital expenditures or price and cost reductions, typically serve to assess bottom-line outcomes. These conventional KPIs need to be preceded by and complemented with measures of the intangible, abstract nature of creative and value-enhancing sourcing strategies. Creative performance thus tends to involve two dimensions: novelty (i.e., outputs are new and different) and meaningfulness (i.e., outputs are appropriate and useful for the target audience) (Amabile, 1983; Carson, 2007; Im et al., 2013). To determine sourcing strategies' ability to fulfill business unit or corporate objectives, we also assess their specificity (i.e., outputs are described in detail) and feasibility (i.e., outputs can be implemented with existing resources

and skills) (Kim and Wilemon, 2002).

3. Scale Development and Validation: A Two-Stage Process

Valid and reliable measurement lies at the heart of any scientific endeavor (Netemeyer et al., 2003) and requires a systematic approach to developing conceptually relevant, psychometrically sound measurement instruments (Churchill, 1979; DeVellis, 1991). To operationalize a facet-specific climate construct such as TCC, we followed a two-stage multi-item scale development approach, as proposed by Rosenzweig and Roth (2007) and Menor and Roth (2007) and depicted in Figure 1.

INSERT FIGURE 1 ABOUT HERE

3.1. Stage 1: Item and scale construction

3.1.1. Item generation and refinement. The primary purpose of the first stage is to provide a conceptual foundation for the TCC construct and arrive at a representative measurement item pool that can capture the domain of interest (Churchill, 1979; DeVellis, 1991; Netemeyer et al., 2003). We derived initial measurement items from a thorough investigation of creative behavior research (Gilson and Shalley, 2004), as well as creativity and innovation climates (Anderson and West, 1998; Ekvall, 1996; Isaksen and Ekvall, 2010; Isaksen and Akkermans, 2011). We conducted face-to-face interviews with five sourcing professionals from the fast moving consumer goods, manufacturing, and chemical industries. All practitioners were men and came from Sweden (1), the Netherlands (3), or the United Kingdom (1). They held senior management positions, with general work experience ranging from 6.5 to more than 20 years and sourcing-related work experience of 10 years on average. As a prerequisite, all respondents participated in sourcing-related teamwork at the time of the interview. Thus, each interviewee was knowledgeable about the research topic and representative of the sample of

sourcing professionals that we ultimately targeted with the final survey (Rosenzweig and Roth, 2007). The interviewees named aspects that contributed to their sourcing team's creative performance and helped complement insights gained from prior research (Netemeyer et al., 2003). Corroboration of the practitioner input with the initial measurement items from the literature review resulted in a pool of 27 items. Because our target construct describes a team-level process, we used the team as a referent in formulating the items. Consistent with the referent shift consensus model (Chan, 1998), the use of referent formulations such as "team," "our," and "we" constitute a precondition for the subsequent aggregation of scale items measured at the individual level to the team level of analysis. That is, aggregating referent shift items is conceptually appropriate because they refer to the level (i.e., team) to which individual responses will be aggregated (Le Breton and Senter, 2008). To establish empirical evidence that the respondents offered shared perceptions, we assessed the degree of "sharedness" with an interrater agreement approach (James et al., 1984). The R_{wg} measure reflects the extent to which respondents agree in their assessment of climate, such that their ratings should be largely interchangeable (Schneider et al., 2013).

Finally, before proceeding to the item reduction stage of the scale development, we obtained expert judgments of the items' content and face validity, and adjusted or dropped items as necessary (Churchill, 1979; DeVellis, 1991; Netemeyer et al., 2003). For this step, seven faculty members from the supply chain management department of a university commented on the item wording and judged each item's relevance to our conceptual definition of TCC. This qualitative input produced a final pool of 24 initial items that were proofread, formatted, and prepared for inclusion in the pilot study.

3.1.2. Scale purification and pretesting. A pilot study served to purify the scale and establish the initial psychometric scale properties. During November and December 2013, we disseminated an electronic survey to industry experts through the online channels of NEVI,

Europe's largest association of purchasing professionals. We collected 140 responses, of which 120 were complete. Considering our narrowly defined construct and the reasonable size of the initial item pool, a sample size between 100 and 200 provided an adequate basis for further item and factor analysis (Netemeyer et al., 2003). These respondents were sufficiently knowledgeable about the research topic, in that they spent, on average, 53% of their total work time in a sourcing team. Moreover, the respondents primarily represented senior (42%) or middle (32%) management levels, and a large majority (79%) actively led one or more sourcing teams. Surveying senior-ranking informants yields more reliable results than lower-ranking informants (Rosenzweig and Roth, 2007). Our sample also covered a variety of industries, including manufacturing, food & beverages, construction, and financial services. Therefore, our sample can be considered representative of the population of sourcing professionals.

The respondents first received a brief definition of creative sourcing teamwork, then were asked to use a five-point Likert scale (1 = "fully disagree," 5 = "fully agree") to indicate how relevant they regarded each of the 24 items for a creative climate in sourcing teams. To affirm discriminant validity and emphasize the uniqueness of the facet-specific TCC construct, we included the 14-item team climate inventory (TCI) scale (Anderson and West, 1994) and the 8-item constructive controversy (CC) scale (Chen et al., 2005). Both constructs relate conceptually to TCC, yet we expect them to be ill-suited for measuring creativity in a sourcing team context, as defined in our conceptual development. This is due to the fact that the TCI scale was developed for various team contexts (e.g., hospital teams, oil company teams) and tasks (e.g., nursing, management, psychiatric care) and the CC scale specifically aims to measure conflict management in teams.

We performed Harman's single-factor test to check for common method bias (Harman, 1976). No single factor accounted for the majority of the variance explained (max. = 37.25%),

so common method bias was not a prominent concern (Podsakoff et al., 2003). We assessed non-response bias by comparing early (first 60) and late (last 60) respondents' scores on all construct variables and selected demographic variables (Armstrong and Overton, 1977). Although early respondents were slightly older than late responders, we found no significant differences in work time spent in sourcing teams, work experience, management level, industry, or the TCC, TCI, and CC construct means.

INSERT FIGURE 2 ABOUT HERE

We used an exploratory factor analysis (EFA) with principal components analysis (PCA) and direct Oblimin rotation on the 24 TCC items. The correlation matrix, Kaiser-Meyer-Olkin (KMO) criteria, and Bartlett's test of sphericity revealed the suitability of the data for factor analysis. Specifically, the correlation matrix exhibited significant coefficients above .3 (Tabachnick and Fidell, 2007), the KMO value of .91 exceeded the recommended cut-off value of .6 (Kaiser, 1970), and Bartlett's (1954) test of sphericity reached statistical significance at the 1% level ($p < .001$, $\chi^2(df) = 1439.76 (276)$). The first PCA with all 24 items yielded six factors with eigenvalues exceeding 1, explaining 40.6%, 6.1%, 5.6%, 4.6%, 4.3%, and 4.2% of the variance. However, the scree plot indicated a clear break after one component, implying a one-factor solution. Additional parallel analyses confirmed the presence of a one-factor solution (Horn, 1965). To arrive at a more parsimonious scale, we dropped items with low loadings ($< .3$) on the first factor (Floyd and Widaman, 1995) and communalities below .4 (Hair et al., 2010), in a stepwise iterative manner. This procedure reduced the number of scale items from 24 to 9, for a reduction ratio of 2.67, in line with common suggestions for adequate domain sampling (De Vellis, 1991; Netemeyer et al., 2003) and good scale development practices in operations management research (i.e., 3.25, Ambulkar et al., 2015; 2.24, Menor and Roth, 2007; 2.86, Rosenzweig and Roth, 2007).

INSERT TABLE I ABOUT HERE

An EFA of the remaining nine items resulted in the extraction of a single factor (Table I). The final nine-item TCC scale accounted for approximately 61% of variance in the items, with significant factor loadings above .5 for all items (Hair et al., 2010). Moreover, the scale exhibited good internal consistency, with a Cronbach's alpha (.92) that exceeded the recommended threshold of .7 (De Vellis, 1991). We also examined the scale with respect to its discriminant validity, that is, whether the construct shared more variance with its own measures than with the related CC or TCI constructs (Chin, 1998). Fornell and Larcker (1981) suggest that the square root of the focal construct's average variance extracted ($\sqrt{AVE} = .833$) should exceed its correlation with related constructs ($\text{CorrCC} \times \text{TCC} = .710$; $\text{CorrTCI} \times \text{TCC} = .709$). The correlation matrix in Table II affirms this requirement, in support of the discriminant validity of the nine-item TCC measurement scale, relative to both TCI and CC. Despite their conceptual distinctiveness, we found no evidence of discriminant validity across the TCI ($\sqrt{AVE} = .756 < \text{CorrCC} \times \text{TCI} = .983$) and CC ($\sqrt{AVE} = .740 < \text{CorrCC} \times \text{TCI} = .983$) constructs. Thus, we confirmed our proposition that TCC is uniquely well suited to the sourcing team context, and we demonstrated its psychometric superiority compared with seemingly similar constructs. The first-stage results, based on a literature review, practitioner interviews ($n = 5$), expert judging ($n = 7$), and pilot study ($n = 120$), thus provide a tentatively reliable, valid, nine-item scale as a basis for the second-stage confirmatory analysis.

INSERT TABLE II ABOUT HERE

3.2. Stage 2: Confirmatory analysis

3.2.1. *Sample and survey design.* To confirm our initial assessment of scale validity and reliability, we conducted a confirmatory factor analysis (CFA) on data obtained from a larger

sample. These survey data came from four global companies operating in the chemical, construction, manufacturing, and oil and gas industries. To further distinguish our proposed construct from seemingly related ones, we included creative ability (CA; Amabile, 1983; Choi et al., 2009), task expertise (TE; Amabile et al., 1996), and task motivation (TM; Amabile et al., 1996) constructs in our survey. In line with the componential theory of creativity (Amabile, 1983), we regard all three constructs as antecedents, rather than inherent characteristics, of a creative team climate, such that we expect significant differences across constructs. Such differences also should give rise to theoretical considerations that TCC might serve as process variable, mediating between input and output variables, as suggested by Hackman's (1987) input-process-output theory. Accordingly, we first attempt to provide evidence of the predictive power of the TCC construct by collecting team members' and team leaders' ratings of the creative performance of the sourcing teams (Im et al., 2013). The items for all constructs were measured on five-point Likert scales (1 = "strongly disagree," 5 = "strongly agree"). We e-mailed the survey to 315 team members of 52 sourcing teams across four companies. After several reminders, we received 253 complete responses from team members and 52 complete responses from team leaders, yielding 80% and 100% response rates, respectively. On average, respondents had been working for their sourcing team for approximately 2 years and averaged 19 years of general work experience. Approximately 70% of respondents reported that they were currently also working in other teams. Sample respondent job titles included global purchasing manager, category manager, procurement director, and strategic buyer. Harman's single-factor test indicated that the largest variance explained by a single factor was 30.93%, indicating an absence of common method bias in this second study (Podsakoff et al., 2003). A comparison of early (first 127) and late (last 126) respondents' scores (Armstrong and Overton, 1977) did not reveal any statistically significant differences for the constructs under analysis (TCC, CA, TE and TM). Although the

respondents also were sufficiently similar in terms of their work experience and functional background, they exhibited significant differences in the percentage of time spent in work teams (19% vs. 51%). This difference appeared to be an artifact of late responders postponing their responses, due to their teamwork obligations, so we retained all the responses for further analysis.

3.2.2. Reliability. To augment our assessment of scale reliability, we derived a composite reliability coefficient (Fornell and Larcker, 1981) from a CFA in AMOS 20. As we show in Table III, the Cronbach's alpha and composite reliability both exceeded the common threshold of .70 (De Vellis, 1991), indicating good construct reliability of the TCC scale.

INSERT TABLE III ABOUT HERE

3.2.3. Unidimensionality. In a CFA, we can assess scale unidimensionality with several model fit statistics and indices. The chi-square test results indicate a poor model fit, with a large, significant chi-square statistic ($\chi^2 = 82.588$; $p < .001$). However, for large samples, the chi-square test of model fit may erroneously reject a valid model (Gatignon, 2010). Hair et al. (2010) assert that a large, significant chi-square statistic for samples larger than 250 is not indicative of poor model fit, so other measures must be consulted. The root mean square error of approximation (RMSEA = .090 < .1) is robust to differences in sample size; for our data, it indicated a moderate model fit (Hu and Bentler, 1999). The root mean square residual (RMR = .027 < .05) also supported the scale's unidimensionality (Hair et al., 2010; Hu and Bentler, 1999). The goodness-of-fit index (GFI = .923 > .9), comparative fit index (CFI = .946 > .9), and adjusted goodness-of-fit index (AGFI = .872 > .8) all were well above the respective threshold values (Hair et al., 2010). Finally, a separate PCA with direct Oblimin rotation resulted in the extraction of a single factor, which confirmed our conclusions with regard to scale unidimensionality.

3.2.4. *Convergent and discriminant validity.* The use of an independent research design and sample in each stage of the scale development process enabled us to hedge against single-source or common method biases (Rosenzweig and Roth, 2007). A more quantifiable way to demonstrate convergent validity is to consider each scale item as a different approach to measuring the construct and determine whether all items converge. We therefore examined the magnitude and sign of the item factor loadings (see Table III). Each standardized loading was in the anticipated direction and statistically significant at $p < .05$ (Froehle and Roth, 2004). Moreover, all items' R-square values were larger than .30, and much of the variance in each item was accounted for by the overall TCC construct (Chen and Paulraj, 2004). The AVE for the TCC scale also exceeded the cut-off value of .5 (Fornell and Larcker, 1981; Rosenzweig and Roth, 2007). Finally, we consulted the Bentler-Bonett (1980) normed fit index (NFI = .922 > .9), which indicated the strong convergent validity of the scale (Hair et al., 2010). With regard to discriminant validity, we determined whether the TCC construct shared more variance with its own measures than with related yet conceptually different constructs. The correlation matrix in Table IV, with the square root of the constructs' AVEs on the diagonal, reveals that the square root of the AVE for TCC (.788) exceeded its correlations with any other constructs (CorrCA \times TCC = .686; CorrTE \times TCC = .684; CorrTM \times TCC = .505), in strong evidence of discriminant validity.

INSERT TABLE IV ABOUT HERE

3.2.5. *Nomological validity.* Finally, to assess nomological validity, we investigated whether the TCC construct was positively associated with one or more relevant outcome variables. Consistent with extant theorizing (Si and Wei, 2012), we expect that a more positive creativity climate in a sourcing team corresponds with more positive creative outcomes. We therefore let the 253 participating team members and their 52 team leaders rate

their team's creative performance (novelty, meaningfulness, feasibility, specificity) on multi-item Likert type scales (1 = "fully disagree," 5 = "fully agree"). By aggregating the team member scores on creative climate and performance to the team level, we formed team averages (James et al., 1984). The Pearson correlations indicated that TCC related positively to both team members' evaluations of creative performance ($r = .694, p < .001$) and team leaders' evaluations of these outcomes ($r = .382, p < .01$). These values are comparable to or higher, on average, than the correlations between TCI and innovative performance in previous studies (e.g., .36–.53, Kivimäki and Elovainio, 1999). That is, TCC performs well relative to established climate constructs and constitutes a reliable, valid construct for predicting sourcing teams' creative performance.

4. Conclusion

At the heart of this study lies the recognition that developing creative sourcing strategies is a social endeavor, arising from collective sensemaking and interactions among employees assigned to sourcing teams, as well as other involved stakeholders. These teams cannot rely fully on the usual, formal processes or top-down instructions to develop breakthrough sourcing strategies. Accordingly, this study set out to illuminate the process by which team members develop shared beliefs about how to approach creative sourcing strategy building. Drawing on the notion of work-unit climates and adopting creativity as the focal facet, this study makes two primary contributions.

First, we introduce a creative team climate construct to account for the collective sensemaking process that precedes the origination of creative and successful strategies in sourcing teams. Following established scale development rules, we built a scale to assess the sourcing team's creative climate. Rigorous and relevant research is needed to advance the insights on creative sourcing team behavior from anecdotes to testable theory (Van Weele and Van Raaij, 2014). In this effort, TCC represents a valid and reliable measurement instrument

to address the dynamics inherent to creative work in sourcing teams that have been charged with presenting breakthrough sourcing strategies. By drawing on the organizational behavior domain, we fill a research void associated with creative work behavior in sourcing teams, as is evident in current sourcing literature. Specifically, we follow recent advances by Driedonks et al. (2010, 2014), who investigate team effectiveness from a behavioral perspective and focus on soft or social factors of sourcing teamwork.

Second, we provide evidence of the predictive power of the TCC construct, by placing it in a nomological network. The newly developed construct captures a great deal of explained variance in the actual creative performance of the 52 sourcing teams from which we obtained survey data. The Pearson correlation values in this study are appropriate, relative to the values reported in other studies (e.g., Kivimäki and Elovainio, 1999), so TCC offers a reliable, valuable team process construct that can be deployed in further research related to sourcing team performance.

4.1. Managerial implications

From a managerial point of view, this study aims to sensitize sourcing team leaders to the soft or social factors that underlie team performance. The general change in focus, from cost to value, requires the adoption of different working styles to respond to contemporary sourcing challenges. Formal processes and technocratic measures alone cannot suffice. Instead, these measures must be complemented by efforts to encourage and fuel creative behavior among sourcing teams. Our research offers a starting point, in that we offer sourcing team leaders an inventory of specific behaviors and activities that can build sourcing strategies in creative ways. The individual items of the TCC scale provide sourcing team leaders with concrete guidance about which behaviors they can adopt to promote creative role behavior among sourcing team members.

Sourcing team leaders also can use the TCC scale as a comprehensive, ready-to-use

measurement instrument for assessing their sourcing teams' creative climates. In addition to using the climate scores as a basis for designing and planning corrective actions to improve sourcing team performance, they facilitate benchmarking across internal and external sourcing teams. Including the TCC scale as an additional KPI that complements conventional team evaluation would provide leaders with a more holistic view of their teams' performance.

The principles of creative team climates might be integrated into team workshops and leadership training to raise awareness and provide guidance for creative behavior in sourcing teams. The behaviors and activities described by the items that constitute the TCC scale also can be used to design and target human resource incentives and initiatives more effectively to encourage sourcing teams' performance.

Managers and team leaders can choose from a vast array of creativity techniques, tools, and instruments developed by consultants and experts to help their teams become more creative. However, while companies oftentimes hire and pay these expensive consultants or trainers, using their techniques comes with no guarantee of more creative ideas. In contrast, our measurement scale offers a fairly simple and inexpensive way to first assess and then systematically manage a team's underlying creative climate. In more practical terms, training budget could be utilized more efficiently by basing the decision of whether or not, and what type of training is needed on the respective climate score. Since our climate construct explains only part of the variance in creative performance ($R^2 = 38\%$ and 69% , respectively), we added in a nuance to explain creative performance. We believe that our TCC scale and other relevant creativity techniques can be used in a complementary fashion.

As the sourcing landscape is very diverse in terms of what is sourced (i.e. product, service, process) and from where it is sourced (i.e. markets, industries, regions), one might raise the issue whether creativity is relevant for all sourcing teams. Clearly, creativity may be less relevant for highly standardized purchases providing leverage in terms of price, compared to

highly strategic and technically complex ones – irrespective of whether it is a product, service or process. Nonetheless, the sourcing of products as simple as doors is growing in complexity, as exemplified by a participant in a valorization workshop:

“A door is not simply a door anymore. Doors don’t have a single key anymore but have an electronic lock with a code. There are many details to specify, ranging from material to be used, design, safety etc. That in turn, has as a consequence that being a generalist is not sufficient anymore. Deep and specialized knowledge is needed.”

Respective sourcing assignment demand the collaborative work of a cross-functional team in which each and every one brings in their own expertise. In search for an answer for what kind of purchases creativity might be useful, we point managers to the widely used purchasing portfolio analysis of Kraljic (1983). More specifically, we suggest to focus on creative climates when the sourcing team is involved in highly strategic items with large financial impact.

In addition, purchasing organizations may differ tremendously in maturity, as reflected in differences in the quality of processes, systems and people employed in sourcing. As such, purchasing maturity accounts for contextual differences in sourcing teams’ composition, focus, strategy, structure, targets, information systems and staff (Keough, 1993; Rozemeijer, 2008). According to participants of one of the research workshops that we organized for the participating companies, strategic sourcing is “not only about *what* you do, but also *how* you do it”. This seems especially true when procurement is more and more involved in supply chain optimization initiatives, invited to actively participate in innovation projects and asked to join, or even head, cross-functional teams aimed at, for example, improving sustainability across the supply chain. As these activities are typically associated with higher purchasing maturity (Schiele, 2007), we believe that the need for creative climates in sourcing teams is most pronounced in organizations at higher stages of purchasing maturity. That is, companies

with higher purchasing maturity have more opportunities for using creativity as a means to create value. In contrast, teams in less mature purchasing organizations are not included in the corporate strategic planning process, occupy a rather passive role in setting the business agenda, have no support and power to pursue corporate and/or strategic initiatives and thereby have fewer potential to add value by means of creative sourcing strategies (Paulraj, Chen and Flynn, 2006). We thus advise managers and team leaders to carefully assess the potential for using a creative team approach in their sourcing projects against their organization's respective purchasing maturity.

4.2. Limitations and further research

Every study should be assessed in light of its limitations; these are outlined as well as discussed in terms of future research opportunities in this section. The sampling method we applied during the item reduction stage of the scale development process might evoke some discussion. The 120 individual respondents sampled for the pilot study, as well as the sample of 52 sourcing teams obtained to establish psychometric scale properties, constitute a heterogeneous crowd. Despite their affiliation with the sourcing profession and similar professional backgrounds, each respondent faced a distinct working environment, reflecting both industry-specific and company-specific dynamics. To guarantee the robustness of our developed TCC scale, additional research should validate the proposed construct using additional, large samples drawn from sourcing teams in a variety of companies and industries.

The pilot study and survey included constructs to establish discriminant and convergent validity. Conceptual distinctness, informed by empirical evidence of construct validity (see Hair et al., 2010; Hu and Bentler, 1999), is desirable for establishing the TCC scale, so we hope further research seeks to delineate this construct from other, seemingly similar constructs that tap behavioral aspects of sourcing, such as continuous improvement or organizational learning.

We did not account for the heterogeneity across different types of sourcing teams. In addition to installing cross-functional sourcing teams, companies increasingly extend beyond their organizational boundaries to tap the capabilities of their suppliers and fulfill their sourcing goals. Sourcing professionals also collaborate more frequently with colleagues and suppliers in virtual teams, using all sorts of social media channels. The contextual factors that govern creative performance in these varied team settings differ inherently. In sourcing teams, for instance, team leaders are confronted with the challenge of uniting team members from diverse functional backgrounds, channeling their efforts, and balancing the interests of several organizational stakeholders. Buyers-supplier innovation teams in turn are subject to contextual influences at both, the buyer and supplier organization (see e.g. Wagner and Hoegl, 2006). Further research should assess systematically the applicability of the TCC scale across different team contexts.

Finally, it is of academic and managerial interest to hypothesize and empirically assess a set of distinct, context-specific antecedents across different types of sourcing teams to determine the influence of leadership behavior, team member capabilities, or contextual circumstances at the team, organization, and partner level of analysis. Positioning the TCC construct as a focal, mediating construct within a conceptual model might provide a more fine-grained investigation and direct the appropriate management of teams' creative performance across distinct contexts within the Purchasing and Supply Management domain.

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Figure 1 – Scale development process chart

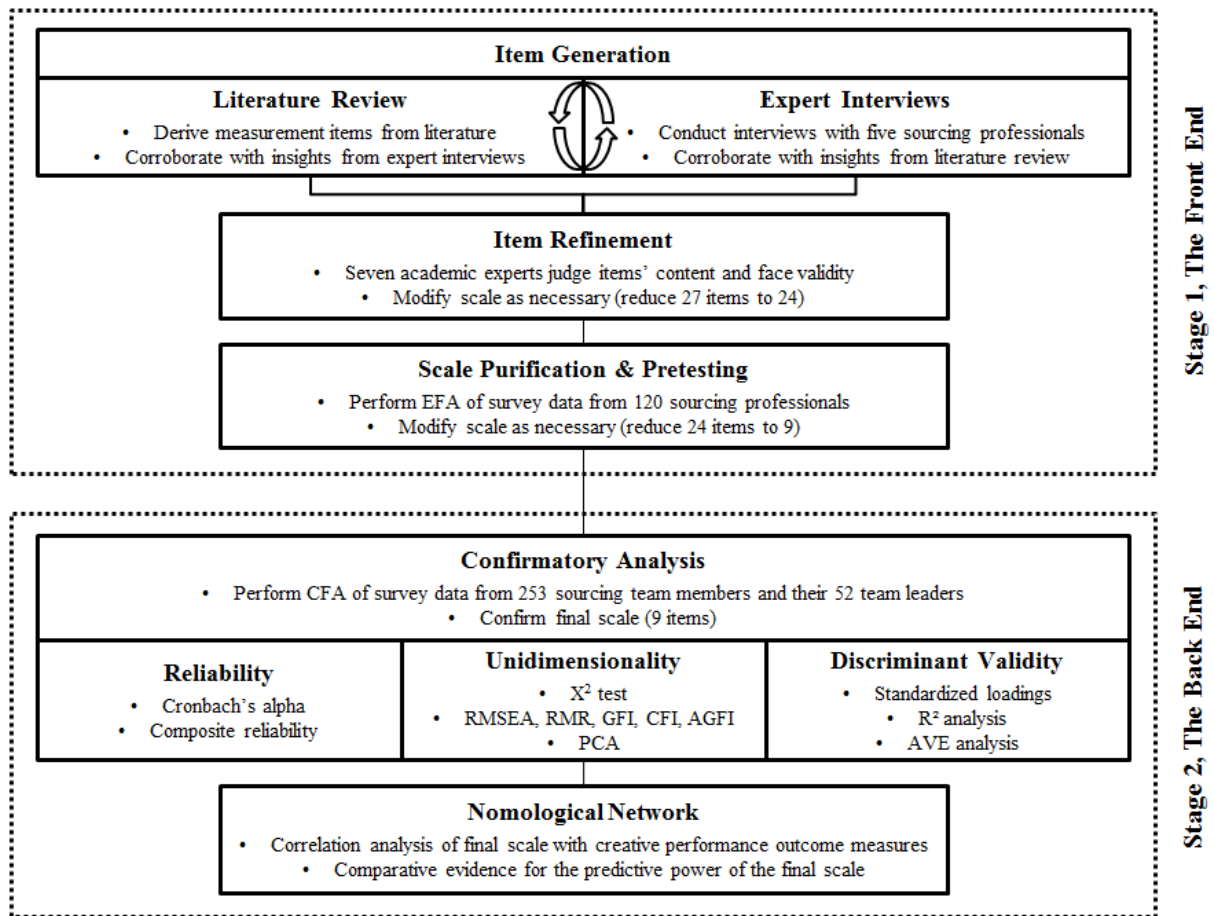


Figure 2 – Scree plot of EFA

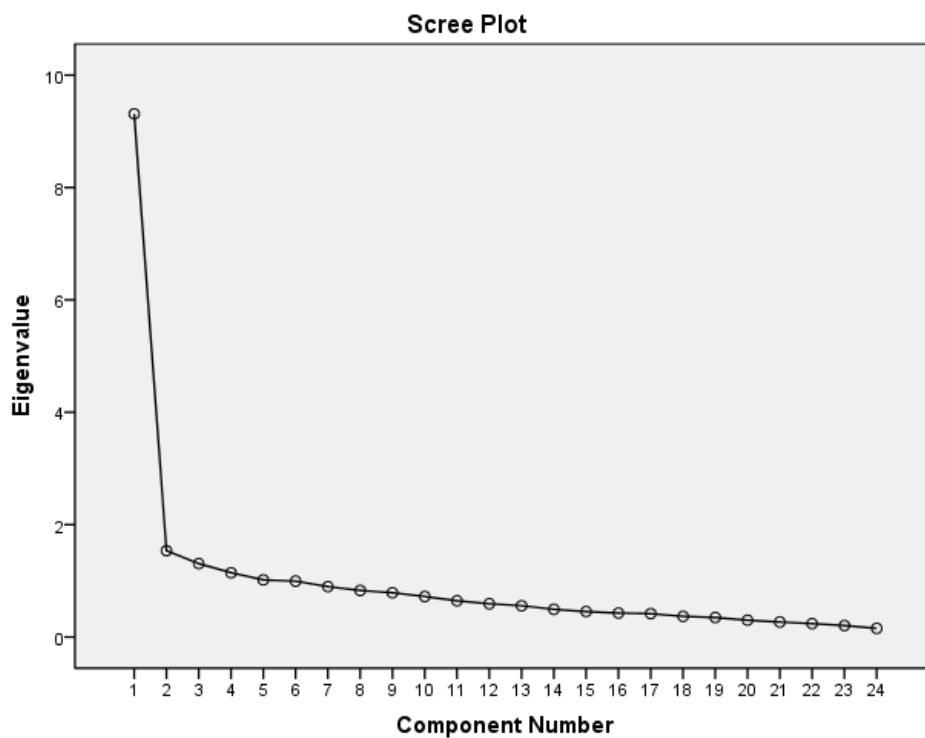


Table I – EFA Summary

| Team Creativity Climate (n = 120) | | | |
|--|---|---------------------|----------------------|
| <i>Item</i> | | <i>Coefficients</i> | <i>Communalities</i> |
| TCC1 | In our team we are open to each other's views and ideas. | 0.853 | 0.728 |
| TCC2 | In our team we strive to think across departmental boundaries. | 0.790 | 0.624 |
| TCC3 | In our team we actively seek out each other for constructive discussions. | 0.700 | 0.490 |
| TCC4 | In our team we are encouraged to try new ways of doing things. | 0.819 | 0.671 |
| TCC5 | In our team we are comfortable with exploring unfamiliar or unknown ideas and perspectives. | 0.770 | 0.593 |
| TCC6 | In our team we openly share our thoughts without fear of rejection. | 0.737 | 0.544 |
| TCC7 | Building on each other's ideas is an integral part of how we work in our team. | 0.821 | 0.674 |
| TCC8 | In our team every team member's contribution is taken seriously. | 0.829 | 0.688 |
| TCC9 | In our team we promote behaviors that are conducive towards a trustful environment. | 0.716 | 0.512 |
| Eigenvalue | | 5.523 | |
| Percentage of variance explained | | 61.369% | |
| Cronbach's α | | 0.920 | |

Table II – Construct Intercorrelations

| <i>Construct</i> | <i>Mean</i> | <i>S.D.</i> | <i>1.</i> | <i>2.</i> | <i>3.</i> |
|------------------------------------|-------------|-------------|--------------|--------------|--------------|
| 1. Team creativity climate | 4.403 | 0.627 | 0.833 | | |
| 2. Constructive controversy | 4.161 | 0.607 | 0.710 | 0.756 | |
| 3. Team climate inventory | 4.243 | 0.590 | 0.709 | 0.983 | 0.740 |

Notes: The square root of the average variance extracted is on the diagonal.

Table III – CFA results

| Team Creativity Climate (n=253) | | | | | |
|---|-----------|-----------------------|----------------------|-------------|-------------|
| <i>Item</i> | <i>SL</i> | <i>Critical ratio</i> | <i>R²</i> | <i>Mean</i> | <i>S.D.</i> |
| TCC1 | 0.743 | 10.54*** | 0.53 | 4.166 | 0.6987 |
| TCC2 | 0.678 | 12.25*** | 0.42 | 4.028 | 0.8747 |
| TCC3 | 0.781 | 10.89*** | 0.57 | 3.913 | 0.8020 |
| TCC4 | 0.699 | 9.793*** | 0.40 | 3.648 | 0.7810 |
| TCC5 | 0.632 | 9.851*** | 0.40 | 3.775 | 0.7404 |
| TCC6 | 0.636 | 11.78*** | 0.49 | 4.170 | 0.7338 |
| TCC7 | 0.753 | 10.07*** | 0.61 | 3.889 | 0.7738 |
| TCC8 | 0.649 | 11.37*** | 0.46 | 4.178 | 0.7155 |
| TCC9 | 0.728 | 10.54*** | 0.55 | 3.877 | 0.7049 |
| Cronbach's α | 0.895 | | | | |
| Composite reliability (CR) | 0.940 | | | | |
| Average variance extracted (AVE) | 0.621 | | | | |

*** $p < .001$.

Table IV – Construct Intercorrelations

| <i>Construct</i> | <i>Mean</i> | <i>S.D.</i> | <i>1.</i> | <i>2.</i> | <i>3.</i> | <i>4.</i> |
|-----------------------------------|-------------|-------------|--------------|--------------|--------------|--------------|
| 1. Team creativity climate | 3.960 | 0.560 | 0.788 | | | |
| 2. Creative ability | 3.661 | 0.568 | 0.686 | 0.758 | | |
| 3. Task expertise | 3.999 | 0.539 | 0.684 | 0.691 | 0.778 | |
| 4. Task motivation | 3.565 | 0.716 | 0.505 | 0.629 | 0.587 | 0.803 |

Notes: The square root of the average variance extracted is on the diagonal.