**Leader Values, Followers' Information Sharing, and Team Effectiveness:
Advancing Lean Team Cultures**

ABSTRACT

When work teams fail to sustain lean management methods, people frequently blame the “organizational culture.” Empirical tests of lean cultural content are nevertheless scarce. This study examined a lean team effectiveness model, comprising of relevant parts of Schwartz’s work-value theory as well as Ilgen, Hollenbeck, Johnson, and Jundt’s (2005) IMO model. Two work value clusters of lean team leaders and their followers’ information sharing behavior are hypothesized to explain lean team effectiveness. Based on valid survey scales, we surveyed team leaders and members ($N = 429$) and tested the hypotheses with the aggregated dataset; this comprised of 25 lean teams involved in commercial and public services and in manufacturing. We were able to remove considerable common source-bias. As expected, 1) lean team effectiveness was significantly linked to high scores on leader self-transcendence values and low scores on leader conservation values; 2) followers in effective lean teams were significantly more engaged in information sharing than those in the less effective teams; and 3) a partial mediation effect of follower information sharing (and thus followers’ “power of words”) was established between leaders’ self-transcendence values and lean team effectiveness. Practical recommendations pertaining to value-based selection of lean team leaders, and their presumed role-modeling of information sharing are given; their teams clearly thrive if their members are enabled to share information. In order to further uncover the precise content of (effective) lean team cultures, and how that may differ from similar non-lean teams, more comparative lean team effectiveness research is proposed.

Keywords:

Leader work values; follower information sharing; lean team effectiveness

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Lean management is a persistently popular management philosophy with associated bundles of work practices, such as total quality management (TQM) and six sigma; it focuses on achieving better customer value by continuously improving the organization's work processes, based on the implementation of non-managerial workers' ideas (Shah & Ward, 2003, 2007). Along the lean-implementation journey, many organizations or teams drop out while some of them make multiple attempts (Scherrer-Rathje, Boyle, & Deflorin, 2009), or they profess to "do lean" while attempting to begin (Hines, Holweg, & Rich, 2004). Most organizations or teams struggle to reach a "continuous improvement" or "lean" culture, including the associated leadership which effectively resources lean practices (Liker & Hoseus, 2008). Despite its popularity, lean has been associated with higher levels of stress (Conti, Angelis, Cooper, Faragher, & Gill, 2006) and more frequent conflict (Delbridge, 1995). Thus better knowledge of key aspects of lean cultures might help teams to engage more effectively in lean.

The key to organizational/team cultures are their members who manifest and realize their relatively stable, shared deeper beliefs (i.e., values) through their observable behaviors (Bardi & Schwartz, 2003; Canato, Ravasi, & Phillips, 2013; Hatch, 1993; Jin & Rounds, 2012; Schein, 1990, 1996). Although organizing cultures can be more specified in terms of their content (e.g., Ford, Wilderom, & Caparella, 2008), lean studies merely coin the term "lean culture" without really unpacking its content (e.g., Angelis, Conti, Cooper, & Gill, 2011; Kanji & Yui, 1997); they tend to take quite a generic approach (e.g., Ahmed, Loh, & Zairi, 1999; Detert, Schroeder, & Mauriel, 2000; Kanji & Yui, 1997; Maull, Brown, & Cliffe, 2001; Naor, Goldstein, Linderman, & Schroeder, 2008; Prajogo & McDermott, 2005; Zu, Robbins, & Fredendall, 2010). For the purpose of managing the evolvement of healthy lean team cultures, it is essential, in our view, to

identify the expected lean-supportive behaviors of the involved leaders and followers as well as their underlying work values (Shook, 2010). Our empirical study centers exclusively on and aims to specify key parts of the content of lean (team) cultures: leader work values and information sharing follower behavior at the (lean) team level. This research focus forces a level of integration between theoretical elements of organizational behavior/studies and operations management (Bendoly, Croson, Goncalves, & Schultz, 2010; Bendoly, Donohue, & Schultz, 2006; Detert et al., 2000; Linderman, Schroeder, & Choo, 2006; Van Dun & Wilderom, 2012). The manifestations of both cultural contents are assumed to enable lean to thrive (Ashkanasy, Wilderom, & Peterson, 2011; Fu, Tsui, Liu, & Li, 2010; Van Dun & Wilderom, 2012).

We direct our attention especially towards an analysis at the work floor team-level since, to date, this lean team-level of (cultural) analysis is largely absent (Van Dun & Wilderom, 2012). A bottom-up view is especially important given that lean principles consider work-floor employees as most knowledgeable (Bicheno & Holweg, 2009; De Lange-Ros & Boer, 2001). Scholarly assessments of lean effectiveness or lean cultures tend to be focused mostly on organizational, divisional or departmental levels (Caffyn, 1999). Past lean culture studies tended to adopt the Competing Values Framework (Cameron & Quinn, 2006): TQM was associated with each of the four competing culture types, being “adhocracy,” “clan,” market,” and “hierarchy” (Cameron & Quinn, 2006; Naor et al., 2008; Prajogo & McDermott, 2005; Zu et al., 2010). Due to a lack of consensus (as noted earlier by Wagner, 2011), Naor et al. (2008) called for new studies with different theoretical frameworks and a link to performance. Our present study also follows the advice of Detert et al. (2000) and Prajogo and McDermott (2005) who suggested that subgroups or teams, as well as micro level behaviors and work values might be fruitful new foci for the study of effective lean team cultures, in order to lift their track record in attaining states of healthy cultures (Ballé, 2005; Scherrer-Rathje et al., 2009).

Leaders' enacted work values are seen as key behavioral compasses for the workers they supervise, leading potentially to higher levels of organizational citizenship behavior and team effectiveness (Sosik, 2005). We examine two sets of team leader work values that are assumed associated with lean team behavior and high lean team effectiveness. The team behavior we focus on here is information sharing, which has been defined as: "the provision of task information and know-how to help others and to collaborate with others to solve problems, develop new ideas, or implement policies or procedures" (Wang & Noe, 2010: 117). Information sharing at the team level includes both the donating and collecting of ideas, information, or knowledge (De Vries, Van Den Hooff, & De Ridder, 2006).

In the remainder of this paper we refer to "lean teams" as (more-or-less) permanent work groups that are embedded in a larger organizing context, that have adopted lean practices (Shah & Ward, 2003). Such teams have a clearly defined team membership; the team members, including their leader, share the responsibility for producing particular products and/or services (Cohen & Bailey, 1997; Edmondson, 1999; Hackman, 1987). Below, we first formulate the hypotheses, based on our integration of parts of theories from several long-established fields: lean management, operations management, team effectiveness, (team) culture, and organizational behavior, in particular. After this review, summarized by six hypotheses, we describe this study's methodology and results, after which we reflect on the empirical findings obtained.

THEORY: LEAN LEADERS' VALUES LINKED TO TEAM-LEVEL INFORMATION SHARING BEHAVIOR AND LEAN TEAM EFFECTIVENESS

Previous studies found support for the idea that specific leader values are associated with behavior toward team members (Fu et al., 2010). Moreover, noticeable team members' behaviors are shown to be a direct reflection of a leader's work values (Cropanzano, James, & Citera, 1993). Leaders are seen to "promote the values they consider desirable through their deeds –

serving as models for others” (Sagiv & Schwartz, 2007: 183). Systematic, empirical efforts in terms of studying leaders’ work values can be found in the field of leadership: Brown and Treviño (2009) adapted Schwartz’s (2012) value system, making it more relevant in work settings. This system consisted of four higher order work value clusters of socialized charismatic leaders, which can be divided into two, bipolar underlying dimensions: “self-transcendence” versus “self-enhancement,” and “conservation” versus “openness to change” (Schwartz et al., 2012). Whereas the self-transcendence work value cluster entails other-focused values such as ‘altruism’ and ‘teamwork,’ the self-enhancement cluster consists of more self-focused values, ‘ambition’ and ‘taking initiative’ (Brown & Treviño, 2009). Moreover, typical change-averse conservation work values are ‘conformity’ and ‘tradition,’ while openness to change work values entails more risk-taking through ‘experimentation’ and ‘daringness’ (Brown & Treviño, 2009).

Relatively few scholars have reported empirical studies on work values in lean work settings (e.g., Emiliani, 2003; Van Dun, Hicks, & Wilderom, 2014), let alone lean *team* leaders’ work values. In an exploratory study, Van Dun et al. (2014) found that lean middle managers espouse predominantly self-transcendent work values, little openness to change values, and they lack conservation or self-enhancement type values. More specifically, they found five central work values in lean middle managers: ‘honesty,’ ‘participation and teamwork,’ ‘open-heartedness,’ ‘responsibility,’ and ‘continuous improvement.’ Indeed, others included similar self-transcendent values: ‘participation and teamwork’ or the conceptually related ‘employee empowerment’ and ‘cooperation’ (Jabnoun, 2001; Liker & Convis, 2012; Womack, Jones, & Roos, 1990); ‘continuous improvement’ (Emiliani, 2003; Liker & Convis, 2012); ‘openness;’ ‘responsibility;’ ‘empathy;’ and ‘trust’ (Jabnoun, 2001). Also listed are: ‘respect for people’ (Bicheno & Holweg, 2009; Emiliani, 2003; Jabnoun, 2001; Liker & Convis, 2012) and ‘humility’ or ‘humbleness’ (Bicheno & Holweg, 2009; Jabnoun, 2001). And although ‘customer focus’

(Womack et al., 1990) or the related norm ‘customer satisfaction’ (Liker & Hoseus, 2010) was not prevalent among middle managers in lean firms (Van Dun et al., 2014), team leaders may have stronger orientations towards customers because their work settings are closer (in the value chain) to the customers. Finally, Liker and Convis (2012) saw ‘challenge’ and a behavioral factor such as ‘go and see’ as key values of lean leaders at Toyota, while in an earlier publication they listed a different set, i.e.: safety, customer satisfaction, respect, integrity, teamwork and continuous improvement (Liker & Hoseus, 2010). In other words, systematic studies of lean leaders’ work values as fundamental manifestations of lean (team) cultures, along the lines of Schwartz’s seminal values framework, are clearly needed.

The Role of Team Leaders’ Self-transcendence Work Values

It can be noted that the values listed in the lean literature fit well in Schwartz’s self-transcendence value cluster. Indeed, leaders’ self-transcendence work values (as perceived by workers) have been associated with higher worker effectiveness (Fu et al., 2010). A recent study with project teams showed that the self-transcendence work value ‘benevolence’ predicted higher levels of group-oriented organizational citizenship behaviors (Arthaud-Day, Rode, & Turnley, 2012), tending to lead to higher team effectiveness. Also, Ooi, Bakar, Arumugam, Vellapan and Loke (2007) established that a TQM culture built on self-transcendent type values, such as teamwork, trust, empowerment and support, led to higher levels of team member job satisfaction, which is an important predictor of team effectiveness. Hence, we propose that team leaders in effective lean teams will score high on self-transcendent work values:

Hypothesis 1a: If lean team leaders score high on self-transcendence work values, their team’s effectiveness is likely to be high.

A leaders’ self-transcendence work values emphasize collaboration, teamwork, and participation, thereby likely increasing collaborative behaviors such as information sharing

among their teams (De Long & Fahey, 2000). Following Ilgen et al.'s (2005) Input-Mediator-Output-Input (IMOI) model, information sharing is considered to be a mediating behavioral process, influenced by input variables such as leader values; together, they account for output variables such as team effectiveness or performance (DeChurch & Mesmer-Magnus, 2010; Ilgen et al., 2005; Mathieu, Maynard, Rapp, & Gilson, 2008). Salas, Sims, and Burke (2005) coined information sharing (seen as closed-loop communication) as an important behavioral process or “coordinating mechanism” underlying various aspects of teamwork. In the lean work context, information sharing is a key behavioral team process (Van Dun & Wilderom, 2012), and is shown to be linked to higher lean team performance (Magnusson & Vinciguerra, 2008). Since the sharing of information exposes team members to a larger and richer pool of ideas and data, information sharing is also an important precondition for team learning (Argote, Gruenfeld, & Naquin, 1999). Indeed, effective lean teams optimize their processes through continuous learning (Aloini, Martini, & Pellegrini, 2011; Bessant, Caffyn, & Gallagher, 2001; Bunderson & Boumgarden, 2010; Hines et al., 2004). In other words, team members' sharing of ideas, knowledge and other kinds of information is likely to lead to healthy, effective and continuously learning teams (Hult, Ketchen Jr., & Nichols Jr., 2003; Ilgen et al., 2005).

Leaders' support, especially their high rating of collectivistic, self-transcendence values, is positively related to work group knowledge sharing (Chen, Tjosvold, Li, Fu, & Liu, 2011; Wang & Noe, 2010). Indeed, if team leaders are open and accessible (both physically and psychologically) to their followers, they create psychologically safe team climates in which team members feel welcome to share their ideas and information (Hirak, Peng, Carmeli, & Schaubroeck, 2012). Similar effects of leader participation and people values were found in a Chinese work context (Wong, Tjosvold, & Lu, 2010). Hence, we argue that if a leader endorses

self-transcendent work values, due to their participatory character, lean team members will engage in more information sharing behaviors.

Hypothesis 1b: Team leaders' self-transcendence work values are positively related to their team members' information sharing behavior.

As argued before, behavioral processes, such as information sharing, are commonly seen as mediating variables in the IMOI model (see, e.g., Ilgen et al., 2005; Mathieu et al., 2008). In line with Hypothesis 1a and 1b, we postulate that leaders' self-transcendence work values predict lean team effectiveness via their team members' information sharing behaviors:

Hypothesis 1c: The positive relationship between team leaders' self-transcendence work values and lean team effectiveness is mediated by their team members' information sharing behavior.

The Role of Leaders' Conservation Work Values

The values that fit the “conservation” cluster seem, contentwise, the opposite of what is advocated by lean. Continuous process improvement is supposed to take place by using workers' insights and creativity (and thus presupposes a non-conformistic attitude) (Bicheno & Holweg, 2009), leading to continuous process changes, for the better. Moreover, lean work practices often demand team leaders to change their role and associated behaviors towards transformational leadership (Poksinska, Swartling, & Drotz, 2013): It can be hard for leaders to make the required changes, especially if they are more conservative in nature. Considering the key role leaders play in teams and lean change (Poksinska et al., 2013; Van Dun & Wilderom, 2012), a leader's conservative values may hinder the effectiveness of a lean team; a previous empirical study found conservative values (i.e., stability and predictability) to be significantly related to low lean performance (Zu et al., 2010).

However, it seems as if lean has a “dual core:” On the one hand “workers are expected to make significant contributions to innovation and improvement”(Delbridge, Lowe, & Oliver, 2000: 1472), while on the other, lean demands workers to stick to the work standards and routines (conservation) so as to maintain quality and to create continuous product flow (Kosuge, Modig, & Åhlström, 2010; Spear & Bowen, 1999). Following a case study at NUMMI, lean does combine standardized or routine work practices with creative employee participation (Rothenberg, 2003). Lean values such as ‘humility’ (Bicheno & Holweg, 2009; Jabnoun, 2001), ‘integrity’ (Liker & Hoseus, 2010), ‘responsibility’ (Jabnoun, 2001), and ‘respect’ (Bicheno & Holweg, 2009; Emiliani, 2003; Jabnoun, 2001; Liker & Convis, 2012), may be associated with a certain level of conservatism. There are apparent gains for some conservatism in lean workplaces, given that standardization is part-and-parcel of a lean team leader’s charge. Yet, team leaders with a set of predominantly conservative work values are less likely to advocate change; question fundamental beliefs; encourage their followers to voice new ideas for purposes of continuous improvement, etc.. Thus, conservation values might even inhibit lean team effectiveness:

Hypothesis 2a: If lean team leaders score high on conservation work values, their team’s effectiveness is likely to be low.

Notwithstanding, if team leaders hold more conservative work values, they are more likely to protect the status quo and limit behaviors that might potentially disrupt extant work practices (Schwartz, 1999; Schwartz et al., 2012). De Long and Fahey (2000) found that organizational cultures with low levels of openness to change discourage the open sharing of knowledge. If leaders espouse conservatism, followers run the risk of being critically judged by their superior when they share certain information, as their supervisors may dislike this sharing of (new) insights as it may reduce their own power (Wang & Noe, 2010). Under such conditions, team members are more likely to suppress their ideas and information and stick to the work

standards. Typically, this leads to a lower level of lean team-level information exchange (Delbridge, 1995). Therefore, our empirical study also tests the following hypothesis:

Hypothesis 2b: Team leaders' conservation work values are negatively related to their team members' information sharing behavior.

If lean work teams score *low* on information sharing due, in our view, to their leaders' conservatism, it is much more likely that mistakes and miscommunications occur (which are seen as waste, from a lean perspective). In turn, this tends to lead to lower production quality or team effectiveness. Thus, lean team information sharing is argued to mediate a negative relationship between a leader's conservative nature and lean team effectiveness. Hence, our final hypothesis:

Hypothesis 2c: The negative relationship between team leaders' conservation work values and lean team effectiveness is mediated by their team members' information sharing behavior.

METHODS

We first pilot tested the survey using the variables of the main study. After subsequent polishing of the instrument, we asked employees and team leaders of 30 lean teams to fill it in. The study's sampling, data-collection procedures, measures, and data analytics are reported below.

Sample and Data-Collection

The pilot was held amongst the members and team leaders of seven work teams with varying levels of lean experience ($n = 77$; 75% response rate; $M_{age} = 42$ years; 58% females; 53% worked full time). These seven teams had adopted lean for an average of five months and they applied various lean tools to improve their operations, i.e., daily performance monitoring routines and employee suggestion schemes (Bicheno & Holweg, 2009; Liker & Hoseus, 2008; Mann, 2005). We pilot tested the survey measures to ensure that the used constructs and survey scales

were sufficiently valid and reliable for the main study. Based on factor and reliability analyses and participants' feedback, we deleted redundant items, and added a few items.

In the main study, the respondents included members of 30 work floor teams, i.e. their team leaders ($n = 34$; $M_{age} = 42$ years; 26.5% females; 94.1% worked full time; $M_{team\ tenure} = 4$ years and 5 months)¹ and team members ($n = 395$; $M_{age} = 41$ years; 34.7% females; 71.4% worked full time; $M_{team\ tenure} = 5.5$ years). These teams varied in terms of their size (ranging from five to 44 members), male/female ratio (four teams employed only men, while four other teams consisted mostly of women), and educational level (ranging from lower vocational education to master degrees). The average response rate of the actors in the full sample was 84%. Because five team leaders (from five teams in one large participating organization) did not fully complete the values survey, we had to eliminate these teams from the hypotheses-testing. The 25 remaining work teams operated within 12 different medium- to large-sized organizations² across four different industries: 1) Six teams came from two different firms within the financial service industry (their main tasks varied from advising private clients, ICT maintenance, to customer contact); 2) ten manufacturing teams of four different firms that assembled electric razors, lighters, or attached wirings; 3) seven teams were from the public sector (they assisted clients with civil registry or managed social cases at two major municipalities); and 4) two teams

¹ Due to part-time work arrangements and the need to relieve leaders' span of control in large teams, some of the 30 work teams had multiple team leaders. All of them were asked to complete the survey and insofar there were more than one leader, their scores were averaged per team.

² The largest organization with several teams participating in our study employed around 120,000 workers worldwide, while the smallest participating organization employed around 200 workers.

processed insurance claims in one large insurance firm. Hence, the sample enabled the testing of the hypotheses among a wide variety of organizational and sectorial contexts.

The teams were recruited by means of a public call at lean practitioner seminars; various websites and social media; as well as via management consultants of a firm specialized in implementing lean. All teams in our main study had adopted a lean strategy and had installed typical lean tools, such as employee suggestion systems; a communication board; daily performance monitoring meetings; and value stream mapping (Bicheno & Holweg, 2009; Liker & Hoseus, 2008; Mann, 2005). Some of the teams had only worked with lean practices for one month, while other teams had already practiced lean for 10 years. On average, the 25 teams had worked with lean for 2 years and 4 months.

Team leaders distributed the web links to each team member, giving them access to an online, anonymous survey on their own work stations. All respondents were informed that the team leaders could not see who or how many employees had responded. After two weeks we sent a reminder, in order to increase the response rate. Because a few of the team members did not have access to a computer, some paper surveys ($n = 33$) were distributed, together with a sealable envelop, to ensure anonymity. In exchange for their participation, we discussed with the team leaders a report on their team-level outcomes—also to check for the findings' ecological validity.

Measures

The main study's survey consisted of two parts: 1) a section on work values, completed by the team leaders; and 2) a part on work team-level information sharing behavior and team effectiveness, completed by the team members. All the English scales were translated into Dutch by an independent expert, following the standard backward translation method (Brislin, 1970).

Team leaders' work values. We assessed team leaders' espoused work values using two valid scales ("self-transcendence" and "conservation") that were adapted slightly to the lean work

context (see below). In order to increase scale distribution and prevent ceiling effects, respondents were forced to first read all the work values and then pick their single most important and single least important work value from the list of 18 work values (see Table 1 for the items that remained after factor analysis): similar to Bardi and Schwartz (2003). The team leaders were then asked to rate each work value on a 7-point Likert scale, ranging from *highly unimportant* (1) to *highly important* (7). Both work value scales had a satisfactory reliability (see Table 3).

Self-transcendence. We used Brown and Treviño's (2009) "self-transcendence" scale, which includes five work values. Based on an earlier qualitative values study of effective middle managers in lean firms, the following five values were added to this scale: 'customer focus,' 'honesty,' 'information sharing,' 'open-heartedness,' and 'trust in people' (Van Dun et al., 2014).

Conservation. Brown and Treviño's (2009) "conservation" scale includes five work values. Based on the same logic of the earlier lean study we added three other work values to this scale: 'humility,' 'integrity,' and 'responsibility' (Van Dun et al., 2014). Moreover, the original 'honor' was relabeled as 'respect,' a typical value for lean leaders (Van Dun et al., 2014).

Team members' information sharing behavior. The second part of the survey, completed by the team members, included a validated "information sharing" scale (De Vries et al., 2006): see Table 2 for all included items and Table 3 for its reliability. We rephrased the scale, given the team-level of analysis, by using the "referent-shift consensus composition" (Chan, 1998: 238). An example of an original information sharing item is: "When I need certain knowledge, I ask my colleagues about it" (De Vries et al., 2006: 131). We rephrased this item into: "When team members need certain knowledge, they ask their colleagues for it." All items were measured through a 7-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (7).

Team members' rating of lean team effectiveness. We asked the team members to assess their team's overall effectiveness through a self-designed "lean team effectiveness" scale. We

asked team members to grade their team's level of continuous improvement, customer focus and employee involvement on a scale from 1 (*lowest*) to 5 (*highest*), see Table 2. The scale showed good reliability ($\alpha = .76$) and tapped their evaluation as to how well the team was doing in terms of these three core principles of lean (Dean & Bowen, 1994).³ Although these metrics fit particularly well in lean contexts, they also reflect general performance outcomes such as process improvement, job satisfaction and quality provided to customers.

 Insert Tables 1 and 2 about here

Control variables. We added “team size,” “male/female ratio,” and “educational level” to the model as control variables. Aubé, Rousseau, and Tremblay (2011) and Cohen and Bailey (1997) suggested that team size influences a team's behavioral processes, for instance the amount of information shared (Argote et al., 1999). At the same time, a team's gender division may have an impact on a team's communication: Teams with more females are more likely to share information (Wang & Noe, 2010). Similarly, educational level may affect the amount of knowledge and information shared among team members (Siemens, Roth, Balasubramanian, & Anand, 2009; Wang & Noe, 2010). Hence, we checked for the three potentially influential variables, in terms of lean team effectiveness, increasing the validity of our results.

Data Analysis

³ On comparing evaluations from team members, some do consider department heads to be more reliable and objective sources of team performance data, especially because they are tasked with evaluating the team's output (Hackman, 1987). However, other studies have argued that department heads may operate too far away from the teams to be able to accurately assess work floor level team performance (e.g., Campion, Papper, & Medsker, 1996).

After analyzing and recoding the missing values, we checked for inconsistencies or outliers in both datasets. Then, principal axis exploratory factor analyses with oblique rotation (promax) were performed (Fabrigar, Wegener, MacCallum, & Strahan, 1999). This rotation was chosen because we had added several lean-related value items to the Brown and Treviño (2009) validated scales (obviously these items were expected to correlate). The samples were adequate for these analyses, evidenced by both the Kaiser-Meyer-Olkin measure and Bartlett's Test of Sphericity. After eliminating six work values items, because they had double loadings or did not load on any of the factors, the remaining 12 work values items ($KMO = .89$; $X^2_{66df} = 1,426.34$; $p = .000$) consisted of two factors, together explaining 48.73% of the variance, see Table 1. The first factor, self-transcendence, consisted of 9 items: Three from Schwartz's and Brown and Treviño's original "self-transcendence" scale and six came from the lean work values literature. The second factor, conservation, included three items: Two items came from Schwartz's original "conservation" cluster, while "humility" originated both from Schwartz's "self-transcendence" cluster as well as from the lean literature. The near absence of cross-loadings indicated discriminant validity. A scree plot and direct oblimin rotation gave similar results. Hence, building upon Schwartz's seminal work (2012), the exploratory factor analysis supported two lean context-fitting measures of self-transcendence and conservation values.

The same type of analysis was performed with the 11 items included in the team member survey ($KMO = .90$; $X^2_{55df} = 2,116.30$; $p = .000$). After examination of the scree plot, we extracted two factors: One factor consisted of the original "information sharing" variable and the other consisted of the dependent "lean team effectiveness" variable (see Table 2). Together these two factors explained 62.63% of the variance. No cross-loadings appeared, which supports discriminant validity. A direct oblimin rotation gave similar results.

We then retrieved the Cronbach's alpha's at the individual level through SPSS 20.0 (see Table 3). In order to check whether data aggregation was justified, we calculated intra-team member agreement coefficients ICC(1) and ICC(2) (Bartko, 1976; Bliese, 2000; Castro, 2002; James, 1982; Newman & Sin, 2009), with $k = 13.20$ as the average group size (Castro, 2002; Newman & Sin, 2009). ICC(1) indicates the extent of agreement among the ratings from members of the same team, whilst ICC(2) indicates whether teams can be differentiated on the variables of interest (James, 1982). Table 3 shows that the independent and dependent variables had satisfactory ICC(1) and ICC(2) scores: An acceptable range for ICC(1) values is between .00 and .50 (Bliese, 2000; James, 1982). ICC(2) values equal to or higher than .50 are satisfactory (Klein et al., 2000). In order to prevent common method bias, we randomly assigned each of the team member respondents to one of two subsets following Rousseau (1985): 1) Half of the team member responses were used to calculate aggregate scores for information sharing; and 2) the other half of the team member responses were used to calculate aggregate scores for lean team effectiveness. A two-tailed Wilcoxon Signed Rank test indicated no significant differences among both team member subsets (information sharing: $Z = -1.12$, $p = .26$; lean team effectiveness: $Z = -1.09$, $p = .28$). All the aggregated variables showed a high reliability (see Table 3) and were normally distributed, with skewness and kurtosis ranging between -2.00 and 2.00. In order to test our hypotheses, we performed hierarchical linear modeling (HLM) at the team-level of analysis, supplemented with structural equations modeling through AMOS 20.0 with Maximum Likelihood bootstrapping, as well as a Sobel test of the indirect effects.

 Insert Table 3 about here

RESULTS

The bi-variate correlations, means and standard deviations for the independent and dependent variables of this study are presented in Table 3. From this table it can be seen that a significant, positive correlation between team leaders' self-transcendence work values and conservation values existed ($r = .59, p < .01$), as well as a negative correlation between team leaders' conservation work values and lean team effectiveness ($r = -.38, p < .04$), and a positive correlation between team members' information sharing and lean team effectiveness ($r = .67, p < .01$). There was also a marginally significant correlation between team leaders' self-transcendence work values and team members' information sharing ($r = .31, p < .07$).

Table 4 reports the results of the hierarchical linear modeling (see also the visual illustration of the results from our hypothesized model in Figure 2), while controlling for team size, male-female ratio, and educational level (all *n.s.*, VIF < 1.20). Hypothesis 1a anticipated that leader self-transcendence values are positively linked to high lean team effectiveness. The right-hand column of Table 4 shows that the standardized regression coefficient of leader's self-transcendence values was significant after entering the variable in the second step of the regression ($\beta = .74, p < .01$, VIF = 1.66), and somewhat decreased in significance ($\beta = .49, p < .03$, VIF = 2.11) when adding information sharing to the model. Hence, Hypothesis 1a is accepted. Hypothesis 2a proposed a negative relationship between leader conservation values and lean team effectiveness. As shown in Table 4, the significant standardized regression coefficients in all the steps of the regression model (Step 2: $\beta = -.84, p < .01$, VIF = 1.64; Step 3: $\beta = -.64, p < .01$, VIF = 1.93) indicated support for this hypothesis. Together with information sharing, the independent and control variables explained 67% of the variance in lean team effectiveness.

In order to test Hypotheses 1b and 2b, we ran a regression analysis with information sharing as the dependent variable (see the left-hand column of Table 4), while controlling for team size, male-female ratio and educational level (all *n.s.*, VIF < 1.12). The results show that

leader self-transcendence was significantly and positively related to members' information sharing ($\beta = .57, p = .03, VIF = 1.66$), thereby providing support for Hypothesis 1b. Hypothesis 2b was not supported: Conservation was marginally significantly and negatively related to information sharing ($\beta = -.46, p < .09, VIF = 1.64$). In total, team leader self-transcendence and conservation work values explained 29% of the variance in members' information sharing. This low explained variance, combined with the non-significant F -value, suggests that other (cultural or work value) factors might be at play as well.

Finally, we tested the mediating effect of information sharing on the relation between leaders' self-transcendence (Hypothesis 1c) and conservation (Hypothesis 2c) work values and lean team effectiveness. As an important precondition, we found a highly significant, positive relationship between information sharing and lean team effectiveness ($\beta = .44, p < .02, VIF = 1.41$; Table 4). Moreover, a Sobel test indicated a significant indirect effect of team leaders' self-transcendence work values on lean team effectiveness, mediated by information sharing behavior (Sobel $z = 1.98, \beta = .25, p < .05$, see Table 5). These results provide support for Hypothesis 1c. There was marginally significant support for the mediation of information sharing on the relationship between team leaders' conservation values and lean team effectiveness (Hypothesis 2c): Sobel $z = -1.63, \beta = -.20, p < .10$, see Table 5. Figure 1 shows the entire research model, based on HLM analyses, including the standardized regression coefficients.

 Insert Tables 4 and 5 and Figure 1 about here

Structural equations modeling, through AMOS, showed similar effects, while controlling for team size ($\beta = -.10$, n.s.), male/female ratio ($\beta = -.01$, n.s.), and educational level ($\beta = .05$, n.s.). Leaders' self-transcendence values were significantly linked to lean team effectiveness ($\beta = .54, p < .00$) and this direct effect somewhat decreased when information sharing was added as a

mediator ($\beta = .48, p < .01$); information sharing was significantly related to lean team effectiveness ($\beta = .44, p < .01$); while conservation remained significantly and negatively linked to lean team effectiveness ($\beta = -.70, p < .00$; with information sharing as a mediator: $\beta = -.62, p < .00$). Moreover, self-transcendence and conservation values were significantly linked to team members' information sharing ($\beta = .56, p < .01$; $\beta = -.45, p < .04$, respectively). The fit indices for the model including information sharing as a mediating variable ($X^2 = 2.346, df = 6, p = .885$, CFI = 1.000, GFI = .974, NFI = .953, RFI = .836, RMSEA = .000, PCLOSE = .899) were better than the fit indices for the model without mediation ($X^2 = 8.405, df = 8, p = .395$, CFI = .986, GFI = .921, NFI = .832, RFI = .559, RMSEA = .046, PCLOSE = .441). Following Baron and Kenny's (1986) approach, we found support for team member information sharing as a partial mediating variable between team leader self-transcendence values and lean team effectiveness.

DISCUSSION

To date, relatively little research attention has been paid to team-level lean cultural features, such as work values and behaviors that are considered essential if lean teams are to thrive as work floor units in (lean) organizations. The key purpose of the current study is to fill this void, by examining both lean team leaders' work values and the team-level behaviors of the followers in their work teams. More knowledge of the specific cultural content of teams which pursue lean effectively will help diminish the potential waste of human resources involved in the resurging attempts at lean implementations. Moreover, from an IMO model point of view, there is a need to "generalize leadership effects [i.e., the effect of their values] to the team level [i.e., information sharing behavior and team effectiveness]" (Kozlowski & Ilgen, 2006: 114). In line with our hypotheses, and with common-source bias largely removed, we show that leaders' self-transcendence values and team members' information sharing behavior are positively related to lean team effectiveness. At the same time, leaders' conservation work values are negatively

linked to lean team effectiveness. This finding implies that a conservative, strict-hierarchical or formal-power type culture is less effective in a lean team context (similar to what was found by Zu et al., 2010): Leader conservation values which are conceptually related to “hierarchical” values such as stability and predictability, are negatively related to lean team effectiveness. Instead, in accordance with Zu et al. (2010), we find lean team leaders tend to build a “clan culture” through their emphasis on teamwork and altruism values. It is surprising to us that studies with the Competing Values Framework have not led to this specific outcome before.

Another outcome of our study concerns the partial mediation effect of team members’ information sharing between leaders’ self-transcendence values and lean team effectiveness. Kozlowski and Ilgen (2006) noted that the leadership levers of improved team communication or information sharing need to be refined: Our study points to leaders’ values; they seem to role-model such sharing, through their own behavior, a representation of their tacit self-transcendent value constellation. Clearly, leaders’ espoused values do matter in resourcing effective lean team behaviors such as information sharing, especially if their value constellation incorporates values such as responsibility, information sharing, and teamwork (and the other values reported in Table 1). Indeed, by using these values, team leaders are shown to be carriers or creators of effective team cultures (Sagiv & Schwartz, 2007; Schein, 1990).

Following Bardi and Schwartz (2003), we show what lean leader work values connect to team behavior. This joint effect unpicks a part of the content of effective lean team cultures. As suggested by Prajogo and McDermott (2005) and Wagner (2011), work floor teams tend to show some degree of “cultural homogeneity.” We focus on one key “lean” behavioral process: information sharing. Because its effect on team effectiveness is well known in the management literature, we establish this also holds for lean work contexts, and show a link to two known clusters of values, each supplemented with values deemed unique for lean work settings. Several

other behavioral processes are likely to play a role on lean work floors as well, for instance innovating work practices and actual leader and follower interactions (Van Dun & Wilderom, 2012). The role of other potential mediating factors such as affective or cognitive emergent states (e.g., psychological safety (Siemens et al., 2009), conflict management (Delbridge, 1995), team cohesion (Mullarkey, Jackson, & Parker, 1995), or team goal orientation (Linderman et al., 2006)) is also in need of investigation in lean work teams (Van Dun & Wilderom, 2012).

Practical Implications

Whereas most managers and consultants tend to start implementing lean management by installing its extensive tools in teams (Shah & Ward, 2003), our study shows that their efforts are likely to be more effective if they also give attention to team leaders' values and information sharing behaviors. If organizations select and/or promote their team leaders based also on their constellation of self-transcendent work values (Jin & Rounds, 2012), it may boost their effectiveness. Moreover, if team leaders show signs of their self-transcendent values, including information sharing, their followers are likely to follow their example (through "value transmission," see Brown & Treviño, 2009). At the same time, leaders with strong conservation values are less likely to bring about lean success in their work teams. Clearly, a human resource policy aligned to the organizations' lean strategy seems of vital importance to a successful lean program (Van Dun & Wilderom, 2012). HR managers may help by selecting and promoting leaders in such values during or even *before* the start of a lean trajectory.

Also, a team's information sharing behaviors may need to be stimulated in order to arrive at lean effectiveness. Workers sharing ideas for process improvement as well as for practical informational exchanges with coworkers is likely to lead to more team learning and continuous improvement. Previous studies established strong links between learning as well as improving work practices and high team performance (Hult et al., 2003; Ilgen et al., 2005). In sum, it seems

as if the lean cultural content is more important to lean team effectiveness than thought thus far; we encourage organizational leaders to engage in leadership training, including their own roles and lean team behavioral dynamics, before they (re)start their lean implementation.

Limitations and Future Research

A first limitation of this study pertains to our assessment of lean team effectiveness: A more varied and extensively validated assessment tool is preferable. Since we could not find an extant scale to assess to what extent *work floor workers* perceive their lean team's effectiveness, we self-designed a scale consisting of three items. The items used are linked to the three key lean concepts: continuous improvement, customer focus, and employee involvement; at the same time they also reflect more traditional effectiveness criteria such as process improvement, quality, and job satisfaction. The scale shows acceptable psychometric values and considerable discriminant validity. In future studies another more effective or refined measure could be the completion time of the specific "lean practice bundle" (see Shah & Ward, 2003, for a list of those bundles), i.e.: how fast was the practice successfully carried out relative to other teams, if comparable. Ideally objective team performance data, for instance in terms of comparable KPIs, could be used.

Secondly, the tapping of leaders' work values with a standard self-report type of measure may have created bias. Yet, most studies assessing values use self-report measures, since deep-seated, intrinsic personal values are known best by the individuals themselves. Moreover, coworkers or followers of a leader have also shown they are a reliable source (Fu et al., 2010). And while we deliberately followed Schwartz's standard procedure to measure leader values, the best-worst scaling approach reported by Lee, Soutar, and Louviere (2008) could be useful for future studies. Plus, we built the value measures upon two original scales that have been extensively validated in the past (Brown & Treviño, 2009). Our exploratory factor analysis revealed a two-factor structure. A point for future consideration, however, entails the positive

inter-correlation among “self-transcendence” and “conservation.” This is in line with a study performed by Aavik and Allik (2006) who indicated an oblique factor structure among ideal and counter-ideal values (in our study: self-transcendent and conservation values, respectively). Similar to what was argued by Van Quaquebeke et al. (2013), the two value scales entail separate factors, yet they are not fully independent. This study thus shows the need for large-scale replications to enable a confirmatory factor analysis of the two newly developed “lean leader” value scales. And although, based on theoretical reasoning, we examined two of Schwartz’s (2012) four work value clusters, future studies may incorporate the full set of values.

Follow-up confirmatory factor analyses may also give attention to the specific “altruism” and “humility” items, needed due to their moderate factor loadings in this study. Although our factor analysis classified humility as a conservation instead of a self-transcendent factor, Schwartz et al. (2012) identified that humility may fit both factors. In a lean context, humility should perhaps be interpreted as “a self-protecting value that is grounded in anxiety avoidance” (Schwartz et al., 2012: 670). Considering that in this study conservation values led to lower lean team effectiveness, it seems as if lean leaders should not emphasize their humbleness. Lean demands people to voice their ideas for improvement, and lean leaders need to set this example. Intriguingly, this finding contrasts with results of earlier studies which show humility as part of the value set of effective lean leaders who give room for the ideas of workers (Bicheno & Holweg, 2009; Collins, 2001; Jabnoun, 2001; Van Dun et al., 2014). The phase in which lean teams find themselves in may make the difference here (Van Dun et al., 2014).

Moreover, our study has a small n of 25 Dutch work teams, although our full sample contains a total of 429 individuals who were employed by a wide variety of organizations: both in terms of size as well as industry. With this dataset we were able to test our hypotheses, while attenuating common method bias. A larger-sample study, performed in multiple countries, may

provide more solid proof for our hypothetical model (see also Roccas & Sagiv, 2010; Sagiv & Schwartz, 2007). Another comparative study may be performed in non-lean work contexts: To find out if our findings are truly unique to lean teams.

Finally, due to our cross-sectional design, we could not show causality in the relations among the variables. Given this study's results it is highly recommended to start examining time-lagged links between variables such as leader work values, their team members' behavior and the level of team effectiveness. We call for larger-sized, longitudinal designs. Moreover, similar or other large-scale, in-depth qualitative field studies may focus on how exactly team information sharing takes place and how it may boost precisely the performance of lean work teams, including the possible value of small talk or information exchange about more or less trivial affairs between members of such teams. Such studies could also explore leaders' and team members' balancing of factual information sharing and less factual exchanges (Van Dun et al., 2014), as well as their knowledge donating and collecting ratio (De Vries et al., 2006).

CONCLUSION

As hypothesized, this multiple-source survey study of lean work teams shows they are more effective when their leaders endorse self-transcendence and reject conservation values while their followers share a lot of information. Because values are relatively stable personal motivations and are hard to change (Jin & Rounds, 2012), organizations would be better off if they select or promote lean team leaders also on the basis of their values. Given that, in theory, people's values and behavior are cornerstones of team cultures, the content of effective lean team cultures looks more-and-more configurable.

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TABLE 1
Lean Leaders' Work Values Factor Pattern Matrix

Item	Factor 1	Factor 2	h^2
Self-Transcendence			
1. * Responsibility (a deal is a deal, living up to one's promise)	.72	-.17	.36
2. * Integrity (dealing honestly with personal information)	.70	-.13	.37
3. * Customer focus (only being satisfied when your customers are satisfied)	.70	-.19	.31
4. * Information sharing (discussing clear information with others)	.61	.10	.42
5. * Honesty (speaking the truth)	.56	.24	.49
6. Teamwork (working together, cooperation)	.54	.08	.34
7. Justice (treating others fairly)	.51	.17	.39
8. * Open-heartedness (freely communicative, openness, being genuine)	.49	.26	.44
9. Altruism (caring, assisting others) ^a	.34	.32	.33
Conservation			
1. Tradition (preserving customs)	-.32	.73	.18
2. Respect (showing deference to senior employees)	.12	.51	.28
3. * Humility (being humble, staying in the background)	.09	.39	.17
Eigenvalue	4.52	1.33	
% of variance	37.66	11.07	

Note. Principal axis exploratory factor analysis with oblique rotation (promax). We used an exploratory sample: $N = 429$. Items marked with an asterisk (*) were newly added to the original Brown and Treviño (2009) scales. h^2 = initial communality coefficient.

^a Because "altruism" is such a theoretically fundamental work value in Schwartz et al.'s (2012) and Brown and Treviño's (2009) self-transcendence cluster, we decided to keep it in factor 1, despite its cross-loading. To check if this altered our results, we ran all tests with an eight-item self-transcendence measure and arrived at similar results.

TABLE 2**Team Members' Information Sharing and Lean Team Effectiveness Factor Pattern Matrix**

Item	Factor 1	Factor 2	h^2
Information Sharing			
1. Team members ask their colleagues about their abilities, when they need to learn something	.78	-.04	.56
2. Team members regularly tell their colleagues what they are doing	.76	-.04	.57
3. Team members share information they have with their colleagues	.76	.01	.57
4. When team members have learned something new, they tell their colleagues about it	.76	.06	.61
5. When a colleague is good at something, other team members ask them to teach them how to do it	.74	-.02	.49
6. When team members need certain knowledge, they ask their colleagues about it	.72	-.02	.48
7. Team members like to be informed of what their colleagues know	.70	.11	.58
8. Team members think it is important that their colleagues know what they are doing	.65	.06	.54
Lean Team Effectiveness			
1. How do you grade this team's level of continuous improvement?	-.06	.84	.46
2. How do you grade this team's level of employee involvement in lean?	.01	.78	.47
3. How do you grade this team's level of customer focus?	.10	.51	.31
Eigenvalue	5.53	1.36	
% of variance	50.30	12.33	

Note. Principal axis exploratory factor analysis with oblique rotation (promax). $N = 395$. h^2 = initial communality coefficient.

TABLE 3
Summary of Descriptive Statistics and Zero-order Correlations

Variable	α	ICC(1)	ICC(2)	F ^a	α^b	M	s.d.	1	2	3	4	5	6
1. Self-transcendence	.81 ^c	-	-	-	-	5.86	.51						
2. Conservation	.69 ^c	-	-	-	-	4.12	1.05	.59**					
3. Information Sharing	.91 ^a	.11	.62	2.64**	.93	5.49	.44	.31†	-.09				
4. Lean Team Effectiveness ^a	.76 ^a	.07	.50	2.08**	.82	3.86	.33	.24	-.38*	.67**			
5. Team Size	-	-	-	-	-	15.56	9.20	.06	-.03	-.14	-.12		
6. Male/Female Ratio	-	-	-	-	-	.60	.32	-.15	-.00	-.25	-.20	-.03	
7. Educational Level	-	-	-	-	-	2.23	.47	-.02	.13	.13	.02	-.10	-.29†

^a Based on individual team member scores ($N = 395$).

^b $N = 25$

^c $N = 34$

† $p < .10$, one-tailed

* $p < .05$, one-tailed

** $p < .01$, one-tailed

TABLE 4

HLM Results for Team Members' Information Sharing and Lean Team Effectiveness

Variable	Team Member's Information Sharing		Lean Team Effectiveness		
	Model 1	Model 2	Model 3	Model 4	Model 5
Step 1					
Team Size	-.12	-.16	-.13	-.18	-.10
Male/Female Ratio	-.23	-.12	-.22	-.06	-.01
Educational Level	-.06	.16	-.05	.11	.05
Step 2					
Self-transcendence		.57*		.74**	.49*
Conservation		-.46†		-.84**	-.64**
Step 3					
Team Members' Information Sharing					.44*
<i>Degrees of freedom</i>	21	19	21	19	18
<i>R</i> ²	.08	.29	.06	.53	.67
<i>F</i>	.61	1.52	.44	4.33**	6.15**

Note. There was no evidence of multicollinearity because none of the variance inflation factors was greater than 2.11.

† $p < .10$, two-tailed

* $p < .05$, two-tailed

** $p < .01$, two-tailed

TABLE 5

Indirect Effects with Team Members' Information Sharing as a Mediator, after

Bootstrapping

Parameters	Lean Team Effectiveness			
	Bootstrapping		BC 95% CI	
	Estimate	SE	Lower	Higher
Leaders' Self Transcendence Values → Team Members' Information Sharing Behavior → Lean Team Effectiveness	.25*	.13	.07	.69
Leaders' Conservation Values → Team Members' Information Sharing Behavior → Lean Team Effectiveness	-.20†	.13	-.55	-.00

Note. Pathways are standardized estimates. Maximum Likelihood bootstrap on 1000 samples with 95% bias-confidence intervals.

† $p < .10$

* $p < .05$

FIGURE 1

Remained Model of Team Leader Work Values and Team Members' Information Sharing Predicting Lean Team Effectiveness

$^\dagger p < .10$
 $^* p < .05$
 $^{**} p < .01$