The Relationship between Organizational Attitude and Lean Practices: An Organizational Sensemaking Perspective

Purpose: Past studies of lean have failed to sufficiently address the importance of social factors for successful lean implementations. This paper aims to broaden and deepen the understanding of lean as a socio-technical paradigm by conceptualizing lean implementation as an organizational change process.

Design Methodology/Approach: We draw on the organizational sensemaking literature to conceptualize and validate lean implementation as an organizational change process that necessitates a focus on the ability of organizational actors to construct a shared meaning of lean. We posit that this shared understanding shapes the collective behaviour and attitudes of people towards a future desired organizational state such as a successful implementation of lean. Survey data was collected from various manufacturing and services firms to test hypothesis derived from literature using a structural equation modelling approach.

Findings: The mutual social interactions of organizational actors contribute to an enabling lean organizational attitude that has a dominant effect on the lean practices of employee empowerment, internal technical practices, supplier and customer management. We also established boundary conditions for these relationships by identifying firm size as a moderating variable.

Research Implications: Our findings establish a supportive organizational attitude as an antecedent for lean implementation, which goes beyond the current socio-technical characterization of lean management. This conceptualization draws the attention of researchers and practitioners towards the critical role of the cooperative behaviours of organizational actors in lean implementations.

Originality/Value: Our statistical results add a novel perspective to the discourse on the social dimension of lean implementation by conceptualizing and validating lean management as a combination of a) organizational attitude b) the process facilitators comprising of employee empowerment, internal technical practices, supplier and customer management.
Lean management is now a key operations tenet with applications across the manufacturing and services sectors. However, a frequently cited reason for the poor performance of some lean implementations is a lack of focus on the socio-cultural aspects of the lean philosophy. The partial implementation of lean that prioritizes the technical aspects over the ‘people part’ of lean fails to get the employees’ buy-in, therefore, restricting the ability of lean to deliver lasting gains (Uhrin et al., 2017). Consequently, there is a growing realization that lean is a socio-technical phenomenon that puts people at the centre-stage to implement lean tools and practices (Hadid et al., 2016). However, there has not been enough academic attention on the social constructions between the various organizational actors such as the management and the employees and if these social constructions impact organizational attitude and adoption of lean practices. The emerging literature on the social constructions in lean management such as Secchi and Camuffo (2019) partially address this apparent shortcoming in the literature but it still does not fully appreciate the effect of the mutually constitutive social interactions between the management and the employees on the adoption of lean practices. We aim to address this literature gap by empirically investigating the effects of social constructions between organizational actors on the adoption of lean practices.

Recently, there is a renewed interest on investigating the collective response of organizational actors to lean implementations and if the organizational response can be influenced. For example, Maalouf et al. (2016) noted negative reaction to lean implementation by the employees and the middle management and put it down to the inability of the top management to construct a persuasive narrative for lean implementation. Secchi and Camuffo (2019) characterized lean implementation as an organizational change process that requires a shift in how management
and employees perceive lean. Enabling strategic shifts in how organizations operate has not been
the focus of industrial management literature particularly in the context of changing peoples’
behaviours and attitudes. However, this occupies a central place in the organization studies
literature. Concepts such as ‘organizational sensemaking’ try to explain the mutual social
constructions of various organizational actors in pursuit of a desired collective behaviour (Brown
et al., 2015). We draw on this literature to understand how lean practices can be implemented as
an organizational change process.

We respond to the literature’s call (Motwani, 2003, Secchi and Camuffo, 2019) to
conceptualize lean implementation as an organizational change process. This allowed us to use an
adaptation of Maitlis and Lawrence (2007)’s organizational sensemaking framework as a
theoretical lens for this study. The sensemaking processes are social constructions initiated in
organizations due to the planned or unplanned external triggers that make the current state
untenable. The mutual social constructions between organizational actors are contested and
collective accounts are negotiated as an organizational attitude that enables the shift to a new
organizational state (Maitlis and Christianson, 2014). We posit that a successful implementation
of lean would constitute effecting lean process facilitators (lean tools and practices) and a lean
enabling organizational attitude that depends on the social constructions between the
organizational actors that shape the behaviours of people (Maitlis and Lawrence, 2007). This is
similar to the socio-technical conceptualization of lean but not the same. For example, Uhrin et al.
(2017)’s investigation of lean as a socio-technical system categorized it as a combination of social
and technical practices whereas an organization’s discursive ability encapsulates its potential to
develop an organizational attitude that shapes peoples’ collective behaviours and attitudes towards
an organizational change such as lean implementation. This study aims to contribute to the
discourse on the social aspects of lean management by investigating the social constructions
between management and the employees and if these constructions could constitute an
organizational attitude that affects the implementation of lean practices. This leads us to the
following research question for this study:

“How does the organizational attitude influence the implementation of lean practices?”

To achieve this, we employ structural equation modelling (SEM) on survey data collected
from the United Arab Emirates (UAE) to establish relationships between the process facilitators
and the organizational attitude for lean implementation. The theoretical constructs and research
hypothesis were developed with literature support in Section 2. Section 3 describes the employed
research methodology and we report the statistical results in Section 4. Section 5 explains the
statistical findings with implications for theory and practice. This paper is concluded in Section 6.

2. Literature Review and Hypothesis Development

We divide our literature review for the development of lean constructs and hypothesis in
two parts. First, we evaluate the literature on lean ‘process facilitators’ by identifying a set of tools,
techniques and practices that directly target lean’s objective of eliminating the waste. Second, we
examine the literature to identify the social factors that affect the cognitions and behaviours of
organizational actors towards a lean enabling organizational attitude.
Adapting from the Maitlis and Lawrence (2007) framework, we define the process facilitators as the tangible actions, tools and practices that are directed at increasing the likelihood of a certain outcome such as minimization of non-value adding activities. Drawing on the lean supply chain concepts, we classify the process facilitators as both internal (within the boundaries of an organization) and external (suppliers and customers). The seminal work on defining lean such as Shah and Ward (2003) focussed more on the internal process facilitators such as just in time (JIT), total preventive maintenance, total quality management as the principal bundles of lean practices along with employee related constructs of cross-functional and self-directed work teams. Shah and Ward (2007) added the external process facilitators such as supplier and customer management to the internal technical practices of pull, flow, setup, process control, preventive maintenance and employees’ involvement. Belekoukias et al. (2014)’s internal lean practices included JIT, Kaizen, total productive maintenance and value stream mapping. Similarly, Fullerton et al. (2014) classified work standardization, manufacturing cells, reduced setups, Kanban systems, one-piece flow, reduced lot sizes, reduced buffer inventories, visualization as the internal process facilitators. Malmbrandt and Åhlström (2013) emphasized the importance of employee empowerment as an internal social practice that affects the internal technical practices such as identification of customer value, standardization, visualization, pull, multi-functional work force and continuous improvement. More recently, Panwar et al. (2018) and Yadav et al. (2019a) conceptualized ‘5S’ (Sort, Set in Order, Shine, Standardize and Sustain) and visual management as the two additional internal technical practice comprising a lean implementation.
The reviewed studies reveal that some variations in how these studies define lean but four major theoretical constructs emerge that represent the internal and external process facilitators of lean implementation. The internal process facilitators comprise various internal technical practices (ITP) and internal human resource practice of empowering employees (EME). The customer (CUS) and supplier management (SUP) are the two external process facilitators (Table 1). The characterization of lean as socio-technical phenomenon has focussed on employees with studies such as Hadid et al. (2016), Knol et al. (2018), Panwar et al. (2018) and Yadav et al. (2019a) establishing positive relationships between internal lean social practices such as employee empowerment and training with successful lean implementations. This allows us to hypothesize that the employee empowerment positively affect all other lean process facilitators, which then contribute to a superior lean performance. The three hypothesized relationships are presented below:

\begin{align*}
H1a: \text{Employee empowerment (EME) positively affects internal technical practices (ITP)} \\
H1b: \text{Employee empowerment (EME) positively affects customer management (CUS)} \\
H1c: \text{Employee empowerment (EME) positively affects supplier management (SUP)}
\end{align*}

2.2 The Lean Enabling Organizational Attitude

The process facilitators are an important facet of lean management but the lean practices need to be complemented by an organizational culture that enables an ownership of lean by the employees and the management (Alkhoraif et al., 2019). We conceptualize this as a lean enabling organizational attitude (ORA) that is shaped by the discursive ability of organizations. The discursive ability is reflected by the conversations, cues, practices and routines that influence the behaviours of people to achieve a shared understanding of the organizational actors towards a
Table 1: Theoretical Constructs of Lean Implementation

<table>
<thead>
<tr>
<th>The External Process Facilitators</th>
<th>Lean - Process Facilitators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplier Management</td>
<td>Shah and Ward (2007), Bevilacqua et al. (2017), Panwar et al. (2018), Yadav et al. (2019a)</td>
</tr>
<tr>
<td>Customer Management</td>
<td>Shah and Ward (2007), Malmbrandt and Åhlström (2013), Hadid et al. (2016), Yadav et al. (2019a)</td>
</tr>
<tr>
<td>The Internal Process Facilitators</td>
<td>Internal Technical Practice</td>
</tr>
<tr>
<td>Quality</td>
<td>Shah and Ward (2007), Malmbrandt and Åhlström (2013), Panwar et al. (2018), Yadav et al. (2019a)</td>
</tr>
<tr>
<td>Work Layout</td>
<td>Shah and Ward (2007),</td>
</tr>
<tr>
<td>Visualization</td>
<td>Fullerton et al (2014), Malmbrandt and Åhlström, (2013), Hadid et al. (2016), Yadav et al. (2019a)</td>
</tr>
<tr>
<td>Levelled Workloads</td>
<td>Malmbrandt and Åhlström, (2013), Hadid et al. (2016), Panwar et al. (2018), Yadav et al. (2019a)</td>
</tr>
<tr>
<td>Internal Social Practices</td>
<td>Employee Empowerment</td>
</tr>
<tr>
<td>The Lean Enabling Organizational Attitude</td>
<td>Employee Commitment</td>
</tr>
<tr>
<td>Management Commitment</td>
<td>Malmbrandt and Åhlström, (2013)</td>
</tr>
</tbody>
</table>

a strategic change (Maitlis and Lawrence, 2007). This literature has helped us to conceptualize a lean enabling attitude as an antecedent to the successful implementation of lean practices. Maitlis and Christianson (2014) noted that when leaders influence employee attitudes towards a strategic change initiative, the employees change their own actions and they also encourage others by co-constructing an organizational attitude that enables transition to the new desired organizational state. We identify Malmbrandt and Åhlström (2013)’s description of management and employee commitment as representing the social constructions that create a lean enabling organizational attitude (Table 1).
Lack of commitment from the management and absence of support by the employees has been reported to be a major setback in implementing lean (Siegel et al., 2019). Toledo et al. (2019)’s investigation of lean implementations revealed that that the constructive interactions between organizational leadership and employees were critical to getting lean right. The literature has identified the separate effects of management commitment and employee commitment on the adoption of lean practices (Netland, 2016). However, we believe that the separate treatment of management and employee behaviours ignores the mutually-constitutive relationship of the organizational actors. For example, Desirée and Wilderom (2016) established causal relationship between the social relating of organizational actors and lean team effectiveness. Similarly, Losonci et al. (2017) suggested that the shop floor culture comprising of the shared values of employees must be synchronized with the organizational culture for lean success. The mutually constitutive relationship of the ‘every day actions’ of plant managers and employees was postulated by Secchi and Camuffo (2016) as a key enabler of the diffusion of lean knowledge in an organization. Maalouf et al. (2016) also identified the social interactions of management and employees as a critical factor affecting lean practices. Therefore, we build on Secchi and Camuffo (2019)’s work to posit that the social interactions between management and employees may result in a shared commitment to lean that has the potential to affect all lean process facilitators. This leads us to the following four research hypothesis:

H2a: Lean organizational attitude (ORA) positively affects supplier management (SUP).
H2b: Lean organizational attitude (ORA) positively affects customer management (CUS).
H2c: Lean organizational attitude (ORA) positively affects internal technical practices (ITP)
H2d: Lean organizational attitude (ORA) positively affects employee empowerment (EME)
2.3 The Moderating Effect of Firm Size on the Adoption of Lean Practices

Our focus on the social aspects of lean implementation necessitates consideration of organizational characteristics that may affect management and employees' mutual interactions. The literature has established that small and medium enterprises (SMEs) and large enterprises (LEs) differ in terms of workplace factors such as job characteristics, relational characteristics and organizational characteristics (Coetzer et al., 2017). Hu et al. (2015) reviewed the literature on lean implementation in SMEs and concluded that the SMEs have organizational characteristics such as general job descriptions that promote multi-skilling and a high level of group teamwork and cohesiveness that are more amenable to a lean implementation. More recently, Yadav et al. (2019b) reviewed literature on lean practices in the SMEs and identified various implementation differences with the LEs in terms of the organizational culture. For example, SMEs' smaller size allows them to operate informally and to manage employees by spatial and social proximity (Yadav et al., 2019b). The SMEs also differ from the LEs because of the personalized employer and employee interactions (Siegel et al., 2019). The SMEs generally have a flatter organization structure with simple systems and procedures which allow flexibility and a quicker response to the customer needs than the LEs (Yadav et al., 2019b).

The broader literature also identifies similar differences between SMEs and the LEs (Coetzer et al., 2017). For example, the human resource literature has established that firm size can itself explain the difference between employee commitment towards the workplace (Saridakis et al., 2013). Similarly, Taylor and Taylor (2014) established difference in the performance management system implementations between large firms and the SMEs. This literature support
for the potential moderating effect of firm size on the social relationships within lean implementations leads us to the following hypothesis:

\[ H3: \text{The relationships between ORA, SUP, CUS, ITP and EME are moderated by the firm size.} \]

3. Research Design and Methods

3.1 Research Design and Operationalization of the Theoretical Constructs

The literature review conducted in Section 2 identified organizational attitude (ORA), internal technical practices (ITP), employee empowerment (EME), supplier management (SUP) and customer management (CUS) as the five theoretical constructs representing the social and technical aspects of lean implementations. The existing survey instruments on lean implementations such as Shah and Ward (2007) and Yadav et al. (2019a) have mainly focussed on the technical practices, supplier and customer related lean practices. Malmbrandt and Åhlström
(2013) included the social practices in their proposed instrument but no scale for measuring the organizational attitude for lean implementation exists. Therefore, we developed a new survey
instrument by following the Gehlbach and Brinkworth (2011)’s guidelines. Gehlbach and
Brinkworth (2011) recommends an expert panel review for the content and face validity of the
constructs identified from the literature. We approached five industry practitioners with
experience in lean implementation for in person discussions to determine if ORA, ITP, EME, SUP
and CUS adequately sampled lean implementations. All five industry experts broadly agreed to
our conceptualization of lean implementation. Then, as suggested by Gehlbach and Brinkworth
(2011), we used Q-Sort procedures to determine if the expert panel categorization of ORA, ITP,
EME SUP and CUS variables matched the Table 1. Each expert was able to match the variables
to their theoretical constructs giving us confidence that the five theoretical constructs have high
content and face validity. The survey questions were also pilot tested with the expert panel to check
for the clarity of expression. Following a successful survey pilot test, we commenced the data
collection phase. After receiving acceptable number of survey responses (see section 3.2), we
conducted multiple statistical tests to determine the constructs reliability and validity. Following
this, we performed confirmatory factor analyses and the SEM analyses for testing Hypothesis H1
(H1a, H1b, H1c) and H2 (H2a, H2b, H2c, H2d). For testing Hypothesis H3, we followed Byrne
(2004)’s multi-group analyses approach to determine if the SMEs and LEs constitute two different
groups for the five theoretical constructs of lean implementation. Figure 1 provides a summary of
the key stages of our research design.
3.2 Sample Context and the Data Collection Method

The population of interest for this research was the managerial cadre of the organizations based in the UAE that had implemented lean for at least one year. The first step in ensuring the significance of a sample to the universe is the selection of an appropriate sampling frame. Sampling frame is a listing of units in the population from which the sample will be drawn. We chose Orbis, a commercial firm database (https://orbis.bvdinfo.com), to select our sampling frame because the literature identifies it as a source of quality information on a range of criteria for both publicly listed and private companies (Bray et al., 2019). We randomly selected UAE manufacturing and services companies from Orbis to obtain the contact details of the potential key informants for our survey i.e the managers working in those companies. We established phone and email contacts with the identified key informants to ensure that the target company had initiated a formal lean program for at least one year and to obtain a preliminary agreement to participate in the mail survey. The key informants from 300 companies agreed to participate in our survey. We, then, sent paper questionnaires to the companies that had agreed to participate in our survey. Follow up emails and phone calls were made to remind the participants for completing and returning the surveys. A total of 135 completed responses were returned by June 2016. The demographic information of the respondents is presented in Table 2.

Sample size requirements were determined using two different approaches. The a-priori sample size calculator (Soper, 2016) was used to determine the minimum recommended sample size as part of our research design. The calculator is based on the theoretical work of Westland (2010). It uses desired statistical power (1-\( \beta \)), the anticipated effect size (\( d \)), the probability of type-1 error (\( \alpha \)), number of latent constructs (LC) and number of manifest variables (MV) to calculate
the minimum sample size. Westland (2010) recommends 1-β=0.8, medium d =0.35 and α = 0.05.

There were five LCs and 23 MVs in our model which gave 103 as the minimum recommended sample size. We also used two frequently cited rules of thumbs to justify the sample size. Kline (2015) suggested a ratio of 5 survey responses for each MV (survey item) as the minimum acceptable sample size. The 23 MVs and 135 useable survey responses gave us a response to variable ratio of 5.9 which satisfies Kline (2015)’s minimum sample size requirement. Hair et al. (2018) suggested a minimum sample size of 100 for five or fewer LCs with high item communalities. The higher communalities for our data and the 5 LCs also satisfy this condition.

To determine non-response bias for the completely anonymous respondents, the literature suggests that the key informants responding in the later waves can be assumed to be more similar to the non-respondents (Lambert and Harrington, 1990). We followed Jadhav et al. (2019) by conducting a Mann-Whitney U test to determine any statistically significant differences between the early (n=67) and late respondents (n=67). No statistically significant differences were found between the two data subsets which led us to conclude that sampling bias was not an issue for our data. To determine the adequacy of the data collection method, we tested out data for common
method bias. A Harmon’s single factor test was conducted by constraining all items into a single factor. The total variance accounted for during this test was 27.134%, which was less than the benchmark of 50%, indicating that common method variance was not a concern for our data (Podsakoff et al., 2003).

4. Results

4.1 Constructs Reliability and Validity Tests

We performed construct reliability tests by calculating Cronbach alpha and the composite reliability values for the five constructs (Table 3). Both Cronbach alpha and composite reliability values were recorded in excess of 0.70 for all constructs indicating a good scale reliability (Archimi et al., 2018). For convergent validity, our data satisfies Hair et al. (2018)'s criteria of strong factor loadings (Table 4) and the Average Variance Extracted (AVE) greater than 0.5 (Table 3). The distinctiveness of the constructs was confirmed using the square root of the AVEs which exceeded the inter-construct correlations, confirming the discriminate validity of the theoretical constructs (Archimi et al., 2018, Hair et al., 2018). Table 3 provides details of the statistical measures representing the constructs reliability, convergent validity and discriminate validity of the five theoretical constructs.

<table>
<thead>
<tr>
<th>Table 3. Construct Reliability &amp; Discriminate Validity Tests.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong># Items</strong></td>
</tr>
<tr>
<td>Organizational Attitude (ORA)</td>
</tr>
<tr>
<td>Internal Technical Practices (ITP)</td>
</tr>
<tr>
<td>Supplier Management (SUP)</td>
</tr>
<tr>
<td>Employee Empowerment (EME)</td>
</tr>
<tr>
<td>Customer Management (CUS)</td>
</tr>
</tbody>
</table>

Notes: n = 135. Square root of Average Variance Extract (AVE) on diagonal in bold face. All measures are on Likert scale from 1 to 5.
4.2 Confirmatory Factor Analyses

In order to carry out confirmatory factor analysis (CFA), a measurement model was constructed using AMOS version 25. We followed Hair et al. (2018)’s guidelines that suggested at least one absolute fit index and one incremental fit index in addition to the $\chi^2$/ degree of freedom ratio (CMIN/DF) value for testing the model fit. For our analyses, we used CMIN/DF, root mean square error of approximation (RMSEA) and Standardized Root Mean Residual (SRMR) as the three absolute fit indices and Comparative Fit Index (CFI), the Tucker–Lewis Fit Index (TLI) and Incremental Fit Index (IFI) as the three incremental fit indices. For CMIN/DF, a ratio of less than 2 is considered to be very good and the recommended values for CFI, TLI and IFI for an acceptable model fit are in excess of 0.9 (Hair et al., 2018). The RMSEA and SRMR values for a good model fit should be less than or equal to 0.08 (Hair et al., 2018). The analysis resulted in CMIN/DF = 1.561, TLI= 0.911, CFI=0.925, IFI=0.926, RMSEA =0.065 and SRMR =0.067. The acceptable model fit values gave us the confidence that the CFA model offers a good fit and the five theoretical constructs provide a good structure to continue with the path diagram, and the structural equation model.
Table 4: The Summary Data for Individual Construct Variables

<table>
<thead>
<tr>
<th>Construct Indicators</th>
<th>Standard Coefficients</th>
<th>t-Values ***</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational Attitude (ORA)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Our managers understand and are able to describe the lean concepts</td>
<td>0.875</td>
<td>14.394</td>
</tr>
<tr>
<td>2 Our managers show a positive approach and are committed to lean projects</td>
<td>0.826</td>
<td>10.973</td>
</tr>
<tr>
<td>3 Our management has made visible investments for lean adoption</td>
<td>0.837</td>
<td>11.169</td>
</tr>
<tr>
<td>4 Most of our Employees show a positive approach towards lean improvement projects</td>
<td>0.722</td>
<td>9.145</td>
</tr>
<tr>
<td>5 Our employees mostly understand and are likely to describe the lean concepts</td>
<td>0.809</td>
<td>10.806</td>
</tr>
<tr>
<td>6 Our employees are given opportunities for training on lean concepts and/or lean improvement projects.</td>
<td>0.830</td>
<td>a</td>
</tr>
<tr>
<td><strong>Internal Technical Practices (ITP)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 We use formal techniques to identify various ‘wastes’ (non-value adding activities) in our processes</td>
<td>0.552</td>
<td>6.327</td>
</tr>
<tr>
<td>2 We investigate quality problems with formal methods to identify the root causes.</td>
<td>0.536</td>
<td>6.117</td>
</tr>
<tr>
<td>3 Most functional areas (departments) are actively working to assure built-in quality (error proofing)</td>
<td>0.623</td>
<td>7.279</td>
</tr>
<tr>
<td>4 Statistical techniques are part of our quality assurance efforts</td>
<td>0.623</td>
<td>7.289</td>
</tr>
<tr>
<td>5 Visual signs are used to guide the customers and employees in our facilities.</td>
<td>0.689</td>
<td>8.190</td>
</tr>
<tr>
<td>6 We display charts and data so that staff knows how improvements are progressing.</td>
<td>0.771</td>
<td>9.352</td>
</tr>
<tr>
<td>7 Visual signs are used for error/defect detection in our processes</td>
<td>0.817</td>
<td>a</td>
</tr>
<tr>
<td><strong>Supplier Management (SUP)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 We frequently are in close contact with our suppliers</td>
<td>0.807</td>
<td>7.738</td>
</tr>
<tr>
<td>2 We prefer a long term relationship with our suppliers.</td>
<td>0.793</td>
<td>7.652</td>
</tr>
<tr>
<td>3 We give our suppliers feedback on quality and delivery performance.</td>
<td>0.763</td>
<td>7.445</td>
</tr>
<tr>
<td>4 Our senior management communicates with key suppliers on important issues.</td>
<td>0.675</td>
<td>a</td>
</tr>
<tr>
<td><strong>Employee Empowerment (EME)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Managers welcome improvement suggestions/new ideas from front line employees</td>
<td>0.741</td>
<td>8.250</td>
</tr>
<tr>
<td>2 Front line employees lead improvement efforts</td>
<td>0.893</td>
<td>8.717</td>
</tr>
<tr>
<td>3 Front line employees are an important part of problem solving teams</td>
<td>0.755</td>
<td>a</td>
</tr>
<tr>
<td><strong>Customer Management (CUS)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 We regularly seek feedback from our customers on our performance.</td>
<td>0.674</td>
<td>a</td>
</tr>
<tr>
<td>2 Most employees are able to identify what activities are value adding for the customers.</td>
<td>0.678</td>
<td>5.614</td>
</tr>
<tr>
<td>3 Variations in customer demand are taken into consideration for planning our operations.</td>
<td>0.704</td>
<td>5.667</td>
</tr>
</tbody>
</table>

*** all significant to p < 0.000, n=135; Estimation Method = Maximum Likelihood
a indicates a parameter that was fixed at 1.0.
Model fit indices: CMIN/DF =1.601, TLI=0.905, CFI=0.919, IFI=0.920 RMSEA=0.067, SRMR=0.078

4.3 The Structural Equation Model and Hypothesis Testing

To assess the path coefficients for hypothesis testing, a structural equation model was constructed. The theoretical relationships between the endogenous and exogenous constructs were
depicted in a path diagram, The SEM model fitness was re-evaluated with CMIN/DF = 1.601, IFI=0.920, TLI=0.905, CFI=0.919, RMSEA =0.067 and SRMR=0.078. All these fit indices met the acceptable fit level of IFI ≥ 0.90, CFI ≥ 0.90, TLI ≥0.90 and CMIN/DF≤ 2 and RMSEA & SRMR ≤ 0.08 (Archimi et al., 2018, Hair et al., 2018). Table 4 presents the standard coefficients and the t-values for all construct variables. Figure 1 shows the results of the structural model and Table 5 reports the results for hypothesis testing for H1 and H2.

**Table 5: The Structural Equation Modelling Results for Hypothesis H1 and H2**

Figure 2: Depiction of Results from the Structural Equation Model
<table>
<thead>
<tr>
<th>Relationships</th>
<th>Hypothesis</th>
<th>Standard Coefficients</th>
<th>t-Values</th>
<th>Hypothesis Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>EME→ ITP</td>
<td>H1a</td>
<td>0.136</td>
<td>1.743n.s</td>
<td>Reject</td>
</tr>
<tr>
<td>EME→ CUS</td>
<td>H1b</td>
<td>0.124</td>
<td>0.242n.s</td>
<td>Reject</td>
</tr>
<tr>
<td>EME→ SUP</td>
<td>H1c</td>
<td>0.085</td>
<td>0.845n.s</td>
<td>Reject</td>
</tr>
<tr>
<td>ORA → SUP</td>
<td>H2a</td>
<td>0.337</td>
<td>3.237***</td>
<td>Accept</td>
</tr>
<tr>
<td>ORA → CUS</td>
<td>H2b</td>
<td>0.361</td>
<td>3.746***</td>
<td>Accept</td>
</tr>
<tr>
<td>ORA→ ITP</td>
<td>H2c</td>
<td>0.562</td>
<td>5.791***</td>
<td>Accept</td>
</tr>
<tr>
<td>ORA→ EME</td>
<td>H2d</td>
<td>0.269</td>
<td>2.735**</td>
<td>Accept</td>
</tr>
</tbody>
</table>

***, ** indicates the significance of the p value at < 0.05, < 0.005, n.s denotes non-significant relationships.

n=135, Estimation Method = Maximum Likelihood

_a indicates a parameter that was fixed at 1.0.

Model fit indices: CMIN/DF =1.601, TLI=0.905, CFI=0.919, IFI=0.92, RMSEA=0.067, SRMR = 0.078
4.4 Multi-Group Analyses for Testing Moderation

We followed Byrne (2004)’s multi-group invariance analyses guidelines to determine if the strength of SEM relationships are moderated by the firm size (FSZ). From our dataset, we noted that the 135 survey respondents can be classified into two groups; n_{SME} = 71 corresponded to the respondents from the SMEs (# of employees < 250) whereas the number of respondents from the LEs (# of employees > 250) was n_{LE} = 64. Following the recommendation of Goldsby et al. (2013), we conducted the moderation analyses for our SEM in two stages. The stage 1 determined the invariance between the two groups in three steps and in stage 2, the moderation effect on individual structural paths was identified. As the first step of stage 1, a baseline model M_1 was constructed across both n_{SME} and n_{LE} by allowing the structural parameters to vary freely ($\chi^2_{(df=442)} = 756.109$, IFI=0.828, TFI=0.796, CFI=0.828). In step two, all structural paths in the SEM model were constrained for both n_{SME} and n_{LE}—hereafter referred to as the constrained model M_2 ($\chi^2_{(df=484)} = 1223.410$, IFI=0.586, TLI=0.562, CFI=0.581). In the third step, the invariance between M_1 & M_2 was assessed by conducting a chi-square test of significance ($\Delta\chi^2_{(df=42)} = 467.301, p<0.000$).

The significant chi-square difference result shows that M_1 & M_2 are not invariant across the two subgroups of n_{SME} and n_{LE}. This shows that the firm size has a moderating effect on the relationships in our theoretical model (Figure 3).
In stage 2 of the moderation analyses, the moderation effect on the individual structural paths was tested by comparing the chi-square difference between the unconstrained (M1) and partially constrained models (M2). Significant differences were found between the following structural paths; ORA → SUP with $\Delta \chi^2_{(df=1)}=17.196$, $p<0.000$, ORA → CUS $\Delta \chi^2 = 17.084$, $p<0.000$, ORA → EME ($\Delta \chi^2_{(df=1)}=26.795$, $p<0.000$), ORA → ITP ($\Delta \chi^2 = 5.64$, $p<0.004$), EME → ITP ($\Delta \chi^2_{(df=1)}=16.795$, $p<0.000$), EME → CUS ($\Delta \chi^2 = 16.795$, $p<0.000$) EME → SUP ($\Delta \chi^2_{(df=1)}=15.795$, $p<0.000$). These findings confirmed that the firm size moderates the relationships between ORA, SUP, CUS, EME and ITP, therefore, the Hypothesis H3 was accepted.

Figure 3: Moderating Effect of Firm Size
5. Discussion

5.1 Theoretical Implications

a) Employee Empowerment and Lean Implementation

The investigation of the relationships between employee empowerment (EME) and the three lean practices of ITP, SUP and CUS showed interesting results. The hypotheses H1a, H1b and H1c proposed positive relationships between EME and ITP, SUP and CUS. However, our statistical results did not support these three hypothesis. The most interesting finding was that EME had no significant relationship with ITP. Apparently, this goes against the emerging socio-technical discourse that prioritises EME as a key aspect of lean implementation (Abreu-Ledón et al., 2018). However, the literature has reported empirical evidence for a lack of relationship between EME and lean practices and performance. For example, Galeazzo and Furlan (2018) did not identify employee empowerment as a necessary practice for a superior lean performance. Similarly, Bevilacqua et al. (2017) did not find a direct relationship between lean social practices of multi-skilled workforce, employees involvement and employee training and a firm’s performance. We compared these findings with empirical studies that reported statistically significant relationships between employee empowerment and lean practices and we observed differences in the sample context. For example, studies that investigated SME process industries (Marin-Garcia and Bonavia, 2015), SME manufacturing firms (Godinho Filho et al., 2016), SME manufacturing firms (Knol et al., 2018) and SMEs (Yadav et al., 2019a) reported statistically significant results for the employee related social practices. The differences in the sample context as an explanation of the apparent inconsistencies on the relationship between EME and lean practices indicate boundary conditions for lean relationships. We had anticipated the contingent
effect of a firm size, which led us to hypothesize that lean implementation in the SMEs would pan out differently to the lean implementation in the LEs (Hypothesis H3).

b) The Moderating Effect of Firm Size on Lean Implementation

In order to fully understand the relationships between the four process facilitators, we conducted a multi-group analyses in Section 4.4 for the two subsets of our data - \( n_{SME} = 71 \) and \( n_{LE} = 64 \). Figure 3 shows interesting statistically significant differences between the two data subsets primarily reflecting the differences in the organizational characteristics between the SMEs and the LEs. For the combined data set, EME did not have a valid relationship with other lean practices. In the multi-group analyses, the LEs subgroup also did not show a valid relationship between EME and the three lean practices of ITP, CUS and SUP (Figure 3-b). However, for the SMEs subgroup, the EME had a positive and statistically significant relationship with ITP and SUP (Figure 3-a). The findings that EME positively affects ITP is backed by the literature because the employee expertise and skills have been identified as a critical resource for the success of lean initiatives in the SMEs (Hu et al., 2015). Panizzolo et al. (2012) suggests that SMEs’ lean performance is contingent upon the expansion in the autonomy and responsibility of workers so that the workers are able to initiate the internal technical practices for operational improvements. The smaller size of SMEs and a flat organizational structure generally means that those who make a decision to implement lean as a strategic initiative also play an active role in implementing lean practices at an operational level (Alkhoraif et al., 2019). The flat organization structure also means that there are less or no hierarchies for seeking approvals for pursuing continuous improvement opportunities (Yadav et al., 2019b) which empowers employees to take action. Our statistical
results confirm this proposition in the literature by establishing a strong relationship between EME and ITP.

The lack of a valid relationship between EME and ITP for the LEs can be explained in terms of the centralized lean roll-outs in large firms. The centralized initiatives are generally led by a team or department that has different reporting lines and is also located separately to the functional areas (Secchi and Camuffo, 2016). The centralized lean roll-outs shift the locus of control away from the functional areas, therefore, contributing to employees’ perception of lack of empowerment because lean principles are seen as being ‘pushed onto them’ (Secchi and Camuffo, 2016). This explains the statistically invalid relationship between EME and ITP for LEs.

The firm size moderation also affected the relationship between EME and SUP for our two subgroups. The literature associates SMEs with a relatively informal working environment with loose functional boundaries and informal communication channels (Hu et al., 2015, Yadav et al., 2019b). This makes the SMEs employees more likely to be exposed to both intra and inter-organizational interactions (Alkhoraif et al., 2019). This explains the positive relationship between EME and SUP for SMEs. We also observed the moderating effect of firm size for the relationships between organizational attitude and the process facilitators. There were no statistically valid relationships between ORA and EME for LEs which indicates that it is more difficult for the larger firms to construct a shared meaning for lean implementation that can influence employee empowerment. The differences in the effects of the employee related social practices on lean implementations between SMEs and LEs is a new and major finding because it provides empirical support to the emerging propositions in the literature that lean implementations would turn out differently for SMEs and for LEs (Siegel et al., 2019, Yadav et al., 2019b).
c) The Dominant Role of Organizational Attitude

The most important contribution of this study lies in providing evidence for the dominant role of organizational attitude in lean implementations. All four hypothesis (H2a, H2b, H2c, H2d) pertaining to the positive relationships between the organizational attitude and the four process facilitators were found to be statistically significant (Table 5). The visible signs of management commitment to lean have been reported to affect lean implementation (Hu et al., 2015). Similarly, employees’ participation also has been identified as an enabler of adoption of lean practices (Uhrin et al., 2017). However, the literature has not yet tested the joint effects of both employees and the management attitude towards lean as one social construct. The emerging literature on the social dimension of lean management has just started to propose the criticality of this joint effect on lean implementations. For example, Secchi and Camuffo (2019)’s exploratory study identified the social tensions between various organizational actors for no productivity gains after one year of lean implementation that had top management support and a strong link to the long term company vision. The organization studies literature identifies top management support as a necessary condition for the organizational sensemaking process but not a sufficient one (Hambrick and Lovelace, 2018). The top management support needs to translate into a shared understanding and ownership of the lean implementation by all organizational actors. This supports our conceptualization of lean implementation as a major organizational change that would be successful through an organizational sensemaking process that influences the behaviours and attitude of all organizational actors towards lean. We call this as a lean enabling organizational attitude that comprises a shared commitment by both the management and the employees. This is a new and major finding because the extant literature does not focus on taking measures to elicit
cooperative social interactions as a necessary condition for the success of lean implementations. This goes beyond the current socio-technical characterization of lean which identifies the interplay of social and technical aspects of lean but fails to sufficiently address the importance of influencing the behaviours for successful lean implementations. The empirical evidence in support of the dominant role of organizational attitude in lean implementation is a significant contribution to the literature on the social aspects of lean management.

The strongest relationship (H2c) of an enabling organizational attitude was recorded with the internal technical practices (ITP) confirming that the visible commitment of the organizational actors towards lean sets the stage for the adoption of lean tools and techniques by the frontline staff. The literature has separately identified the relationship of the technical practices with leadership behaviours (Toledo et al., 2019) and employee attitude (Jayamaha et al., 2014). Maalouf et al. (2016)’s qualitative study investigated managerial responses to deal with the employee involvement issues during lean implementation suggesting that such ‘social tensions’ hamper the diffusion of lean technical practices. However, our study is a first attempt that established the joint effects of the social constructions of all organizational actors on the internal technical practices. Our results also show that the shared commitment of the organizational actors is linked to the employee empowerment (H2d), therefore, confirming a recursive relationship between the social constructs of lean. The findings (H2a and H2b) that the shared lean commitment of internal organizational actors also influences the relationship with the external actors of supply chain underscores the importance of the people aspects for lean management. The literature has previously established top management’s commitment to lean as a critical factor within the internal boundaries of an organization (Knol et al., 2018). Our finding extends the literature by establishing
that the management and employees’ commitment factors into a joint effect on the customer and supplier related practices.

5.2 Implications for Practice

Our research also has major implications for practice. First, the empirical support for the joint effects of the management and employees’ social constructions on all lean practices establishes the cooperative behaviours of organizational actors as an antecedent for lean implementation. This draws the attention of practitioners on sequencing the lean implementation process which must start with building a shared understanding of the organizational actors regarding lean management. Our statistical results support Knol et al. (2018)’s analogy of the ‘bottom-up diffusion’ of lean practices i.e a lean enabling organizational attitude ensures employees ownership of the lean initiatives. Second, our statistical analyses shows that the lean implementations for LEs would turn out differently to the lean implementations in the SMEs. This has important managerial implications because the practitioners must customize their lean implementation by taking into account the relevant organizational characteristics. For example, large organizations must ensure that its formal structures and procedures are made flexible to support lean’s overarching objective of prioritising people over processes. This would ensure a greater engagement of employees, therefore, increasing the effective of a lean implementation

6. Conclusions and Limitation of the Study

This study answered the research question: “How does the organizational attitude influence the implementation of lean practices?” by investigating the joint effects of the shared commitment of management and employees’ on lean implementation. We identified lean
organizational attitude as having a dominant effect on lean practices of employee empowerment, internal technical practices, supplier and customer management. Our statistical results add a novel perspective to the discourse on the social dimension of lean management by highlighting the importance of the shared understanding of lean by the organizational actors. We also established boundary conditions for these relationships by identifying firm size as a moderating variable. This has allowed us to make two major contributions to the discourse on lean management. First, the extant literature does not focus on the ability of the mutual social constructions of organizational actors to influence lean adoption. We draw on the organizational sensemaking literature to conceptualize and validate lean implementation as a combination of process facilitators and a supportive organizational attitude. Second, our statistical analyses shows that the lean implementations for the SMEs and large enterprises are fundamentally different to each other.

Despite the contribution to theory and practice, we would like to acknowledge the apparent limitations of our study. First, our study investigated the effect of organizational attitude on lean practices and it would be interesting to examine if our organizational sensemaking conceptualization also affects a firm’s operational or economic performance. We suggest inclusion of a firm’s performance as a dependent variable to our conceptual framework as a potential future research direction. Second, we believe that our research findings are generalizable but we cannot fully rule out the contextual effects of the sample drawn from the UAE. Examining the effect of organizational attitude and the moderating effect of firm size on lean practices from other cultural settings is likely to deepen the understanding of the socio-technical aspects of lean implementation.
7. References


