

# **Transformational Leadership and its impact on Lean Implementation**

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## **Abstract**

With the multitude of variables that may play a role in a company's Lean journey, it is becoming more understood that leadership plays a significant role in implementing lean principles on construction projects. The goal of this research is to investigate the relationship between leadership and Lean Construction implementation. The research uses a quantitative research in which a survey was conducted, followed by a statistical analysis to test the hypothesis. Through the statistical analysis of survey data, the research finds that there is positive relation between the level of transformational leadership and the effectiveness of lean implementation. When an organization is implementing organizational change like Lean, the relationship of the project leaders and followers must not be underestimated. The study findings may contribute to the knowledge of lean construction leadership by bridging the gap between leadership and the effectiveness of lean implementation.

Keywords: Lean construction; organizational change; leadership; implementation strategy; transformational leadership

## **Introduction**

With the multitude of variables that may play a role in a company's Lean journey, it is becoming more understood that leadership plays a significant role in creating a company's Lean opportunities (Ballard et al, 2007). Recognized is how the presence of leadership has to be consistent with an ability to change the company culture by changing management practices (Ballard and Kim, 2007). There is a wealth of knowledge untapped about the relation between lean construction and leadership though many qualitative studies assert that leadership plays a critical role in lean implementation.

The research began with the idea that senior leadership should be stressed as a key factor in implementing Lean principles (Mann 2010). The ability for organizations to navigate the implementation process not only requires the improvement of company's systems and training programs, but also understanding that a behavioral change must also occur (Salem et al., 2005). In this regard, the goal of this research is to investigate the relationship between leadership and Lean Construction implementation.

## **Hypothesis Development**

Leadership has been described as "a process of social influence in which one person can enlist the aid and support of others in the accomplishment of a common task" (Chemers, 1997). Bass (1991) compares two styles of leadership regarding organizational performance: transactional leadership and transformational leadership. According to Bass, transactional leaders predetermine what their followers should do to realize their personal and organizational aims; they classify these aims and help their followers to become more self-confident in order to achieve their goals with the minimum effort (Bass, 1991). On the contrary, transformational leadership, defined as a

set of behaviors that motivates followers to exceed expectations in pursuit of the organization's vision, sacrifices their self-interests for the collective good (Bass and Avolio 2007). The research finds that the attributes of transformational leadership is in line with the value of lean which emphasizes the sacrifice of self-interests for the organization's goals living up to long-term philosophy (Liker, 2004; Liker et al, 1999). Based on transformational leadership theory and organizational change in lean implementation, the researchers developed the following hypothesis:

*Transformational leadership will be positively related to the effectiveness of lean implementation*

## **Measures**

The most recent model of transformational leadership encompasses the following leadership dimensions as measured by the Multifactor Leadership Questionnaire (Bass and Avolio, 2000): idealized attributes, idealized behaviors, inspirational motivation, and intellectual stimulation. This research used a work of Bass and Avolio to measure the transformational leadership.

## **Survey Results**

### ***Descriptive Statistics***

Table 1 presents the number of samples, means, standard deviations of each variable. The first four variables show each dimension of TLV. Unlike variables one through six, the higher value of "lean construction costs" indicates negative feedback on lean implementation. Variables one through five were used as independent variables while the

last two variables (i.e, lean construction effectiveness and lean construction costs) as dependent variables in the analysis.

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Idealized Influence	78	2.33	5.00	4.0451	.71722
Idealized Behavior	78	2.33	5.00	4.1305	.75703
Inspirational Motivation	78	2.40	5.00	4.0131	.67666
Intellectual Stimulation	78	2.57	5.00	4.0494	.64289
Transformational Leadership	78	2.59	5.00	4.0601	.64350
Lean, Effectiveness	78	2.71	5.00	4.2122	.63834
Lean, Costs	78	1.00	4.50	3.0128	.72959
Valid N	78				

Table 2 shows the correlations between independent variables and dependent variables.

According to Table 2, transformational leadership demonstrated expected positive relationship with the effectiveness of lean construction ( $r = 0.644$ ,  $p < 0.05$ ), but not associated with lean construction costs ( $r = -0.228$ ,  $p < 0.05$ ). Among the factors in transformational leadership showed “idealized behavior” and “idealized influence” relationship with the effectiveness of lean construction ( $r = 0.622$ ;  $0.621$ ,  $p < 0.005$ ).

Table 3. Correlation Coefficient

Leadership	Lean Implementation	
	Lean Construction Effectiveness	Lean Construction Costs
1. Idealized influence	0.621	-0.278
2. Idealized behavior	0.622	-0.193
3. Inspirational motivation	0.576	-0.18
4. Intellectual stimulation	0.548	-0.187
5. Transformational Leadership	0.644	-0.228

### *Hypothesis Testing*

The research performed regression analysis between transformational leadership and lean

implementation indexes to understand how transformational leadership or its factor(s) impact on the lean implementation. First, the research investigated the impact of transformational leadership on the effectiveness of lean implementation by running the following regression equations.

$$\text{Lean Implementation Effectiveness} = \beta_0 + \beta_1 * \text{Transformational Leadership} \quad (\text{Model 1})$$

$$\text{Lean Implementation Effectiveness} = \beta_0 + \beta_1 * \text{Idealized Influence} \quad (\text{Model 2})$$

$$\text{Lean Implementation Effectiveness} = \beta_0 + \beta_1 * \text{Idealized Behavior} \quad (\text{Model 3})$$

$$\text{Lean Implementation Effectiveness} = \beta_0 + \beta_1 * \text{Inspirational Motivation} \quad (\text{Model 4})$$

$$\text{Lean Implementation Effectiveness} = \beta_0 + \beta_1 * \text{Intellectual Stimulation} \quad (\text{Model 5})$$

**Table 3. Regression Analysis Result (Lean Construction Effectiveness)**

Number of Observations = 79  
 Dependent Variable = Lean Construction Effectiveness

<i>Model 1 (Adjusted R-Squared = 0.415)</i>		Prob > F = 0.000		
	Coefficient	Standard Error	t	
Transformational Leadership	0.639	0.087	7.345	
Constant	1.617	0.358	4.522	
<i>Model 2 (Adjusted R-Squared = 0.386)</i>		Prob > F = 0.000		
	Coefficient	Standard Error	t	
Idealized influence	0.553	0.08	6.907	
Constant	1.976	0.329	6.013	
<i>Model 3 (Adjusted R-Squared = 0.387)</i>		Prob > F = 0.000		
	Coefficient	Standard Error	t	
Idealized behavior	0.524	0.076	6.92	
Constant	2.047	0.318	6.435	
<i>Model 4 (Adjusted R-Squared = 0.332)</i>		Prob > F = 0.000		
	Coefficient	Standard Error	t	
Inspirational motivation	0.544	0.088	6.147	
Constant	2.031	0.36	5.643	
<i>Model 5 (Adjusted R-Squared = 0.300)</i>		Prob > F = 0.000		
	Coefficient	Standard Error	t	
Intellectual stimulation	0.5444	0.095	5.713	
Constant	2.008	0.391	5.143	

The results of regression analysis with “lean construction effectiveness” as a dependent variable are shown in Table 4. As the results indicate, the effects of transformational leadership on “lean construction effectiveness” are statistically significant, at the 99% confidence level ( $p < 0.01$ ). This shows that the primary hypothesis of this research holds true. The slope coefficient of 0.639 for “transformational leadership” indicates that one scale level increase of “transformational leadership” would result in a 0.639 increase in “lean construction effectiveness” scale level.

Models two through five were tested to investigate if there is a specific factor in transformational leadership that has a strong relationship with the “lean construction effectiveness.” However, the results show that no specific factor with such relationship.

### **Discussions and Conclusions**

The purpose of this study was to empirically examine the role of leadership in lean implementation at construction projects. It was also an endeavor that confirms the claims in publication as to leadership being a success factor. Though claimed leadership a success factor in lean implementation, literature has not address the type of leadership needed for lean implementation, nor investigate the relations between leadership and its impact on lean implementation.

Through the statistical analysis of survey data, the research finds that there is positive relation between the level of transformational leadership and the effectiveness of lean implementation. The study findings may contribute to the knowledge of lean construction leadership by bridging the gap between leadership and the effectiveness of lean implementation. They also send a message to the industry, especially the areas in leadership training and the selection of leaders for successful lean implementation.

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