



Research Article

Transformational Leadership on Product Innovation with Open System as Moderator

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ARTICLE INFO

Article History

Date Received: August 28, 2023

Date Accepted: October 8, 2023

Keywords

transformational leadership, open system, radical innovation, incremental innovation

ABSTRACT

Business survival for ten years and beyond is a common goal of any organization. Transformational leaders are being relied upon to conceptualize strategic plan that would drive continuous growth and profitability. One common embedded strategy on sustainability program is unceasing product or service innovation. This study investigated the effect of the individual components of transformational leadership, namely intellectual stimulation, inspirational motivation, and individualized consideration, on product innovation. Additionally, this study examined the moderating effect of open system - characterized by flexibility, outward focus, and reflexivity on the relationship between an individual component of transformational leadership and product innovation. This study utilized descriptive research design in examining the effect of transformational leadership to product innovation, and used multiple regression analysis in testing the hypotheses. Results revealed that all dimensions of transformational leadership have significant effect on radical innovation but do not have significant effect on incremental innovation. In the same way, open system does moderate the positive relationship between transformational leadership and radical innovation, but does not moderate between transformation leadership and incremental innovation. The results are good indicators for the success of future projects by having an edge on the competition through radical innovation of machine design. Company CDE must be able to standardize its program on transformational leadership and open system, should apply these on its code of conduct documents, and include these as part of the semi-annual policy roll down on learning and growth of the balance scorecard.

INTRODUCTION

A. Background of the Study

Global cost competition in consumer electronics manufacturing is getting tougher, influenced mostly by China manufacturing companies. Company CDE, a Japanese manufacturing company in the Philippines, is among the companies affected by the pressure on manufacturing price war. Its parent company, Company J based in Japan, has instructed all of its three hundred thirty-six subsidiaries, including Company CDE, to expedite all cost measures to win majority share rate supply to the customers and achieve its profit target.

One of the strategies of Company CDE's top management is the expansion of its in-house manufacturing of machines used in the electronic product assembly, as the company has developed strength on this field throughout the years. This new product venture undergoes rigid design review and down selection of the customer competing with machine manufacturer in China. Every year, three or more new electronic products are being launched, which need new assembly machines. The challenge of headquarters to Company CDE management is to reduce cost of machines by fifty percent, to reduce selling price per piece of electronic product and to take lead on the competition.





The management team of Company CDE headed by a local factory manager is running its automation department, responsible for the manufacturing of machines, through transformational leadership program concept. It focuses on inspiring the employees to work on a common goal (Allen et al., 2016), and transforms the values, moral, beliefs, and behavior of followers (Dean Angell, 2017). This program led to the successful recovery of customer trust, after the company was almost by its two major American customers.

There are four dimensions of transformational leadership (Alahmad, 2016), in which Company CDE anchors its program. First is idealized influence which emphasized the importance of sense of mission and purpose, and setting example to the team in leading each critical discussion with customer. Second is intellectual stimulation or the encouragement of employees to think out of the box and solve problems by looking on unusual perspective with the guidance of technical expert from Japan. Third is inspirational motivation or leaders that motivate and inspire people by showing their enthusiasm and optimism. Company CDE has implemented series of benchmarking with China and Thailand subsidiaries to inspire the local team, enhance their motivation, and learn from the best practices of those subsidiaries. Last is individualized consideration, that looks into the individual needs and desire to develop strengths. One of the programs established in 2018 is the skill competency levelling matched with monetary skill allowance. This helped motivate the designers to strive and learn more, which benefit the company.

In order for businesses to attain better sustainabil-

ity performance, product innovation program should be continuous (Behnam & Cagliano, 2017). Product innovation is the conception of new products and services in order to create new business opportunities and clients, or to fulfill existing markets and consumers (Sattayaraksa, & Boon-itt, 2014). Innovation could either be incremental which means improving the existing design, or radical innovation which means a totally different design from the existing ones (Behnam & Cagliano, 2017).

The long-term plan of Company CDE is to sell machines to other subsidiaries of Company J and even other companies starting 2021. Therefore, more innovations in machine including process design and manufacturing will be the challenge. This expansion of business will also explore new opportunities like service or machine maintenance for other companies. According to the study of Kesting et al. (2015), leadership is associated with goal; this could be broad or could be a very concrete target. There are several types of leadership; directive, participative, interactive, charismatic, transformational, transactional, strategic, and shared and distributed leadership. Transformational leadership has been found to be strongly linked to innovation culture, and partly linked to development approach and new product development processes (Sattayaraksa, & Boon-itt, 2014). Studies by Zhang et al. (2018), Kazmi (2016), and Iscan et al. (2014) have supported this concept, which will result to company advancement and cost competitiveness (Abdullah et al., 2016).

While transformational relationship is being linked to innovation, it will be worthy to consider in



the study the impact of the working environment on the organization. Organizational climate is referred in the research as the shared perceptions, feelings and attitudes of employees, which reflect the established norms, values and attitudes of the organization's culture and influence individuals' behavior either positively or negatively. It has four dimensions, human relation, internal process, rational goal, and open system (Agarwal, 2019). Researchers studying innovation are focusing on open system which includes reflexivity, innovation and flexibility, and outward focus (Patterson et al., 2011). Flexibility is an orientation toward change, outward focus refers to how the organization responds to the needs of customer and market place, and lastly, reflexivity is defined as attention to reviewing and reflecting upon objectives, strategies and work process to adapt to a broader environment (Alahmad, 2016). Open system was the climate used by Alahmad (2016) in his study as the moderator between transformational leadership and product innovation, which was adopted in this study.

This study determined the effect of transformational leadership on product innovation. Additionally, this explored the moderating effect of open system to the relationship of the transformational leadership style and product innovation. This study may help Company CDE management to assess and formulate strategic plans to improve its organizational management.

B. Research Frameworks

This study adopted the conceptual framework of Alahmad (2016). The said conceptual framework is

illustrated in figure 1. There are four dimensions of transformational leadership (TL) according to Alahmad (2016). First is idealized influence (II) or leaders that emphasize the importance of sense of mission and purpose. Second is intellectual stimulation (IS) or leaders that encourage employees to think out of the box and solve problems by looking on unusual perspective. Third is inspirational motivation (IM) or leaders that motivate and inspire people by showing their enthusiasm and optimism. Last is individualized consideration (IC), who look into the individual needs and desire to develop their strengths.

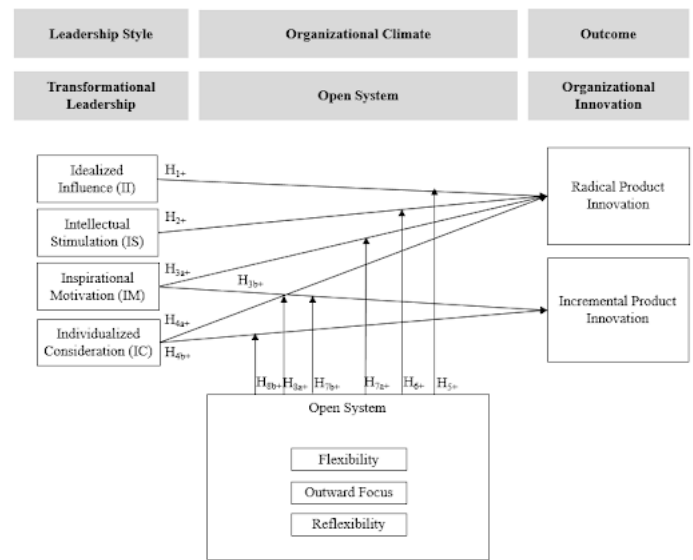


Figure 1. Conceptual Framework

Source: Understanding the Relationship between Transformational Leadership Styles: Idealized Influence, Intellectual Stimulation, Inspirational Motivation, Individualized Consideration and Product Innovation among Manufacturing and Services Firms: The Role of Open System (Alahmad, 2016)

Open system gives emphasis on change readiness and innovation in which in the study of Alahmad (2016) is characterized by flexibility, outward focus, and reflexivity. Flexibility is an orientation toward change, outward focus refers to how the organization responds to the needs of customer and market place, and lastly, reflexivity is defined as attention to review-





ing and reflecting upon objectives, strategies and work process to adapt to a broader environment. Product innovation has incremental and radical classification. Incremental innovation is a minor change of the current product or technology while radical innovation is the adaptation of new technology that will create a demand that the customer has not yet identified.

The study of Alahmad (2016), which is about understanding the relationship between transformational leadership styles and product innovation among manufacturing and services firms, and the role of open system, was conducted in the United States of America with 220 American manufacturing and service company respondents. This study fully adopted the framework of Alahmad (2016) and examined the effect of transformational leadership to innovation, moderated by open system on Automation Department of Company CDE.

C. Research Objectives

In general, the study examined the effect of transformational leadership on product innovation in Company CDE. Specifically, the study aimed to:

1. determine the effect of transformational leadership dimensions such as idealized influence, intellectual stimulation, inspirational motivation, and individualized consideration on radical and incremental product innovations.
2. determine whether open system moderates the relationship of the dimensions of transformational leadership and product innovation.
3. determine if the transformational leadership style being adopted by Company CDE leaders is aligned with its goal to motivate its employees to continuously develop innovative products in their fast-paced technology industry.

The following hypotheses were tested:

- H_{01} : Idealized influence has no significant effect on radical product innovation.
- H_{02} : Intellectual stimulation has no significant effect on radical product innovation.
- H_{03a} : Inspirational motivation has no significant effect on radical product innovation.
- H_{03b} : Inspirational motivation has no significant effect on incremental product innovation.
- H_{04a} : Individualized consideration has no significant effect on radical product innovation.
- H_{04b} : Individualized consideration has no significant effect on incremental product innovation.
- H_{05} : An open system does not moderate the rela-

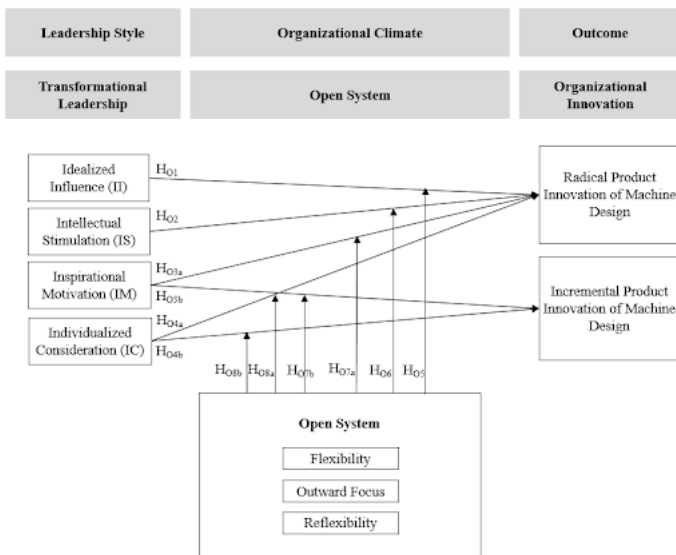


Figure 2. Operational Framework



tionship between idealized influenced and radical innovation such that that radical product innovation will be higher when the level of open system is higher.

H₀₆: An open system does not moderate the relationship between intellectual stimulation and radical product innovation such that radical product innovation will be higher when the level of open system is higher.

H_{07a}: An open system does not moderate the relationship between inspirational motivation and radical product innovation such radical product innovation will be higher when the level of open system is higher.

H_{07b}: An open system does not moderate the relationship between inspirational motivation and incremental product innovation such incremental product innovation will be higher when the level of open system is higher.

H_{08a}: An open system does not moderate the relationship between individualized consideration and radical product innovation such that radical product innovation will be higher when the level of open system is higher.

H_{08b}: An open system does not moderate the relationship between individualized consideration and incremental product innovation such that incremental product innovation will be higher when the level of open system is higher.

MATERIALS AND METHODS

The study employed descriptive research design to determine the effect of transformational leadership on product innovation. The respondents of the study were the employees of Company CDE's Automation

Department. The entire department is involved in the conceptualization, design, fabrication, assembly, and installation of machines for internal use of manufacturing motor products and for external selling to other product manufacturers. Total enumeration was employed to examine the entire population of supervisors, engineers, and technicians under the Automation Department that are involved in the design of mechanical, electrical, and software of machine including the manufacturing data system. It adopted the survey questionnaire from Alahmad (2016). The questionnaire was divided into nine parts. All the question items were evaluated using a six-point Likert-type scale, ranging from 1=strongly disagree to 6=strongly agree. Table 1 presents an itemized representation of the questionnaire.

Table 1. Questionnaire Specification

Part	Variable	No. of Items	Cronbach Alpha
I.	Idealized Influenced	4	0.865
II.	Intellectual Stimulation	4	0.834
III.	Inspirational Motivation	4	0.913
IV.	Individualized Consideration	4	0.858
V.	Flexibility Assessment	5	0.953
VI.	Outward Focus Assessment	4	0.897
VII.	Reflexivity Assessment	4	0.884
VIII.	Radical Product Innovation Assessment	5	0.954
IX.	Incremental Product Innovation Assessment	5	0.951

The research instrument undergone test for reliability by conducting a pilot study to 21 engineers of a design company in Makati resulting to significant loadings in Cronbach's alpha. Reliability reflects the extent to which a construct can generate the same outcome in repeated statistical tests. Reliability is evaluated by using Cronbach's Alpha and values greater than 0.700 are acceptable (Alahmad, 2016).

The actual survey was done through the distribution of questionnaire by emailing the respondents, which was facilitated by the human resource department. The answered survey forms were collected af-





ter a week. Data results were summarized and tallied using Microsoft Excel, and thereafter forwarded to the statistician for data analysis. Using Statistical Package for Social Sciences (SPSS) software, simple and multiple regression analysis were used to determine the influence of each dimension of transformational leadership and evaluate the moderating effect of open system on transformational leadership and innovation of machine design.

The study was able to get a response rate of 94%, where 53 responded out of the total population of 55. One member who wasn't able to respond is in maternity leave and the other is under prolonged sick leave. The response rate exceeded the category of very good response rate of 60% for email survey mode (Saldivar, 2012).

RESULTS AND DISCUSSION

Table 2 presents the mean and standard deviation of each variable in the study for company CDE. Among the four dimensions of transformational leadership, inspirational motivation has the highest recognition from the respondents with mean of 5.08. This result shows that respondents perceived that their leaders motivate and inspire its subordinate showing their enthusiasm and optimism. Individual consideration has the lowest mean compared to other three dimensions. This indicate that leaders have less time or have less program covering individual needs and support. Among three open system characteristic, outward focus got the highest mean with 5.20, indicating company's high reputation in prioritizing customer and market requirement. Flexibility has the lowest with 4.45 showing management are less focus

on adaptation to change. Incremental innovation has higher mean compared to radical innovation having more product developed and manufactured with small change from predecessor model.

Table 2. Mean and Standard Deviation of Variables

Variable	Mean	Std. Deviation
Idealized Influenced	4.95	0.83
Intellectual Stimulation	4.92	0.83
Inspirational Motivation	5.08	0.79
Individualized Consideration	4.67	1.08
Flexibility Assessment	4.45	1.05
Outward Focus Assessment	5.20	0.75
Reflexivity Assessment	4.62	0.81
Radical Product Innovation Assessment	4.28	1.06
Incremental Product Innovation Assessment	4.47	0.88

Effect of Transformational Leadership on Product Innovation

a. Idealized Influence on Radical Product Innovation

Table 3 presents the simple linear regression results, indicating the effect of idealized influence on radical product innovation. The findings revealed that idealized influence has a significant effect on radical product innovation ($\rho = 0.009$). The findings indicate that leaders who emphasize the importance of sense of mission and purpose positively affects the introduction of new products or application of new processes ($\beta = 0.475$).

Table 3. Effect of Idealized Influence on Radical Product Innovation

Model	R	R ²	Unstandardized Coefficients (Beta)	t-value	p-value	Interpretation
Constant			1.930	2.227	0.030	
Idealized Influence	0.358	0.128	0.475	2.737	0.009	Significant

Dependent Variable: Radical Product Innovation

Similarly, the study of Ahmad et al. (2019) indicate that idealized influence is positively related to product innovation. This means that employees are challenged to take innovative approaches when they





feel that they are being trusted by their leaders.

b. Intellectual Stimulation on Radical Product Innovation

The findings in table 4 indicate that intellectual stimulation significantly affects radical product innovation ($\rho = 0.002$). The results revealed that leaders who encourage employees to think out of the box and solve problems by looking on unusual perspective positively affects the radical product innovation ($\beta = 0.563$).

Table 4. Effect of Intellectual Stimulation on Radical Product Innovation

Model	R	R ²	Unstandardized Coefficients (Beta)	t- value	p- value	Interpretation
Constant			1.513	1.804	0.077	
Intellectual Stimulation	0.423	0.179	0.563	3.331	0.002	Significant

Dependent Variable: Radical Product Innovation

This finding is supported by the study of Singh and Shukla (2018), which found out that leaders who encourage experimentation in new areas are keen in achieving innovation of product including processes and recognize that innovation adds value to the accomplishment of employees. Further, Sattayaraksa and Boon-itt (2014) concluded that leaders who intellectually stimulate employees will create a culture of subordinates being challenged to look for innovative solution. This is also true in study of Alahmad (2016), that the intellectual stimulation style stimulates creative thinking and can therefore find better and more innovative solutions.

c. Inspirational Motivation on Radical Product Innovation

The findings in table 5 indicate that inspiration motivation has significant effect on radical product innovation ($\rho = 0.001$). The results mean that leaders who motivate and inspire people showing their enthusiasm and optimism positively affects the radical product innovation ($\beta = 0.621$).

Table 5. Effect of Inspiration Motivation on Radical Product Innovation

Model	R	R ²	Unstandardized Coefficients (Beta)	t- value	p- value	Interpretation
Constant			1.122	1.238	0.221	
Inspirational Motivation	0.441	0.195	0.621	3.513	0.001	Significant

Dependent Variable: Radical Product Innovation

The results are in agreement with the findings in the study of Ahmad et al. (2019) that inspirational motivation was found to be positively related to product and process innovation in the banking sector. This indicate that leaders with inspirational motivation will motivate bank staff and will enable them to achieve their greatest potential. Similarly, the study of Al-husseini and Elbeltagi (2014) revealed that inspirational motivation had a positive effect on product innovation in the private higher education institutions in Iraq.

d. Inspirational Motivation on Incremental Product Innovation

The results in table 6 revealed that inspiration motivation has significant effect on incremental product innovation ($\rho = 0.047$). The findings indicate that leaders who motivate and inspire people showing their enthusiasm and optimism positively affects the version modification of an existing product range ($\beta = 0.305$).



Table 6. Effect of Inspiration Motivation on Incremental Product Innovation

Model	R	R ²	Unstandardized Coefficients (Beta)	t- value	p- value	Interpretation
Constant			2.918	3.793	0.001	
Inspirational Motivation	0.274	0.075	0.305	2.031	0.047	Significant

Dependent Variable: Incremental Product Innovation

e. Individualized Consideration on Radical Product Innovation

The findings in table 7 indicate that individualized consideration has significant effect on radical product innovation ($p = 0.020$). The results mean that leaders who look into the individual needs and desire to develop their strengths positively affects the radical product innovation ($\beta = 0.371$).

Table 7. Effect of Individualized Consideration on Radical Product Innovation

Model	R	R ²	Unstandardized Coefficients (Beta)	t- value	p- value	Interpretation
Constant			2.545	3.485	0.001	
Individualized Consideration	0.320	0.102	0.371	2.408	0.020	Significant

Dependent Variable: Radical Product Innovation

This is true in the study of Ahmad et al. (2019) regarding individualized consideration which demonstrated that individualized consideration is positively related to product innovation in the banking sector. Further, the employees surveyed from banking sector believed that their supervisors exhibited individualized consideration, motivate them to be creative, come up with new ideas and to adopt innovative approaches at work, as such generating new ideas, developing new services, embracing new solutions and adopting new technology, and follows flexible strategies to deal with unexpected changes. In addition, the analysis carried out by Al-husseini and Elbeltagi (2014) found out that

the individualized consideration increases product and process innovation. When leaders listen to the ideas of their members and are involved in a continuous process of coaching, it is likely that new approaches will be explored, which could enhance innovation in the public sector of Iraq’s higher education.

f. Individualized Consideration on Incremental Product Innovation

The findings in table 8 revealed that individualized consideration has a negligible correlation to incremental product innovation, therefore individualized consideration did not have significant effect on incremental product innovation ($p = 0.588$). Negligible correlation is correlation value that range from 0.0 – 0.3 (Mukaka, 2012).

Table 8. Relationship of Individualized Consideration on Incremental Product Innovation

	r- value	Individualized Consideration Verbal Interpretation	p- value	Verbal Interpretation
Incremental Product Innovation	0.076	Negligible Correlation	0.588	Not Significant

Regression analysis was not performed since the relationship between individualized consideration and incremental product innovation is not significant.

Based on the summary of results in table 9, it can be noted that the four dimensions of transformational leadership have significant effect on radical product innovation. Two of the four dimensions of transformational leadership were tested for the effect with incremental innovation. Individual consideration was found to have no significant effect on incremental innovation ($p = 0.588$) while inspirational motivation was found to have significant effect with a p -value





of 0.047, significant but considerably closer with 0.5 margin compared to other results.

Table 9. Summary of Results on the Effect of TL to Innovation

Variable	Mean	Std. Deviation
Idealized Influenced	4.95	0.83
Intellectual Stimulation	4.92	0.83
Inspirational Motivation	5.08	0.79
Individualized Consideration	4.67	1.08
Flexibility Assessment	4.45	1.05
Outward Focus Assessment	5.20	0.75
Reflexivity Assessment	4.62	0.81
Radical Product Innovation Assessment	4.28	1.06
Incremental Product Innovation Assessment	4.47	0.88

Study of Yadav (2013) revealed that majority of the characteristics of transformational leadership style and radical innovation were compatible. On the other hand, transactional leadership characteristics were found to be aligned with incremental innovation. Thus it was proposed that transformational leadership is facilitative for radical innovation whereas transactional leadership is facilitative for incremental innovation.

Moderating Effect of Open System on the Relationship of Transformational Leadership and Product Innovation.

Tables 10 to 15 present the simple and multiple linear regression results, indicating the moderating effect of open system on the relationship of transformational leadership and product innovation.

a. Open System on Idealized Influence and Radical Product Innovation

The findings in table 10 indicate that open system significantly moderates the relationship between idealized influence and radical product innovation with ρ value of 0.014 which is statistically significant since

p-value is less than 0.05. R2 Change of 0.092 denotes that 9.2% of variation in radical product innovation is the interaction between open system and individualized consideration. As the moderating effect of open system increase on individualized consideration, the radical product innovation also increases.

Table 10. Moderating Effect on Idealized Influence and Radical Product Innovation

Model		R	R ²	Unstandardized Coefficients (Beta)	t-value	p-value	Interpretation
Model 1	Constant			4.279	37.268	0.001	
	Idealized Influence	0.468	0.219	0.283	2.416	0.019	Significant
	Open System			0.289	2.463	0.017	Significant
Model 2	Constant			4.249	38.772	0.001	
	Idealized Influence	0.558	0.311	0.319	2.848	0.006	Significant
	Open System			0.295	2.654	0.011	Significant
	Interaction			0.205	2.561	0.014	Significant

Dependent Variable: Radical Production Innovation Assessment
 Moderating Variable: Open System
 R2Change: 0.092

The same result was concluded in the study of Khattak et al. (2017). Overall organizational climate moderates the relationship between transformational leadership and employee creativity. In the study of Teymournejad and Elghaei (2016), it states that there is a positive relationship between idealized influence and creativity of employees. This relationship is stronger when the leaders are supportive of employees and their tasks and work.

b. Open System on Intellectual Stimulation and Radical Product Innovation

The results in table 11 revealed that open system significantly moderates the relationship between intellectual stimulation and radical product innovation ($\rho = 0.007$). Open system increases the effect of intellectual stimulation to radical production innovation





assessment having an R2 Change = 0.103. This means that 10.3% of variation in radical product innovation is the interaction between open system and intellectual stimulation. As intellectual stimulation increase creativity in employee the radical product innovation also increases.

Table 11. Moderating Effect of Open System on Intellectual Simulation and Radical Product Innovation

Model		R	R ²	Unstandardized Coefficients (Beta)	t- value	p- value	Interpretation
Model 1	Constant			4.279	37.945	0.001	
	Intellectual Stimulation	0.497	0.247	0.334	2.849	0.006	Significant
	Open System			0.249	2.126	0.038	Significant
Model 2	Constant			4.225	39.272	0.001	
	Intellectual Stimulation	0.592	0.350	0.355	3.223	0.002	Significant
	Open System			0.282	2.550	0.014	Significant
	Interaction			0.236	2.792	0.007	Significant

Dependent Variable: Radical Production Innovation Assessment
 Moderating Variable: Open System
 R2Change: 0.103

This is the same with the study of Yıldız and Özcan (2014) which revealed that the organizational culture moderated the effect of transformational leadership on creativity.

c. Open System on Inspirational Motivation and Radical Product Innovation

The results in table 12 revealed that open system significantly moderates the relationship between inspirational motivation and radical product innovation ($\rho = 0.014$). Open system increases the effect of inspirational motivation to radical production innovation assessment (R2 Change = 0.084). R2 change of 0.084 denotes that 8.4% of variation in radical product innovation is the interaction between open system and inspirational motivation. This means the higher the open system in a firm, the higher the relationship between inspirational motivation and radical product

innovation.

Table 12. Moderating Effect of Open System on IM and Radical Product Innovation

Model		R	R ²	Unstandardized Coefficients (Beta)	t- value	p- value	Interpretation
Model 1	Constant			4.279	38.691	0.001	
	Inspirational Motivation	0.525	0.276	0.366	3.229	0.002	Significant
	Open System			0.267	2.360	0.022	Significant
Model 2	Constant			4.249	40.192	0.001	
	Inspirational Motivation	0.600	0.360	0.352	3.268	0.002	Significant
	Open System			0.288	2.671	0.010	Significant
	Interaction			0.190	2.542	0.014	Significant

Dependent Variable: Radical Production Innovation Assessment
 Moderating Variable: Open System
 R2Change: 0.084

In the study of Sethibe and Steyn (2018), when the relationship between transformational leadership and its components and innovative behavior was examined, the results showed that inspirational motivation and intellectual stimulation were significantly and positively related to innovative behavior.

d. Open System on Inspirational Motivation and Incremental Product Innovation

The findings in table 13 indicate that open system does not significantly moderate the relationship between inspirational motivation and incremental product innovation ($\rho = 0.127$).

Table 12. Moderating Effect of Open System on IM and Radical Product Innovation

Model		R	R ²	Unstandardized Coefficients (Beta)	t- value	p- value	Interpretation
Model 1	Constant			4.468	48.207	0.001	
	Inspirational Motivation	0.435	0.189	0.160	1.682	0.099	Not Significant
	Open System			0.252	2.656	0.011	Significant
Model 2	Constant			4.484	48.740	0.001	
	Inspirational Motivation	0.477	0.227	0.167	1.783	0.081	Not Significant
	Open System			0.241	2.568	0.013	Significant
	Interaction			-0.101	-1.553	0.127	Not Significant

Dependent Variable: Incremental Product Innovation Assessment
 Moderating Variable: Open System
 R2Change: 0.038





e. Open System on Individualized Consideration and Radical Product Innovation

The results in table 14 revealed that open system significantly moderates the relationship between individualized consideration and radical product innovation (ρ = 0.009). Open system increases the effect of individualized consideration to radical production innovation assessment (R2 Change = 0.104). This R2 change of 0.104 denotes 10.4% of the variation in radical product innovation is the interaction between open system and individualized consideration. As the moderating effect of open system increase on individualized consideration, the radical product innovation also increases.

Table 14. Moderating Effect of Open System on IC on Radical Product Innovation

Table with 7 columns: Model, R, R², Unstandardized Coefficients (Beta), t-value, p-value, Interpretation. It shows data for Model 1 and Model 2 across different variables like Constant, Individualized Consideration, Open System, and Interaction.

Dependent Variable: Radical Product Innovation Assessment

Moderating Variable: Open System

R2Change: 0.104

In the study of Teymournejad and Elghaei (2016), result shows that significant effect of individualized considerations on employee creativity can provide a competitive advantage for the organization and ultimately improve organizational performance.

f. Open System on Individualized Consideration and Incremental Product Innovation

The results in table 15 revealed that open system

does not significantly moderate the relationship between individualized consideration and incremental product innovation.

Table 15. Relationship of IC on Incremental Product Innovation

Table with 5 columns: Incremental Product Innovation, r-value, Individualized Consideration Verbal Interpretation, p-value, Verbal Interpretation. Shows a negligible correlation with a p-value of 0.588.

Regression analysis was not performed since the relationship between individualized consideration and incremental product innovation is not significant. Summary of the moderating effects of open system is presented in Table 16.

Table 16. Summary of Moderating Effect of Open System to TL and Innovation

Table with 5 columns: Hypothesis, Independent Variable, Dependent Variable, p-value (Interaction), Significance. Lists hypotheses H05 through H08b and their corresponding results.

The findings in this study are related with the result of the study of Imran and Haque (2011), which confirms that open system facilitates the relationship between transformational leadership innovative work behavior of employees.

In the study of Imran et al. (2010), intense global competition and perishable nature of the commodities pressurizes the organizations to be flexible to the environment, to bring innovativeness in their processes, to adapt to market trends and seek constant growth. The perception of open system model of organizational climate would encourage the employees of such organizations to facilitate innovative work behavior. Similarly, in the study of Kayaalp (2018) it was found out that organizational innovative climate moderates the relationship between creativity and transforma-





tional leadership. Furthermore, study of Yadav (2013) proposed that transformational leadership is facilitative for radical innovation whereas transactional leadership is facilitative for incremental innovation.

CONCLUSION AND RECOMMENDATIONS

On every business decision like expansion, diversification, or even consolidation, resource manpower capability is the primary factor being considered from the management level down to the simple worker. This study examined the effect of transformational leadership — idealized influence, intellectual stimulation, inspirational motivation and individualized consideration — on machine design product innovation in Company CDE. Results revealed that idealized influence, intellectual stimulation, inspirational motivation and individualized consideration significantly affect radical product innovation. Therefore, the study rejected H_{01} , H_{02} , H_{03a} and H_{04a} . Similarly, inspirational motivation was found to have a significant effect on incremental product innovation, thus the study rejects H_{03b} . For H_{04b} , results indicate that individualized consideration does not have a significant effect on incremental product innovation therefore the study failed to reject H_{04b} .

It was also found out that open system significantly moderates the relationship between each component of transformational leadership and radical product innovation. Thus, the study rejected H_{05} , H_{06} , H_{07a} and H_{08a} . Conversely, the findings indicate that open system does not moderate the relationship between the inspirational motivation and incremental product innovation as well as individualized consideration and incremental product innovation. Therefore,

the study failed to reject H_{07b} and H_{08b} .

The study showed that the rank and file perceived management leadership program to be influencing its members towards radical product innovation, and that the existing organizational climate which is open system serves as catalyst of this relationship. This finding is a good indicator for the business to get a competitive edge through innovation.

The findings of this study revealed that transformational leadership is an important determinant of radical product innovation, and that open system has great effect to propel this relationship. The challenge to Company CDE now is how to sustain and continuously evolve so that they can adapt to the changing business trend and environment. As transformational leadership was being practiced in Company CDE, it is recommended to include the transformational leadership concept into the managers' code of conduct standard to serve as guide on executing programs and setting expectations on managers. The code of conduct and training modules should also include how managers will create and sustain better organization climate through open system (flexibility, outward focus, and reflexivity). This must be reviewed and updated semi-annually to adapt on changing trend and strategy. Seminars and workshop for managers and supervisors must be conducted semi-annually. The human resource team should spearhead the preparation of standard modules and the identification of subject matter experts who will facilitate the learning of transformational leadership and open system, with project execution examples, experience, and success stories of innovation. This way, those will be put into



actual practice simulation, and then eventually into the field by younger generation of managers. While standard training modules and seminar/workshops will sustain and maintain the leadership style, innovation and adaptation to changing business environment must be explored continuously. A collaboration with academe, such as instructors' industry immersion project, could bring up a partnership that will tackle latest student behavior and adjustment preparation for the incoming future workforce. In return, industry work experience could be given to the academe to continuously align the education with the industry requirements. In addition, a benchmark or research activity with leading big technology company can help in adding new programs for Company CDE. Lastly, with the findings of the study, the organization is suggested to aggressively pursue its future plan to develop machines for other segment of the global business, especially on the field of medical and automotive, which are totally different than the existing product.

The respondents considered in this study to determine the effect of transformational leadership on product innovation were the members of the Automation Department of Company CDE. Future research can be done on other design or manufacturing companies interested in assessing the perception of employees on leadership and organizational climate, in order to verify if their future plans and projects are supported by management style. Other types of leadership styles such directive, participative, interactive, charismatic, transactional, and strategic, may have an effect on product innovation. On the other hand, innovation type with regards to process, organizational, and market including specific elements of in-

novation process like research and development, path dependence, creativity, and task completion can also be studied as there are strong suggestions that different undertakings make diverse demand on leadership (Kesting et al., 2015).

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