

# The Influence of Organizational Culture on Innovation Management of Malaysian Small and Medium Enterprises (SMEs) towards Industry 4.0

Asokan Vasudevan<sup>1\*</sup>, Saranyah Uthama kumaran<sup>1</sup>, Kumarashvari Subramaniam<sup>1</sup>,  
Sam Toong Hai<sup>1</sup>

<sup>1</sup> Faculty of Business, Communication and Law (FOBCAL), INTI International University, Nilai 71800, Negeri Sembilan, Malaysia

\*Corresponding Author: [asokan.vasudevan@newinti.edu.my](mailto:asokan.vasudevan@newinti.edu.my)

Accepted: 15 June 2021 | Published: 1 July 2021

---

**Abstract:** *Organizational culture is a significant problem that has a considerable influence on innovation and innovation management. This research was conducted to determine the influence of organizational culture on innovation management of Malaysian Small and Medium Enterprises (SMEs) towards industry 4.0. Hofstede's cultural dimension theory was used to support the model in this research. Data were collected from primary sources using a questionnaire as the method for data collection, and it was tested using IBM Statistical Package for the Social Sciences (SPSS) statistics 26. The questionnaire items were adapted from Cameron and Quinn's Organizational Culture Assessment Instrument, and the questionnaire was distributed to the executives of 50 SME manufacturing companies in Negeri Sembilan. One hundred questionnaires were received out of 175 questionnaires distributed and used to perform data analysis for this study. A few different analysis types were conducted in this research, consisting of descriptive analysis, reliability test, factor analysis, Pearson correlation analysis, and simple linear regression analysis. The result shows that adhocracy culture has the highest correlation and strongest determinant of innovation management. All the four dimensions of culture, also known as the independent variables, are essential. It achieved a P-value of 0.000, which wrote down that it significantly influences Malaysian SMEs' innovation management towards industry 4.0. Therefore, all the tested research hypotheses were accepted, and all four aims were achieved in this study. Organizational culture is the main determinant of firm innovation where it can promote organizational culture and at the same time act as a barrier to innovation. Therefore, it is crucial for the top management, owners, or executives to adapt specific managerial approaches to help innovative management and innovative approaches required to incorporate and operate effectively in industry 4.0.*

**Keywords:** Organizational culture, Innovation, Innovation management, SMEs IR4.0

---

## 1. Introduction

Nearly every company faces cultural barriers that cause more challenges, particularly in SMEs in the 4th industrial revolution. Management needs to address the conventional problems and the current modern management challenges such as in-depth knowledge of innovation management, vision to foresee the future, etc. (Adelekan, 2016). In today's business, organizational culture is expected to balance itself with modern human values and development styles that have been introduced a new era in enterprises. Human factors and values play an essential part in the innovation process, ranging from managers' personalities leading employee

teams, executives' ability to manage the innovation process, managers' ability and desire to take risks, employee-employer interaction components, and employee attitude. To ensure enterprise development, managers need to be visionary and actively involved in diverse innovation practices, from innovative and revolutionary developments to minor modernization that brings measurable effects (Mehta and Krishnan 2004). Therefore, organizations that wish to be innovative have to change their organizational culture to be pro-innovative. It has been discovered that a strong organizational culture will pose a massive influence on the implementation and development of the Strategy that is essential to its execution and enterprises' performance, but that is the factor that is lacking in Malaysian SMEs (Adelekan, 2016). Therefore, this paper investigates the influence of organizational culture on Malaysian SMEs' innovation management towards industry 4.0. SMEs contributed almost more than RM520 billion of the nation's GDP in 2018. Since this research mainly focuses on the manufacturing sector, GDP for SMEs in the manufacturing sector has increased marginally to 34.4% in 2018 from 34.2% in 2017 attributed to petroleum, chemical, plastic, and rubber products (Dosm.gov.my, 2018). Besides, non-metallic mineral products, basic metals, and manufactured metal products increased to 6.9% from 6.1% in 2018, while the food, beverages, and tobacco sector decreased from 11% in 2017 to 3.6% in 2018 (Dosm.gov.my, 2018).

## **2. Literature Review**

Organizational culture plays a significant role in every organization, and it has a considerable influence on the processes and outcomes related to both individuals and organizations (Adelekan, 2016). It is also known as the crucial mechanism for implementing organizational change (Yeung, Brockbank, and Ulrich, 1991). The concept of organizational culture, which has been widely adopted by researchers working in this field of knowledge, is a collection of fundamental principles that the team has invented, discovered, or formed while learning how to solve environmental adaptation and internal integration problems (Adelekan, 2016). Cameron and Quinn model (1999) analyzed all cultures' relationships within an enterprise concerning innovation management. This model has been used in many empirical studies on organizational culture. The model has four dimensions of culture consisting of the clan, adhocracy, market, and hierarchy.

Innovation is vital since it places a company at a competitive advantage (Thamhain, 1990). Innovation is considered deviating from the values, procedures, and conventional management methods or deviation from the normal organizational types that alter the way the job is done (Hamel and Prahalad, 1994). On the other hand, Herkema (2003) sees innovation as adopting new concepts or actions by the company, which could be new goods, services, or technologies. Innovation is at the top of the list of organizational interventions, especially in complex business environments such as price wars, shorter product cycles, and significant players' entrance from various industries with massive capital (Aarons et al., 2015). Innovation boosts competition, increases income, and increases profitability (Nemeth, 1997; O'Regan and Ghobadian, 2005) and promotes new product creation outcomes (Brockman and Morgan, 2003). Similarly, innovativeness transforms opportunity into practical use (Keskin, 2015), and it occurs only when it is practiced (Sharifirad and Ataei, 2012).

Schein (1984) and Weick (1985) firmly believe that culture is the foundation of innovation. Successful companies to SMEs have the ability or expertise to incorporate innovation in the corporate culture and management processes of the organization (Syrett and Lammiman, 1997; Tushman and O'Reily, 1997). The organizational culture that encourages entrepreneurship to learn new skills and competencies growing leads to a firm breakthrough (Hurley and Hut, 1998;

Liu, Luo, Shi, 2002). A culture that promotes innovation includes the value of creativity, risk-taking, faith and respect, freedom, teamwork, communication, value-driven and solutions-oriented, and decisions (Tajudin, Musa, and Musa, 2012). Most of the research that has been conducted on organizational culture and innovation has high support for innovation and creativity. It identifies various factors, for instance, the innate desire to generate highly innovative behaviour, independence and autonomy, organizational encouragement, workgroup encouragement, supervisory encouragement, and resources (Tajudin, Musa, and Musa, 2012). Malaysian SMEs' growth in innovative output has a tremendous impact on the country's economic development. As stated previously, the Malaysian Government has come up with various initiatives to promote innovation among small and medium-sized enterprises (Abdul-Halim et al., 2015; Ngah & Ibrahim, 2012). However, although small and medium-sized enterprises innovation activities have received much attention from researchers (Keskin, 2015; Anahita, Jennifer, Sally, et al., 2012; Massa and Testa, 2008), there is a consensus that more needs to be done (Oke, Burke and Myers 2007; Lee and Ging, 2007). Furthermore, because of the complexities and difficulties of innovation, it is noticed that a cultural perspective can be accepted in the understanding of innovation (Jaskyte, 2004; Brettel, Chomik, and Flatten, 2015).

### **Materials and Methods**

Questionnaires were used as the measuring instrument adopted primarily from Cameron and Quinn's OCAI (Organizational Culture Assessment Instrument). It consists of six dimensions: Dominant character, Organizational Leadership, Management of employees, Organization Glue, Strategic Emphases, and Criteria of success to suit this study's design (Quinn and Cameron, 1996). It was a quantitative study using convenient sampling, and the targeted participants were the executives of the SME manufacturing sector with a working experience of more than three years. A Likert five-point scale was employed as it is a very well-known method of designing questionnaires for various research used widely by other researchers.

A pilot test was then carried out before a thorough review to ensure that the data is dependable and used for further studies. According to previous research, Cronbach's Alpha of 0.6, the questionnaire's reliability was acceptable for SMEs. Kaiser-Meyer-Olkin (KMO) test and Bartlett's Test of Sphericity (BTS) test were used to determine the questionnaire's validity and legal or ethical suitability and also to measure the proportion of variation in the variables that can be caused by the underlying factors (Ibm.com, 2020). The collected data was primary, analysed using simple statistical tools (SPSS-26) to meet the study's aim. One hundred seventy-five questionnaires were distributed and only received 100 sets. A factor was conducted to ensure the KMO is  $>0.60$

Pearson Correlation Analysis and Multiple Linear Regression were conducted to evaluate the strength and the direction of the association between two variables and between both of the dependent variables. Multiple Linear Regression analysis is used to further test the hypotheses in the research. Analysis of Variance (ANOVA) was initiated to analyse the ANOVA as it would assess the statistical significance of the result and determine the significant difference between the means. Collinearity statistics of independent variables with the tolerance and VIFs values were conducted.

### 3. Discussion and Conclusion

#### Reliability Test

Cronbach's Alpha for the dependent variable was 0.864. The independent variables, the Cronbach's Alpha of each of the variables are above 0.6 where clan culture is 0.671; adhocracy culture is 0.818, market culture is 0.822, and hierarchy culture is 0.673 (see Figure 1). Therefore, since all of the Cronbach's alpha values for each variable meet the minimum requirement of reliability, which is more than 0.6, the questionnaire is considered reliable. Therefore, all of the items are retained for future analysis.

Reliability Test (Dependent Variable)		
Variable	Number of Items	Cronbach's Alpha
Innovation Management (DV)	6	0.864

  

Reliability Test (Independent Variables)		
Variable	Number of Items	Cronbach's Alpha
Clan Culture (IV)	6	0.671
Adhocracy Culture (IV)	6	0.818
Market Culture (IV)	6	0.822
Hierarchy Culture (IV)	6	0.673

Figure 1: Reliability Test

#### Factor Analysis

All the values under dependent variables and independent variables shown in figure 15 (Refer to Appendices E) are higher than 0.6 for KMO. All the variables are significant since it is below 0.05 in Bartlett's test. As for the dependent variable, the result for KMO was 0.774, and Bartlett's was 0.000 (see Figure 2).

KMO and Bartlett's Test (Dependent Variable)				
KMO and Bartlett's Test for Innovation Management (DV)				
Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy		0.774		
Bartlett's Test of Sphericity (BTS)	Approx. Chi-Square	380.201		
	df	15		
	Sig.	0.000		

  

KMO and Bartlett's Test (Independent Variables)				
KMO and Bartlett's Test for Clan Culture (IV)		KMO and Bartlett's Test for Market Culture (IV)		
Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy	0.600	Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy	0.770	
Bartlett's Test of Sphericity (BTS)	Approx. Chi-Square	Bartlett's Test of Sphericity (BTS)	Approx. Chi-Square	230.570
	df		df	15
	Sig.		Sig.	0.000
KMO and Bartlett's Test for Adhocracy Culture (IV)		KMO and Bartlett's Test for Hierarchy Culture (IV)		
Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy	0.635	Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy	0.641	
Bartlett's Test of Sphericity (BTS)	Approx. Chi-Square	Bartlett's Test of Sphericity (BTS)	Approx. Chi-Square	141.722
	df		df	15
	Sig.		Sig.	0.000

Figure 2: KMO and Bartlett's Test (Dependent Variable and Independent Variables)

### Pearson Correlation Analysis

		Innovation Management (DV)
<b>Clan Culture (IV)</b>	Pearson Correlation	0.505**
	Sig. (2-tailed)	0.000
	N	100
<b>Adhocracy Culture (IV)</b>	Pearson Correlation	0.726**
	Sig. (2-tailed)	0.000
	N	100
<b>Market Culture (IV)</b>	Pearson Correlation	0.605**
	Sig. (2-tailed)	0.000
	N	100
<b>Hierarchy Culture (IV)</b>	Pearson Correlation	0.383**
	Sig. (2-tailed)	0.000
	N	100

\*\* Correlation is significant at the 0.01 significant level (2-tailed)

**Figure 3: Pearson Correlation Analysis**

The Pearson Correlation the most crucial figure is the 2-tails significance, which dictates that the correlation is at 0.01 level, which means that all the variables are significant, being 0.000 as presented in figure 3. the independent variables show a positive and moderate association with the dependent variable which is innovation management. It also indicated that there is a significant relationship between all the independent variables with innovation management since the p-value of all the variables is 0.000 (< 0.01) (see Figure 3 above).

As summarized in figure 4, the adjusted R square is 0.529, with the R square of 0.548. This means that the linear regression explains 54.8% of the variance in the data. The remaining 45.2% is clarified by the other predictors that are not included in this study. This suggests that other predictors may be significant in describing the outcome of innovation management in this analysis.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.741 <sup>a</sup>	0.548	0.529	0.34310

•Dependent Variable: TIM  
•Predictors: (Constant), THC,TCC,TAC,TMC

**Figure 4: Model Summary**

Figure 5 below shows the Analysis of Variance (ANOVA). It is essential to analyse the ANOVA table to assess the statistical significance of the result and determine the significant difference between the means (Seen et al., 2012). In the ANOVA table, the focus would be on the F-value at 28.834 with a significance of 0.000, which again is below the alpha value of 0.005. This result shows that there is a significant statistical difference between the means of all different independent variables.

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.577	4	3.394	28.834	0.000 <sup>b</sup>
	Residual	11.183	95	.118		
Total		24.761	99			

•Dependent Variable: TIM  
•Predictors: (Constant), THC,TCC,TAC,TMC

**Figure 5: Analysis of Variance (AVOVA)**

## Conclusions

This research has proven that only adhocracy culture is an essential factor out of all the other cultural dimensions since it influences Malaysian SMEs' innovation management towards industry 4.0. This indicates that only research hypothesis 2 (RH2) is accepted. Compared to all the variables presented in this research, the findings show that clan culture has the highest correlation with innovation management and the most vital determinant of innovation management. In contrast, the weakest determinant of innovation management is clan culture. Fifty-four percent of the innovation management variance is explained in the model, and the remaining 45.2% is clarified by the other predictors that are not included in this research. In conclusion, this research study has concluded that adhocracy culture significantly influences innovation management in Malaysian SMEs. Out of four research objectives, only one goal was achieved in this research study.

Few managerial implications could be useful for SMEs' executives or owners, particularly manufacturing sectors, in many different ways. This study would provide the executives or owners of SMEs with a better understanding of organizational culture dimensions and their influence on innovation management. Moreover, it would also help them to understand the relationship between both variables in depth. They can use this knowledge to implement initiatives or strategies to shift their perspective on organizational culture and how they operate the business, which would eventually guide them to improve the company in many ways.

## References

- Aarons, G. A., Ehrhart, M.G., Farahnak L.R. and Hurlburt, M.S. (2015). "Leadership and organizational change for implementation (LOCI): a randomized mixed method pilot study of a leadership and organization development intervention for evidence-based practice implementation." *Implementation Science*, 10(11), 1-12.
- Abdul Halim, H., Ahmad, N., Ramayah, T., Hanifah, H., Taghizadeh, S. & Mohamad, M. (2015). Towards an Innovation Culture: Enhancing Innovative Performance of Malaysian SMEs. *Academic Journal of Interdisciplinary Studies*, 4(2), 85-94.
- Adelekan, S. (2016). The impact of organizational culture on innovation capability of SMEs: Case study of SMEs in Alimosho and Ojo Local Government Area of Lagos State, Nigeria. [Ijecm.co.uk](http://ijecm.co.uk). 2020. <http://ijecm.co.uk/wp-content/uploads/2016/09/4911.pdf>
- Anahita, B., Jennifer, R, Sally, S., & Daffyd, D. (2012). Innovation in food sector SMEs, *Journal of Small Business and Enterprise Development*, 19(2), 300 – 321.
- Brettel, M., Chomik, C., & Flatten, T. S. (2015). How organizational culture influences innovativeness, proactiveness, and risk-taking: Fostering entrepreneurial orientation in SMEs, *Journal of Small Business Management*, 53(4), 868–885.
- Brockman, B.K., and Morgan, R.M. (2003). "The role of existing knowledge in new product innovativeness and performance", *Decision Sciences*, (34)2, 385-419.
- Cameron, K and Quinn, R. (1999). *Diagnosing and Changing Organizational Culture*. Addison-Wesley, Massachusetts.
- Dosm.gov.my. (2018). Department Of Statistics Malaysia Official Portal. [https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=159&bul\\_id=R0Vka2RpeVJ0cUlpR3BqdjhudDZhdz09&menu\\_id=TE5CRUZCblh4ZTZMODZlbnk2aWRRRQT09](https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=159&bul_id=R0Vka2RpeVJ0cUlpR3BqdjhudDZhdz09&menu_id=TE5CRUZCblh4ZTZMODZlbnk2aWRRRQT09)
- Hamel, G., & Prahalad, C. K. (1994). Strategy as a field of study: Why search for a new paradigm? *Strategic Management Journal*, 15(2), 5-16.

- Herkema, S. (2003). A complex adaptive perspective on learning within innovation projects, *The Learning Organization*, 10(6), 340-346.
- Hurley, R.F. and Hult, G.T.M., and Tomas M. (1998). Innovation, Market Orientation, and Organizational Learning: An Integration and Empirical Examination. *Journal of Marketing*, 62(3), 42 – 54.
- Jaskyte, K. (2004). Transformational leadership, organizational culture and innovativeness in nonprofit organizations. *Nonprofit Management and Leadership*, 15(2), 153-168.
- Keskin, H. (2006). Market orientation, learning orientation, and innovation capabilities in SMEs. *European Journal of Innovation Management*, 9(4), 396–417.
- Lee, C., and Ging C. G., (2007), SME innovation in the Malaysian manufacturing sector. *Economics Bulletin*, vol. 12(30), 1-12.
- Liu, S., Luo, X., and Shi, Y. (2002). Integrating customer orientation, corporate entrepreneurship, and learning orientation in organizations in transition: an empirical study. *International Journal of Research in Marketing*, 19, 367-382.
- Massa, S., and Testa, S. (2008), Innovation and SMEs: Misaligned perspectives and goals among entrepreneurs, academics, and policy makers, *Technovation*, 28(7), 393-407.
- Mehta, S. and Krishnan V.R. (2004). Impact of Organizational Culture and Influence Tactics on Transformational Leadership. *Journal of Management and Labor Studies*, 29(4).
- Nemeth, C.J. (1997). "Managing innovation: when less is more." *California Management Review*, 40(1), 59-74.
- Ngah, R., & Ibrahim, A. R. (2012). The relationship of intellectual capital, innovation and organizational performance: A preliminary study in Malaysian SMEs, *International Journal of Management Innovation Systems*, 1(1), 1-13.
- O'Regan, N. and Ghobadian, A. (2005). "Innovation in SMEs: The impact of strategic orientation and environmental perceptions." *International Journal of Productivity and Performance Management*, 54(2), 61-69.
- Oke, A., Burke, G., & Myers, A. (2007). Innovation types and performance in growing UK SMEs. *International Journal of Operations & Production Management*, 27(7), 735-753.
- Schein, E. (1984). Coming to a New Awareness of Organisational Culture. *Sloan Management Review*, 25(2), 3-16.
- Sharifirad, M. S., & Atei, V. (2012). Organizational culture and innovation culture: Exploring the relationships between constructs, *Leadership & Organization Development Journal*, vol. 33, no. 5, pp. 494 – 517.
- Syrett, M., and Lammiman, J. (1997). The art of conjuring ideas. *Director*, 50(9), 48-54.
- Tabachnick, B.G., and Fidell, L.S. (2001). *Using Multivariate Statistics* (2nd. Ed), Harper & Row, Cambridge, MA.
- Tajudin, M., Musa, O. and Musa, N. (2012). Effects of Organizational Culture, Market Orientation, And Innovativeness Toward New Product Performance Amongst Malaysian Smes.[online] Business.utm.my.  
[https://business.utm.my/ijibs/attachments/article/22/IJIBS\\_01\\_02.pdf](https://business.utm.my/ijibs/attachments/article/22/IJIBS_01_02.pdf)
- Tushman, M. L. and O'Reilly, C. A. III (1997). *Winning through Innovation: A Practical Guide to Leading Organizational Change and Renewal*. Boston, MA: Harvard Business School Press.
- Weick, K. (1985). *The Significance of Corporate Culture in P. J. Frost, L. F. Moore, M. R. Louis, C. C. Lundberg and J. Martin. Organizational Culture*. Beverly Hills, Sage, 381-389.

Yeung, A.K.O., Brockbank, J.W. and Ulrich, D.O. (1991). "Organizational cultures and human resource practices: An empirical assessment." *Research in organizational change and development*, 5, 59 – 81.