Organizational Innovative Climate as a Predictor of Innovative Behaviour among Engineers in the Electrical and Electronic Manufacturing Industry

Review of Integrative Business & Economics Research

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ABSTRACT

Innovative behaviour is empirically proven to be a critical element for organizations in order to remain competitive in the global market. Based on literature, organizational innovative climate has been found to influence innovative behaviour among employees. The current study seeks to investigate the relationship between the two variables within the context of the electrical and electronic (E & E) manufacturing sector in Malaysia. The respondents for the study are engineers employed in the E and E sector. Data was collected from 309 respondents through structured questionnaire. The results of the analysis indicated support for the dimensions of support for innovation and performance orientation.

Keywords: Innovative climate, innovative behaviour, engineers.

1. INTRODUCTION

Malaysia has been a competitive investment destination, especially in electrical and electronic (E & E) manufacturing, for more than 30 years. Currently it is facing increased competition from Singapore, Vietnam, Taiwan and China (MIDA, 2015). China poses a strong threat after emerging as the global center for assembly manufacturing. Based on World Bank's report 2015 (Schwab, 2015), they found increased export competition between Malaysia and China. Another country that poses a serious challenge to the Malaysian E&E sector is Vietnam, which is fast attracting low-cost companies in the E&E industry while the high-end manufacturers flock to Singapore and Taiwan. This situation indicates that it is critical for E&E organizations to find a way to remain competitive not only in the country but also regionally and globally. According to Agarwal and Brem (2012), to remain competitive and attractive to investors, multinational corporations (MNCs) are obliged to initiate new innovative paradigms. They added that countries like China and India emerges because of their initiative to become global innovation hubs. Thus, to optimize innovation among MNCs operating in Malaysia, the firms need to encourage innovative behaviour among their employees, so that the collection of new ideas, process and its' implementations will move the organization forward.

Firms need to address the isuue of innovative behaviour among their employees, as it is one of the primary source of competitiveness possessed by the firms' employees.

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Organizations utilize multiple resources to compete, but now organizations are increasingly becoming aware that other organizations are likely to have the same resources and managerial expertise (Harrison & Samson, 2002), especially in the context MNCs in the E&E manufacturing sector. Innovative behaviour among the employees is an important factor for the realization of innovation, as it can lead the change to a more improved innovation process either in the production line or to produce new ideas (Arif, Zubair, & Manzoor, 2012; Rudskaia & Rodionov, 2018), innovative behaviour also leads to organizational reform processes, methods and operations (Delaney & Huselid, 1996).

In brief, innovation and innovative practices in Malaysia private organization such as MNCs still remain relatively under-researched (Idris, 2000; Mohamed & Rickards, 1996; Sta Maria, 2000). Based on previous studies, organizations that fail to inculcate innovative behaviour among their employees will face obstacles and challenges that may reduce their organizational ability to sustain and compete in the market, locally or globally(Axtell et al. (2000). Agarwal and Brem (2012) mention that MNCs without innovation but practice imitation to compete, will not be able to maintain their competitiveness in the global market and has been pushed to merge like Siemens-Nokia or in some extreme cases like Nortel, to go bankrupt. Lack of technological innovation capabilities among the workers also causes the decline of value-added products and low total factor productivity that reflect low-income level per capita of the company (Best, 1999). In addition, the limited innovation-related knowledge and skills have hampered the skill formation capabilities in the area such as design engineering, computer science, systems analysis, and information technology generally (Best, 1999).

Moreover, without the enhancement of the discovery and innovation process in Malaysian manufacturing sector, namely in electrical and electronic, the county will be left behind compared to other nations, such as Korea, Singapore, India, and China, especially in terms of R&D, since innovation is widely recognized as key factor in sustaining Malaysian competitiveness in the era of rapid globalization. Past studies indicated that the country's weak position, in terms of R&D and innovative capability, poses major challenges, such as failure in attracting MNCs headquarters to be located in Malaysia (as headquarters significantly contribute to R&D activities), lack of skilled professionals in supplementing the industries, and lack of entrepreneurship and innovative culture among Malaysian workers (Chandran, Rasiah, & Wad, 2009).

Subsequently, lack of innovative behaviour among employees may reduce the effectiveness of organizational success in achieving competitive strategy, behavioural standards, financial objectives, concern for survival, concern for customers, and organizational vision (Bart, 1998). Organizations that lack the practice of innovative behaviour have been linked to vague competitive strategy in their mission statements. Without a better understanding of organizational competitive strategy, organizations lose their focus, become confused and operate without direction. From employee's behavioural standards perspective, the low level of employees that practice innovation will automatically reduce the levels of organization's innovativeness. Within in the context of financial objectives, the organizations that do not encourage innovative behaviour, unfortunately, will not be able to prepare and provide the guidelines to define success or failure of projects undertaken, and prepare where initial losses is expected to be high before actions are taken. Furthermore, organizations may appear to be working in a state of imbalance and may be focusing on the customer to the detriment of other critical stakeholder groups. Consequently, lack of innovative behaviour in organizations

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

may result in the diversion of vision, losing the sense of direction and ability to meet future demand. (Best, 1999)

2. LITERATURE REVIEW

2.1 Innovative Organizational Climate

While Siegel and Kaemmerer (1978) examined innovativeness within the traditional school environment and found that support for creativity, tolerance for diversity, and feelings of ownership is related to innovation resulting in the development of the Scale of Innovation Support (SSSI) to measure perceived support for innovation. Siegel and Kaemmerer (1978) argued that an innovative organization is one that promotes creative function among members of the organization. Perceptions of climate approach are likely to be favoured when assessing organizational climate (Siegel & Kaemmerer, 1978; Yoo, Huang, & Lee, 2012). Schneider (2000) states that organizational climate is behaviourally oriented. This suggests that the behaviours that exist in the workplace is affected by the change in organizational culture. Thus, within this particular context organizational climate is said to exist (Patterson et al., 2005; Svyantek & Bott, 2004). For example, when the behaviour promotes safety in the workplace, organizational climate for safety is more likely to exist (Zohar, 1980). Both objective and perception approach were used to examine and measure organizational climate (Siegel & Kaemmerer, 1978).

The term climate originates from the work of organizational theorist such as Kurt Lewin (i.e. leadership styles create social climates), and Douglas McGregor (Theory X and Y), who used this term to refer to the social climate and organizational climate (Ahmed & Shepherd, 2010). Practitioners and researchers have concluded organizational climate as the encapsulation of the organization's true priorities. Employees make sense of the organizational environment through their observation and implementation of organizational priorities. The employees' perception and understanding of the environment is guided by the organizational decisions and behaviours. The interaction between the organizational procedures and practices influences the environment that affect individual's behavioural postures, thus, the employees operate in in this organizational climate generated by such interaction. (source)

The innovative climate is defined as the sharing of perceptions related to practices, procedures, and behaviours to encourage the generation, recognition, and realization of new ideas. Siegel and Kaemmerer (1978, p. 3) defined innovative climate as "…one that fosters the creative functioning of its members". Practices and procedures contribute toward the organizational encouragement that supports the development of new ideas that to some extent posed a challenge to the traditional way of taking action. These activities are generally regarded as the heart of the main drivers of change, innovation and organizational effectiveness (Daellenbach, McCarthy, & Schoenecker, 1999).

Research has called for organizations to be more flexible, adaptive, entrepreneurial, and innovative to effectively meet the changing demands of today's environment (Orchard, 1998; Valencia, Valle, & Jimenez, 2010). The current study will examine organizational innovative climate as a predictor of the organizations to motivate their employees to engage in innovative behaviour. Therefore, there is a need for the climate to be conducive to encourage such innovative behaviour in the organization. The innovation climate of an organization is based on the shared perceptions and knowledge of how "the manner of working together" has evolved (Anderson & West, 1994, 1998).

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The combination of a supportive climate and innovative behaviour within an organization would presumably lead to higher level of self-esteem where, the employees are willing to display their ability to take a risk, venture into new markets, products or services to improve the individual and organizational innovative performance.

2.2 Innovative Behaviour

Innovation is an important factor in driving the growth in various industries because it provides organizations with a competitive advantage to survive and thrive in today's economic situation (Johannessen, Olaisen, Johannessen, & Olsen, 1999; Kanter, 1983; Peters & Waterman, 1982). There are various definitions of innovative behaviour that have been expressed by the previous researcher such as by Mumford and Gustafson (1988), who believes that creativity is related to the production of novel and useful ideas, and innovation is related to useful products or adoption of new ideas and the implementation of such ideas (Kanter, 1988; Van de Ven, 1986). In addition, Janssen (2004) based on West and Farr (1989) defined innovative behaviour as "the intentional creation, introduction, and application of new ideas within a work role, group or organization, in order to benefit performance role, the group, or organization". Innovative behaviour has also been mentioned as an important and powerful tool due to its potential for generating competitive advantage in the organization (Janssen, 2004; Mayfield & Mayfield, 2004). This term also has a spiritual connotation (Twigg & Parayitam, 2006) as it has been noted that it requires interaction with other individuals in the workplace. In an extended model of creativity by Woodman and Schoenfeldt (1989) and Woodman, Sawyer, and Griffin (1993), they noted that individual creativity works as a function of employee characteristics, social influences, and contextual factors. The hypothesis has proved that employee creativity will be higher if a group promotes norms such as information sharing. Recently, Wang, Fang, Qureshi, and Janssen (2015) defined innovative behaviour as a complex behaviour that consists of three different task, which is idea generation, idea promotion, and idea realization. Lastly, Kang, Solomon, and Choi (2015) concluded that innovative behaviour is a multistage process with several different activities with different individual behaviours required in each stage.

There are limited numbers of study relating to organizational culture and climate related to innovation (Shafie, Siti-Nabiha, & Tan, 2014). However, individual perception of organizational climate and culture have been empirically proven to influence the effectiveness and performance of the organization (Chatman, Caldwell, O'Reilly, & Doerr, 2013; Denison & Mishra, 1989; Heskett & Kotter, 1992). Hensen and Wernerfelt (1989) found that organizational factors such as organizational climate has influenced the economic factors of the development of innovative organization. Support for innovation is one of the dimension of organizational climate in this study and it has proven to be a critical element in producing innovative performance (Malik & Wilson, 1995). Previous research has found that organizational climate consisting of support for innovation as an important determinant for actual innovative performance (Abbey & Dickson, 1983; Fischer & Farr, 1985). Likewise, the dimensions of competitiveness and performance orientation have played important roles towards achieving organizational innovativeness and has been perceived to be a driver of organizational behaviour in private sector organizations (Sarros, Cooper & Santora, 2008). Olanipekun, Aje, and Abiola-Falemu (2013) reveals that competitiveness and performance orientation influences the organizational performance. Recently, Gopalakrishnan and Zhang (2017) found that

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

organizational competitiveness reflects the positive impact of innovative aspirations of the organization. Overall, support for innovation, competitiveness and performance orientation plays an important role to enhance the firms' innovativeness. Thus, the objective of this study is to provide empirical evidence concerning the influence of organizational innovative climate in predicting innovative behaviour in the organization.

3. METHODOLOGY

The current study utilizes the non-probability method of judgmental sampling for data collection. According to Sekaran (2000), judgmental sampling involves the choice of subjects of individual or workers which is in the best position to provide the most relevant and required information. In the context of this study, this sampling method is the most suitable because the sample requires specific attributes to be the criteria in order to ensure the interpretation of the data is meaningful. The position selected for this study are engineers because they are in the best position to provide reliable information to the researcher in studying organizational innovative climate and innovative behaviour in their organizations and their jobs are related specifically to innovativeness and sophisticated knowledge that requires them to be consistently exhibit the suggestion of new products or processes, the adoption of new technologies or the application of new working methods (Monteiro, da Silva & Capretz, 2016). The unit of analysis of the study is the engineer. The engineers are employed by MNCs in Malaysian electrical and electronic manufacturing sector. The list of the manufacturing firms is obtained from the Federation of Malaysian Manufacturers: Electrical and Electronic Directory 2016 (FMM, 2016). The questionnaires were mailed to the HR managers of 750 manufacturing firms, where, the HR managers were instructed to select an engineer to respond to the survey. 309 usable responds were received from the manufacturing firms, indicating 41.2% rate of response. Data is analysed using Partial Least Square (PLS)-SEM.

3.1 Organizational Innovative Climate Factor

Previous studies found that the support for innovation and organizational culture are closely related and they reflect the innovative climate in the organization (Chandler, Keller, & Lyon, 2000; Denison, 1996; Detert, Schroeder, & Mauriel, 2000; Johnson, 1996; Judge, Fryxell, & Dooley, 1997; Martins & Terblanche, 2003; Montes, Moreno, & Fernández, 2004; Mumford & Gustafson, 1988; Pienaar & Boshoff, 1996; Sarros, Cooper, & Santora, 2008; Scott & Bruce, 1994; Shaughnessy, 1988; Tesluk, Farr, & Klein, 1997; Tushman & O'Reilly III, 1997). For the purpose of the current study, organizational innovative climate is represented by two dimensions: support for innovation and organizational culture. Organizational culture consists of two sub-dimensions; competitiveness and performance orientation. The variable's instruments and items were adopted from the support for innovation scale by Malik and Wilson (1995) and organizational culture was adopted from Sarros et al. (2008) due its suitability to meet the study's research objectives. All the items are measured with five points Likert scale ranging from (1) for 'Never', (2) for 'Almost Never', (3) for 'Sometimes', (4) for 'Often', and (5) for 'Very Often'

3.2 Innovative Behaviour

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

The measures are adopted from Janssen (2000) scale for individual innovative behaviour in the workplace with nine items (Cronbach's alpha = 0.95). The nine items are divided into three dimensions, which is idea generation (three items), idea promotion (three items), and idea realization (three items). All the items are measured with five points Likert scale ranging from (1) for 'Never', (2) for 'Almost Never', (3) for 'Sometimes', (4) for 'Often', and (5) for 'Very Often'.

4. DATA ANALYSIS

Results from the analysis of the demographic profile of respondents indicate that majority of the sample are male (59.2%) as compared to female (40.8%). Respondents spanned the range of age categories from 25 to 55 years and above, with the majority (57.3%) of the respondents included in the survey sample being between the ages of 26-40 years, followed by 41-55 age groups at 36.2% and third largest age group was the 25 years at 4.9%. While the smallest respondents came from the group age of 55 years and above (1.6%). Statistic on the total length of service showed that majority of respondents had worked in their company within 1-5 years (37.9%) respectively. Meanwhile, 26.5% employee has served for 6-10 years, 18.8% have served for 11-15 years, 10% have served for 16-20 years, 5.8% have served for 18 years and only 1% respondent has served the company for 26-30 years. In addition, the respondents were also about the county origin of the companies. Data showed that the companies in the E&E sector in this study are foreign companies originating from 13 different countries. The larger number being from USA (33%); followed by Japan (29.8%); Germany (18.8%); Singapore (5.8%); UK (3.2%); Taiwan (1.9%); Denmark, France, and Netherland (each 1.6%); China (1.3%); Sweden (2%); UAE and Australia (each 0.3%).

4.1 Convergent Validity

Convergent validity is the extent to which the items that are indicators of a specific construct should converge or share a high proportion of variance in common (Hair, Hult, Ringle, & Sarstedt, 2014). Hair et al. (2014) suggested several ways to estimate the convergent validity among items measures such as factor loadings, average variance extracted (AVE) and composite reliability (CR). The loadings for all items exceed the recommended value of 0.40 or higher (Hair et al., 2014). AVE which is a mean variance extracted for the items loadings on a construct were all above the recommended value of 0.40 or higher (Hair et al., 2014), which means that more than one-half of the variance observed in the items were accounted for by their hypothesized factors. The AVE for this study is in the range of 0.514 to 0.768. Composite Reliability (CR) which indicate the degree to which the latent variables can be explained by the observed variables (Tseng & Tsai, 2011) is in the range of 0.756 to 0.930, which exceeds the cut off value of 0.6 (Bagozzi & Yi, 1988). Thus, this study ensured the existence of convergent validity. Table 1 and Figure 1 summarize the result of the measurement model, which shows that the constructs are all valid measures of their respective constructs.

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

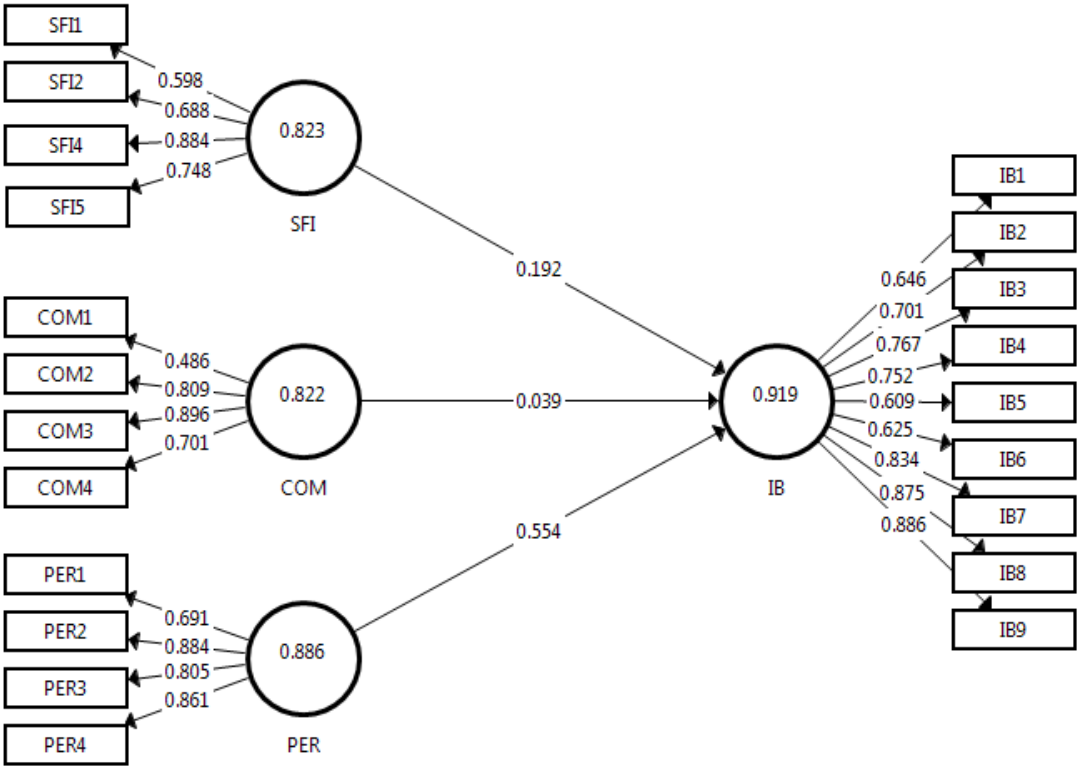

Figure 1
Structural Model with Item Loadings

Table 1
Convergent Validity

Construct	Item	Loadings	Cronbach's Alpha	CR	AVE
Support for Innovation	SFI1	0.598	0.758	0.823	0.543
	SFI2	0.688			
	SFI4	0.884			
	SFI5	0.748			
Competitiveness	COM1	0.486	0.748	0.822	0.546
	COM2	0.809			
	COM3	0.896			
	COM4	0.701			
Performance orientation	PER1	0.691	0.829	0.886	0.662
	PER2	0.884			
	PER3	0.805			
	PER4	0.861			
Innovative behaviour	IB1	0.646	0.9	0.919	0.563
	IB2	0.701			
	IB3	0.767			
	IB4	0.752			

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

	IB5	0.609
	IB6	0.625
	IB7	0.834
	IB8	0.875
	IB9	0.886

4.2 Discriminant Validity

Discriminant Validity is the extent to which a construct is truly distinct from other construct (Hair et al., 2014). It is indicated that by inevitable low correlation between the same variable or concept (Heeler & Ray, 1972). To address discriminant validity the square root of the AVE is compared against the correlations of another construct. As shown in Table 2, the calculated square root of the AVE exceeds the inter-correlations of the construct with the other constructs in the model, which ensures adequate discriminant validity. In total, the measurement model of the study demonstrated adequate convergent and discriminant validity.

Table 2
Discriminant Validity

	1	**2**	**3**	**4**
1. Competitiveness	0.739			
2. Innovative Behaviour	0.521	0.751		
3. Performance Orientation	0.589	0.659	0.814	
4. Support for Innovation	0.808	0.46	0.427	0.737

Table 3 below presents the results of hypothesis testing (e.g., path coefficients, standard errors, and *t*-values) for the direct effects of (i) organizational innovative climate factor (support for innovation, competitiveness, and performance orientation on giving and receiving dimensions of knowledge sharing. The bootstrap critical values for a one-tail test are >1.645, indicating only two hypotheses received support, namely, H1: the relationship between support for innovation to innovative behaviour and H3: the relationship between performance orientation and innovative behaviour. The relationship between competitiveness and innovative behaviour did not receive support, as the t-value is less than 1.645.

Table 3
Summary of the Result

Hypothesis	**Relationship**	**Std. Beta**	**Std. Error**	**t-value**	**Decision**
1. H1	Support for Innovation -> Innovative Behaviour	0.192	0.197	3.239*	Supported
2. H2	Competitiveness -> Innovative Behaviour	0.039	0.041	0.556*	Not Supported
3. H3	Performance Orientation -> Innovative Behaviour	0.554	0.552	12.3*	Supported

Note. *p<0.05

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5. CONCLUSION

The outcome of the data analysis provided evidence that engineers in the E and E manufacturing sector, perceived that organizational innovative climate to be a significant predictor of innovative behaviour. The result magnifies the importance for organizations to provide an environment where, exchange of ideas, creativity and openness, can thrive. As exhibited by the result of the analysis, support for innovation and performance orientation are significant predictors for innovative behaviour, because both dimensions implies that organizations promote and allows employees to communicate their ideas without hierarchical restrictions. Both support for innovation and performance orientation are significant probably due to the nature of work process in the E and E industry itself, which requires rapid changes to cater to changing customers' needs. In such volatile environment, creativity and communication flow freely and the ability to respond to changes in the industry is tied to the engineers' key performance index, implying the significance of both dimensions. However, the non-significance of competitiveness implies that the dimension is of more importance at the firm level rather than at the individual level, which was the focus of the current study.

ACKNOWLEDGEMENT

The authors wish to thank Universiti Sains Malaysia for funding this research under Research University Grant 1001/PMGT/8016008.

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