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Is Organisational Culture a Necessity in Explaining the Relationship between Market Orientation, Total Quality Management and Innovation Performance?

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Abstract

The increasing significance of innovation notion within global market, endeavour on close scrutinises on organisations' performance, specifically innovation performance. Previous academicians proposed on market orientation, total quality management and organisational culture as the influencer of innovation performance that will be extended and discussed in this study. The successful synergy between market orientation and total quality management assist the firms in transforming market-based knowledge into innovations finished-products following efficient management framework. The research utilises 105 manufacturing firms in Malaysia for data collection. PLS-Structural Equation Modelling is used to analyse the proposed research hypotheses. The findings revealed that market orientation and total quality management has significant indirect effect on innovation performance via organisational culture. The limitations and recommendations for future practices also explained in this research.

Keywords: Competing Values Framework (CVF), Market Orientation, Total Quality Management, Organisational Culture, Innovation Performance, PLS-SEM, Malaysia

Introduction

The limited studies discussing on the relationship between market orientation, total quality management and innovation performance indicate the significance of the framework in the context of manufacturing industries in Malaysia (Ali et al., 2020; Asad et al., 2020). Innovation factor have become an increasing significant facet within the changing global market. As such, it is paramount for organisations, specifically manufacturing firms to endeavour on discussing the innovation performance's influencer. Prior researches mentioned on the long-existing market orientation as one of the criterion that affects innovation performance (Putra et al., 2020; Shaher & Ali, 2020; Wahyuni & Astawa, 2020). Market orientation implies its significance on innovation performance in Small and Medium Enterprises (SMEs)'s context,

deliberating on stronger implementation of market orientation to enhance the firm's innovation performance (Wahyuni & Astawa, 2020). Firms with higher ability to discuss on market knowledge, respond to the market information and adapt to changes in customer's demand facilitate higher innovation performance. In line with that, Shaher and Ali (2020) contend that market-oriented organisations have higher successful rate in the development of innovative products compare to non-market-oriented firms. This is due to the organisation's ability to integrate market-based knowledge in creating novel innovations within short timeframe. Meanwhile, Putra et al (2020)'s study discusses on the impact of market orientation on innovation performance from Indonesian SMEs' perspectives. However, the findings indicated no significant direct effect of market orientation on innovation performance. The results contradict the previous interpretations on market orientation – innovation performance relationship and highlighted its significance to be incorporated in future researches with additional influencers.

Total quality management, one of the prevailing subject of interest within management academic fields reveal its significance in innovation performance relationship (Alshourah, 2021; Mushtaq & Peng, 2020; Zhou & Gu, 2019). A total quality management strategy is considered as a prospective tool that assist organisation to facilitate innovation performance, while increasing their competitive advantages in economy market. Alshourah (2021)'s study on total quality management effects on innovation performance within Jordanian manufacturing organisations ascertains positive significant effect of total quality management. Five out of six total quality management's dimensions (i.e. leadership, people involvement, customer focus, process management and product design) are confirmed to have positive significant effects on innovation performance with supplier support component revealed to have no significant influences on innovation performance. Thus, it is imperative to extend the proposed model with other factors (e.g. market orientation). Mushtaq and Peng (2020) concur on the significant relationship between total quality management and innovation performance within Pakistan manufacturing industry. The research, further discuss on innovation capability as a mediating influencer on the relationship, indicating possible mediating influencer (e.g. organisational culture) on explaining the total quality management – innovation performance relationship.

Previous scholarly articles confer on the relationship between organisational culture and innovation performance (Globocnik et al., 2020; Oluwa & Ibrahim, 2021; Shahzad et al, 2017). The presences of different type of culture have the ability to influence innovation performance following different principles. The Competing Value Framework (CVF) model introduced by Cameron and Sine (1999) debated on four culture typologies, listing on; adhocracy culture, hierarchy culture, market culture, and clan culture. The model is utilised in this study to underline the different business environment experienced by different companies within economic world. Furthermore, prior scholars noted that CVF model was extensively discussed and widely implemented within various context of study (Zeb et al., 2022). For instance, flexible culture in organisation's management might influence employees to participate in decision-making process, presenting innovative ideas and procedures to assist in increasing the firms' innovation performance (Shahzad et al., 2017). The significant relationship highlighted between organisational culture and innovation performance also being analysed under Austrian firms' context (Globocnik et al., 2020). The study, however,

argued on only two organisational culture's dimensions (i.e. clan culture and adhocracy culture) have significant relationship on innovation performance, while contradicting the other two dimensions (i.e. market culture and hierarchy culture). Therefore, it is noteworthy to extend the proposed model with other influencers (i.e. market orientation and total quality management) to improve firms' innovation performance.

The synergistic effects between market orientation and total quality management have been extensively discussed within different countries; India (Bhaskar, 2020), Indonesia (Fikri et al., 2022), Pakistan (Imran et al., 2019), Nigeria (Rogo et al., 2018) and Saudi Arabia (Ali et al., 2020). Despite that, there is lack of study on the relationship between market orientation and total quality management on innovation performance, filling the gap within the academic fields. Furthermore, the proposed integration model had been extended in Ali et al (2017)'s study with organisational culture as a moderating facet. This coincides with previous scholarly article that confers organisational culture as moderating mechanism in strengthening innovation performance relationship (Kanapathy et al., 2017). The interpretation of organisational culture as a mediating mechanism has been proposed in Lee (2022)'s study regarding the relationship between leadership and organisational commitment, indicating its potential as a mediating notion in explaining innovation performance relationship. Following that, this study attempts to extend the proposed model with organisational culture as mediating influencer on explaining innovation performance relationship. Interestingly, there are no empirical studies delving on the relationship between market orientation, total quality management and innovation performance with the intervening factor of organisational culture, specifically in manufacturing industries. Therefore, this paper intends to fill the gap within the field of knowledge through exploring the combination effects of market orientation, total quality management, organisational culture and innovation performance in Malaysian manufacturing industries.

Literature Review

Relationship between MO and IP

A companies' crucial resources nowadays depends on its ability to procure and delivers innovations either products or operations itself (Wahyuni & Astawa, 2020). In the ever-changing economies market, the less innovative companies will face difficulties to dominate and survive in the long period of time. The pressure exert from global competition, rapid changes in market environment and short product life cycle demand firms, specifically product-based companies to observe and improve their performance from innovation aspects (Buli, 2017). This indicates the significance of innovation performance and needs to be explored from different perspectives. In line with that, the scholars proposed on the influences of market orientation as one of the factors in enhancing firms' innovation performance (Ghorbani et al., 2013). Mekhum and Rajabhat (2020), in their study regarding service innovation performance within Thailand's hotel corroborates on the significant effect of market orientation on the relationship. The paper, however, indicates the construct as mediating factor between technology-based CRM (customer relationship management) and service innovation performance. Thus, it is interesting to adapt the model with alternative constructs in further strengthening the model proposed. The positive influence of market orientation on firm performance is validated from previous scholar's discussions (Yusof et al., 2020). However, their findings delivers significant effects on cultural components, while, the

behavioural dimensions of market orientation are not supported. Therefore, the scholars suggest on additional influencers to further strengthen the proposed theoretical model. As such, the researcher discovers potential extension of the previous measurement model with total quality management as another influencer in enhancing firms' innovation performance.

Relationship between TQM and IP

Total quality management, another business management philosophy dated since decades ago has been recognised as another essential factor that subject to be perused and observed within firms' operations. The concept deliberated by previous academicians as an "improvement of all functions within an organisation through continuous improvement and organisational changes" (Alshourah, 2021). The scholars also interpreted the concept as "management approach considering the participation of all employees with purposes of long-term success through satisfying the customers' needs and continuous improvement in business' operations". The prevailing stance of total quality management within academic fields resulted in wide extension of dimensions that proven difficulties in generalising the constructs under single measures. Hence, the researcher implemented Kafetzopoulos's five dimensions model (Kafetzopoulos et al., 2015). The rationale lay on the similar aspects measured, that is investigating the relationship between total quality management and innovation performance. Zhou and Li (2020) mentioned on the positive impact of quality management on innovation performance within China small and medium enterprises (SMEs). However, the paper indicates additional influencer (i.e. supply chain practices) in influencing innovation performance, reflecting the needs to investigate the relationship with other constructs. Following this line of thinking, the researcher decides to integrate market orientation and total quality management in examining the innovation performance relationship.

Relationship between MO and OC

Organisational culture, another ever-changing construct has been extensively-developed since its first appearance in academic fields 60 years ago based on its definitions and dimensions. The fundamental groundwork provided by Inkeles and Levinson (1969) described organisational culture as 4-dimensional measures; power-distance, uncertainty avoidance, individualism and masculinity. The dimensions proposed were further supported by later researchers and still being modified to comply with the changes in economic market. The relationship between market orientation and organisational culture has been proven in Shehu and Mahmood (2014)'s study on the subject of Nigerian SMEs. The scholars concur to the direct effect of market orientation on organisational culture, though discovering no direct relationship between market orientation and business performance. Therefore, it is relevant to extend the model with additional influencers (i.e. total quality management). Hamzah et al (2020)'s study regarding sales performance of banking sector integrates both market orientation and organisational culture within single theoretical model. However, organisational culture construct was proposed as a moderating construct in strengthening the effects of market orientation on sales performance. From the three dimensions proposed, hierarchical culture is the sole moderating factor strengthening the relationship, while the other three dimensions indicate inverse relationship. As such, the researcher decides to incorporate the variable as mediating factor in explaining the relationship between market orientation and innovation performance. Following the extensive literatures on

organisational culture, the researcher decides to adopt Hamzah et al (2020)'s classification on the construct, namely; hierarchical culture, adhocracy culture, group culture and rational culture. The lack of study exploring on the direct relationship of market orientation on organisational culture delivers its novelty within academic fields, thus, reflecting its significance in explaining innovation performance relationship

Relationship between TQM and OC

The synergy between total quality management and organisational culture has been a compelling subject of interest since years back. The integration proposed by Donk and Sanders (1993) in 1993 studying the missing link of quality management within engineering department in Dutch organisation. The proposed framework, however, reveal the influence of organisational culture on quality management and not vice versa. The model further developed by Dimitrantzou, Psomas, Bouranta and Kafetzopoulos (2021) in analysing the cost of quality within Greece service and manufacturing companies. This study is in consistent with the previous research regarding organisational culture's dimensions (i.e. group, development, hierarchical and rational culture) as total quality management's influencer. The findings confirmed the possible integration of total quality management and organisational culture within single study acceptable for future practices. On the other hand, Shuaib (2022)'s model postulated on organisational culture as a moderating factor in analysing the relationship between soft total quality management and hard total quality management on innovation from Nigerian manufacturer's perspective. The scholar, however, only verify significant moderating effect hard total quality management and no significant moderating role the effects of soft total quality management on innovations. This merits further investigation on the possible integration of organisational culture as a mediating mechanism in explaining total quality management – innovation performance relationship. In line with this thinking, organisational culture has been analysed as a mediating role to explain the relationship between quality management and organisational performance (Cebekhulu & Ozor, 2022). The results indicate significant indirect effect between quality management and organisational performance via organisational culture, thus, validating the presence of organisational culture as an intervening factor in performance relationship. Hence, this study contributes toward the scarce literatures on total quality management-organisational culture-innovation performance relationship, filling the gap within management body of knowledge.

Relationship between OC and IP

Regardless of the growing importance of organisational culture and innovation performance within organisations in the economy market, the combinations of the two notions within single research is a noteworthy subject underlining its significance across countries with different culture. In accordance to Shahzad et al (2017)'s study on organisational culture impacts on innovation performance under Pakistan's software industry, organisational culture is revealed to have significant effect on innovation performance. The scholars emphasise on flexible culture implement in the organisations' management encourage innovative ideas development and finally, improve the organisations' innovation performance. This coincides with previous literatures delving on organisational culture – innovation performance relationship within Spanish industry (Naranjo-Valencia et al., 2019). The complex nature between organisational culture and innovation performance is

highlighted in the study reflecting on different organisations not necessarily integrate a single type of organisational culture in their management. The research, however, prioritises on discussing adhocracy culture and hierarchical culture to determine its significance in measuring innovation performance. Adhocracy culture indicated positive influences, while hierarchy culture shown negative impact on innovation performance, conforming to diverse organisational culture contributing towards different effects on innovation performance (Laforet, 2016). The lack of study concerning the effect of organisational culture on innovation performance, project its significance within the present academic field and merit for further investigation.

Research Framework

Following the preceding discussion on the literature review, a theoretical framework was developed responding to the research question postulated in this research paper;

RQ1: Does market orientation and total quality management has significant impact on innovation performance?
RQ2: Does market orientation and total quality management has significant impact on organisational culture?
RQ3: Do organisational culture have significant impact on innovation performance?
RQ4: Do organisation culture mediate the relationship between market orientation, total quality management and innovation performance?

Figure 1 reflects on the comprehensive model improving the previous measurement model by the academicians in marketing, quality and innovation field of knowledge. The framework projected the linkages between market orientation, total quality management, organisational culture and innovation performance.

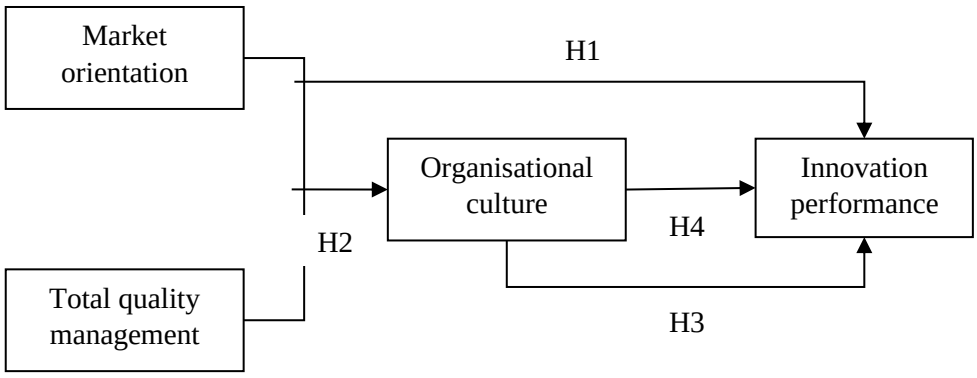

Figure 1. Theoretical framework

Methodology

This research was formulated to

1. Investigate the relationship between market orientation, total quality management and innovation performance
2. Examine the relationship between market orientation, total quality management and organisational culture

3. Identify the relationship between organisational culture and innovation performance
4. Investigate the mediating effect of organisational culture on the relationship between market orientation, total quality management and innovation performance

Therefore, survey relevant to the aforementioned issues was conducted to quantitative data. The research coincided with previous empirical literatures within Malaysia (Yusof et al., 2020), employing the mail questionnaire under reasons of large geographical areas, limited time and cost reduction (Sekaran, 2005). The data collected was first analysed using SPSS to measure the descriptive analysis and PLS-SEM for model estimation and hypotheses testing. The following section will elaborate on the data sampling and collection procedures and latent constructs measurement.

Sample and Data Collection

The population for this study consists of manufacturing firms in Malaysia. The rationale of the chosen samples relate to its eligibility in fulfilling the criterion of the measurement model; understanding the influence of market orientation and total quality management on innovation performance within the firms' operations. Accordingly, the sampling frames were extracted from online website, Federation of Malaysian Manufacturers (FMM) that listed the latest manufacturing companies in the country. Prajogo et al (2021) confer that the data collected should originated from senior managers or knowledgeable personnel within the companies to ensure full comprehension on the queries concerning the variables measured (i.e. market orientation, total quality management, organisational culture, innovation performance).

Measurement Model

Innovation Performance

Innovation performance is operationalised as the firm's ability to accept innovative ideas on basis of process of the project and products delivered to customers (Wahyuni & Astawa, 2020). Further revision on the previous research related to innovation performance highlighted several diverse approaches in measuring innovation performance. The general agreement proposed by previous literatures prioritized on two measures namely; product and process innovation that will be adopted in this study (Alshourah, 2021). The construct is measured with 7 items using Likert scale with; (1 = strongly disagree; 5 = strongly agree).

Market Orientation

Market orientation is another essential construct following marketing principle, indicating on the importance of identifying customers' demands, satisfying the desires of specific customer to fulfil the business objectives and providing value more effective than their competitors (Yusof et al., 2020). Since decades ago, market orientation is classified under two broad approaches; cultural and behavioural components. This study will adapt Narver and Slater (1990)'s interpretations on cultural components, listing on; customer orientation, competitor orientation and inter-functional coordination. The researcher implemented MKTOR (Market orientation) scale after several modifications proposed in Yusof et al (2020)'s study with 8 items, following the Likert scale (1 = strongly disagree, 5 = strongly agree).

Total Quality Management

Total quality management is described as "a comprehensive management philosophy that improves all organisations' function through continuous improvement and organisational changes" (Dimitrantzou et al., 2021). The concept has been researched within three decades with no specific definitions due to various extensions on the theory and lack of agreement by previous scholars. This paper delved on the widely-accepted dimensions of total quality management proposed by Kafetzopoulos and Psomas (2015), noted as; leadership and top management support, employee training and involvement, information and learning, process management and customer focus. 14 items were developed according to the variable based on the 5-point Likert scale (1 = strongly disagree; 5 = strongly agree).

Organisational Culture

The construct reflects as a control mechanism in establishing organisational commitment and assisting the firms in adapting to external changes (Halim et al., 2015). In general terms, it described on the employees' behaviour within the firms' operations and their core responsibilities in innovation activities employed by their organisation. The instrument is adapted from Hamzah et al (2020)'s study, describing the 4 dimensions of organisational culture, listing on; hierarchy culture, adhocracy culture, group culture and rational culture. The 10 items measurement scale is modified from the proposed competing values scale by Quinn (1991) that has been extensively utilized in previous literatures. The Likert scale range from 1 = strongly disagree to 5 = strongly agree.

Data Analysis

This paper utilize two step approach of data analysis as recommended by Hair et al (2019) involving analysis of measurement model and hypotheses testing the structural model. Following this, IBM SPSS Statistical software utilise to measure the descriptive analysis and PLS-SEM methods are chosen to explain the variance of the dependent variable through the application of Smart PLS Software v2.0 (Hair et al., 2019). The constructs in this study are considered latent constructs (Prajogo & McDermott, 2011), thus, applying SEM (structural equation modelling), the sole techniques that allow the distinctions between experiential and latent construct. The crucial issues pertinent to the application of PLS-SEM involve four factors; (1) data; (2) properties of model; (3) algorithm of PLS-SEM and (4) evaluation of model. The sample size is relatively small (n = 105), applicable in using PLS that efficiently work in small sample size, complex model and no assumption regarding the distribution of data. PLS analysis can handles single-item and multi-item measures, complex structural model and large number of structural model relations that tailor to the scholars' needs in investigating the relationship proposed (Hair et al., 2019). Algorithm of PLS refers to the minimization of unexplained variance while maximizing the R^2 values through interpretation on the predictive relationship on the development of theory (Hair et al., 2019). Finally, PLS elaborates on the simultaneous examination of reliability and validity of the measurement model, in addition to the relationship between variables investigated (Calvo-Mora et al., 2014).

Respondents' Profile

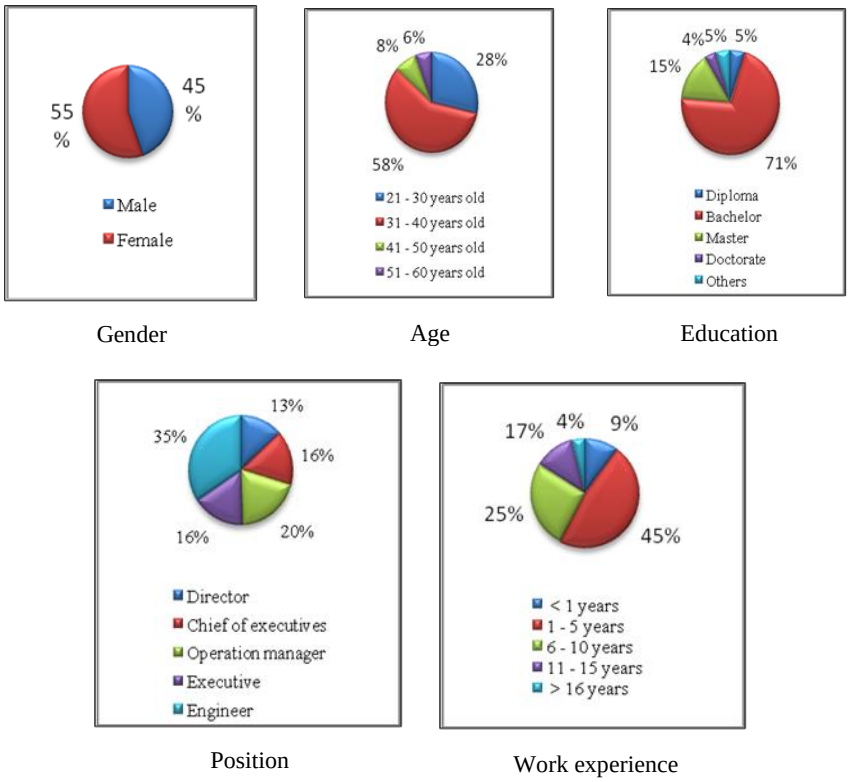

Figure 2. Demographic characteristics of respondents

The respondents for this study consist of senior members (e.g. managers, executives, production engineers and owners) within Malaysian manufacturing industries. From the 105 respondents, 55% were female and 45% were male. Individuals of age group between 31 - 40 years old contribute to the largest percentage of 58%, followed by age range of 21 – 30 years old, 41 – 50 years and 51 – 60 years, representing 28%, 8% and 6% respectively. Majority of the respondents graduate in bachelor's degree (71%), seconded by master's graduate (15%) and followed by diploma (5%), other certificates (5%) and doctorate level (4%). The largest group of the respondents was production engineer (35%) and operation managers (20%). The similar percentage of interviewees from chief of executives (16%) and executives (16%), with the least percentage from director groups (13%). Besides, experienced personnel in the sector of range 1 – 5 years projected the highest percentage of 45%, followed by the range of 6 – 10 years (25%), 11 – 15 years (17%), below 1 year (9%) and the least from experiences' work above 16 years (4%). The large percentage of work experience indicates the manufacturing workforce's expertise in the field and satisfies the requirements of the survey regarding the knowledgeable person in the industries.

Table 1
Organisational characteristics of respondents

Variables	Value	n = 105	
		Freq	Percentage
Business sector	Electrical and electronic	24	23%
	Chemicals	14	13%
	Chemical and petroleum products	20	19%
	Wood and wood products	8	7%
	Textiles, apparel and footwear	6	6%
	Construction-related materials	6	6%
	Transport equipment	14	13%
	Food and beverages	3	3%
	Others	10	10%
Type of organisation	Multinational corporation	50	47%
	Joint venture organisation	6	6%
	Malaysian organisation	46	44%
	Others	3	3%
Company age	< 1 years	5	5%
	2 – 5 years	11	11%
	6 – 10 years	19	18%
	11 – 15 years	13	12%
	16 – 20 years	21	20%
	> 21 years	36	34%

Distribution of respondents within manufacturing industries incline towards electrical and electronic sector (23%), followed by chemical and petroleum products (19%), chemicals (13%) and transport equipments (13%). Other nominal sectors contribute to 10% of the respondents and 8% from wood and woods products sector. Textiles, apparel and footwear and construction-related materials indicates similar distribution of 6% and the least from food and beverages sector (3%). Majority of the companies in Malaysia are multinational corporations (47%) and Malaysian organisation (44%). Joint venture organisation and other domestic organisation represent 6% and 3%, respectively. The company age further reflect on the firms' survivability within the global market. Felisia et al (2020) confirm that firms of age above 10 years are stable and unlikely to face bankruptcy in contrast to the newly-developed ones. The highest percentages for companies' age are above 21 years (34%), followed by the range of 16 – 20 years (20%) and 6 – 10 years (18%). Other companies' age of range 11 – 15 years, 2 – 5 years and below 1 year constitute to 12%, 11% and 5% of the respondents, respectively. Therefore, most manufacturers in Malaysia are secure, infallible and crucial within the country's economy.

Descriptive Analysis

The descriptive analysis relevant to SPSS statistical software indicates the firms' perception on market orientation, total quality management, organisational culture and innovation performance within Malaysian manufacturers. Hair et al (2019) proposed on identifying the mean values of constructs to represent the composite predictors due to its method simplicity and accuracy in determining the analysing the constructs.

Table 2
Descriptive analysis

Variables	No. of items	Mean	S.D.
Innovation performance (IP)	7	3.57	0.945
Market orientation (MO)	8	3.98	0.820
Total quality management (TQM)	14	3.72	0.945
Organisational culture (OC)	10	3.70	0.961

The paper adapts and modifies the previous scholars' questionnaires listing 7 items for innovation performance, 8 items for market orientation, 14 items for total quality management and 10 items for organisational culture. Mean value for all constructs reach above 3.50 indicating its high predictor value and standard deviation value of above 0.80

Measurement Model Analysis

Under measurement model analysis, each model was tested in the validity and reliability test following the measurement specifications. Smart PLS version 2 was utilized in analysing the data collected. The reliability test was conducted through assessment on Cronbach's alpha (α) and composite reliability (CR) as projected in Table 3.

Table 3
Reliability and validity analysis

Measurement items	Outer loadings	Cronbach's alpha	CR	AVE
	> 0.7	**> 0.7**	**CR > 0.7**	**AVE > 0.5**
Market orientation		**0.927**	**0.940**	**0.663**
Customer orientation				
MO1	0.770			
MO2	0.875			
MO3	0.772			
Competitor orientation				
MO4	0.903			
MO5	0.783			
MO6	0.795			
Inter-functional coordination				
MO7	0.749			
MO8	0.853			
Total quality management		**0.961**	**0.965**	**0.666**
Top management support				
TQM1	0.791			
TQM2	0.791			
TQM3	0.748			
Employee training				
TQM4	0.760			
TQM5	0.843			
TQM6	0.787			
Information and learning				

TQM7	0.763			
TQM8	0.910			
TQM9	0.821			
Process management				
TQM10	0.936			
TQM11	0.884			
TQM12	0.768			
Customer focus				
TQM13	0.804			
TQM14	0.792			
Organisational culture		**0.950**	**0.957**	**0.690**
Hierarchy culture				
OC1	0.827			
OC2	0.769			
OC3	0.854			
Adhocracy culture				
OC4	0.835			
OC5	0.884			
Group culture				
OC6	0.749			
OC7	0.821			
OC8	0.846			
Rational culture				
OC9	0.896			
OC10	0.816			
Innovation performance		**0.919**	**0.935**	**0.675**
Product innovation				
IP1	0.822			
IP2	0.878			
IP3	0.792			
IP4	0.733			
Process innovation				
IP5	0.777			
IP6	0.861			
IP7	0.875			

From the table, the reliability and validity analysis of the data exceed the threshold proposed by Hair et al (2019) that is above 0.70 for both Cronbach's alpha (α) and composite reliability (CR) indicating its acceptable measurement model. The convergent validity for the data reflects by the constructs' outer loadings and average variance extracted (AVE). The outer loadings range from 0.748 to 0.936, above the 0.70 recommended level, while AVE range from 0.663 to 0.690, which is higher than 0.50 confirming the measures' convergent validity. In addition, the assessment regarding the discrepancies of one construct overlapped with another construct defined the discriminant validity. Table 4 illustrated on the squared roots of AVE values for all measures higher than their off-diagonal values further prove the model's discriminant validity for the research.

Table 4
Discriminant validity analysis

	IP	MO	TQM	OC
Innovation performance (IP)	**0.906**			
Market orientation (MO)	0.716	**0.902**		
Total quality management (TQM)	0.774	0.809	**0.903**	
Organisational culture (OC)	0.750	0.769	0.865	**0.911**

Structural Model Analysis

Further section explains on the assessment of structural model. PLS-SEM is utilized to measure the model's goodness of fit, elaborating on the ability of model to predict the endogenous constructs following several criterions. The criteria include the path coefficients, model's determination coefficient (R^2) and cross-validated redundancy (Q^2). The R^2 value interprets on the predictive accuracy and projects the exogenous constructs' contributions in deducing the variance within endogenous variables. The values of R^2 range between 0 and 1, with values of 0.20, 0.50 and 0.75 as threshold indicating the weak, moderate and substantial contributions (hair). The R^2 coefficients for the model are moderate and substantial; showing values of 0.639 ($R^2 > 0.5$) for innovation performance and 0.761 ($R^2 > 0.75$) for organisational culture. In addition, cross-validated redundancy (Q^2) was measured through blindfolding process on PLS as indicator for the model's predictive relevance. Hair et al (2019) mentioned on the values of (Q^2) exceeding the values of 0 reflects its predictive relevance on the endogenous constructs measured. As such, the model indicated satisfactory predictive relevance power as projected in Table 5.

Table 5
Predictive relevance of PLS model

Endogenous	R^2	Cross-validated redundancy	Cross-validated communality
Innovation performance	0.639	0.411	0.567
Organisational culture	0.761	0.520	0.690

The final step includes examining the path coefficient of the measurement model. The results from bootstrapping method deduce on the significant effects of all structural relationship.

Table 6
Hypotheses testing result

No.	Hypothesis statement	Path coefficients	SE	*t*-value	*p*-value	Decision
H1a	MO → IP	0.206	0.096	2.139	0.035*	Supported
H1b	TQM → IP	0.380	0.091	3.431	0.001***	Supported
H2a	MO → OC	0.204	0.058	3.531	0.001***	Supported
H2b	TQM → OC	0.702	0.046	15.387	0.000***	Supported
H3	OC → IP	0.264	0.083	3.191	0.002**	Supported
H4a	MO → OC → IP	0.200	0.058	3.434	0.001***	Supported
H4b	TQM → OC → IP	0.703	0.046	15.339	0.000***	Supported

Note: ***$p < 0.001$; **$p < 0.005$; *$p < 0.01$

Table 6 highlighted on the significant impact of market orientation and total quality management on innovation performance, with path coefficients ($\beta = 0.206$, $t = 2.139$, $p < 0.01$) and ($\beta = 0.380$, $t = 3.431$, $p < 0.001$), respectively, thus supporting H1. Furthermore, the direct effect of both market orientation and total quality management on organisational culture also demonstrated significant effects ($\beta = 0.204$, $t = 3.531$, $p < 0.001$) and ($\beta = 0.702$, $t = 15.387$, $p < 0.001$), providing support for H2. The third hypotheses, H3, that indicates the positive and significant relationship between organisational culture and innovation performance also supported ($\beta = 0.264$, $t = 3.191$, $p < 0.005$). The hypothesised relationship between market orientation and innovation performance, mediated by organisational culture ($\beta = 0.200$, $t = 3.434$, $p < 0.001$) and relationship between total quality management and innovation performance, intervened by organisational culture ($\beta = 0.703$, $t = 15.339$, $p < 0.001$) also indicated positive and significance effect, hence, supporting all the structural relationship proposed.

Mediating Effects

PLS bootstrapping method is implemented to investigate the mediating effect of organisational culture between market orientation, total quality management and innovation performance through estimation of indirect effects within the measured variables. Table 6 shown that market orientation significantly affects innovation performance both directly and indirectly, with values ($\beta = 0.206$, $t = 2.139$, $p < 0.01$) and ($\beta = 0.200$, $t = 3.434$, $p < 0.001$), respectively. Hence, in estimating the indirect effect of organisational culture, Hair et al. (2019) proposed on the variance accounted for (VAF) formulae.

$$VAF = \frac{\text{Indirect effect}}{\text{Total effect}}$$

The results confer a 49.3% indirect effect of organisational culture, indicating partial mediation effect on market orientation – innovation performance relationship, supporting H4a. Meanwhile, total quality management significantly affects innovation performance both directly and indirectly through organisational culture, with values ($\beta = 0.380$, $t = 3.431$, $p < 0.001$) and ($\beta = 0.703$, $t = 15.339$, $p < 0.001$), respectively. Therefore, the results indicate a 64.9% indirect effect of organisational culture on the relationship between total quality management and innovation performance with partial mediation effect, supporting H4b.

Discussion and Conclusion

This study extends the boundaries of CVF (competing value framework) theory by the inclusion of market orientation and total quality management as exogenous variable. The findings indicate that high market orientation and total quality management can improve firm's innovation performance. To investigate the influence of both resources in the proposed model, the researcher proposed on organisational culture as the mediating facet in explaining the relationship between market orientation, total quality management and innovation performance. The first results shown that firms with strong market orientation and total quality management can improve firm's innovation performance. This finding coincides with existent literatures on market orientation – innovation performance relationship (Puspita et

al., 2020; Shaher & Ali, 2020; Wahyuni & Astawa, 2020) and total quality management – innovation performance relationship (Escrig-Tena et al., 2018; Kanapathy et al., 2017; Zhang & Huo, 2013). Furthermore, it demonstrated the necessity of firms (i.e. manufacturers) in understanding and improving their market orientation through researching their customers' needs and market demand. In the similar vein, total quality management further enhanced the firms' innovation performance as highlighted in the results acquired. The second results confirm on the significant relationship between market orientation, total quality management and organisational culture, that is consistent with previous scholarly works contemplating on the crucial roles of market orientation and total quality management in augmenting organisational culture (Ali et al., 2020). However, the scholar proposed on theoretical framework without quantitative evidences indicating difficulties to estimate the strength of the model. As such, the researcher deliberated on the strength of market orientation and total quality management within the companies' operation affecting the strength of organisational culture in the organisations' workplace. Literally, firms with high level of market orientation can affects organisational culture based on their market-based knowledge and customers' demands. Aljanabi (2020) elaborated on the risk of implementing organisational culture without fundamental knowledge on market trends and customer's requirements may lead to firm's difficulties in meeting the customers' endless needs and consumers' ever-changing desires. Besides that, total quality management as companies' management system prioritizing customer satisfaction within its operations, further proven to have significant influence on organisational culture. This can be deduced through understanding that stronger total quality management within organisations will strengthen the organisational culture in the firms' activities. This is in line with previous literary works on the relationship between total quality management and organisational culture (Cebekhulu & Ozor, 2022; Dimitrantzou et al., 2021; Shuaib, 2022).

The third findings support the relationship between organisational culture and innovation performance. This corroborates with earlier studies by Shahzad et al (2017), discussing on the five organisational culture's dimensions (e.g. external orientation, organisational climate, flexibility, employee empowerment and teamwork) enhancing innovation performance of software industry in Pakistan. The findings revealed that strong and flexible organisations' culture portray vital role in motivating employees to contribute innovative and novel concepts, finally influencing the innovation performance of the organisations. Naranjo-Valencia et al (2019) confer on the abilities of organisational culture in improving organisational innovation. Adhocracy culture indicate positive significant influence on innovation performance, while hierarchical culture reflects negative influences further confirming the direct effects of organisational culture on innovation performance. Following these arguments, the result of the intervening model indicated that organisational culture serves as a device in strengthening the influence of market orientation and total quality management on innovation performance. The fourth results proven on the extent in which the firms deploy their market orientation and total quality management to improve innovation performance is influenced by organisational culture. The findings projected significant mediating effects of organisational culture on both relationships with partial mediation effect of 49.3% for market orientation – innovation performance and 64.9% for total quality management – innovation performance relationship, thus, verifying the intervening role of organisational culture on the relationship. The original implications reflect

by the extension of theoretical model is proven by the researcher and satisfying all the hypotheses proposed in this paper.

The innovation performance scholarly articles confirmed the significant influence of market orientation, total quality management and organisational culture. However, most of the literatures discuss single notion (i.e. market orientation) or combination of the two aforementioned factors (i.e. market orientation and total quality management). Through the synergy of market orientation and total quality management with organisational culture as an intervening factor, this study differentiates its arguments from previous literatures extending both marketing and management body of knowledge. The implementation of the model within organisations' operations, specifically within manufacturing organisations assist the firm to convert market-knowledge into new innovative products in short timeframe, due to the effective and efficient management strategy utilised in the organisations (i.e. total quality management). Furthermore, the interaction between market orientation and total quality management mediates by organisational culture contributes towards higher innovation performance, enhancing the firms' receptiveness to the ever-changing market trends. The present study enlightens manufacturing managers on the significant effect of market orientation and total quality management towards innovation performance. As such, it is imperative to develop their skills on both market orientation and total quality management notion within the organisations. Market-oriented organisations characterizes on the information garnered from their customers, competitor and inter-functional coordination to generate new products in timely manner fulfilling their customers' satisfaction. Total quality management involve efficient management framework utilised in the organisations maintain high-quality products delivers to the market. Therefore, both factors reflect its significance in influencing the innovation performance of manufacturing companies, further contribute toward higher market share in global market.

This study, regardless, is not without limitations consistent with previous scholarly articles. This study drawn sample from a single developing country (i.e. Malaysia). It is worthwhile to implement the framework in other developed countries such as China, Switzerland, England, etc. Furthermore, this research discusses on single industry (i.e. manufacturing industry), recommending on the model's implementation within other industry for future practices to induce the generalisability of data. This research also prioritises on manager's perception on the organisations' innovation performance. It is interesting to note on the customers' perceptions of novel products to gauge the firm's innovation performance, under reasoning that the success of new products entrants to the market are interdependent with the customers' perceived values on the developed innovations.

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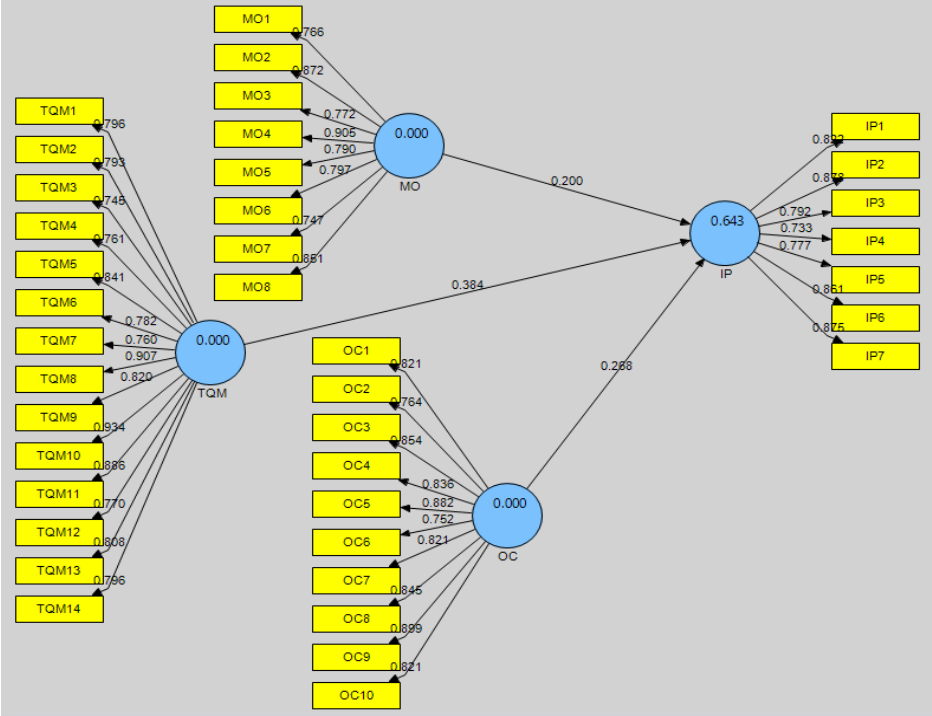
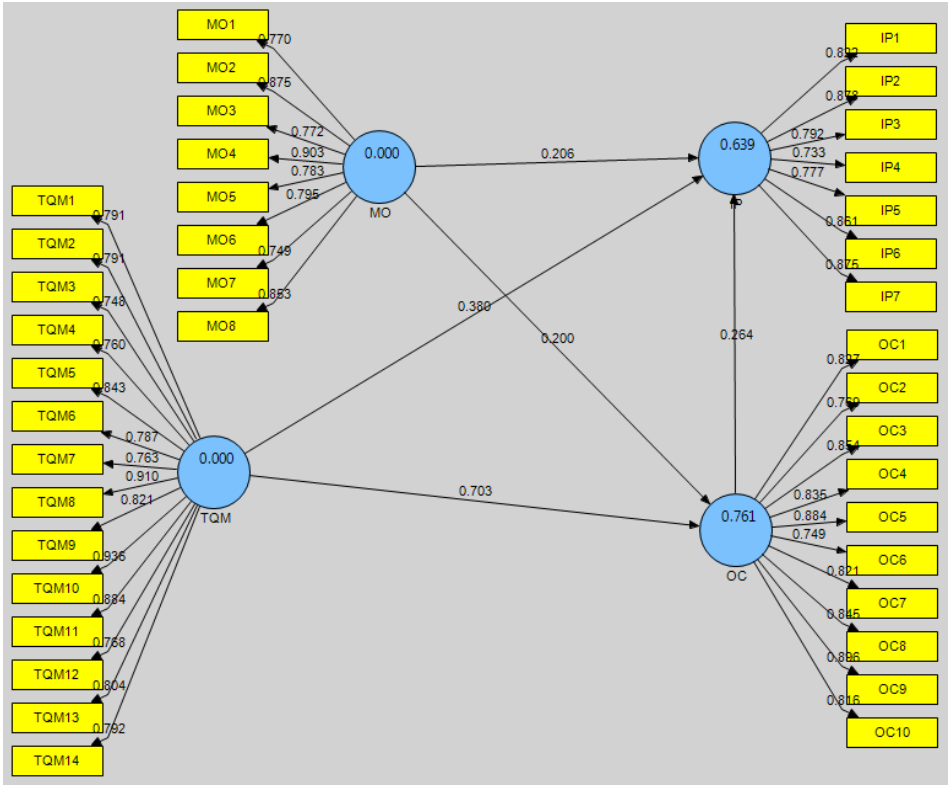
Appendix A

PLS algorithm on the direct relationship between MO, TQM, OC and IP



Appendix B

PLS algorithm on the mediating effect of OC on the relationship between MO, TQM and IP



Appendix C

PLS bootstrapping with mediating effect of OC on the relationship between MO, TQM and IP