

# Intervention of Organizational Culture in Achieving Competitive Advantage through Knowledge Management in Malaysian Construction Companies

Wiwied Virgiyanti, Muhammad Asim Tufail, Abu Hassan Abu Bakar

**Abstract:** *The demands of modern market have led construction companies to implement a competitive strategy that represents a new business approach, which should be concentrated on the effective use of all usable resources, capacities and capabilities. Knowledge has been considered as an organization's strategic resource and as such, it needs to be managed to promote the competitive performance. For enterprises to be successful, they must exploit methodically their knowledge assets since these have an enabling role to play in the formulation of winning strategies, the organization's mission, vision, and objectives where the knowledge management strategy should then be aligned. While addressing the organization strategy, competitive advantage is a decisive outcome. This is because of the acceptance that learning processes associated with knowledge management are instrumental in strengthening organizations' competitive position and maintaining their sustainability. However, in the knowledge management process, individual efforts are often seen to clash with organizational culture, because it consists of the basic, taken-for-granted assumptions and deep patterns of meaning shared through organizational participation as well as the manifestation of these assumptions. Thus, this study investigates the relationship between knowledge management processes, organizational culture, and competitive advantage, by investigating the relationships between those factors in construction companies in Malaysia. Its main objective is to empirically investigate the mediating effect of organizational culture on the relationship between knowledge management and competitive advantage. Using simple random sampling, 84 CIDB Malaysia's Grade-7 (G7) construction companies were sampled from 4,462 of total population from West and East Malaysia. The sample size was justified with Post-Hoc Power Analysis using G\*Power to calculate the appropriateness of sample size. The research instruments used were the Knowledge Management Assessment Instrument (KMAI) by Lawson (2003), Organizational Culture Assessment Instrument (OCAI) by Cameron and Quinn (2006), and Competitive Advantage instrument by Byrd and Turner (2001). The main data analysis was performed using structural equation modelling (SEM) – partial least squares (PLS). The findings indicate that organizational culture partially mediates the relationship between knowledge management processes and competitive advantage.*

**Keywords:** *Knowledge management processes, Organizational culture, Competitive Advantage, Construction companies.*

## I. INTRODUCTION

In today's vastly competitive environment, knowledge is increasingly considered as a treasured organizational asset [1, 2, 3, 4]. Managing knowledge as an organizational asset comprises how knowledge is attained, stored and organized and accessed and shared when needed [5]. Knowledge management (KM) is a ground breaking system increasingly adopted as a major source of competitive advantage to increase organizational performance [6]. According to [7], knowledge management is an approach, which is essential for innovation and assists the companies to remain competitive in the market. Moreover, knowledge is an essential resource for organization in general [8] as well as has the largest contributory factor for the growth of construction industries proven empirically [9].

Construction business is facing multifaceted challenges in today's turbulent environment which requires appropriate planning strategies in order to remain relevant, competitive and grow in this ever challenging industry [10]. Knowledge is a critical factor in carrying out and improving risk management in construction projects. Even so, this management has been found being done ineffectively mainly due to the lack of knowledge available for its implementation [11]. The construction companies contribute directly to economic development and play an important role for the establishment of infrastructure which is essential for socioeconomic prosperity in Malaysia [12]. As compared to the companies in other industries such as manufacturing industry, the production level of construction companies is comparatively low although it has high economic significance. Malaysia has obtained a significant improvement through more than three decades of construction companies' performance with better project quality and effective time and cost performance, which is represented as a fact [13], but the performance and productivity of construction companies remain low [13, 14]. As Porter [15] contended, productivity is the real source of competitive advantage, and competitive advantage can lead to high performance. In this case, it indicates that the construction industries will reduce their competitive advantage to sustain due to lower level of performance and production in the domestic and global market.

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The Malaysian construction companies must achieve their competitive advantage to survive in the global, as well as, domestic market.

The organizational ability is used to perform the right choice about how to utilize these resources in order to gain organizational purpose; for example competitive advantage, which may be increased by better understanding of the relationship between knowledge management and organizational culture.

The role of knowledge management and organizational culture to achieve competitive advantage is generally accepted. The significance of competitive situation by using the strategic cultural improvement for knowledge management is emphasized by many researchers [16, 17]. In this competitive era, knowledge is taken into consideration as the most essential factor in a societal order of business, as well as, effecting the profitability in construction industries [18]. Construction as a project-based companies have also identified that knowledge has become a business and requires competitive advantage for acquiring efficiency and effectiveness [19, 20]. For long term success of the companies, knowledge management is identified as an important factor [21]. In context of Malaysia, there is majority of organizations where the implementation of formal knowledge management is in the primary stage so the knowledge management practices may be taken into consideration as comparatively new, thus it can be characterised at its elementary level of knowledge management practices [22]. The objective of current research is to investigate the relationship between knowledge management and competitive advantage where organizational culture act as a mediator in the context of Malaysian construction companies

**II. LITERATURE REVIEW**

**Overview of Knowledge Management Processes**

In this intellectual period, knowledge acts as a key force behind the prosperity of organization as well as is essential to the firm for its skilful management [8]. Moreover, knowledge is the most essential intangible resource. For this reason, business managers make an effort to use this resource in many ways for creating the maximum value [23]. Knowledge has been characterized for its capability to gather the theoretical information with applied expertise and application [24]. Giovanni [24] added that knowledge can be defined as the general system for, both the organization and the individual, generating a new ability. According to the statement of [25], researchers define knowledge as the combination of different procedures, rules, ideas and concepts that show the way to perform the decision and action. Knowledge management plays an important role to improve the performance of organization. That is why, it has been considered as an investment in various organizations as well as a strategy [26]. The improving, gathering, sharing and extracting of knowledge is essential to take a wise decision for the development and growth of an organization as well as support potential recovery which is largely concerned by the knowledge management [27]. Some of the researchers depend on features to differentiate between each procedure where to

start and where to finish which is taken into consideration as the solution to the knowledge management processes [28]. In another context, Zwain, Teong, and Othman [29], used the acquisition, application, transferring, storage, sharing and identification of knowledge as the dimensions of the knowledge management processes.

**Table. 1 The processes in Knowledge Management Cycle Knowledge**

Knowledge Management process	Wiig (1993)	Parikh (2001)	Horwitch & Armacost (2002)	Lawson (2003)	Jones (2009)	Chin-Loy & Mujtaba (2011)	Zwain et al. (2012)
Creation	√		√	√	√	√	
Capture/ Identification			√	√	√	√	√
Organization		√	√	√	√	√	
Storage				√	√	√	√
Dissemination/ Sharing	√	√		√	√	√	√
Application	√	√		√	√	√	√
Transfer			√				√
Acquisition		√					√
Compilation/ Transformation	√						
Use			√				

Sources: [17], [30], [31], [32], [33], [34], [29].

Table 1 shows that Lawson [32] linked the cycle of knowledge management the processes that are also used by the Wiig [34], Parikh [33], and Horwitch and Armacost [30]. The processes described in this study are knowledge organization, creation, storage, dissemination, capture and application. This study uses six processes which are creation of knowledge, capture of knowledge, organization of knowledge, storage of knowledge, dissemination of knowledge and application of knowledge based on Lawson’s [32] definition. These processes are used to evaluate the present knowledge management applied in Malaysian construction industries. Lawson [32] utilized the processes of knowledge management that are also followed by the other researchers, for example; Chin-Loy and Mujtaba [17], Jones [31] and Zwain, Teong, and Othman [29]. Lawson [32] described six processes of knowledge management in knowledge management cycle which are discussed below:

1. Knowledge creation – Organizations seek to find and define knowledge and its sources within the organisations and also out of the organization. Knowledge is created through social interaction as well as when trying to experiment with new ideas, where employees develop new methods, or it is adopted from outside sources.
2. Knowledge capture – New knowledge is valued for the current requirements and the future needs.



3. It is kept in a way that it is easily accessible when needed, can be extracted and shared with the relevant users.
4. Knowledge organization – New knowledge is refined and organized through filtering to identify and cross-list the useful knowledge dimensions for different products and services. The knowledge is positioned in context so that it is actionable and can be reviewed and kept updated and relevant.
5. Knowledge storage – knowledge kept in encrypted scripts or codes is stored and managed using tools such as database management and data warehousing technologies, so that others can access the knowledge.
6. Knowledge dissemination – Knowledge is personalized and disseminated in a useful format to meet users' specific needs. Furthermore, knowledge is articulated in a common language and using tools that are all users can understand.
7. Knowledge application – Knowledge is applied to new circumstances where users can learn and produce new knowledge. In the learning process, the presence of analysis and critical evaluation to generate new patterns and knowledge for future use should exist.

### Organizational Culture

Organizational culture is a term that is used as a leading element for institutional renovation and change. It is one type of glue that connects together with the social structure about an organization [35]. From the point of view of a constructivist, the organizational culture can be considered as a continuous construction and reconstruction process inside and in the surroundings of an institution. For creating and disseminating the knowledge, an appropriate organizational culture is used as a prerequisite. Several authors [36, 37] also suggested that these facts in an organizational context, establish social communication as well as generating rules for “correct” and “incorrect” established by the culture. For achieving their goals, present organizations must adapt themselves to changing environment; they also have to choose their appropriate organizational culture. This identification as well as determination of dynamic impact of the management and culture outcomes is an appropriate sensibility of visible and invisible impact of management and culture [38].

### Competitive Advantage

Chamberlin [39] posited the basic primary concept of competitive advantage, while Selznick [40] associated advantage to competency. Competitive advantage as the unique position an organisation develops against its competitors through its patterns of resource deployment was the next major advancement elaborated by Hofer and Schender [41]. The next generation of conception that considered competitive advantage as the objective of strategy and, furthermore, the dependent variable was later on provided by Day [42] and Porter [15]. The logic behind this is that superior performance is interrelated with competitive advantage, and achieving an advantage will result in greater performance automatically [15, 43]. Competitive advantage can result either from implementing a value-creating strategy not being

employed by current or potential competitors or through the superior execution of a strategy which is also being employed by competitors [44], it is sustained when other firms are unable to duplicate the benefits of this strategy [45]. Competitive advantage can result either from implementing a value-creating strategy not being employed by current or prospective competitors or through the superior execution of a strategy which is also being employed by competitors [44], which is sustained when other firms are unable to duplicate the benefits of this strategy [45]. Competitive advantage is recognised as the objective of organisational strategies [15], which can be measured in many dimensions such as innovativeness, market position, mass customisation, and difficulty in duplication [46].

### Knowledge Management and Organizational Culture

Researchers revealed that organizational culture is an essential element for knowledge management. Previous research has confirmed that in the organisational context, knowledge and culture are associated simultaneously [47, 48, 49]. Davenport & Klahr [50] proposed that one of the more significant success factors of knowledge management systems is the friendly culture of knowledge application. Moreover, there is a significant correlation between all of the culture types and knowledge management [32]. Cultural strength is proven to effect the knowledge management success factor cores [51] and knowledge management systems (KMS) success. Zheng [52] discovered that organizational culture even had a great influence on knowledge management effectiveness, and it is proven to have higher influence compared to organizational structure or strategy. In contrary with that, in knowledge management agenda, organisational culture is ever more recognized as a major barrier to optimizing intellectual assets [53]. One of the biggest problems in implementing knowledge management is performance assessment, because knowledge managers are increasingly required to rationalize the investment on knowledge management, which also comprises of evaluating the organizational culture, since it is recognized to be a far greater influence on success on knowledge management initiatives [54]. Moreover, organizational culture was also found determining knowledge practices [55].

### Knowledge Management and Competitive Advantage

There is a general agreement that knowledge management will represent the most vital competitive advantage factor for organisations [90, 91, 92, 93, 94]. Drucker [90] proposed that knowledge not only is the business' advantage resource, hence, it is the one and only resource of advantage as well. Toffler [93] supported that knowledge will become the ultimate substitute for any other resource. The ability to optimizing the use of knowledge and properly manage and apply this of knowledge internally within a firm has become the major criteria for business competition [95, 96]. Likewise, Spender [97] noted that an organization's knowledge and its ability to generate new knowledge is the key to achieve competitive advantage. Skyrme and Amidon [98] pointed that a general agreement concerning the knowledge has important



role as a foundation for competitive advantage and superior operational effectiveness.

Moreover, the advantages of continual competition depend upon of the knowledge integration efficiency [99]. Sustainable competitive advantage is no longer rooted in physical assets and financial capital, but in effective channelling of intellectual capital [100]. Therefore, managing knowledge is becoming a critical concern for organizations globally. The possible role of knowledge management in creating sustained competitive advantages for firms has been mentioned by many researchers [90, 91, 92, 93, 94].

### **Knowledge Management in Malaysian Construction Companies**

Managing knowledge has always been a challenge for the heterogeneous construction industry. It is widely recognized as being slow to innovate, and has trailed many industrial sectors in modernizing its business processes [57]. The most valuable form of knowledge for construction companies is tacit in nature, It is the accumulated experience of construction professional, which manifests itself through social interaction [57]. The project-based, fragmented and unstable nature of the industry has led to chronic knowledge loss compared with other industries [58, 59]. Fragmentation in construction industry leads to unclear role of learning in construction companies because it reduces mutual knowledge capturing and sharing, inhibits knowledge production and limits learning and innovation solutions [60, 61, 62, 63, 64]. There is a wealth of information and knowledge that resides in the individuals on the project [65]. The staff employed on construction projects have experience that spans years, geographical location, cultures, languages, technical expertise, education and political experiences, and many more. Each person also has different skills and attitudes, and different methods and speeds of learning. Further obstacles to effective project management transfer include: lack of incentive to appraise performance, pass on learning to others, and ultimately improve project delivery [66].

Knowledge management processes and culture are also major concerns, even in a project based-organization like construction firms. According to Egbu and Robinson [67], there are three traits of knowledge to manage in the construction setting; products or project types, processes, and people. The knowledge base of construction companies is a function of the procedures put in place to capture knowledge about processes, products, as well as people, because knowledge basically resides in people, not technology [68]. Nevertheless, technology should not be set aside, since it supports connectivity, therefore a critical enabler to support the processes of knowledge management [67]. According to Palmer and Platt [69], properly implemented knowledge management can offer construction firms the benefits, such as: a major competitive advantage, avoid repeating mistakes and reinventing the wheel, reducing the time taken to find information, allowing faster decision making, and improving client satisfaction, employee morale, and

teamwork. Furthermore, in maintaining their competitive advantage and knowledge, Malaysian construction industries must implement an organized knowledge management that supports an appropriate use of all processes of knowledge management [70].

### **III. RESEARCH METHODOLOGY**

This study uses quantitative approach to assess the impact of mediation on the mutual relation among the two factors; knowledge management processes and competitive advantage in context of Malaysian construction industries. There were 590 questionnaire sets distributed to selected individuals (CEO/Director/General Managers) in 4,462 grade G7 construction companies in Malaysia. Those companies are registered under Construction Industry Development in Malaysia (CIDB).

The questionnaire was divided into two sections. The first section consists of respondent's profile, such as working field, proprietary structure, individual's working expertise, age and highest study acquired. The second part comprises the analysis of three variables, namely knowledge management processes, organizational culture and competitive advantage. There are six (6) dimensions such as to capture, create, organize, store, disseminate and apply knowledge which are measured by the Knowledge Management Assessment Instrument (KMAI) adopted from Lawson [32] and validated by Lawson [32]. Organizational culture dimensions were assessed using Organizational Culture Assessment Instrument (OCAI) developed by Cameron and Quinn [71]. OCAI assessed organizational culture with six (6) elements namely strategic emphasis, employee management, dominant characteristics, criteria of success, organization glue and organizational leadership. Competitive advantage was assessed using questions adopted from a study conducted by Byrd and Turner [46].

This paper discusses the second order constructs of organizational culture and knowledge management, as main dimensions of analysis which were developed through in depth analysis on the first order indicators. Therefore, the second order latent variables are taken as the formative constructs of the dimensions. Out of 91 responses, 84 were picked as the useable samples. Partial least square (PLS) was chosen as the better method than the other when exploratory models are the aim of the study [72, 73].

#### **Development of Research Hypotheses**

The aim of this study is to verify a model relating to management of knowledge as proceeding of competitive advantage intervened by organizational culture. Thus, the following hypothesis were developed as working hypotheses (H): shown in Figure 1.

The hypothesis developed for this study are:

- H1: Knowledge Management is used as a proceeding of competitive advantage.
- H2: There is positive impact between knowledge management and organizational culture.
- H3: The relationship between knowledge management and competitive advantage is mediated by organizational culture.



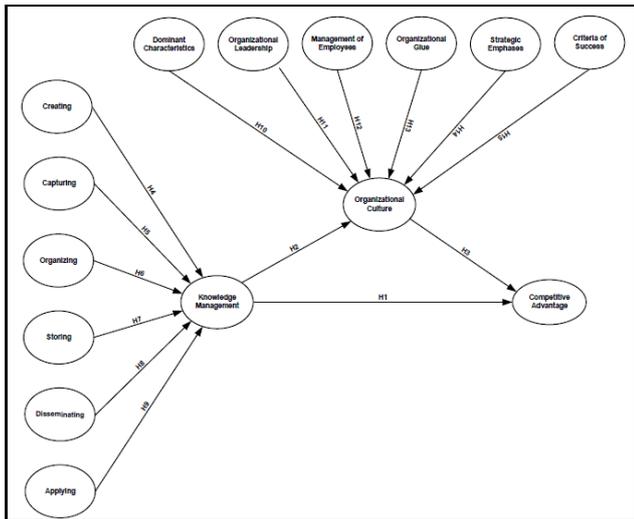


Fig. 1 Theoretical Model

IV. RESULTS AND FINDINGS

The results of the analysis are as follows;

Profile of respondents

There are 84 representatives who have professional expertise from 5 to more than 20 years participating in this survey. There are 58.4% of them who has experience for more than 10 years in the field of construction and rest

have experience in the field through the year of 5 and 10. Thus it may be summarized that majority of them have experience for long time that accounts for 58.4%. Majority of them are of the age of more than 30 years that accounts for 55.96%. While, 35.7% of them between are of 41 and 50 years of age. Only 10.6% of respondents are of age more than 50 years. Based on their education level, there are 83.3% of the responders achieving a bachelor degree, about 13.1% of them achieving a master degree. While 3.6% of population holds the PhD degree and the rest have other professional or academic qualifications.

Partial Least Squares

The objective of this research is to predict the main destination constructs or identification of main-operator mediator as well as constructs [73] by using structural equation modelling (SEM) tool (Smart-PLS 2.0 M3) and The Partial Least Squares (PLS) method [74]. The procedure of analysis is discussed briefly below.

Reliability Analysis and Convergent Validity

There are two terms such as Average Variance Extracted (AVE) and Composite Reliability (CR) is used to analyse the quality of the measurement model. To measure the inner item constancy a Cronbach’s alpha was used as the coefficient [8].

Table. 2 Model Quality Overview

Variable	AVE	Composite Reliability	R <sup>2</sup>	Cronbach’s Alpha
APPLYING	0.688	0.898	0.756	0.848
COMPETITIVE ADVANTAGE	0.763	0.928	0.579	0.895
CAPTURING	0.645	0.878	0.810	0.814
CREATING	0.678	0.894	0.686	0.841
CRITERIA OF SUCCESS	0.672	0.891	0.786	0.836
DISSEMINATING	0.572	0.842	0.686	0.753
DOMINANT CHARACTERISTICS	0.653	0.882	0.663	0.822
MANAGEMENT OF EMPLOYEES	0.647	0.878	0.734	0.812
ORGANISATION GLUE	0.649	0.881	0.785	0.819
ORGANITIONAL LEADERSHIP	0.719	0.911	0.686	0.869
ORGANIZING	0.661	0.886	0.748	0.829
STORING	0.671	0.891	0.824	0.836
STRATEGIC EMPHASIS	0.668	0.889	0.761	0.834

Table 2 concludes the value of Alpha and Loadings. Table 2 shows that all Alpha values such as Composite Reliability and Cronbach’s Alpha are more than 0.8 as recommended by Nunnally [75, 76]. It can be summarized that the measurements are reliable. Convergent validity is used to measure the degree of items in a scale which are linked to each other. The loadings for all items exceeded suggested value of 0.7 [77]. To measure the amount of inconsistency in a dormant variable, Average Variance Extracted (AVE) is used as well as contributing from its indicators [72].

According to Hair et al. [73] and Chin [72], the AVE must be more than 0.50. All dormant variables that contain

in this model have values of AVE exceeding the minimal expected value of 0.50. The outcomes shown revealed convergent validity. For the structural model in PLS, there are some key assessment criteria. Those are the measurement of R<sup>2</sup> regarding dependent variables of endogenous as well as the level and importance about path coefficients [73], since the role of R<sup>2</sup> is to explain the difference in the endogenous dormant variable. If R<sup>2</sup> is of higher value, it will be able to explain more difference [72]. Hair et al. [73] concluded that R<sup>2</sup> level is highly dependable, whereas on the particular research field.



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Cohen [78] provided a reference that is used to conduct this analysis. The results are higher than the considerable values for the variables of endogenous which showed the values of  $R^2$  as shown in Table 2 (0.02 for small, 0.13 for moderate, 0.26 for substantial) [78].

### Analysis of mediation

Mediation analysis is the procedure which underlies the relationship between a dependent and an independent variable through the insertion of a third illustrative variable, called a mediator.

The conceptual model in this paper concludes the management of knowledge impacts the organizational culture, which is also influenced by competitive advantage.

Mediator is a variable which works to explicate the attitude of the relationship between the management of knowledge and competitive advantage [79].

Four (4) steps of Mediation test:

Step 1: This stage represents that causative variable which has mutual relationship with result. Competitive advantage is used as the standard variable in an equation of regression on the other hand, knowledge management acts as purpose of its role of a predictor. There is an impact that may be intervened which is established in this step.

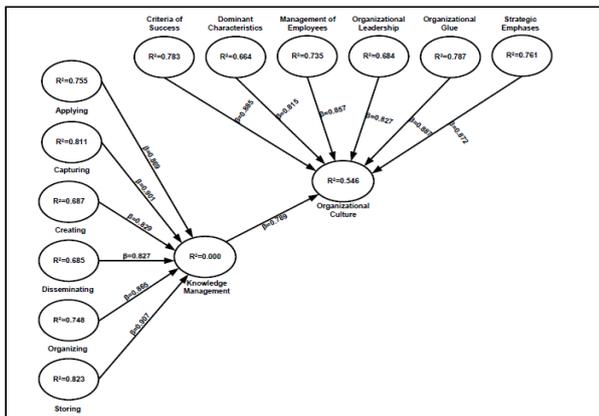
**Table. 3 The Total Effect Original**

Hypotheses	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T statistics (O/STERR)
KM -> APPLYING	0.87	0.87	0.03	0.03	25.73
KM -> CA	0.68	0.68	0.10	0.10	6.58**
KM -> CAPTURING	0.90	0.90	0.03	0.03	34.35
KM -> CREATING	0.83	0.82	0.07	0.07	12.22
KM -> DISSEMINATING	0.83	0.83	0.04	0.04	19.27
KM -> ORGANIZING	0.86	0.86	0.04	0.04	24.59
KM -> STORING	0.91	0.91	0.03	0.03	34.81

$p < 0.05^*$ ,  $p < 0.01^{**}$  (2-tailed)

The value of the t-statistics regarding the direct effect model is shown in Table 3. At  $p < 0.01$  (99% of reliability), it can be represented that total effect of competitive advantage as a standard variable and Management of knowledge as a predictor is important. Hence, an impact is realized that can be intervened via organizational culture.

Step 2: This stage represents that causative variable that has mutual relationship with mediator. Competitive advantage is used as the standard variable in an equation of regression on the other hand knowledge management acts in role of a predictor. Treating the mediator is basically included in this step as if it were a variable of outcomes. Organizational culture is used as outcome and knowledge management acts in a role of predictor as demonstrated in Figure 2, according to value of 10.18  $p < 0.01$ .



**Fig. 2 Mediator as criterion variable**

**Table. 4 Relationship between Predictor and Mediator Variable**

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics (O/STERR)
KM -> APPLYING	0.87	0.87	0.04	0.04	24.08
KM -> CA	0.90	0.90	0.03	0.03	34.37
KM -> CAPTURING	0.83	0.83	0.07	0.07	12.48
KM -> CREATING	0.83	0.83	0.04	0.04	18.05
KM -> DISSEMINATING	0.74	0.74	0.07	0.07	<b>10.18*</b>
KM -> ORGANIZING	0.87	0.87	0.04	0.04	22.07
KM -> STORING	0.91	0.91	0.03	0.03	33.44
OC -> CRITERIA OF SUCCESS	0.89	0.89	0.03	0.03	30.00
OC -> DOMINANT CHARACTERISTICS	0.82	0.82	0.06	0.06	13.95
OC -> MANAGEMENT OF EMPLOYEES	0.86	0.86	0.06	0.06	15.49



OC ORGANISATION GLUE	->	0.8 9	0.89	0.03	0.03	27.88
OC ORGANISATIONAL LEADERSHIP	->	0.8 3	0.83	0.04	0.04	22.66
OC -> STRATEGIC EMPHASIS		0.8 7	0.87	0.03	0.03	31.08

p<0.05\*, p<0.01\*\* (2-tailed)

There is an important connection among mediator variables and predictor, and it is shown in Table 4.

Step 3: Represents that mediator influence the variable of outcome. Competitive advantage is used as the standard variable in an equation of regression on the other hand knowledge management acts in role of a predictor (Test and estimation of path b). Correlating the mediator such as organizational culture with the outcome such as competitive advantage is insufficient. The causative variable knowledge management influences both mediator and the outcome that is why there may have a relation to each other. This is the way, to establish the impact of the mediator on the outcome, where causative variable must be regulated.

Table. 5 Mediation Model Analysis

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics (O/STERR)
KM ->APPLYING	0.87	0.87	0.03	0.03	25.46
KM -> CA	0.32	0.33	0.17	0.17	<b>1.88</b>
KM -> CAPTURING	0.90	0.90	0.03	0.03	34.76
KM -> CREATING	0.83	0.83	0.07	0.07	12.76
KM -> DISSEMINATING	0.83	0.83	0.05	0.05	18.15
KM -> OC	0.74	0.73	0.08	0.08	<b>9.70**</b>
KM -> ORGANISING	0.87	0.86	0.03	0.03	25.97
KM -> STORING	0.91	0.90	0.03	0.03	33.21
OC -> CA	0.50	0.48	0.14	0.14	<b>3.50**</b>
OC -> CRITERIA OF SUCCESS	0.89	0.89	0.06	0.06	31.70
OC -> DOMINANT CHARACTERISTICS	0.81	0.81	0.06	0.06	12.79
OC -> MANAGEMENT OF EMPLOYEES	0.86	0.85	0.03	0.03	14.01
OC -> ORGANISATION GLUE	0.89	0.88	0.03	0.03	25.92
OC -> ORGANISATIONAL LEADERSHIP	0.83	0.84	0.04	0.04	22.64
OC -> STRATEGIC EMPHASIS	0.87	0.87	0.03	0.03	31.10

p<0.05\*, p<0.01\*\* (2-tailed)

Step 4: The impact of knowledge management on competitive advantage, regulating for organizational culture (path c') must be nil in order to establish organizational culture absolutely intervenes the knowledge management to competitive advantage relationship. The impacts of two steps such as Step 3 as well as 4 are evaluated in the similar equation.

Four-steps of mediation were used to analyse this process and thus, it can be summarized that the data support the hypothesis that make the relationship between the knowledge management and competitive advantage is partially mediated by the organizational culture.

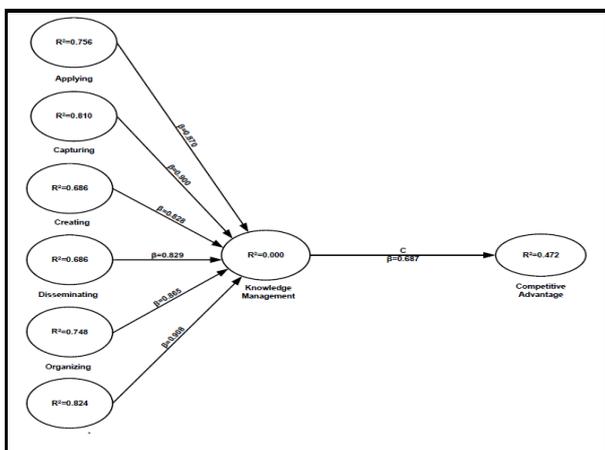


Fig. 3 The total effect model

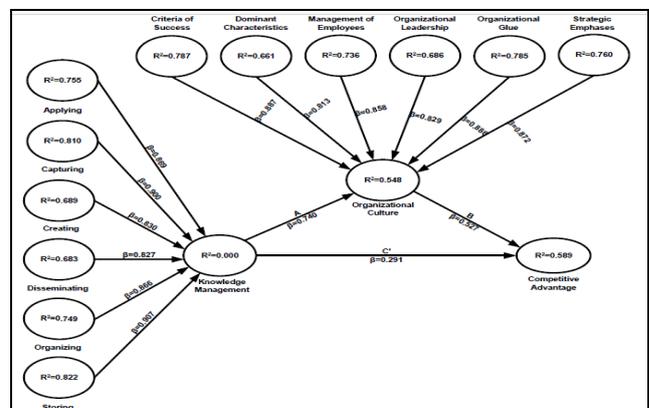


Fig. 4 The direct effect model



Table 5 presents that at t-value of 1.88, the direct effect becomes nil. As shown in Table 5, the variance has been achieved by using total effect model as shown in Figure 3. The mediator and total effect model is shown in Figure 4 as well as Table 5.

**SOBEL Test**

SOBEL Test was first introduced by Sobel [82]. Some sources referred to this type of test as the delta method. It is essential to measure the standard error of a or  $s_a$  as well as the standard error of b or  $s_b$ . An approximate standard error estimation of ab that equalize the square root, provided by the SOBEL test is given below:

$$= \sqrt{b^2s_a^2 + a^2s_b^2}$$

There are many other approximate standard error estimations regarding  $s_{ab}$  standard errors that have been introduced. SOBEL test is more old-fashioned that is why currently SOBEL test with the bootstrapping introduction is mostly used for estimating. The indirect effect test is taken as ratio of ab to square root of the sum of variance with standard error and process the report as a Z-test (i.e., more than 1.96 in absolute value is important at the level of 0.05). The estimation of paths a and b are not dependent and are deduced by the derivation of the SOBEL standard error. It is correct when test are taken from multiple regression.

**Bootstrapping in the Analysis of Mediation**

As from the above view it can be concluded that the popularity of bootstrapping is rising as the method of mediation test [81, 82]. Bootstrapping is a method for nonparametric observations where sampling with the process of replacing is done repeatedly, for example, 5,000 to 10,000 times. The indirect effect is calculated as well as a sampling distribution is generated empirically from these samples of each. For that reason, the average of the bootstrapped distribution will not approximately equal the indirect effect of a bias correction is generally made. P-value, confidence intervals, or a standard error is set up along with distribution. More generally a confidence interval is calculated as well as also checked to ascertain whenever the interval is nil. It may show the researcher that the indirect effect is other than zero, until zero is not in the range. Furthermore, a P-value is also ascertained.

**Table. 6 Direct and Total Effects**

	$\beta$ Coefficient	Std error.	t-stat	P Sig (two- tailed)
<b>b (YX)</b>	0.6867	0.0803	8.5550	0.0000
<b>b(MX)</b>	0.7484	0.0732	10.2171	0.0000
<b>b(YM.X)</b>	0.4644	0.1103	4.2110	0.0001
<b>b(YX.M)</b>	0.3392	0.1103	3.0751	0.0029

Table 6 represents the importance outcomes of:

1. It is significant at p = 0.0000 in the case of "c" path (IV to DV, also indicate the Total Effect).

2. It is significant at p = 0.0001 in the case of "a" path (IV to Mediator).
3. It is significant at p = 0.0000 in the case of "b" path (Mediator to DV, regulating for the IV).
4. It is significant at p = 0.0000 in the case of "c" path (IV to DV, also indicate the Total Effect).

Moreover, the model does not fulfil all of the formulation regarding mediation by Baron and Kenny [83] as well as the direct effect  $c'$  is reduced. In spite of the fact that it has remained of importance because partial mediation can be seen. Organizational culture is used as mediator to get outcomes for the amount of variance that has been accounted for by using this equation:

$$VAF = \frac{a \times b}{a \times b + c} = 0.5644$$

Based on the outcome, there is 56% of variance is explained by the mediator variable. Moreover, the relationship between the knowledge management and competitive advantage is partly mediated by the organizational culture and as it accounts for 56.4% of total magnitude [83].

**V. DISCUSSION AND FINDINGS**

The model of mediation as process of knowledge management mediated by organizational culture in order to gain a competitive advantage was formed and verified. The theory has been formulated with the help of PLS Structural Equation Modelling approach to discover the explanation of conceptual model or decide an effective relationship between the variables in order to describe a phenomenon or model [73].

Meditational hypotheses test has been done by using the four step analysis as a requirement according to SOBEL test [83, 84, 85]. All model adjustment indicators meet the good model criteria as shown in the first step. Knowledge management processes showed a significant relationship. There is an important relationship with the consequent competitive advantage with the t-value that accounts for 6.58 (p <0.1) at 99% probability is represented by the process of knowledge management. The outcomes of second step represent that at t value of 10.17 or p<0.01, the causative variable is connected with the mediator. Finally, the third and the fourth step represent that it is important at p<0.1 t-value 9.70 in the case of path "a" (knowledge management to organizational culture), for the path "b" organizational culture to competitive advantage, it is significant at p<0.1 t-value 3.50, on the other hand it is reduced with t-value of 1.88 for path  $c'$  known as the Direct Effect.

According to study by Preacher and Hayes [86] and Hayes and Scharkow [87], PLS-SEM model meets all four requirements for the purpose of mediation tests. Hayes [88, 89], Hayes and Scharkow [87] and Hair, Hult, Ringle and Sarstedt [77], the model was verified through the method of bootstrapping for several reasons such as, it shows the form of variables' distribution or sampling of statistical distribution and may be applicable for comparatively small size of sample with more credence.



Based on the outcomes there is 56.4% of variance accounted for (VAF) which is responsible for the relationship between knowledge management processes and competitive advantage is, in fact, partly mediated by the organizational culture.

## VI. CONCLUSION AND RECOMMENDATIONS

At the starting point of this research, a conceptual model of knowledge management processes and competitive advantage was described as well as organizational culture which plays a role as a mediator as shown in Figure was verified with the relationships in the conceptual model. The key achievement of this study is that there is a partial mediation of organizational culture in the relationship between knowledge management processes and competitive advantage as shown by the outcomes of this research. Defining and measuring knowledge management is challenging and comprises of a framework of holistic dealing with system, culture, operation, process, structure and function of organization. This study corroborated that the process of knowledge management is extremely correlated. It has to be taken into a consideration as a holistic framework, where the organizational culture plays as a role of mediator processing to obtain a competitive advantage. This study was expected to contribute towards academicians, this study has contributed to overcome the knowledge gap in relationship that has been made between organizational culture, knowledge management and competitive advantage. For the practitioners, it looks forward for contributing to the solutions for the problems faced by the industry. After conducting this research, it is clear that there is a relationship between process of knowledge management and competitive advantage via attributes of organizational culture, however, there is no explanation that how they are correlated and how the organizations should balance them. Therefore, it is not clear whether the process of knowledge trigger organizational culture as well as vice versa.

A particular relationship between each of them may be identified by the follow-up research. Moreover, in the cycle of knowledge management, there may be other processes which has contribution to gain competitive advantage. Furthermore there are many other dimensions of organizational culture type. Those dimensions may be taken into consideration as a mediator in the relationship between knowledge management and competitive advantage. One of the drawbacks of this study is that the research has been conducted in the context of Malaysian construction. The outcomes of this research might be covered only for developing countries like Malaysia. Every company has its own attributes and that is why outcomes of this research may not be generalized.

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