

# The Role Of Organizational Culture On Sustainable Construction Among Malacca Malaysian Construction Industry: A Partial Least Square Approach

N.A.Subani,<sup>1</sup> A.Q.Adeleke,<sup>2</sup> J.A. Bamgbade<sup>3</sup>

<sup>1,2</sup>Faculty of Industrial Management, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300

Gambang, Pahang, Malaysia

<sup>3</sup>Faculty of Engineering, Computing and Science, Swinburne University of Technology Sarawak Campus, Sarawak, Malaysia

**Abstract:** - This research studies the influence of organizational culture on sustainable construction among G7 contractors operating in Malacca, Malaysia. As there are opinions buttressing the need to integrate culture that reinforces devotion towards sustainability in an organization so as to ensure a successful sustainability adoption in project' activities. Therefore, in response to this apprehension, the objectives of this study are to investigate the significant relationship between adhocracy culture and environmental protection and to investigate the significant relationship between hierarchical culture and environmental protection. To achieve this, quantitative research was conducted with a proportionate stratified random sampling used to choose 100 construction companies mainly G7 that are registered under the Construction Industry Development Board (CIDB) Malaysia operating in Malacca. A total of 90 valid and completed questionnaires were returned representing a 90% response rate. The validity, as well as the reliability of the items in this research, were assessed using the PLS-SEM measurement model and it shows that the results are reliable. The two hypotheses were tested and the result showed that adhocracy culture (AC) variable has a significant positive relationship on sustainable construction ( $\beta = 0.525$ ,  $t = 3.722$ ,  $p = 0.000$ ) as organizational culture with dynamism, which is represented by adhocracy is concluded to be influential in sustainability, and also play a critical role in a society in the context of sustainability and corporate citizenship. Implications for practice and future research were also discussed.

**Keywords:**- Organizational culture, adhocracy culture, hierarchical culture, sustainable construction, environmental protection, construction industry, Malaysia.

## 1.0 Introduction

The world is facing rapid and incessant environmental changes and intense competition to be on top of the game. In business, the combination of employees' effort and personal goals with organizational objectives is essential in building those valuable, exceptional, unique and non-identical capabilities (Adeleke et al., 2019; Taofeeq et al., 2019; Oney-yazıcı, Giritli, & Topcu-oraz, 2007). With this, a business needs to adopt organizational culture with increasing insight, and accomplishment to balance the internal and external dynamism, thus, giving general patterns of behavior to the organizational culture within the organization (Acar

& Pinar, 2014). On this account, Oney-yazıcı, Giritli, and Topcu-oraz (2007) responded with, organizations' actions will vary depending on their organizational culture when being edgy by external and internal pressure.

Culture is the determinant of the stance and attitude of people and organizations (Wang & Abdul-Rahman, 2010). All behavior such as the way of driving, studying, working in a team, table manners, greetings, and walking are fragments of culture. Cultures grew over time and being transferred from generation to generation. It is important to

understand the culture of an organization in order to observe the situation in the organizations, to operate it and to mend it accordingly.

Organizational culture can be defined as the shared values, beliefs, and practices existing in the organization (Acar & Pinar, 2014). It is recognized by many scholars that organizational performance and long term effectiveness is affected by organizational culture (Malik & Adeleke, 2018). Studies have shown that things that distinguished successful businesses from others are their organizational culture (Agrawal, 2017).

In the study of Hofstede (2011), through comparison of organizations' cultural differences - differences in way of thinking, social act, and behavior, it is explicitly recognized that each organization differed in the basis of practices as practices are rather tangible than values.

## **2.0 Literature Review**

### **2.1 Overview of the Malaysian Construction Industry**

Construction comprises building new structures, renovating old structures and the maintenance and repair of buildings or other engineered structures such as highways or utility systems ( Bamgbade et al., 2019; Hassan & Adeleke, 2019; Wang & Abdul-Rahman, 2010). Furthermore, it is not only limited to the building but also embraces a couple of other activities such as painting, landscaping, electrical supply, telecommunications, plastering, and paving. The construction industry plays a central role in the national welfare of a country through the development of housing and office buildings, education and health centres, transport infrastructure, industrial plants and the restoration of the nation's infrastructure as well as other public facilities Adeleke et al., 2019; Taofeeq et al., 2019). In addition, construction is fundamental to all major economic drivers and contributes massively to the economy of a nation especially in the era of globalization.

The economic development of a country is highly affected by the construction industry as it is listed as one of the major contributors. The involvement of

construction in various industries and sectors that can be seen clearly shows the importance of the construction industry. Since the independence of Malaysia on 31<sup>st</sup> August 1957, the construction industry is one of the most booming industries in the continuance of the development process as Malaysia moves towards becoming a developed nation.

One of many of Malaysia's economic driving forces is the construction industry. Malaysia's construction industry plays a critical role in creating prosperity and improving the quality of life. This is achievable as social and economic infrastructure and the building are transformed from the socio-economic policies of the government.

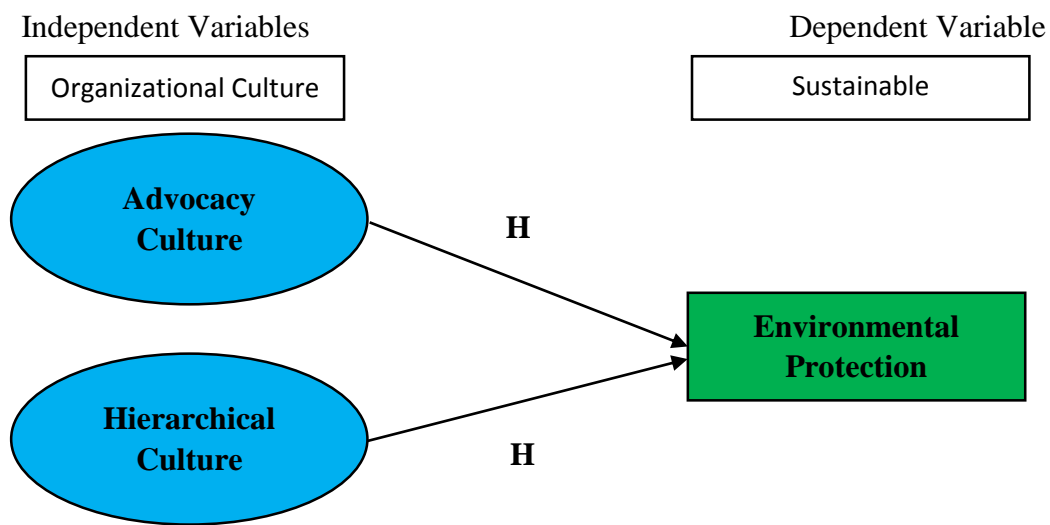
In an adhocracy culture, employees are able to take the chances, reinforced with new findings and liberties so they feel satisfied, contented and positive in their working environment which basically refers to the ability to quickly adapt to any modifications or alterations of surrounding (Bamgbade et al., 2019; Taofeeq & Adeleke, 2019; Berchicci, 2007). Adhocracy culture is widely known for its dynamism, prominence on individual ingenuity, and worker empowerment (Oney-yazıcı et al., 2007). In the corporate level, it is less strictly defined and it is also very flexible compared to the hierarchical culture which is inflexible and rigid obligation towards rules. Its emergence was based in accordance with the theory of "organizational innovation and adaptation leads to new resources and economic prosperity" (Bamgbade et al., 2016; Adeleke et al., 2018). Foundation of an adhocracy organization is to endorse dynamism, flexibility, and creativity as well as creating ground-breaking products or services (Kargas & Varoutas, 2015).

Hierarchical culture is a culture with effective leadership that gives importance to command and regulation as it is in bureaucratic organizations (Kargas & Varoutas, 2015). The items in hierarchical culture are ranked based on the level of importance (Oney-yazıcı et al., 2007). Hierarchical culture normally used top-down organizational structure to conduct and control business activities and performance. It is devoted in recognizing the best practices to be implemented, measuring system

and significant mistake are vital for attainment and output ( Adeleke et al., 2018; Hassan et al., 2019; Acar & Pınar, 2014). Clear lines of decision-making power, standardization of policies and rules, and authority as well as responsibility mechanisms are considered as the success’s keys ( Taofeeq et al., 2019; Omer & Adeleke, 2019; Cameron & Quinn, 2011). Therefore, having strong leadership and a centralized organizational structure is good as with a clearer goal, the organization could deliver products or services successfully and with the right lead, environment preservation can be conducted even from within.

**2.2 Conceptual Framework**

This research is developed with a clearly defined independent and dependent variables by using a specified model. Based on the conceptual framework, the independent variables in this research are adhocracy culture and hierarchical culture, and the dependent variable is sustainable construction (environmental protection). The framework shows the relationships between these variables, in order to determine whether there is a significant relationship between the variables or not.



**Figure 1:** Research framework

**2.3 Relationship between Adhocracy Culture and Sustainable Construction (Environmental Protection)**

Undoubtedly, the foremost concern of adhocracy organization is nurturing adaptability, creativity, and flexibility, in addition to creating ground-breaking products and services (Cameron & Quinn 2011). In the adoption and adaptation of sustainability, they are vital in an organization (Chan & Liu, 2012) as these merits are also proficient in encouraging organizational efficiency, effectiveness, and competitiveness. Studies have also proved that innovation centered values, like adhocracy, would always make thoughtful changes to organizational products or processes, without jeopardizing the economic values while delivering environmental and

social benefits (Bamgbade et al., 2019; Abulhakim & Adeleke, 2019; Lozano, 2013).

Organizational culture with dynamism and as corporate entities represents adhocracy is concluded to be influential in sustainability, and also play a critical role in a society in the context of sustainability and corporate citizenship (Preuss, 2008). Trong Tuan, (2012) mentioned that adhocracy culture is the most appropriate preference for sustainability-oriented organizations, and sustainability can be fully exploited through entrepreneurship as it assists organization’s capability. Therefore, it is hypothesized thus:

**Hypothesis 1:** There is a significant relationship between adhocracy culture and sustainable construction (environmental protection).

## **2.4 Relationship Between Hierarchical Culture and Sustainable Construction (Environmental Protection)**

In an organization with culture which is more structured and organized (hierarchical culture), corporate values are clearly defined in attaining the predicted goals or outcomes. Hierarchical culture is another acceptable option of culture that is applicable in integrating sustainability in the organization process. This is due to the clear clarification of sustainability practices are well-defined for integration (Wang & Abdul-Rahman, 2010). A hierarchical culture focused more on internal aspects of an organization compared to adhocracy, which focuses more on external aspects. The internal factors as well as external factors, in a construction organization, plays a critical part in adopting sustainability in a project (Adeleke et al., 2016; Azman & Adeleke, 2018; Bamgbade et al., 2017; Efferin & Hopper, 2007) as it is the heart of a business. Meaning, the internal factors of a business must be strong enough before moving to the external factors (HOMBURG & Pflesser, 2013).

Adoption of sustainability in construction has a quicker progress in hierarchy organizations (Kargas & Varoutas, 2015) as employees are able to adapt and follows changes accordingly since they are bound by rules, and they are obligated to cooperate once policies on sustainability is embedded in the company's values (Oney-Yazici et al., 2007; Taofeeq et., 2019; Jamil & Adeleke, 2019). Hierarchy is made on the basis of rules, responsibility, and specialization, which are highly effective in goal accomplishment (Cameron & Quinn, 2011). Furthermore, as hierarchical culture is known for its rigidity and adherence towards rules. Leadership or authorities with power have a vital role in inculcating the awareness and practices of sustainable development in the organization as everyone is bound to follow every rule in the organization (Wang & Abdul-Rahman, 2010). Therefore, it is hypothesized thus:

**Hypothesis 2:** There is a significant relationship between hierarchical culture and sustainable construction (environmental protection).

## **3.0 Methodology**

The research approach is quantitative, which commonly adopted in social sciences (Sekaran, Robert & Brain, 2001) as it is objective testing, controlled, supports or rejects hypotheses as well as reducing bias in data collection and analyses (Dowd, 2018). Information about all 189 G7 construction firms registered and operating in Malacca are obtained from the CIDB database and they represent the sample population for this study. G7 contractors are considered for this research because of the higher likelihood of making construction sustainability a success since it required financial strength, innovations, and willingness to bring it to the fore (Nathan, 2015). In this study, both mailed and personally administered survey methods were employed with the aid of close-ended structured questionnaires. Based on the G\*Power 3.1 sample size calculator, a sample size of 89 is required for a population of 189 contractors. Considering the fact that the MCI is associated with a low response rate (Waris et al. 2014), the sample size was rounded off to 100. The data were collected at single-point-in-time, so this research is a cross-sectional research design which applied structured questionnaire (Sabodin & Adeleke, 2018; Bamgbade et al., 2016; Sekaran & Bougie, 2013). The period of data collection process took around 2 to 3 weeks approximately to be completed. The total number of 90 correctly answered questionnaires were collected from the sampled companies. So, the sample size for this research was 90 G7 companies in Malacca which is appropriate for the analysis.

### **3.1 Instrument Design**

All variables studied were measured using the most suitable survey mechanism which is the Five-point Likert scaling. Through this instrument, the respondents' responses were measured under the categories of "Strongly disagree=5", "Disagree=4", "Neutral=3", "Agree=2" and "Strongly agree=1" (Bamgbade et al., 2016). This rating scale is adopted to compute the standard deviation and the mean feedback of the variables and the mid-point of the scale in accordance with Sekaran (2003) and Sekaran & Bougie (2009). Table 1 shows the sources of

measurement in which the studied items were adopted and adapted. In analyzing the data, Microsoft Excel version 2016 was used for respondents' demographic information. Smart PLS

version 3.0 was adopted for analyzing the relationship between dependent and independent variables.

**Table 1:** Sources of measurement

| S/N | Constructs               | Dimension                                 | Source                                      | Remarks |
|-----|--------------------------|---|---|---------|
| 1   | Organizational culture   | Adhocracy culture<br>Hierarchical culture | (J. A. Bamgbade, Kamaruddeen, & Nawi, 2015) | Adapted |
| 2   | Sustainable construction | Environmental protection                  | (J. A. Bamgbade et al., 2015)               | Adapted |

## 4.0 Results and Discussions

### 4.1 Data Collection and Sample

The demographics analysis depicts that more than half of the G7 contractors in Malacca have existed for more than 10 years. Also more than half of the respondent's organization has workers exceeding 150. The summary of demographic scales of respondents for this research is as shown in Table 2 below.

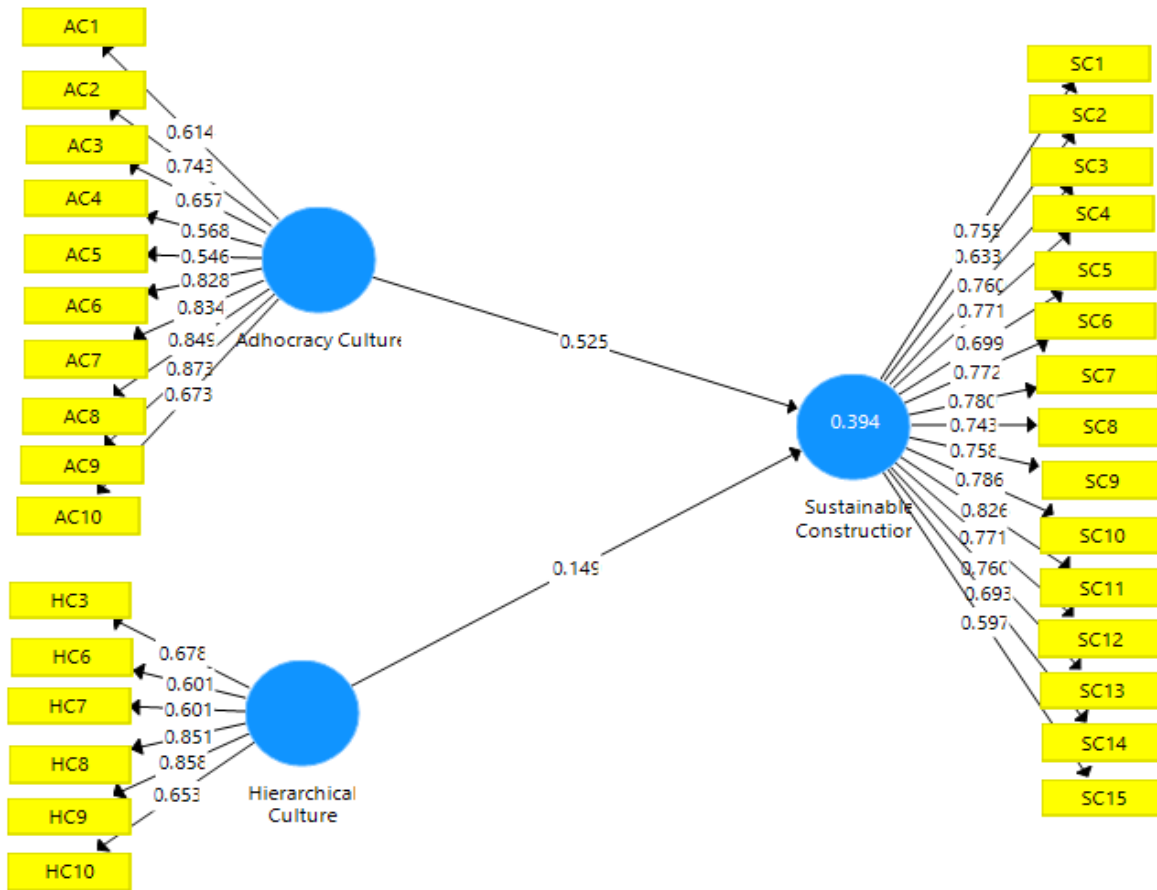
**Table 2:** Summary of Demographic Scales of Respondents

| Type                          | Items                    | Percentage (%) |
|-------------------------------|--------------------------|----------------|
| <b>Position</b>               | Contract manager         | 2.22           |
|                               | Safety officer           | 20.00          |
|                               | Project manager          | 20.00          |
|                               | Other                    | 57.78          |
| <b>Working experience</b>     | 1-3 years                | 45.56          |
|                               | 4-6 years                | 28.89          |
|                               | 7-9 years                | 11.11          |
|                               | >10 years                | 14.44          |
| <b>Gender</b>                 | Male                     | 87.78          |
|                               | Female                   | 12.22          |
| <b>Type of Project</b>        | Residential building     | 53.40          |
|                               | Commercial building      | 31.40          |
|                               | Educational building     | 13.60          |
|                               | Other                    | 1.70           |
| <b>Company ownership</b>      | Local                    | 50.00          |
|                               | National                 | 47.78          |
|                               | Private                  | 1.11           |
|                               | Government-owned company | 1.11           |
| <b>Company prime location</b> | Local market areas       | 7.78           |
|                               | Across Malaysia          | 41.11          |
|                               | Within a few states      | 24.44          |
|                               | International markets    | 26.67          |
| <b>No. of employees</b>       | 0-50                     | 5.56           |
|                               | 50-100                   | 10.00          |
|                               | 100-150                  | 6.67           |
|                               | >150                     | 77.78          |
| <b>Company existence</b>      | 1-3 years                | 3.33           |
|                               | 4-6 years                | 5.56           |
|                               | 7-9 years                | 7.78           |
|                               | >10 years                | 83.33          |

**4.2 Measurement Model**

Since Partial Least Square Structure Equation Modelling (PLS-SEM) is relatively able to accommodate a small sample size it is used as the

technique in this research for it is suitable for analyzing data with a small sample size (J. A. Bamgbade et al., 2015). Figure 2 illustrates the structural dimension model of this research.



**Figure 2:** Measurement model

The measured content validity (Table 3) was explained using two different manners. The first way was through high loading in the items on their corresponding constructs in relation to other constructs. The second way was through the loading of items that were significantly loading on their corresponding constructs by confirming the content validity of the measures utilized in the study (Rahman & Adeleke, 2018; Chow and Chan, 2008).

Meanwhile, for convergence validity, parameters such as Composite Reliability (CR), Average Variance Extracted (AVE), and Factor Loadings (FL) were assessed (Hair et al., 2010). Corresponding loadings and cross-loadings of the items are assessed so as to distinguish any problems

with the items. Table 3 shows the cross-loadings of items in their respective constructs. Convergent validity is considered valid when all the loading of the items on their respective constructs displayed are 0.5 and above, in which no other items of different construct load higher on other constructs besides their own respective constructs that are meant for them to measure (Hair et al., 2010; Barclay et al., 1995). Eventually, convergent validity is established since all the items loaded satisfactorily on their respective construct that loaded higher than 0.5 which is higher than the recommended threshold value (Hair et al., 2010). As shown in Table 3, all items are loaded on their respective constructs with a lower bound of 0.546 to an upper bound of 0.858 (Adeleke et al., 2015).

**Table 3:** Factor Analysis and Loading of the items (Cross-Loading)

|      | AC    | HC    | SC    |
|------|-------|-------|-------|
| AC1  | 0.614 | 0.385 | 0.295 |
| AC10 | 0.673 | 0.381 | 0.424 |
| AC2  | 0.742 | 0.501 | 0.483 |
| AC3  | 0.657 | 0.358 | 0.356 |
| AC4  | 0.568 | 0.424 | 0.247 |
| AC5  | 0.546 | 0.362 | 0.211 |
| AC6  | 0.828 | 0.528 | 0.572 |
| AC7  | 0.834 | 0.559 | 0.436 |
| AC8  | 0.849 | 0.396 | 0.575 |
| AC9  | 0.873 | 0.558 | 0.613 |
| HC10 | 0.244 | 0.653 | 0.319 |
| HC3  | 0.467 | 0.678 | 0.262 |
| HC6  | 0.359 | 0.601 | 0.168 |
| HC7  | 0.310 | 0.851 | 0.242 |
| HC8  | 0.552 | 0.858 | 0.415 |
| HC9  | 0.626 | 0.653 | 0.484 |
| SC1  | 0.704 | 0.567 | 0.753 |
| SC10 | 0.382 | 0.291 | 0.787 |
| SC11 | 0.585 | 0.497 | 0.825 |
| SC12 | 0.491 | 0.345 | 0.771 |
| SC13 | 0.550 | 0.536 | 0.760 |
| SC14 | 0.432 | 0.356 | 0.693 |
| SC15 | 0.390 | 0.255 | 0.596 |
| SC2  | 0.401 | 0.231 | 0.632 |
| SC3  | 0.413 | 0.332 | 0.761 |
| SC4  | 0.409 | 0.293 | 0.772 |
| SC5  | 0.326 | 0.238 | 0.700 |
| SC6  | 0.308 | 0.331 | 0.774 |
| SC7  | 0.359 | 0.305 | 0.781 |
| SC8  | 0.414 | 0.349 | 0.744 |
| SC9  | 0.355 | 0.358 | 0.760 |

Besides, AVE (Average Variance Extracted) is used also in assessing the convergent validity for this research. According to Fornell and Larcker (1981), the Average Variance Extracted (AVE) must be 0.5 at least in order for a construct to demonstrate convergent validity as it indicates that the measurement error is smaller than the variance of the construct (Bamgbade et al., 2015).

Table 4 depicts that all AVE readings are higher than 0.5, with 0.511 as the lowest and 0.552 as the highest reading which indicates that the convergent validity is adequate for every measure (Adeleke et al., 2015). Therefore, it is proven that all of the items are the true representation of their underlying constructs.

**Table 4:** Convergent Validity Analysis

| Construct dimensions     | Items | Loading | Composite Reliability | AVE   | Cronbach's Alpha |
|--------------------------|-------|---------|-----------------------|-------|------------------|
| Hierarchical Culture     | HC3   | 0.678   | 0.860                 | 0.511 | 0.813            |
|                          | HC6   | 0.601   |                       |       |                  |
|                          | HC7   | 0.851   |                       |       |                  |
|                          | HC8   | 0.858   |                       |       |                  |
|                          | HC9   | 0.653   |                       |       |                  |
|                          | HC10  | 0.653   |                       |       |                  |
| Adhocracy Culture        | AC1   | 0.614   | 0.916                 | 0.530 | 0.900            |
|                          | AC2   | 0.742   |                       |       |                  |
|                          | AC3   | 0.657   |                       |       |                  |
|                          | AC4   | 0.568   |                       |       |                  |
|                          | AC5   | 0.546   |                       |       |                  |
|                          | AC6   | 0.828   |                       |       |                  |
|                          | AC7   | 0.834   |                       |       |                  |
|                          | AC8   | 0.849   |                       |       |                  |
|                          | AC9   | 0.873   |                       |       |                  |
|                          | AC10  | 0.673   |                       |       |                  |
| Sustainable Construction | SC1   | 0.753   | 0.948                 | 0.552 | 0.942            |
|                          | SC10  | 0.787   |                       |       |                  |
|                          | SC11  | 0.825   |                       |       |                  |
|                          | SC12  | 0.771   |                       |       |                  |
|                          | SC13  | 0.760   |                       |       |                  |
|                          | SC14  | 0.693   |                       |       |                  |
|                          | SC15  | 0.596   |                       |       |                  |
|                          | SC2   | 0.632   |                       |       |                  |
|                          | SC3   | 0.761   |                       |       |                  |
|                          | SC4   | 0.772   |                       |       |                  |
|                          | SC5   | 0.700   |                       |       |                  |
|                          | SC6   | 0.774   |                       |       |                  |
|                          | SC7   | 0.781   |                       |       |                  |
|                          | SC8   | 0.744   |                       |       |                  |
|                          | SC9   | 0.760   |                       |       |                  |

Moreover, as shown in Table 5, discriminant validity was established accordingly as all items loaded better on their particular constructs rather than on other different constructs. Hence, with the establishments of discriminant validity, it indicates that measurements that are not expected to be related are

indeed unrelated (Bamgbade et al., 2015). Furthermore, evidence of the establishments of discriminant validity can be seen as all of the constructs' AVE square roots are higher along the diagonals compared to the corresponding off-diagonal reading in both columns and rows.

**Table 5:** Validity Analysis

|                          | AC           | HC           | SC           |
|--------------------------|--------------|--------------|--------------|
| Adhocracy Culture        | <b>0.728</b> |              |              |
| Hierarchical Culture     | 0.620        | <b>0.715</b> |              |
| Sustainable Construction | 0.617        | 0.474        | <b>0.743</b> |

The next step is to investigate the relationships that were hypothesized for this research after confirming the goodness of the outer model. Table 6 shows the

hypothesis testing. The result showed that adhocracy culture (AC) variable has a significant positive relationship on sustainable construction ( $\beta = 0.525$ , t



= 3.722, p = 0.000) as organizational culture with dynamism, which is represented by adhocracy is concluded to be influential in sustainability, and also play a critical role in a society in the context of sustainability and corporate citizenship (Preuss, 2008). Therefore, H<sub>1</sub> which is the influence of adhocracy culture on sustainable construction was supported.

Meanwhile, H<sub>2</sub> which states that the hierarchical culture have significant negative relationship on

**Table 6:** Results of the Inner Structural Model

| Items          | Constructs/variables                             | Beta  | S/E   | T-value | P-value | Findings      |
|----------------|--|-------|-------|---------|---------|---------------|
| H <sub>1</sub> | Adhocracy culture -> Sustainable construction    | 0.525 | 0.141 | 3.722   | 0.000   | Supported     |
| H <sub>2</sub> | Hierarchical culture -> Sustainable construction | 0.145 | 0.132 | 1.126   | 0.260   | Not supported |

As for effect size, if the value is below 0.02 it is considered as small, lower than 0.15 is considered as medium and less than 0.35 is considered as high (Cohen,1988). Based on Table 7 below, the effect size of adhocracy culture was medium and hierarchical culture effect size is small which depicts that adhocracy culture has a stronger relationship with sustainable construction as the effect size

**Table.7** Direct Effect IV-DV

| R-squared            | Included | Excluded | f-squared | Effect size |
|----------------------|----------|----------|-----------|-------------|
| Adhocracy culture    | 0.394    | 0.235    | 0.2624    | Medium      |
| Hierarchical culture | 0.394    | 0.381    | 0.0215    | Small       |

**5.0 Conclusion**

This research centered on adhocracy and hierarchical culture as domains of organizational culture in Malacca Malaysian construction industries in influencing sustainable construction. While ample researches related to organizational culture and sustainable construction has been done, however, only a small portion of research related to organizational culture and sustainable construction in one single context has been done. Therefore, the future researcher can explore to investigate other domains of organizational culture such as market

sustainable construction ( $\beta=0.145$ ,  $t = 1.126$ ,  $p = 0.260$ ) as the rigidity and power control by the top management suppressed employees’ creativity and innovation which are the prominent aspects in successful sustainability adoption in project activities (Sharma, 2002; Wong & Avery, 2009; Linnenluecke and Griffiths, 2010). Hence, only adhocracy culture has a significant relationship on sustainable construction (environmental protection) among Malacca Malaysian construction industries.

increase, the relationship between two variables will become stronger (McLeod, 2019).

Effect size is calculated using the below formula:

$$\text{Effect size (f)} = R^2 \text{ incl} - R^2 \text{ excl}$$

$$1 - R^2 \text{ incl}$$

culture or resolve to any external factors that have an influence on sustainable construction and empirically validate the proposed model in this research.

Thus, this research does not only give a benefit to the academic world but for those in construction industries especially the industries that treasure humanity values and preserve the environment in every construction project.

## Acknowledgement

Authors of this study acknowledge the research funding from the Fundamental Research Grant Scheme (FRGS), Managed by PNI, Universiti Malaysia Pahang [Grant code: RDU190127].

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