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Organizational external factors, culture, and innovativeness of shipbuilding companies: Moderating role of resources

Ahmed Mohammed Kamaruddeen *, Chieng Tiong Koh, Wahida Wahi, Angela Ting Mee Yii

Quantity Surveying Programme, School of Built Environment, University College of Technology Sarawak, Sarawak, Malaysia

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ABSTRACT

In examining the influence of organizational culture and external factors on the innovativeness moderated by company resources among the shipbuilding companies operating in Sarawak Malaysia, we draw upon a theoretical perspective to develop hypotheses proposing that the organizational culture and external factors do influence the innovativeness among the shipbuilding companies in Sarawak. We used the simple random sampling to collect data from shipbuilding companies in Sarawak. We received 41 valid questionnaires out of 65 questionnaires distributed, yielding 63% response rate. Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to test the direct and moderating effect on the variables. The result shows an unexpected negative relationship between organizational culture and innovativeness. However, external factors have a significant relationship with innovativeness among the shipbuilding companies. In addition, company resources moderate the relationships between culture and innovativeness. The findings from this study suggest that to enhance the innovativeness among the shipbuilding companies operating in Sarawak, managers and chief executives need to seriously consider all dimensions of culture, external factors and company resources examined in this research. It is hoped that our findings complement the existing body of knowledge and contribute to future studies on organizational innovativeness.

1. Introduction

The strategic regional development plan of Sarawak state in particular that focuses on the priority sectors including Maritime industry and the strive for innovativeness at the national level have motivated Malaysia to aim at improving its position in the global market from 1% in 2010 to 2% by 2020. Achieving the 2% of global Shipbuilding market share will certainly require a considerable innovativeness among the Shipbuilding companies.

The literature has shown that innovativeness does enhance the competitive advantage and enhance the organizational performance of organizations (Ackermann et al., 2015; Raj and Srivastava, 2016). Learning from previous research and even replicating research hypotheses as well as methodology will provide a platform for developing a new theory that encompasses the distinct features of the industry (Hjalager, 2010).

Despite the considerable research in the field of industrial innovation and innovativeness (Tajeddini, 2010; Hjalager, 2010; Camisón and Monfort-Mir, 2012), the Shipbuilding industry has only received limited attention in this field of research. For example Tsekouras et al. (2011) examined the types, nature and the impacts of innovations developed among small shipping companies in Greece. It was found that organisational and process innovations are critical to the dynamic strategy among small service companies. Marsh (2012) explored the introduction of cruise ship tourism into historic urban centres, and the mitigation policies that can be implemented to encourage sustainable development in South Carolina.

The work of Dennett et al. (2014) focused on the complex nature of work undertaken by waiters and pursers on-board cruise ships in the United Kingdom cruise ship port. It is obvious from the previous studies mentioned above that most maritime related studies focus on the ship operators while less attention has been directed to the shipbuilding companies particularly in the field of organizational

* Corresponding Author.
Email Address: kamaruddeen@ucts.edu.my (A. M. Kamaruddeen)
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innovativeness. There is a need for a better empirical research and evidence about innovativeness at industry level (Hall and Williams, 2008; Hall, 2009; Hjalager, 2010). This will provide adequate representation of industries in a comprehensive national or international innovation survey. This research is underpinned by the readiness to change theory and therefore seeks to achieve the following objectives:

a. Determine the barriers to innovativeness among the Shipbuilding companies operating in Sarawak.
b. Examine the influence of company culture on the innovativeness among the shipbuilding companies operating in Sarawak.
c. Examine the influence of external factors on the innovativeness among the ship building companies operating in Sarawak.
d. Examine the moderating role of resources on the relationship between organizational culture and innovativeness among the shipbuilding companies in Sarawak.

2. Hypothesis development

2.1. Organizational innovativeness

In general, organizational innovativeness has received considerable attention among scholars (Damanpour and Evan, 1992; Wang and Ahmed, 2004; Kocher et al., 2011; Peters and Naicker, 2013; Kaya and Torlak, 2013). Thus, a number of definitions of the term have been provided in the extant literature (Jain et al., 2010). For example, Knowles et al. (2008) defined organizational innovativeness as "the propensity of an organizational to create and/or adopt new products, processes, and business systems". Accordingly, while Knowles et al. (2008) conceptualized organizational innovativeness as product, process, and business, they did not consider information technology as an important dimension, despite several studies linking the adoption of technology with innovation (Kock et al., 2011).

In this paper, Kamaruddeen et al. (2012)'s definition is adopted, where organizational innovativeness is conceptualized as organization's drive or capacity to adopt innovation in shipbuilding products, processes or concepts, businesses and information technology that are new to the shipbuilding companies or the industry in order to attain competitive advantage and meet customers' needs.

We define organizational or company innovativeness as the propensity or capacity of an organization or company to adopt innovative products, processes, concepts, and business systems and technology that are new to the shipbuilding industry; not just for business survival, but also to meet the needs of the customers or end users, but also taking into consideration the aspects of sustainability and the environment.

2.2. Organizational factors

Studies have shown that certain organizational internal factors, such as culture and structures (Kimberly and Evanisko, 1981; Kanter, 2000; Thong, 1999; Russell and Hoag, 2004; Kamaruddeen et al., 2012); organizational characteristics, such as firm size (Damanpour, 1991; Kamaruddeen et al., 2015); firm structure and resources (Subramanian and Nilakanta, 1996) do enhance organizational innovativeness. While there are mixed findings among the scholars in this field of research, organizations are only capable of managing their internal factors to enhance innovative capability, the external factors, such as role of stake holders, usually are beyond their control. Hence, the need to examine the influence of external factors on organizational innovativeness. Accordingly, scholars have grouped the organizational factors into internal and external (Akgun et al., 2007). In this paper, internal factors consist of organizational culture and resources. We conceptualized organizational culture as adhocracy culture and market orientation; organizational resource as transformational leadership style and organizational learning. Likewise; external factors comprise of environmental uncertainty, market competition and government support.

2.2.1. Organizational culture and innovativeness

Previous studies have proven that organizational culture enhances organizational innovativeness, efficiency and improved productivity within organizations (Alas et al., 2009). Hence, the shipbuilding industry needs to practice and prioritize the culture that enhances innovativeness as an avenue for the attainment of competitive edge. In specific terms, researchers like Cherian and Deshpande (1985) argued that organization's cultural systems do interact with their structure that forms the basis for organizational policy and procedures that influence all organizational actions including the innovation performance (Obendhain and Johnson, 2004).

Cameron and Quinn (2005) have grouped organizational culture into four dimensions, namely adhocracy, clan, hierarchy and market orientation cultures. These four dimensions of organizational culture exemplify different value orientations. Clan emphasizes flexibility, change and it focuses on the internal organization. In adhocracy, the external focus is emphasized, in addition to flexibility, continuous growth, adaptation, creativity, and resource acquisition. Hierarchy organizations are also externally focused, but they are control-oriented with emphasis on productivity and accomplishment of fixed objectives to gain more competitive advantage with the external environment. Market orientation culture places emphasis on stability, and focuses on the internal organization. It prioritizes uniformity, co-ordination, internal productivity and a strict adherence to regulations (Shih and Huang, 2010). Even though the competing value framework

(CVF) subdivided these cultural dimensions into quadrants with divergent features, it should be noted that organizations hardly align with only one value system.

This study adopts the Cameron and Quinn's (2005) competing value framework to measure organizational culture to examine extent of market and adhocracy cultures practiced by shipbuilding companies. This implies that only the adhocracy and market orientation culture dimensions are considered in this to determine the shipbuilding company culture (Duygulu and Özeren, 2009).

Additionally, market-orientation enables organizations to create corporate cultures that form the foundation for attaining a competitive edge, and it is also an essential determinant of organizational performance (Narver and Slater, 1990). The development of market orientation within an organization is to represent the firm's focus on all the stakeholders, customers, suppliers, competitors and governmental institutions (Slater and Narver, 1995). In this line of reasoning, organizations with market orientation are always proactive in developing innovative capabilities to rise above their competitors. It can therefore be inferred that market oriented organizations are strongly associated with innovativeness (Szymanski and Henard, 2001; Naidoo, 2010). As depicted in Fig. 1, we hypothesized H1 as follow:

Hypothesis 1: Organizational culture will have a positive influence on the innovativeness of Shipbuilding companies.

2.2.2. External factors and innovativeness

External factors (conceptualized in this paper as environmental uncertainty, market competition and government support) refer to those factors that are beyond the control of an organization. Environmental uncertainty is a well-established factor that exerts a significant influence on organizational successes (Sutcliffe and Zaheer, 1998). Irregularity in the external environment always results in high level information-processing demands for organizations (Tushman and Nadler, 1978). Studies on market competition and organizational innovativeness have a long history. For example, Dasgupta and Stiglitz (1980) showed that organizations in a competitive environment are likely to invest more in R&D than their counterparts. Recently, a number of studies have also examined the influence of competitive market on firms' innovative activities. By estimating a production function that includes the market structure, Slivko and Theilen (2014) showed that, when competition is intense, efficient firms' incentives to innovate tend to improve. In the same line of reasoning, Salavou and Lioukas (2003) argued that market concentration has a diminishing effect on organization's innovative behaviour because the intensity of competition induces organizations to be innovative. In this study, external factors are regarded as those factors that company have no control over. They only tend to adapt those factors through several mechanisms. As depicted in Fig. 1, we hypothesize H2 as follows:

Hypothesis 2: Organizational external factors will have positive influence on the innovativeness of Ship building companies.

2.2.3. Organizational resources as moderator

According to Baron and Kenny (1986), the moderating variable performs the function of a third variable which can be in a form of a qualitative or qualitative variable influencing either the direction and/or strength of the relationship existing between an independent variable and a dependent variable. In other words, the moderating variable is one that has a strong contingent effect on the independent variable-dependent variable relationship. The presence of the moderating variable modifies the original relationship between the independent and the dependent variables" (Sekaran and Bougie, 2016).

Underpinned by the resource based view (RBV) theory, organizational learning (Hurley and Hult, 1998), and transformational leadership (Ergeneli et al., 2007) have been theorized as the antecedent to innovativeness. In organizational learning, the organizational ability to learn both new and external information, understand the value, assimilate it and subsequently applying it to all business systems is crucial because all these would eventually assist in the organization's innovative capabilities (Cohen and Levinthal, 1990).

Organizations that enable members' transformation of information into knowledge and then into action can afford experimentation and adopt innovativeness more rigorously (Jiménez-Jiménez and Sanz-Valle, 2011). This knowledge acquisition depends on the organization's knowledge base (Salavou and Lioukas, 2003), as well as on their capacity to acquire external information (Chang and Cho, 2008). Equally, innovation also requires the transformation and utilization of existing organizational knowledge, which implies that firm employees need to continuously share information and knowledge. Nonaka (2002) notes that innovative capacity is easily earned when members share knowledge within the organization, and subsequently this shared information and knowledge engenders new insights. In a nutshell, organizational learning produces organizational development, acquisition, and exploitation of novel knowledge that improves organizational innovativeness (Jiménez-Jiménez and Sanz-Valle, 2011). In addition, transformational leadership allows leadership to demonstrate the ability to motivate members to outperform their initial expectations as the organization strives to attain better performance. Jung et al. (2003), demonstrated a significant relationship exists between transformational leadership and organizational

innovativeness, in the sense that transformational leaders promote group effectiveness through followership empowerment so that job execution is done without leaders' interference. As depicted in Fig 1, we hypothesize H3 as follows:

Hypothesis 3: Organizational resources will moderate the influence of company resources on the innovativeness of Shipbuilding companies.

3. Research method

3.1. Measures and scale development

The data were obtained using a mailed and self-administered questionnaire to examine organizational culture, resources, external factors and innovativeness. The items were measured using a 5-point Likert-type ranging from 1 = "not at all" to 5 = "Completely true". Measures used in the study are presented in Table 1. All the measures were obtained from previous studies, with sound validity and reliability. All the indicator variables are modelled reflectively because they are caused by their main constructs, and any of the indicators can be left out without changing the real meaning of the latent constructs.

3.2. Data collection and sample

The data for this study was collected from the Shipbuilding companies operating in Sarawak Malaysia. Sarawak State was chosen because the majority of the shipbuilding companies are located there (Zhang et al., 2011). The key target respondents for the survey were executive directors, operating and business managers in each of the companies, who have acquired satisfactory professional experience to provide the data needed for this study. The population of this study consists of companies fully registered with the Association of Shipbuilders in Sarawak.

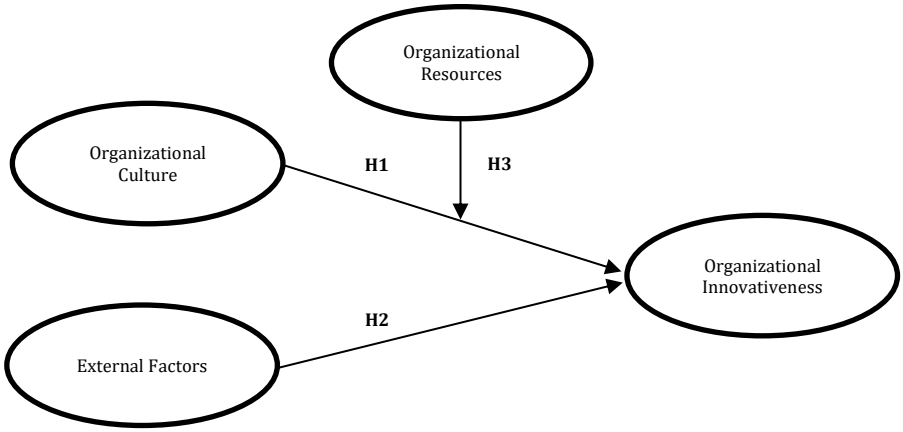

Fig. 1: Research model

Table 1: Source of measurement instrument

S/N	Variables	Sources	Scale	Remarks
1.	Adhocracy culture	Cameron and Quinn (2005)	5-point	Adopted
2.	Market orientation	Jaworski and Kholi (1993)	5-point	Adapted
3.	Transformational leader	Garcıa-Morales et al. (2006)	5-point	Adopted
4.	Organizational learning	Garcıa-Morales et al. (2006)	5-point	Adopted
5.	Government support	Lin (2007)	5-point	Adapted
6.	Environment uncertainty	Lin (2007)	5-point	Adopted
7.	Market competition	Premkumar and Robert (1999)	5-point	Adopted
8.	Firm Innovativeness	Knowles et al. (2008)	5-point	Adopted

Krejcie and Morgan (1970)'s criteria were used to determine the appropriate sample size for this research and to ascertain the significance of 95% confidence level. It was found that 65 samples were deemed appropriate for a population of 97 ship building companies.

Following Sekaran and Bougie (2016), a simple random sampling was used to select the respondents for this study. The copies of questionnaire were sent by post to the selected companies, accompanied by a cover letter which explained its purpose and also the respondents were assured that their responses will be treated with utmost confidentiality throughout the research. Thereafter, all the 41 returned questioners were retained for analysis because they were completely filled. The 41 returned questionnaires corresponds to 63% response rate and this is considered adequate (Akintoye, 2000; Dulaimi et al., 2003).

Owing to the fact that this study used self-reporting survey, Podsakoff and Organ's (1986) Harman's single factor test was also performed to further examine the common method variance. In conducting Harman's single-factor test, all variables of interest were entered into the exploratory factor analysis (EFA) with the aid of unrotated principal components factor analysis.

The results suggest that common method variance is not of great concern in this study, and it is unlikely to inflate the relationships among the variables measured in this study. The characteristics of the sample, as shown in Table 2, consist of the positions, number of employees, company age and number of full time employees.

Table 2: Demographic profile of respondents

Respondents	Frequency	%
Position in the Company		
Executive/Managing Director	9	21.9
Marketing manager	7	17.1
General Manager	6	14.6
Operations Manager	8	19.5
Others	11	26.8
Work Experience (in years)		
Years		
1-5 Years	6	14.6
6-10 years	16	39.0
More than 10 years	19	46.3
Gender		
Male	40	97.5
Female	1	2.4
Company Ownership		
Proprietorship	0	0
Partnership	0	0
Private Limited (Sdn Bhd)	39	95.1
Corporation	2	4.8
Others	0	0
Company Location		
Within Sarawak state	34	82.9
Within few states	4	9.8
Regional	0	0
Across Malaysia	1	2.4
International market	2	4.8
Company age		
1-5 Years	11	26.8
6-10 years	19	46.3
More than 10 years	11	26.8
Number of Full Time Employees		
<50	39	95.1
51-100	1	2.4
>100	1	2.4

3.3. Data analysis

To achieve the first objective of this paper, we used the mean score and Relative Importance Index (RII) to identify the critical barriers to organizational innovativeness of the shipbuilding companies surveyed. To achieve the second, third and fourth objectives of this paper, we used the Partial least squares Structural Equation Modelling technique to analyze the data obtained (Goodhue et al., 2007). This analysis technique was chosen based on the following considerations. Firstly, PLS-SEM has the ability to model latent constructs either formatively or reflectively. All the latent constructs in this study were modelled reflectively. Secondly, PLS-SEM path modelling can be used for the assessment of the psychometric properties of individual latent constructs. Thirdly, the technique has the ability to model latent variables under non-normality conditions. Fourthly, it has the ability to handle the small sample size. Hence, PLS-SEM was considered appropriate for analyzing the 41 valid responses (Chin, 1998). The analyses were then performed using a two-step procedure (Henseler et al., 2009), comprising (1) measurement model assessment, where the items of reliability and validity are assessed, and (2) structural model assessment, where the significance of path coefficients is tested, and the coefficient of determination (R^2 value) is determined

4. Results

Following Kometa and Olomolaiye (1997), a non-parametric technique was used to obtain the relative importance index (RII) of the barriers to innovativeness among the shipbuilding companies. The RII was calculated using the following formula.

$$RII = \text{Sum of weights } (W1+W2+W3+\ldots+Wn)/A \times N \ldots \quad (1)$$

where W = weights given to each factor by the respondents and will range from 1 to 5 where '1' is less significant and '5' is extremely significant. A = highest weight (i.e., 5 in this case), and N = total number of respondents. As shown in Table 3, economic turbulence and the difficulties in keeping qualified staff showed the highest RII (RII=0.683), indicating the most important barriers in innovativeness faced by the shipbuilding companies. It was followed by the lack of internal employee training (RII=0.673), the difficulty in accessing financial resources (RII=0.668) and lack of market information (RII=0.654). It was found that high cost associated with innovation (RII=0.605), risk associated with innovation (RII=0.580) and lack of flexibility in rules and policy (RII=0.571) showed the lowest importance compared to the other barrier as shown in Table 3.

Table 4 presents the overall mean and standard deviation scores for this study's exogenous and endogenous latent variables. Meanwhile, organizational learning has the highest mean (3.626), adhocracy culture showed the lowest mean score (3.022), low level practice of adhocracy culture among the shipbuilding companies in Sarawak.

Table 3: Relative importance index of barriers to organizational innovativeness

	Items	Mean	RII	Rank
1.	Economic turbulence is preventing us from innovating.	3.415	0.683	1
2.	The problems of keeping qualified Staff are preventing us from innovating	3.415	0.683	1
3.	Lack of internal employee training is preventing us from innovating.	3.366	0.673	3
4.	Difficulty in accessing financial resources is preventing us from innovating	3.341	0.668	4
5.	Lack of market information is preventing us from innovating	3.268	0.654	5
6.	Employees' resistance to change is preventing us from innovating	3.098	0.620	6
7.	Lack of external partners' opportunities is preventing us from innovating.	3.049	0.610	7
8.	High costs associated with innovation are preventing us from innovating.	3.024	0.605	8
9.	Excessive risk associated with innovation **i**s preventing us from innovating	2.902	0.508	9
10.	Lack of flexibility in rules and policies is preventing us from innovating	2.854	0.571	10

4.1. Validity and reliability

We evaluated the reliability of each item by examining the outer loadings of the latent variables (Duarte and Raposo, 2010; Hair et al., 2016). We adhered to the requirement of standardized loadings between 0.40 and 0.70 to be retained (Hair et al., 2016). We deleted only one item of Adhocracy culture (AC1) from the 67 items, because it loaded below the expected threshold of 0.40, while the remaining 66 items loaded well above 0.40. Thus, as indicated in Table 7, the items had loadings between 0.635 and 0.918.

Table 4: Descriptive statistics for latent variables

Latent Variables	Number of Items	Mean	Std. Deviation
Environmental Uncertainty	6	3.581	0.550
Market Competition	6	3.329	0.730
Government Support	5	3.512	0.663
Adhocracy	11	3.022	0.650
Market Orientation	10	3.239	0.728
Transformational Leadership	6	3.426	0.738
Organizational Learning	6	3.626	0.803
Product Innovativeness	3	2.910	0.813
Process Innovativeness	4	3.116	0.868
Business innovativeness	4	3.030	0.789
Info-tech Innovativeness	6	3.293	0.794

The internal consistency of reliability is explained in terms of the extent to which all parts of a particular scale measure a concept (Sun et al., 2007). Cronbach's alpha coefficient and composite reliability coefficient are mostly used to estimate this reliability of a scale (McCrae et al., 2011). Therefore, to ascertain the internal consistency of this study's measures, we considered the composite reliability coefficient in lieu of the popular Cronbach's alpha coefficient. Organizational researchers (Gotz et al., 2010) claim that composite reliability coefficient has lesser biased estimation of reliability than in Cronbach's alpha coefficient. Their claim is based on the fact that in Cronbach's alpha coefficient, items simultaneously contribute to the latent variable without ascertaining the individual items' contribution. Therefore, the criterion for interpreting internal consistency of reliability using composite reliability coefficient is that the reliability coefficient should be 0.70 and above (Bagozzi and Yi, 1988; Hair et al., 2011).

4.2. Measurement model results

We adopt a two-step approach for the evaluation of PLS-SEM path model results in this study. The two steps are: firstly, measurement model assessment, where item reliability and validity are assessed, and secondly, structural model assessment, whereby the significance of path coefficients is tested, and the coefficient of determination is assessed (Henseler et al., 2009). In the estimating measurement model, individual item reliability, internal consistency of reliability, content validity, discriminant validity and convergent validity are determined (Hair et al., 2016; Hair et al., 2011). Table 5 presents the coefficient, composite reliability, average variance extracted and item loading.

Table 5: Loadings, composite reliability (CR) and AVE

Construct and Their Variables	Loading
Product innovativeness, AVE = 0.778; Composite reliability = 0.913	
PR1. We tend to be an early adopter of innovation ship building materials	0.775
PR2. We are able to adopt innovative ship building used by other companies	0.780
PR3. We seek for innovative building materials from outside this organization	0.737
Process innovativeness, AVE = 0.725; Composite reliability = 0.913	
PC1. We tend to be an early adopter of innovative ship building process	0.746
PC2. We are able to implement innovative process used by other companies	0.833
PC3. We actively develop in-house solution to improve our ship building services.	0.772
PC4. We seek for innovative ship building process outside this organization	0.731
Business system innovativeness, AVE = 0.750; Composite reliability = 0.923	
BS1. We see creating new business systems as critical to our success	0.773
BS2. We tend to be an early adopter of innovative business system	0.918
BS3. We are able to implement innovative business systems used by other companies	0.862
BS4. We actively seek innovative business systems from outside this company	0.904
Information technology innovativeness, AVE = 0.635; Composite reliability = 0.913	
Info1. Most of our employees are computer literate	0.810
Info2. We have a policy that encourages the application of information technology	0.786
Info3. Our company is well computerized	0.703
Info4. Our company has high bandwidth connectivity to the internet	0.782
Info5. Employees support the application of information technology	0.805
Info6. We conduct most business transactions online	0.748
Adhocracy culture, AVE = 0.602; Composite reliability = 0.938	
AC2. The company is an entrepreneurial place.	0.800
AC3. The leadership in our company generally exemplifies innovativeness	0.813
AC4. The leadership in our company generally exemplifies risk-taking	0.822
AC5. The management style in the company is characterized by freedom	0.797

AC6. The management style in our company is characterized by uniqueness	0.782
AC7. We are committed to innovation	0.791
AC8. We are committed to development	0.717
AC9. The company emphasizes on creating new challenges	0.733
AC10. The company emphasizes on acquiring new resources	0.792
AC11. We define success on the basis of unique services	0.701
Market orientation, AVE = 0.649; Composite reliability = 0.949	
MO1. Our staff share competitor information within the company	0.788
MO2. We respond rapidly to competitive actions	0.827
MO3. The company's top management regularly discusses competitors' strength	0.836
MO4. We target customers when we have an opportunity for competitive advantage	0.799
MO5. The company pays close attention to after- service	0.796
MO6. Our business objectives are driven by customer satisfaction	0.823
Transformational Leadership, AVE = 0.665; Composite reliability = 0.922	
TSL1. The management team is always on lookout for new opportunities for the organization	0.714
TSL2. The management team has a clear view of its final goals	0.685
TSL3. The management team succeeds in motivating the rest of the company employees	0.794
TSL4. The management team always acts as the organizational leading force	0.712
TSL5. The company leaders are capable of motivating the employees on their job	0.787
TSL6. The company has leaders who are capable of guiding the employees on their job	0.783
Organizational learning, AVE = 0.647; Composite reliability = 0.916	
OL1. The company promotes a learning culture	0.728
OL2. The company has a strong commitment to learn	0.718
OL3. The company promotes open-mindedness	0.751
OL4. The management team acts a learning agent for the company	0.728
OL5. The company proactively questions long-held way routines	0.725
OL6. Our shared vision provides a focus for learning	0.677
Environmental uncertainty, AVE = 0.602; Composite reliability = 0.929	
EU1. Our customers' preference changes quite a bit over time	0.788
EU2. Our customers tend to look for new service all the time	0.847
EU3. Other companies are adopting innovation in their services	0.850
EU4. New customers are demanding for our services	0.828
EU5. New customers tend to have needs that are different from our existing customers	0.812
EU6. We currently cater for many of the same customers we used to deal with in the past	0.843
Market competition, AVE = 0.693; Composite reliability = 0.919	
MC1. Competition is intense in the ship building industry	0.797
MC2. There are many promotions in the ship building industry	0.856
MC3. Anything that one competitor can offer, others can provide same	0.863
MC4. Price competition is a hallmark of this industry	0.834
MC5. We hear of a new competitive move almost every time	0.812
Government support, AVE = 0.659; Composite reliability = 0.905	
GS1. Government provides financial support for Innovation	0.635
GS2. Government encourages innovation in Ship building industry	0.848
GS3. Government agencies provide incentive for innovation	0.829
GS4. Government introduces a regulation that promotes innovation	0.878
GS5. Government policy promotes competition in the ship building industry	0.846

As shown in Table 5, the coefficients ranged from 0.905 to 0.938, which implies that the latent variable's internal consistencies were adequate as they all exceeded the minimum level of 0.70.

Thus, in Table 6, the square root of AVE (appearing in bold) is compared with the off-diagonal coefficients. The results showed that the square roots of all the AVEs along the diagonals are greater than the off-diagonal coefficients both in rows and columns, indicating adequate discriminant validity. Discriminant validity is also be assessed by comparing the item loadings with the cross-loadings, where all the item loadings should be greater than other loadings in rows and columns. As shown in the result of cross loading, all item loadings were not only higher than the recommended value of 0.5, they are also higher than the cross loadings. This suggests that discriminant validity of the outer model is satisfactory.

4.3. Structural model and hypothesis testing

The higher-order model (hierarchical component model, HCM) involves the testing of a second-order structure that has two level-components. This model is considered to achieve a more parsimonious theoretical relationship and to reduce the complexity of a model (Hair et al., 2013). This procedure also gives additional evidence in support of this study's theoretical model as indicated in the structural model, based on the suggestions of Chin (2010). All the four variables in this study are multi-dimensional, which necessitated the inclusion of the higher-order model, and in estimating the model, the latent variable scores of these dimensions were

taken as indicators from the SmartPLS analysis report.

As indicated by Byrne (2010), to further advance the knowledge on the existing theoretical basis, the second order constructs should be conceptually explained by their first order constructs (i.e., the dimensions of company culture, company resources, external factors, and firm innovativeness). Before estimating the research model, it is important to establish the suitability of the first order constructs to be able to conceptually describe the second order constructs. This is presented in Table 7 where the results emphasized the suitability of the dimensions of the first order constructs to explain the second order constructs in this study.

Table 6: Correlations among variables (n = 41)

	Latent Variables	1	2	3	4	5	6	7	8	9	10	11
1	Adhocracy	**0.776**										
2	Buss. Innovativeness	0.608	**0.866**									
3	Envt. Uncertainty	0.521	0.359	**0.828**								
4	Govt. Support	0.509	0.428	0.726	**0.812**							
5	IT Innovativeness	0.650	0.611	0.468	0.467	**0.797**						
6	Market Competition	0.519	0.354	0.791	0.715	0.463	**0.833**					
7	Market Orientation	0.653	0.597	0.564	0.505	0.548	0.563	**0.805**				
8	Org. Learning	0.580	0.578	0.492	0.485	0.645	0.494	0.525	**0.804**			
9	Process Innovativeness	0.659	0.711	0.397	0.525	0.690	0.395	0.595	0.629	**0.851**		
10	Product Innovativeness	0.613	0.679	0.368	0.437	0.640	0.371	0.570	0.576	0.790	**0.882**	
11	Transform. Leadership	0.685	0.469	0.399	0.459	0.512	0.393	0.650	0.651	0.605	0.742	**0.815**

Table 7: Second-order Construct Establishment

Second-order Constructs	First-order Constructs	Loadings	SE	T-Value	P-Value	R^2
Company Culture	Adhocracy Culture	0.989	0.006	88.474	0.00	0.977
	Market Orientation	0.987	0.006	88.732	0.00	0.977
Company Resources	Transform. Leadership	0.924	0.017	34.852	0.00	0.839
	Organizational Learning	0.892	0.013	41.445	0.00	0.811
External Factors	Environ. Uncertainty	0.962	0.015	52.579	0.00	0.963
	Market Competition	0.958	0.006	0.181	0.43	0.944
	Government Support	0.884	0.009	30.763	0.00	0.714
Firm Innovativeness	Product Innovativeness	0.879	0.007	31.702	0.00	0.749
	Process Innovativeness	0.909	0.010	27.602	0.00	0.821
	Business Innovativeness	0.865	0.008	36.201	0.00	0.730
	Info-Tec Innovativeness	0.844	0.012	30.435	0.00	0.751

P <0.01

In Table 7, the two first orders constructs, which are: adhocracy and market orientation are well explained by company culture as their R2 values are 0.977 respectively. Equally, organizational culture was able to explain the two first orders constructs (transformational leadership and organizational learning) considering their R^2 values which are 0.839 and 0.811 respectively. The R^2 value recorded for the three first order constructs of external factors indicated that they have been well explained by their second order construct with environmental uncertainty having 0.963, market competition 0.944, and government support 0.714. Thus, the results in Table 7 confirm the distinct nature of this study's constructs.

After establishing the fitness of the outer model in the previous steps, the next assessment involves inspecting the structural model to determine the path coefficients for the hypotheses testing with the aid of Smart PLS 2.0 software. This study applied the non-parametric evaluation criteria based on the bootstrapping procedure with 500 bootstrap samples and 41 cases to in order to assess the significance of the path coefficients (Hair et al., 2016; Hair et al., 2011). In Fig. 2, this study's structural (inner) model, without the inclusion of the moderating effects is depicted.

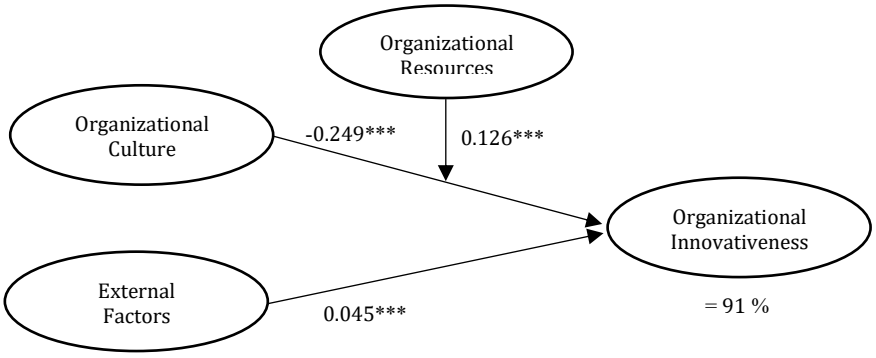

Fig. 2: Path coefficient beta values, significance and R2 value

The non-parametric evaluation criteria based on the bootstrapping procedure with 500 bootstrap samples and 41 cases were applied to assess the significance of the path coefficients (Hair et al., 2016;

Henseler et al., 2009). As shown in Figs. 3 and 4, the inner model, including the moderating effects is depicted. Table 8 also explains the result for the full structural model including the moderating variables, which are company resources and external factors.

Table 8: Structural model assessment with moderator

S/No	Relationships	Path coefficient	Standard Error	t-value	p-value	Decision
1	Culture -> Innovativeness	-0.249	0.045	5.498***	0.00	Rejected
2	Ext -> Innovativeness	0.045	0.019	2.404***	0.00	Supported
3	Culture * Resource -> Innovativeness	0.126	0.064	3.919***	0.00	Supported

Note: ***Significant at 0.01 (2 tailed)

Table 8 presents the assessment of the full model with the moderating effect. We hypothesized a significant relationship between company culture and innovativeness of ship building companies operating in Sarawak in H1. Conversely, the result shown in Table 8 revealed a negative relationship between organizational culture and innovativeness of the shipbuilding companies. (β = -0.249, t = 5.498, p< 0.01). The results in Fig. 2 and Table 8 showed a direct effect of external factors on firm innovativeness as hypothesized in H2. The hypothetical paths retain the positive relationship postulated earlier, and it is statistically significant (β = 0.045, t = 2.404, p< 0.01). Hence, H2 was supported. This result has significant implications for the management of shipbuilding firms and their innovative capabilities. Shipbuilding firms need to understand the environmental factors and leverage this understanding for their innovation adoption. The findings also imply that external factors like market competition will motivate shipbuilding firms to devise ways of attaining competitive advantage. In the same way, government continued support like policies that reward and encourage innovativeness in the shipbuilding industry which is a possible determinant of innovation adoption.

Hypothesis H3, which hypothesized a moderating influence company resources on the relationship between company culture and innovativeness of shipbuilding firms in Sarawak was also found to be supported (β = 0.126, t = 3.919. p< 0.01). The observed moderating influence of company resources reflects that with varying levels of transformation leadership and organizational learning, Malaysian shipbuilding firms attain different capacity levels of innovativeness.

Another important criterion for the assessment of inner model is the coefficient of determination (R^2). According to Hair et al. (2011), the R^2 coefficient measures the proportion of an endogenous latent construct's variance that is explained by one or more predictor(s). It is a measure of a model's predictive accuracy, which is usually calculated as the squared correlation that exists between a specific endogenous variable's predicted values (Elliott and Woodward, 2007). The rule of thumb for an acceptable R^2 level, according to Falk and Miller (1992) is 0.10. Also, Chin, (1998) suggested R^2 values of 0.67, 0.33, and 0.19 as substantial, moderate, and weak, respectively. In Table 8, the R2 value in this study's endogenous latent variable is presented.

As shown in Table 9, this study's model explains 91% of the total variance in firm innovativeness. This, according to Falk and Miller (1992) implies that the three independent latent variables (company culture, company resources and external factors), including the contributions of their dimensions, jointly explain 91% of the variance in the dependent variable, which is firm innovativeness.

Table 9: Variance explained in the endogenous latent construct

Latent Construct	Variance Explained (R^2)
Firm Innovativeness	91%

4.4. Effect size (f2) evaluation

In determining the strength of a model, the R^2 value of the endogenous latent variable is calculated, because this procedure is suitable for the estimation of how substantial the impact of exogenous latent construct (s) on the endogenous construct. The effect size involves running a PLS algorithm while an exogenous construct is removed from the model in order to generate the R^2 excluded value for the same excluded construct. The same procedure is repeated the second time by returning the exogenous latent construct in the model to generate the R^2 included value (Hair et al., 2013). All the changes observed in R^2 values are used to compute the effect size (f^2) which is calculated thus:

$$f^2 = \frac{R^2 included - R^2 excluded}{1 - R^2 included} \quad (2)$$

The f^2 values of 0.02, 0.15 and 0.35 are considered as weak, moderate, strong effect sizes respectively (Cohen, 1988). Table 10 presents the respective effect sizes of the latent variables in the structural model.

Table 10: Effect Size on Firm innovativeness (Endogenous Construct)

R-squared	R^2 Incl.	R^2 Excl.	R^2incl-R^2excl	1- R^2incl	Total Effect
Company culture	0.915	0.903	0.012	0.988	0.141
Company resources	0.915	0.670	0.245	0.309	2.882
External factors	0.915	0.913	0.002	0.085	0.024

As indicated in Table 10, the effect sizes for company culture, company resources, and external factors on firm innovativeness are 0.141, 2.882 and 0.024 respectively. Thus, following the guideline of

Cohen (1988), the effect sizes of these three independent variables on firm innovativeness are considered as small, large, and small respectively.

4.5. Testing moderating effects of external factors

Factors that are external to the ship building companies (like environmental uncertainty, market competition, and government support) are also considered in this study to moderate the relationship between shipbuilding resources and firm innovativeness. As described earlier, product indicator approach was applied to estimate the strength of this moderating effect. And in Figs. 3 and 4 and Table 8, the estimates after applying the product indicator approach were established. It was earlier proposed in Hypothesis 3 that external factors will moderate the relationship between resources and firm innovativeness, such that this relationship will become stronger for the ship building companies operating within those external factors than for those without such factors. As indicated in Figs. 3 and 4 and Table 8, the interaction terms representing resources and external factors (β = 0.095, t = 2.201, p < 0.00) were statistically significant.

Expectedly, hypothesis 3 was fully supported at 0.10 level of significance. Equally, the path coefficient in the structural model was utilized to plot the moderating effect of the external factors on the relationship between company resource and firm innovativeness, and Figs. 3 and 4 clearly indicated that the relationship between shipbuilding resources and firm innovativeness becomes stronger for ship building companies operating in the external environmental factors (like environmental uncertainty, market competition and government support) than for those that are not operating in these circumstances.

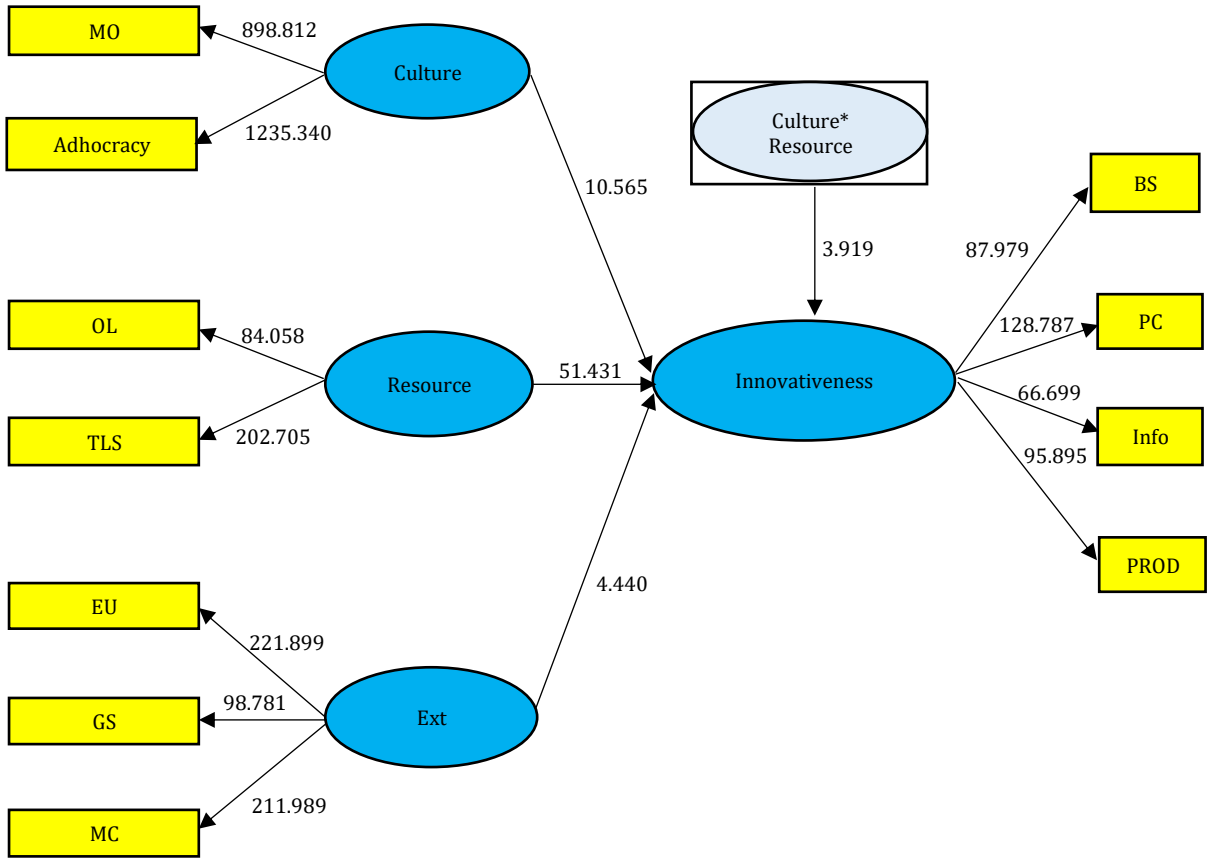

Fig. 3: Structural model with company resources as moderator

Expectedly, hypothesis 3 was fully supported at 0.10 level of significance. The beta values in the structural model were also used to plot the moderating effect of company resources on the relationship between company culture and firm innovativeness, and Figs. 3 and 4 clearly indicated that the relationship between firm innovativeness and company culture like adhocracy culture and market orientation becomes stronger for ship building companies with strong resources than for those that are not privileged to have the resources considered in this study.

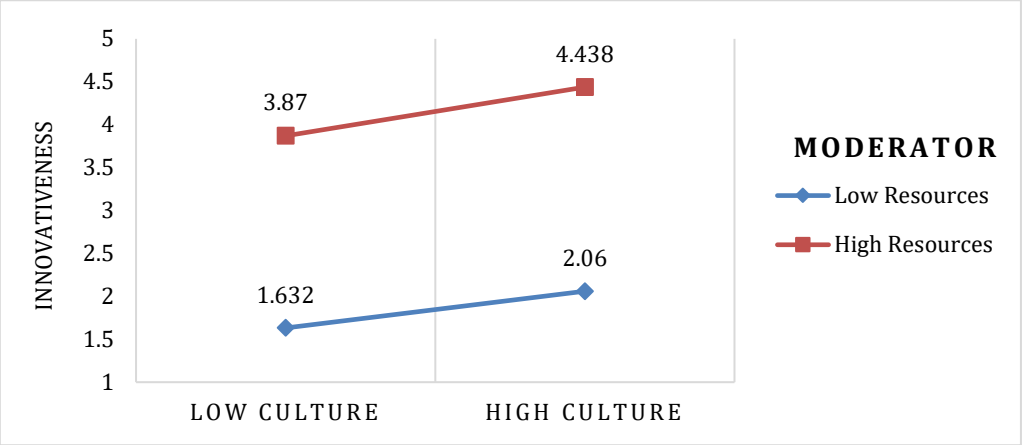

Fig. 4: Interaction effects of resource and culture on firm innovativeness (Resources strengthen the positive relationship between Culture and Innovativeness)

5. Discussion

The purpose of this study is to identify the critical barriers to innovativeness; examine the influence of organizational culture and external factors on the Innovativeness of Shipbuilding companies operating in Sarawak, Malaysia; and to test whether resources (transformational leadership and organizational learning) moderate the relationship between organizational culture and innovativeness.

Economic turbulence and problems of keeping qualified staff have been identified as critical barriers to innovativeness of shipbuilding companies operating in Sarawak, Malaysia. Although these two factors have not been seen as critical in previous studies due to the differences in the market characteristics across industries, yet this study complements the work of Demirbas et al. (2011) who found that high cost of innovation, lack of appropriate source of finance and lack of qualified staff are barriers to innovation propensity among the SMEs operating in Turkey. Our results are also consistent with the findings of Madrid-Guijarro et al. (2009). Excessive risk associated with innovation and lack of flexible rules as barriers to innovativeness are consistent with Mostafa (2005) who found risk aversion and strict rules to be one of the major creativity barriers to creativity and innovativeness among managers in Egypt.

Contrary to most previous studies that found a positive relationship between organizational culture and innovativeness (Jantan et al., 2003), our finding showed a negative relationship between the two variables. Hence, the hypothesis (H1) was not supported. However, our finding complements Laforet (2016) who finds a negative relationship between a paternalistic and founder culture type and family firm innovation performance. This implies that the less shipbuilding companies in Sarawak practice adhocracy culture and market orientation, the more their propensity to adopt innovative shipbuilding materials, innovative process, business, and information technology would be enhanced. An explanation to this finding could be as a result of low level of adhocracy culture practiced and its perception among the ship building industry probably due to family business type of ownership existing in the Sarawak shipbuilding industry.

In H2, we hypothesized that external factors will have a significant relationship with innovativeness. This implies that the existence of external factors (environmental uncertainty, market competition and government support) will enhance the innovativeness of the shipbuilding companies who have transformational leaders and continuous organizational learning. In response to business uncertainty, and high competition, transformational leaders will take advantage of government support and leverage the organizational resources to enhance their innovativeness. This finding extends the work of Prasad and Junni (2017) who found that environmental uncertainty moderates the relationship between an organizational behaviour (top management team cognitive conflict) and firm innovativeness by enhancing this relationship. Our finding is also consistent with Altayyar and Beaumont-Kerridge (2016) who found the relevance of external factor to the adoption of e-procurement in Saudi Arabian SMEs.

In H3, we hypothesized that organizational resources will moderate the relationship between organizational culture and innovativeness among the shipbuilding companies in Sarawak. Consistent with Raj and Srivastava, (2016), we found a moderating effect of resources on the relationship between culture and innovativeness. As organizational resources were conceptualized in this study, a transformational leader will leverage other organizational resources such as organizational knowledge to enhance their competitive advantage such as through innovativeness.

6. Conclusion

This paper complements the existing organizational innovativeness literature in the ship building industry and provides some theoretical and practical implications. While most studies found a positive and significant relationship between organizational culture and innovativeness, our study sheds more light on the extent of practice and perception of organizational culture among the

shipbuilding companies in Sarawak. In addition, this paper contributes to the innovativeness literature by presenting a direct relationship between external factors and innovativeness; and the moderating effect of organizational resources on the relationship between culture and innovativeness.

The findings of this study have shown that while shipbuilding companies can enhance their competitive advantage through organizational innovativeness, certain antecedents such as transformational leadership style and organizational knowledge should be given considerable attention in addition to addressing external factors such as government support, environment uncertainty. Hence, this study is relevant to the stakeholders in addressing some of the challenges currently facing the shipbuilding industry. While this study uses the quantitative approach to obtain data and focus on Sarawak alone, future research could use a qualitative approach or mix method and expand the scope to all the shipbuilding companies operating in west Malaysia.

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