



## CEO Age and Managerial Risk Taking: Do National Cultures Matter?

YEOH SIEW BOEY<sup>a</sup> AND HOOY CHEE WOOL<sup>a\*</sup>

<sup>a</sup>*School of Management, Universiti Sains Malaysia, Malaysia*

### ABSTRACT

The relationship between CEO age and corporate risk taking has remained inconclusive after decades of research. Drawing on upper echelons theory, we document that risk-taking behaviour increases as CEOs become older. We further explore the moderating influences of national culture on the age-risk taking relationship based on Hofstede's cultural dimensions. Using analyses 50,555 firms from 90 countries, our findings reveal that cultural dimension of power distance and long-term orientation foster risk-taking behaviour while individualism, uncertainty avoidance and indulgence attenuate risk-taking propensity. However, we obtain inconsistent result for masculinity for our proxies of risk taking. By examining firms' risk-taking using managerial characteristics and environmental cues, we offer important implications by integrating insights from multiple theoretical perspective.

**JEL Classification:** G31, G32

**Keywords:** CEO age; managerial risk taking; national culture

---

*Article history:*  
Received: 15 February 2021  
Accepted: 7 August 2021

---

---

\* Corresponding author: Email: [cwhooy@usm.my](mailto:cwhooy@usm.my)

## INTRODUCTION

Managerial risk-taking is today considered of considerable importance for firms due to uncertainty surrounding the organisation in the business world. According to Hoskisson et al. (2017), managerial risk taking activities enhance the competitive advantage of an organisation. Upper echelon theory has provided a substantial theoretical base for research on profile of corporate elite in determining the strategic choice and organisational outcome (Hambrick and Mason, 1984) and CEO age has been acknowledged as one of the factors that have an impact on managerial risk-taking (Li et al., 2017; Serfling, 2014; Yim, 2013).

Despite decades of extensive empirical investigations, the relationship between risk-taking and CEO age is mixed and inconclusive. One stream of research contends that older CEOs are less willing to take risk due to the aging effect (Child, 1974; Hambrick and Mason, 1984; Taylor, 1975) and prefer to have a quiet life when they get older (Bertrand and Schoar, 2003). Older CEOs tend to undertake lesser capital expenditure, lower leverage and higher cash holdings (Bertrand and Schoar, 2003). In contrast, another stream of research argues that older adults base on experiential strategies when making decisions rather than analytical aspects due to frontal lobe function (Weller et al., 2011). As a result, older CEOs have greater risk-taking propensity as they have greater experience in identifying risky strategies that produce the greatest possibility of success (Simsek, 2007).

Many studies find that individual-level characteristics cannot fully explain the behaviour of an organisation without including country-specific factors. For example, Geletkanycz (1997) and Aggarwal (1981) provide empirical evidence that a country factor is an important determinant of risk-taking given the various national cultures and business environment. As corporations are part and parcel of a nexus of formal and informal institutions, culture provides a cognitive map for people within the institution to think, reason, act, react, perceive and interact (Tung, 1996). Even in organizations with specified standard operating procedures, interpretation of environmental cues may vary among managers due to differences in national culture (Tse et al., 1988). We therefore explore environmental characteristics to systematically delineate the moderating effect of cultures on the relationship between CEO age and risk-taking activities. To do so, we follow the cultural dimensions proposed by Hofstede (1983) and Hofstede et al. (2010), which are defined as power distance, individualism, masculinity, uncertainty avoidance, long-term orientation and indulgence.

We examine the relation between CEO age and corporate policies by analysing investment policy through which CEOs can influence the risk profiles of the firm. Following previous literature, we use R&D expenditure and long-term investment to measure investment policy (Hoskisson et al., 2017; Serfling, 2014). We further analyse how national cultures affect these policies by considering a sample of 50552 firms from 90 countries.

This study thus contributes to the strategic management research by extending the existing knowledge on how personal attributes and cultural dimension influence managerial risk taking. First, although studies have begun to adopt multiple theories of risk-taking to examine how the mechanisms interact, such work remains limited (Hoskisson et al., 2017). Thus, we attempt to respond to calls for such research. While upper echelons theory has devoted to executive orientations in influencing the strategic choice of a firm, we contend that culture may have a direct impact on their operations by drawing on institutional theory. Second, by considering a sample of 90 countries, we complement prior studies that have focused on specific geographical region, such as European countries (Gallego-Álvarez and Pucheta-Martínez, 2021). Third, as compared to previous studies which have considered only four or five dimensions (e.g. indulgence has scarcely been employed) we include all dimensions proposed by Hofstede et al. (2010).

The paper is developed in the following sections: the theoretical framework and hypothesis formulation is described in the next section. Section 3 describes the methodology and the variables used. Section 4 presents an analysis of the results and Section 5 provides discussion based on the results. Finally, Section 6 covers the conclusion of the research and the implications of its findings.

## REVIEW OF LITERATURE AND DEVELOPMENT OF HYPOTHESES

Strategic risky choices are important in decision making as it affects economic performance, growth and survival of an organisation (Bromiley, 1991). CEO is the central decision maker who dominates the top

management team and determines the corporate policies and organisational outcome (Bertrand and Schoar, 2003). The most successful executives are the greatest risk takers (MacCrimmon and Wehrung, 1990). Extensive studies have shown that personal characteristics of CEOs shape the attitude towards firms' risk-taking. Prior research has examined individual traits such as gender, career experience, education level and tenure, among others (Barker III and Mueller, 2002; Bertrand and Schoar, 2003; Elsaid and Ursel, 2011).

Upper echelons theory explicitly argued that personal attributes of an individual affect his or her values, preference, interpretation and action. The theory is built on the basic principle of bounded rationality (Simon and March, 1958). Bounded rationality is the idea that uncertain and informationally complex situations are able to be interpreted. In order to understand why an organisation behaves in a certain way, one must make reference to the character of the top executives as they are the most powerful actors of the organisation. Based on this bounded rationality principle, Hambrick and Mason (1984) develop two interconnected clues, namely psychological properties and observable experience. The former idea denotes that the actions of managers are based on their interpretation of the situation. The latter idea suggests that these personal interpretations are a function of their characteristics, values and experiences.

CEO age is a source of innate preference of risk that shapes the behaviour of the organisation (Serfling, 2014). Age determines the cognitive and processing information ability of a person. Elderly adults are under greater recency effects due to deteriorated memory functions (Wood et al., 2005). They have lesser ability to integrate and utilise the information base effectively when making decisions (Taylor, 1975). This stream of studies has shown that the aging effect results in a negative association between the age of CEO and risk-taking tendency.

Older executives are undeniably having more working experience. CEO age has been used as a proxy for level of experience (Herrmann and Datta, 2006). Specifically, executives who frequently make decisions will have greater past involvement in handling risk. The familiarity of dealing with risky situations determines individual risk preference and behaviour. When the CEOs have more experience in tackling problem situations, they are prone to perceive less risk as compared to those with less of such experience (March and Shapira, 1987). Research on wisdom development also suggests that older adults are better in using immediate recognition, intuition and inference before making judgement (Pliske and Mutter, 1996). This stream of research exhibits that experience effect results a positive association between age of CEO and risk-taking propensity.

Risk-taking relies on idiosyncratic and tacit knowledge of the CEO which can only be gained via longer experience in the CEO position (Simsek, 2007). Probability domain familiarity by Sitkin and Pablo (1992) also proposed that the more the past experience in dealing with risk, the less likely the individual is to perceive uncertainty on the outcome of taking these risks, and the more reasonable the risk will appear to be. Experience may attenuate the degree of actual or perceived loss associated with risk. We contend that experience effect dominates and there should be a positive correlation between CEO age and risk-taking.

*Hypothesis 1: CEO age is positively related to managerial risk-taking.*

Organizations interact with their environment, and cultural factors affect the way companies do so. According to institutional theory, organizations are not detached from their environment and cultural aspects, but instead interact with it (Scott, 2013). Cultural norms surrounding an organization and values promoted within it have a profound impact on the organisational behaviour, as it adapts norms and beliefs of the society, rendering it socially acceptable to obtain the necessary resources and legitimacy for its performance and survival (Alvarez and Barney, 2007).

Prior studies have focused on selected Hofstede's cultural dimensions, namely individualism/collectivism, masculinity/femininity, uncertainty avoidance and long-term/short-term orientation (Alvarez and Barney, 2007). We have taken into consideration all the six dimensions proposed by Hofstede et al. (2010). Power distance refers to the degree of equality between people in a nation. A high-power distance score implies that inequalities of power are prevailing in the country. Executives in countries with high degrees of power distance are more likely to undertake risky policies when the power is concentrated in their hands (Dechow et al., 1996).

Vecchi and Brennan (2009) report that power distance has a positive impact on managerial risk-taking, as companies in countries with a higher power distance invest significantly greater in R&D than their firms in countries with a lower power distance. The intuition is that companies in these cultural environments find it

easier to overcome the barriers to initiate changes (Ambos and Schlegelmilch, 2008). Zhang and Zhou (2015) also demonstrate that power distance has a positive influence on risky activities in Chinese firms.

*Hypothesis 2a: The positive effect of CEO age on managerial risk-taking will be strengthened for firms in countries with high power distance.*

Individualism refers to the extent to which a country supports individual or collective achievements. A high score of individualism denotes individual rights are dominant in one country. Executives operating in highly individualistic countries are more concerned with their own interests than the wealth of the shareholders and the requirement of the stakeholders (Khlif, 2016). They have a higher tendency to manage earnings for their own interests (Zhang et al., 2016).

Allred and Swan (2004) show that countries with high levels of individualism undertake risky activities to achieve better growth as people in the societies are given greater freedom to discover new ideas, give suggestions and express opinions. Shane (1993) reports that high individualistic countries tend to have more patents and innovation. Jones and Teegen (2001) also found a positive relationship between R&D investment and individualism.

*Hypothesis 2b: The positive effect of CEO age on managerial risk-taking will be strengthened for firms in countries with high individualism.*

The dimension of masculinity/femininity focuses on views of gender and the role of men/women in the society (Gallego-Álvarez and Pucheta-Martínez, 2021). Male-dominated cultures tend to be assertive and view material success as important part of their lives, while female-dominated cultures are more modest and emphasise on quality of life. A low masculinity score implies that the societies attribute more importance to relationships and modesty. In highly masculine country, managers have great salience on values such as professional career and business success (Peng et al., 2014).

Efrat (2014) contends that people in a masculine society are self-assured, optimistic and ready to tackle challenges, with a strong sense of initiative and aggressiveness to take a bolder approach. Rhyne et al. (2002) document that masculine culture produces a higher level of innovation in new products. In the similar vein, Jones and Davis (2000) report that masculinity is associated with incremental R&D efforts and investment.

*Hypothesis 2c: The positive effect of CEO age on managerial risk-taking will be strengthened for firms in countries with high masculinity.*

Uncertainty avoidance refers to the degree to which people tolerate uncertainty and ambiguity in one country. A high uncertainty avoidance ranking suggests that people in one country are not willing to tolerate a high degree of uncertainty and prefer more rules and order to reduce ambiguity (De Mooij and Hofstede, 2010). Executives in nations with higher degrees of uncertainty avoidance tend to be more risk averse (Zhang et al., 2016).

According to Gaspay et al. (2009), societies with high uncertainty avoidance hinders the development of new ideas and the implementation of R&D activities. On the contrary, firms in countries with low uncertainty avoidance foster innovative practices and activities (Waarts and Van Everdingen, 2005). Tian et al. (2018) also find that as the level of uncertainty avoidance increases, the positive impact that technological investment has on a firm's market share tends to be weakened, which proposes that low uncertainty avoidance facilitates R&D activities.

*Hypothesis 2d: The positive effect of CEO age on managerial risk-taking will be weakened for firms in countries with high uncertainty avoidance.*

Long-term orientation dimension suggests that a culture places great emphasis on future events. Individuals in these kinds of societies have a strong tendency to save and invest (Hofstede et al., 2010). Cultures with a long-term focus are able to adjust traditions to new circumstances with a great level of adaptability (Waarts and Van Everdingen, 2005). Companies in cultures with a long-term orientation will focus more on long-term and future outcomes (Gallego-Álvarez and Pucheta-Martínez, 2021).

Given that risky corporate policies such as R&D expenditure require long-term planning and investment which is normally associated with long-term orientation should correspond to higher levels of risky investment. Societies with a long-term orientation are instilled with persistence in striving to achieve their goals and objectives (Rhyne et al., 2002). Rujirawanich et al. (2011) also report that long-term orientation is positively correlated to long-term business investment.

*Hypothesis 2e: The positive effect of CEO age on managerial risk-taking will be strengthened for firms in countries with high long-term orientation.*

People in indulgent societies tend to appreciate leisure, value freedom and prefer control over life (Ismail and Lu, 2014). Its opposite pole, namely the restraint culture, refers to a society which controls the gratification of desires and restrain feelings. There are scant studies on the relationship between indulgence and risk-taking. Cultures with high indulgence are more readily to adopt new technologies than countries with low levels of indulgence (Syed and Malik, 2014). Griffith and Rubera (2014) exhibit that innovation has a positive effect on market share, which increases along with a culture of higher indulgence.

*Hypothesis 2f: The positive effect of CEO age on managerial risk-taking will be strengthened for firms in countries with high indulgence.*

## RESEARCH METHODOLOGY

We use a sample of 116,288 international firm-year observations for the period of 2015 to 2019. Data for all the variables have been collected from the S&P Global database, which encompasses 50,555 companies from 90 countries. Table 1 shows the list of countries by continents. 15.33% of the sample's firms are domiciled in Europe, 46.98% in Asia, 30.48% in North America, 1.57% in South America, 1.87% in Africa and 3.77% in Oceania.

Table 1 List of countries by continents

Europe	Asia	North America	South America	Africa	Oceania
Austria	Bahrain	Antigua & Barbuda	Argentina	Egypt	Australia
Belgium	Bangladesh	Bermuda	Brazil	Ghana	Marshall Islands
Bulgaria	China	British Virgin Islands	Chile	Kenya	New Zealand
Croatia	Hong Kong	Canada	Colombia	Liberia	
Cyprus	India	Cayman Islands	Peru	Malawi	
Czech Republic	Indonesia	Jamaica	Venezuela	Mauritius	
Denmark	Israel	Mexico		Morocco	
Estonia	Japan	United States		Nigeria	
Finland	Jordan			Rwanda	
France	Kazakhstan			South Africa	
Germany	Kuwait			Tanzania	
Greece	Lebanon			Tunisia	
Guernsey	Malaysia			Zimbabwe	
Hungary	Oman				
Iceland	Pakistan				
Ireland	Philippines				
Isle of Man	Qatar				
Italy	Russia				
Jersey	Saudi Arabia				
Lithuania	Singapore				
Luxembourg	South Korea				
Netherlands	Sri Lanka				
Norway	Taiwan				
Poland	Thailand				
Portugal	United Arab Emirates				
Romania	Vietnam				
Serbia					
Slovenia					
Spain					
Sweden					
Switzerland					
Turkey					
Ukraine					
United Kingdom					

The dependent variable for measuring managerial risk-taking (*RiskTaking*) is R&D expenditure and long-term investment. R&D expenditure (*R&D*) is measured as R&D expenses divided by book value of assets (Serfling, 2014). Long-term investment (*LTInv*) is measured as long-term investment divided by book value of assets. Our independent variable is CEO age and we follow previous study to compute CEO age in the given year (*CEOAge*) (Serfling, 2014).

The moderating variable is national culture (*NCulture*), measured using Hofstede's six cultural dimensions. This model of national cultural dimensions has been used by prior research (Gallego-Álvarez and Ortas, 2017; Peng et al., 2014). The six cultural dimensions are: (1) power distance (*PDI*) (2) individualism (*IDV*) (3) masculinity (*MAS*) (4) uncertainty avoidance (*UAI*) (5) long-term orientation (*LTO*) and (6) indulgence (*IDG*). Scores for the six cultural dimensions range from 0 to 100, with 50 being the halfway point. Countries with a score under 50 show a low cultural score for that dimension, while 50 or above is considered a high score. All the values related to each culture dimension are publicly available through the website of Geert Hofstede.

Based on previous studies on risk-taking (Elnahas and Kim, 2017; Habib and Hasan, 2017; Lu and Wang, 2018; Rashad Abdel-Khalik, 2014; Serfling, 2014), we control a series of factors that may affect risk-taking activities. We control for market-to-book (*MTBV*, measured as ratio of market value of equity to its book value), firm size (*LogFirmSize*, measured as natural logarithm of the book value of total assets), firm age (*FirmAge*, measured as the number of years from the establishment of the firm to the year of observation), sales growth (*SalesGrowth*, measured as the annual rate of growth of sales), return on asset (*ROA*, measured as ratio of earnings before interest & taxes to total assets) and cash holdings (*Cash*, measured as the cash and cash equivalents divided by the assets).

We set up a baseline model to examine whether CEOs age is positively related to managerial risk-taking as given in model below:

$$Risk\ Taking_{it} = \alpha_{it} + \sum \beta_k Control_{it} + \beta_1 CEO\ Age_{it} + \varepsilon_{it} \quad (1)$$

Next, we test the moderating effects of national cultures on the relationship between CEO age and managerial risk-taking using the six cultural dimensions:

$$Risk\ Taking_{it} = \alpha_{it} + \sum \beta_k Control_{it} + \beta_1 CEO\ Age_{it} + \beta_2 NCulture + \beta_3 (CEO\ Age \times NCulture) + \varepsilon_{it} \quad (2)$$

## RESULTS

Table 2 presents the descriptive statistics and correlations for the variables in our analysis. We show the mean and standard deviation value of the variables. Table 3 displays the correlation matrix of all variables. In correlation analysis, all the correlation values are between -0.5 and 0.5, except *MAS* vs *PDI* (0.511), *LTO* vs *PDI* (0.609) and *LTO* vs *UAI* (0.530). However, this relationship will not affect the results as both of them are not included in the regression models at the same time. In general, the correlation figures among explanatory variables and control variables are less than 0.50, indicating no problem of multicollinearity.

Table 2 Summary statistics for variable characteristics

Variable	Mean	Std. Dev.
<i>R&amp;D</i>	1.3%	5.5%
<i>LTInv</i>	5.1%	11.9%
<i>CEOAge</i>	52.6	10.0
<i>PDI</i>	50.4	24.8
<i>IDV</i>	48.6	31.9
<i>MAS</i>	51.2	23.8
<i>UAI</i>	49.3	26.6
<i>LTO</i>	49.5	29.4
<i>IDG</i>	43.7	23.3
<i>MTBV</i>	2.0	6.2
<i>LogFirmSize</i>	7.0	3.4
<i>FirmAge</i>	31.4	35.4
<i>SalesGrowth</i>	15.1%	67.7%
<i>ROA</i>	-4.1%	30.0%
<i>Cash</i>	16.8%	94.8%

Table 3 Correlation matrix

	1	2	3	4	5	6	7
1 <i>R&amp;D</i>	1.000						
2 <i>LTInv</i>	-0.060	1.000					
3 <i>CEOAge</i>	0.002*	0.064*	1.000				
4 <i>PDI</i>	-0.062*	0.027*	0.039*	1.000			
5 <i>IDV</i>	0.112*	-0.101*	0.088*	-0.102*	1.000		
6 <i>MAS</i>	0.032*	0.024*	0.180*	0.511*	0.457*	1.000	
7 <i>UAI</i>	0.011*	0.043*	0.212*	0.386*	0.222*	0.564*	1.000
8 <i>LTO</i>	-0.018*	0.064*	0.098*	0.609*	-0.244*	0.466*	0.530*
9 <i>IDG</i>	0.098*	-0.093*	0.101*	-0.030*	0.757*	0.317*	0.209*
10 <i>MTBV</i>	0.060*	0.007*	-0.025*	0.024*	-0.03	-0.015*	-0.019*
11 <i>LogFirmSize</i>	-0.087*	0.109*	0.059*	0.242*	-0.434*	0.087*	0.176
12 <i>FirmAge</i>	-0.086*	0.144*	0.167*	0.040*	0.018*	0.136*	0.184*
13 <i>SalesGrowth</i>	0.035*	0.009*	-0.063*	0.002	0.011*	-0.016	-0.037*
14 <i>ROA</i>	-0.020*	-0.098*	0.001*	0.006*	-0.010*	0.032*	0.016*
15 <i>Cash</i>	-0.031*	0.063*	0.021*	0.051*	-0.090*	0.041*	0.030*

Table 3 Cont.

	8	9	10	11	12	13	14	15
1 <i>R&amp;D</i>								
2 <i>LTInv</i>								
3 <i>CEOAge</i>								
4 <i>PDI</i>								
5 <i>IDV</i>								
6 <i>MAS</i>								
7 <i>UAI</i>								
8 <i>LTO</i>	1.000							
9 <i>IDG</i>	-0.127*	1.000						
10 <i>MTBV</i>	0.014*	-0.009*	1.000					
11 <i>LogFirmSize</i>	0.437*	-0.276*	0.104*	1.000				
12 <i>FirmAge</i>	0.109*	0.032*	0.007*	0.215*	1.000			
13 <i>SalesGrowth</i>	-0.025*	-0.006*	0.038*	-0.042*	-0.065*	1.000		
14 <i>ROA</i>	0.037*	-0.006*	0.004*	0.003	-0.039*	-0.003	1.000	
15 <i>Cash</i>	0.105*	-0.071*	-0.007*	0.123*	0.084*	0.004*	0.023*	1.000

All continuous variables are winsorised at their 1st and 99th percentiles to mitigate the effect of potential bias due to outliers. We test the relationship between CEO age and managerial risk-taking in Table 4, using R&D expenditure and long-term investment as the proxies for risk-taking. We test H2a to H2f in Model 1 to 6 in Table 5 to analyse the moderating effect of cultural dimensions on the relationship between CEO age and managerial risk-taking using R&D expenditure and long-term investment.

We examine whether CEO age is positively associated with managerial risk-taking in Table 4. As expected, the coefficient of CEO age is positive, and it is statistically significant for both proxies, namely R&D expenses and long-term investment. These findings support H1 which suggests that older CEOs undertake higher level of risk-taking.

Hypothesis 2 predicts the moderating effects of national culture. As shown in Table 5, Model 1 test the Hypothesis 2a on the effect of power distance on the relationship between age and managerial risk-taking. The coefficient on the interaction between age and power distance is positive and significant for R&D expenditure and long-term investment. Model 2 tests the Hypothesis 2b on the effect of individualism. The individualism variable shows a negative sign for R&D expenditure and long-term investment, which is contrary to our predictions.

In Model 3, we analyse the Hypothesis 2c on whether masculinity may strengthen the relationship between age and managerial risk-taking. We do not get consistent result for the two proxies of risk-taking. The coefficient for R&D expenses is positive, however it is negative for long-term investment. We analyse Hypothesis 2d on whether uncertainty avoidance may weaken the relationship in Model 4. We get consistent results with significant negative coefficient for proxies.

Based on the coefficients on the interaction reported in Model 5, the long-term orientation variable is positive and significant for R&D expenditure and long-term investment. The effect of indulgence on the relationship between CEO age and risk-taking are shown in Model 6. The interaction coefficient for the indulgence variable is negative and significant for both proxies.

Table 4 Regression results for testing H1

	<i>R&amp;D</i>	<i>LTInv</i>
<i>CEOAge</i>	0.057*** (0.000)	0.130*** (0.000)
<i>MTBV</i>	0.007*** (0.000)	0.009*** (0.008)
<i>LogFirmSize</i>	-0.164*** (0.000)	0.047 (0.198)
<i>FirmAge</i>	-0.013 (0.377)	-0.072** (0.035)
<i>SalesGrowth</i>	-0.000** (0.040)	-0.001*** (0.000)
<i>ROA</i>	-0.001*** (0.002)	-0.001* (0.065)
<i>Cash</i>	0.000 (0.310)	-0.000*** (0.000)
Constant	0.198 (0.684)	1.912* (0.087)
No. of observation	116288	116288



CEO Age and Managerial Risk Taking: Do National Cultures Matter?

Table 5 Regression results for testing H2a to H2f

	Model 1		Model 2		Model 3	
	<i>R&amp;D</i>	<i>LTI</i> <i>nv</i>	<i>R&amp;D</i>	<i>LTI</i> <i>nv</i>	<i>R&amp;D</i>	<i>LTI</i> <i>nv</i>
<i>CEOAge</i>	-0.026 (0.147)	0.068* (0.099)	0.129*** (0.000)	0.341*** (0.000)	0.032* (0.073)	0.313*** (0.000)
<i>PDI</i>	-0.217 (0.938)	-0.093 (0.989)				
<i>CEOAge x PDI</i>	0.002*** (0.000)	0.001*** (0.006)				
<i>IDV</i>			0.054 (0.833)	0.199 (0.736)		
<i>CEOAge x IDV</i>			-0.001*** (0.000)	-0.004*** (0.000)		
<i>MAS</i>					-0.039 (0.891)	0.15 (0.817)
<i>CEOAge x MAS</i>					0.001** (0.013)	-0.004*** (0.000)
<i>UAI</i>						
<i>CEOAge x UAI</i>						
<i>LTO</i>						
<i>CEOAge x LTO</i>						
<i>IDG</i>						
<i>CEOAge x IDG</i>						
<i>MTBV</i>	0.007*** (0.000)	0.009*** (0.007)	0.007*** (0.000)	0.009*** (0.007)	0.007*** (0.000)	0.009*** (0.009)
<i>LogFirmSize</i>	-0.161*** (0.000)	0.049 (0.179)	-0.146*** (0.000)	0.100*** (0.006)	-0.166*** (0.000)	0.065* (0.076)
<i>FirmAge</i>	-0.017 (0.239)	-0.075** (0.028)	-0.011 (0.451)	-0.066* (0.052)	-0.015 (0.302)	-0.055 (0.106)
<i>SalesGrowth</i>	-0.000** (0.045)	-0.001*** (0.000)	-0.000** (0.039)	-0.001*** (0.000)	-0.000** (0.040)	-0.001*** (0.000)
<i>ROA</i>	-0.001*** (0.002)	-0.001* (0.068)	-0.001*** (0.002)	-0.001* (0.064)	-0.001*** (0.002)	-0.001* (0.066)
<i>Cash</i>	0.001 (0.314)	-0.000*** (0.000)	0.001 (0.290)	-0.000*** (0.000)	0.001 (0.328)	-0.000*** (0.000)
Constant	11.405 (0.938)	6.685 (0.984)	-2.522 (0.843)	-8.131 (0.782)	2.261 (0.881)	-5.973 (0.864)
No. of observation	116288	116288	116288	116288	116288	116288

Table 5 Cont.

	Model 4		Model 5		Model 6	
	<i>R&amp;D</i>	<i>LTI</i>	<i>R&amp;D</i>	<i>LTI</i>	<i>R&amp;D</i>	<i>LTI</i>
<i>CEOAge</i>	0.091*** (0.000)	0.264*** (0.000)	-0.045*** (0.009)	0.072* (0.070)	0.129*** (0.000)	0.370*** (0.000)
<i>PDI</i>						
<i>CEOAge x PDI</i>						
<i>IDV</i>						
<i>CEOAge x IDV</i>						
<i>MAS</i>						
<i>CEOAge x MAS</i>						
<i>UAI</i>	0.116 (0.934)	0.14 (0.965)				
<i>CEOAge x UAI</i>	-0.001*** (0.000)	-0.003*** (0.000)				
<i>LTO</i>			-0.075 (0.784)	-0.046 (0.941)		
<i>CEOAge x LTO</i>			0.002*** (0.000)	0.001*** (0.003)		
<i>IDG</i>					0.539 (0.966)	-0.555 (0.985)
<i>CEOAge x IDG</i>					-0.002*** (0.000)	-0.006*** (0.000)
<i>MTBV</i>	0.007*** (0.000)	0.009*** (0.006)	0.007*** (0.000)	0.009*** (0.007)	0.007*** (0.000)	0.010*** (0.006)
<i>LogFirmSize</i>	-0.158*** (0.000)	0.070* (0.053)	-0.161*** (0.000)	0.048 (0.185)	-0.152*** (0.000)	0.087** (0.017)
<i>FirmAge</i>	-0.009 (0.553)	-0.055 (0.109)	-0.019 (0.194)	-0.075** (0.027)	-0.012 (0.414)	-0.069** (0.044)
<i>SalesGrowth</i>	-0.000** (0.040)	-0.001*** (0.000)	-0.000** (0.047)	-0.001*** (0.000)	-0.000** (0.038)	-0.001*** (0.000)
<i>ROA</i>	-0.001*** (0.001)	-0.001* (0.058)	-0.001*** (0.002)	-0.001* (0.068)	-0.001*** (0.002)	-0.001* (0.062)
<i>Cash</i>	0.001 (0.277)	-0.000*** (0.000)	0.001 (0.401)	-0.000*** (0.000)	0.001 (0.291)	-0.000*** (0.000)
Constant	-5.372 (0.937)	-4.789 (0.976)	3.876 (0.778)	4.197 (0.895)	-23.462 (0.966)	26.147 (0.984)
No. of observation	116288	116288	116288	116288	116288	116288

## DISCUSSION

In this research, we aim to explore how the age of CEOs affect the risk-taking activities of the firms. Drawing upon upper echelons theory, we provide evidence that older CEOs take higher levels of risk as compared to younger CEOs. We have shown that older CEOs invest more in R&D and undertake higher level long-term investment. This is consistent with the theorizing that experience effect results in an older manager to take more risk as they have more experience and ability in tackling problems (March and Shapira, 1987) and are better in using intuition and inference prior to making judgement (Pliske and Mutter, 1996).

We also document that this relationship depends on the national culture where firms are domiciled. We find that firms operating in cultures where there are high levels of power distance are more likely to have higher investment activities than those in countries with lower levels. Thus, power distance culture fosters older CEOs to undertake higher levels of R&D and long-term investment. This evidence is consistent with studies by Vecchi and Brennan (2009) and Zhang and Zhou (2015) that companies domiciled in greater power distance societies tend to invest more in R&D because it will be easier to overcome barriers to promote innovation.

For individualism, our results show that the level of R&D activities and long-term investment is lower in individualistic culture. This evidence suggests, in contrast to past evidence (e.g. Shane 1993; Jones and Teegeen 2001), societies with individualistic cultures tend not to take higher risk. Our finding is in line with Taylor and Wilson (2012) who support the view that in collectivist cultures, with higher levels of nationalism and patriotism, firms tend to undertake risk. There is a higher expectation of individual freedom, approval of

self-enrichment, and greater tolerance in individualistic societies, but it appears that innovation and long-term investment decisions require collective support and nationalism values.

We have inconsistent results for both proxies of variable masculinity. We get a positive sign for R&D but a negative sign for long-term investment. For R&D, our evidence is consistent with Efrat (2014), which proposed that masculinity contexts are more aggressive and proactive in taking challenges and leads to higher levels of innovation in developing new products. However, we get a negative relationship between masculinity and long-term investment. Prior studies also find some conflicting predictions for the relationship between the use of debt and masculinity as masculinity is in certain situations associated with conservatism and uncertainty avoidance (Wang and Esqueda, 2014).

We find that uncertainty avoidance discourages managerial risk-taking. This is consistent with our hypothesis that uncertainty avoidance attenuates the relationship between CEO age and risk-taking activities. R&D projects and long-term investments are associated with high a degree of uncertainty and likelihood of failure. Besides, this kind of activity involves long-term horizons, so it is probable that companies located in countries with low levels of uncertainty avoidance will be more aggressive in undertaking risky projects (Chen et al., 2017).

We scrutinize the effect of long-term orientation dimension on innovation. As expected, the long-term orientation promotes older CEOs to take a higher level of risk. This finding shows that companies domiciled in long-term orientation contexts tend to undertake more long-term investment and R&D activities, in line with studies by Rhyne et al. (2002) and Rujirawanich et al. (2011) who also document a positive correlation between the long-term cultural dimension and innovation.

In the final model, we examine how the relationship between CEO age and managerial risk-taking is affected in indulgent cultures. Our evidence does not support the idea that the more indulgent a society is, the higher the level of risk-taking. In our first model, we have found that power distance which promotes social order is associated with higher risk-taking propensity. In the similar vein, the opposite pole of indulgent culture, namely the restraint culture which controls and regulates societies by means of strict social norms may also find it easier to overcome the barrier of implementing risky policies. This may explain our result of the less indulgent a society, the greater the level of risk-taking activities.

## CONCLUSIONS

In this research, we aim to explore whether a CEO's age impacts his/her risk-taking behaviour. Consistent with the theoretical prediction that risk-taking behaviours increase as CEOs age, we find that CEO age is positively related to firms' R&D expenditure and long-term investments. Older CEOs with greater experience in managing risk are more able to comprehend, interpret and apply new information in ways that those lacking that experience are not able to replicate.

We further test on the moderating effect of national culture to the age-risk taking relationship. Our results demonstrate that risk-taking is strengthened by the cultural dimensions of power distance and long-term orientation, while individualism, uncertainty avoidance and indulgence weaken risk-taking propensity. Thus, firms domiciled in powerful and long-term orientation societies appear to be more likely to undertake R&D and long-term investment, and less likely if they operate in individualistic, uncertainty avoidant and indulgent culture.

Our results have several implications. Firstly, our evidence supports the notion of upper echelons theory that firms' risk behaviour can be predicted by the personal traits of CEOs. By combining with institutional mechanisms, we examine how national culture may motivate managers to engage in more risk-taking activities. In this regard, firms and management which engage in innovating strategies should consider the cultural factors prevalent where the companies are operating. Besides, given the positive effects that risk-taking can have on competitive advantage of a firm, policy makers which have the power to institutionalise behaviours by rules, laws and recommendation, policy makers should encourage more R&D and long-term investment in individualistic, uncertainty avoidant and indulgent cultures.

There are several limitations of the current study. First, this study employs R&D and long-term investment as the proxies to measure managerial risk taking. There are many other proxies for managerial risk taking such as mergers and acquisition, diversification and strategic change (Hoskisson et al., 2017). Second,

as predicted by upper echelons theory, CEO personal attributes impact his/her risk preference and risk-taking behaviour. This study only takes into account the age of the CEO. There are other managerial attributes which are also observable, such as gender, education and foreign experience of a CEO, that can be employed to examine the determinants for risk taking. Third, we encourage other researchers to extend our research to examine other institutional factors such as corporate governance mechanisms or political situation of the country, among others.

## ACKNOWLEDGMENT

The authors are grateful to Universiti Sains Malaysia for the financial support through the Research University Grants (1001/PMGT/8016091).

## REFERENCE

- Aggarwal, R. (1981) "International differences in capital structure norms: An empirical study of large European companies", *Management International Review*, pp. 75-88.
- Allred, B. B. and Swan, K. S. (2004) "Global versus multidomestic: Culture's consequences on innovation", *Management International Review*, pp. 81-105.
- Alvarez, S. A. and Barney, J. B. (2007) "Discovery and creation: Alternative theories of entrepreneurial action", *Strategic Entrepreneurship Journal*, 1(1-2), pp. 11-26.
- Ambos, B. and Schlegelmilch, B. B. (2008) "Innovation in multinational firms: Does cultural fit enhance performance?", *Management International Review*, 48(2), pp. 189-206.
- Barker III, V. L. and Mueller, G. C. (2002) "CEO characteristics and firm R&D spending", *Management Science*, 48(6), pp. 782-801.
- Bertrand, M. and Schoar, A. (2003) "Managing with style: The effect of managers on firm policies", *The Quarterly Journal of Economics*, 118(4), pp. 1169-1208.
- Bromiley, P. (1991) "Testing a causal model of corporate risk taking and performance", *Academy of Management Journal*, 34(1), pp. 37-59.
- Chen, Y., Podolski, E. J. and Veeraraghavan, M. (2017) "National culture and corporate innovation", *Pacific-Basin Finance Journal*, 43, pp. 173-187.
- Child, J. (1974) "Managerial and organizational factors associated with company performance part I", *Journal of Management Studies*, 11(3), pp. 175-189.
- De Mooij, M. and Hofstede, G. (2010) "The Hofstede model: Applications to global branding and advertising strategy and research", *International Journal of Advertising*, 29(1), pp. 85-110.
- Dechow, P. M., Sloan, R. G. and Sweeney, A. P. (1996), "Causes and consequences of earnings manipulation: An analysis of firms subject to enforcement actions by the SEC", *Contemporary Accounting Research*, 13(1), pp. 1-36.
- Efrat, K. (2014) "The direct and indirect impact of culture on innovation", *Technovation*, 34(1), pp. 12-20.
- Elnahas, A. M. and Kim, D. (2017) "CEO political ideology and mergers and acquisitions decisions", *Journal of Corporate Finance*, 45, pp. 162-175.
- Elsaid, E. and Ursel, N. D. (2011), "CEO succession, gender and risk taking", *Gender in Management*, 26(7), pp. 499-512.
- Gallego-Álvarez, I. and Ortas, E. (2017) "Corporate environmental sustainability reporting in the context of national cultures: A quantile regression approach", *International Business Review*, 26(2), pp. 337-353.
- Gallego-Álvarez, I. and Pucheta-Martínez, M. C. (2021) "Hofstede's cultural dimensions and R&D intensity as an innovation strategy: a view from different institutional contexts", *Eurasian Business Review*, 11(2), pp. 191-220.
- Gaspay, A., Dardan, S. and Legorreta, L. (2009), "Software of the mind - A review of applications of Hofstede's theory to IT research", *Journal of Information Technology Theory and Application*, 9(3), pp. 1-37.

- Geletkanycz, M. A. (1997) "The salience of 'culture's consequences': The effects of cultural values on top executive commitment to the status quo", *Strategic Management Journal*, 18(8), pp. 615-634.
- Griffith, D. A. and Rubera, G. (2014) "A cross-cultural investigation of new product strategies for technological and design innovations", *Journal of International Marketing*, 22(1), pp. 5-20.
- Habib, A. and Hasan, M. M. (2017) "Firm life cycle, corporate risk-taking and investor sentiment", *Accounting & Finance*, 57(2), pp. 465-497.
- Hambrick, D. C. and Mason, P. A. (1984) "Upper echelons: The organization as a reflection of its top managers", *Academy of Management Review*, 9(2), pp. 193-206.
- Herrmann, P. and Datta, D. K. (2006) "CEO experiences: Effects on the choice of FDI entry mode", *Journal of Management Studies*, 43(4), pp. 755-778.
- Hofstede, G. (1983) "The cultural relativity of organizational practices and theories", *Journal of International Business Studies*, 14(2), pp.75-89.
- Hofstede, G., Hofstede, G. J. and Minkov, M. (2010) *Cultures and organizations: Software of the mind*, McGraw-Hill, New York.
- Hoskisson, R. E., Chirico, F., Zyung, J. and Gambeta, E. (2017) "Managerial risk taking: A multitheoretical review and future research agenda", *Journal of Management*, 43(1), pp. 137-169.
- Ismail, M. and Lu, H. S. (2014) "Cultural values and career goals of the millennial generation: An integrated conceptual framework", *Journal of International Management Studies*, 9(1), pp. 38-49.
- Jones, G. K. and Davis, H. J. (2000) "National culture and innovation: Implications for locating global R&D operations", *Management International Review*, pp. 11-39.
- Jones, G. K. and Teegen, H. J. (2001) "Global R&D activity of US MNCs: Does national culture affect investment decisions?", *Multinational Business Review*, 9(2), pp. 1-7.
- Khlif, H. (2016) "Hofstede's cultural dimensions in accounting research: A review", *Meditari Accountancy Research*, 24(4), pp. 545-573.
- Li, X., Low, A. and Makhija, A. K. (2017) "Career concerns and the busy life of the young CEO", *Journal of Corporate Finance*, 47, pp. 88-109.
- Lu, J. and Wang, W. (2018) "Managerial conservatism, board independence and corporate innovation", *Journal of Corporate Finance*, 48, pp. 1-16.
- MacCrimmon, K. R. and Wehrung, D. A. (1990) "Characteristics of risk taking executives", *Management Science*, 36(4), pp. 422-435.
- March, J. G. and Shapira, Z. (1987), "Managerial perspectives on risk and risk taking", *Management Science*, 33(11), pp. 1404-1418.
- Peng, Y.-S., Dashdeleg, A.-U. and Chih, H. L. (2014) "National culture and firm's CSR engagement: A cross-nation study", *Journal of Marketing & Management*, 5(1), pp. 38-49.
- Pliske, R. M. and Mutter, S. A. (1996) "Age differences in the accuracy of confidence judgments", *Experimental Aging Research*, 22(2) , pp.199-216.
- Rashad Abdel-Khalik, A. (2014) "CEO risk preference and investing in R&D", *Abacus*, 50(3), pp. 245-278.
- Rhyne, L. C., Teagarden, M. B., and Van den Panhuyzen, W. (2002) "Technology-based competitive strategies: The relationship of cultural dimensions to new product innovation", *The Journal of High Technology Management Research*, 13(2), pp. 249-277.
- Rujirawanich, P., Addison, R. and Smallman, C. (2011) "The effects of cultural factors on innovation in a Thai SME", *Management Research Review*, 34(12), pp. 1264-1279.
- Scott, W. R. (2013) *Institutions and organizations: Ideas, interests, and identities*, Sage publications.
- Serfling, M. A. (2014) "CEO age and the riskiness of corporate policies", *Journal of Corporate Finance*, 25, pp. 251-273.
- Shane, S. (1993) "Cultural influences on national rates of innovation", *Journal of Business Venturing*, 8(1), pp. 59-73.
- Simon, H. and March, J. (1958), *Organization*. N.-Y.
- Simsek, Z. (2007) "CEO tenure and organizational performance: An intervening model", *Strategic Management Journal*, 28(6), pp. 653-662.

- Sitkin, S. B. and Pablo, A. L. (1992) "Reconceptualizing the determinants of risk behavior", *Academy of Management Review*, 17(1), pp. 9-38.
- Syed, H. and Malik, A. N. (2014) "Comparative study of effect of culture on technology adoption in Pakistan and USA", *The Business & Management Review*, 5(1), pp. 42-51.
- Taylor, M. Z., & Wilson, S. (2012), "Does culture still matter?: The effects of individualism on national innovation rates", *Journal of Business Venturing*, 27(2), pp. 234-247.
- Taylor, R. N. (1975) "Age and experience as determinants of managerial information processing and decision making performance", *Academy of Management Journal*, 18(1), pp. 74-81.
- Tian, M., Deng, P., Zhang, Y. and Salmador, M. P. (2018) "How does culture influence innovation? A systematic literature review", *Management Decision*, 56(5), pp. 1088 - 1107.
- Tse, D. K., Lee, K.-h., Vertinsky, I. and Wehrung, D. A. (1988) "Does culture matter? A cross-cultural study of executives' choice, decisiveness, and risk adjustment in international marketing", *Journal of Marketing*, 52(4), pp.81-95.
- Tung, R. L. (1996) "Managing in Asia: Cross-cultural dimensions", *Managing across cultures: Issues and perspectives*, pp. 233-245.
- Vecchi, A. and Brennan, L. (2009) "A cultural perspective on innovation in international manufacturing", *Research in International Business and Finance*, 23(2), pp. 181-192.
- Waarts, E. and Van Everdingen, Y. (2005) "The influence of national culture on the adoption status of innovations: An empirical study of firms across Europe", *European Management Journal*, 23(6), pp. 601-610.
- Wang, D. and Esqueda, O. A. (2014) "National cultural effects on leverage decisions: Evidence from emerging-market ADRs", *Research in International Business and Finance*, 31, pp. 152-177.
- Weller, J. A., Levin, I. P. and Denburg, N. L. (2011) "Trajectory of risky decision making for potential gains and losses from ages 5 to 85", *Journal of Behavioral Decision Making*, 24(4), pp. 331-344.
- Wood, S., Busemeyer, J., Koling, A., Cox, C. R. and Davis, H. (2005) "Older adults as adaptive decision makers: evidence from the Iowa gambling task", *Psychology and Aging*, 20(2), pp. 220-225.
- Yim, S. (2013) "The acquisitiveness of youth: CEO age and acquisition behavior", *Journal of Financial Economics*, 108(1), pp. 250-273.
- Zhang, M., Zhang, W. and Zhang, S. (2016), "National culture and firm investment efficiency: international evidence", *Asia-Pacific Journal of Accounting & Economics*, 23(1), pp. 1-21.
- Zhang, Y. and Zhou, Y. (2015), *The source of innovation in China*, London, Palgrave Macmillan UK.