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The Impact of National Determinates on Intellectual Capital: International Evidence

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Abstract:

This comprehensive study examines the impact of national determinates on intellectual capital across multiple countries, utilizing Hofstede's cultural dimensions as key explanatory variables. Intellectual capital, measured through human, market, process, renewal, and financial capital, is analyzed in relation to cultural indicators such as power distance (PD), individualism (IND), masculinity (MAS), uncertainty avoidance (UNCER), and long-term orientation (LTO). Using a dataset comprising 40 countries, we apply stepwise multiple regression analysis to identify significant cultural determinants of intellectual capital.

The findings of this study are significant, revealing that power distance (PD) and uncertainty avoidance (UNCER) have significant negative associations with intellectual capital, while long-term orientation (LTO) has a positive influence. Individualism (IND) also emerges as a significant positive predictor, particularly for human and process capital. Market capital is primarily affected by uncertainty avoidance, whereas financial capital is strongly linked to power distance. The results suggest that lower power distance and greater long-term orientation foster a stronger intellectual capital environment.

This study contributes to the literature by providing empirical evidence on the role of national culture in shaping intellectual capital at the country level. The insights from this research offer practical implications for policymakers and business leaders, providing them with a roadmap to enhance intellectual resources through cultural and institutional strategies.

Keywords: National Culture, Intellectual Capital, Hofstede's Dimensions, Stepwise Regression, Cross-Country Analysis

1. Introduction:

National culture significantly influences various aspects of organizational behavior and economic development, particularly intellectual capital. Intellectual capital refers to an organization's intangible assets, encompassing human capital, structural capital, and relational capital, which collectively contribute to value creation and competitive advantage. Understanding how cultural dimensions affect the development and management of intellectual capital is essential for organizations operating in diverse cultural contexts.

In the developing landscape of the knowledge economy, nations are increasingly recognizing the role of intangible assets in fostering sustainable development and competitive advantage. Intellectual Capital (IC), conceptualized as the collective knowledge, capabilities, relationships, and innovation potential of a country, has emerged as a critical driver of economic performance. While earlier studies have predominantly emphasized the influence of organizational-level culture on IC, recent research underscores the significance of national culture in shaping the formation, development, and utilization of intellectual capital on a country-wide scale.

This paper studies the relationship between national culture, as articulated by Geert Hofstede's cultural dimensions, and the components of national intellectual capital. Specifically, it explores how dimensions such as power distance (PD), individualism (IND), masculinity (MAS), uncertainty avoidance (UNCER), and long-term orientation (LTO) affect human, market, process, renewal, and financial capital. Through an integrative review of recent literature and a hypothesis-driven analytical framework, this study aims to add

both theoretical and empirical value to the growing discussion on the cultural determinants of national knowledge assets.

2. Literature review

2.1 Intellectual capital

Intellectual Capital (IC) has become a fundamental driver of national and organizational growth in the modern knowledge-based economy. Unlike physical assets, IC is intangible yet significantly contributes to value creation, innovation, and sustainable development. Scholars have explored various models and frameworks to measure and understand IC at both corporate and national levels (Lin & Edvinsson, 2008). While businesses leverage IC to enhance their competitiveness, nations also seek to strengthen their IC to sustain long-term economic growth and global positioning (Lee, Lin, & Lin, 2017).

IC is generally classified into three primary components: Human Capital – Represents the knowledge, skills, competencies, and innovative potential of individuals within an organization or a nation. Structural (or Process) Capital – Includes the systems, databases, patents, and processes that allow knowledge to be stored and utilized effectively. Relational (or Market) Capital – Encompasses the relationships and networks that organizations or nations develop with external stakeholders, such as customers, investors, and international partners (Bik & Hooghiemstra, 2017). Additionally, some scholars have expanded the IC framework to include Renewal Capital (innovation and research capabilities) and Financial Capital (economic resources supporting IC development) (Chen et al, 2005)

One of the key challenges in IC research is how to quantify and compare IC across different contexts. Various models have been

proposed, including: The Skandia Navigator Model – First introduced by Edvinsson and Malone (1997), this model laid the foundation for measuring IC in organizations and later inspired national-level studies. Intangible Asset Monitor: Sveiby (1997) proposed this method, which categorizes intangible assets into internal structure, external structure, and employee competence, aligning with the IC components. Value Added Intellectual Coefficient (VAIC): Pulic (1998) developed VAIC to measure the efficiency of value added by corporate intellectual ability. It assesses how well an organization utilizes its capital, human capital, and structural capital to create value. In addition, there is The National Intellectual Capital Index – Developed by Bontis (2004); this index evaluates a country's intellectual wealth by analyzing human, structural, and relational capital. OECD and World Bank Models – These frameworks emphasize knowledge-based economies, focusing on factors such as education, R&D investment, and innovation systems. Despite these methodologies, there is no universally accepted standard for measuring IC, leading to ongoing debates and research in this area.

A comparative study of Nordic countries revealed that Sweden, Finland, and Denmark rank highest in intellectual capital (IC) due to their strong education systems, innovation policies, and efficient governance structures (Hofstede & Minkov, 2010). This positioning is no coincidence—it reflects a long-standing cultural and institutional commitment to fostering knowledge-based economies. These countries have embraced knowledge as a strategic national resource, embedding intellectual capital development at the core of public policy and corporate strategy. Their approach provides a compelling case study

on how nations can convert intangible assets into sustainable economic and social value.

At the heart of Nordic success in IC lays their education systems, which are consistently ranked among the best globally. Education in these countries is publicly funded, inclusive, and oriented toward lifelong learning, which contributes to well-informed, adaptable, and innovative workforce— hallmarks of strong human capital. Finland, for instance, has gained international attention for its learner-centered pedagogy, minimal standardized testing, and emphasis on teacher autonomy and quality (Sahlberg, 2014). This approach not only increases educational outcomes but also cultivates critical thinking, creativity, and collaboration—skills that are essential for innovation and knowledge transfer within organizations.

In addition to education, Nordic countries have invested heavily in research and development (R&D) and created innovation ecosystems that support collaboration between academia, industry, and government. These Triple Helix models foster knowledge diffusion and encourage the commercialization of academic research, thus reinforcing structural capital through innovation infrastructure (Etzkowitz & Leydesdorff, 2000). Sweden, for instance, is home to world-class research institutions such as the Karolinska Institute and the Royal Institute of Technology (KTH), which have strong partnerships with industries and public agencies. Denmark's innovation strategy has similarly emphasized cross-sectorial collaboration, focusing on biotechnology, green energy, and digital innovation. These innovation-friendly environments contribute significantly to structural capital by creating supportive networks,

technology platforms, and regulatory frameworks that facilitate intellectual output.

Another key factor in the Nordic IC model is the quality of governance. Good governance—characterized by transparency, accountability, low corruption, and efficient public administration—acts as a catalyst for intellectual capital development. It creates a stable environment where businesses, educational institutions, and individuals can thrive. For instance, Denmark and Finland consistently rank at the top of global transparency and ease of doing business indices. Effective governance also ensures equitable access to education, healthcare, and digital infrastructure, which further supports the accumulation and distribution of IC. This reinforces relational capital by strengthening public trust and engagement in civic and economic life.

The emphasis on equity and social cohesion in Nordic societies also contributes to their success in building relational capital. These countries have cultivated cultures of trust, cooperation, and civic responsibility. High levels of social capital—another form of intangible asset—enhance collaboration across institutions and sectors, enabling smoother knowledge flows and joint problem-solving. Furthermore, their welfare models support work-life balance and gender equality, which in turn facilitate broader participation in the knowledge economy. Studies have shown that diversity and inclusion enhance organizational innovation and decision-making quality, thus adding a valuable dimension to IC (Carter et al., 2003).

In contrast to countries where IC policies are fragmented or underdeveloped, the Nordic model demonstrates the benefits of a

coordinated, systemic approach. Rather than treating human, structural, and relational capital as isolated domains, these countries integrate them through holistic strategies. Policies are informed by evidence and long-term vision rather than short-term political gains. The role of trust and consensus in Nordic political culture enables stable, cross-party support for education and innovation investments, ensuring continuity and sustained impact.

Moreover, Nordic firms tend to embed IC principles into their strategic management practices. Large corporations like Nokia, Ericsson, and Novo Nordisk have been proactive in managing knowledge assets, cultivating organizational learning cultures, and building strong stakeholder networks. Many have adopted reporting practices that go beyond financial statements to include human and intellectual capital disclosures, signaling transparency and long-term value creation to investors and stakeholders (Bontis, 2001).

In sum, the Nordic experience illustrates how national IC can be strategically nurtured through synergistic investments in education, innovation, governance, and social cohesion. It offers valuable lessons for countries aiming to transition toward knowledge economies: that intellectual capital is not just a business concern but national imperative requiring integrated, inclusive, and forward-thinking policies.

2.2 National Culture through the Lens of Hofstede

National culture has increasingly gained attention as a significant factor influencing managerial behavior, organizational systems, and accounting judgments across countries. Among the most widely recognized frameworks for understanding cultural variability is Geert

Hofstede's model of national culture. Developed through a comprehensive study of IBM employees across different countries, Hofstede's framework initially identified four cultural dimensions, later expanded to six. This paper aims to delve deeply into these six dimensions and evaluate their implications on accounting and organizational behavior.

Hofstede's model encompasses six dimensions: (1) Power Distance Index (PDI), (2) Individualism vs. Collectivism (IDV), (3) Uncertainty Avoidance Index (UAI), (4) Masculinity vs. Femininity (MAS), (5) Long-Term vs. Short-Term Orientation (LTO), and (6) Indulgence vs. Restraint (IVR). These dimensions serve as a comparative tool for analyzing how cultural values influence workplace behaviors and institutional structures.

Power distance implies the less powerful participants of a society accept and assume unequal power distribution. In high power distance cultures like China, hierarchy and centralized decision-making are accepted and even expected. Chow, Lindquist, and Wu (2001) found that Chinese employees more readily accepted autocratically imposed high-stretch performance standards than their U.S. counterparts, reflecting deference to authority. Conversely, low power distance countries like the United States tend to emphasize participatory decision-making and employee empowerment, leading to resistance when top-down directives are imposed.

This dimension distinguishes societies based on whether individuals prioritize personal achievements or group cohesion. Collectivist cultures (e.g., China and Italy to some extent) favor group harmony and consensus, which can lead to conformity in professional judgment.

Individualist cultures (e.g., the U.S.) encourage autonomy and personal responsibility. Curtis et al. (2017) demonstrated that Italian accounting professionals and students, influenced by more collectivist norms, expressed ethical judgments grounded in communal values, whereas Americans were more individually driven in their decision-making.

Uncertainty avoidance describes a society's tolerance for ambiguity. High UAI countries, such as Germany, prefer structured environments, detailed regulations, and clear procedures. This is evident in how German auditors interpret probabilistic expressions in accounting standards more conservatively than Americans (Doupnik & Richter, 2004). Similarly, Góis et al. (2018) found that countries with higher uncertainty avoidance exhibited a more cautious approach to International Financial Reporting Standards (IFRS) adoption, impacting the cost of equity capital.

Masculine cultures value competition, achievement, and assertiveness, while feminine cultures emphasize care, collaboration, and quality of life. Hofstede's framework indicates that masculine traits may influence aggressive earnings management or performance-driven behaviors. In ethical decision-making, masculine cultures might lean toward utilitarian reasoning, whereas feminine cultures may prioritize fairness and stakeholder well-being. Though less studied, this dimension may affect judgments related to executive compensation, audit severity, and corporate social responsibility.

Long-term orientation reflects a focus on future rewards, perseverance, and adaptability. Short-term orientation emphasizes respect for tradition and fulfilling social obligations. In their study on IFRS and cost of capital, Hu et al. (2013) reported that countries with

long-term orientation benefited more from IFRS adoption, suggesting a greater alignment with transparent, future-focused financial reporting. Long-term orientation also fosters sustainable business practices and patient capital, which are vital in corporate governance systems.

Indulgent societies allow free gratification of basic human desires, while restrained societies regulate such impulses through social norms. This dimension may influence ethical sensitivity and whistleblowing behavior. Khosrowjerdi & Bornmann (2021) noted that restrained cultures, like Italy, exhibit a higher sense of duty and compliance, which can enhance ethical standards but may also suppress dissent. Indulgent cultures, while more expressive, may face challenges in maintaining ethical consistency.

3. Hypotheses Development

3.1 National Culture and Intellectual Capital: Theoretical Linkages

Intellectual capital (IC) is broadly defined as the intangible value embedded within a nation's knowledge systems, innovation capacity, institutional structures, and relational networks (Mukaro et al 2023; Malhotra, Y. 2003). At the national level, IC is typically conceptualized through five key components: human capital (HC), market capital (MC), process capital (PC), renewal capital (RC), and financial capital (FC). Each of these dimensions captures a unique but interrelated facet of a country's ability to generate, sustain, and expand its economic and social wealth.

National culture, as described by Hofstede (2001), consists of the shared values, beliefs, and norms that guide individual behavior and shape societal institutions. Hofstede's framework outlines six cultural

dimensions: power distance (PDI), individualism versus collectivism (IDV), masculinity versus femininity (MAS), uncertainty avoidance (UAI), long-term versus short-term orientation (LTO), and indulgence versus restraint (IVR). This paper focuses on the five most widely studied dimensions—PDI, IDV, MAS, UAI, and LTO—due to their direct theoretical relevance to the development and configuration of intellectual capital (Lee, Lin, & Lin, 2017; Lin & Edvinsson, 2010).

Cultural values significantly influence the structures that underpin IC, such as education systems, innovation environments, labor market dynamics, institutional trust, and regulatory quality. For instance, nations characterized by low power distance and high individualism tend to foster open, meritocratic systems that encourage participation, innovation, and competition—conditions that are highly conducive to building robust HC and MC (North, D. 2006; Papula et al., 2018). In contrast, cultures with high uncertainty avoidance may emphasize rule-based systems and formalization, which, while beneficial for PC development, may impede adaptability and renewal.

Power distance (PDI) reflects the extent to which less powerful individuals within a society accept and expect power to be distributed unequally. High-PDI cultures often maintain rigid hierarchies and centralized authority structures, which can stifle collaborative learning and discourage innovation, thereby limiting the growth of human and renewal capital (Reed et al, 2006). Conversely, low-PDI societies that promote egalitarianism are more likely to support bottom-up knowledge flow and participative governance.

Individualism (IDV) implies to the degree to which societies prioritize individual autonomy and self-expression over group conformity.

Highly individualistic cultures typically value personal achievement, entrepreneurial initiative, and creativity, all of which are essential for the advancement of HC and MC (Seleim, & Bontis, 2013). While collectivist cultures often excel in fostering strong community ties and social cohesion, they may unintentionally suppress the individual risk-taking and open competition necessary for innovation.

The masculinity (MAS) dimension contrasts achievement-driven cultures with those oriented toward quality of life and interpersonal care. Masculine societies tend to emphasize competition, success, and material rewards, which may drive economic output and bolster FC. However, such environments may underinvest in social capital and welfare systems. In contrast, feminine societies often prioritize collaboration, work-life balance, and social development—attributes that strengthen HC and PC, especially in public institutions and services (Lin & Edvinsson, 2010).

Uncertainty avoidance (UAI) denotes the extent to which members of a culture feel unpleasant with ambiguity and uncertainty. High-UAI societies typically implement strict rules, formalized structures, and a low tolerance for deviance, which can support the development of PC through institutionalization and standardization. However, these same characteristics can constrain RC, as they inhibit experimentation, flexibility, and openness to novel ideas (Stewart, T., 2010).

Long-term orientation (LTO) highlights a cultural preference for future rewards, perseverance, and sustained effort over time. Societies high in LTO are more inclined to invest in education, research, and technological innovation, ultimately enhancing HC, RC, and FC (Subramaniam, & Youndt, 2005; Sullivan, P, 1998). These future-

focused investments build national resilience and capacity for long-term wealth creation and competitiveness.

Accordingly, our hypothesis will be as follows:

H0: National culture significantly influences national intellectual capital.

This overarching hypothesis proposes that variations in Hofstede's cultural dimensions are associated with measurable differences in the level and structure of a nation's intellectual capital.

The main hypothesis is then divided into sub-hypotheses as follows:

H1a: Power Distance (PDI) is associated with Human Capital (HC).

H1b: Power Distance (PDI) is associated with Market Capital (MC).

H1c: Power Distance (PDI) is associated with Process Capital (PC).

H1d: Power Distance (PDI) is associated with Renewal Capital (RC).

H1e: Power Distance (PDI) is associated with Financial Capital (FC).

H2a: Individualism (IDV) is associated with Human Capital (HC).

H2b: Individualism (IDV) is associated with Market Capital (MC).

H2c: Individualism (IDV) is associated with Process Capital (PC).

H2d: Individualism (IDV) is associated with Renewal Capital (RC).

H2e: Individualism (IDV) is associated with Financial Capital (FC).

H3a: Masculinity (MAS) is associated with Human Capital (HC).

H3b: Masculinity (MAS) is associated with Market Capital (MC).

H3c: Masculinity (MAS) is associated with Process Capital (PC).

H3d: Masculinity (MAS) is associated with Renewal Capital (RC).

H3e: Masculinity (MAS) is associated with Financial Capital (FC).

H4a: Uncertainty Avoidance (UAI) is associated with Human Capital (HC).

H4b: Uncertainty Avoidance (UAI) is associated with Market Capital (MC).

H4c: Uncertainty Avoidance (UAI) is associated with Process Capital (PC).

H4d: Uncertainty Avoidance (UAI) is associated with Renewal Capital (RC).

H4e: Uncertainty Avoidance (UAI) is associated with Financial Capital (FC).

H3a: Long-Term Orientation (LTO) is associated with Human Capital (HC).

H3b: Long-Term Orientation (LTO) is associated with Market Capital (MC).

H3c: Long-Term Orientation (LTO) is associated with Process Capital (PC).

H3d: Long-Term Orientation (LTO)is associated with Renewal Capital (RC).

H3e: Long-Term Orientation (LTO) is associated with Financial Capital (FC).

The following model is proposed to test the influence of national culture dimensions on national intellectual capital:

$$INTELL_i = \beta_0 + \beta_1 PDI + \beta_2 IDV + \beta_3 MAS + \beta_4 UNCER + \beta_5 LTO + \varepsilon_i, \quad \text{for } i = 1, 2, 3, \dots, 40$$

Where, $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ are regression coefficients and

INTELL = Intellectual index
PDI = Power Distance
IDV = Individualism
MAS = Masculinity
UNCER = Uncertainty Avoidance
LTO = Long-Term Orientation

Table 1: All variables used in our analysis

Country	HC	MC	PC	RC	FC	INTELL	PD	INDI	MAS	UNCER	LTO
Finland	7.55	6.56	7.59	7.08	9.56	38.33	33	63	26	59	38
USA	6.98	6.07	7.26	7	9.82	37.12	40	91	62	46	26
Denmark	8.3	6.59	7.06	5.54	9.81	37.3	18	74	16	23	35
Norway	7.81	5.96	6.99	4.69	9.92	35.37	31	69	8	50	35
Sweden	8.08	6.18	6.98	7.54	9.61	38.39	31	71	5	29	53
Singapore	5.88	8.17	6.95	4.64	9.52	35.17	74	20	48	8	72
Australia	6.48	6.04	6.81	4.33	9.42	33.07	36	90	61	51	21
Iceland	7.23	6.7	6.76	4.89	9.72	35.3	30	60	10	50	28
The Netherlands	6.47	6.92	6.6	5.2	9.57	34.77	38	80	14	53	67
Canada	6.	6.	6.	4.	9.	33.86	39	80	52	48	36

	95	14	55	76	46						
Switzerland	7.01	6.27	6.38	7.8	9.94	37.4	34	68	70	58	74
New Zealand	6.05	6.25	6.26	3.54	9.14	31.24	22	79	58	49	33
Ireland	5.76	7.1	6.25	3.88	9.54	32.54	28	70	68	35	24
UK	5.74	5.67	6.17	4.43	9.51	31.52	35	89	66	35	51
Austria	6.69	6.46	5.94	4.33	9.63	33.04	11	55	79	70	60
Taiwan	6.2	5.83	5.82	4.75	8.97	31.57	58	17	45	69	93
Germany	6.12	5.34	5.76	5.86	9.6	32.67	35	67	66	65	83
Belgium	6.39	5.58	5.5	4.6	9.57	31.63	65	75	54	94	82
France	6.04	4.79	5.23	5.08	9.56	30.69	68	71	43	86	63
Japan	6.5	4.4	4.98	7.17	9.85	32.91	54	46	95	92	88
Malaysia	4.95	6.11	4.94	2.22	7.89	26.12	100	26	50	36	41
Spain	5.32	5.66	4.77	2.6	9.12	27.47	57	51	42	86	48
Korea	5.57	4.72	4.66	4.07	8.72	27.73	60	18	39	85	100
Italy	6	4.59	4.57	2.7	9.39	27.25	50	76	70	75	61
Chile	4.66	6.35	4.54	1.99	8	25.54	63	23	28	86	31

Hungary	**5.68**	**5.84**	**4.47**	**2.48**	**8.16**	**26.63**	**46**	**80**	**88**	**82**	**58**
Philippines	**5.49**	**5.24**	**4.43**	**2.01**	**6.75**	**23.92**	**94**	**32**	**64**	**44**	**27**
Czech Republic	**4.9**	**5.41**	**4.18**	**2.54**	**8.22**	**25.24**	**57**	**58**	**57**	**74**	**70**
Greece	**4.9**	**5.13**	**4.12**	**2.05**	**8.89**	**25.1**	**60**	**35**	**57**	**100**	**45**
South Africa	**4.19**	**4.67**	**4.11**	**2.21**	**7.65**	**22.83**	**49**	**65**	**63**	**49**	**34**
Thailand	**4.48**	**5.55**	**3.8**	**1.57**	**7.38**	**22.78**	**64**	**20**	**34**	**64**	**32**
Turkey	**3.99**	**5.01**	**3.46**	**1.67**	**7.59**	**21.72**	**66**	**37**	**45**	**85**	**46**
Brazil	**4.19**	**4.76**	**3.39**	**1.83**	**7.78**	**21.95**	**69**	**38**	**49**	**76**	**44**
India	**3.41**	**4.75**	**3.38**	**1.85**	**5.82**	**19.22**	**77**	**48**	**56**	**40**	**51**
China	**3.8**	**5.11**	**3.38**	**2.38**	**6.44**	**21.11**	**80**	**20**	**66**	**30**	**87**
Poland	**4.36**	**4.89**	**3.29**	**1.67**	**7.8**	**22**	**68**	**60**	**64**	**93**	**38**
Mexico	**4.08**	**4.71**	**3.26**	**1.41**	**8.04**	**21.51**	**81**	**30**	**69**	**82**	**24**
Portugal	**4.86**	**4.05**	**3.19**	**2.11**	**8.78**	**23**	**63**	**27**	**31**	**99**	**28**
Argentina	**4.6**	**4.14**	**2.91**	**1.74**	**8.32**	**21.7**	**49**	**46**	**56**	**86**	**20**
Russia	**4.64**	**3.89**	**2.7**	**2.94**	**7.42**	**21.57**	**93**	**39**	**36**	**95**	**81**

4. Data analysis and results

4.1 Descriptive statistics

Table 2 summarizes descriptive statistics for each variable used in this study. Descriptive statistics include means, standard deviations, minimum, maximum, and p-values for the normality test, which uses the Kolmogorov-Smirnov test.

Results show that all independent variables (PD, IND, MAS, UNCER, and LTO) lie between 5 and 100, with means varying from 50.3 (MAS) to 63.4 (UNCER). All independent variables (PD, IDV, MAS, LTO, and IND) means are in the fifties except UNCER, which has a mean of 63.4. Variation (standard deviation) for all independent variables varies within a very small range from 21.3 to 23.9.

The averages for the five dependent variables vary from 3.8 (RC) to 8.7 (FC). The Other three intellectual measures average in the fives (HC, MC, and PC). The variation (standard deviations) of intellectual variables (indicators) vary between 0.9 (MC) and 1.9 (RC). All standard deviations for most variables are close to each other except Renewal Capital (1.9). Correlations between the variables are shown in Table 3.

Table-2 Summary statistics

vARIABLE	N	MEAN	STD dEV	MIN	MAX	NORMALITY TEST P-VALUE
HC	40	5.7	1.2	3.4	8.3	
MC	40	5.6	0.9	3.9	8.2	
PC	40	5.1	1.4	2.7	7.6	
RC	40	3.8	1.9	1.4	7.8	

FC	**40**	**8.7**	**1.1**	**5.8**	**9.9**	
Intell	**40**	**29.0**	**5.8**	**19.2**	**38.4**	**0.10**
PD	**40**	**53.2**	**21.5**	**11.0**	**100.0**	**>0.15**
IND	**40**	**54.1**	**23.0**	**17.0**	**91.0**	**>0.15**
MAS	**40**	**50.3**	**21.3**	**5.0**	**95.0**	**>0.15**
UNCER	**40**	**63.4**	**23.9**	**8.0**	**100.0**	**0.081**
LTO	**40**	**50.7**	**22.6**	**20.0**	**100.0**	**0.054**

Table 3 illustrates Pearson correlation matrix for dependent (INTELL) and independent variables (national culture variables). There were a significant correlation between intellectual (INTELL) and three of the cultural indicators (PD, IND, UNCER), while the correlations with (MAS and LTO) were not significant. The significant correlations were negative with PD and UNCER (-0.71 and -0.43, respectively), and positive with IND (0.55). Among the significant correlations, the strongest correlation is with PD (-0.71), followed by IND (0.55) and least significant correlation with UNCER (-0.43). Furthermore, independent variables are not significantly correlated with each other, in which multicollinearity is not a problem when we model all the independent variables (culture indicators) with Intellectual index using multiple regression technique. However, we still use stepwise regression and monitor value of VIF in our regression modelling.

Table 3. Correlation between variables

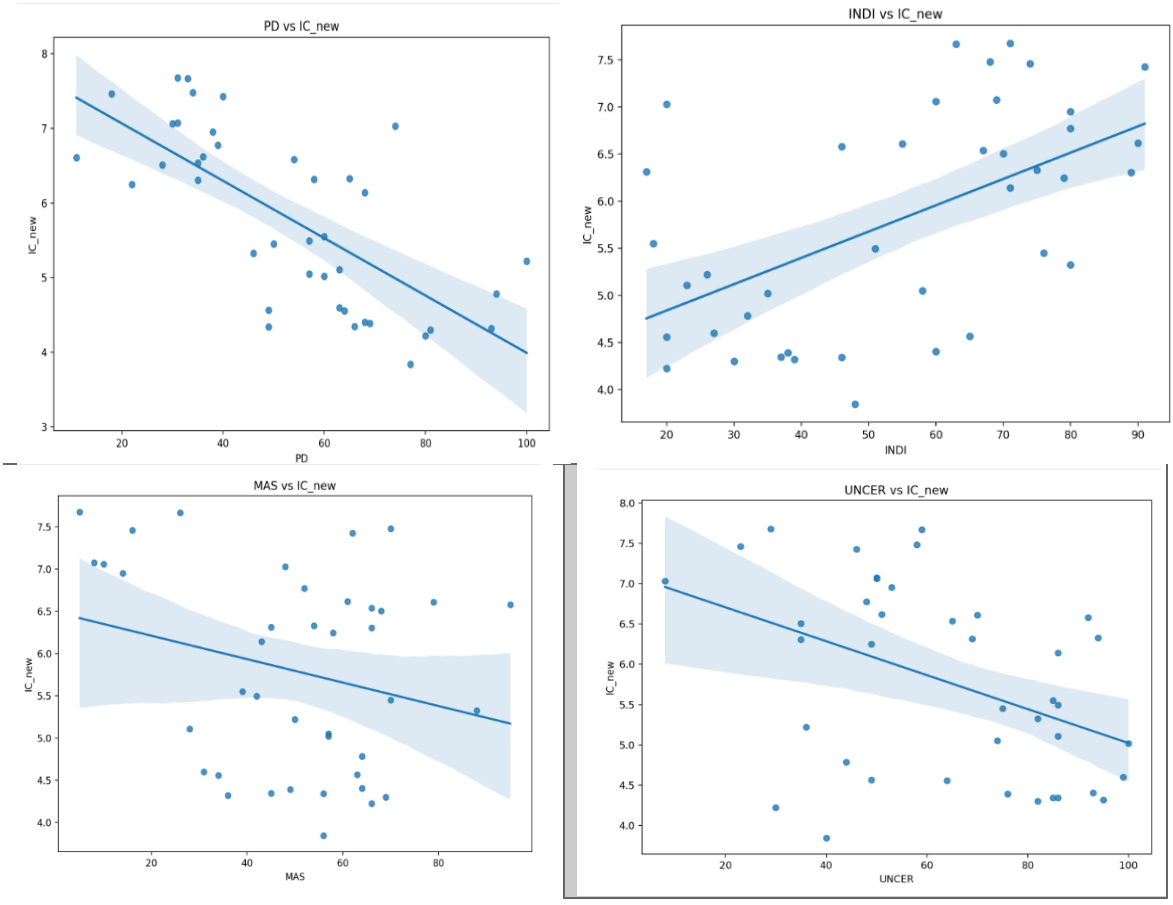
	INTEL	HC	MC	PC	RC	FC	PD	INDI	MAS	UNCER
HC	0.94***									
MC	0.70***	0.56***								
PC	0.96***	0.89***	0.80***							
RC	0.91***	0.85***	0.45**	0.81***						
FC	0.87***	0.84***	0.48**	0.78***	0.76***					
PD	-0.71***	-0.70***	-0.46***	-0.69***	-0.58***	-0.71***				
INDI	0.55***	0.56***	0.25	0.56***	0.48**	0.55***	-0.67***			
MAS	-0.25	-0.32*	-0.26	-0.275	-0.15	-0.15	0.11	0.08		
UNCER	-0.43**	-0.34*	-0.64	-0.57***	-0.32*	-0.09	0.24	-0.21	0.17	
LTO	0.09	0.03	-0.11	-0.04	0.30	0.07	0.16	-0.19	0.17	0.155

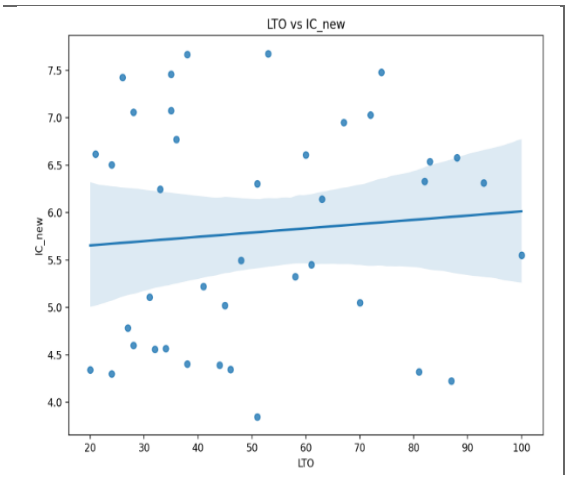
*** Significant at 0.05, ** significant at 0.01, *** significant at 0.001**

4.2 Hypothesis testing

To test the research objective outlined above, multiple regression analysis with stepwise variable selection was employed to identify and depict the effect of national cultural variables on the Intellectual Index. A backward stepwise procedure was adopted to select which variables should remain in the final model. This method required identifying the "best" subset of predictors whilst simultaneously removing those variables that were redundant or were collinearly related to others (Talpey S. et al., 2016).

Figure 1: The Relationship between National Culture and Intellectual Capital





Before running the model, data was tested for heteroscedasticity using the Breusch-Pagan test. The results of the test conclude that residuals are homogeneous. We also tested for omitted variable bias using the Ramsey test and concluded that we do not need more variables. In addition, the variance inflation factor was calculated to test for multicollinearity and found that independent variables are not multicollinear. The results of the regression model are reported in Table – 4 Stepwise regression of Intellectual predictors

variable	estimate (β)	SE (β)	T-value	p-value	F	VIF
Regression				0.000	16.5	
constant	41.86	2.380	17.55	0.000		
PD	-0.179	0.028	-6.36	0.000		1.08
MAS	-0.049	0.028	-1.73	0.093		1.06
UNCER	-0.069	0.026	-2.71	0.010		1.10
LTO	0.068	0.027	2.57	0.014		1.06
R-sQuared	0.654					

Results revealed that PD, UNCER, and LTO are significant at a 5% level of significance, while only MAS was significant at a 10% level. MAS was the only positive significant predictor for Intellectual with $\beta = 0.068\ (0.027)$ and p-value=0.014, whereas PD, MAS and UNCER were significant and negative predictors of intellectual index with $\beta = -0.179\ (0.028)$, p-value<0.001, $\beta = -0.049\ (0.028)$, p-value=0.093, $\beta = -0.069\ (0.026)$, p-value=0.010, respectively. The only not significant (removed from the model) national culture variable was UNCER. F –value is 16.5 (p-value<0.001), indicating the fitness of the model with an R-squared of 0.654, which means that about 65.4% of the variations in the intellectual index are explained by national culture variables.

The previous model used the aggregated intellectual index. Aggregation of intellectual index includes Human Capital, Market Capital (MC), Process Capital (PC), Renewal Capital (RC), and Financial Capital (FC). To study which cultural variable effect each capital, multiple regression used again regressing each intellectual capital with cultural variables (PD, IDV, MAS, LTO and IND). Results of multiple stepwise regression are summarized in Table 4.

Results show that the significant national culture variables (in descending order according to their importance to Human capital) are PD, MAS, LTO and IND. F –value is 14.69 (p-value<0.001), indicating the fitness of the model with an R square of 0.627, which means that about 62.7% of the variations in the Human Capital index are explained by the model (PD, MAS, LTO and IND).

Results show that the significant national culture variables (in descending order according to their importance to Market Capital) are only UNCER and PD. F–value is 19.48 (p-value<0.001), indicating the fitness of the model with an R square of 0.513, which means that about 62.7% of the variations in the Market Capital index are explained by the model (UNCER and PD).

Results also show that all culture variables (UNCER, PD, MAS, LTO, INDI), in descending order according to their importance to Process Capital. F–value of 16.8 (p-value<0.001) indicates the fitness of the model with an R square of 0.712, which means that about 71.2% of the variations in the Process Capital index are explained by the national culture variables (UNCER, PD, MAS, LTO, INDI).

Results show that the significant national culture variables (in descending order according to their importance to Human capital) are PD, UNCER and LTO. F–value is 13.82 (p-value<0.001), indicating the fitness of the model with an R square of 0.535, which means that about 53.5% of the variations in the Renewal Capital index are explained by the model (PD, UNCER and LTO).

Results show that PD is the only significant national culture predictor to financial capital. F–value is 39.12 (p-value<0.001), indicating the model's fitness with an R square of 0.507, which means that about 50.7% of the variations in the Financial Capital index are explained by the model PD.

Table 4. Stepwise regression for intellectual capital indicators with national culture variables

	VARIABLE	Estimate	SE	T-VALUE	P-VALUE	F	VIF
HUMAN CAPITAL	Regression				0	14.69	
	Constant	41.86	2.38	17.55	0		
	PD	-0.029	0.008	-3.55	0.001		1.9
	IND	0.016	0.008	2.01	0.053		1.9
	MAS	-0.019	0.006	-3.03	0.005		1.1
	UNCER	NS					
	LTO	0.012	0.006	2.08	0.045		1.1
	R-squared	0.627					
MARKET CAPITAL							
	Regression				0	19.48	
	Constant	7.723	0.362	21.36	0		
	PD	-0.014	0.005	-2.78	0.009		1.06
	IND	NS					
	MAS	NS					
	UNCER	-0.022	0.005	-4.76	0		1.06
	LTO	NS					
	R-Squared	0.513					
PROCESS CAPITAL							
	Regression				0	16.8	
	Constant	7.628	0.916	8.32	0		
	PD	-0.029	0.009	-3.4	0.002		1.92
	IND	0.014	0.008	1.8	0.085		1.95
	MAS	-0.014	0.007	-2.1	0.043		1.12
	UNCER	-0.025	0.006	-4.2	0		1.11
	LTO	0.011	0.006	1.8	0.077		1.09
	R-squared	0.712					
RENEWEL CAPITAL							
	Regression				0	13.82	
	Constant	5.9	0.805	7.33	0		
	PD	-0.051	0.01	-4.94	0		1.08
	IND						
	MAS						
	UNCER	-0.019	0.009	-2.03	0.05		1.08

	LTO	**0.035**	**0.01**	**3.65**	**0.001**		**1.04**
	R-squared	**0.535**					
FINANCIAL CAPITAL							
	Regression				**0**	**39.12**	
	Constant	**10.63**	**0.32**	**32.88**	**0**		
	PD	**-0.035**	**0.01**	**-6.25**	**0**		**1**
	IND	**NS**					
	MAS	**NS**					
	UNCER	**NS**					
	LTO	**NS**					
	R-squared	**0.507**					

Table 5. Summary of results

IC Component	PDI (–)	IDV (+)	MAS (–)	UAI (–)	LTO (+)
Human Capital	✅ Supported	❌ Marginal	✅ Supported	❌ Not Significant	✅ Supported
Market Capital	✅ Supported	❌ Not Significant	❌ Not Significant	✅ Supported	❌ Not Significant
Process Capital	✅ Supported	❌ Marginal	✅ Supported	✅ Supported	❌ Not Significant
Renewal Capital	✅ Supported	❌ Not Significant	❌ Not Significant	✅ Supported	✅ Supported
Financial Capital	✅ Supported	❌ Not Significant	❌ Not Significant	❌ Not Significant	❌ Not Significant

The table titled "Table 5. Summary of results" presents a synthesized overview of how various components of Intellectual Capital (IC)

interact with five cultural dimensions based on Hofstede's framework: Power Distance Index (PDI), Individualism (IDV), Masculinity (MAS), Uncertainty Avoidance Index (UAI), and Long-Term Orientation (LTO). Each cultural dimension is either positively or negatively hypothesized to influence different IC components: Human Capital, Market Capital, Process Capital, Renewal Capital, and Financial Capital.

1. Power Distance Index (PDI −):

The negative sign indicates that lower power distance (i.e., more egalitarian cultures) is hypothesized to positively influence IC. The data supports this across all five IC components—Human, Market, Process, Renewal, and Financial Capital—indicating that societies with lower power distance foster better development and utilization of intellectual capital in various forms.

2. Individualism (IDV +):

Here, the expectation is that individualistic cultures positively influence IC. However, the findings suggest otherwise. Only Human Capital and Process Capital show "Marginal" support, while the other components—Market, Renewal, and Financial Capital—are marked as "Not Significant." This suggests a limited or weak influence of individualism on intellectual capital, with only slight evidence for its effect on human-related aspects.

3. Masculinity (MAS −):

The negative sign denotes that less masculine (i.e., more feminine or nurturing) cultures are expected to enhance IC. The data supports this relationship only for Human and Process Capital. Other components show no significant relationship, suggesting that nurturing environments particularly benefit human-oriented and process-driven elements of IC.

4. Uncertainty Avoidance Index (UAI −):

A lower UAI (cultures more tolerant of ambiguity) is hypothesized to support IC. The results provide mixed evidence. Process, Market, and Renewal Capital show significant support, while Human and Financial Capital are not significantly affected. This may indicate that cultures

comfortable with uncertainty are more inclined to invest in innovation and market-driven IC.

5. Long-Term Orientation (LTO +):

LTO is expected to positively influence IC due to its emphasis on perseverance and future rewards. Human and Renewal Capital are significantly supported, while the other components do not show significant relationships. This supports the idea that future-oriented cultures are more likely to invest in talent and innovation.

The results indicate that Power Distance consistently influences all IC components negatively, affirming that more egalitarian societies are better at leveraging IC. Uncertainty Avoidance and Long-Term Orientation also play important but selective roles, particularly in Process, Renewal, and Human Capital. In contrast, Individualism and Masculinity have limited or marginal effects, suggesting cultural values around autonomy and competitiveness may not be as critical to IC development as inclusivity, long-term thinking, and adaptability. Overall, the table highlights the nuanced ways cultural values shape different facets of intellectual capital.

5. Conclusion, Implications and Future Research

This study aimed to investigate the relationship between national culture and intellectual capital (IC) by applying Hofstede's cultural dimensions to five components of IC: Human Capital (HC), Market Capital (MC), Process Capital (PC), Renewal Capital (RC), and Financial Capital (FC). The empirical findings demonstrate that national culture significantly influences IC development, with Power Distance (PDI) and Uncertainty Avoidance (UAI) exerting the strongest negative effects, while Long-Term Orientation (LTO) has a positive influence on selected IC components.

A key finding is the consistent negative relationship between Power Distance (PDI) and all IC components. This suggests that hierarchical societies, where authority and decision-making are concentrated among elites, tend to limit knowledge sharing, innovation, and overall

intellectual capital formation. High PDI cultures may restrict access to education, discourage open communication, and create rigid corporate structures, deterring human, market, process, renewal, and financial capital. This aligns with prior research indicating that flatter, egalitarian structures foster better knowledge transfer and human capital development.

Uncertainty Avoidance (UAI) was found to negatively impact Market Capital (MC), Process Capital (PC), and Renewal Capital (RC). Countries with a strong preference for structure, rules, and risk aversion may struggle with market flexibility, efficient business processes, and innovation. High-UAI societies often emphasize stability over experimentation, which can slow down adaptation to new technologies and business models. This finding suggests that while structured environments contribute to formalized knowledge retention, they can also stifle dynamic capabilities necessary for market expansion and renewal.

Long-Term Orientation (LTO) positively influenced Human Capital (HC) and Renewal Capital (RC), confirming the idea that cultures focused on future rewards, persistence, and long-term investments in education and research tend to accumulate stronger intellectual capital. These societies prioritize knowledge creation and R&D, ensuring sustained economic growth and development. However, LTO showed no significant impact on Market, Process, or Financial Capital, suggesting that long-term planning may not directly translate into immediate financial or market benefits.

Masculinity (MAS) had a negative impact on Human Capital (HC) and Process Capital (PC). This indicates that cultures driven by competition, achievement, and material success may underinvest in

workforce development and structured organizational processes. In contrast, more feminine cultures that prioritize well-being, collaboration, and equality tend to nurture a more knowledge-driven economy with better educational and institutional support.

Individualism (IDV) did not show strong statistical significance in most IC components, except for marginal support in Human and Process Capital. While individualistic cultures promote autonomy and entrepreneurship, this may not always translate into broader knowledge-sharing or structured intellectual capital development. The findings suggest that both individualistic and collectivist societies have different strengths when it comes to IC, and neither is inherently superior in driving national intellectual capital.

Overall, these findings validate the role of national culture in shaping intellectual capital. They highlight the risks posed by hierarchical and uncertainty-averse cultures while reinforcing the benefits of long-term thinking and inclusive, process-driven governance in fostering national intellectual capital.

The findings of this study have several theoretical, managerial, and policy implications for nations and organizations seeking to enhance their intellectual capital.

This study contributes to the literature by providing empirical evidence on how Hofstede's cultural dimensions influence different components of IC. It reinforces the negative effects of high Power Distance (PDI) and Uncertainty Avoidance (UAI) on knowledge sharing, innovation, and market expansion. The positive role of Long-Term Orientation (LTO) in Human and Renewal Capital further supports the argument that forward-thinking societies invest more in education, research, and innovation.

For managerial implications, Organizations operating in high-PDI environments should decentralize decision-making and promote knowledge-sharing cultures to improve their intellectual capital. Businesses in high-UAI cultures should introduce flexible work structures and risk-friendly policies to encourage market expansion and innovation. Companies in masculine cultures should balance competitive drive with investment in human and process capital, ensuring long-term organizational growth.

For policy implications, Governments should reduce hierarchical barriers in education and business environments to foster more inclusive knowledge economies. Policymakers in high-UAI cultures should promote innovation-friendly regulations and financial incentives to reduce risk aversion and encourage entrepreneurship. Nations with a short-term focus should invest in R&D, skill development, and sustainable economic policies to strengthen intellectual capital over time.

By addressing cultural barriers, countries and businesses can optimize their IC development, ensuring long-term competitiveness in the global knowledge economy.

As the global economy continues to shift towards knowledge-based industries, future research should focus on Developing standardized IC measurement frameworks that can be applied across different cultural and economic contexts, Examining the role of artificial intelligence and digital transformation in shaping IC, Exploring the impact of national policies on IC growth and innovation and Understanding the interplay between IC and sustainability, particularly in addressing climate change and social equity.

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