Journal of Transport and Supply Chain Management
ISSN: (Online) 1995-5235, (Print) 2310-8789

Does culture matter? Assessing its impact on logistics performance across countries

Authors:
Dai Long Khuc[1]
Thi van Nguyen[2]
Tien Dung La[3]
Quoc Hoan Kieu[4]
Nguyen Thanh Thuy Duong[5]

Affiliations:
[1]Department of Brand Management, Faculty of Marketing, Thuongmai University, Hanoi, Vietnam

[2]Department of Strategic Management, Institute of Business Administration, Thuongmai University, Hanoi, Vietnam

[3]Department of Business Management, Institute of Business Administration, Thuongmai University, Hanoi, Vietnam

[4]Department of Human Resource Economics, Faculty of Human Resource Management, Thuongmai University, Hanoi, Vietnam

[5]Department of Economics, Faculty of Economics, Thuongmai University, Hanoi, Vietnam

Corresponding author:
Thi van Nguyen,
vannguyen@tmu.edu.vn

Dates:
Received: 09 Nov. 2025
Accepted: 18 Feb. 2026
Published: 31 Mar. 2026

Background: Whilst logistics performance is central to economic development and international integration, the influence of national culture on logistics outcomes remains underexplored, as prior studies have largely emphasised infrastructure, policy and firm-level factors.

Objectives: This article examines how national culture, as defined by Hofstede's Cultural Dimensions Theory, influences countries' logistics performance. It empirically analyses the impact of six cultural dimensions on the national logistics performance, providing insights for theory and policy development.

Method: Using panel data of 628 country-year observations from 95 countries over 2010–2022, a robust random-effects model (REM) is employed, supported by Hausman and Breusch-Pagan Lagrange Multiplier tests, confirming significant unobserved heterogeneity and the appropriateness of REM over alternative models.

Results: Individualism (IDV) and long-term orientation (LTO) have positive impacts, whilst power distance (PDI) and uncertainty avoidance (UAI) negatively influence national logistics performance. Masculinity and indulgence vs. restraint show no significant association with logistics outcomes of countries.

Conclusion: National culture significantly influences logistics performance, with IDV and LTO enhancing efficiency, whilst PDI and UAI reduce flexibility and innovation. These results highlight the importance of cultural factors in national logistics governance and performance improvement.

Contribution: This study contributes to logistics performance research by integrating Hofstede's cultural dimensions at the country level, providing evidence that cultural values shape how national logistics systems function. The findings offer practical guidance for policymakers to develop culturally aligned strategies that enhance coordination, innovation and sustainable logistics development.

Keywords: logistics; logistics performance; national logistics performance; culture; cultural dimensions; Hofstede's theory; cross-country analysis.

Introduction

Logistics represents a fundamental pillar of the supply chain and is widely regarded as the lifeblood of national economies, playing a critical role in facilitating trade, driving economic growth and advancing international integration of countries (Hwang et al. 2017; Wong & Tang 2018). In parallel, national culture serves as the underlying framework that shapes the behaviour, cognition and interactions of social actors within a society (Hofstede 1980). Whilst logistics determines the efficiency of the flow of goods, services and information, culture influences how logistics stakeholders coordinate actions, make decisions and manage risks, all of which are determinants of the logistics performance of countries. Logistics performance, in this context, is an indicator of a country's capacity to effectively organise and operate its supply chain (Kesavan & Deif 2021; Wong & Tang 2018). National culture, meanwhile, contributes to the development of organisational mindsets, work practices and trust in inter-organisational collaboration – factors that critically impact logistics implementation (EL Baz et al. 2022; Hofstede 2011). Therefore, cultural differences can serve either as a strategic asset or as a constraint in the implementation of national logistics systems across countries (Cannon et al. 2010; Kesavan & Deif 2021).

How to cite this article: Long Khuc, D., Van Nguyen, T., Dung La, T., Hoan Kieu, Q. & Thanh Thuy Duong, N., 2026, 'Does culture matter? Assessing its impact on logistics performance across countries', *Journal of Transport and Supply Chain Management* 20(0), a1296. https://doi.org/10.4102/jtscm.v20i0.1296

In the current context of global supply chains, understanding the relationship between national culture and logistics performance is essential. Such understanding not only facilitates the identification of underlying factors that affect logistics performance but also enables the development of culturally tailored policies and strategies. Despite its significance, existing literature has predominantly concentrated on technical determinants such as infrastructure (Hwang et al. 2017; Wong & Tang 2018), regulatory frameworks (Hausman, Lee & Subramanian 2013), and international trade intensity (Raimbekov et al. 2024), economic growth (Khan et al. 2019) or at micro level of logistics firms (Chu et al. 2017; Yang & Lirn 2017), often overlooking the foundational and potentially decisive role of cultural factors in shaping logistics performance at country level.

Importantly, examining logistics performance at the country level allows for a systematic comparison across countries with substantially different levels of economic development, income, population size and institutional capacity. From a comparative perspective, national culture can be understood as a relatively stable macro-level characteristic that interacts with economic and structural conditions to shape logistics outcomes. Therefore, focusing on the country level is particularly appropriate for capturing cross-national differences in logistics performance across countries. Despite recent contributions, such as the study by Wong, Sancha and Thomsen (2017) on the role of national culture in supply chain integration practices and the research by Kesavan and Deif (2021) examining the impact of national culture on national logistics performance, there remains a critical need for more comprehensive empirical research. Most prior studies primarily relied on traditional regression methods, such as Ordinary Least Squares (OLS), which have produced mixed findings and may not adequately control for unobserved country-specific heterogeneity or capture dynamic variations over time. More comprehensive empirical studies are therefore necessary to explain the mechanisms through which culture influences logistics outcomes and to inform context-specific recommendations aligned with each country's cultural profile. Thus, the present study employs a panel data approach across countries and years, enabling a more robust examination of both cross-country differences and within-country variations over time whilst accounting for unobserved heterogeneity. In this context, this study aims to examine the influence of cultural dimensions, as conceptualised by Hofstede's Cultural Dimensions Theory, on national logistics performance at the country level. National logistics performance is defined as a country's capacity to organise, manage, and optimise logistics activities to ensure the efficient flow of goods, services and information across the supply chain (Arvis et al. 2023). This concept encompasses both domestic logistics operations (such as pre-export and post-import activities) and international logistics functions, including cross-border transportation, thereby reflecting the full journey from the point of production in the exporting country to the final delivery at the importer's warehouse. Accordingly, logistics performance at country level extends beyond transportation and warehousing to include elements such as customs procedures, transportation infrastructure, the quality of logistics services, and the effectiveness of governmental support policies. Hofstede's framework is adopted because it conceptualises culture explicitly at the national level and has been extensively applied and validated in cross-country studies in economics, management and supply chain research. Its broad country coverage and conceptual compatibility with macro-level indicators enable meaningful comparisons of logistics performance across countries.

The following sections of this article are organised as follows. Firstly, the theoretical framework is presented, and hypotheses concerning the relationship between cultural dimensions and logistics performance at the country level are developed. Secondly, the methodology section outlines the data sources, sample selection, variable construction and panel data techniques employed to empirically test the proposed relationships. Thirdly, the empirical findings are reported and interpreted, followed by a discussion of theoretical and policy implications. Finally, the key contributions and proposed directions for future research are summarised.

Literature review and hypotheses development

By definition, 'culture is the collective programming of the mind that distinguishes the members of one group or category of people from others' (Hofstede 2011:3). Newman and Nollen (1996) emphasised that national culture comprises a coherent system of values, beliefs and underlying assumptions that are instilled from an early age. These cultural elements serve as foundational markers distinguishing one societal group from another. National culture is deeply embedded in the historical, religious and linguistic contexts of a society and tends to exhibit resilience to short-term fluctuations. From this standpoint, culture manifests in the shared value orientations, cognitive schemas and behavioural norms of individuals within a community, thereby shaping how social actors perceive, engage with, and respond to their socio-environmental contexts (Prim et al. 2017). Drawing upon Hofstede's Cultural Dimensions Theory, this study investigates the influence of national culture on logistics performance at the country level. Originally developed by Hofstede and subsequently refined by his collaborators, the framework delineates six core dimensions of national culture: power distance (PDI), individualism (IDV) versus collectivism, uncertainty avoidance (UAI), masculinity (MAS) versus femininity, long-term versus short-term orientation and indulgence vs. restraint (IVR) versus restraint (Hofstede 1980). Each dimension captures a fundamental aspect of how individuals and organisations interpret, navigate and respond to their socio-economic environments. For instance, high levels of UAI or long-term orientation (LTO) may shape strategic decisions related to investments in logistics infrastructure, risk management and the development of resilient supply chain networks (Prim et al. 2017). Likewise, cultural traits such as IDV or high PDI can

influence managerial hierarchies, coordination mechanisms and the degree of collaboration amongst supply chain actors (Kesavan & Deif 2021; Rinne, Steel & Fairweather 2013). Through a detailed examination of these dimensions, this study seeks to elucidate the cultural mechanisms that underpin variations in logistics performance across countries. Specifically:

Power distance and national logistics performance

Power distance is defined '[…] as the extent to which the less powerful members of organizations and institutions (like the family) accept and expect that power is distributed unequally' (Hofstede 2011:9). This first cultural dimension reflects how societal inequality is perceived and legitimised by both dominant and subordinate groups. The PDI quantifies the degree to which hierarchical power structures are accepted without resistance. In low-PDI societies, authority is more likely to be questioned and power more evenly distributed, whereas in high-PDI societies, centralised control and social stratification are widely accepted. Jain and Jain (2018) further emphasised that PDI not only characterises societal structures but also significantly influences individual and organisational behaviour. In the context of national logistics performance, PDI influences how authority is exercised and decisions are made. A high PDI often leads to centralised control, limited stakeholder involvement and reduced transparency. These can negatively affect coordination and reduce the responsiveness of logistics systems. It can also delay innovation, complicate administrative procedures, and weaken supply chain agility. In contrast, a low PDI promotes open communication, equitable coordination and efficient system governance. In the literature, empirical research suggests that there is a negative correlation between PDI and logistics performance. For instance, Kesavan and Deif (2021) indicate that decentralisation and egalitarianism, which are characteristic of hallmarks of low-PDI countries, enhance cross-sector logistics coordination. Khatri (2009) further linked high PDI with limited access to and adoption of information technology, reducing operational performance. Similarly, Jain and Jain (2018) associated high PDI with elevated corruption in public logistics functions such as licensing and customs clearance, which directly impairs national logistics effectiveness. Building on prior findings and re-examining this relationship using panel data analysis, the first research hypothesis is proposed as follows:

H1: Power distance has a significant negative effect on national logistics performance.

Individualism versus collectivism and national logistics performance

Individualism and collectivism capture '[…] the degree to which people in a society are integrated into groups' (Hofstede 2011:11). In individualistic societies, both individuals and organisations tend to value autonomy, independence, and personal interests. In contrast, collectivist cultures emphasise group cohesion, loyalty, and the prioritisation of communal goals over individual aspirations. These cultural orientations not only shape societal norms and value systems but also significantly influence decision-making behaviours across various domains, including economic activities, corporate governance and national logistics operations. Countries with high levels of IDV are often characterised by a strong emphasis on personal responsibility, performance, and efficiency. In the logistics sector, where transparency, reliability and process optimisation are critical, actors operating in individualistic environments are more likely to adopt technology, streamline operations and pursue continuous improvement to maximise performance outcomes. Conversely, in collectivist societies, decision-making is typically group-oriented and influenced by relational norms or traditional expectations. This can lead to slower adoption of innovation and lower operational performance in national logistics systems. Empirical studies generally suggest that these distinctions may matter for logistics outcomes. Prim et al. (2017) and Rinne et al. (2013) argued that cultures emphasising IDV foster innovation and creativity, both of which are essential drivers of logistics development through the adoption of new technologies and business models. Similarly, Kesavan and Deif (2021) highlighted that individualistic societies often feature more open markets, dynamic entrepreneurial ecosystems, and a more enabling business environment, all of which contribute to improved logistics service performance. In contrast, Wong et al. (2017) found that low IDV or highly collectivist cultures may impede innovation, reduce incentives for individual initiative, and create institutional frictions that hinder logistics development. Drawing on prior findings and seeking to reassess this relationship within a multi-country panel framework, the second research hypothesis is proposed as follows:

H2: Individualism has a significant positive effect on national logistics performance.

Masculinity versus femininity and national logistics performance

According to Hofstede (1980, 2011), MAS reflects a preference in society for achievement, heroism, assertiveness and material rewards for success, whereas femininity refers to a preference for cooperation, modesty, caring for the weak and quality of life. In masculine cultures, economic actors tend to exhibit goal-oriented, competitive, and risk-taking behaviours, fostering innovation and performance optimisation. In contrast, feminine cultures prioritise social cohesion, conflict avoidance and sustainable development, often resulting in more cautious decision-making and long-term system stability. In the logistics domain, countries with high MAS typically focus on cost and time efficiency, supported by decisive governance and responsive operational capacity. Feminine societies, by contrast, emphasise social welfare and environmental sustainability, which can support long-term resilience but may impede rapid optimisation. Empirical findings, however, have produced mixed and inconclusive results regarding the role of MAS in logistics performance. Whilst Prim et al. (2017) suggested a partial

link between MAS and innovation in logistics, Kesavan and Deif (2021) reported no statistically significant association between MAS and logistics performance.

Although the theoretical framework posits that MAS should positively influence national logistics performance through assertiveness and performance orientation, existing evidence indicates that this relationship is not consistently observed across contexts. Accordingly, rather than presuming a confirmed association, this study re-examines the proposed linkage using panel data techniques:

H3: Masculinity has a significant positive effect on national logistics performance.

Uncertainty avoidance and national logistics performance

Uncertainty avoidance, one of Hofstede's (1980) six cultural dimensions, '[…] deals with a society's tolerance for ambiguity. It indicates to what extent a culture programs its members to feel either uncomfortable or comfortable in unstructured situations' (Hofstede 2011:10). High-UAI cultures tend to emphasise stability, rules and risk aversion, whilst low-UAI societies are more open to change, innovation, and flexible behaviour. This cultural trait shapes how economic actors respond to uncertainty – an increasingly critical factor in the dynamic global logistics landscape. In logistics, high UAI often results in rigid systems, limited innovation, and slow adaptation to environmental changes. Conversely, low-UAI countries tend to exhibit operational flexibility, technological openness and proactive process adjustment – contributing to improved coordination and system responsiveness. Qu and Yang (2015) found that high UAI is associated with poor logistics performance because of inflexible procedures and weak adaptability, whilst Kesavan and Deif (2021) presented empirical results indicating that low UAI may correlate positively with logistics performance at the country level. Building upon this stream of literature and extending the analysis to a panel dataset, the fourth research hypothesis is proposed:

H4: Uncertainty avoidance has a significant negative effect on national logistics performance.

Long-term orientation versus short-term orientation and national logistics performance

The cultural dimension of LTO versus short-term orientation captures how societies relate to time, influencing decision-making behaviours and strategic priorities (Hofstede 2011). Societies with low LTO tend to emphasise tradition, immediate outcomes and short-term gains, whereas high-LTO societies prioritise long-term planning, adaptability and sustained investment based on historical learning. Time orientation significantly shapes national logistics development. Short-term-oriented countries often lack strategic vision, underinvest in infrastructure and innovation, and focus on immediate performance, hindering systemic growth. In contrast, high-LTO societies adopt long-term logistics strategies, ensure policy continuity, and foster stakeholder trust, all of which are essential factors for effective coordination and sustained competitiveness. These countries are also more likely to invest in risk management, technological advancement, and infrastructure, strengthening their logistics performance. Empirical evidence has provided support for the relevance of temporal orientation in logistics and infrastructure development. Cannon et al. (2010) highlighted the role of LTO in fostering trust and reducing conflict amongst logistics stakeholders, whilst Ryu and Moon (2009) emphasised its contribution to strategic investment in ports and multimodal transport systems. In light of these findings, and to reassess their robustness within a broader cross-national and longitudinal setting, the fifth hypothesis is formulated as follows:

H5: Long-term orientation has a significant positive effect on national logistics performance.

Indulgence versus restraint and national logistics performance

The IVR dimension captures the extent to which societies permit the free gratification of basic human desires related to enjoyment and leisure. As Hofstede (2011) noted:

> Indulgence stands for a society that allows relatively free gratification of basic and natural human desires related to enjoying life and having fun. Restraint stands for a society that controls gratification of needs and regulates it by means of strict social norms. (p. 15)

This cultural orientation influences national logistics performance by shaping consumption behaviours and attitudes toward innovation. In indulgent societies, high consumer demand – particularly in sectors like e-commerce and fast delivery – drives the expansion of logistics services to meet expectations for speed, variety, and personalisation. Furthermore, such societies typically demonstrate openness to technological innovation, facilitating the adoption of advanced solutions like drone delivery, artificial intelligence (AI), powered logistics platforms and smart warehousing, thereby enhancing system performance. In the literature, empirical evidence on the relationship between national cultural dimensions and logistics performance remains inconclusive. Kesavan and Deif (2021) found that the IVR dimension exhibited no statistically significant effect on logistics performance at the country level. In contrast, Prim et al. (2017) demonstrated a positive and significant association between higher IVR scores and national innovation outputs. Given these divergent findings, this study re-examines the potential influence of IVR on logistics performance using a panel data approach and proposes the following hypothesis:

H6: Indulgence has a significant positive effect on national logistics performance.

Research methods and design

Data collection, processing and research samples

Data on the logistics performance index (LPI) and country indicators were sourced from the World Development Indicators (WDI) database of the World Bank (2023). The WDI compiles standardised socio-economic data from national and international organisations (e.g. International Monetary Fund [IMF], United Nations [UN], United Nations Educational, Scientific and Cultural Organization [UNESCO]) following rigorous procedures to ensure consistency and comparability across countries and over time. The LPI, published biennially except for the second edition released 3 years after 2007, is based on surveys of logistics professionals and measures customs, infrastructure, international shipments, competence, tracking and timeliness. Owing to its methodological rigour, the LPI is widely recognised as a reliable indicator and is frequently employed in both academic research and policy analysis. Data on cultural dimensions were obtained from The Culture Factor Group (2024), which provides standardised indicators developed by Hofstede and colleagues (Hofstede 1980; Hofstede & Bond 1988; Hofstede, Hofstede & Minkov 2010). These indicators are based on large-scale International Business Machines Corporation (IBM), surveys across over 70 countries and have been refined through successive studies. To construct the research dataset, logistics and cultural data were matched by country and year. Observations with missing values were excluded to ensure completeness and consistency. The final unbalanced panel contains 628 country-year observations over 2007–2022, drawn from seven LPI surveys published biennially, except for the second round issued 3 years after 2007. A detailed distribution is provided in Table 1. The sample includes countries that differ markedly in terms of economic development, income level, population size, and geographic scale. This heterogeneity is intentional, as it allows the analysis to adopt a comparative cross-country perspective and to examine whether cultural dimensions exert systematic influences on logistics performance across diverse national contexts.

TABLE 1: List of countries in the research sample.

Countries	Number	Year
Algeria, Angola, Argentina, Armenia, Australia, Austria, Belgium, Bolivia, Bosnia and Herzegovina, Brazil, Bulgaria, Burkina Faso, Canada, Chile, China, Colombia, Croatia, Czechia, Denmark, Dominican Republic, Egypt, El Salvador, Estonia, Finland, France, Germany, Ghana, Greece, Hong Kong, Hungary, India, Indonesia, Ireland, Italy, Japan, Kazakhstan, Latvia, Lithuania, Luxembourg, Malaysia, Mexico, Mongolia, Netherlands, New Zealand, Nigeria, North Macedonia, Norway, Paraguay, Peru, Philippines, Poland, Portugal, Republic of Korea, Republic of Moldova, Romania, Russia, Saudi Arabia, Serbia, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, Vietnam	73	7
Albania, Bangladesh, Belarus, Georgia, Iceland, Iran, Iraq, Jordan, Lebanon, Libya, Malta, Montenegro, Pakistan	13	6
Ethiopia, Sao Tome and Principe, United Republic of Tanzania, Zambia	4	5
Azerbaijan, Morocco, Mozambique, Venezuela	4	4
Trinidad and Tobago	1	3
Total number of countries (cross-sectional units)	**95**	-
Total country–year observations	-	**628**

Source: World Bank, 2023, *DataBank: World development indicators*, World Bank, viewed from https://databank.worldbank.org/source/world-development-indicators; and The Culture Factor Group, 2024, *Country comparison tool*, The Culture Factor Group, viewed from https://theculturefactor.com/country-comparison-tool

Variables

The *dependent variable* in this study is the LPI, developed by the World Bank to provide a comprehensive assessment of national logistics performance (Arvis et al. 2007). The index is composed of six key dimensions: (1) the ability to track and trace consignments, (2) the competence and quality of logistics services, (3) the ease of arranging competitively priced international shipments, (4) the efficiency of customs clearance processes, (5) the frequency with which shipments reach the consignee within the scheduled or expected time and (6) the quality of trade and transport-related infrastructure (Arvis et al. 2007). The *independent variables* include six cultural dimensions developed by Hofstede and colleagues: PDI, IDV, UAI, MAS, LTO and IVR (Hofstede 1980; Hofstede & Bond 1988; Hofstede et al. 2010). Each dimension is scaled from 0 to 100, with higher scores indicating a stronger presence of the respective cultural trait. These variables are treated as time-invariant, reflecting the stable nature of national culture. The *control variable* is current gross domestic product (GDP), expressed in natural logarithmic form to reduce scale bias and to control for differences in economic size across countries. This variable helps account for broader economic conditions that may affect the logistics performance of countries. Population is excluded as a result of high multicollinearity with GDP. By incorporating GDP in logarithmic form as a control variable, the analysis mitigates potential bias arising from large disparities in economic scale and income across countries, thereby allowing the estimated effects of cultural dimensions to be interpreted net of differences in development level. Table 2 presents the summary statistics of the research variables, including the dependent variable, six independent cultural dimensions, and one control variable. The LPI, serving as the dependent variable, ranges from 1.9 to 4.3, with a mean of 3.13 and a standard deviation of 0.57, indicating moderate variation in logistics performance across countries. The six cultural dimensions (PDI, IDV, MAS, UAI, LTO and IVR) exhibit considerable diversity across the sample. Notably, PDI and UAI display relatively high mean values (65.33 and 67.81, respectively), suggesting a general tendency toward hierarchical structures and risk aversion amongst the countries included. In contrast, dimensions such as IDV, LTO and IVR show wider variation, with minimum values as low as 0 or 5, reflecting substantial cross-cultural differences. The control variable, GDP (log-transformed), ranges from 8.17 to 13.41, with a mean of 11.24, highlighting the broad spectrum of economic development represented in the dataset. Overall, the statistics suggest a rich and heterogeneous dataset suitable for investigating the relationship between national culture and logistics performance.

Table 3 reports the Pearson correlation coefficients between the dependent variable (LPI) and the independent variables, alongside the Variance Inflation Factor (VIF) values for

TABLE 2: Summary statistics of variables.

Variable		Unit	Obs	Mean	Std. dev.	Min	Max
Dependent variable							
LPI	Logistics performance index	0–5	628	3.13	0.57	1.90	4.30
Independent variables of cultural dimensions							
PDI	Power distance index	0–100	628	65.33	21.02	11.00	100.00
IDV	Individualism vs. collectivism index	0–100	628	44.00	23.53	0.00	100.00
MAS	Masculinity vs. femininity index	0–100	628	47.54	18.39	5.00	100.00
UAI	Uncertainty avoidance index	0–100	628	67.81	21.33	8.00	100.00
LTO	Long-term vs. short-term orientation index	0–100	628	43.42	20.45	5.00	100.00
IVR	Indulgence vs. restraint index	0–100	628	43.72	22.62	0.00	100.00
Control variables							
GDP	Gross domestic product	Logarithm value	628	11.24	0.80	8.17	13.41

Obs, Observation; Std. dev., Standard development; vs., versus; Min, minimum; Max, maximum.

TABLE 3: Pearson correlation matrix of the variables.

Variable	LPI	PDI	IDV	MAS	UAI	LTO	IVR	GDP	VIF
LPI	1.000	-	-	-	-	-	-	-	-
PDI	-0.645**	1.000	-	-	-	-	-	-	2.07
IDV	0.697**	-0.642**	1.000	-	-	-	-	-	2.28
MAS	0.076	0.074	-0.160**	1.000	-	-	-	-	1.17
UAI	-0.310**	0.289**	-0.050	-0.006	1.000	-	-	-	1.21
LTO	0.518**	-0.239**	0.453**	-0.048	-0.140**	1.000	-	-	1.54
IVR	0.209**	-0.350**	0.192**	0.038	-0.193**	-0.216**	1.000	-	1.36
GDP	0.609**	-0.304**	0.286**	0.284**	-0.203**	0.237**	0.193**	1	1.34

LPI, Logistics performance index; PDI, Power distance index; IDV, Individualism versus collectivism index; MAS, Masculinity versus femininity index; UAI, Uncertainty avoidance index; LTO, Long-term versus short-term orientation index; IVR, Indulgence versus restraint index; GDP, Gross domestic product.

**, Correlation is significant at the 0.01 level (2-tailed).

multicollinearity assessment. Specifically, LPI is positively and significantly correlated with IDV (r = 0.697), LTO (r = 0.518), IVR (r = 0.209) and GDP (r = 0.609), suggesting that higher levels of these variables are associated with better national logistics performance. In contrast, LPI shows a significant negative correlation with PDI (r = −0.645) and UAI (r = −0.310), implying that societies characterised by greater PDI and UAI may experience lower logistics performance. Regarding the interrelationships amongst the cultural dimensions, several significant correlations are also observed – for example, between IDV and LTO (r = 0.453), PDI and UAI (r = 0.289), and PDI and IVR (r = −0.350) – but none are high enough to raise multicollinearity concerns. This is confirmed by the mean VIF value of 1.57, with all individual VIFs well below the threshold of 4, indicating that multicollinearity is not a concern in the subsequent regression analysis.

Regression analysis

This study uses panel data regression to examine the impact of national culture on logistics performance across 95 countries and 628 year-observations. This method captures both cross-country differences and within-country changes over time whilst controlling for unobserved heterogeneity. Following Dougherty (2011), we compare three models using Stata: fixed effects (FEM), random effects (REM) and pooled OLS models. Year dummies are included to control for common shocks and macroeconomic fluctuations. As FEM drops time-invariant cultural variables, the between-effects model (BEM) is also employed to retain these variables whilst ensuring compatibility with standard tests (Gould 2022). The Hausman test (Hausman 1978) determines whether REM or BEM is preferred; a significant result favours BEM, whilst a non-significant result supports REM. Additionally, the Lagrange Multiplier (LM) test (Breusch & Pagan 1980) assesses whether REM/BEM is superior to pooled OLS. Once the optimal model is selected, robust regression techniques are used to correct for heteroskedasticity to ensure reliable inference. In practice, because of our short and strongly unbalanced dataset, serial correlation, cross-sectional dependence, and endogeneity are less of a concern (Baltagi & Maasoumi 2013). Although the study period spans from 2007 to 2022, only seven years of observations are available because the LPI is published biennially, except for the second round released 3 years after 2007. The unbalanced structure, with missing and irregularly spaced observations, restricts the application of more advanced econometric techniques such as the Mundlak approach (because time-invariant variables cause their group means to be omitted because of multicollinearity), as well as Generalised Least Squares (GLS) and Driscoll–Kraay methods (which are not suitable for strongly unbalanced panels).

Ethical considerations

Ethical clearance to conduct this study was obtained from the Thuongmai University CSTRAD Ethics Committee (No. 2025/CSTRAD-11-036).

Results

The regression results obtained from Stata are summarised in Table 4. Following the model selection procedure outlined by Dougherty (2011), the insignificant Hausman test ($\chi^2[13] = 11.40$, $p = 0.577 > 0.05$) confirms the consistency and efficiency of REM given the structure of the current dataset.

Concurrently, the significant LM test (chibar²[01] = 845.83, $p < 0.001$) indicates strong panel-level effects, thereby rejecting the suitability of the pooled OLS model. Based on these diagnostic outcomes, the REM is identified as the most appropriate estimation technique. To mitigate potential heteroskedasticity and improve the robustness of inference, the robust REM is adopted as the final model. The robustness of our selected robust REM is validated by the consistency of coefficient estimates. As reported in Table 4, its coefficient estimates are nearly identical to the ones of the standard REM, suggesting that heteroskedasticity correction does not materially alter the results. Moreover, compared with the GLS model used for the robustness check (which employs the force option to include all available observations, allowing the GLS model to run despite missing data in the unbalanced panel), the robust REM yields comparable coefficient signs and significance levels. These consistencies confirm the empirical reliability and appropriateness of the selected robust REM in examining the influence of cultural dimensions on national logistics performance. The robust REM further demonstrates strong empirical validity, with an overall R^2 of 0.766 and a highly significant Wald test (χ^2[13] = 935.29, $p < 0.001$), indicating that the independent variables collectively explain a substantial portion of the variation in logistics performance across countries. The statistical significance of the year dummies also confirms effective control for time-specific effects. In sum, the consistent diagnostics, robustness checks and model fit statistics support the methodological rigour and reliability of the selected estimation approach.

Impact of power distance on national logistics performance

The robust REM results in Table 4 reveal a statistically significant negative relationship between PDI and national logistics performance (coefficient = –0.006, $p = 0.002 < 0.05$), thereby *supporting Hypothesis 1 (H1)* and aligning with prior findings (Kesavan & Deif 2021). In low-PDI societies, governance tends to be decentralised, decision-making is more flexible and public-private coordination is enhanced. These contexts foster innovation amongst logistics personnel, promote transparency and reduce corruption, contributing to more efficient supply chains. Conversely, high-PDI societies are typically characterised by centralised authority, rigid hierarchies, limited delegation and slow responsiveness to change, which hinders logistics performance. To further assess the validity of H1, we provide a descriptive illustration using the 2022 cross-section drawn from our database, which illustrates this pattern. Countries such as Finland (PDI = 33; LPI = 4.2, rank = 2), the Netherlands (PDI = 38; LPI = 4.1, rank = 3), Germany (PDI = 35; LPI = 4.1, rank = 3), Denmark (PDI = 18; LPI = 4.1, rank = 3) and Switzerland (PDI = 34; LPI = 4.1, rank = 3) all exhibit low PDI and consistently rank amongst the top performers in global logistics. This descriptive evidence is consistent with the regression results, indicating a negative association between PDI and LPI. These countries share key institutional features, including decentralised administration, responsive public sector engagement with private initiatives, and organisational cultures that value empowerment, critical thinking and innovation. Such environments facilitate rapid technological adoption, cross-sector coordination, and agile responses to crises such as pandemics, supply chain disruptions, labour conflicts or geopolitical shocks. In contrast, countries with high PDI tend to exhibit low logistics performance. Notable examples include Libya (PDI = 100; LPI = 1.9, rank = 95), Iraq (PDI = 97; LPI = 2.4, rank = 90), Belarus (PDI = 95; LPI = 2.7, rank = 62), Mongolia (PDI = 93; LPI = 2.5, rank = 71) and Russia (PDI = 93; LPI = 2.6, rank = 68). These observations further reinforce the empirical pattern identified in the panel regression analysis. These countries share institutional characteristics such as centralised power structures, top-down decision-making, and limited delegation in

TABLE 4: Regression results from panel models ($N = 95$).

Variable	Between-effects model (BEM)†		Random-effects model (REM)†		Robust random-effects model (REM)†		GLS model for robustness check†	
	Coef.	*t*	Coef.	*z*	Coef.	*z*	Coef.	*t*
Independent variables								
PDI	-0.007**	-3.540	-0.006**	-3.35	-0.006**	-3.13	-0.007***	-8.63
IDV	0.009***	4.950	0.009***	5.55	0.009***	6.21	0.009***	12.66
MAS	0.002	1.510	0.002	1.37	0.002	1.85	0.001	1.61
UAI	-0.004**	-2.720	-0.003*	-2.58	-0.003*	-2.09	-0.002**	-2.60
LTO	0.006**	3.430	0.006***	3.78	0.006**	3.40	0.005***	7.80
IVR	0.000	-0.020	0.000	0.23	0.000	0.26	0.000	-0.64
GDP	0.239***	5.900	0.229***	6.64	0.229***	6.05	0.272***	15.74
Year								
2010	-1.599	0.176	0.088***	3.73	0.088***	3.60	0.076***	3.76
2012	0.079	0.940	0.082**	3.42	0.082**	3.10	0.053*	2.17
2014	1.460	0.194	0.140***	5.80	0.140***	5.78	0.110***	4.22
2016	-0.754	0.545	0.146***	6.17	0.146***	5.61	0.118***	4.40
2018	-0.022	0.985	0.090***	3.69	0.090***	3.55	0.064*	2.35
2022	0.393	0.603	0.148***	5.80	0.148***	5.26	0.106***	3.80
_cons	0.463	0.604	0.294	0.72	0.294	0.67	-0.096	-0.48

Note: Hausman test: chi²(13) = 11.40, Prob > chi² = 0.577; LM-test: chibar²(01) = 845.83, Prob > chibar² = 0.000; Between-effects model (BEM): $R^2 = 0.2088$ (overall); Random-effects model (REM): $R^2 = 10.7660$ (overall); Robust random-effects model (REM): $R^2 = 0.7660$ (overall).

PDI, Power distance index; IDV, Individualism vs. collectivism index; MAS, Masculinity versus collectivism index; MAS, Masculinity versus femininity index; UAI, Uncertainty avoidance index; LTO, Long-term versus short-term orientation index; IVR, Indulgence versus. restraint index; GDP, Gross domestic product; GLS, Generalised Least Squares; LM, Lagrange Multiplier.

†, Observation = 628.

*, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$.

logistics operations. The dominance of hierarchical control and a 'report-and-wait' administrative mindset impede timely crisis response and stifle innovation. Moreover, public-private partnerships in these contexts are often underdeveloped, transparency in logistics governance is limited, and technological adoption remains sluggish. These institutional and cultural barriers collectively hinder efforts to reform logistics systems and improve overall performance in high-PDI countries. Whilst these features align with high-PDI characteristics, they are discussed here solely to illustrate the descriptive contrast observed in the 2022 data.

Impact of individualism versus collectivism on national logistics performance

The robust REM results in Table 4 indicate that the IDV versus collectivism index exerts a statistically significant and positive effect on national logistics performance at the 95% confidence level (coefficient = 0.009, $p = 0.000 < 0.05$). This finding *supports Hypothesis 2 (H2)* and is consistent with prior research by Kesavan and Deif (2021), which suggests that higher IDV is associated with better logistics performance. In individualistic societies, autonomy, creativity and critical thinking are encouraged, fostering innovation, technological adoption, information sharing and inter-sectoral coordination in logistics operations. A descriptive examination of the 2022 cross-sectional data from our sample further illustrates this empirical relationship: countries such as the Netherlands (IDV = 100; LPI = 4.1), Denmark (IDV = 89; LPI = 4.1), Sweden (IDV = 87; LPI = 4.0), Germany (IDV = 79; LPI = 4.1) and Switzerland (IDV = 79; LPI = 4.1) are top global performers in logistics. Their institutional settings promote innovation, support individual initiative, and facilitate the deployment of advanced logistics solutions, such as automation, AI, and big data analytics. These capabilities contribute to efficient, low-cost and high-quality logistics services, reinforcing their global competitiveness. Conversely, in collectivist societies with low IDV scores, logistics performance tends to lag, despite infrastructure investments. For example, Libya (IDV = 17; LPI = 1.9), Angola (IDV = 18; LPI = 2.1), and Burkina Faso (IDV = 15; LPI = 2.1) consistently rank low on the LPI. These contrasting cases provide additional descriptive support for the regression findings. These countries often exhibit bureaucratic organisational cultures, where conformity and group consensus are prioritised over individual initiative. This inhibits rapid decision-making, slows the adoption of new technologies, and reduces responsiveness to supply chain disruptions. Furthermore, limited transparency, weak inter-sectoral coordination, and constrained innovation capacity impede efforts to improve the logistics performance of countries in the face of growing global complexity and volatility.

Impact of masculinity versus femininity on national logistics performance

The robust REM results in Table 4 indicate that the MAS versus femininity index does not significantly influence national logistics performance at the 95% confidence level (coefficient = 0.002, $p = 0.064 > 0.05$). As such, *Hypothesis 3 (H3) is not supported*. This result contradicts the findings of Prim et al. (2017), who suggest that high-MAS societies, characterised by competitiveness, assertiveness, and performance, tend to foster innovation and logistics development. However, it aligns with the arguments of Kesavan and Deif (2021), who contend that MAS exerts an indirect and inconsistent influence on systemic functions such as logistics. From a theoretical standpoint, the MAS dimension primarily captures social norms and gender-related value orientations – such as the emphasis on achievement versus care or competition versus cooperation – rather than structural or institutional factors that directly shape logistics systems. Therefore, its limited explanatory power in this context may reflect the fact that national logistics performance is more strongly driven by institutional effectiveness, technological capacity, and inter-organisational coordination than by gender-role orientations or cultural attitudes toward assertiveness. A review of the 2022 cross-sectional data from our sample further illustrates this lack of a systematic relationship. Countries with contrasting MAS scores, such as Japan (MAS = 95, rank = 2; LPI = 3.9, rank = 13), Sweden (MAS = 5, rank = 84; LPI = 4.0, rank = 7) and Germany (MAS = 66, rank = 10; LPI = 4.1, rank = 3), have all achieved high levels of national logistics performance. Despite substantial cultural differences in gender-role orientation, these countries demonstrate that effective logistics performance can be maintained under both masculine and feminine cultural paradigms. In Japan, traditionally characterised by high MAS, values such as competitiveness and discipline may contribute to organisational commitment but are not sufficient conditions for logistics excellence. Conversely, Sweden's feminine culture – emphasising consensus, cooperation, and social harmony – supports effective inter-organisational coordination and stakeholder alignment, essential for modern supply chain management. Similarly, the inconsistency of MAS as a predictor is evident in countries with high or low MAS scores but poor logistics outcomes. Libya (MAS = 66, rank = 10; LPI = 1.9, rank = 95) and Albania (MAS = 80, rank = 4; LPI = 2.5, rank = 72) exhibit strong masculine cultural traits, yet their logistics performance remains low. On the other hand, Angola (MAS = 20, rank = 75; LPI = 2.1, rank = 94) and Mongolia (MAS = 29, rank = 71; LPI = 2.5, rank = 72), which reflect more feminine or gender-neutral cultures, also underperform in logistics. These contrasting cases descriptively reinforce the regression finding that MAS does not exert a consistent direct effect on LPI. These patterns suggest that gender-related cultural values do not directly translate into logistics performance unless they are embedded into institutional practices, such as long-term strategic orientation, operational discipline and multi-actor coordination. In sum, the MAS index may influence management style or policy orientation, but without being integrated into systemic organisational behaviour, it is unlikely to exert a direct or consistent impact on the logistics performance of countries.

Impact of uncertainty avoidance on national logistics performance

The robust REM results in Table 4 indicate that UAI exerts a statistically significant negative impact on national logistics performance at the 95% confidence level (coefficient = –0.003, $p = 0.037 < 0.05$). This finding *supports Hypothesis 4 (H4)* and aligns with prior research by Qu and Yang (2015) and Kesavan and Deif (2021), which posited that societies characterised by low UAI (i.e. high tolerance for uncertainty) tend to exhibit more flexible governance structures and stronger innovation capacity in logistics operations.

A brief look at the 2022 cross-sectional data in our sample further illustrates this negative relationship. Countries such as Singapore (UAI = 8; LPI = 4.3), Denmark (UAI = 23; LPI = 4.1), and Sweden (UAI = 29; LPI = 4.0) exemplify low-UAI cultures that consistently rank amongst the global leaders in logistics performance. Their institutional environments encourage risk-taking, experimentation and rapid adoption of digital technologies such as the Internet of Things, artificial intelligence, and big data – tools crucial for enhancing adaptability, minimising delays, and improving the overall resilience of supply chains. In the face of global disruptions (e.g. the coronavirus disease 2019 [COVID-19] pandemic or geopolitical shocks), such cultural orientations have proven critical for enabling the timely restructuring of logistics strategies and maintaining service quality. Conversely, countries with high UAI scores typically exhibit weaker logistics performance. For instance, Iraq (UAI = 96; LPI = 2.4), Moldova (UAI = 95; LPI = 2.5), Russia (UAI = 95; LPI = 2.6), and Ukraine (UAI = 95; LPI = 2.7) are characterised by organisational cultures that emphasise predictability, control and risk aversion. These environments often delay the adoption of new technologies, discourage experimentation and hinder responsiveness to external shocks – factors that collectively undermine the logistics performance of countries. The reluctance to deviate from established procedures or tolerate errors constrains innovation and adaptive capacity, both of which are essential for navigating complex, dynamic supply chains. These contrasting cases descriptively align with the regression evidence indicating a negative relationship between UAI and LPI. In sum, the findings confirm that low-UAI cultures are better positioned to foster the flexibility, innovation, and technological agility necessary for superior national logistics performance in an increasingly volatile global landscape.

Impact of long-term orientation versus short-term orientation on national logistics performance

The robust REM results in Table 4 reveal that LTO exerts a statistically significant positive effect on national logistics performance at the 95% confidence level (coefficient = 0.006, $p = 0.001 < 0.05$). This finding *supports Hypothesis 5 (H5)* and is consistent with prior studies (e.g. Ryu & Moon 2009), which suggested that cultures characterised by high LTO typically emphasise strategic foresight, systematic planning and long-term investment, which are key drivers of effective and sustainable logistics systems. Empirical data from the 2022 cross-sectional data in our sample offer a descriptive illustration of this positive relationship. Countries with high LTO scores, including Japan (LTO = 100; LPI = 3.9), South Korea (LTO = 100; LPI = 3.8), Hong Kong (LTO = 93; LPI = 4.0) and Singapore (LTO = 67; LPI = 4.3), consistently demonstrate strong logistics performance. These societies tend to prioritise perseverance, consistency and future-oriented policies, forming a cultural environment conducive to long-term infrastructure development, stable supply chain management and continuous innovation. In such contexts, logistics operations are underpinned by resilience and alignment with enduring strategic goals, resulting in high service quality and global competitiveness. Conversely, countries with low LTO scores, such as Libya (LTO = 22; LPI = 1.9), Angola (LTO = 15; LPI = 2.1), Iraq (LTO = 11; LPI = 2.4) and Trinidad and Tobago (LTO = 17; LPI = 2.5), tend to exhibit weaker logistics performance. These contrasting observations are descriptively consistent with the regression results reported above. Cultural characteristics in these societies emphasise short-term outcomes, immediate rewards and limited strategic continuity. This short-termism undermines the ability to build and sustain complex logistics systems, resulting in fragmented planning, underinvestment in infrastructure, and poor adaptability to long-term challenges. As logistics increasingly demands strategic coordination and resilience, the absence of a long-term cultural orientation constrains national logistics performance. The findings underscore the critical role of LTO in fostering a cultural foundation that supports effective logistics planning, innovation and operational sustainability over time.

Impact of indulgence versus restraint on national logistics performance

The results of the robust REM presented in Table 4 indicate that the cultural dimension of IVR does not have a statistically significant impact on national logistics performance at the 95% confidence level (coefficient = 0.0003, $p = 0.798 > 0.05$). This outcome *does not support Hypothesis 6 (H6)* that IVR influences national logistics performance and diverges from the findings of Prim et al. (2017), who posited that higher levels of IVR correlate positively with national innovation outputs, such as technological advancement and creative capacity, which are often considered foundational to logistics development. Conversely, the present findings align more closely with the perspective of Kesavan and Deif (2021), who contend that IVR primarily reflects personal and societal values related to freedom, enjoyment and emotional expression. These values, whilst influential at the individual or social level, may not directly translate into performance within logistics systems, which are inherently structured, rule-based, and reliant on coordination and institutional capability. Thus, in the current empirical context, IVR does not emerge as a significant explanatory variable for differences in logistics performance across countries. A review of the 2022 cross-sectional data further illustrates this absence of such a systematic relationship. Several countries with high or moderate IVR scores nonetheless exhibit

strong logistics performance. For instance, Sweden (IVR = 78, rank = 7; LPI = 4.0, rank = 7), the Netherlands (IVR = 68, rank = 14; LPI = 4.1, rank = 3), Singapore (IVR = 46, rank = 37; LPI = 4.3, rank = 1) and Finland (IVR = 57, rank = 26; LPI = 4.2, rank = 2) all perform exceptionally well in logistics despite exhibiting varying orientations along the IVR spectrum. In high-IVR cultures like Sweden and the Netherlands, personal freedom, leisure and emotional expression are culturally valued, yet these individual-level traits do not appear to directly drive national logistics performance. Similarly, in lower-IVR contexts such as Singapore and Finland, where restraint, self-discipline, and societal order are emphasised, logistics excellence is maintained through strategic institutional and technological investments rather than cultural permissiveness. On the other hand, countries with either high or low IVR scores may still exhibit low logistics performance. Examples include Libya (IVR = 74, rank = 9; LPI = 1.9, rank = 95), Angola (IVR = 83, rank = 4; LPI = 2.1, rank = 94), Burkina Faso (IVR = 18, rank = 74; LPI = 2.3, rank = 92) and Iraq (IVR = 23, rank = 65; LPI = 2.4, rank = 90). These cases illustrate that neither IVR alone is sufficient to explain variations in national logistics outcomes. In countries like Burkina Faso and Iraq, for example, despite cultural tendencies toward enjoyment and personal freedom, such values are not effectively embedded into organisational systems or policy frameworks to enhance logistics capacity. Likewise, high restraint in Libya and Angola does not translate into systematic advantages in logistics management. Whilst the IVR dimension captures meaningful aspects of cultural life related to individual satisfaction and behavioural norms, it does not exert a significant or direct influence on logistics performance at the country level. Overall, these descriptive patterns are in line with the non-significant regression results for IVR. National logistics performance appears to depend more on structural, institutional, and strategic factors (such as long-term planning, investment in digital infrastructure, and governance quality) than on individual-level cultural preferences. Therefore, the role of IVR in explaining cross-national differences in logistics performance is limited and likely mediated by more systemic variables.

Discussion

Theoretically, this study contributes to the advancement of the conceptual foundation of national logistics performance by adopting a cultural perspective. Utilising Hofstede's Cultural Dimensions framework and empirically testing the influence of each cultural dimension on logistics performance at the country level, the study underscores the pivotal role of societal values, behavioural norms and community trust in shaping the functionality and development of logistics systems. Our findings should be interpreted as indicating that cultural dimensions operate as relatively stable contextual and institutional conditions that shape, rather than mechanically determine, logistics system performance. The findings reveal that cultural impacts are conditional, influenced by the operational characteristics of logistics systems, including cross-sector coordination, real-time decision-making, and adaptability to risk. Whilst logistics systems may also exert gradual feedback effects on organisational practices over time, national cultural values tend to be more deeply embedded and persistent, thereby functioning primarily as antecedent contextual factors within which logistics institutions evolve. These insights offer a novel research direction for logistics studies, particularly in the context of globalisation and increasingly frequent supply chain disruptions. Future research may continue to explore the relationship between cultural attributes and specific aspects of logistics management and global supply chain dynamics.

From a policy perspective, the empirical findings demonstrate that the influence of cultural dimensions on logistics performance is not uniform. Specifically, IDV and LTO exert positive effects, whilst PDI and UAI are associated with negative impacts. These results provide practical insights for policymakers aiming to enhance logistics performance through culturally aligned strategies. However, these findings do not imply that national culture itself must or can be directly changed in order to improve logistics performance. Cultural traits are relatively stable and cannot be engineered through short-term policy interventions. Instead, policymakers may strengthen logistics performance by designing institutional arrangements, governance mechanisms and regulatory frameworks that align with or strategically leverage prevailing cultural characteristics. Firstly, given the negative influence of PDI on the flexibility and transparency of logistics coordination, it is recommended that countries develop a roadmap to gradually reduce hierarchical distance, promote egalitarianism within governance and logistics enterprises, and foster bottom-up communication. Encouraging feedback and idea generation from lower-level employees, as well as supporting innovative initiatives, is essential for enhancing coordination efficiency within national supply chains. Secondly, based on the positive impact of IDV, governments should cultivate a constructive individualist culture that promotes creativity, proactivity, and personal accountability in logistics operations. Policy frameworks should emphasise transparency and openness to minimise inefficiencies and motivate contribution. Promoting a culture of innovation, especially in digital technology and automation, is critical for improving the logistics performance of countries. Thirdly, addressing the negative impact of UAI, national logistics strategies should aim to nurture a culture of calculated risk acceptance. This can be achieved through training programs designed to enhance adaptability, encourage innovative risk management practices, and support investment in resilient logistics solutions, particularly from the private sector and technology startups. Finally, the positive association between LTO and logistics performance suggests the need for governments to continue advancing national logistics strategies with a long-term vision. This includes comprehensive infrastructure planning, strengthening institutional capacity, and promoting international cooperation to facilitate integration into global supply chains, contributing to green growth and sustainable development.

Conclusion

This study investigates the relationship between Hofstede's national cultural dimensions and national logistics performance using panel data from multiple countries. The empirical results confirm that national culture significantly influences logistics performance. Specifically, IDV and LTO exert positive effects, whilst PDI and UAI have negative impacts. The remaining dimensions, including MAS versus femininity and IVR, do not show statistically significant effects. These findings highlight the critical role of cultural factors in shaping the operational performance of national logistics systems. The study contributes theoretically by incorporating cultural dimensions into the analysis of logistics performance – an area that remains underexplored in the existing literature. Methodologically, the application of panel data analysis provides robust quantitative evidence, reinforcing the significance of cultural variables in logistics performance evaluation. From a policy perspective, the findings should not be interpreted as advocating direct or short-term changes in deeply embedded national cultural traits, which are relatively stable and evolve gradually over time. Rather than proposing cultural transformation, the study suggests the design of institutional arrangements and governance mechanisms that are compatible with, or strategically responsive to, prevailing cultural characteristics in each country. Emphasis should be placed on institutional reforms and managerial practices that mitigate the constraints associated with high PDI or strong UAI – for example, by improving transparency, decentralising decision-making processes, strengthening accountability frameworks and promoting evidence-based strategic planning – rather than attempting to alter cultural behaviour itself. Nonetheless, the study has some limitations. It relies exclusively on Hofstede's framework without considering alternative cultural models such as GLOBE or Trompenaars, which may limit the comprehensiveness of the analysis. Additionally, the study treats culture as static and does not account for regional variations or the dynamic nature of culture in the context of globalisation. Moreover, the exclusive use of quantitative methods limits the ability to capture the underlying mechanisms through which culture affects logistics performance in specific national contexts. Furthermore, the use of country-level analysis may obscure within-country heterogeneity, particularly in large and economically diverse countries. Whilst this approach is consistent with the conceptualisation of culture in Hofstede's framework and aligns with the macro-level focus of the study, it may not fully capture regional or subnational variations in logistics practices. This limitation is partly addressed through the inclusion of GDP (in logarithmic form) as a control variable, which helps account for cross-country differences in development and income levels, but it does not eliminate all sources of heterogeneity. Future research can address these limitations by: (1) comparing multiple cultural frameworks to test the robustness and generalisability of the findings; (2) focusing on specific logistics domains (e.g. agricultural, urban, or e-commerce logistics) to contextualise the cultural impacts; (3) treating culture as an evolving factor influenced by digital transformation and global integration; (4) multilevel or mixed-method approaches to capture both national and subnational dynamics; and (5) explicitly examining how cultural effects on logistics performance differ across countries with varying levels of economic development and income. These directions will contribute to a more comprehensive understanding of the cultural determinants of logistics performance and inform both academic and policy-oriented discussions.

Acknowledgements

Competing interests

The authors reported that they received funding from Thuongmai University, which may be affected by the research reported in the enclosed publication. The authors has disclosed those interests fully and has implemented an approved plan for managing any potential conflicts arising from their involvement. The terms of these funding arrangements have been reviewed and approved by the affiliated university in accordance with its policy on objectivity in research.

CRediT authorship contribution

Dai Long Khuc: Conceptualisation; Funding acquisition; Project administration; Supervision; Writing – review & editing. Thi van Nguyen: Data curation; Formal analysis; Writing – original draft. Tien Dung La: Conceptualisation; Methodology; Validation: Writing – review & editing. Quoc Hoan Kieu: Data curation; Formal analysis; Methodology; Resources; Software. Nguyen Thanh Thuy Duong: Data curation; Visualisation; Writing – original draft. All authors reviewed the article, contributed to the discussion of results, approved the final version for submission and publication, and take responsibility for the integrity of its findings.

Funding information

This work was supported by the Thuongmai University, Hanoi, Vietman (grant number: NNC25-30).

Data availability

The data that support the findings of this study were collected from the World Bank's open database at https://data.worldbank.org/ and The Culture Factor Group at https://theculturefactor.com/country-comparison-tool.

Disclaimer

The views and opinions expressed in this article are those of the authors and are the product of professional research. They do not necessarily reflect the official policy or position of any affiliated institution, funder, agency, or that of the publisher. The authors are responsible for this article's results, findings, and content.

References

Arvis, J.-F., Alina Mustra, M., Panzer, J., Ojala, L. & Naula, T., 2007, *Connecting to compete: Trade logistics in the global economy – The logistics performance index and its indicators*, World Bank, Washington DC.

Arvis, J.-F., Bank, T.W., Ojala, L., Shepherd, B., The, D.U., Bank, W. & The, C.W., 2023, *Connecting to compete 2023 trade logistics in an uncertain global economy the logistics performance index and its indicators developing trade consultants*, World Bank, Washington DC.

Baltagi, B.H. & Maasoumi, E., 2013, 'An overview of dependence in cross-section, time-series, and panel data', *Econometric Reviews* 32(5–6), 543–546. https://doi.org/10.1080/07474938.2012.740957

Breusch, T.S. & Pagan, A.R., 1980, 'The Lagrange Multiplier Test and its applications to model specification in econometrics', *The Review of Economic Studies* 47(1), 239–253. https://doi.org/10.2307/2297111

Cannon, J.P., Doney, P.M., Mullen, M.R. & Petersen, K.J., 2010, 'Building long-term orientation in buyer–supplier relationships: The moderating role of culture', *Journal of Operations Management* 28(6), 506–521. https://doi.org/10.1016/j.jom.2010.02.002

Chu, S.H., Yang, H., Lee, M. & Park, S., 2017, 'The impact of institutional pressures on green supply chain management and firm performance: Top management roles and social capital', *Sustainability (Switzerland)* 9(5), 764. https://doi.org/10.3390/su9050764

Dougherty, C., 2011, *Introduction to econometrics*, 4th edn., Oxford University Press, Oxford.

EL Baz, J., Jebli, F., Cherrafi, A., Akenroye, T. & Iddik, S., 2022, 'The cultural dimensions in supply chain management research: A state-of-the-art review and research agenda', *European Business Review* 34(2), 171–190. https://doi.org/10.1108/EBR-04-2020-0092

Gould, W., 2022, *What is the between estimator?* Stata, viewed 12 April 2023, from https://www.stata.com/support/faqs/statistics/between-estimator/.

Hausman, J.A., 1978, 'Specification tests in econometrics', *Econometrica* 46(6), 1251–1271. https://doi.org/10.2307/1913827

Hausman, W.H., Lee, H.L. & Subramanian, U., 2013, 'The impact of logistics performance on trade', *Production and Operations Management* 22(2), 236–252. https://doi.org/10.1111/j.1937-5956.2011.01312.x

Hofstede, G., 1980, *Culture's consequences: International differences in work-related values*, Sage, Beverly Hills, CA.

Hofstede, G., 2011, 'Dimensionalizing cultures: The Hofstede Model in context', *Online Readings in Psychology and Culture* 2(1), 1–26. https://doi.org/10.9707/2307-0919.1014

Hofstede, G. & Bond, M.H., 1988, 'The Confucius connection: From cultural roots to economic growth', *Organizational Dynamics* 16(4), 5–21. https://doi.org/10.1016/0090-2616(88)90009-5

Hofstede, G., Hofstede, G.J. & Minkov, M., 2010, *Cultures and organizations: Software of the mind*, 3rd edn., McGraw Hill, New York, NY.

Hwang, D.W., Hong, P.C., Lee, D.Y. & Hwang, D., 2017, 'Critical factors that affect logistics performance: A comparison of China, Japan and Korea management', *International Journal of Shipping and Transport Logistics* 9(1), 107–129. https://doi.org/10.1504/IJSTL.2017.080587

Jain, S.S. & Jain, S.P., 2018, 'Power distance belief and preference for transparency', *Journal of Business Research* 89, 135–142. https://doi.org/10.1016/j.jbusres.2018.04.016

Kesavan, D.P. & Deif, A.M., 2021, 'Exploring national culture impact on logistics performance', *Transportation Journal* 60(1), 20–42. https://doi.org/10.5325/transportationj.60.1.0020

Khan, S.A.R., Jian, C., Zhang, Y., Golpîra, H., Kumar, A. & Sharif, A., 2019, 'Environmental, social and economic growth indicators spur logistics performance: From the perspective of South Asian Association for Regional Cooperation countries', *Journal of Cleaner Production* 214, 1011–1023. https://doi.org/10.1016/j.jclepro.2018.12.322

Khatri, N., 2009, 'Consequences of power distance orientation in organisations', *Vision: The Journal of Business Perspective* 13(1), 1–9. https://doi.org/10.1177/097226290901300101

Newman, K.L. & Nollen, S.D., 1996, 'Culture and congruence: The fit between management practices and national culture', *Journal of International Business Studies* 27, 753–776. https://doi.org/10.1057/palgrave.jibs.8490152

Prim, A.L., Filho, L.S., Zamur, G.A.C. & Di Serio, L.C., 2017, 'The relationship between national culture dimensions and degree of innovation', *International Journal of Innovation Management* 21(1), 1730001. https://doi.org/10.1142/S136391961730001X

Qu, W.G. & Yang, Z., 2015, 'The effect of uncertainty avoidance and social trust on supply chain collaboration', *Journal of Business Research* 68(5), 911–918. https://doi.org/10.1016/j.jbusres.2014.09.017

Raimbekov, Z., Syzdykbayeva, B., Rakhmetulina, A., Rakhmetulina, Z. & Kinasheva, Z., 2024, 'Assessment of the impact of international trade intensity on logistics efficiency: A case study of the EAEU countries', *Journal of Logistics, Informatics and Service Science* 11(1), 163–180. https://doi.org/10.33168/JLISS.2024.0111

Rinne, T., Steel, G.D. & Fairweather, J., 2013, 'The role of Hofstede's individualism in national-level creativity', *Creativity Research Journal* 25(1), 129–136. https://doi.org/10.1080/10400419.2013.752293

Ryu, S. & Moon, C.W., 2009, 'Long-term orientation as a determinant of relationship quality between channel members', *International Business & Economics Research Journal (IBER)* 8(11), 1–9. https://doi.org/10.19030/iber.v8i11.3180

The Culture Factor Group, 2024, *Country comparison tool*, The Culture Factor Group, viewed 30 November 2024, from https://theculturefactor.com/country-comparison-tool.

Wong, C.W.Y., Sancha, C. & Thomsen, C.G., 2017, 'A national culture perspective in the efficacy of supply chain integration practices', *International Journal of Production Economics* 193, 554–565. https://doi.org/10.1016/j.ijpe.2017.08.015

Wong, W.P. & Tang, C.F., 2018, 'The major determinants of logistic performance in a global perspective: Evidence from panel data analysis', *International Journal of Logistics Research and Applications* 21(4), 431–443. https://doi.org/10.1080/13675567.2018.1438377

World Bank, 2023, *DataBank: World development indicators*, World Bank, viewed 15 December 2023, from https://databank.worldbank.org/source/world-development-indicators.

Yang, C.S. & Lirn, T.C., 2017, 'Revisiting the resource-based view on logistics performance in the shipping industry', *International Journal of Physical Distribution and Logistics Management* 47(9), 884–905. https://doi.org/10.1108/IJPDLM-05-2017-0184