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FUZZY MULTICRITERIA DECISION-MAKING FOR ASSESSING MULTINATIONAL ENTERPRISES' OUTBOUND INVESTMENT DESTINATIONS ON THE BASIS OF TAX FACTORS

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Abstract. Taxes are a crucial consideration in a multinational enterprise's (MNE)'s choice of overseas market to invest in. Taxes are affected by a variety of factors, and these factors are prioritized vis-à-vis each other in such investment decision-making. The present study thus developed a framework for evaluating the relative importance of tax factors affecting the outbound investment decisions of MNEs, using insights from the literature and expert interviews to establish evaluation criteria. To address the complexities of multicriteria decision-making, this study employed fuzzy linguistic preference relations. The study subsequently applied the fuzzy VIse Kriterijumska Optimizacija I Kompromisno Resenje (VIKOR) approach to rank the alternatives proposed by the expert decision-making group. Finally, this study applied this methodology to a case study of candidate overseas markets (Vietnam, Malaysia, and Indonesia) for Taiwanese firms to invest in, providing a practical demonstration of the model. In conclusion, the present study's comparative analysis of the application of fuzzy VIKOR to foreign direct investment by Taiwanese MNEs offers a systematic approach for both academic and industry practitioners involved in strategic host country selection for multinational investments.

Keywords: tax factors, multinational enterprise, outbound investment, multicriteria decision-making, fuzzy VIKOR, fuzzy linguistic preference.

JEL Classification: C43, C61, D81.

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1. Introduction

Evidence from decades of international tax audits across government agencies indicates that multinational enterprises (MNEs) often do not account for income tax systems, tax incentives, and risk factors when devising foreign direct investment (FDI) strategies. Additionally, studies have yet to consider the diverse range of tax considerations affecting FDI decisions as an integrated whole. Several studies have uncovered these considerations. First, studies on investment costs, such as Devereux and Griffith (1998), have revealed that effective tax rates are crucial determinants of where US firms end up investing in. Second, theories of effective tax rates, including those evaluated in De Mooij and Ederveen's (2003) meta-analysis, have uncovered a negative association between effective tax rates and FDI flows. Third, research on tax competition, such as the study of Azémar and Delios (2008), has evaluated how effective tax competition by developing countries is in attracting FDI. Fourth, studies on

transaction costs, including that of Azémar and Dharmapala (2018), have indicated that in a pure worldwide income tax framework, countries should tax an entity's total global income regardless of source. In accordance with these principles, active income is taxed by the home country where a firm is headquartered, whereas active and passive income are taxed by the host country where a firm operates when this income is repatriated, leading to the problem of double taxation.

After-tax returns from MNEs' foreign investments directly affect overall operating performance, making tax factors critical in choosing investment locations. The crucial role of after-tax returns in international tax planning is demonstrated by the policies of global corporations such as Microsoft, for which 90% of global finances support investment transactions and financial management. Microsoft's Irish subsidiary, Microsoft Round Island One, which has no employees, recorded US$2.35 billion in operating profits in 2020 without tax liability. Microsoft Round Island One also controls Microsoft Ireland Research, which owns Microsoft's primary Australian subsidiary, Microsoft Pty Ltd. Microsoft Pty Ltd earned more than AU$5 billion (approximately US$3.2 billion) in 2021, with 70% of this revenue from related-party transactions. Microsoft Ireland Research also controls Microsoft Singapore Holdings, which reported a tax-exempt dividend income of US$22.35 billion in 2020, incurring only US$15 in tax expenses (Sarfo, 2022).

In these cases, the meager effective tax rates for overseas subsidiaries result from strategic tax planning to capitalize on favorable jurisdictions (Drucker, 2010). Schanz et al. (2017) attributed the substantial tax savings of MNEs to complex group structures that considerably minimize tax liabilities (Mintz & Weichenrieder, 2010). Schanz et al. (2017) examined the factors influencing whether MNEs establish subsidiaries in countries offering tax incentives and identified specific tax factors influencing these decisions. Furthermore, Mosquera Valderrama and Burgers (2019) noted that international anti-tax-avoidance legislation under the base erosion and profit shifting (BEPS) action plan – to which 131 jurisdictions had committed as of July 1, 2019 – centers on general anti-avoidance rules, consistent with the Organization of Economic Cooperation and Development (OECD)/Group of 20 (G20) BEPS Project standards for developed and developing nations.

In summary, tax planning for MNEs involves balancing operational performance (after-tax net income) with tax-saving benefits, and the present study assumes that MNEs seek to strike this optimal balance.

In the literature, linear regression on publicly available financial databases is commonly used to assess the tax factors influencing FDI by MNEs. This approach does not incorporate insights from tax authorities, senior tax experts, or professionals in cross-border investment taxation. To address this research gap, the present study analyzed variables related to tax burdens, tax savings, and international tax fairness that influence foreign investment decisions by MNEs. However, any tax factor assessment model for making decisions regarding outbound investment destinations must account for impending tax burdens. Because tax incentives vary widely and MNEs are increasingly urged to prioritize international tax fairness, this study established an assessment framework including 4 dimensions and 16 criteria to evaluate the tax factors most relevant to MNE FDI destinations on a pragmatic basis (Figure 1). The four factors are 1) income taxes, which are MNEs' tax burden arising from the

income tax system in the host countries and the tax burden incurred in the home country as a result of FDI; 2) FDI tax incentives, which are FDI tax incentives provided to MNEs by host countries; 3) anti-tax-avoidance legislation, which entails the use of legislation following the OECD and G20's BEPS plan to secure government tax revenue and ensure tax fairness; and 4) tax treaty networking, which entails the use of the tax treaty networks of host countries to alleviate MNE concerns regarding double taxation of FDIs. However, MNEs remain subject to transfer pricing adjustments and tax information exchange measures implemented by treaty countries to prevent cross-border tax avoidance (Figure 1).

The 16 criteria, categorized by dimension (4 per dimension), are (1) income tax systems (criteria: statutory income tax rates, withholding tax rates, loss carryforward time and amount, and loss carryback time and amount), (2) FDI tax incentives (criteria: tax incentives for research and development (R&D) investment, tax incentives for manufacturing equipment procurement, tax incentives for environmental, sustainability, and governance (ESG) investment, and preferential tax rates for holding companies), (3) anti-avoidance legislation

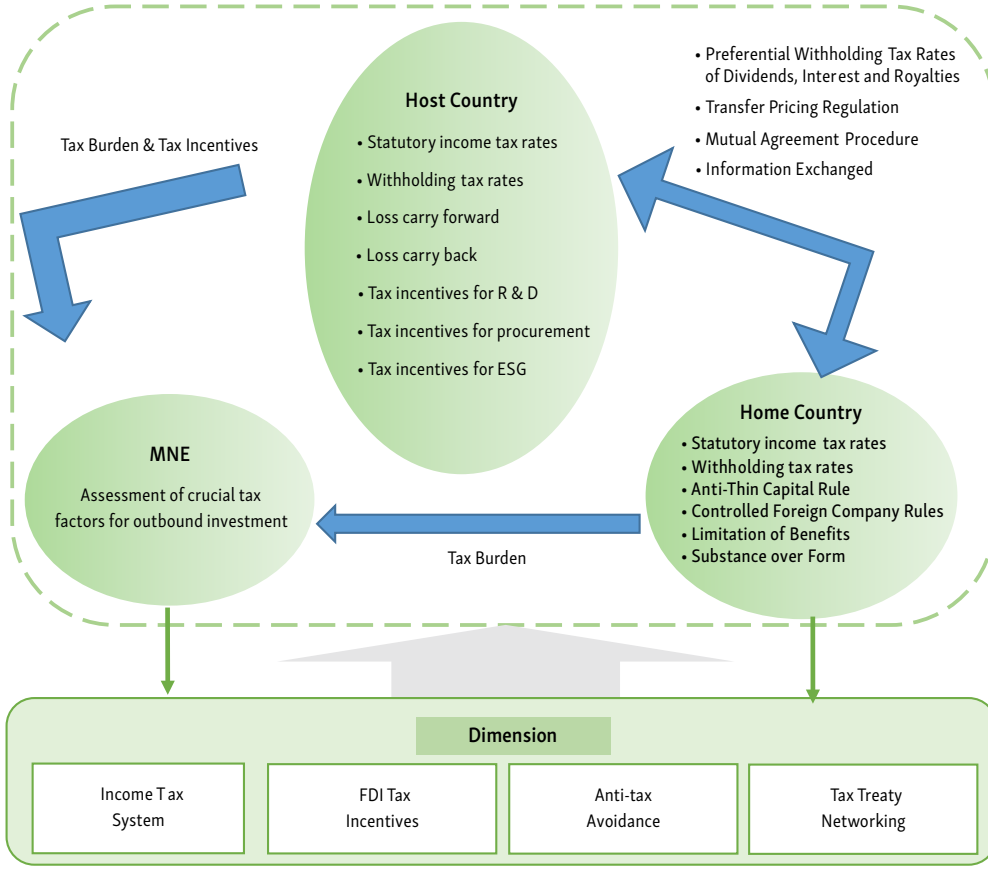

Figure 1. Relevant tax factors ASSESSMENT model for MNE'S outbound investment destinations decision-making

(criteria: anti-thin-capital rules, controlled-foreign-company rules, limitation of benefits, and substance over form), (4) tax treaty networking (criteria: preferential withholding tax rates for dividends, interest, and royalties, transfer pricing regulations, mutual agreement procedures, and information exchange). A detailed description of the 16 criteria is presented in Table 1; the assessment framework of tax factors influencing MNE decision-making associated with FDI is presented in Figure 2.

This study also administered a questionnaire survey to 20 experts – 6 tax authorities, 6 certified public accountants (CPAs) involved in cross-border investment business, and 8 senior financial accountants of MNEs – referred to as the Decision-Making Group (DMG) for the sake of convenience.

Table 1. Assessment criteria of essential tax factors on multinational enterprise outbound investment destination decision-making

Dimension	Criteria	Description
Income Tax System (D_1)	Statutory income tax rates (F_{11})	Tax laws should clearly state the applicable tax rates. Income tax rates may be flat or progressive.
	Withholding tax rates (F_{12})	Pre-withholding tax rates for various types of income, including tax rates on dividends, capital gains, and interest payments to offshore parent companies.
	Loss carry forward time and amount (F_{13})	Rules for compensation of business operating losses in previous consecutive years by tax refund or tax credits.
	Loss carry back time and amount (F_{14})	Rules for compensation of business operating losses in backward consecutive years by tax refund or tax credit.
FDI Tax Incentives (D_2)	Tax incentives for R & D investment (F_{21})	Tax incentives for R&D investment are tax policies that aim to encourage companies to invest in research and development activities by offering tax credits, deductions, or exemptions for expenses related to R&D.
	Tax incentives for manufacture equipment procurement (F_{22})	Tax incentives for manufacturing equipment procurement are tax policies designed to encourage companies to invest in new equipment and machinery by offering tax credits, deductions, or exemptions for the costs associated with the purchase of qualifying equipment.
	Tax incentives for ESG investment (F_{23})	Tax incentives for ESG (Environmental, Social, and Governance) investment are tax policies designed to encourage individuals and companies to invest in ESG-friendly assets or projects. ESG investing involves considering environmental, social, and governance factors in investment decision-making in addition to traditional financial metrics.
	Preferential Tax Rate of Holding Company (F_{24})	A preferential tax rate for a holding company is a tax policy that provides a lower tax rate on income derived from qualifying subsidiaries, affiliates, or investments held by the holding company. The goal of such tax policies is to encourage the use of holding companies as a way to consolidate and manage investments in subsidiaries or affiliates.

End of Table 1

Dimension	Criteria	Description
Anti-tax avoidance legislation (D_3)	Anti Thin Capital Rule (F_{31})	An anti-thin capitalization rule is a tax policy designed to prevent multinational corporations from reducing their tax liability by artificially shifting profits to lower-tax jurisdictions through excessive debt financing. Thin capitalization refers to a situation where a company has a high level of debt in relation to its equity.
	Controlled Foreign Company Rules (F_{32})	Controlled Foreign Company (CFC) rules are a tax policy that aims to prevent multinational corporations from artificially shifting profits to lower-tax jurisdictions by requiring them to pay tax on the profits earned by their subsidiaries or affiliates in those jurisdictions.
	Limitation of Benefits (F_{33})	Limitation of Benefits (LOB) is a provision in tax treaties that aims to prevent treaty shopping, which is the practice of exploiting differences in tax laws between countries to minimize or avoid taxes.
	Substance over Form (F_{34})	Substance over form is a principle used in accounting and taxation to ensure that the economic substance of a transaction is given priority over its legal form. In other words, substance over form requires that the true nature of a transaction or arrangement is considered for tax and accounting purposes, rather than simply relying on the legal structure of the transaction.
Tax treaty Networking (D_4)	Preferential Withholding Tax Rates of Dividends, Interest and Royalties (F_{41})	Preferential withholding tax rates of dividends, interest, and royalties refer to lower tax rates that may be applied to these types of income when paid to non-residents, under certain circumstances. Normally, a country may offer a lower withholding tax rate on dividends, interest, and royalties paid to a non-resident if that non-resident is a resident of a country with which the country has a tax treaty.
	Transfer Pricing Regulation (F_{42})	Transfer pricing regulation is a set of rules and guidelines designed to ensure that transactions between related parties are conducted at arm's length, meaning that the terms and conditions of the transaction are similar to those that would be agreed upon between unrelated parties under similar circumstances.
	Mutual Agreement Procedure (F_{43})	The Mutual Agreement Procedure (MAP) is a dispute resolution mechanism provided for in tax treaties between countries. It is designed to resolve disputes between countries that arise from the interpretation or application of a tax treaty.
	Information Exchanged (F_{44})	Exchange of information (EOI) is a process by which tax authorities in one country share information with tax authorities in another country for the purpose of enforcing tax laws and preventing tax evasion. EOI can involve the exchange of various types of information, such as bank account information, tax returns, financial statements, and other records. The information exchanged may relate to individuals or businesses that are subject to tax in one or both of the countries involved in the exchange.

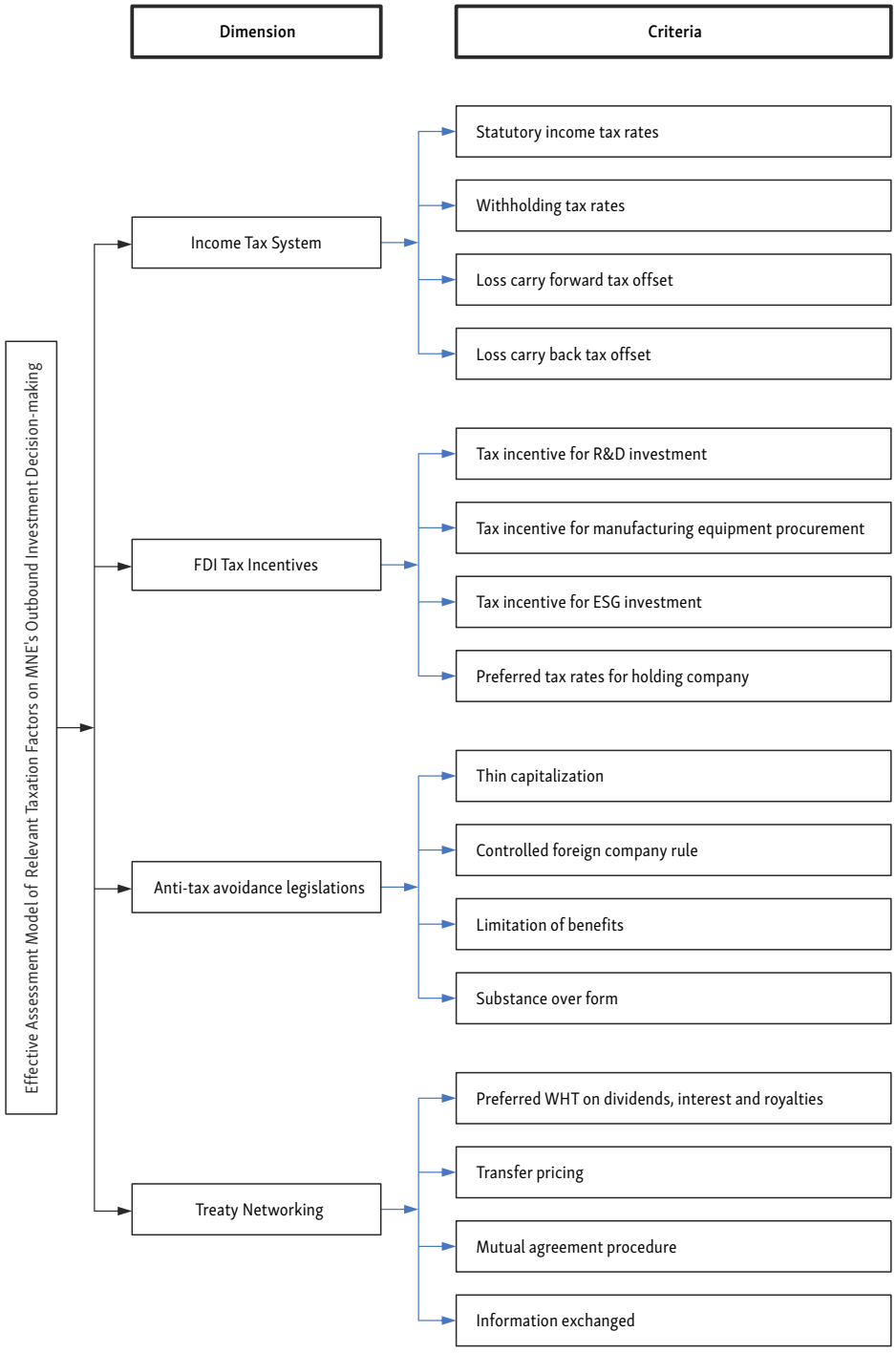

Figure 2. Assessment framework of critical tax factors on MNE's outbound FDI destinations decision-making

The present study assessed the relative importance of tax factors by utilizing a multicriteria decision-making model (MCDM) and the aforementioned tax framework. This study also employed the fuzzy linguistic preference relations (LinPreRa) method of Wang and Chen (2008) to assess the relative importance of these tax dimensions and criteria. Finally, the study used the fuzzy VIse Kriterijumska Optimizacija I Kompromisno Resenje (VIKOR) model to integrate fuzzy logic (Wang & Chen, 2010) into the compromise ranking method developed by Opricovic and Tzeng (2007) and rank foreign investment target countries. This indicators uncovered from the use of this methodology are likely to be useful for MNEs when making international investment decisions.

The academic contributions of this study's fuzzy VIKOR method are as follows:

1. **Enhanced understanding of decision-making under uncertainty:** The fuzzy VIKOR method offers a comprehensive framework to analyze decision-making in uncertain environments, highlighting the role of fuzzy logic in MCDMs in which traditional data lack precision.
2. **Integration of subjective and objective weights:** By combining subjective and objective weighting, this study's application of the fuzzy VIKOR approach extends the literature on decision-making, reflecting the complexity of real-world challenges involving both personal judgments and empirical data.
3. **Development of novel methodological approaches:** The fuzzy VIKOR method may lead to further innovations in MCDM, resulting in hybrid models that address specific challenges in fields such as finance, health care, and environmental management.
4. **Empirical validation:** This study's application of the fuzzy VIKOR method to a case study provides empirical support for its effectiveness, offering deep insights into its cross-domain applicability and strengthening its credibility as a decision-making tool.

The expected practical contributions of applying the fuzzy VIKOR method are as follows:

1. **Improved decision-making for MNEs:** The fuzzy VIKOR method offers MNEs a practical tool for evaluating investment destinations under uncertainty that accommodates qualitative assessments and linguistic variables to support informed, priority-aligned decisions.
2. **Enhanced stakeholder engagement:** Incorporating diverse stakeholder perspectives fosters collaborative decision-making, promoting consensus and alignment among the parties involved in investment decisions.
3. **Adaptability to dynamic environments:** Fuzzy VIKOR's capacity to manage imprecise data enables swift responses to changing market or regulatory conditions, benefiting practitioners in rapidly evolving environments.
4. **Comprehensive evaluation framework:** The fuzzy VIKOR method's structured approach to evaluating multiple conflicting criteria helps identify balanced solutions essential to strategic planning and resource allocation.

In summary, the fuzzy VIKOR method improves on existing theoretical frameworks and methodologies, providing practical benefits that enhance decision-making processes for MNEs and other organizations in complex, uncertain environments.

The Taiwanese government has actively promoted its Southbound Investment Policy of investing in Southeast Asian nations. Data from National Development Council of Taiwan (2021) reveal that direct investments in Vietnam, Indonesia, and Malaysia represented 80%, 71%, and 45.45%, respectively, of Taiwan's total foreign investments from 1952 to 2020. These countries exhibited distinct economic growth and labor dynamics in the 2020s.

Vietnam's gross domestic product (GDP) increased 7.4% year-over-year in Q3 of 2024, driven by domestic consumption and exports in services and industry despite challenges such as natural disasters. By contrast, Malaysia's GDP contracted by 14.7% in Q2 of 2020 but rebounded to grow by 3.7% annually by the end of 2023. Per the World Bank's Group (2019), Malaysia's rise to 27th in the International Institute for Management Development World Competitiveness Ranking reflects recovery, investment growth, and stable employment. Hence, although challenges remain, Malaysia offers substantial investment opportunities in talent development, digital innovation, regulatory reform, and sustainable development. Finally, Indonesia's economy expanded by 5.05% year-over-year in Q2 of 2024, sustained by strong private consumption and export growth encouraged by political stability following recent elections.

Labor supply trends in these countries – a key factor influencing FDI – also vary considerably. Vietnam offers a large, young, and skilled workforce in manufacturing and technology, supported by government initiatives in vocational training. By contrast, Malaysia faces labor challenges, relying on foreign workers in construction and agriculture and addressing skills gaps through training to increase local workforce participation. Finally, with its vast young labor force, Indonesia is working to formalize employment and enhance skills to increase productivity.

These three Southeast Asian nations are primary FDI destinations for Taiwan-based MNEs and provide a valuable sample for simulated analyses of FDI decisions based on tax factors. The results of the present study's analysis offer critical insights into the tax factors influencing FDI by MNEs.

2. Framework for assessing the tax factors influencing multinational enterprises' decisions on which foreign market to invest in

To achieve sustainable business objectives, MNEs must assess factors associated with cross-border investment scale and geographic location to formulate international tax strategies. Tax-efficient strategies must complement profit maximization to achieve the greatest global profits after taxes. To maximize investment returns and minimize tax burdens, MNEs require a framework for evaluating tax strategies for outbound investments that identifies key tax variables that may influence cross-border decisions. For example, Schanz et al. (2017) highlighted four key variables affecting location choices among German MNEs: 1) statutory income tax rates, 2) withholding tax rates on interest payments to foreign parent companies, 3) tax treaty networks, and 4) holding company tax regimes.

This study surveyed 20 tax experts – 6 Taiwanese tax officials, 6 CPAs advising MNEs on outbound investments, and 8 senior MNE financial accountants – asking them to rank the relative importance of key tax factors across dimensions using an MCDM and a fuzzy Lin-

PreRa method as a framework to assess MNEs' outbound foreign investment tax strategies. An analysis of their rankings indicated optimal foreign investment locations on the basis of tax factors.

2.1. Assessment dimensions

On the basis of the literature, the four assessment dimensions in the model used in the present study can be summarized as follows:

2.1.1. Income tax systems

The outbound investment host country's income tax system can considerably influence MNEs' decision-making and operations. A favorable income tax system with competitive tax rates, incentives and a transparent and predictable tax environment can attract FDI (Buettner et al., 2018).

2.1.2. FDI tax incentives

These are tax benefits or advantages governments provide to attract and promote foreign direct investment. These incentives involve tax holidays, reduced tax rates, exemptions or deductions, and other favorable tax treatment (Hsu et al., 2018).

2.1.3. Anti-Tax-Avoidance legislation

These measures refer to laws and regulations implemented by governments to combat aggressive tax planning and minimize tax avoidance by individuals and businesses. Such measures close loopholes, strengthen tax enforcement, and ensure taxpayers pay their fair share (Chen et al., 2023).

2.1.4. Tax treaty networking

Tax treaty networking refers to the network of tax relations established by treaties to connect a host country with other countries. A wide tax treaty network can promote cross-border trade and investment by providing legal certainty and reducing the risk of double taxation (Dharmapala & Hines, 2009).

2.2. Assessment criteria

The 16 assessment criteria – 4 under each model dimension – can be summarized as follows.

2.2.1. Criteria for income tax systems

Statutory income tax rates: These rates are the tax rates established by law or statute and apply to specific types of taxable income. They are used to determine the taxes individuals and businesses owe on their income or profits.

Withholding tax rates: These rates refer to the percentage of income that an employer or other payer must withhold from an employee or payee's wages, salaries, or other income to fulfill the tax obligations of the payee. The rates vary depending on income type, jurisdiction, and payee tax status and may differ for federal, state, and local taxes (Damak-Ayadi et al., 2020).

Loss carryforward tax offset: Tax jurisdictions often regulate the losses realized in relation to tax periods from previous years that may be carried forward to offset current profits. This is typically done to allow businesses and individuals to offset current profits with losses incurred in previous years and reduce their overall tax liability (Desai & Dharmapala, 2006).

Loss carryback tax offset: To provide more immediate tax relief to companies incurring tax operating losses, some tax jurisdictions allow tax losses to be carried back for a refund (Hanlon et al., 2017).

2.2.2. Criteria for FDI tax incentives

Tax incentives for R&D investment: These incentives are tax benefits governments provide to encourage R&D activities undertaken by businesses. Such incentives can involve deductions or credits for R&D expenses, accelerated depreciation for R&D equipment, or tax exemptions on income generated from R&D-related intellectual property (Akcigit et al., 2022).

Tax incentives for manufacturing equipment procurement: Governments may provide tax incentives to promote investment in manufacturing equipment. These incentives may involve accelerated depreciation allowances, investment tax credits, or exemptions from sales taxes or customs duties on equipment purchases (Chyz et al., 2021).

Tax incentives for ESG investments may be provided to encourage investments that consider ESG criteria. These incentives can be tax deductions, exemptions, or reduced tax rates for investments made in environmentally friendly or socially responsible projects (Bissoondoyal-Bheenick et al., 2023).

Preferred tax rates for holding companies: Lower or preferential tax rates may be applied to income generated by holding companies primarily owning and managing investments such as stocks, bonds, and other securities (Beer et al., 2020).

2.2.3. Anti-Tax-Avoidance legislation

Anti-Thin-Capitalization rules: Countries may enact regulations to prevent MNEs from obtaining excessive interest deductions by limiting the amount of debt they can amass in relation to equity. These rules prevent profit shifting through excessive interest payments (Shieh et al., 2014).

Controlled foreign company rules: Countries may enact regulations designed to tax the passive income of residents or domestic corporations earned through foreign subsidiaries or affiliates. These rules prevent profit shifting to low-tax jurisdictions (Moser, 2017).

Limitation of benefits: Limitation of benefits refers to a provision in tax treaties that prevents treaty benefits from being abused or misused by ensuring that the benefits are granted only to those who meet specific requirements. These provisions prevent treaty shopping and ensure that tax treaties are used for their intended purposes (Kuzniacki, 2018).

Substance over form: Substance over form is a principle in tax law that emphasizes a transaction's economic or commercial reality rather than its legal or formal structure, focusing on the substance and economic effects rather than the legal form of a transaction (Prebble & Hikaka, 2010).

2.2.4. Tax treaty networking

Preferred withholding tax rates: These are reduced tax rates or exemptions on dividends, interest, and royalties paid to nonresidents as specified in tax treaties or domestic tax laws. Such provisions facilitate cross-border transactions and attract foreign investment (Merlo et al., 2019).

Transfer pricing: Transfer pricing refers to pricing goods, services, and intellectual property transferred between related entities within a multinational corporation in a manner that ensures such transactions are conducted on an arm's-length basis and reflect fair market value (Picciotto, 2018).

Mutual agreement procedures: Mutual agreement procedures are mechanisms in tax treaties to resolve disputes or double taxation problems between countries that enable taxpayers to seek relief by initiating a dialogue and negotiating between the home and host countries' tax authorities (Christians, 2017).

Information exchanged: Information exchanged refers to the mechanism for sharing tax-related information between tax authorities of different countries. This exchange enables countries to monitor compliance, combat tax evasion and avoidance, and enforce tax laws (Bacchetta & Wincoop, 2006).

Table 1 and Figure 2 present the assessment framework and briefly describe the aforementioned assessment dimensions and criteria.

3. Methods

Fuzzy VIKOR is an MCDM applied in engineering, finance, environmental management, and the social sciences. This method enables decision-makers to evaluate alternatives using both quantitative and qualitative criteria. Nevertheless, fuzzy VIKOR's capacity to manage complexities and uncertainties in real-world scenarios remains underexplored, especially in the context of MNEs selecting investment destinations. However, traditional decision-making models that rely on precise data and criteria weights often oversimplify the nuanced factors influencing MNE decisions, making them less suited than fuzzy VIKOR to optimizing such decisions.

MNEs frequently grapple with contextual and qualitative factors, such as political instability, cultural differences, and market dynamics, that are difficult to quantify. The fuzzy VIKOR method addresses this difficulty by accommodating imprecision and vagueness, making it well-suited to scenarios in which human judgment substantially influences outcomes (Chatterjee & Chakraborty, 2016).

Fuzzy VIKOR (Suh et al., 2019) offers the following advantages:

(1) **Managing uncertainty:** The fuzzy VIKOR method applies fuzzy set theory to manage uncertainty and imprecision in decision-making, factors critical for MNEs engaging with unpredictable market conditions and external factors.

(2) **Flexible criteria weighting:** Unlike traditional methods requiring fixed weights, fuzzy VIKOR enables decision-makers to use linguistic variables, accommodating complex decision-making environments that are often highly subjective.

(3) **Comprehensive evaluation:** Fuzzy VIKOR offers a structured approach to assessing multiple conflicting criteria simultaneously by considering both proximity to an ideal solution and maximum group utility. This approach aids MNEs in identifying investments that are aligned with strategic objectives.

(4) **Enhanced decision-making:** Fuzzy VIKOR supports nuanced analysis by integrating diverse stakeholder perspectives, promoting informed and robust investment decisions.

Additionally, compared with other VIKOR methods (Mahmoudi et al., 2016), fuzzy VIKOR offers the following advantages:

1) **Improved accuracy:** Fuzzy VIKOR increases evaluation accuracy in scenarios with uncertain or vague data by using fuzzy instead of crisp values.

2) **Broader applicability:** Fuzzy VIKOR's incorporation of qualitative assessments increases versatility across contexts compared with traditional MCDM techniques relying on quantitative data.

3) **Dynamic adaptability:** Fuzzy VIKOR's capacity to adapt to changing criteria and relative importance is essential for MNEs operating in volatile global markets.

4) **Facilitated Consensus:** Fuzzy VIKOR enables multiple decision-makers to provide input, fostering consensus that can be challenging to achieve in traditional frameworks.

In conclusion, the fuzzy VIKOR method addresses key challenges related to uncertainty and qualitative factors, offering superior accuracy, flexibility, and applicability for MNEs making real-world decisions.

3.1. Analysis

The analytical process employed in this study is illustrated in Figure 3.

The analytical procedures employed are detailed as follows:

Step 1. Identification of model dimensions and criteria

On the basis of a literature review and interviews with tax authorities, major consulting firm CPAs, and MNE staff, four assessment dimensions were identified for evaluating outbound investment: the host country's income tax system, FDI tax incentives, anti-tax-avoidance legislation, and tax treaty networking. Each dimension included four criteria as follows:

I. **Income tax systems:** Criteria for evaluating the host country's income tax system are (1) statutory income tax rates, (2) withholding tax rates, (3) loss carryforward offsets, and (4) loss carryback offsets.

II. **FDI tax incentives:** Criteria for evaluating FDI tax incentives in the host country are (1) tax incentives for R&D investment, (2) tax incentives for manufacturing equipment procurement (including accelerated depreciation), (3) tax incentives for ESG investment (sustainable development), and (4) preferred tax rates for holding companies.

III. **Anti-Tax-Avoidance legislation:** This dimension involves legislation aligned with the OECD and G20 BEPS action plan, with criteria covering (1) anti-thin-capitalization, (2) controlled foreign company rules, (3) limitation of benefits, and (4) substance-over-form principles.

IV. Tax treaty networking: Criteria related to the host country's tax treaty network are (1) preferred withholding tax rates on dividends, interest, and royalties, (2) transfer pricing regulations, (3) mutual agreement procedures, and (4) information exchange mechanisms.

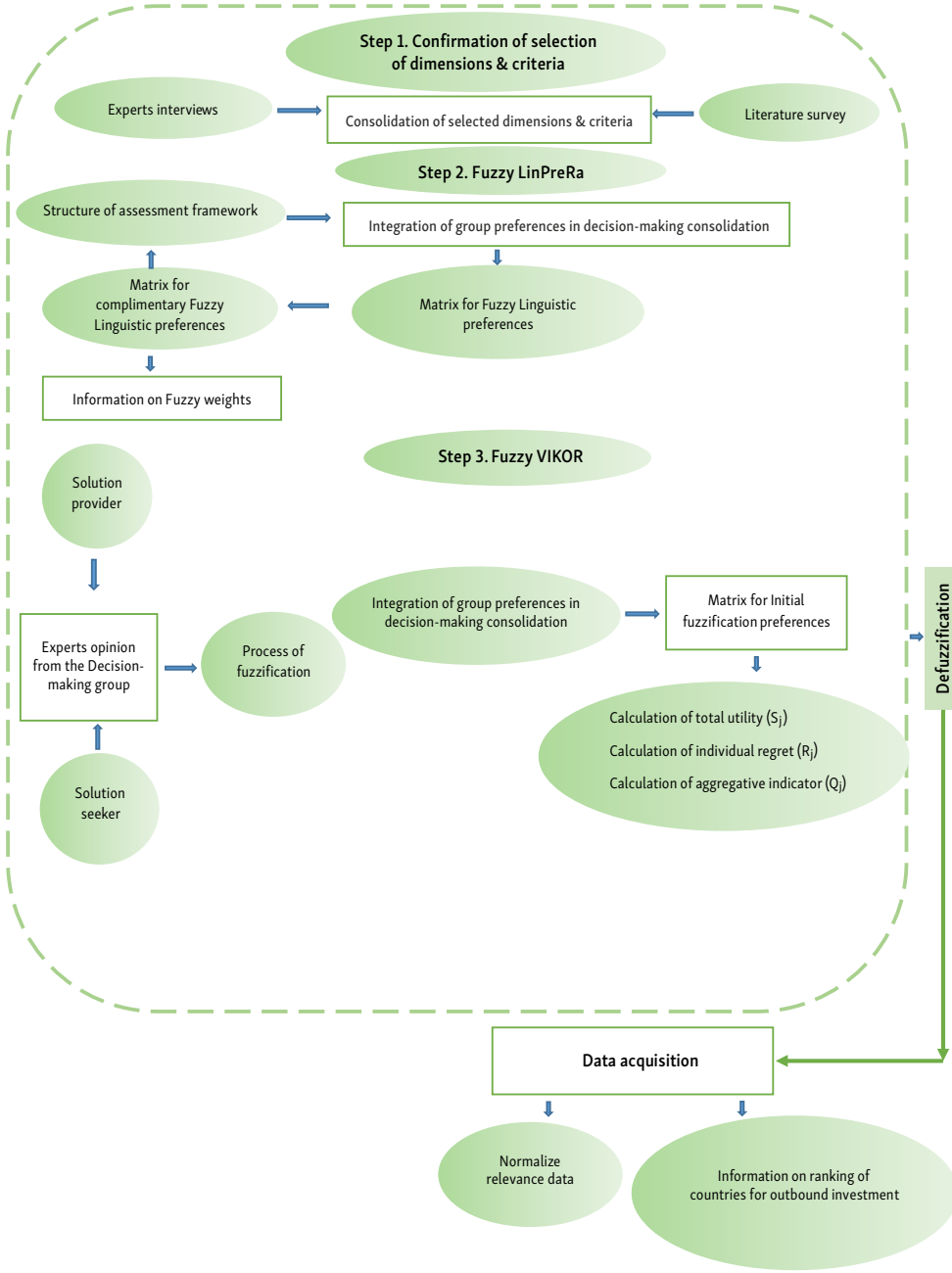

Figure 3. Research flow

The procedures for applying fuzzy VIKOR in evaluations of these 4 assessment dimensions and 16 criteria are as follows:

Step 2: Determine weights for assessment dimensions and criteria

This study applied the fuzzy LinPreRa method to the expert evaluations of the tax factors influencing MNEs' outbound investment decisions. The evaluators initially conducted sequential pairwise assessments of dimensions and criteria (Table 3). The resulting fuzzy LinPreRa matrix provided fuzzy weights (wj); the evaluators' assessments of the weights indicating the relative importance of the dimensions and criteria are presented in Tables 4, 5, and 6. The fuzzy linguistic assessment variables are presented in Table 2.

Table 2. Fuzzy linguistic assessment variables

Linguistic variables	Triangle fuzzy numbers (TFN)
Absolutely important (AB)	(0.90,1.00,1.00)
Very strongly important (VS)	(0.80,0.90,1.00)
Essentially important (ES)	(0.50,0.70,0.90)
Weakly important (WK)	(0.50,0.60,0.70)
Equally important (EQ)	(0.40,0.50,0.60)
Weakly unimportant (WN)	(0.30,0.40,0.50)
Essentially unimportant (EN)	(0.10,0.30,0.50)
Very strongly unimportant (VN)	(0.00,0.10,0.20)
Absolutely unimportant (AN)	(0.00,0.00,0.10)

Table 3. Results of pairwise comparison in adjacent sequence for the dimensions and the criteria by experts

	G_1	G_2	G_3	G_4	G_5	G_6	A_1	A_2	A_3	A_4	A_5	A_6	I_1	I_2	I_3	I_4	I_5	I_6	I_7	I_8
D_1:D_2	VS	EN	VN	NN	WK	EQ	WN	VS	VS	VS	VS	EQ	VS	EN	VN	VN	EQ	AB	ES	VS
D_2:D_3	WN	VN	VS	VS	WK	WK	WK	VS	VS	VS	WK	WK	EQ	WK	VS	VS	VS	VS	ES	VS
D_3;D_4	WN	VN	VS	EN	WK	VN	WN	VN	ES	VN	VN	EQ	VN	WN	VN	ES	EN	ES	VN	VS

	G_1	G_2	G_3	G_4	G_5	G_6	A_1	A_2	A_3	A_4	A_5	A_6	I_1	I_2	I_3	I_4	I_5	I_6	I_7	I_8	
F_{11}	WK	VS	VN	ES	VS	EQ	EQ	ES	AB	ES	WK	ES	VS	WN	VN	WN	WK	AB	VS	EN	F_{12}
F_{12}	EQ	VS	ES	ES	VN	VN	WN	ES	VN	ES	ES	EQ	VS	WK	VS	EN	WN	AB	WN	EN	F_{13}
F_{13}	WK	VS	EN	WK	ES	EQ	EQ	ES	VS	ES	VN	EQ	VS	WK	VS	EQ	EQ	ES	ES	EQ	F_{14}
F_{21}	EQ	AB	EN	VS	EQ	EQ	EQ	ES	VS	ES	EN	WK	EQ	WK	VN	VN	EN	VS	WK	EQ	F_{22}
F_{22}	EN	AB	ES	ES	EQ	EQ	EQ	ES	ES	ES	VS	WN	ES	WK	VN	VS	VS	VS	WN	WN	F_{23}
F_{23}	EQ	AB	ES	WK	EQ	EQ	EQ	ES	EN	ES	VS	EQ	EQ	WK	VS	ES	VS	EQ	VN	WK	F_{24}
F_{31}	EQ	EN	EN	WK	WN	WK	WK	VN	EN	VN	WK	EQ	VN	VS	WK	WK	EQ	WN	WN	EN	F_{32}
F_{32}	WK	EN	ES	WN	EN	WN	WN	ES	ES	ES	VN	EQ	VS	EQ	WN	WN	EQ	WK	WK	AN	F_{33}
F_{33}	WN	EN	VN	WK	VN	WK	EQ	ES	ES	ES	EQ	WN	EQ	EQ	WK	WN	EQ	EQ	WK	AB	F_{34}
F_{41}	WK	VN	VS	VS	ES	VN	EQ	EQ	VN	EQ	AB	VS	EQ	ES	VS	VS	ES	VS	VS	VN	F_{42}
F_{42}	WK	ES	VS	ES	ES	EQ	EQ	EQ	VS	EQ	VS	EQ	VS	ES	VS	ES	EQ	WK	ES	EQ	F_{43}
F_{43}	WN	EN	VN	WN	EN	EQ	EQ	VN	EN	VN	WK	EQ	AN	WK	WK	WK	EQ	AB	WN	WK	F_{44}

Table 4. Assessment of the importance Weights of various dimensions and criteria by experts in tax authority group

	G_1	G_2	G_3	G_4	G_5	G_6	Mean	BNA	Ranking
D_1	(0.2,0.33,0.53)	(0.16,0.23,0.32)	(0.18,0.25,0.35)	(0.09,0.19,0.35)	(0.21,0.31,0.47)	(0.13,0.24,0.42)	(0.15,0.25,0.4)	0.275	2
D_2	(0.1,0.18,0.3)	(0.11,0.16,0.23)	(0.27,0.34,0.44)	(0.23,0.34,0.52)	(0.19,0.27,0.39)	(0.15,0.24,0.38)	(0.17,0.24,0.37)	0.270	3
D_3	(0.14,0.23,0.37)	(0.2,0.26,0.34)	(0.19,0.25,0.33)	(0.11,0.19,0.32)	(0.16,0.23,0.34)	(0.11,0.19,0.32)	(0.15,0.22,0.34)	0.236	4
D_4	(0.16,0.28,0.47)	(0.26,0.35,0.47)	(0.09,0.16,0.24)	(0.17,0.29,0.48)	(0.1,0.19,0.32)	(0.21,0.34,0.55)	(0.16,0.25,0.41)	0.285	1
F_{11}	(0.18,0.3,0.5)	(0.28,0.34,0.42)	(0.09,0.18,0.3)	(0.25,0.34,0.45)	(0.19,0.31,0.52)	(0.1,0.19,0.32)	(0.17,0.26,0.4)	0.090	2
F_{12}	(0.16,0.25,0.4)	(0.24,0.28,0.34)	(0.22,0.3,0.43)	(0.21,0.27,0.36)	(0.09,0.16,0.28)	(0.12,0.19,0.29)	(0.16,0.24,0.34)	0.078	9
F_{13}	(0.16,0.25,0.4)	(0.18,0.22,0.27)	(0.15,0.22,0.33)	(0.16,0.21,0.29)	(0.21,0.31,0.48)	(0.22,0.31,0.45)	(0.18,0.25,0.36)	0.081	6
F_{14}	(0.1,0.2,0.37)	(0.11,0.16,0.21)	(0.2,0.3,0.46)	(0.11,0.18,0.27)	(0.11,0.21,0.38)	(0.21,0.31,0.47)	(0.14,0.22,0.35)	0.076	11
F_{21}	(0.1,0.2,0.37)	(0.34,0.38,0.39)	(0.16,0.25,0.39)	(0.27,0.35,0.45)	(0.14,0.25,0.43)	(0.14,0.25,0.43)	(0.19,0.29,0.42)	0.087	5
F_{22}	(0.12,0.2,0.33)	(0.27,0.29,0.31)	(0.24,0.33,0.47)	(0.21,0.26,0.34)	(0.16,0.25,0.4)	(0.16,0.25,0.4)	(0.2,0.27,0.38)	0.081	7
F_{23}	(0.2,0.3,0.47)	(0.2,0.21,0.23)	(0.17,0.25,0.37)	(0.16,0.21,0.27)	(0.16,0.25,0.4)	(0.16,0.25,0.4)	(0.17,0.23,0.33)	0.076	10
F_{24}	(0.18,0.3,0.5)	(0.12,0.13,0.16)	(0.09,0.17,0.29)	(0.12,0.18,0.26)	(0.14,0.25,0.43)	(0.14,0.25,0.43)	(0.12,0.19,0.3)	0.069	12
F_{31}	(0.15,0.26,0.45)	(0.11,0.17,0.24)	(0.11,0.2,0.33)	(0.16,0.28,0.47)	(0.12,0.18,0.26)	(0.16,0.28,0.47)	(0.13,0.22,0.36)	0.065	16
F_{32}	(0.17,0.26,0.42)	(0.17,0.22,0.29)	(0.2,0.28,0.41)	(0.14,0.23,0.37)	(0.16,0.21,0.27)	(0.14,0.23,0.37)	(0.16,0.24,0.35)	0.065	15
F_{33}	(0.13,0.21,0.35)	(0.22,0.28,0.35)	(0.13,0.2,0.3)	(0.18,0.28,0.43)	(0.21,0.26,0.34)	(0.18,0.28,0.43)	(0.17,0.25,0.37)	0.069	13
F_{34}	(0.15,0.26,0.45)	(0.26,0.33,0.44)	(0.22,0.32,0.49)	(0.12,0.23,0.4)	(0.27,0.35,0.45)	(0.12,0.23,0.4)	(0.18,0.28,0.44)	0.080	8
F_{41}	(0.18,0.3,0.5)	(0.09,0.18,0.3)	(0.26,0.34,0.46)	(0.26,0.36,0.5)	(0.22,0.33,0.5)	(0.08,0.16,0.28)	(0.16,0.26,0.41)	0.094	1
F_{42}	(0.16,0.25,0.4)	(0.22,0.3,0.43)	(0.19,0.25,0.33)	(0.18,0.25,0.35)	(0.17,0.25,0.37)	(0.2,0.28,0.41)	(0.19,0.26,0.38)	0.087	4
F_{43}	(0.12,0.2,0.33)	(0.15,0.22,0.33)	(0.11,0.16,0.22)	(0.12,0.18,0.26)	(0.1,0.17,0.26)	(0.2,0.28,0.41)	(0.13,0.2,0.3)	0.068	14
F_{44}	(0.14,0.25,0.43)	(0.2,0.3,0.46)	(0.18,0.25,0.35)	(0.14,0.21,0.33)	(0.16,0.25,0.39)	(0.18,0.28,0.43)	(0.16,0.26,0.4)	0.088	3

Table 5. Assessment of the importance weights of various dimensions and criteria by tax professionals in CPA firms group

	A_1	A_2	A_3	A_4	A_5	A_6	Mean	BNA	Ranking
D_1	(0.12,0.23,0.4)	(0.26,0.34,0.46)	(0.28,0.35,0.43)	(0.26,0.34,0.46)	(0.22,0.33,0.5)	(0.16,0.28,0.47)	(0.21,0.31,0.45)	0.327	1
D_2	(0.18,0.28,0.43)	(0.19,0.25,0.33)	(0.23,0.28,0.34)	(0.19,0.25,0.33)	(0.14,0.21,0.32)	(0.18,0.28,0.43)	(0.18,0.25,0.36)	0.268	2
D_3	(0.14,0.23,0.37)	(0.11,0.16,0.22)	(0.17,0.21,0.26)	(0.11,0.16,0.22)	(0.1,0.17,0.26)	(0.14,0.23,0.37)	(0.13,0.19,0.28)	0.201	4
D_4	(0.16,0.28,0.47)	(0.18,0.25,0.35)	(0.12,0.16,0.22)	(0.18,0.25,0.35)	(0.19,0.29,0.45)	(0.12,0.23,0.4)	(0.15,0.24,0.36)	0.258	3
F_{11}	(0.12,0.23,0.4)	(0.26,0.33,0.44)	(0.26,0.36,0.45)	(0.26,0.33,0.44)	(0.18,0.3,0.5)	(0.2,0.33,0.53)	(0.23,0.33,0.47)	0.117	1
F_{12}	(0.14,0.23,0.37)	(0.22,0.28,0.35)	(0.13,0.18,0.25)	(0.22,0.28,0.35)	(0.16,0.25,0.4)	(0.14,0.23,0.37)	(0.17,0.24,0.34)	0.090	3
F_{13}	(0.18,0.28,0.43)	(0.17,0.22,0.29)	(0.22,0.29,0.38)	(0.17,0.22,0.29)	(0.08,0.15,0.27)	(0.14,0.23,0.37)	(0.15,0.22,0.32)	0.087	4
F_{14}	(0.16,0.28,0.47)	(0.11,0.17,0.24)	(0.12,0.18,0.27)	(0.11,0.17,0.24)	(0.18,0.3,0.5)	(0.12,0.23,0.4)	(0.13,0.2,0.32)	0.086	5
F_{21}	(0.14,0.25,0.43)	(0.26,0.33,0.44)	(0.24,0.34,0.48)	(0.26,0.33,0.44)	(0.2,0.27,0.38)	(0.15,0.26,0.45)	(0.21,0.31,0.43)	0.091	2
F_{22}	(0.16,0.25,0.4)	(0.22,0.28,0.35)	(0.17,0.23,0.33)	(0.22,0.28,0.35)	(0.26,0.34,0.44)	(0.13,0.21,0.35)	(0.19,0.26,0.36)	0.079	8
F_{23}	(0.16,0.25,0.4)	(0.17,0.22,0.29)	(0.11,0.16,0.24)	(0.17,0.22,0.29)	(0.18,0.24,0.32)	(0.17,0.26,0.42)	(0.16,0.22,0.31)	0.069	10
F_{24}	(0.14,0.25,0.43)	(0.11,0.17,0.24)	(0.18,0.27,0.39)	(0.11,0.17,0.24)	(0.09,0.15,0.23)	(0.15,0.26,0.45)	(0.12,0.2,0.3)	0.066	11
F_{31}	(0.15,0.26,0.45)	(0.13,0.22,0.36)	(0.16,0.25,0.39)	(0.13,0.22,0.36)	(0.11,0.21,0.38)	(0.13,0.24,0.42)	(0.13,0.23,0.39)	0.058	15
F_{32}	(0.13,0.21,0.35)	(0.25,0.34,0.49)	(0.24,0.33,0.47)	(0.25,0.34,0.49)	(0.09,0.16,0.28)	(0.15,0.24,0.38)	(0.17,0.26,0.4)	0.064	13
F_{33}	(0.17,0.26,0.42)	(0.18,0.26,0.38)	(0.17,0.25,0.37)	(0.18,0.26,0.38)	(0.21,0.31,0.48)	(0.15,0.24,0.38)	(0.18,0.26,0.4)	0.062	14
F_{34}	(0.15,0.26,0.45)	(0.09,0.18,0.3)	(0.09,0.17,0.29)	(0.09,0.18,0.3)	(0.19,0.31,0.52)	(0.17,0.29,0.48)	(0.12,0.22,0.38)	0.057	16
F_{41}	(0.14,0.25,0.43)	(0.13,0.22,0.36)	(0.09,0.19,0.35)	(0.13,0.22,0.36)	(0.31,0.38,0.43)	(0.23,0.34,0.51)	(0.16,0.26,0.4)	0.081	7
F_{42}	(0.16,0.25,0.4)	(0.15,0.22,0.33)	(0.23,0.34,0.52)	(0.15,0.22,0.33)	(0.22,0.26,0.31)	(0.15,0.22,0.33)	(0.17,0.25,0.36)	0.075	9
F_{43}	(0.16,0.25,0.4)	(0.15,0.22,0.33)	(0.11,0.19,0.32)	(0.15,0.22,0.33)	(0.16,0.19,0.24)	(0.15,0.22,0.33)	(0.14,0.21,0.32)	0.065	12
F_{44}	(0.14,0.25,0.43)	(0.23,0.34,0.51)	(0.17,0.29,0.48)	(0.23,0.34,0.51)	(0.13,0.17,0.23)	(0.13,0.22,0.36)	(0.17,0.26,0.41)	0.083	6

Table 6. Assessment of the importance weights of various dimensions and criteria by tax professionals in multinational enterprises group

	I_1	I_2	I_3	I_4	I_5	I_6	I_7	I_8	Mean	BNA	Ranking
D_1	(0.2,0.33,0.53)	(0.09,0.19,0.35)	(0.1,0.19,0.32)	(0.16,0.24,0.36)	(0.18,0.3,0.5)	(0.31,0.37,0.42)	(0.22,0.32,0.49)	(0.28,0.34,0.42)	(0.18,0.28,0.42)	0.300	1
D_2	(0.1,0.18,0.3)	(0.19,0.29,0.45)	(0.22,0.31,0.45)	(0.27,0.35,0.47)	(0.2,0.3,0.47)	(0.23,0.27,0.31)	(0.16,0.24,0.36)	(0.24,0.28,0.34)	(0.19,0.27,0.39)	0.290	2
D_3	(0.1,0.18,0.3)	(0.15,0.24,0.38)	(0.12,0.19,0.29)	(0.17,0.24,0.34)	(0.08,0.15,0.27)	(0.17,0.2,0.25)	(0.09,0.16,0.25)	(0.18,0.22,0.27)	(0.13,0.19,0.29)	0.208	4
D_4	(0.2,0.33,0.53)	(0.17,0.29,0.48)	(0.21,0.31,0.47)	(0.1,0.17,0.27)	(0.14,0.25,0.43)	(0.12,0.16,0.21)	(0.18,0.28,0.43)	(0.11,0.16,0.21)	(0.15,0.23,0.36)	0.259	3
F_{11}	(0.28,0.34,0.42)	(0.14,0.25,0.43)	(0.18,0.25,0.35)	(0.09,0.18,0.3)	(0.15,0.26,0.45)	(0.33,0.38,0.41)	(0.23,0.33,0.47)	(0.09,0.16,0.26)	(0.17,0.26,0.38)	0.092	2
F_{12}	(0.24,0.28,0.34)	(0.2,0.3,0.47)	(0.27,0.34,0.44)	(0.15,0.22,0.33)	(0.13,0.21,0.35)	(0.25,0.28,0.31)	(0.16,0.22,0.32)	(0.17,0.23,0.33)	(0.19,0.26,0.36)	0.088	4
F_{13}	(0.18,0.22,0.27)	(0.16,0.25,0.4)	(0.19,0.25,0.33)	(0.22,0.3,0.43)	(0.17,0.26,0.42)	(0.17,0.19,0.22)	(0.19,0.26,0.36)	(0.23,0.3,0.41)	(0.19,0.25,0.35)	0.086	6
F_{14}	(0.11,0.16,0.21)	(0.1,0.2,0.37)	(0.09,0.16,0.24)	(0.2,0.3,0.46)	(0.15,0.26,0.45)	(0.13,0.15,0.19)	(0.11,0.19,0.29)	(0.21,0.3,0.43)	(0.13,0.21,0.31)	0.076	9
F_{21}	(0.18,0.3,0.5)	(0.21,0.31,0.47)	(0.09,0.16,0.24)	(0.16,0.24,0.36)	(0.2,0.27,0.38)	(0.27,0.35,0.46)	(0.14,0.23,0.37)	(0.13,0.24,0.42)	(0.16,0.26,0.39)	0.088	5
F_{22}	(0.2,0.3,0.47)	(0.19,0.27,0.39)	(0.19,0.25,0.33)	(0.27,0.35,0.47)	(0.26,0.34,0.44)	(0.21,0.27,0.35)	(0.12,0.19,0.29)	(0.15,0.24,0.38)	(0.19,0.27,0.38)	0.090	3
F_{23}	(0.12,0.2,0.33)	(0.16,0.23,0.34)	(0.27,0.34,0.44)	(0.17,0.24,0.34)	(0.18,0.24,0.32)	(0.14,0.19,0.25)	(0.16,0.23,0.34)	(0.19,0.29,0.45)	(0.17,0.24,0.35)	0.080	7
F_{24}	(0.1,0.2,0.37)	(0.1,0.19,0.32)	(0.18,0.25,0.35)	(0.1,0.17,0.27)	(0.09,0.15,0.23)	(0.13,0.19,0.27)	(0.24,0.35,0.53)	(0.13,0.24,0.42)	(0.13,0.21,0.33)	0.074	10
F_{31}	(0.11,0.21,0.38)	(0.23,0.34,0.51)	(0.16,0.28,0.47)	(0.14,0.25,0.43)	(0.14,0.25,0.43)	(0.13,0.24,0.42)	(0.14,0.25,0.43)	(0.12,0.16,0.23)	(0.14,0.24,0.4)	0.063	14
F_{32}	(0.25,0.36,0.55)	(0.15,0.22,0.33)	(0.14,0.23,0.37)	(0.12,0.2,0.33)	(0.16,0.25,0.4)	(0.19,0.29,0.45)	(0.2,0.3,0.47)	(0.19,0.23,0.28)	(0.17,0.25,0.39)	0.063	12
F_{33}	(0.13,0.21,0.35)	(0.15,0.22,0.33)	(0.18,0.28,0.43)	(0.16,0.25,0.4)	(0.16,0.25,0.4)	(0.15,0.24,0.38)	(0.16,0.25,0.4)	(0.32,0.38,0.43)	(0.17,0.26,0.39)	0.063	15
F_{34}	(0.11,0.21,0.38)	(0.13,0.22,0.36)	(0.12,0.23,0.4)	(0.18,0.3,0.5)	(0.14,0.25,0.43)	(0.13,0.24,0.42)	(0.1,0.2,0.37)	(0.18,0.23,0.29)	(0.13,0.23,0.39)	0.060	16
F_{41}	(0.16,0.26,0.43)	(0.25,0.34,0.45)	(0.28,0.35,0.44)	(0.27,0.35,0.45)	(0.2,0.33,0.53)	(0.28,0.34,0.41)	(0.26,0.36,0.5)	(0.06,0.15,0.3)	(0.2,0.3,0.43)	0.092	1
F_{42}	(0.19,0.26,0.4)	(0.21,0.27,0.36)	(0.22,0.28,0.34)	(0.21,0.26,0.34)	(0.14,0.23,0.37)	(0.23,0.27,0.32)	(0.18,0.25,0.35)	(0.2,0.3,0.47)	(0.19,0.26,0.37)	0.078	8
F_{43}	(0.06,0.11,0.21)	(0.16,0.21,0.29)	(0.16,0.2,0.26)	(0.16,0.21,0.27)	(0.14,0.23,0.37)	(0.21,0.25,0.3)	(0.12,0.18,0.26)	(0.2,0.3,0.47)	(0.14,0.2,0.29)	0.063	13
F_{44}	(0.24,0.36,0.51)	(0.11,0.18,0.27)	(0.12,0.18,0.24)	(0.12,0.18,0.26)	(0.12,0.23,0.4)	(0.11,0.14,0.19)	(0.14,0.21,0.33)	(0.14,0.25,0.43)	(0.13,0.21,0.31)	0.066	11

Step 3: Determine the fuzzy VIKOR decision matrix and fuzzy VIKOR composite score and interpret the results

First, this study integrated the expert DMG's ratings for three candidate countries (Vietnam, Indonesia, and Malaysia) across each criterion, presenting results in Tables 7, 8, and 9. The synthetic fuzzy evaluation decision matrix for each candidate country evaluated by the DMG is presented in Table 10. Second, the fuzzy VIKOR decision matrix was calculated by normalizing each criterion. This process involved calculating the utility score (Sj), which reflects how well a criterion meets the ideal solution, and the regret score (Rj), which indicates a criterion's divergence from the ideal solution. The resulting fuzzy VIKOR decision matrix (16 criteria × 4 dimensions) was used to calculate the fuzzy VIKOR composite score (Qj) through weighted aggregation (Table 11). This step involves multiplying each criterion score by its assigned weight, summing the scores for all criteria and dimensions, and normalizing the result to be on a scale from 0 to 1. The Qj provides an overall measure of each host country's appeal as an investment destination on the basis of the 4 assessment dimensions and 16 criteria. Lower composite scores indicate more attractive investment destinations. These results highlight each host country's strengths and weaknesses across the assessed dimensions and criteria.

Table 7. The original ratings of government officers for the three outbound investment candidate countries under each criteria

Criteria \ Interviewer	G_1			G_2			G_3			G_4			G_5			G_6		
Candidate country	V	M	I	V	M	I	V	M	I	V	M	I	V	M	I	V	M	I
F_{11}	M	VP	P	M	M	M	G	M	G	M	M	M	G	M	M	M	M	M
F_{12}	G	M	P	M	M	M	M	M	P	M	M	M	G	M	P	M	M	M
F_{13}	M	G	M	M	G	M	M	G	M	M	G	M	M	G	M	M	G	M
F_{14}	VP	VP	VP	M	G	M	P	P	P	M	G	M	M	M	M	M	G	M
F_{21}	VP	VP	VP	VP	P	P	P	P	P	P	P	P	M	M	M	VP	VP	VP
F_{22}	VP	VP	G	P	P	P	P	G	P	P	P	M	M	M	G	VP	VP	P
F_{23}	VP	VP	VP	P	P	P	P	G	M	P	P	P	M	M	M	VP	VP	VP
F_{24}	VP	G	VP	P	P	P	P	M	M	P	P	P	M	G	M	VP	VP	VP
F_{31}	P	G	P	M	M	M	M	M	M	M	M	M	P	G	P	M	M	M
F_{32}	G	G	P	M	M	M	P	M	M	M	M	M	M	M	P	M	M	M
F_{33}	M	M	M	M	M	M	P	M	M	M	M	M	M	M	M	M	M	M
F_{34}	G	P	G	M	P	M	P	M	M	P	P	P	G	P	G	P	P	P
F_{41}	M	M	M	M	VP	M	M	M	M	M	M	M	M	M	M	M	M	M
F_{42}	M	M	M	VP	VP	VP	M	M	M	P	M	P	M	M	M	P	M	P
F_{43}	M	M	M	VP	VP	M	P	M	M	VP	M	M	M	M	M	VP	M	M
F_{44}	M	M	M	VP	P	VP	M	G	G	P	P	P	M	M	M	P	P	P

Table 8. The original ratings of CPA firm professionals for the three outbound investment candidate countries under each criteria

Criteria \ Interviewer	A_1			A_2			A_3			A_4			A_5			A_6		
Candidate country	V	M	I	V	M	I	V	M	I	V	M	I	V	M	I	V	M	I
F_{11}	M	VP	P	M	M	M	G	M	G	M	M	M	G	M	M	M	M	M
F_{12}	G	M	P	M	M	M	M	M	P	M	M	M	G	M	P	M	M	M
F_{13}	M	G	M	M	G	M	M	G	M	M	G	M	M	G	M	M	G	M
F_{14}	VP	VP	VP	M	G	M	P	P	P	M	G	M	M	M	M	M	G	M
F_{21}	VP	VP	VP	VP	P	P	P	P	P	P	P	P	M	M	M	VP	VP	VP
F_{22}	VP	VP	G	P	P	P	P	G	P	P	P	M	M	M	G	VP	VP	P
F_{23}	VP	VP	VP	P	P	P	P	G	M	P	P	P	M	M	M	VP	VP	VP
F_{24}	VP	G	VP	P	P	P	P	M	M	P	P	P	M	G	M	VP	VP	VP
F_{31}	P	G	P	M	M	M	M	M	M	M	M	M	P	G	P	M	M	M
F_{32}	G	G	P	M	M	M	P	M	M	M	M	M	M	M	P	M	M	M
F_{33}	M	M	M	M	M	M	P	M	M	M	M	M	M	M	M	M	M	M
F_{34}	G	P	G	M	P	M	P	M	M	P	P	P	G	P	G	P	P	P
F_{41}	M	M	M	M	VP	M	M	M	M	M	M	M	M	M	M	M	M	M
F_{42}	M	M	M	VP	VP	VP	M	M	M	P	M	P	M	M	M	P	M	P
F_{43}	M	M	M	VP	VP	M	P	M	M	VP	M	M	M	M	M	VP	M	M
F_{44}	M	M	M	VP	P	VP	M	G	G	P	P	P	M	M	M	P	P	P

Table 9. The original ratings of MNE professionals for the three outbound investment candidate countries under each criteria

Interviewer / Criteria	I_1			I_2			I_3			I_4			I_5			I_6			I_7			I_8		
Candidate country	V	M	I	V	M	I	V	M	I	V	M	I	V	M	I	V	M	I	V	M	I	V	M	I
F_{11}	G	P	M	M	M	M	G	M	M	M	P	P	G	P	M	M	M	G	G	M	M	P	P	M
F_{12}	M	G	M	G	G	M	G	G	P	G	M	P	G	M	M	M	G	P	VG	G	P	P	G	P
F_{13}	M	G	M	M	G	M	M	G	M	M	G	M	G	G	M	G	VG	G	M	G	M	M	M	M
F_{14}	VP	VP	VP	P	P	P	P	P	P	VP	VP	VP	M	M	M	M	M	M	M	M	M	M	G	M
F_{21}	VP	VP	VP	P	P	P	P	P	P	P	P	P	M	M	M	G	G	G	M	G	M	P	P	P
F_{22}	VP	VP	VP	P	P	P	P	P	M	P	P	P	M	M	M	M	M	M	M	M	M	M	M	M
F_{23}	P	VP	VP	P	P	P	VP	VP	VP	VP	VP	VP	M	M	M	VG	VG	VG	M	M	M	P	P	P
F_{24}	VP	VP	VP	P	M	P	VP	G	VP	VP	G	VP	M	G	M	M	VG	M	M	M	M	M	G	M
F_{31}	VP	VP	VP	M	M	M	P	G	P	P	G	P	M	M	M	G	VG	M	G	M	M	M	G	M
F_{32}	G	G	P	M	M	M	G	G	G	G	G	G	M	M	G	VG	VG	P	VG	VG	M	M	M	M
F_{33}	M	M	M	M	M	M	M	M	M	M	M	M	M	M	G	M	M	M	G	M	M	M	M	M
F_{34}	M	P	M	M	M	M	G	P	G	M	P	M	M	M	M	M	M	M	G	M	M	P	G	P
F_{41}	M	G	M	M	M	M	G	G	M	G	G	G	G	G	M	M	VG	P	VG	G	VP	M	G	M
F_{42}	M	M	M	G	G	G	P	G	M	M	M	M	G	G	M	M	M	M	M	M	M	G	G	G
F_{43}	M	M	M	M	M	M	P	G	G	M	M	M	M	G	M	G	G	VG	M	M	M	G	G	G
F_{44}	M	M	M	M	M	M	P	G	G	M	M	M	M	G	M	M	M	M	M	M	M	G	G	G

Table 10. The synthetic fuzzy evaluation decision matrix of DMG for each outbound investment candidate country

Candidates / Criteria	Vietnam			Malaysia			Indonesia		
Group	G	A	I	G	A	I	G	A	I
F_{11}	(3.67,5.67,7.67)	(4,6,8)	(3.75,5.75,7.75)	(2.5,4.33,6.33)	(1.67,3.67,5.67)	(2,4,6)	(3,5,7)	(3,5,7)	(3,5,7)
F_{12}	(3.67,5.67,7.67)	(4.33,6.33,8.17)	(4.25,6.25,8.13)	(3,5,7)	(4,6,8)	(4.50,6.50,8.50)	(2,4,6)	(2.33,4.33,6.33)	(1.63,3.50,5.50)
F_{13}	(3,5,7)	(3,5,7)	(3.50,5.50,7.50)	(5,7,9)	(5,7,9)	(5,7,8.875)	(3,5,7)	(3,5,7)	(3.25,5.25,7.25)
F_{14}	(2.17,4,6)	(1.67,2.67,4.67)	(1.75,3.5,5.5)	(3.17,5,7)	(1.50,3.33,5.33)	(2,3.75,5.75)	(2.17,4,6)	(1.33,3.00,5.00)	(1.75,3.5,5.5)
Group	G	A	I	G	A	I	G	A	I
F_{21}	(0.83,2.33,4.33)	(1.83,3.67,5.67)	(1.88,3.75,5.75)	(1,2.67,4.67)	(2.33,4.33,6.33)	(2.13,4,6)	(1,2.67,4.67)	(2,4,6)	(1.88,3.75,5.75)
F_{22}	(1,2.67,4.67)	(1.83,3.67,5.67)	(1.88,3.75,5.75)	(1.67,3.33,5.33)	(2.33,4.33,6.33)	(1.88,3.75,5.75)	(2.67,4.67,6.67)	(3,5,7)	(2.13,4,6)
F_{23}	(1,2.67,4.67)	(2.50,4.33,6.33)	(2,3.75,5.63)	(1.67,3.33,5.33)	(2.67,4.67,6.67)	(1.88,3.50,5.38)	(1.33,3,5)	(2.67,4.67,6.67)	(1.88,3.50,5.38)
F_{24}	(1,2.67,4.67)	(1.50,3.33,5.33)	(1.63,3.25,5.25)	(2.5,4.33,6.33)	(4.33,6.33,8.17)	(4.13,6,7.88)	(1.33,3,5)	(1.67,3.67,5.67)	(1.63,3.25,5.25)
Group	G	A	I	G	A	I	G	A	I
F_{31}	(2.33,4.33,6.33)	(3.67,5.67,7.67)	(2.63,4.5,6.5)	(3.67,5.67,7.67)	(3.67,5.67,7.67)	(3.88,5.75,7.63)	(2.33,4.33,6.33)	(2.67,4.67,6.67)	(2.125,4,6)
F_{32}	(3,5,7)	(4.67,6.67,8.50)	(4.75,6.75,8.5)	(3.33,5.33,7.33)	(4.67,6.67,8.50)	(4.75,6.75,8.5)	(2.33,4.33,6.33)	(3,5,7)	(3.25,5.25,7.25)
F_{33}	(2.67,4.67,6.67)	(3,5,7)	(3.25,5.25,7.25)	(3,5,7)	(3.33,5.33,7.33)	(3,5,7)	(3,5,7)	(3,5,7)	(3.25,5.25,7.25)
F_{34}	(2.67,4.67,6.67)	(3.33,5.33,7.33)	(3.25,5.25,7.25)	(1.33,3.33,5.33)	(4,6,8)	(2.5,4.5,6.5)	(3,5,7)	(3.33,5.33,7.33)	(3,5,7)
Group	G	A	I	G	A	I	G	A	I
F_{41}	(3,5,7)	(4,6,8)	(4.25,6.25,8.13)	(2.5,4.33,6.33)	(4.33,6.33,8.33)	(5,7,8.88)	(3,5,7)	(3,5,7)	(2.63,4.5,6.5)
F_{42}	(1.83,3.67,5.67)	(3.33,5.33,7.33)	(3.5,5.5,7.5)	(2.5,4.33,6.33)	(3.67,5.67,7.67)	(4,6,8)	(1.83,3.67,5.67)	(3.33,5.33,7.33)	(3.5,5.5,7.5)
F_{43}	(1.17,2.67,4.67)	(2.50,4.33,6.33)	(3.25,5.25,7.25)	(2.5,4.33,6.33)	(2.50,4.33,6.33)	(4,6,8)	(3,5,7)	(2.17,4,6)	(4,6,7.88)
F_{44}	(1.83,3.67,5.67)	(3,5,7)	(3,5,7)	(2.33,4.33,6.33)	(3.33,5.33,7.33)	(3.75,5.75,7.75)	(2.17,4,6)	(3,5,7)	(3.5,5.5,7.5)

Table 11. Coefficients and Rankings of S, R, Q for each outbound investment candidate country assessment by DMG

Candidates / Group & Criteria	Vietnam			Malaysia			Indonesia		
	G	A	I	G	A	I	G	A	I
F_{11}	(0,0,0)	(0,0,0)	(0,0,0)	(0.03,0.07,0.17)	(0.05,0.1,0.21)	(0.04,0.08,0.16)	(0.02,0.04,0.09)	(0.02,0.04,0.09)	(0.02,0.03,0.07)
F_{12}	(0,0,0)	(0,0,0)	(0,0.01,0.02)	(0.01,0.03,0.06)	(0.01,0.01,0.02)	(0,0,0)	(0.03,0.06,0.14)	(0.04,0.07,0.16)	(0.04,0.08,0.15)
F_{13}	(0.03,0.07,0.15)	(0.04,0.07,0.15)	(0.03,0.06,0.13)	(0,0,0)	(0,0,0)	(0,0,0)	(0.03,0.07,0.15)	(0.04,0.07,0.15)	(0.04,0.07,0.15)
F_{14}	(0.02,0.06,0.15)	(0.03,0.07,0.16)	(0.03,0.06,0.14)	(0,0,0)	(0,0,0)	(0,0,0)	(0.02,0.06,0.15)	(0.01,0.03,0.08)	(0.03,0.06,0.14)
Group	G	A	I	G	A	I	G	A	I
F_{21}	(0.03,0.07,0.16)	(0.04,0.08,0.16)	(0.04,0.07,0.16)	(0,0,0)	(0,0,0)	(0,0,0)	(0,0,0)	(0.02,0.04,0.09)	(0.04,0.07,0.16)
F_{22}	(0.03,0.07,0.14)	(0.04,0.07,0.14)	(0.04,0.08,0.15)	(0.02,0.04,0.09)	(0.02,0.04,0.07)	(0.04,0.08,0.15)	(0,0,0)	(0,0,0)	(0,0,0)
F_{23}	(0.03,0.06,0.14)	(0.03,0.06,0.12)	(0,0,0)	(0,0,0)	(0,0,0)	(0.04,0.07,0.14)	(0.02,0.03,0.07)	(0,0,0)	(0.04,0.07,0.14)
F_{24}	(0.02,0.05,0.13)	(0.02,0.05,0.12)	(0.03,0.06,0.14)	(0,0,0)	(0,0,0)	(0,0,0)	(0.02,0.04,0.1)	(0.02,0.05,0.11)	(0.03,0.06,0.14)
Group	G	A	I	G	A	I	G	A	I
F_{31}	(0.02,0.05,0.12)	(0,0,0)	(0.01,0.03,0.09)	(0,0,0)	(0,0,0)	(0,0,0)	(0.02,0.05,0.12)	(0.02,0.04,0.11)	(0.02,0.04,0.11)
F_{32}	(0.01,0.02,0.04)	(0,0,0)	(0,0,0)	(0,0,0)	(0,0,0)	(0,0,0)	(0.02,0.05,0.12)	(0.02,0.05,0.12)	(0.02,0.05,0.12)
F_{33}	(0.03,0.06,0.12)	(0.02,0.05,0.11)	(0,0,0)	(0,0,0)	(0,0,0)	(0.02,0.05,0.11)	(0,0,0)	(0.02,0.05,0.11)	(0.02,0.05,0.11)
F_{34}	(0.01,0.01,0.03)	(0.02,0.04,0.11)	(0,0,0)	(0.03,0.06,0.15)	(0,0,0)	(0.02,0.05,0.12)	(0,0,0)	(0.02,0.04,0.11)	(0.02,0.04,0.11)
Group	G	A	I	G	A	I	G	A	I
F_{41}	(0,0,0)	(0.01,0.02,0.04)	(0,0,0)	(0,0.07,0.17)	(0,0,0)	(0,0,0)	(0,0,0)	(0.03,0.06,0.15)	(0,0,0)
F_{42}	(0.03,0.07,0.16)	(0.03,0.06,0.14)	(0,0,0)	(0,0,0)	(0,0,0)	(0,0,0)	(0.03,0.07,0.2)	(0.03,0.06,0.14)	(0,0,0)
F_{43}	(0.02,0.05,0.13)	(0,0,0)	(0.02,0.05,0.12)	(0,0.02,0.04)	(0,0,0)	(0,0,0)	(0,0,0)	(0.02,0.05,0.12)	(0,0,0.01)
F_{44}	(0.03,0.07,0.17)	(0.03,0.07,0.16)	(0.02,0.05,0.13)	(0,0,0)	(0,0,0)	(0,0,0)	(0.01,0.03,0.08)	(0.03,0.07,0.16)	(0.01,0.02,0.04)
Group	G	A	I	G	A	I	G	A	I
S_j	(0.31,0.71,1.64)	(0.29,0.63,1.41)	(0.22,0.48,1.05)	(0.13,0.3,0.68)	(0.07,0.14,0.3)	(0.07,0.14,0.3)	(0.22,0.5,1.18)	(0.33,0.75,1.7)	(0.27,0.58,1.27)
R_j	(0.03,0.07,0.17)	(0.04,0.08,0.16)	(0.04,0.08,0.16)	(0.03,0.07,0.18)	(0.05,0.1,0.21)	(0.05,0.1,0.21)	(0.03,0.07,0.16)	(0.04,0.07,0.16)	(0.04,0.08,0.16)
dfuzzy S_j	0.885	0.777	0.584	0.367	0.171	0.171	0.633	0.925	0.704
dfuzzy R_j	0.091	0.092	0.091	0.094	0.117	0.117	0.087	0.090	0.090
Q_j	0.77488	0.43729	0.478	0.5	0.5	0.5	0.26	0.5	0.5

3.2. Assessment methods: linguistic variables (fuzzy numbers), criteria weights, and multicriteria ranking

3.2.1. Linguistic variables and fuzzy numbers

The DMG evaluated the importance of each criterion and rated alternatives on the basis of various criteria. Conventional quantitative techniques are inadequate to express complex or poorly defined situations. Therefore, the present study applied linguistic variables, using words or phrases instead of numbers to represent values.

To compare the importance of two dimensions or criteria within the outbound investment tax factors (OITF) assessment framework, this study used the following linguistic terms adapted from Chen and Hwang (1992): "absolutely important," "very strongly important," "essentially important," "weakly important," "equally important," "weakly unimportant," "essentially unimportant," "very strongly unimportant," and "absolutely unimportant." These fuzzy linguistic assessment variables, which can be represented as triangular fuzzy numbers (TFNs), are presented in Table 2.

A TFN expresses the relative importance of each pair of criteria in the evaluation framework can be denoted as $\tilde{B}=\left(b_1+b_2+b_3\right)$ where $b_1\leq\ b_2\ \leq\ b_3$.

The membership function of $\tilde{B}$ fuzzy number can be described as

$$\mu_{\tilde{B}}\left(y\right)=\begin{cases}\left(y-b_1\right)\Big/\left(b_2-b_1\right), b_1\leq y\leq b_2\\ \left(b_3-y\right)\Big/\left(b_3-b_2\right), b_2\leq y\leq b_3\\ 0 \quad ,otherwise\end{cases}. \tag{1}$$

Because the results of the fuzzy number calculation are themselves fuzzy numbers, they must be defuzzified into crisp values for further analysis.

Methods for defuzzification include the mean of maximum, center of the area, α-cut, and maximizing–minimizing-set methods (Lu et al., 2001). This study utilized the maximizing–minimizing sets method proposed by Chen and Hwang (1992) to convert fuzzy numbers into the best nonfuzzy assessments (BNAs):

(1) The maximizing–minimizing sets of the membership function are defined by

$$\mu_{\max}\left(y\right)=\begin{cases}y, & 0\leq y\leq 1\\ 0, & \text{otherwise}\end{cases},\quad \mu_{\min}\left(y\right)=\begin{cases}1-y, & 0\leq y\leq 1\\ 0, & \text{otherwise}\end{cases}. \tag{2}$$

(2) The right utility value of fuzzy number $\tilde{B}$ is calculated by

$$\mu_R\left(\tilde{B}\right)=\sup\left[\mu_{\tilde{B}}\left(y\right)\wedge\mu_{\max}\left(y\right)\right]. \tag{3}$$

(3) The left utility value of fuzzy number $\tilde{B}$ is calculated by

$$\mu_L\left(\tilde{B}\right)=\sup\ \left[\mu_{\tilde{B}}\left(y\right)\wedge\mu_{\min}\left(y\right)\right]. \tag{4}$$

(4) The total utility value of fuzzy number $\widetilde{B}$ is calculated by

$$\mu_T\left(\tilde{B}\right)=\frac{\left[\mu_R\left(\tilde{B}\right)+1-\mu_L\left(\tilde{B}\right)\right]}{2}=BNA. \tag{5}$$

Finally, on the basis of the BNA value, the relative importance (weights) of the assessment dimensions and criteria in the assessment framework of the OITF can be assessed. These weights are employed in subsequent calculations using the fuzzy VIKOR method.

3.2.2. Criteria weighting

On the basis of the hierarchical structure illustrated in Figure 1, this study measured the relative importance of criteria for selecting OITFs using pairwise comparisons. The analytical hierarchical process proposed by Saaty (1977, 1980) is typically used in this context. However, when several criteria are present, conventional or fuzzy analytical hierarchical processes (Buckley, 1985) can complicate pairwise comparisons, leading to inefficiencies in data collection. To address such difficulties, Herrera-Viedma et al. (2004) developed the consistent fuzzy

preference relations approach to simplify analytical hierarchical processes by leveraging additive transitivity and reducing inconsistency. Wang and Chen (2008) extended this framework into the fuzzy LinPreRa approach, enabling decision matrices of pairwise comparisons based on consistent fuzzy preference relations to capture experts' fuzzy judgments efficiently. Fuzzy LinPreRa also enables experts to use linguistic variables with minimal judgments, eliminating the requirement for consistency in the decision-making process. Furthermore, by applying TFNs (Table 2), this study calculated the weighted rankings of the assessment dimensions and criteria for the tax authority, CPA firm, and MNE groups (Tables 4 through 6). These tables present the overall importance rankings, the relative importance levels used, and the BNA for each assessment dimension and criterion evaluated by the three expert groups.

3.2.3. Multicriteria ranking

Opricovic and Tzeng (2002, 2004) developed VIKOR to revise the technique for order of preference by similarity to the ideal solution (TOPSIS), establishing a compromise solution that balances closeness to the ideal with mutual concessions. This solution maximizes group utility for the majority and minimizes individual regret for those with the opposing perspective (Opricovic & Tzeng, 2007). Both VIKOR and TOPSIS rank options by aggregating functions that measure proximity to reference points (Tzeng et al., 2005). In decision-making, the decision-maker often encounters ambiguity and uncertainty. Fuzzy set theory (Zadeh, 1975) addresses this uncertainty by using linguistic terms to express subjective judgments. Bellman and Zadeh (1970) introduced a fuzzy decision-making approach to manage imprecision in assigning importance to evaluation criteria and rating alternatives. The present study used the fuzzy LinPreRa method proposed by Wang and Chen (2008) to evaluate the associations between selection dimensions and criteria. Using the derived weights and assessment scores from DMG evaluations, this study applied fuzzy VIKOR to rank the three candidate countries for outbound investment (Figure 3), using a widely applied method of assessing optimal investment locations for MNEs.

4. Assessment framework and evaluation of outbound investment locations for multinational enterprises

This study used the established assessment model to design survey questionnaires to administer to the DMG. The survey targeted six international tax authorities, six international investment advisers from the Big Four CPA firms (Deloitte Touche Tohmatsu, Ernst and Young, PricewaterhouseCoopers, and Klynveld Peat Marwick Goerdeler International), and eight finance and accounting managers from Taiwanese MNEs. The fuzzy LinPreRa approach was used to determine each evaluation criterion's importance (weight) in the overall framework. The survey was conducted as follows: Initially, the tax authorities, CPA firm members, and MNE finance and accounting staff assessed the importance of each evaluation criterion (Table 12). These experts subsequently conducted pairwise comparisons of adjacent assessment dimensions and criteria using the linguistic scale presented in Table 2. The experts' basic characteristics, including their affiliations and salient attributes, are presented in Table 12.

Table 12. Profiles of interviewed experts

Institutions / Categories		Tax authority	CPA firms	Multinationals	Total
Gender	Male	3	4	6	13
	Female	3	2	2	7
	Total	6	6	8	20
Working period	21 and above	1	1	2	4
	16–20	3	2	2	7
	11–15	2	1	4	7
	6–10	0	2	0	2
	Total	6	6	8	20
	CPA	0	3	0	3
Positions	Vice GM	0	2	1	3
	Manager	2	0	5	7
	Special Assistant	4	1	2	7
	Total	6	6	8	20

Note: The ranking of section chief, auditor and commissioner in tax authority are equivalent to manager and special assistant in CPA firms and multinationals respectively.

The fuzzy LinPreRa method was employed to aggregate the experts' linguistic assessments of importance across assessment dimensions and criteria. The rating results for each dimension and criterion assessed by the three interviewee groups (G1–G6, A1–A6, and I1–I8) of tax authorities, individuals from CPA firms, and staff of MNEs, respectively, are presented in Table 3.

Tables 4 through 6 present the ranking of assessment dimensions by importance and the top five ranked assessment criteria determined by the three expert groups. Table 13 presents a summary of the analysis.

4.1. Data analysis

In assuming that each expert possessed knowledge of equal value and to reduce the effects of extreme values, the geometric average was used as the total average value to obtain the distribution of the relative weights for each dimension and integrity criterion.

4.1.1. Analysis of importance ranking of assessment dimensions and criteria

To elucidate the differences in the views of the experts, this study segmented the experts in the DMG into three groups on the basis of their expertise: tax authorities, CPA firm experts, and MNE tax practitioners. The calculated local weights and overall weights and rankings are presented in Tables 4 through 6. The results for each dimension are described as follows.

The income tax system dimension had a BNA of 27.5%, 32.7%, and 30%, ranking second and first among the four dimensions for the tax authority group and the CPA firm and MNE groups, respectively. The highest-ranking criterion under this dimension was F_{11} (statutory income tax rates), indicating the value of income tax rates in evaluating MNE OITFs. Income tax rates are valuable metrics because the statutory income tax rate directly and substantially affects the tax burden on outbound investments.

The second-ranking criterion was F_{41} (preferential withholding tax rates of dividends, interest, and royalties). MNEs must pay taxes at the regular withholding rate on dividends, interest, and royalties from foreign investments mandated by the home country's income tax laws. However, tax treaties between home countries and host countries may enable MNEs to benefit from preferential rates on this income, rendering F_{41} critical in determining the tax burden for FDI.

The FDI tax incentives dimension had a BNA of 27%, 26.8%, and 29% for the tax authority group, CPA firm group, and MNE group, ranking second among the four dimensions. The highest-ranked criterion within this dimension was F_{21} (tax incentives for R&D investment). Overall, F_{11} (statutory income tax rates), F_{41} (preferential withholding tax rates of dividends, interest, and royalties), F_{21} (tax incentives for R&D investment), and F_{12} (withholding tax rates) were the top four factors in descending order of importance. Broadly, the high rankings accorded to F_{21} and F_{12} reflect the reality that tax incentives for R&D investment and withholding tax rates are similarly vital in shaping the global investment landscape and influencing the decisions of MNEs choosing where to invest and conduct their business activities.

Table 13. The sequence of importance level of the assessment dimension and criteria

Group / Ranking / Dimension & Criteria	Tax Authority	CPA Firm	Multinationals
D_1 (Income Tax System)	2	1	1
D_2 (FDI Tax Incentives)	3	2	2
D_3 (Anti-tax avoidance legislation)	4	4	4
D_4 (Tax treaty Networking)	1	3	3
F_{11} – Statutory income tax rates	2	1	2
F_{12} – Withholding tax rates	✳	3	4
F_{13} – Loss carry forward time and amount	✳	4	✳
F_{14} – Loss carry back time and amount	✳	5	✳
F_{21} – Tax incentives for R & D investment	5	2	5
F_{22} – Tax incentives for manufacture equipment procurement	✳	✳	3
F_{41} – Preferential Withholding Tax Rates of Dividends, Interest and Royalties	1	✳	1
F_{42} – Transfer Pricing Regulation	4	✳	✳
F_{44} – Information Exchanged	3	✳	✳

Note: ✳represent the sequence of importance level of the assessment criteria is out of the top five ranking position.

4.2. Case study

This study formulated a survey on the basis of reference data on tax conditions in three outbound investment candidate countries (OICCs) – Vietnam, Malaysia, and Indonesia (Table 14) – using the assessment model. Selection criteria for the assessment framework were determined using the fuzzy LinPreRa approach, with the relative importance of each criterion determined by the DMG. The weight-allocated evaluation framework, detailed in Tables 4 through 6 and Tables 13 through 14, provided the foundation for assessing the OICC model in this case study.

The assessment model guided the DMG in evaluating and ranking these three OICCs in a simulation to determine the most suitable FDI destination for Taiwanese MNEs. The evaluation was based on fuzzy LinPreRa and fuzzy VIKOR, and each group member was required to assign a relative performance value to various items. The 20 DMG members rated the three OICCs as *excellent* (E) (9.0, 10, 10), *very good* (VG) (7.0, 9.0, 10), *good* (G) (5.0, 7.0, 9.0), *medium* (M) (3.0, 5.0, 7.0), *poor* (P) (1.0, 3.0, 5.0), *very poor* (VP) (0.0, 1.0, 3.0), or *worst* (W) (0.0, 0.0, 1.0).

By applying the fuzzy LinPreRa and fuzzy VIKOR methods, the tax authority group, CPA firm group, and MNE group separately evaluated and selected the optimal outbound investment destination from among the three OICCs. Tables 7 through 9 present the ratings of each OICC's performance across the assessment criteria. Table 10 presents the comprehensive fuzzy decision matrices provided by the DMG experts for each OICC, and Table 11 presents the calculated S-value, R-value, and Q-value derived from these comprehensive fuzzy decision matrices. Using a group decision-making model, each DMG member selected from among the three OICCs for Taiwanese MNEs on the basis of multiple evaluation criteria.

After the fuzzy VIKOR values were calculated, the groups determined their final ranking on the basis of two conditions. First, they conducted an analysis to assess the acceptable benefit threshold condition. In this case, the three defuzzified candidate alternatives set the acceptable threshold for benefits at $1/(3-1) = 0.5$. The tax authority group's Q-value for Indonesia was 0.26 (Table 11), lower than the Q-values for the other two countries, leading the group to select Indonesia as the most suitable OICC. By contrast, the CPA firm and MNE groups' Q-values for Vietnam were 0.43729 and 0.478, respectively (Table 11), both lower than those for Malaysia and Indonesia, leading these groups to select Vietnam as the preferred OICC.

Second, the CPA firm and MNE groups ranked tax income systems as the most important dimension, ranking FDI tax incentives second, followed by tax treaty networking. By contrast, the tax authority group ranked tax treaty networking as the most important dimension, followed by tax income systems, and FDI tax incentives. The tax authority group ranked the statutory income tax rate as the most important criterion. Preferred withholding tax rates and tax incentives for R&D were also highly valued, ranking second and third, respectively, for the tax authorities.

This weight distribution framework is well-suited to assessing tax factors influencing MNEs' selection of foreign investment destinations.

Table 14. Basic tax regulations to the relevant assessment criteria of outbound investment candidate country

Candidate country / Assessment Criteria	Vietnam	Malaysia	Indonesia
F_{11} Statutory income tax rate	1. Resident Companies		
	Income tax rate: 20% (Including capital gains)	(1) domestic sourced income tax rate: 24%, SME: 17%, 33% for income exceeding MYR 100 million. (2) Capital gains are not subject to tax.	(1) global sourced income tax rate: 22% a reduced standard rate of 3% applies from the 2020 financial year subject to certain conditions. (2) Capital gains – Capital gains are not separately taxed; they are considered part of the general taxable income.
	2. Non-resident Companies		
	Income tax rate depends on the type of business, ranging from 0.1% to 10% of income.	(1) Income tax rate: 24%. (2) Capital gains from the sale of shares in resident companies are exempt from tax. (3) Capital gains from the sale of real estate are exempt from tax.	(1) Income tax rate: 22%. (2) Capital gains from the sale of shares in resident companies of non-listed shares in Indonesian limited liability companies are subject to a final withholding tax of 20% for certain conditions. (3) Capital gains from the sale of real estate is taxed at 2.5% of the selling price.
	3. Individual Residents		
	Taxed on global sourced income with progressive income tax rates – the highest tax rate of 35% applies to monthly income exceeding 80 million Vietnamese Dong.	(1) Taxed on domestic sourced income with progressive income tax rates – the highest tax rate is 30% (applies to income exceeding MYR 2 million). (2) Capital gains are exempt from tax (special provisions apply for the sale of shares in real estate companies).	(1) Taxed on global sourced income with progressive income tax rates – the highest tax rate is 35%, but individuals with annual total business revenue not exceeding 4.8 billion Indonesian Rupiah are subject to a tax rate of 0.5%. (2) Capital gains – Capital gains are not separately taxed; they are considered part of the general taxable income.
	4. Individual Non-residents		
	(1) Flat income tax rate of 20% for salary income. (2) Capital gains from the sale of shares in resident companies taxed at 0.1%. As for from the sale of real estate taxed at 2%. (3) Dividends 5%, interest 5%, royalties 5%, technical service fees 5%, director's fees 5%.	(1) Flat income tax rate of 30%. (2) Capital gains from the sale of shares in resident companies and from the sale of real estate are exempt from tax.	(1) Flat income tax rate of 20%. (2) Tax on capital gains as the same as non-resident companies.

End of Table 14

Candidate country / Assessment Criteria	Vietnam	Malaysia	Indonesia
F_{12} Withholding tax rate	1. Non-resident Companies		
	Tax rate (Branch profit: 20%. Dividend: 0%. Interest: 5%. Royalty: 10%. Technical service fee: 10%. Management fee: 5%. Restaurant, hotel, and casino management service: 10%.)	Tax rate (Branch profit and dividend are 0%. Interest: 15%. Royalty, technical service fee and management fee: 10%). For those services provided outside Malaysia are tax exempted.	Tax rate (Branch profit, dividend, interest, royalty, technical service fee and management fee: 20%).
	2. Individual Non-residents		
	Tax rate for dividend, interest, royalties, technical service fee, director and supervisor remuneration is 5%.	Tax rate for salary income and director and supervisor remuneration is 30%. Regulations for tax rate on dividend, interest, royalties and technical service fee is the same as non-resident companies.	Tax rate (Salary income, dividend, interest, royalty, technical service fee and director and supervisor remuneration: 20%).
F_{13} Loss Carry Forward Tax Offset	Allowable for consecutive 5 years.	Allowable for consecutive 10 years.	Allowable for consecutive 5 years.
F_{14} Loss Carry Back Tax Offset	none	none	none
F_{21} Tax incentive for R&D	none	none	none
F_{22} Tax Incentive for Manufacturing Equipment Procurement	none	none	accelerated depreciation
F_{23} Tax Incentive for ESG	none	none	none
F_{24} Preferred Tax Rates for Holding Company	none	implementing	none
F_{31} Anti-thin cap. rules	Deductible limit for given interest expenses is 30% of pre-depreciation and amortization profit.	none	implementing
F_{32} (CFC) rules	none	none	none
F_{33} (LOB) provision	Subject to the provisions of each tax treaty	Subject to the provisions of each tax treaty	Subject to the provisions of each tax treaty
F_{34} Substance over form	none	implementing	none
F_{41} Preferred WHT rate	Subject to the provisions of each tax treaty	Subject to the provisions of each tax treaty	Subject to the provisions of each tax treaty
F_{42} TP regulation	implementing	implementing	implementing
F_{43} MAP	Subject to the provisions of each tax treaty	Subject to the provisions of each tax treaty	Subject to the provisions of each tax treaty
F_{44} Information exchange	Subject to the provisions of each tax treaty	Subject to the provisions of each tax treaty	Subject to the provisions of each tax treaty

5. Conclusions and recommendations

The results of the analysis detailed in Table 13, Figure 4, and Figure 5 reveal that D_1 (income tax systems) and D_2 (FDI tax incentives) were the top two dimensions ranked by the CPA firm and MNE groups in the decision-making process for multinational enterprises' outbound investment. D_4 (tax treaty networking) was the next most important factor, and D_3 (anti-tax-avoidance legislation) was ranked least important.

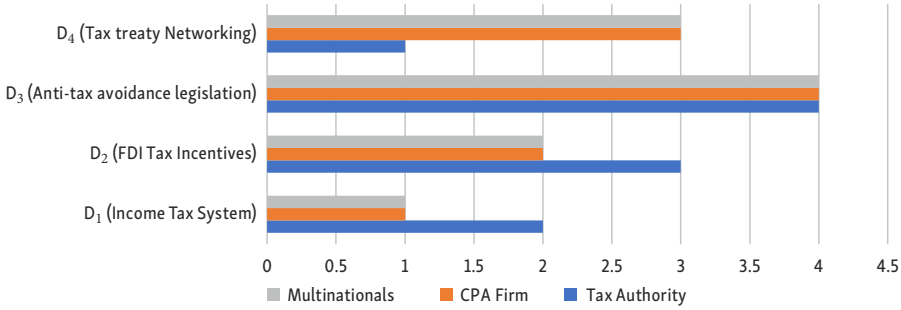

Figure 4. The sequence of importance level of the assessment dimension

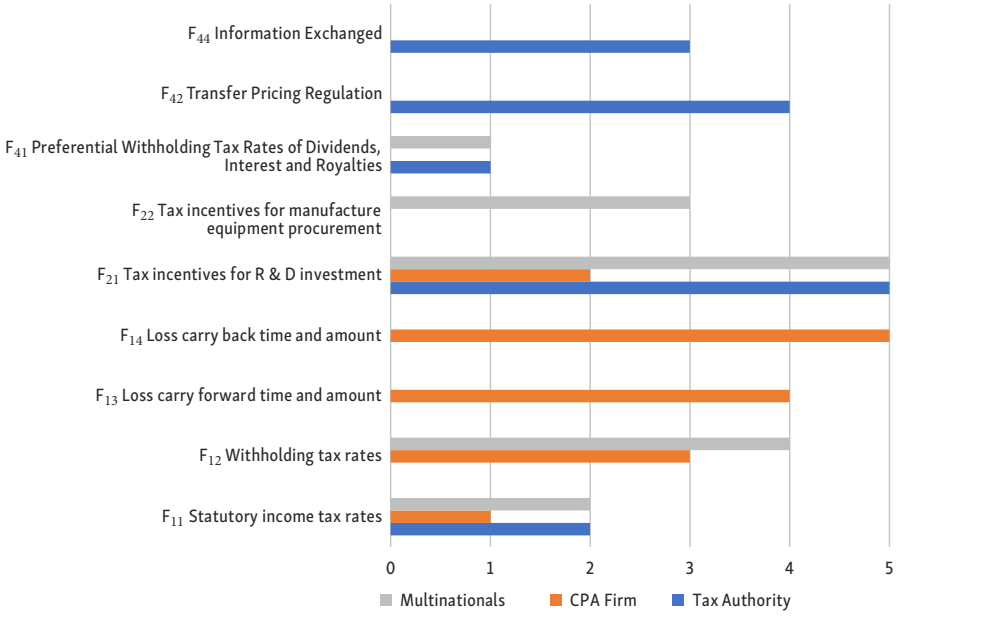

Figure 5. The sequence of importance level of the assessment criteria

These findings were anticipated because D_1 and D_2 directly and frequently affect MNEs' outbound investment tax burden, influencing their performance after tax. Thus, these experts ranked them as the most critical dimensions.

Regarding D_4 and D_3, the CPA firm and MNE groups did not prioritize these dimensions because they do not regularly affect the tax burden of MNEs' outbound investments. However, D_4 was evaluated as the most critical tax dimension by the tax authorities because it influences the execution of tax policy. Specifically, the tax authorities noted the following benefits of tax treaty networking:

1. **Avoidance of double taxation:** Tax treaties prevent double taxation on income or profits earned by MNEs in both home and host countries. Double taxation substantially increases MNEs' tax burden and reduces after-tax profits. Tax treaties allow MNEs to benefit from reduced rates or exemptions, helping them retain more earnings.
2. **Reduction of withholding taxes:** Several tax treaties reduce withholding tax rates on cross-border payments, such as dividends, interest, and royalties. Lower withholding taxes enable MNEs to repatriate funds more efficiently and at a lower cost, promoting foreign investment.
3. **Legal certainty and clarity:** Tax treaties define tax residency rules and allocate taxation rights between countries. This creates legal certainty for MNEs and facilitates tax-efficient structuring of their investments and operations.
4. **Prevention of tax evasion and abuse:** Several provisions in tax treaties prevent tax evasion and treaty abuse. These measures ensure that MNEs cannot exploit loopholes or engage in aggressive tax strategies to shift profits artificially to low-tax jurisdictions.
5. **Enhanced competitiveness:** Countries with extensive tax treaty networks are more attractive to MNEs because they signal openness to international business and a commitment to providing tax certainty and benefits to foreign investors.
6. **Mitigation of transfer pricing risks:** Tax treaties often include an "arm's length principle," which mitigates transfer pricing risks by ensuring that transactions between related parties occur at fair market value, reducing the likelihood of disputes with tax authorities.
7. **Access to treaty benefits:** MNEs must structure investments and operations to meet eligibility criteria to access tax treaty benefits. This requirement guides MNEs in optimizing global tax planning strategies.

Tax treaty networking is crucial for MNEs making outbound investment decisions because it provides a framework for minimizing tax costs, ensuring compliance, and promoting tax efficiency. Incorporating tax treaty provisions into investment decisions can substantially enhance after-tax profitability and competitiveness in the global market. On the basis of the analysis presented in Sections 2 and 3, this study offers the following recommendations for MNEs developing outbound investment strategies on the basis of tax factors:

1. **Evaluate income tax systems (D_1):** MNEs should assess the income tax frameworks in potential host countries, focusing on tax rates, deductions, credits, and exemptions. Identifying countries with favorable income tax systems that align with cross-border performance objectives and organizational structures is crucial.

2. **Leverage FDI tax incentives (D_2):** MNEs should seek countries offering tax incentives for FDI, such as reduced tax rates, tax breaks, and investment credits. Evaluating these incentives can substantially enhance investment profitability.
3. **Prioritize tax treaty networks (D_4):** MNEs should direct investments to countries with robust tax treaty networks that mitigate double taxation, improve tax predictability, and include dispute-resolution mechanisms, facilitating smoother cross-border operations and reducing tax-associated uncertainties.
4. **Understand anti-tax-avoidance legislation (D_3):** Although anti-tax-avoidance legislation ranked last in importance in the DMG's evaluations, MNEs must remain aware of such laws. Compliance with these regulations is vital to avoiding legal, reputational, and tax risks. Developing strategies to navigate these rules can prevent conflicts with tax authorities.

In conclusion, MNEs should prioritize income tax systems and FDI tax incentives, implement tax treaty networking, and remain aware of anti-tax-avoidance legislation. A strategic approach to international tax planning that involves flexibility, adaptability, and collaboration with tax experts is crucial to effective investment decisions.

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Author contributions

Chun-Chieh Chu: Plan the research framework, establish the assessment model, literature collection, questionnaire design, plan the interview subjects, organize questionnaire data, integrate and calculate the preferences of each interviewed expert regarding the evaluation dimensions and criteria of FDI countries, integrate and calculate the fuzzy preference importance of each interviewed group regarding FDI countries, calculate the Sj and Rj coefficients to obtain and rank the decision coefficients Qj for each interviewed group concerning FDI countries, writing-original draft based on the survey and calculation results, revise and respond to reviewers' questions, and request professional English editing. Shih-Tong Lu: Provide recommendations for the research methodology, assist in confirming the design and accuracy of the questionnaire, and help check the explanation and editing accuracy of the mathematical models used in the research methodology.

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