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Factors influencing the selection of Incoterms® 2020 among Australian exporters and importers

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Abstract

Incoterms® 2020 rules allocate the costs, risks and tasks of international delivery between sellers and buyers, yet little empirical evidence shows which considerations guide the choice of rule. This study identifies the factors influencing the selection of Incoterms® 2020 among Australian exporters and importers and ranks them by relative importance. A literature review identified 24 factors in five categories, which 36 experienced exporters, importers, freight forwarders, logistics service providers and academics evaluated with the Best–Worst Method (BWM). Transportation cost, knowledge and understanding, trust between buyer and seller, payment terms or mode of payment and country risk ranked first in their categories. Across all factors, transportation cost, trust between buyer and seller and payment terms or mode of payment received the highest weights. The findings can guide Australian traders, freight intermediaries and trade agencies in matching delivery terms to payment, documentary and border requirements.

Keywords: Incoterms® 2020; Best–Worst Method (BWM); multi-criteria decision-making (MCDM); international trade; freight logistics; Australia

1. Introduction

International trade depends on supply chains in which the costs, risks and responsibilities of moving goods must be divided clearly between sellers and buyers. To reduce uncertainty and disputes in cross-border sales, the International Chamber of Commerce (ICC) introduced the International Commercial Terms, or Incoterms, in 1936 and has revised them in response to changes in trade practice, transport systems and logistics organisation (Sheikh et al., 2024; Unal

& Metin, 2021). Incoterms are now the common commercial language of contracts of sale. They state who arranges and pays for carriage, insurance and customs formalities, where delivery takes place and when risk passes from seller to buyer (International Chamber of Commerce [ICC], 2020; Vogt & Davis, 2020). Because the chosen rule fixes the point of risk transfer and decides which party controls the main logistics activities, selecting an Incoterm is a strategic decision that affects transaction cost, legal exposure and supply chain control (Yang, 2021). The decision recurs across a large volume of Australian trade: in 2024–25, Australia exported goods and services worth A$646.6 billion and imported goods and services worth A$629.9 billion (Department of Foreign Affairs and Trade, 2025).

The 2020 revision gave practitioners new reasons to review their choices. Delivered at Place Unloaded (DPU) replaced Delivered at Terminal (DAT) to show that delivery can occur at any place. Carriage and Insurance Paid To (CIP) now requires a higher default level of insurance cover than Cost, Insurance and Freight (CIF), and Free Carrier (FCA) allows the parties to agree that the buyer will instruct its carrier to issue an on-board bill of lading to the seller (ICC, 2020; Yang, 2021). In Australia, domestic law adds a further layer. Bergami (2016) shows that Australian customs authorities may still demand short-paid duty from an Australian buyer under a Delivered Duty Paid (DDP) contract, because the legal definition of "owner" is broad, even where the overseas seller has agreed to clear the goods and pay the duty.

Empirical studies from Turkey (Unal & Metin, 2021), Thailand (Suraraksa et al., 2020) and Bangladesh (Sheikh et al., 2024) show that the factors guiding the selection of Incoterms, and their relative importance, differ from one country to another (Section 2.2). Incoterms selection therefore depends on the national trading environment and should be studied within it.

Despite this evidence, research on Incoterms remains thin. Vogt and Davis (2020) report that peer-reviewed research on the practical understanding and use of Incoterms is sparse.

Limited attention has been given to how Australian exporters and importers select Incoterms® 2020, and no study has ranked the factors behind that choice in the Australian context.

This study therefore seeks to identify the factors influencing the selection of Incoterms® 2020 among Australian exporters and importers and to rank them according to their relative importance in practical trade decision-making. An extensive literature review was conducted to identify the factors, and the Best–Worst Method (BWM), a multi-criteria decision-making (MCDM) approach, was used to weight and rank them (Rezaei, 2015). BWM was chosen because it needs fewer pairwise comparisons than the Analytic Hierarchy Process (AHP) and gives a structured way to prioritise many criteria (Rezaei, 2015). It has been applied to the selection of Incoterms in Bangladesh (Sheikh et al., 2024) and to factor-ranking problems in the maritime sector (Kakon et al., 2025; Kakon et al., 2026).

The ranking of these factors can help exporters, importers and freight intermediaries make better-informed contractual choices, and it can help trade agencies and industry bodies design guidance that reflects how practitioners actually choose delivery terms. The study also has constraints. The results depend on the judgement of the participants, which may be biased if the experts are not well matched to the subject, and the participant group is limited to Australian trade practitioners. The remainder of the paper is organised as follows. Section 2 reviews the literature, and Section 3 describes the data collection and methodology. Section 4 presents the analysis and findings, Section 5 discusses them, and Section 6 concludes the study.

2. Literature review

The literature shows that Incoterms are more than standard contractual abbreviations. They allocate the delivery tasks, costs and risks of an international sale and, in doing so, shape how logistics activities are coordinated between seller and buyer. The research base is nevertheless small (Vogt & Davis, 2020). This review first considers how Incoterms allocate delivery

obligations and then examines the factors that earlier studies have linked to the selection of a rule.

2.1 Incoterms and the allocation of delivery obligations

Davis and Vogt (2022) describe Incoterms as the accepted way of expressing, in abbreviated and enforceable form, the obligations, risks and costs that seller and buyer bear in the exchange of goods. Bergami (2016) explains that they define the rights, duties and responsibilities of the parties insofar as the movement of goods and the associated functions are concerned. Each rule therefore generates subsidiary contracts for carriage, insurance and border formalities, and the party that holds those contracts also holds the related documents. According to Yang (2021), Incoterms affect the management of logistics systems, transaction costs and the legal rights and obligations of the parties to the sales contract, and a sound choice of rule should take into account product attributes, logistics capability, infrastructure, transaction volume, operating expenses, customs regulations, taxation and accounting.

Unal and Metin (2021) built their model of Incoterms selection on the Resource-Based View, the Transaction Cost Approach and Institutional Theory. From a resource-based perspective, firms with stronger resources, staff knowledge and international experience can take on wider delivery responsibilities. From a transaction-cost perspective, firms choose terms that reduce cost, uncertainty and operational exposure. From an institutional perspective, customs systems, bureaucracy, regulation and business norms decide which terms are feasible. Bergami (2013) adds that Incoterms are an effective risk-management instrument when properly used, but that outdated trade and banking practices can create tension with modern logistics and raise risk for the firm. Taken together, these studies treat the selection of Incoterms as a strategic logistics and risk decision that should not be left to habit.

2.2 Factors influencing the selection of Incoterms

Transport considerations are the most consistently reported determinants. Unal and Metin (2021) placed mode of transportation, transportation cost, type of goods and complexity of transportation in an efficiency-cost group and found transportation cost to be the main concern of both exporters and importers. Sheikh et al. (2024) observed that variable domestic transport costs in Bangladesh discourage foreign parties from arranging inland carriage, which narrows the choice of rules. Mode matters because Incoterms® 2020 separates the rules for any mode of transport from the rules for sea and inland waterway transport only (ICC, 2020). Hien et al. (2009) identified the mode of transportation as an internal environmental factor, and the type of goods and distance also affect which allocations are practical (Sheikh et al., 2024; Unal & Metin, 2021).

Organisational capability forms the second group. Hien et al. (2009) linked international experience, financial resources and organisational habits to the choice of Incoterms and found that firms considering both internal and external factors achieved better export performance. Unal and Metin (2021) identified firm size, staff characteristics and relations with forwarding agents as resource-advantage factors. Sheikh et al. (2024) found that many Bangladeshi small and medium enterprises lacked the knowledge to evaluate alternative rules and defaulted to Free on Board (FOB) for exports and Cost and Freight (CFR) for imports, and Suraraksa et al. (2020) ranked knowledge and understanding second in the Thai automotive parts industry.

Relational dynamics form the third group. The selection of a rule is usually negotiated, and it depends on the bargaining power, trust and cooperation of the parties (Sheikh et al., 2024; Suraraksa et al., 2020). Avsar and Batmaz (2022) confirmed that bargaining power influences the choice of delivery terms, with stronger firms shifting obligations and risks to their counterparties. Trust affects the willingness of each party to accept obligations with few

legal safeguards (Suraraksa et al., 2020), and firms without in-house logistics expertise rely on forwarding agents to execute delivery (Unal & Metin, 2021).

Financial and transaction-specific factors form the fourth group. Suraraksa et al. (2020) found operating cost to be the leading factor overall and listed annual budget, transportation expense and shipment value among the main sub-factors. High-value goods carry greater exposure to loss or damage in transit (Hien et al., 2009), and payment terms connect to the selection of a rule through documentation, particularly under letters of credit, where the delivery rule decides which documents the seller can present for payment (Suraraksa et al., 2020; Unal & Metin, 2021).

Institutional and environmental factors form the fifth group. Sheikh et al. (2024) found that government policies, the influence of banks and currency fluctuations were the three most influential factors in Bangladesh, where export and import policy orders effectively required FOB for exports and CFR for imports. Hien et al. (2009) named country risk and the regulations of the destination country as external environmental factors, and Unal and Metin (2021) added customs and bureaucracy as a legitimacy factor. Relevant literature has thus been reviewed to determine the primary categories of factors influencing the selection of Incoterms (Table 1).

Table 1. Primary categories of factors influencing the selection of Incoterms.

Category	Description
Transportation	Transport considerations decide which rules are operationally appropriate. Mode, cost, type of goods and complexity of transportation form an efficiency-cost group, and transportation cost was the main concern of exporters and importers (Unal & Metin, 2021). Variable domestic transport costs narrow the choice of rules (Sheikh et al., 2024), and Incoterms® 2020 separates the rules for any mode from the rules for sea and inland waterway transport (ICC, 2020).
Organisational capability	International experience, financial resources and organisational habits influence the choice of rule and export performance (Hien et al., 2009). Firm size and staff characteristics affect the capacity to assume delivery tasks (Unal & Metin, 2021), and limited knowledge leads firms to default to FOB and CFR (Sheikh et al., 2024; Suraraksa et al., 2020).
Relational and negotiation	The rule is negotiated and depends on bargaining power, trust and cooperation between the parties (Sheikh et al., 2024; Suraraksa et al., 2020). Stronger firms shift obligations to their counterparties (Avsar & Batmaz, 2022), and firms without in-house expertise rely on forwarding agents (Unal & Metin, 2021).

Category	Description
Financial and transaction-specific	Operating cost, annual budget, transportation expense and shipment value shape the financial burden of a rule (Suraraksa et al., 2020). High-value goods carry greater exposure in transit (Hien et al., 2009), and payment terms connect to the rule through documentary requirements (Unal & Metin, 2021).
Institutional and environmental	Government policies, influence of banks and currency fluctuations were the most influential factors in Bangladesh (Sheikh et al., 2024). Country risk and the regulations of the destination country are external environmental factors (Hien et al., 2009), and customs and bureaucracy affect who can complete border procedures (Unal & Metin, 2021).

Note. Source: Developed by the authors from the reviewed literature.

2.3 Research gap

Three gaps remain. First, much of the existing scholarship concerns the interpretation, revision and legal framework of Incoterms, and few studies examine how firms choose a rule in practice (Unal & Metin, 2021; Vogt & Davis, 2020). Second, the empirical evidence that does exist is specific to its context: studies from Turkey, Thailand and Bangladesh produce different factor hierarchies depending on the legal system, logistics structure and trade policy of the country studied. Third, the reviewed literature provides no empirical ranking of the factors behind the selection of Incoterms® 2020 in Australia, although Australian customs law can change the practical risk consequences of a rule (Bergami, 2016). To address this gap, the present study identifies these factors through an extensive literature review and ranks them using the judgements of Australian trade practitioners.

3. Data collection and methodology

This research adopts a quantitative design, in which numerical data are gathered and systematically analysed (Creswell & Creswell, 2018). This study has two specific objectives, which are:

- Objective 1: To identify the factors influencing the selection of Incoterms® 2020 among Australian exporters and importers.
- Objective 2: To rank these factors to evaluate their relative importance in practical trade decision-making within the Australian context.

To address the first objective, an extensive literature review was conducted. The review examined scholarly articles, books and ICC publications on international trade risk allocation, trade finance, logistics capability and legal compliance in cross-border transactions. Studies published before 2000 were excluded from factor extraction because they predate the Incoterms® 2000, 2010 and 2020 revisions and because their findings have been incorporated into later empirical work. Factor labels were extracted from each source and grouped into the categories used in the original studies where these were given; otherwise, categories were assigned according to the thematic content of the factors (Patton, 2002). The initial extraction yielded 43 factor labels. Factors were retained when they recurred across studies or when a single study identified them as influential in an institutional setting relevant to Australia, and labels that overlapped conceptually with a retained factor were merged. This process produced 24 factors in five categories. To address the second objective, Australian trade practitioners evaluated the 24 factors directly using BWM. Figure 1 indicates the research process flow diagram.

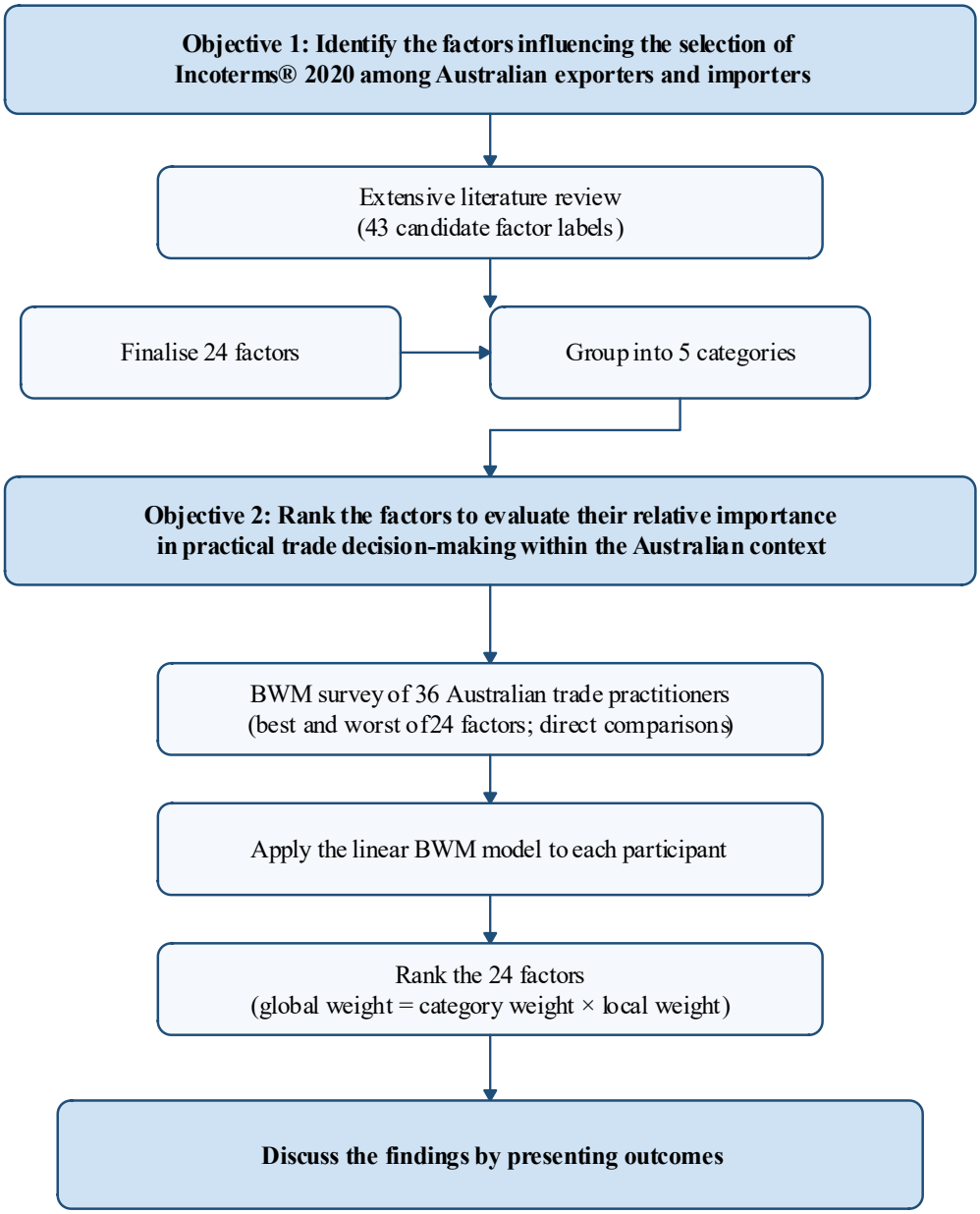


Figure 1. Research process flow diagram.

3.1 Sampling method and participants

The target population comprised Australian trade practitioners who select, negotiate or advise on Incoterms® 2020 rules. No register of these decision-makers exists from which a random sample could be drawn, and BWM is designed to draw on the informed judgement of a small number of experts (Rezaei, 2015). A non-probability purposive (expert) sampling method was therefore used, in which participants are chosen deliberately because they hold the knowledge

and experience that the research question requires (Patton, 2002). Purposive sampling has been used for the same reason in earlier BWM studies in the maritime sector (Kakon et al., 2025).

Participants were drawn from five stakeholder groups so that the ranking would reflect different perspectives on the decision: exporters, importers, freight forwarders, logistics service providers, and academics and researchers in international trade and logistics. No quotas were set for the groups. The sampling frame was built in three steps. First, the company directory of the Australian Securities Exchange (n.d.) was used to identify relevant Australian trading businesses among listed companies. Second, organisational email addresses published on company websites and linked LinkedIn profiles were identified through lead searching. Third, the Apollo.io business contact database was used to reach people in leadership and managerial roles in Australian exporting, importing, freight forwarding and third-party logistics (3PL) firms, together with academics in international trade and logistics. Invitations to the online questionnaire were sent by email, following the recruitment procedure reviewed by the institutional Human Research Ethics Committee. At the start of the questionnaire, each respondent confirmed that they were at least 18 years of age, had relevant experience in Australian international trade, exporting, importing, freight forwarding, logistics service provision, or academic research in international trade or logistics, had read the participant information sheet and agreed to take part. Participants also reported their professional role and their years of experience in Australian international trade, and only those with at least three years of experience were eligible for analysis.

The questionnaire was open between 9 May and 23 August 2026. Of 48 recorded responses, two declined consent and ten ended before the factor evaluation, which left 36 complete responses. All 36 met the experience requirement. A sample of this size is consistent with BWM practice, which relies on a relatively small number of knowledgeable experts (Rezaei, 2015), and comparable maritime BWM studies analysed 57 and 38 respondents

(Kakon et al., 2025; Kakon et al., 2026). A detailed breakdown of the participants by experience level and professional role is presented in Table 2, and the distribution by role is presented in Figure 2. The group was highly experienced: 26 participants (72.2%) reported more than ten years of international trade experience.

Table 2. Detailed list of participants.

Experience level	Professional role	Number of participants
More than 20 years	Exporter	7
	Freight forwarder	5
	Logistics service provider	3
	Importer	2
11–20 years	Importer	3
	Freight forwarder	2
	Academic or researcher	2
	Exporter	1
	Logistics service provider	1
6–10 years	Exporter	4
	Academic or researcher	2
	Freight forwarder	1
3–5 years	Exporter	1
	Freight forwarder	1
	Academic or researcher	1
Total		**36**

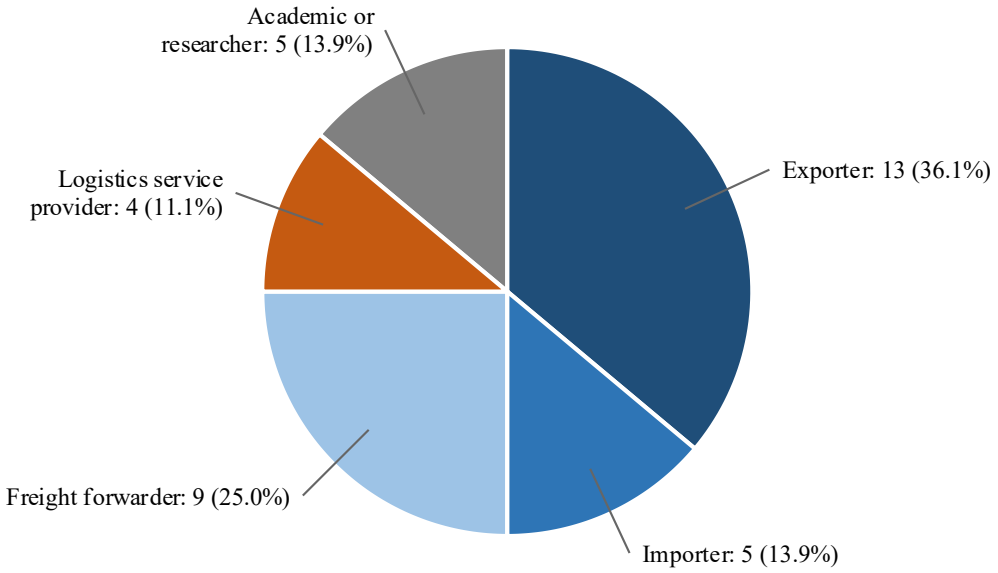


Figure 2. Distribution of study participants by professional role.

3.2 Survey instrument and ethics

The questionnaire applied BWM to the full set of 24 factors. Each participant selected the most important (best) and the least important (worst) factor, stated the importance of the best factor over each other factor on a scale from 1 (equal importance) to 9 (extreme importance), and stated the importance of each other factor over the worst factor on the same scale. Because BWM needs $2n - 3$ comparisons for a set of n criteria, the design required 45 comparisons from each participant, compared with 276 under AHP. The 24 factors were evaluated as a single set. This departs from the usual BWM practice of comparing no more than nine criteria at a time and clustering larger sets into a hierarchy (Corrente et al., 2024; Rezaei, 2026; Srđević et al., 2022). The single set was chosen because the study aims to rank all factors against one another; in a hierarchical design, factors in different categories are not compared directly, and their global weights are products of category and local weights. The cost of this choice is a more demanding selection of the best and worst factors from 24 options. The five categories were not compared directly; their weights were derived from the factor weights (Sections 3.3 and 4.2).

Before data collection, the institutional Human Research Ethics Committee reviewed the project and granted an exemption from ethical review under the National Statement on Ethical Conduct in Human Research. Participants were informed of the purpose of the study, their right to withdraw at any time and how their responses would be used. Consent was incorporated into the questionnaire, participation was voluntary and no personal identifiers were collected.

3.3 Formation of the Best–Worst Method

After the extensive literature review, BWM was applied to rank the factors. BWM was introduced by Rezaei (2015) and uses pairwise comparisons to derive the weights of decision criteria. In maritime and logistics research it has also been used to weight logistics performance indicators (Rezaei et al., 2018) and to select a port governance model (Munim et al., 2020). This study uses the linear model of Rezaei (2016), which yields a unique optimal weight vector. The steps were as follows.

The first step was the identification of the decision criteria, which were the 24 factors finalised through the extensive literature review.

In the second step, each participant selected the best (most important) and the worst (least important) factor.

The third step was the participant's statement of the importance of the best criterion over each other criterion on the 1 to 9 scale. The best-to-others vector is:

$$A_B = (a_{B1}, a_{B2}, \ldots, a_{Bn})$$

where a_{Bj} indicates the importance of the best criterion B over criterion j.

The fourth step was the participant's statement of the importance of each criterion over the worst criterion. The others-to-worst vector is:

$$A_W = (a_{1W}, a_{2W}, \ldots, a_{nW})$$

where a_{jW} indicates the importance of criterion j over the worst criterion W.

The fifth step determined the optimal weights (w^*_1, w^*_2, …, w^*_n) from the following linear model (Rezaei, 2016):

$$min\ \xi^L$$

Subject to,

$$|w_B - a_{Bj}\, w_j| \le \xi^L, \text{ for all } j$$

$$|w_j - a_{jW}\, w_W| \le \xi^L, \text{ for all } j$$

$$\Sigma_j\, w_j = 1, \text{ and } w_j \ge 0 \text{ for all } j.$$

The model was solved for each participant. Because each participant compared all 24 factors in one set, the solution gives the weight w_j^k of every factor j for participant k directly. For participant k, the weight of category c is the sum of the weights of its factors, and the local weight of factor j is its weight divided by the weight of its category $c(j)$:

$$W_c^k = \Sigma_{j \in c}\, w_j^k, \quad l_j^k = w_j^k / W_{c(j)}^k$$

Group category and local weights are the arithmetic means over the $N = 36$ participants, and the group global weight of factor j is the product of the group weight of its category and its group local weight:

$$\bar{W}_c = (1/N)\, \Sigma_k\, W_c^k, \quad \bar{l}_j = (1/N)\, \Sigma_k\, l_j^k, \quad \bar{w}_j = \bar{W}_{c(j)} \times \bar{l}_j$$

Because the group local weights sum to one within each category and the group category weights sum to one, the group global weights also sum to one. This product of averages is not identical to the arithmetic mean of the participants' own weights. It was used so that each global weight reported in Section 4 equals the product of the corresponding category and local weights.

All analyses were run in R version 4.3.3 (R Core Team, 2024), and the linear BWM model was solved with the lpSolve package (Berkelaar, 2023). Each participant's solution was reproduced in a 24-criterion extension of the BWM Solver workbook (Rezaei, 2022).

To support the validity of the results, the study used data triangulation by gathering responses from five stakeholder groups with different roles in Australian trade, which widened the range of views and reduced single-perspective bias (Table 2). Theory triangulation was applied by comparing the findings with earlier studies in the discussion section.

4. Analysis and findings

The analysis section is divided into three subsections: the finalisation of the factors, the weights of the factors based on BWM, and their overall ranking across categories, which Figure 3 summarises.

4.1 Finding the factors based on the literature review

The 24 finalised factors in five categories, with the literature used for each, are presented in Table 3.

Table 3. Finalised categories and factors.

Categories	Factors	Used literature
Transportation	1. Transportation cost 2. Mode of transportation 3. Distance 4. Type or nature of goods 5. Complexity of transportation	(Hien et al., 2009; Sheikh et al., 2024; Suraraksa et al., 2020; Unal & Metin, 2021)
Organisational capability	1. Knowledge and understanding 2. International experience 3. International trade laws 4. Firm size 5. Staff characteristics 6. Financial resources or performance	(Hien et al., 2009; Sheikh et al., 2024; Suraraksa et al., 2020; Unal & Metin, 2021)
Relational and negotiation	1. Bargaining power 2. Negotiation between buyer and seller 3. Trust between buyer and seller 4. Relations with forwarding agents	(Avsar & Batmaz, 2022; Sheikh et al., 2024; Suraraksa et al., 2020; Unal & Metin, 2021)

Categories	Factors	Used literature
Financial and transaction-specific	1. Shipment value or value of goods 2. Payment terms or mode of payment 3. Annual budget	(Hien et al., 2009; Sheikh et al., 2024; Suraraksa et al., 2020; Unal & Metin, 2021)
Institutional and environmental	1. Government policies 2. Influence of banks 3. Currency fluctuations 4. Country risk 5. Regulations of the destination country 6. Customs or bureaucracy	(Hien et al., 2009; Sheikh et al., 2024; Unal & Metin, 2021)

4.2 Finding the weights of the factors based on the Best–Worst Method

Following the BWM steps in Section 3.3, the linear model was solved for each participant. Because the factors were weighted as a single set, the weight of a category is the sum of the weights of its factors and therefore increases with the number of factors it contains (Rezaei, 2026). The category weights in Table 4 follow this pattern. The two six-factor categories, organisational capability (0.2366) and institutional and environmental (0.2266), and the five-factor transportation category (0.2267) received the highest weights, and the three-factor financial and transaction-specific category (0.1304) the lowest. The category weights therefore describe how total importance is shared among the categories and do not indicate that one category matters more than another. Tables 5–9 report the local weights of the factors within each category.

Table 4. Category weights based on BWM.

Category	Factors	Weight	Rank
Organisational capability	6	0.2366	1
Transportation	5	0.2267	2
Institutional and environmental	6	0.2266	3
Relational and negotiation	4	0.1797	4
Financial and transaction-specific	3	0.1304	5
Total	24	1.000	

Note. Weight is the sum of the weights of the factors in the category, averaged across participants. Rows are ordered by rank.

4.2.1 Transportation factors

As shown in Table 5 and Figure 4, within the category of transportation factors, *transportation cost* (0.2495) received the highest weight, followed by *complexity of transportation* (0.2228) and *mode of transportation* (0.2088). *Distance* (0.1289) ranked last.

Table 5. Outcome of the transportation category based on BWM.

Category	Factors	Weights	Rank
Transportation	Transportation cost	0.2495	1
	Complexity of transportation	0.2228	2
	Mode of transportation	0.2088	3
	Type or nature of goods	0.1900	4
	Distance	0.1289	5
	Total	1.000	

Note. Weights are the means of the participant-level linear BWM solutions.

4.2.2 Organisational capability factors

As shown in Table 6 and Figure 5, within the category of organisational capability factors, *knowledge and understanding* (0.1928) received the highest weight, followed by *international trade laws* (0.1872) and *financial resources or performance* (0.1811). *Firm size* (0.1119) ranked last.

Table 6. Outcome of the organisational capability category based on BWM.

Category	Factors	Weights	Rank
Organisational capability	Knowledge and understanding	0.1928	1
	International trade laws	0.1872	2
	Financial resources or performance	0.1811	3
	International experience	0.1731	4
	Staff characteristics	0.1539	5
	Firm size	0.1119	6
	Total	1.000	

4.2.3 Relational and negotiation factors

As shown in Table 7 and Figure 6, within the category of relational and negotiation factors, *trust between buyer and seller* (0.3000) received the highest weight, followed by *negotiation*

between buyer and seller (0.2595) and *relations with forwarding agents* (0.2340). *Bargaining power* (0.2065) ranked last.

Table 7. Outcome of the relational and negotiation category based on BWM.

Category	Factors	Weights	Rank
Relational and negotiation	Trust between buyer and seller	0.3000	1
	Negotiation between buyer and seller	0.2595	2
	Relations with forwarding agents	0.2340	3
	Bargaining power	0.2065	4
	Total	1.000	

4.2.4 Financial and transaction-specific factors

As shown in Table 8 and Figure 7, within the category of financial and transaction-specific factors, *payment terms or mode of payment* (0.3991) received the highest weight, followed by *shipment value or value of goods* (0.3698). *Annual budget* (0.2311) ranked last.

Table 8. Outcome of the financial and transaction-specific category based on BWM.

Category	Factors	Weights	Rank
Financial and transaction-specific	Payment terms or mode of payment	0.3991	1
	Shipment value or value of goods	0.3698	2
	Annual budget	0.2311	3
	Total	1.000	

4.2.5 Institutional and environmental factors

As shown in Table 9 and Figure 8, within the category of institutional and environmental factors, *country risk* (0.2017) received the highest weight, followed by *regulations of the destination country* (0.1967) and *customs or bureaucracy* (0.1741). *Influence of banks* (0.1385) ranked last.

Table 9. Outcome of the institutional and environmental category based on BWM.

Category	Factors	Weights	Rank
Institutional and environmental	Country risk	0.2017	1
	Regulations of the destination country	0.1967	2

Category	Factors	Weights	Rank
	Customs or bureaucracy	0.1741	3
	Government policies	0.1489	4
	Currency fluctuations	0.1401	5
	Influence of banks	0.1385	6
	Total	1.000	

4.3 Overall ranking of the factors

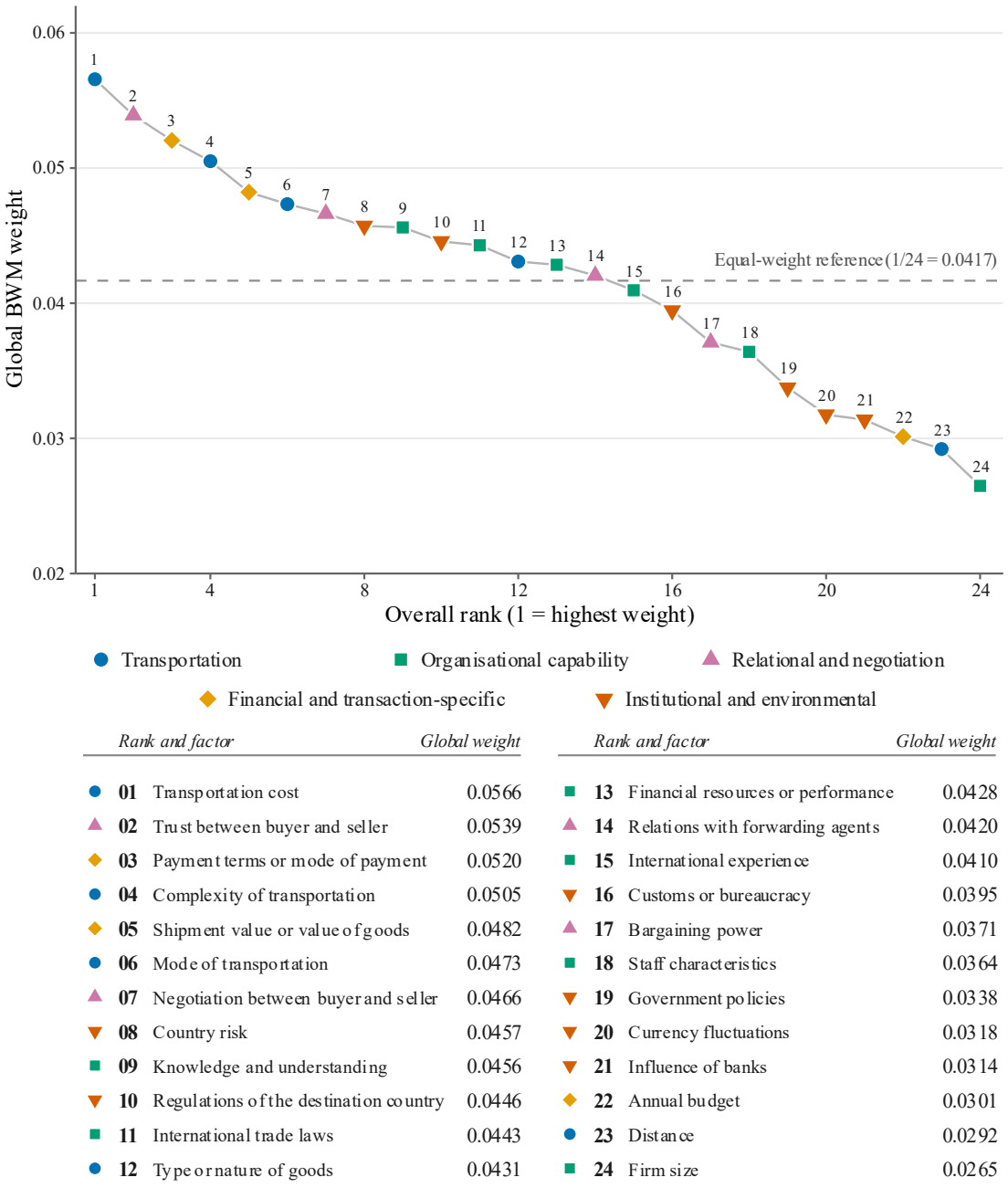
The global weight of each factor is the product of the group weight of its category and its group local weight (Section 3.3). Table 10 and Figure 3 present the overall ranking. *Transportation cost* (0.0566), *trust between buyer and seller* (0.0539) and *payment terms or mode of payment* (0.0520) received the highest global weights, and *firm size* (0.0265) the lowest; the highest weight is 2.1 times the lowest. The three leading factors account for 16.3% of the total weight and the ten leading factors for 49.1%, compared with 12.5% and 41.7% under an equal allocation across the 24 factors.

Table 10. Overall ranking of the 24 factors based on BWM.

Rank	Factor	Category	Category weight	Local weight	Global weight
1	Transportation cost	Transportation	0.2267	0.2495	0.0566
2	Trust between buyer and seller	Relational and negotiation	0.1797	0.3000	0.0539
3	Payment terms or mode of payment	Financial and transaction-specific	0.1304	0.3991	0.0520
4	Complexity of transportation	Transportation	0.2267	0.2228	0.0505
5	Shipment value or value of goods	Financial and transaction-specific	0.1304	0.3698	0.0482
6	Mode of transportation	Transportation	0.2267	0.2088	0.0473
7	Negotiation between buyer and seller	Relational and negotiation	0.1797	0.2595	0.0466
8	Country risk	Institutional and environmental	0.2266	0.2017	0.0457
9	Knowledge and understanding	Organisational capability	0.2366	0.1928	0.0456
10	Regulations of the destination country	Institutional and environmental	0.2266	0.1967	0.0446
11	International trade laws	Organisational capability	0.2366	0.1872	0.0443
12	Type or nature of goods	Transportation	0.2267	0.1900	0.0431
13	Financial resources or performance	Organisational capability	0.2366	0.1811	0.0428
14	Relations with forwarding agents	Relational and negotiation	0.1797	0.2340	0.0420

Rank	Factor	Category	Category weight	Local weight	Global weight
15	International experience	Organisational capability	0.2366	0.1731	0.0410
16	Customs or bureaucracy	Institutional and environmental	0.2266	0.1741	0.0395
17	Bargaining power	Relational and negotiation	0.1797	0.2065	0.0371
18	Staff characteristics	Organisational capability	0.2366	0.1539	0.0364
19	Government policies	Institutional and environmental	0.2266	0.1489	0.0338
20	Currency fluctuations	Institutional and environmental	0.2266	0.1401	0.0318
21	Influence of banks	Institutional and environmental	0.2266	0.1385	0.0314
22	Annual budget	Financial and transaction-specific	0.1304	0.2311	0.0301
23	Distance	Transportation	0.2267	0.1289	0.0292
24	Firm size	Organisational capability	0.2366	0.1119	0.0265

Note. Global weight = category weight × local weight. Rows are ordered by global weight.



Rank and factor		*Global weight*	*Rank and factor*		*Global weight*
01	Transportation cost	0.0566	**13**	Financial resources or performance	0.0428
02	Trust between buyer and seller	0.0539	**14**	Relations with forwarding agents	0.0420
03	Payment terms or mode of payment	0.0520	**15**	International experience	0.0410
04	Complexity of transportation	0.0505	**16**	Customs or bureaucracy	0.0395
05	Shipment value or value of goods	0.0482	**17**	Bargaining power	0.0371
06	Mode of transportation	0.0473	**18**	Staff characteristics	0.0364
07	Negotiation between buyer and seller	0.0466	**19**	Government policies	0.0338
08	Country risk	0.0457	**20**	Currency fluctuations	0.0318
09	Knowledge and understanding	0.0456	**21**	Influence of banks	0.0314
10	Regulations of the destination country	0.0446	**22**	Annual budget	0.0301
11	International trade laws	0.0443	**23**	Distance	0.0292
12	Type or nature of goods	0.0431	**24**	Firm size	0.0265

Figure 3. Rank–weight spectrum of the 24 factors. Each marker shows the global BWM weight of a factor at its overall rank (1 = highest weight); colour and marker shape identify the category. The dashed line marks the equal weight of 1/24 (0.0417). The key and Table 10 give the exact weights.

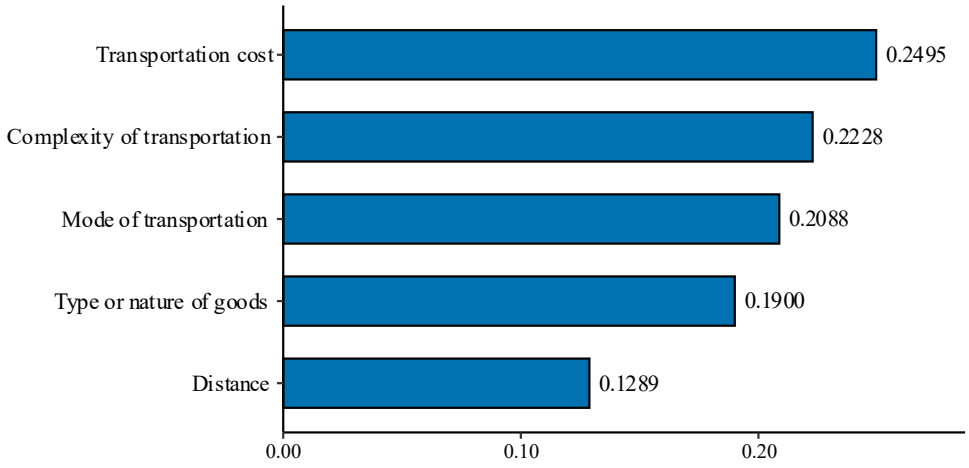
5. Discussion

The selection of an Incoterms® 2020 rule decides which party arranges carriage, holds the transport documents, insures the goods and completes the border formalities. From the judgements of experienced Australian practitioners, this study found the relative importance of

the factors that guide that decision. Each of the 24 factors in the five categories carries weight in the decision, and the key findings for each category are discussed below.

5.1 Transportation factors

The transportation category reflects the physical movement of goods under the chosen rule. As shown in Figure 4, *transportation cost* is the most important factor in this category, which agrees with Unal and Metin (2021), who found it to be the main concern of Turkish exporters and importers, and with the importance of operating cost reported by Suraraksa et al. (2020). Cost here is best read as the total consequence of an allocation, because a rule shifts freight procurement, insurance, handling and documentation between the parties (Yang, 2021). *Complexity of transportation* and *mode of transportation* ranked second and third. Because Incoterms® 2020 groups its rules by mode of transport (ICC, 2020), a containerised consignment handed over at an inland terminal calls for a different rule from bulk cargo loaded on board a vessel. *Type or nature of goods* ranked fourth, consistent with its role in limiting how delivery tasks can be divided (Sheikh et al., 2024; Unal & Metin, 2021). The least important factor is *distance*. Unal and Metin (2021) found that distance mattered differently to exporters and importers in Turkey; for Australian traders, whose international shipments are mostly long-haul, distance may do little to distinguish one rule from another.



	Transportation cost	Complexity of transportation	Mode of transportation	Type or nature of goods	Distance
Weights	0.2495	0.2228	0.2088	0.1900	0.1289

Figure 4. Transportation category BWM analysis.

5.2 Organisational capability factors

The organisational capability category reflects the resources and expertise a firm brings to the decision. As shown in Figure 5, *knowledge and understanding* of Incoterms rules and trade procedures is the most important factor in this category. Suraraksa et al. (2020) ranked it second in Thailand, and Sheikh et al. (2024) found that a lack of such knowledge led Bangladeshi firms to default to FOB and CFR regardless of the transaction. *International trade laws* ranked second, which reflects the legal exposure that a rule can create; in Australia, a DDP purchase can leave the buyer liable for short-paid duty (Bergami, 2016). *Financial resources or performance* and *international experience* ranked third and fourth with similar weights, both of which Hien et al. (2009) linked to Incoterms selection and export performance. *Staff characteristics* ranked fifth. The least important factor is *firm size*, as Unal and Metin (2021) also found. A smaller firm can obtain transport expertise through its staff, customs brokers or freight forwarders, whereas a larger firm can still make a poor allocation if it lacks legal, documentary or modal knowledge, so task-specific capability appears to matter more than scale.

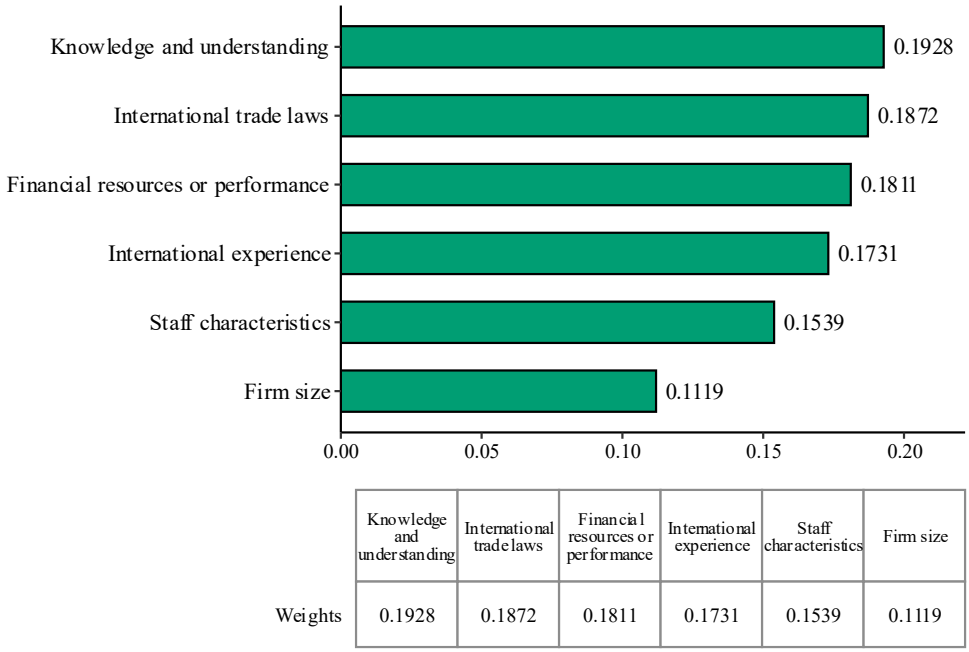


Figure 5. Organisational capability category BWM analysis.

5.3 Relational and negotiation factors

The relational and negotiation category reflects the relationship between the trading parties and with their intermediaries. As shown in Figure 6, *trust between buyer and seller* is the most important factor in this category, and it leads its category by a wider margin than any other category leader (Table 7). Trust affects the willingness of each party to accept obligations with few legal safeguards (Suraraksa et al., 2020), and it governs how far a seller can rely on the buyer to pay once control of the goods has passed. *Negotiation between buyer and seller* ranked second and *relations with forwarding agents* third, consistent with the reliance of many firms on intermediaries to execute delivery (Sheikh et al., 2024; Unal & Metin, 2021). The least important factor is *bargaining power*. This result contrasts with Avsar and Batmaz (2022), who found that stronger firms use their position to shift obligations to the counterparty, and with Sheikh et al. (2024), who reported that the weak bargaining position of Bangladeshi small and medium enterprises constrained their choices. Australian practitioners appear to treat the selection of a rule mainly as a matter of workable coordination, although the difference in instruments and samples means that this contrast should not be over-read.

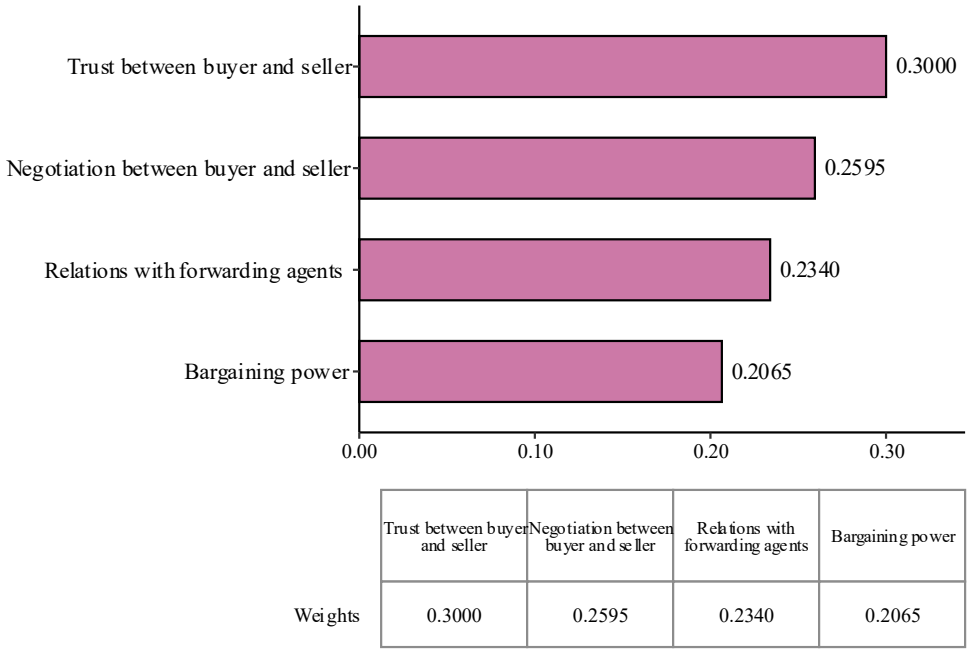


Figure 6. Relational and negotiation category BWM analysis.

5.4 Financial and transaction-specific factors

The financial and transaction-specific category reflects the money at stake in a transaction and the way it is paid. As shown in Figure 7, *payment terms or mode of payment* is the most important factor in this category. Incoterms do not govern payment or the transfer of title. The delivery rule nevertheless determines who controls the transport documents and when evidence of shipment becomes available, and therefore whether a payment mechanism can work in practice. The FCA on-board bill of lading option in Incoterms® 2020 exists because FCA with buyer-arranged carriage conflicted with the documentary requirements of letters of credit (ICC, 2020). The choice between open account, documentary collection and letters of credit reflects contract enforcement and counterparty risk (Antràs & Foley, 2015; Schmidt-Eisenlohr, 2013), which links this result to the importance of trust in Section 5.3. *Shipment value or value of goods* ranked second, as high-value goods carry greater exposure to loss or damage in transit (Hien et al., 2009) and are affected by the different insurance requirements of CIF and CIP (ICC, 2020). The least important factor is *annual budget*, which contrasts with Suraraksa et al.

(2020), who listed annual budget among the leading financial sub-factors for Thai manufacturers.

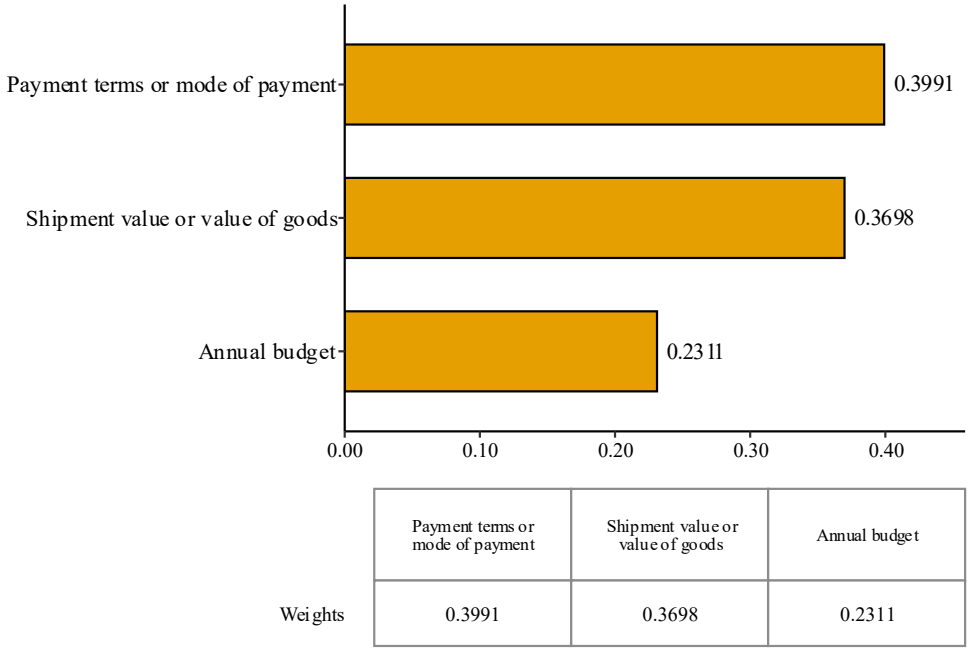
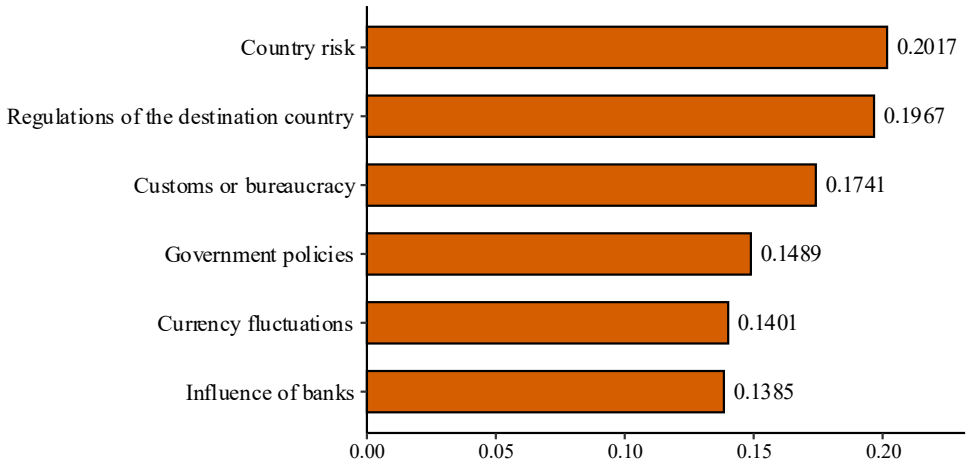


Figure 7. Financial and transaction-specific category BWM analysis.

5.5 Institutional and environmental factors

The institutional and environmental category reflects the regulatory, political and financial setting in which trade takes place. As shown in Figure 8, *country risk* and *regulations of the destination country* lead this category with almost identical weights, both of which Hien et al. (2009) identified as external environmental factors. For an Australian importer, the destination is Australia, where goods must meet biosecurity and documentary requirements and may face inspection or treatment (Department of Agriculture, Fisheries and Forestry, 2025a, 2025b). For an Australian exporter, the destination is the buyer's jurisdiction. In both cases, the factor captures whether the party assigned the border tasks can lawfully perform them. *Customs or bureaucracy* ranked third, consistent with Unal and Metin (2021). The least important factors are *government policies*, *currency fluctuations* and *influence of banks*. In Bangladesh, the same three factors ranked first to third, because policy orders effectively required FOB for exports and CFR for imports and banking practice restricted outflows of foreign currency (Sheikh et

al., 2024). Australia does not prescribe delivery terms, which is consistent with the low weight of these factors. The comparison rests on two studies that differ in instrument, factor wording and respondent mix, so it is best treated as a hypothesis for comparative research.



	Country risk	Regulations of the destination country	Customs or bureaucracy	Government policies	Currency fluctuations	Influence of banks
Weights	0.2017	0.1967	0.1741	0.1489	0.1401	0.1385

Figure 8. Institutional and environmental category BWM analysis.

5.6 Priorities across categories

Across all 24 factors, transportation cost, trust between buyer and seller and payment terms received the highest weights, which lie close together (0.0566, 0.0539 and 0.0520; Section 4.3). The close standing of trust and payment terms with transportation cost shows that Australian practitioners weigh freight cost together with the counterparty and the payment mechanism when they select a rule. A rule must also allow the payment mechanism to work and must assign each transport, documentary and border task to a party able to perform it. Distance, firm size and annual budget ranked lowest overall, which places the capacity to execute a rule ahead of the scale of the firm and the size of its budget.

6. Conclusion

Incoterms® 2020 rules decide how the costs, risks and tasks of international delivery are divided between seller and buyer, and Australian traders choose among them in almost every international sale. This study set out to identify the factors influencing the selection of Incoterms® 2020 among Australian exporters and importers and to rank them by their relative importance. An extensive literature review identified 24 factors in five categories, and BWM, applied to the direct comparisons of 36 experienced Australian trade practitioners, provided their weights within each category and across all factors. The results indicate that transportation cost, knowledge and understanding, trust between buyer and seller, payment terms or mode of payment and country risk are the most important factors in their categories, while distance, firm size, bargaining power, annual budget and influence of banks are the least important. Across all factors, transportation cost, trust between buyer and seller and payment terms or mode of payment receive the highest weights.

The findings have several implications. Exporters and importers should test a proposed rule against the payment mechanism and its documentary requirements, and against the ability of the assigned party to complete export and import formalities, before comparing freight quotations. For example, FCA with the on-board bill of lading option suits containerised cargo under a letter of credit better than FOB, and a DDP purchase from a seller who cannot act as importer in Australia exposes the buyer to customs and biosecurity risk (Bergami, 2016; ICC, 2020). Freight forwarders and logistics service providers can add value by advising on these documentary and border consequences as well as on freight cost. Trade agencies and industry associations can prepare scenario-based guidance that presents delivery terms together with payment and border requirements, and training that builds task-specific knowledge, given that knowledge and understanding led the organisational capability category, without any need to regulate the choice of terms.

Implementing these improvements involves some challenges. Guidance material must respect the licensing of the ICC rule text, must be kept current as destination requirements change, and may expose its authors to liability for advice. Its value could be evaluated by comparing document discrepancies, clearance holds or disputes among users and non-users.

The study has limitations. The purposive sample of 36 participants is small and non-probabilistic, so the weights describe the judgement of these experts and cannot be read as population values. Comparing 24 factors in a single set departs from the BWM guidance to cluster sets of more than nine criteria (Corrente et al., 2024; Rezaei, 2026), and fatigue may have affected the later comparisons. Because the categories were not compared directly, their weights reflect the number of factors each contains. The results were not analysed separately for each stakeholder group, firm characteristics such as size, sector and dominant mode of transport were not collected, and the cross-sectional design observes neither the rule chosen nor its outcomes. The factor set did not include insurance, supply chain resilience, emissions or electronic transport documents as separate criteria. Future research could estimate group weights probabilistically with the Bayesian BWM (Mohammadi & Rezaei, 2020), and a hierarchical BWM design (Rezaei, 2026) would yield category weights that do not depend on the number of factors in each category. Larger samples could compare stakeholder groups and trade directions, comparative studies with a common instrument could test the institutional contrast with Bangladesh, and transaction-level studies that record the rule chosen and its outcomes could link the ranked factors to logistics performance.

References

Antràs, P., & Foley, C. F. (2015). Poultry in motion: A study of international trade finance practices. *Journal of Political Economy, 123*(4), 853–901. https://doi.org/10.1086/681592

Australian Securities Exchange. (n.d.). *Company directory*. Retrieved October 9, 2026, from https://www.asx.com.au/markets/trade-our-cash-market/directory

Avsar, V., & Batmaz, O. (2022). Legal, financial, and strategic forces in cross-border delivery terms. *Emerging Markets Finance and Trade, 58*(13), 3609–3621. https://doi.org/10.1080/1540496X.2022.2051811

Bergami, R. (2013). Managing Incoterms 2010 risks: Tension with trade and banking practices. *International Journal of Economics and Business Research, 6*(3), 324–338. https://doi.org/10.1504/IJEBR.2013.056126

Bergami, R. (2016). International delivery risks: The case of Delivered Duty Paid in Australia. *Acta Universitatis Bohemiae Meridionales, 19*(1), 1–9. https://doi.org/10.1515/acta-2016-0005

Berkelaar, M. (2023). *lpSolve: Interface to 'Lp_solve' v. 5.5 to solve linear/integer programs* (R package version 5.6.20) [Computer software]. https://CRAN.R-project.org/package=lpSolve

Corrente, S., Greco, S., & Rezaei, J. (2024). Better decisions with less cognitive load: The parsimonious BWM. *Omega, 126*, Article 103075. https://doi.org/10.1016/j.omega.2024.103075

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications. https://us2.sagepub.com/en-us/nam/research-design/book270550

Davis, J., & Vogt, J. (2022). Incoterms® 2020 and the missed opportunities for the next version. *International Journal of Logistics Research and Applications, 25*(9), 1263–1286. https://doi.org/10.1080/13675567.2021.1897974

Department of Agriculture, Fisheries and Forestry. (2025a). *How to import goods to Australia*. Retrieved September 25, 2026, from https://www.agriculture.gov.au/biosecurity-trade/import/before/how-to-import

Department of Agriculture, Fisheries and Forestry. (2025b). *Minimum documentary and import declaration requirements policy* (Version 4.2). https://www.agriculture.gov.au/biosecurity-trade/import/arrival/clearance-inspection/documentary-requirements/minimum-document-requirements-policy

Department of Foreign Affairs and Trade. (2025). *Australia's trade in goods and services 2024–25* [Data set]. https://www.dfat.gov.au/sites/default/files/australia-goods-services-exports-imports-2024-25.pdf

Hien, N., Laporte, G., & Roy, J. (2009). Business environment factors, Incoterms selection and export performance. *Operations and Supply Chain Management: An International Journal, 2*(2), 63–78. https://doi.org/10.31387/oscm040017

International Chamber of Commerce. (2020). *Incoterms® 2020: ICC rules for the use of domestic and international trade terms*. ICC Publishing. https://www.iccitalia.org/wp-content/uploads/2025/03/indice-incoterms-2020_eng.pdf

Kakon, K., Askari, H. R., Aktar, S., Muktadir, D. G., & Shaheen, M. M. A. (2026). Assessing human rights preservation for women seafarers on board. *Australian Journal of Maritime & Ocean Affairs*. Advance online publication. https://doi.org/10.1080/18366503.2026.2662114

Kakon, K., Askari, H. R., Shaheen, M. M. A., & Muktadir, D. G. (2025). Factors influencing seafarers' human rights preservation onboard. *Maritime Technology and Research, 7*(4), Article 276889. https://doi.org/10.33175/mtr.2025.276889

Mohammadi, M., & Rezaei, J. (2020). Bayesian best-worst method: A probabilistic group decision making model. *Omega, 96*, Article 102075. https://doi.org/10.1016/j.omega.2019.06.001

Munim, Z. H., Sornn-Friese, H., & Dushenko, M. (2020). Identifying the appropriate governance model for green port management: Applying analytic network process and best-worst methods to ports in the Indian Ocean Rim. *Journal of Cleaner Production, 268*, Article 122156. https://doi.org/10.1016/j.jclepro.2020.122156

Patton, M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). SAGE Publications. https://collegepublishing.sagepub.com/products/qualitative-research-evaluation-methods-3-9906

R Core Team. (2024). *R: A language and environment for statistical computing* (Version 4.3.3) [Computer software]. R Foundation for Statistical Computing. https://www.R-project.org/

Rezaei, J. (2015). Best-worst multi-criteria decision-making method. *Omega, 53*, 49–57. https://doi.org/10.1016/j.omega.2014.11.009

Rezaei, J. (2016). Best-worst multi-criteria decision-making method: Some properties and a linear model. *Omega, 64*, 126–130. https://doi.org/10.1016/j.omega.2015.12.001

Rezaei, J. (2022). *BWM Solver* (Version 2.0) [Computer software]. https://bestworstmethod.com

Rezaei, J. (2026). Best-worst method: A decade of evolution and future prospects. *Omega, 143*, Article 103546. https://doi.org/10.1016/j.omega.2026.103546

Rezaei, J., van Roekel, W. S., & Tavasszy, L. (2018). Measuring the relative importance of the logistics performance index indicators using Best Worst Method. *Transport Policy, 68*, 158–169. https://doi.org/10.1016/j.tranpol.2018.05.007

Schmidt-Eisenlohr, T. (2013). Towards a theory of trade finance. *Journal of International Economics, 91*(1), 96–112. https://doi.org/10.1016/j.jinteco.2013.04.005

Sheikh, W., Miah, S. M. A. N., Hasan, M. T., Zitu, K. K., & Hosain, J. (2024). Optimising international trade: The examination of Incoterms selection by exporters and importers. *Review of International Business and Strategy, 34*(4), 562–583. https://doi.org/10.1108/RIBS-08-2023-0093

Srđević, Z., Srđević, B., Ždero, S., & Ilić, M. (2022). How MCDM method and the number of comparisons influence the priority vector. *Computer Science and Information Systems, 19*(1), 251–275. https://doi.org/10.2298/CSIS210410051S

Suraraksa, J., Amchang, C., & Sawatwong, N. (2020). Decision-making on Incoterms 2020 of automotive parts manufacturers in Thailand. *The Journal of Asian Finance, Economics and Business, 7*(10), 461–470. https://doi.org/10.13106/jafeb.2020.vol7.no10.461

Unal, T. D., & Metin, I. (2021). Do the factors affecting Incoterms® selection differ for exporters and importers? A fuzzy analytical hierarchy process (FAHP) application. *LogForum, 17*(2), 299–309. https://doi.org/10.17270/J.LOG.2021.585

Vogt, J., & Davis, J. (2020). The state of Incoterm® research. *Transportation Journal, 59*(3), 304–324. https://doi.org/10.5325/transportationj.59.3.0304

Yang, J.-H. (2021). A study on the reasonable choice and utilization of Incoterms 2020 rules from the perspective of logistics and supply chain management. *Journal of Korea Trade, 25*(1), 152–168. https://doi.org/10.35611/jkt.2021.25.1.152