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Interrelations between logistics, trade, and law in the Incoterms® context: A bibliometric analysis of academic literature

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ABSTRACT

This study uses a comprehensive bibliometric analysis to examine the relationships between the International Commercial Terms (Incoterms®), logistics, and legal issues in the context of international trade. By examining a dataset of 290 documents published from 1973 to 2023 in various academic databases such as Web of Science, Scopus, Science Direct, Google Scholar, SpringerLink, Wiley, Ebsco, Jstor, Emerald and Taylor & Francis, the research aims to identify trends, key issues, and potential future research directions in this interdisciplinary field. The analysis reveals a significant increase in publications since 2010, with a focus on topics such as legal and contractual issues, supply chain management, risk mitigation, and the evolution of Incoterms® rules. Co-occurrence analysis emphasizes six distinct clusters, ranging from international trade dynamics and transaction costs to regulatory frameworks and risk management. The abstract content analysis further highlights the interconnectedness of legal, logistical and implementation issues. The study also identifies the United Kingdom, the United States, and South Korea as the most important countries contributing to the field. It is concluded that Incoterms® and its multidisciplinary essence generates a greater interest in the international trade, not only because of its incidence in diverse fields of management; but also, because these rules are updated to regulate better the business transactions. The findings provide valuable insights for researchers, policymakers, and practitioners, and show the importance of considering the multifaceted nature of Incoterms® research and its impact on global trade practices.

1 Introduction

International trade is a fundamental element of the global economy, enabling the seamless transfer of goods and services across national borders. However, maintaining the smooth flow of products between countries requires a complex interplay of transactional agreements, logistical operations, and risk management strategies. At the core of this complex system are International Commercial Terms (Incoterms®), a standardized framework that governs the allocation of responsibilities, costs, and risks in cross-border trade transactions. Incoterms®

play a central role in shaping the dynamics of commercial relationships and have evolved over time to address the ever-changing landscape of global trade [19, 36, 63].

Standardized trade terminologies established by the International Chamber of Commerce (ICC) define the respective obligations of buyers and sellers in global contracts. These terminologies provide a well-defined structure for the exchange of goods, risk allocation, and documentation, thereby promoting streamlined and transparent trade practices. In addition, the incorporation of these standards-based trade terms is closely related to the field of logistics. The choice of a particular

trade term shapes the subsequent activities within the supply chain undertaken by both suppliers and buyers. These activities include but are not limited to transportation arrangement and costs, delivery terms and transfer of risk, export/import clearance and customs obligations, insurance coverage requirements, packaging, handling and loading/unloading, documentary requirements [14]. Responsibilities such as shipping, handling, and insurance depend on the chosen trade term, which together influence the overall efficiency and economics of trade operations. As these standardized trade terms evolve in response to the demands of modern trade practices, their effects reverberate throughout the logistics framework, requiring constant adaptation to ensure uninterrupted and mutually beneficial trade exchange [63].

Thus, it is evident that Incoterms® as a set of rules are decisive for international contracts of sale of goods. This is because they allow to establish the responsibilities for the parties (seller and buyer) in different matters. First, they point out the commitments regarding where the parties must leave the cargo within the international logistic chain. This mean, the exactly costs of the exporter and importers when the cargo has to be moved in any transport mode (sea, land and air) since complete nationalization of cargo in the country of destination. Secondly, they define the type of procedures to be completed because depending on the selected rule each party must complete some specific formalities (legal documents) for achieve the shipment or receipt of cargo before customs. Finally, Incoterms® determine the risks of involved parts if any fortuitous event appears during the cargo transportation. Then, if this incident occurs and result in partial or total loss of the goods these rules will clarify the responsibilities in this regard. Likewise, Incoterms® settle, depending on where everything happens, who must claim to insurance company the payment of cargo value for goods transported in case of damage [48, 51].

Similarly, it can be said that Incoterms play a key role in facilitating transactions within international trade. All this, because they maintain uniformity in all commercial operations related to export and import of goods. Also, these rules, which are usually updated every decade by the ICC, adapt to the practices of internationalized companies, the business culture, and the environment. This means that from one version to another new rules may emerge that improve in principle the content or understanding of the previous versions. However, this does not imply, that previous rules or versions of Incoterms become obsolete. The explanation lies in the fact that the parties can draft their contracts for the international sale of goods because of any rule of an even earlier version of Incoterms because these rules do not expire as they are retroactive. In short, Incoterms are essential because they can avoid communication er-

rors, both importers and exporters refer to them to plan operations and above all to know how to act in case of problems. This apart from the fact that Incoterms, and any of their versions, are accepted worldwide and provide predictability and transparency in international business [54, 65].

Therefore, according to Ramberg [49] it is possible to highlight Incoterms® are suitable for international business focused on contracts for the sale of goods. All this because within the private international law they provide specific rules in relation to the buyer and seller's responsibilities when dealing with loss, damages, and the costs of transport. However, they are only commercial in nature, and are widely adopted during international commercial transactions, so they do not constitute any form of legislation. Hence, each country oversees establishing and complying with its legal system, a whole series of norms or prohibitions. Then, the Incoterms are not a law, they are international rules, so they are not mandatory, unless the buyer and seller agree in their sales contract. Thereby, with these rules there is freedom of agreement between the parties, although with the limit of not doing what is prohibited by law of the countries involved.

Considering all the previous ideas and findings about the relevance of Incoterms®, it is clear that these terms play a crucial role not only from a logistical perspective in defining the responsibilities and costs for buyers and sellers, but also from a legal perspective in determining the point at which risk transfers between parties and the obligations each party must fulfill. The current study goes further by analyzing the role of publications in this regard. In fact, descriptive reviews, systematic reviews, and meta-analyses of Incoterms® are becoming increasingly common. Systematic reviews provide the state of the art in topic research by addressing specific research questions based on the synthesis of primary research evidence [66], while a meta-analysis is a quantitatively based systematic review that combines the results of many empirical studies to assess the effectiveness of different mechanisms using appropriate statistical methods [21]. Nevertheless, existing reviews in the field of Incoterms® tend to focus on one aspect of the status quo [19] and rarely provide a macro picture of the current development processes and trends in Incoterms® research, as they draw on a limited body of knowledge [36, 63]. In this sense, bibliometrics can help researchers better understand many publications by providing visualizations that help researchers identify areas where significant results have been achieved and determine future research directions based on this information [17, 25, 38]. This paper can help fill the gap in the field of international trade terms related to logistics and legal topics.

Despite the growing interest in the study of Incoterms®, there remains a dearth of analysis on the connec-

tions between the composition, development, and collaboration of the body of existing knowledge and the identification of potential research directions. To address this gap, this paper uses a bibliometric analysis of international terms of trade to comprehensively examine the current state of research on the application of Incoterms® to logistics and trade. The results of this study will provide valuable insights for internationalists scholars, researchers, policymakers, and higher education institutions to identify research hotspots and emerging trends in Incoterms® and inform their future research efforts.

Specifically, this study aims to address the following research questions:

RQ1: How have Incoterms® evolved over the past decades (1973-2023), and what trends in publication quantities, national involvements, and organizational contributions can be discerned within the broader context of logistics and legal research?

RQ2: Within the nexus of Incoterms®, logistics, and law, which disciplines, thematic clusters, and research foci have emerged as dominant forces in scholarly literature, and how have these interrelated fields collectively shaped trade practices and legal frameworks?

RQ3: Looking forward, what are the potential areas of synergy and future directions for research that bridges the gaps between Incoterms®, logistics, and legal considerations, paving the way for enhanced trade efficiency, risk mitigation, and legal compliance in international commerce?

2 Contextualizing previous work

The ICC has periodically updated the Incoterms® since their initial publication in 1936, with major revisions in 2000, 2010, and 2020 [9, 28, 44]. Campuzano [9] provides an overview of the 2000 revision, which made some terminological alignments with the United Nations Convention on Contracts for the International Sale of Goods (CISG). Özgür [44] analyzes the 2010 revision, showing structural changes such as the bifurcation of the rules by mode of transport, the reduction of the number of terms from 13 to 11, the extension of the applicability to domestic transactions, and greater specificity regarding minimum insurance requirements. Meanwhile, Human [28] discusses the 2020 revision which continues the trends of expanded electronic documentation and insurance requirements while further condensing the rules. According to Etibar [20], the ICC aimed to reflect evolving logistical realities and commercial practices across versions. Recently, Davis and Vogt [14] argue that there are opportunities to significantly streamline and strengthen the construct clarity of Incoterms by 2030 by reducing ambiguity, improving parsimony and completeness in plausible trade scenarios.

2.1 Incoterms® and their effect on logistics processes

The rise of globalization and offshore sourcing has significantly increased the complexity of managing international logistics networks. Firms now face logistical challenges related to designing and operating efficient transportation and distribution systems over global distances. As Creazza et al. [13] note, longer distances mean higher transportation costs and a more complicated balance between inventory and distribution costs. Firms face critical decisions about shipment consolidation strategies, transportation modes, network configuration (direct shipping vs. tiered systems), and optimal locations for consolidation hubs and warehouses. In addition to this complexity, the availability and reliability of data to measure logistics costs at the macro level across countries is challenging [50]. Apart from that, legal and regulatory issues, especially for the transportation of hazardous materials, can be significant stumbling blocks. Failure to comply with regulations can result in hefty fines, and improper handling of shipping documents, insurance, and Incoterms can lead to major complications [26]. Nechaev and Schupletsov [43] further show up the lack of optimized logistics strategies for export-oriented firms and propose financial instrument methods to balance contract costs and time factors. What is more, Van der Hoop [60] highlights the influence of delivery terms, such as Incoterms, on the information flow and documentation requirements between parties, while cautioning that commonly used Incoterms can sometimes impede seamless door-to-door transportation.

Logistics processes within modern global supply chains are inherently interdependent. Song [53] points out that the underutilization of appropriate multimodal Incoterms such as CPT, CIP, and FCA compared to traditional terms indicates a lack of understanding of evolving transportation practices. Incoterm selection directly impacts key logistics decisions such as routing, shipment consolidation strategy, hub locations, safety stock levels, and ultimately network configuration and overall costs [13]. This interdependence is further accentuated by the constant evolution of both transportation and logistics, which necessitates regular Incoterms revisions. For example, the emergence of intermodal transportation has led ICC to introduce multimodal terms such as FCA, CPT, and CIP in order to adapt [19]. Conversely, the misapplication of Incoterms can disrupt logistics operations, as illustrated by Stapleton et al. [55] in their study of how the use of FOB for containerized shipping burdens sellers with unnecessary inland transit risks and complicates execution. As Kumar [35] shows, the choice of Incoterm directly affects up-front transportation costs, routing flexibility, and inland transportation consistency in retail supply chains, with significant implications for logistics performance.

2.2 Incoterms® as facilitators of international trade

The use of Incoterms in international trade is crucial for defining the responsibilities, costs, and risks borne by buyers and sellers. However, various challenges arise when applying these rules, such as the correct use of Incoterms, which requires not only knowledge of the rules, but also their proper insertion into international sales contracts [15, 18]. In addition, domestic legal systems, especially Islamic law, can have a significant impact on bilateral trade levels, with Islamic law countries having the lowest trade levels compared to common law and civil law countries [47]. Furthermore, the application of Incoterms in intra-community transactions within the European Union remains relevant despite the absence of customs formalities [18]. Specific processes related to maritime transport can lead to time loss, uncertainty and additional costs, which affect the efficiency of logistics and supply chains [61]. Finally, the importance of using appropriate trade terms, such as FCA instead of FOB, for ocean containerized goods transportation is emphasized to prevent disputes and misconduct [37].

According to de Sousa [15], the correct use of Incoterms requires not only knowledge of the rules, but also their proper incorporation into international sales agreements, as omissions may reduce the expected benefits for both parties. In addition, the use of Incoterms in intra-community transactions within the European Union remains relevant, despite the absence of customs formalities [15]. In addition, Paliu-Popa [45] highlights the importance of Incoterms in defining the precise scope of parties' delivery obligations, which serves as an essential component in the development of international sales contracts. Finally, Kadlubka [33] notes that Incoterms play a crucial role in the freight forwarding services market, as they facilitate the establishment of business relationships and organize commercial processes.

2.3 The legal implications of Incoterms® usage

Although widely used in international sales contracts, Incoterms face ongoing legal challenges due to inconsistent global adoption. This inconsistency leads to enforcement difficulties due to different interpretations by different legal systems [62]. Berger [6] suggests the UNIDROIT Principles as a possible solution. Their adaptable and comparative nature has led to increasing adoption by different stakeholders, suggesting the feasibility of a non-binding transnational framework for Incoterms. Applying this flexibility and allowing for commercial tailoring, as suggested by Arias [1], could help mitigate conflicting interpretations globally and these soft law instruments bridge differences through flexible and practice-based guidance [23]. Moreover, in order to empower parties in their choice of applicable

law, Perales [46] advocates modernizing the link between Incoterms and conflict of laws rules.

Uneven global modernization and jurisdictional inconsistencies further hinder harmonization and consistent enforcement [52]. In addition to these complexities, Irvine [30] suggests that codified terms may not cover all relevant transactions, while Beattie [4] points to complications arising from interactions with banking instruments. These issues highlight the need for continuous revision of Incoterms and ongoing dialogue among stakeholders [10, 42]. Given the complex interactions between Incoterms, sales contracts, shipping, insurance, and financing mean that parties must proactively ensure alignment [58]. In this sense, achieving harmonized interpretation and application remains a critical challenge for efficient global trade.

From another perspective, courts increasingly treat private uniform laws like Incoterms as equivalent to national sales laws, allowing them to act as stabilizing 'global customs' that solidify expectations [8, 32]. This pragmatic approach helps to achieve consistency. Nonetheless, lack of awareness and misapplication remain significant obstacles to legal certainty [31]. While codifications such as Incoterms aim to standardize trade terms and facilitate transactions, their scope may be limited and, in some cases, require supplementation [12]. The interplay between Incoterms and contract sales law demonstrates their mutual reinforcement despite institutional differences. Uniform sales law prioritizes party choice, while commercial custom, such as Incoterms, reflects autonomous transnational practices. This interplay offers promising avenues for enhancing predictability and stability in international trade.

3 Methodology

3.1 Systematic Literature Review Approach

In this review, we adopt a systematic literature review (SLR) approach, which is recognized for its robustness in comprehensively assessing and synthesizing a wide range of existing literature. An SLR involves a rigorous process of identification, selection, and synthesis of relevant studies in a transparent and unbiased manner, facilitating a comprehensive understanding of the research landscape and enabling the identification of gaps and trends [59]. The structured nature of an SLR enhances its suitability for our objectives, which include exploring the complex interplay between Incoterms®, logistics and legal issues.

To ensure the methodological rigor of our review, we follow established guidelines for conducting an SLR, which include scoping, planning, identification, and synthesis phases [25, 66]. The scoping phase defines the scope and research questions and clarifies the boundaries of the review. The planning phase involves the de-

velopment of search strategies, study selection criteria, and data extraction protocols. The identification phase involves a systematic search of relevant scientific databases to identify studies that address our research questions. Finally, the synthesis phase involves the qualitative and quantitative analysis of the selected studies to provide a comprehensive overview of the relationships between Incoterms®, logistics, and legal considerations. By following these systematic procedures, we aim to provide a structured and rigorous analysis of the scholarly landscape in this multifaceted field.

This review shows the interrelationship between Incoterms, logistics and legal issues in the context of international trade. In this sense, with regard to the latter concept, it is essential to understand that Incoterms® have a direct relationship with certain „legal aspects” of the law, particularly in the field of commercial law and private international law. In other words, these rules make it possible, first of all, to clarify responsibilities (transfer of risks and associated costs). Secondly, they define the contractual framework (part of the sales contract and legal interpretation). Third, they define customs compliance (documentation procedures and legal requirements). Fourth, they enable dispute resolution (basis for dispute resolution and reduction of ambiguity). Fifth, they create compatibility with other standards and conventions (relationship with the Vienna Convention CISG and international harmonization) [11]. Therefore, and in accordance with all the above, this paper and the current research illustrate how theoretical or scientific applications can connect distant and unrelated perspectives. In addition to the foregoing, it is also possible to demonstrate how new areas of research will emerge from the harvest of a more developed industry. Incoterms, logistics, and legal drafting are discussed in detail. Furthermore, the review explores how these topics will be further stimulated in the new international context. To achieve these objectives, VOSviewer is used to perform a relational analysis of the relevant literature. Various knowledge maps are created and the latest advances and innovative points in the field are incorporated.

3.2 Search strategy and data retrieval

A comprehensive search of related research between 1973 and 2023 was conducted to produce a synthesis of the reviewed literature. The beginning of the period was chosen not only because of the formal appearance of scientific papers registered in the literature, but also as the tool Google Books Ngram Viewer, which showed that the concept of Incoterms® has shown a significant increase in appearance since the mid-1990s. An added value of the search process was that it was not limited to a specific database, but took several as a reference. In particular, it was based on an initial selection in Scopus

and Web of Science, using the search equation Incoterms AND trade OR logistics OR law. These words were also entered in Web of Science, Google Scholar, Scopus, Science Direct, Springerlink, Wiley, Ebsco, Jstor, Emerald and Taylor & Francis in order to obtain a greater number of academic works and approaches applied to the subject. Several bibliographic management tools such as Mendeley and MyEndNote were used to create a unified bibliographic record. The initial query resulted in a compilation of 290 published works.

3.3 Scoping, paper selection and evaluation

The scoping phase of this systematic literature review aims to define the research questions and clarify the boundaries of the review. Our primary focus is to explore the multifaceted interplay between Incoterms®, logistics, and legal issues in the context of international trade. We seek to understand how these three areas interact and influence each other, and how their relationships have evolved over time. The paper selection and evaluation phase involves a rigorous process of screening and assessing the identified studies to ensure their relevance and quality. The initial search resulted in a compilation of 290 published papers. To refine this pool of studies, we applied a set of inclusion and exclusion criteria. Inclusion criteria included relevance to the research questions, peer-reviewed status, and quality of publication. Exclusion criteria included nonscientific papers, duplicates, and studies that only marginally addressed the topic.

4 Results

In this section, the study presents a comprehensive analysis including descriptive statistics, mapping and examination of publications, authors, and journals in the field of Incoterms®. In addition, the analysis deals with co-occurrence examination and title and abstract fields. In order to provide a comprehensive overview of the evolution of Incoterms® research, we explore different methodologies. Specifically, we use VosViewer software, which allows for an in-depth exploration of the keyword co-occurrence analysis to identify prevalent themes and trends within the field.

4.1 Descriptive analysis

After conducting a comprehensive search and meticulous screening process, we successfully compiled a dataset comprising 290 documents, including 265 papers, 16 conference proceedings, 3 short surveys, 4 theses, and 2 book chapters. These documents were authored by 460 individuals affiliated. These publications were disseminated in 238 distinct journals and collectively include 936 keywords and 5972 terms.

Table 1 Ten most common author keywords

#	Keywords	Cluster	Occurrences	Total link strength
1	Incoterms®	1	110	131
2	International trade	5	47	80
3	International Chamber of Commerce	2	30	46
4	Logistics	4	23	42
5	Incoterms® 2010	2	34	41
6	Supply chain management	4	22	33
7	International delivery terms	2	18	32
8	Incoterms® 2020	2	18	27
9	Delivery terms	1	13	26
10	Risks	3	9	21

Source: Own work based on VosViewer

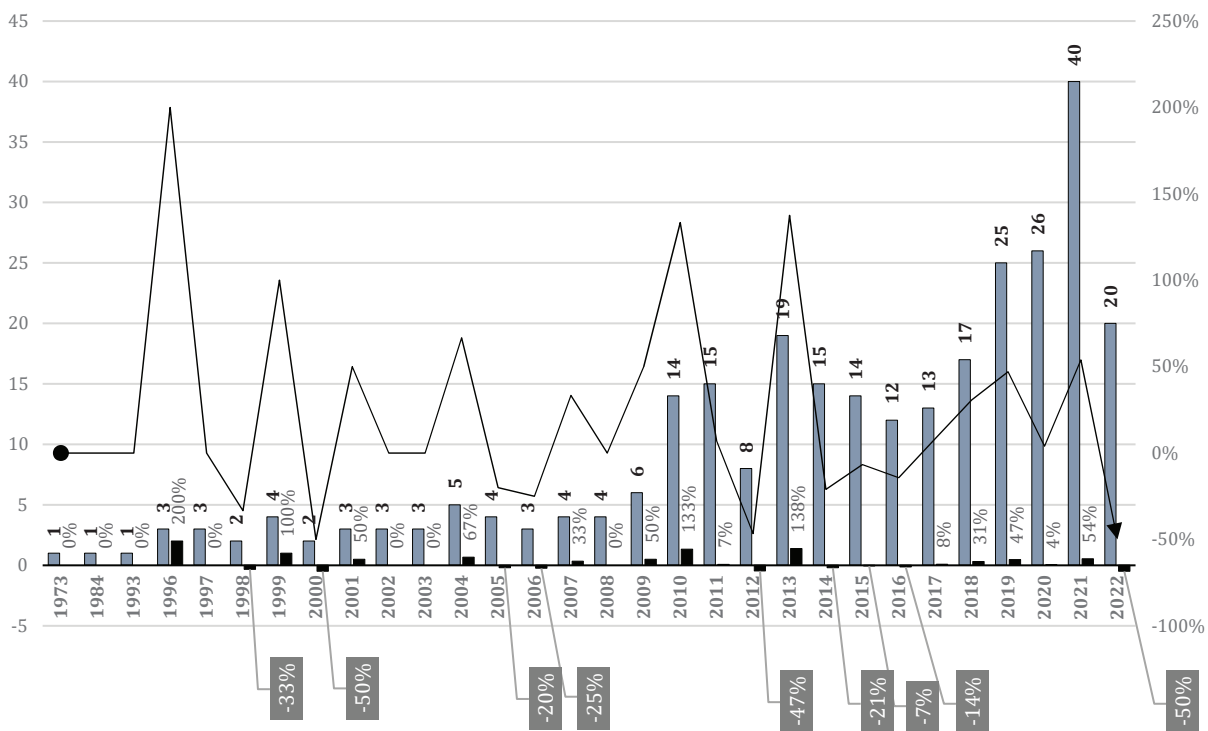


Figure 1 Distribution of publications across years.

Source: Own work

Table 1 shows the top 10 most common author keywords from the Incoterms® literature analyzed. The keywords were ranked by the number of occurrences, yielding a total of 490 co-occurrences and a total link strength of 990. Only 51 met the requirement of appearing in at least 20 articles, which corresponds to a statistical frequency of 0.85% (51/5972). This minimum occurrence requirement ensures that the selected keywords represent the most common research topics.

Figure 1 displays the chronological development of publications in the field of Incoterms research. The earliest identifiable article appeared in 1973, marking the beginning of scientific contributions in this field. Subsequently, there has been a marked upward trend in the number of publications. This growth pattern can be divided into two distinct phases. The first phase, from 1973 to 2009, was characterized by the publication of few papers per year, indicating an embryonic phase of research. The next phase, from 2010 to 2022, saw a sig-

nificant increase, with the number of papers published more than quadrupling compared to the previous phase, indicating a period of significant expansion and academic prosperity in the field.

4.2 Study of the trends observed in the previous years

From the point of view of the thematic activity based on the co-occurrence of keywords, the resulting networks and links show an increase in publications. While it is true that some relevant data bases as Scopus and Web of Science do not report papers before the 90s decade. In any case, after this current comprehensive analysis, it can be said that other academic databases such as Google Books shows that the first publication, in this case article, about incoterms was published in 1973. Then, since that decade the publications regarding Incoterms® have increased according to bibliometrics.

However, the meaningful boom with publications in this field began between 2012 and 2018 including other

different issues directly and indirectly linked with Incoterms®. For instance, the evidence suggests, see Figure 2, that main topics are usually related with law, contracts, seller and buyer, study, and research. In this manner, the performance, supply chain management, transportation costs, and regulation are increasingly recurring themes nowadays. This finding implies, in the first case, that researchers focused on the implications of non-compliance with the commitments agreed between the parties in addition to the means of payment and customs jurisdictions. In the second case, the essence of private contracts between companies involved in contracts for the international sale and purchase of goods. In the third and fourth case, the role of the parties involved (seller and buyer), some relevant terms, export performance, selection factors, supply chain management, convention on contracts for the international sale of goods (CISG), among other topics. In the fifth case, some case studies, efficiency in use, export and import flows, new incoterms rules. Lastly in the sixth case, some trends about this topic including new systematic theoretical work carried out to increase the body of knowledge in this field.

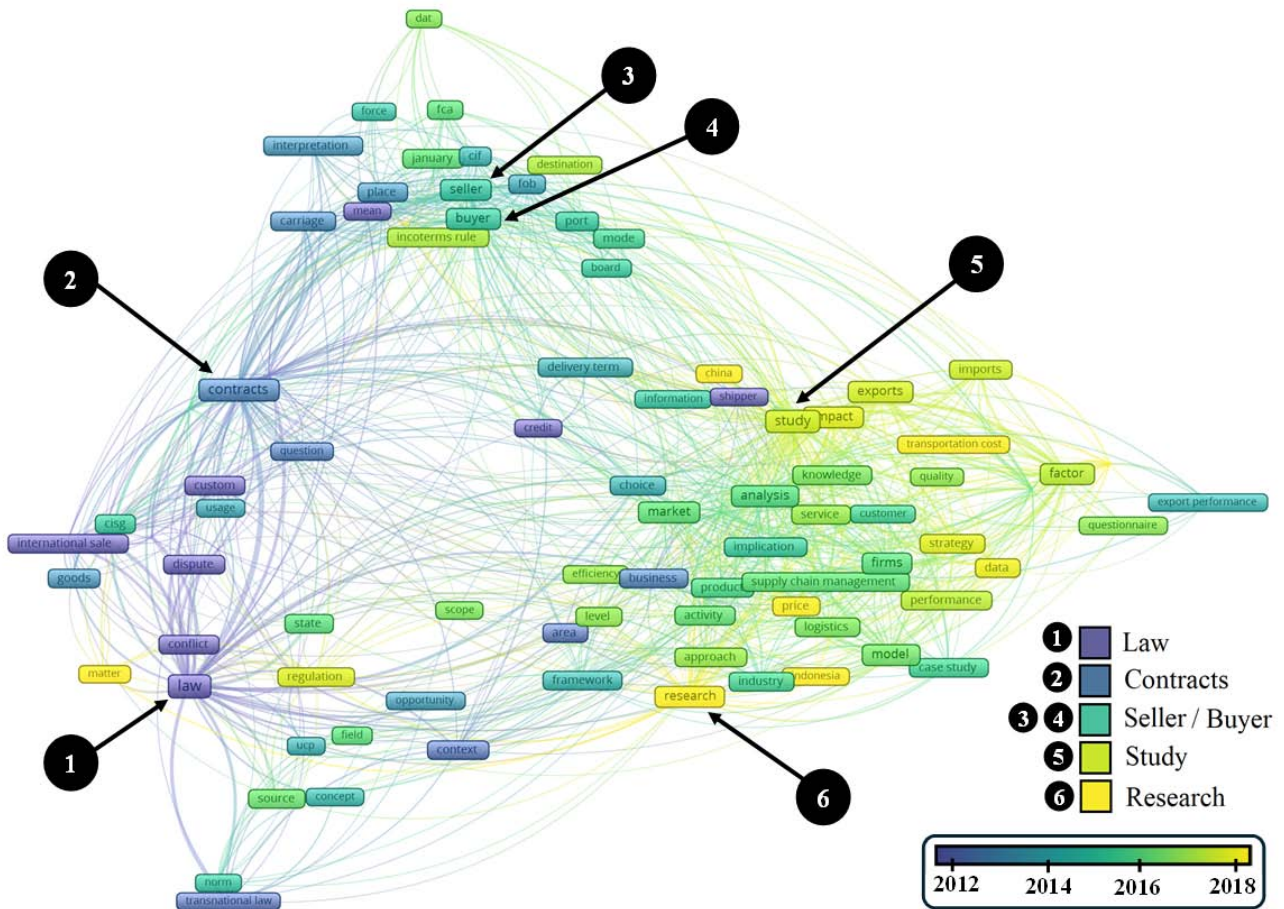


Figure 2 Keyword’s view of recent ten years in Incoterms® research.

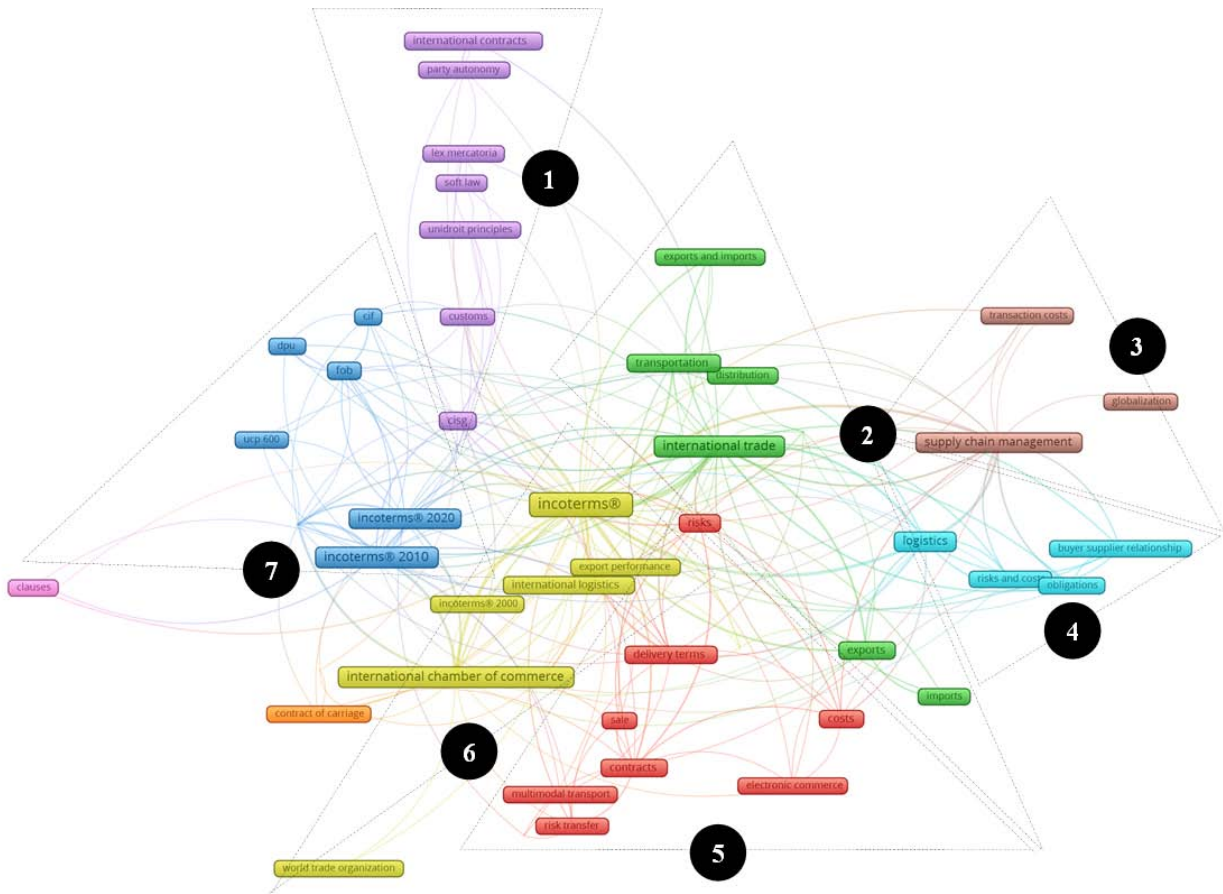


Figure 3 Keywords co-occurrence analysis.

Source: Own work based on VosViewer

4.3 Semantic connectivity analysis

4.3.1 Co-occurrence analysis

Through a comprehensive analysis of keyword co-occurrence, we delineated a network comprising six distinct clusters covering the interrelationship between Incoterms®, logistics and legal issues (Figure 3). The first cluster, ‘International trade dynamics and transaction costs’ focuses on the complexities of international trade, concentrating on the multifaceted dynamics and transactional challenges involved. The second cluster, ‘globalization and supply chain’ deals with issues related to logistics, supply chain management and risks and costs. ‘Legal framework and contractual elements’, the third cluster, explores tailored approaches for customs, delivery terms, international contracts, *lex mercatoria* and *unidroit* principles. The fourth cluster, ‘contractual costs and risk management’ delves into the necessity of electronic commerce, multimodal transport, and risk transfer. In the fifth cluster, ‘incoterms and international delivery terms’ research is focused on the temporary changes of international delivery terms (2010 vs. 2020), contract of carriage,

the different delivery terms, and the role of ICC. Finally, the sixth cluster, ‘international business and risk mitigation’ scrutinizes the defining features and economic dynamics of exports, international logistics and risk management.

Thus, in addition to the expected keywords directly related to Incoterms® and trade, “supply chain”, “risks”, and “contracts” seem to be other common topics discussed in this field of knowledge. This suggests that analysis of the impact of Incoterms® use on supply chain dynamics, risk management, and contractual issues are also common research topics in the literature based on this dataset. Some secondary common keywords include delivery terms, trade terms, transportation, CISG, costs, documents, and shipping, again highlighting a focus on both the logistics and documentation/legal aspects associated with the use of Incoterms®.

4.3.2 Abstract content analysis

To complete the previous analysis, the abstracts were analyzed in addition to the co-occurrence of keywords. Three clusters emerged from the thematic content (Figure 4), based on the grouping of the keywords

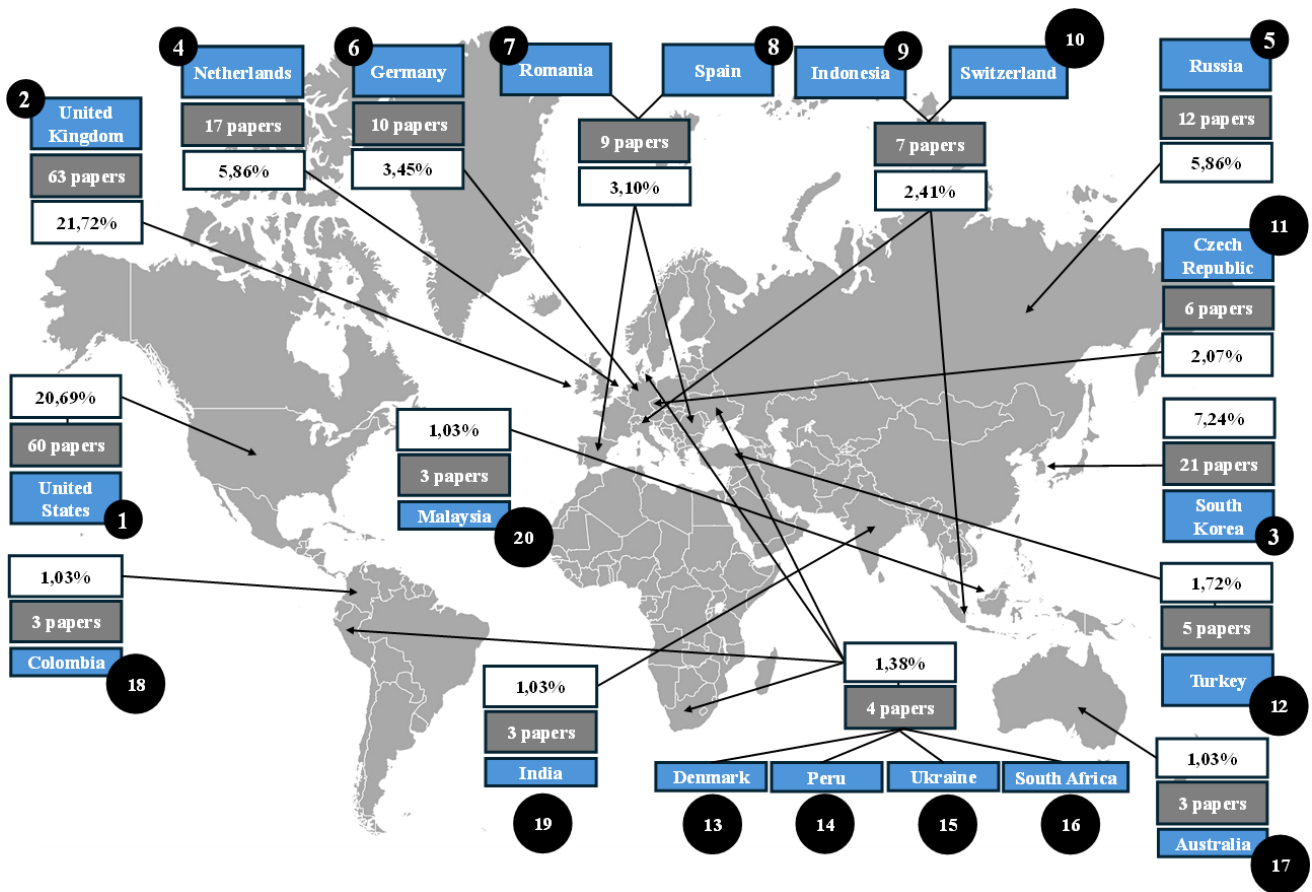


Figure 5 Origin of the production of documents on incoterms according to compiled dataset.

Source: Own work

5 Discussion

Overall, the various thematic clusters show how contemporary Incoterms® research and knowledge building span a spectrum that includes policy, operations, and evaluation, with interdisciplinary connections between legal structures, shipping workflows, and business implementation that require synchronized consideration to maximize real-world impact. As international trade matures and Incoterms standardization seeks to better represent realities on the ground, mapping academic discourse across disciplinary boundaries can reveal unexplored intersections for theory building while informing practice-oriented improvements.

Additionally, the bibliometric analysis conducted provides valuable information on the evolution of research on Incoterms and its connections to logistical, trade and legal aspects. Now, when comparing the previous findings of the referents in front of this topic, it is possible to identify that the growing interest in research since the 2000s that emerges from the results is consistent with previous reviews, which show an increase in the attention paid to the implications of Incoterms®

[36, 63]. The thematic grouping around logistics, risk, and contracts reflects current areas of interest identified in the literature. Likewise, the results obtained reflect what was previously stated by Campuzano [9] and Özgür [44], advising that periodic updates of ICC Incoterms reflect evolving commercial realities and aim to improve their applicability. The results reflect the view of Davis and Vogt [14] that revising and updating Incoterms could improve clarity and ease of use.

Regarding logistics, the findings reflect arguments by Creazza et al. [13] and Rantasila and Ojala [50] that globalized sourcing complicates transportation, inventory, and network optimization. As Van der Hoop [60] cautions, Incoterms® can enable or impede seamless door-to-door logistics depending on fit. Fransoo and Lee [22] argue ocean shipping is critical for supply chains, so misapplying terms like FOB burdens sellers.

The results of this study are consistent with the existing literature on international trade. The findings confirm the crucial role of Incoterms® in defining the responsibilities, costs and risks borne by buyers and sellers in international trade, as highlighted by de Sousa

[15] and del Rosal [16]. Furthermore, the study confirms the challenges that arise in the application of Incoterms®, such as the need for proper knowledge and incorporation into international sales contracts, as pointed out by de Sousa [15] and Dugan & Talmaciu [18].

Regarding legal aspects, the results corroborate Schwenzer and Hachem [52] emphasis on discrepancies in the adoption and interpretation of Incoterms between countries. As Gabriel [23] points out, private international frameworks such as Incoterms® allow for flexible harmonization, which is consistent with results pointing to research on modernization and adaptation of trade terms. The results confirm the ongoing exploration of the legal implications of Incoterms® and efforts to improve uniformity.

Beyond these, the results demonstrate the interdisciplinary nature of Incoterms® studies, spanning operations, law and business strategy. As Durdağ and Delipinar [19] point out, Incoterms® bridge the gap between logistics and regulation. In this regard, authors such as Creazza et al. [13] and Song [53] argue that the selection of trade terms significantly determines logistics and transportation planning, an aspect that corroborates the results of the abstract analysis by highlighting the connections between contractual, supply chain and implementation perspectives.

Finally, the results of this study reveal several important trends, key issues and potential future directions in the interrelationship between logistics, trade and law in the context of Incoterms®. One of the most significant trends identified is the growing recognition of the critical role that Incoterms® play in facilitating global trade and supply chain management. As international trade continues to expand and become more complex, the need for a standardized set of rules and guidelines governing the delivery of goods has become increasingly apparent [5, 40]. Another notable trend is the increasing awareness of the legal implications of the selection and use of Incoterms®. The choice of Incoterms® has a significant impact on the allocation of risks, costs and responsibilities between buyers and sellers [12, 55]. Failure to fully understand and comply with the legal obligations can lead to disputes, delays, and financial losses. The findings also highlight several key issues that need to be addressed to optimize the use of Incoterms® in international trade. One of the most critical issues is the need for a clear understanding of the responsibilities and obligations of buyers and sellers under each Incoterms® [45, 47]. Misinterpretation or misapplication of Incoterms® can lead to confusion, disputes, and inefficiencies in the supply chain. Looking ahead, the findings suggest several potential directions for research and practice in this interdisciplinary field. One promising avenue is the impact of Incoterms® on the efficiency and effectiveness of global supply chains. While there is a growing body of literature on the legal

and operational aspects of Incoterms®, more empirical research is needed on how they affect key performance indicators such as cost, speed, reliability, and flexibility

6 Conclusive remarks

The field of knowledge of Incoterms® and its interrelationship with logistics and legal issues has been explored through various papers over the years. Nevertheless, the comprehension of recent research in this area remains fragmented. This study examines the evolution of Incoterms® studies from 1973 to 2022 using bibliometric analysis. Through an examination of 290 papers sourced from diverse academic databases, significant publications, authors, journals, and thematic tendencies were identified and thoroughly analyzed within the context of the Incoterms® research domain. The study not only presents a comprehensive overview of existing literature but also predicts potential future trends and emerging topics within this field. Thus, this research contributes valuable insights, consolidating the existing body of knowledge in this field of study.

Similarly, the visualization of keyword co-occurrences and analysis of abstract content reveals the interconnected themes of legal/contractual aspects, logistics/transportation factors, and performance/implementation impacts that collectively shape trade practices. Thus, this paper discusses how the evolution of Incoterms influences global supply chain design, risk allocation between parties, compliance issues, misunderstanding and disputes, as well as financial implications – pointing to potential areas for further research bridging gaps between Incoterms, logistics, and legal considerations. Thus, this paper establishes a solid foundation serving as a reference point for subsequent bibliometric analyses, systematic reviews, and cross-pollination of ideas to advance Incoterms research across disciplinary divides.

On the other hand, the study contributes to consolidating the fragmented literature and provides valuable insights to inform future research directions. It maps the academic discourse across disciplines to reveal unexplored intersections for theory building while informing practice-oriented improvements in international trade facilitated by Incoterms®.

In terms of limitations, although comprehensive, the search was primarily limited to major academic databases such as Scopus and Web of Science, so some publications in other sources may have been unintentionally omitted. In addition, the analysis was based on keywords and abstracts, providing a robust high-level thematic overview. However, it may have missed deeper nuances that might emerge from an exhaustive full-text analysis.

According to the conclusions mentioned above, it can be confirmed that the article satisfactorily fulfils the objective proposed for this research. In essence, this pa-

per makes significant contributions by systematically reviewing and mapping the landscape of Incoterms research, revealing its multidisciplinary scope and interconnected nature. By synthesizing insights across diverse publications, it consolidates the existing literature, while simultaneously paving the way for future studies by academics, industry professionals, and policymakers to advance this evolving field.

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