

AI-Based Import–Export Business and Global Marketing: A Comprehensive Review of AI Techniques, Marketing Frameworks, Empirical Evidence, and Adoption Challenges

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Abstract — Cross-border trade remains costly and uneven. Exporters, especially small firms in developing regions, face language barriers, limited market knowledge, complex customs and compliance procedures, fragmented logistics and unequal access to digital tools. Artificial intelligence (AI) is widely proposed as a way to lower these costs and to improve global marketing through translation, demand forecasting, segmentation, personalisation and process automation. This paper presents a focused narrative review that synthesises five sources: a causal field study of machine translation on an online trade platform, a strategic framework for AI in marketing, a bibliometric review of 1,580 AI-in-marketing papers, a systematic review of 64 studies of AI in supply chain management, and the World Trade Organization’s World Trade Report 2025. The review examines three connected themes: AI techniques and marketing frameworks relevant to trade, the strength of the empirical evidence, and the conditions that matter for deployment by small exporters. The only causal study reports that a machine translation upgrade raised exports on eBay by 10.9%, which its authors describe as equivalent to reducing the distance between trading countries by 26.1%. The WTO projects that AI could raise cross-border trade in goods and services by nearly 40% by 2040, but only with enabling policies, and warns that unequal access could widen divides. However, the technical literature is dominated by model-building, few studies test usability or generalisability, and most are not specific to an industry or country. The review contributes a comparative table, a conceptual architecture for an AI-enabled export platform, and a prioritised agenda of research gaps.

Keywords— Artificial intelligence, international trade, import–export, global marketing, machine translation, supply chain, trade costs, digital divide.

I. INTRODUCTION

Import–export business moves goods and services across borders, and so involves tasks that domestic trade does not: finding foreign buyers and suppliers, communicating across languages, meeting customs and regulatory requirements, arranging logistics, and managing payment and risk. Language has long been recognised as a barrier to international trade [1], and the WTO notes that access to AI is highly unequal, which limits the ability of many economies to take part in AI-driven trade [5]. Any AI tool proposed for exporters therefore has to be affordable, easy to use and useful for small firms with little staff time and little data.

AI is defined in one of the reviewed studies as the capability of machines to communicate with and imitate humans [4]. In marketing it can be understood as computational machinery that emulates the human capabilities of doing mechanical tasks, thinking and feeling [2]. AI is regarded as a technology with immense marketing transformation potential [3]. At the same

time, the literature has grown large, with 1,580 papers on AI in marketing between 1982 and 2020 [3], while a systematic review of AI in supply chain management found that most studies propose models or systems and few test them in practice [4].

This paper reviews five sources that together span a causal field study [1], a strategic marketing framework [2], a bibliometric review [3], a systematic review [4] and an institutional trade report [5].

Three questions guide the review. RQ1: Which AI techniques and marketing frameworks underpin AI-based trade and global marketing? RQ2: How strong is the evidence that AI lowers trade costs and improves marketing outcomes? RQ3: What does the evidence imply for AI-enabled platforms used by small and emerging-economy exporters? The paper ends with a comparative table, a conceptual architecture and a list of research gaps.

II. REVIEW METHODOLOGY

This is a narrative review of a purposively chosen set of five sources, not a systematic database search, so no claim of exhaustive coverage is made. The sources are one article in *Management Science* [1], one in the *Journal of the Academy of Marketing Science* [2], one in the *International Journal of Information Management Data Insights* [3], one in the *Journal of Business Research* [4] and one flagship report of the World Trade Organization [5]. The first four are peer-reviewed journal articles; [5] is an institutional report whose projections are model-based. For each source the aim, design, scope, main findings and stated limitations were extracted and compared. The full text of [4] was read. For [1], [2], [3] and [5] the review relies on the published abstracts and on official, institutional or university summaries, so their detailed methods were not independently re-read. All figures quoted are those reported by the original authors or institutions. Studies that these sources cite are described only as the citing source describes them. Because only one of the five measures a causal effect of AI on trade outcomes [1], conclusions about small exporters in emerging economies are inferences and are labelled as such. Five further works [6]–[10] are cited only for background and context; they are not among the five reviewed sources and are not included in Table 1.

III. THEORETICAL FOUNDATIONS

1. AI, trade costs and information

Trade economics treats language, distance and information gaps as trade costs. Studies that estimate gravity models of trade typically use a language dummy to capture such effects, whereas Brynjolfsson et al. exploit an exogenous improvement in translation quality to measure the effect directly [1]. Melitz and Toubal find that the combined impact of linguistic factors is at least twice as great as the usual common-language dummy implies, and that translation and interpreters contribute to ease of communication [6]. If AI lowers the cost of searching for and understanding foreign offers, trade should rise [1]. The WTO makes the broader claim that AI lowers trade costs through several channels, including better supply-chain visibility, automated customs clearance, reduced language barriers, stronger market intelligence, improved contract enforcement and help for micro, small and medium-sized enterprises (MSMEs) in navigating complex regulations [5]. Goldfarb and Trefler add that the trade effects of AI depend on scale, knowledge diffusion and behind-the-border regulation such as privacy and data localisation, and that much remains to be learned [7].

2. Marketing theory

Huang and Rust propose a three-stage planning cycle of marketing research, marketing strategy (segmentation, targeting and positioning) and marketing action [2]. At each stage three kinds of AI can be used. Mechanical AI automates repetitive tasks, thinking AI processes data to reach decisions, and feeling AI analyses interactions and emotions [2]. At the action stage, mechanical AI supports standardisation, thinking AI personalisation and feeling AI relationalisation [2]. Global marketing has long faced a tension between standardising an offer across countries and adapting it locally. Mapping standardisation to mechanical AI and adaptation to thinking AI is the authors' inference; [2] does not test it for cross-border trade. Davenport et al. offer a complementary framework built on levels of intelligence, task types and whether AI is embedded in a robot, and suggest that AI is most effective when it augments rather than replaces human managers [8].

3. Frameworks and classifications

The reviewed sources use different lenses. The review in [4] adopts a supply chain definition that includes marketing, logistics, production and supply chain as four fields. The review in [3] uses bibliometric, conceptual and intellectual-network analysis, with Louvain clustering to identify sub-themes. The WTO report introduces an AI Trade Policy Openness Index covering tariffs on AI-enabling goods, restrictions on services trade and limits on cross-border data flows [5]. Economic, managerial, bibliometric, operational and policy lenses are all present, but none of the five offers a single integrated framework for AI in import–export business; this is an observation of this review.

IV. AI TECHNIQUES AND APPLICATIONS

1. Common techniques

The systematic review of 64 articles published from 2008 to 2018 found artificial neural networks (ANNs) to be the most prevalent technique (18 uses), followed by fuzzy logic and models (12), agent-based and multi-agent systems (9) and genetic algorithms (7); within marketing, ANNs and genetic algorithms appeared four times each [4].

Natural language processing, including machine translation and chatbots, was identified as promising but underused [4]. The translation system studied in [1] is itself a machine-learning program that statistically learns to translate. More broadly, machine learning has been the main paradigm of AI research since the 1990s and is increasingly applied in marketing research [9].

2. Applications in marketing and operations

For marketing, [4] lists sales forecasting, pricing, market and customer segmentation, consumer behaviour prediction, direct marketing and marketing decision support. The framework in [2] places AI across marketing research (data collection, market analysis, customer understanding), strategy (segment recognition, recommendation and resonance) and action. For operations, [4] reports demand forecasting as the most frequently studied supply chain subfield, alongside supplier selection, risk management, container terminal operations and container loading; one study combined RFID with multi-agent systems to control global value chains. The WTO report adds customs automation, supply-chain visibility and contract enforcement as areas where AI tools are already improving trade efficiency [5].

3. Cautions

Several cautions recur. Most outcomes in [4] are models, systems, frameworks and approaches, and few studies test their usability, application or generalisability. Of the 64 articles, 76.5% do not target a specific industry [4]. Within marketing, price, sales and segmentation received most attention, and promotion, product and place less [4]. The WTO stresses that the gains from AI are far from guaranteed: access is unequal, bound tariffs on AI-enabling goods reach up to 45% in some low-income economies, and AI may shift comparative advantage in ways that reinforce inequality [5]. Broader multidisciplinary assessments likewise stress that AI brings challenges as well as opportunities and call for a research agenda that spans business, government and policy [10]. Finally, the sources predate widespread generative AI, so its effect on export marketing is not evaluated here (an observation of this review).

V. EVIDENCE OF EFFECTIVENESS

1. Causal evidence

The strongest evidence is a natural experiment on eBay, which handled more than \$14 billion of trade across more than 200 countries in 2014 [1]. After eBay introduced a new machine translation system for listing titles, exports increased by 10.9% in the published article [1].

An earlier working-paper version reported 17.5%, a reminder that estimates depend on specification. The authors describe the effect as equivalent to reducing the distance between countries by 26.1% [1], and they report that a moderate improvement in translation quality (about 10% by some measures) was enough to produce it.

2. Projected evidence

The WTO projects that, with the right enabling policies, AI could raise cross-border flows of goods and services by nearly 40% by 2040 and global GDP by 12–13% across scenarios [5]. Summaries of the report quote slightly different upper figures, such as up to 37%, so the full report should be consulted before any figure is reused. These are model-based projections that depend on bridging digital gaps, investing in skills and keeping trade open, not observed outcomes [5].

3. Quality of the technical literature

The bibliometric review of 1,580 papers shows how large the field has become and identifies its authors, sources and sub-themes [3], but a map of a literature describes its structure rather than whether interventions work. The systematic review of 64 studies is more informative about content, yet its authors conclude that few studies test their proposals with real-world data and call for empirical comparison of studies on the same topic [4]. Together they suggest that research effort has been spent mainly on building AI models rather than on measuring their effect on trade or marketing outcomes.

4. Coverage of topics

Of the 64 articles in [4], 14 concern marketing, 6 logistics, 23 production and 21 supply chain, and the search covered 2008–2018. Production dominates, and the categorisation lists only one study under global value chains. Cross-border import–export topics are therefore thinly represented, and only [1] directly measures a trade outcome. The consequence for small exporters outside online platforms is that very little direct evidence exists.

VI. AI-ENABLED CROSS-BORDER TRADE ON A DIGITAL PLATFORM

The only study among the five that measures trade outcomes is the analysis of eBay's machine translation system [1].

1. Design and findings

eBay introduced its machine-translation system, a proprietary machine-learning program, in 2014 to translate product listing titles [1]. Researchers compared U.S. exports to countries where the improved system was available with exports to countries where it was not, before and after the change [1]. To reduce the risk that other factors, such as more marketing, explained the result, they also compared the effect on longer and shorter product titles. Exports to the affected countries rose by 10.9% [1].

2. Mechanism

The authors report that effects varied across product, listing and buyer characteristics, including differentiated and cheaper products, longer titles and less-experienced buyers, in a pattern consistent with a substantial reduction in translation-related search costs [1]. They conclude that language barriers significantly hinder trade and that AI has already begun to improve economic efficiency in at least one domain [1].

3. Limits and transferability

The evidence comes from one platform, one proprietary system and listing titles only, and the outcome is exports rather than profit or buyer satisfaction. The authors themselves note that evidence of the economic effects of AI is otherwise limited [1]. Whether the result transfers to negotiation, customs documentation, regulated goods or exporters outside online marketplaces is untested. Even so, the finding fits the wider literature: the systematic review identifies NLP as underused [4], and the WTO lists reduced language barriers as one channel through which AI lowers trade costs [5].

VII. COMPARATIVE ANALYSIS

Table 1 summarises the five reviewed sources. Findings are not directly comparable because designs, scopes and outcome measures differ.

Table 1. Comparison of the five reviewed sources

Study	Objective and design / sample	Main findings and limitations
Brynjolfsson et al. (2019) [1]	<i>Aim:</i> effect of AI machine translation on international trade <i>Design:</i> natural experiment, difference-in-differences; eBay machine translation (2014); exports to Latin America	<i>Findings:</i> exports +10.9% (17.5% in working paper); equivalent to a 26.1% cut in distance; pattern consistent with lower search costs <i>Limits:</i> one platform, one proprietary system; listing titles only; exports are the outcome
Huang & Rust (2021) [2]	<i>Aim:</i> strategic framework for AI in marketing <i>Design:</i> conceptual; research–strategy–action cycle;	<i>Findings:</i> mechanical AI for standardisation, thinking AI for personalisation, feeling AI for relationalisation

Study	Objective and design / sample	Main findings and limitations
	mechanical, thinking and feeling AI	<i>Limits:</i> conceptual, not tested; not specific to trade
Verma et al. (2021) [3]	<i>Aim:</i> review AI in marketing research <i>Design:</i> bibliometric, conceptual and intellectual-network analysis; 1,580 papers, 1982–2020; Louvain clustering	<i>Findings:</i> maps leading authors, sources and research sub-themes; proposes directions <i>Limits:</i> describes structure of literature, not effect sizes; not specific to trade
Toorajipour et al. (2021) [4]	<i>Aim:</i> contribution of AI to supply chain management <i>Design:</i> systematic review; 758 papers screened to 64; 2008–2018; 5 databases	<i>Findings:</i> ANNs (18 uses), fuzzy logic (12), agents (9), genetic algorithms (7) lead; NLP underused <i>Limits:</i> mostly models and systems; few tested; 76.5% not industry-specific; ends 2018
WTO (2025) [5]	<i>Aim:</i> examine how AI and trade interact <i>Design:</i> institutional report; model-based projections to 2040	<i>Findings:</i> trade up to nearly 40%, GDP 12–13% by 2040 with enabling policies; AI lowers trade costs; access is unequal <i>Limits:</i> projections, not observed outcomes; reviewed through summaries

VIII. PROPOSED CONCEPTUAL ARCHITECTURE

Figure 1 gathers the design implications of the reviewed sources into a layered architecture for an AI-enabled platform used by a small exporter. It is a conceptual proposal derived from the literature and has not been tested experimentally.

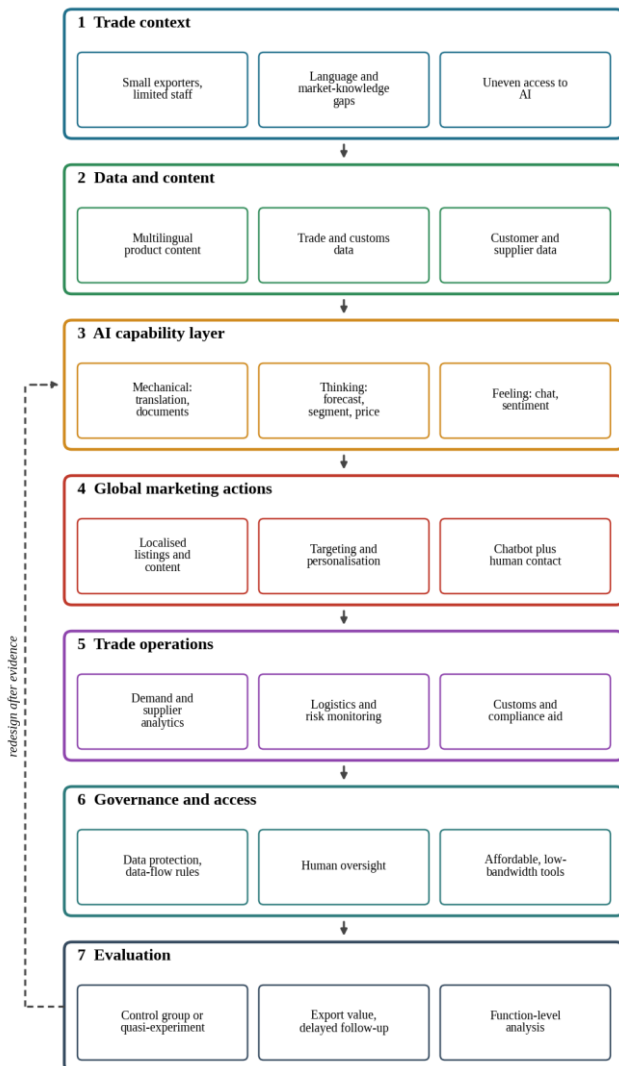


Fig. 1. Proposed conceptual architecture for an AI-enabled import-export and global marketing platform (conceptual, not experimentally validated)

Layer 1 captures the context: small exporters with limited staff, language and market-knowledge gaps, and uneven access to AI [1], [5]. Layer 2 holds multilingual product content, trade and customs data, and customer and supplier data; this matters because ANN-based models depend on large amounts of data [4]. Layer 3 organises AI tools using the mechanical, thinking and feeling view of [2]: mechanical tools for translation and document handling [1], thinking tools for forecasting, segmentation, pricing and supplier selection [4], and feeling tools for chat and sentiment analysis [2], [4].

Layer 4 turns these capabilities into global marketing actions: localised listings [1], targeting and personalisation [2], and chatbots for customer service [4], with human staff kept for relationships, in line with the view that AI is most effective when it augments human managers [8]. Layer 5 supports trade operations such as demand forecasting, supplier selection, risk monitoring and logistics planning [4], and customs and compliance assistance [5]. Layer 6, governance and access, covers data protection, rules on cross-border data flows [5], human oversight and affordable low-bandwidth tools; its content is the authors' inference from [5], and none of the reviewed studies tested it. Layer 7 closes the loop with evaluation: control groups or quasi-experiments, export-value outcomes, delayed follow-up and function-level analysis [1], [4], with results fed back into layers 3 to 5.

IX. RESEARCH GAPS AND FUTURE DIRECTIONS

Gaps supported by the reviewed evidence. (i) Very little causal evidence: one of the five sources measures a trade outcome [1]. (ii) Technical studies mostly propose models, and few test usability, application or generalisability [4]. (iii) Little industry or country specificity: 76.5% of studies in [4] are not industry-specific, and none of the five measures outcomes directly for emerging-economy exporters; [5] addresses them through projections and policy analysis. (iv) Under-researched techniques such as NLP and chatbots [4], although machine translation has a measurable effect [1]. (v) The reviewed literature ends in 2018 [4] and 2020 [3], so generative AI is not evaluated. (vi) Uneven coverage of the marketing mix, with promotion, product and place less studied than price, sales and segmentation [4]. (vii) Unequal distribution of gains, given uneven access, tariffs on AI-enabling goods and shifting comparative advantage [5].

Directions requiring investigation. Priorities include field experiments or staggered roll-outs of AI translation and localisation tools among small exporters, measuring inquiries, orders and export value; comparison of individual AI functions (translation, forecasting, personalisation, chatbots) for specific exporter types and markets, asking narrower questions than whether AI works in general; empirical tests of the mechanical, thinking and feeling mapping in cross-border business-to-business marketing [2]; studies that include generative AI; low-cost, low-bandwidth tools co-designed with exporters; and research on data governance and the distribution of gains across firms and countries [5].

X. CONCLUSION

Across the five reviewed sources, AI shows real promise for lowering trade costs and improving global marketing. The clearest causal support is a 10.9% rise in exports after a machine translation upgrade on one platform [1], and the WTO projects large gains by 2040 if enabling policies are in place [5]. The evidence is nevertheless thin. The projections are conditional, much of the technical literature builds models without testing them [4], bibliometric growth shows volume rather than effect [3], and the marketing framework remains conceptual [2]. For small exporters this points to starting with language and market-intelligence tools, using forecasting where data exist, keeping humans in customer relationships, and attending to affordability and data governance. Rigorous field trials are needed before AI-based platforms can be recommended as a proven route to export growth.

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