



Economic Efficiency of the Channel Mix in the e-Commerce of Romanian Local and 3D Printed Products

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ABSTRACT

Local and 3D-printed products face the dual challenge of embodying cultural or creative value while competing in increasingly globalized and digital marketplaces. This paper investigates the most economically advantageous channels for Romanian makers to promote such products internationally. Using official statistics from Eurostat, UNCTAD, ITC/UN Comtrade, Etsy investor relations, Shopify, Amazon Handmade, MyMiniFactory, and TikTok Shop, we benchmark the relative benefits and risks of marketplaces, proprietary stores, and social commerce. The analysis shows that a hybrid, multi-channel mix, combining discovery platforms such as Etsy or MyMiniFactory with scalable infrastructures like Amazon Handmade, proprietary Shopify stores, and social-commerce channels such as TikTok Shop offers the highest economic efficiency for Romanian makers. This combination maximizes exposure while preserving margins and brand control. The findings suggest that coordinated national and EU support for digital skills and cross-border logistics would further enhance the competitiveness of Romanian local and 3D-printed products.

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1. Introduction

Place-based and digitally fabricated products hold significant potential for internationalization. Crafts and heritage products reflect cultural identity, while 3D-printed products exemplify frontier production methods enabling small-batch customization (Cerdas et al., 2017). Yet, despite demand, Romanian producers face structural disadvantages: low domestic e-commerce penetration, fragmented export logistics, and limited brand visibility abroad.

This study aims to identify which international promotion channels offer the most economically advantageous pathways for Romanian makers, combining statistical data with marketplace analysis. To achieve the proposed objective, the paper is guided by three research questions:

1. Which global demand trends justify investment in cross-border promotion of local and 3D-printed products?
2. Which digital channels (Etsy, Amazon Handmade, Shopify, MyMiniFactory, TikTok Shop) present the best balance of margin, exposure, and scalability?
3. How can Romanian makers leverage these channels effectively despite national structural gaps?

2. Literature review

The internationalization of local products often relies on Geographical Indications (GIs), heritage branding, and diaspora-driven demand. The European Commission's quality schemes (PDO, PGI, TSG) demonstrate measurable export premiums (European Commission, 2024). UNESCO intangible heritage recognition, such as Horezu ceramics (UNESCO 2012), strengthens authenticity signals in tourism and exports (Bica & Florescu, 2017, Bogan & Roman, 2013).

In parallel, digital commerce has transformed the global landscape. UNCTAD reports global B2B e-commerce sales at \$27 trillion in 2022, up ~60% since 2016, while cross-border e-commerce enables micro-producers to bypass intermediaries (UNCTAD, 2022). Eurostat data confirm that 77% of EU internet users purchased online in 2024, though Romania lags at ~60%, limiting domestic digital maturity but highlighting export-first strategies.

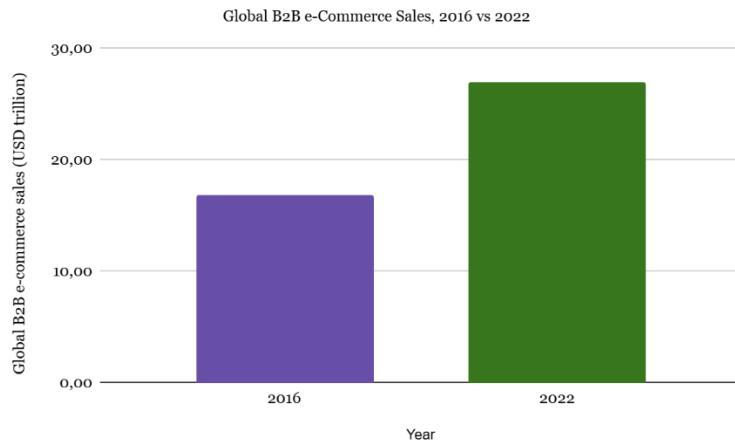


Figure 1. Global B2B e-commerce Sales, 2016 vs 2022

Source: Created by author based on UNCTAD (2024) & Digital Economy Report 2024

The chart shows that worldwide B2B e-commerce sales rose from approximately USD 16.9 trillion in 2016 to USD 27 trillion in 2022, representing a growth of about 60% in six years. This rapid expansion highlights the structural shift toward digital trade infrastructure on a global scale.

3. Data & Methods

This study integrates:

- ❖ Eurostat: online buyers (% of internet users), enterprise e-sales, adoption of 3D printing by enterprises.
- ❖ UNCTAD Digital Economy Report 2024: e-commerce macro-trends.
- ❖ Etsy IR/SEC (2020–2025): active buyers, sellers, gross merchandise sales (GMS).
- ❖ Amazon Handmade documentation: fee structures, Handmade eligibility.
- ❖ MyMiniFactory announcements (2024–2025): Premium Merchant program.
- ❖ Shopify financials & reports: global merchant growth and EMEA penetration.
- ❖ TikTok Shop press releases & analytics: GMV and monthly active users (MAU).
- ❖ National sources (Romania): online trade penetration, crafts/ceramics exports (UN Comtrade HS 69).

Indicators are benchmarked to assess: (i) buyer reach, (ii) fee impact on margins, (iii) control over branding, (iv) scalability/logistics, (v) delisting/regulatory risks.

4. Results

4.1. Global & EU demand

- ❖ EU agri-food exports reached €235.4bn in 2024, confirming global appetite for origin-linked products (European Commission, 2023).
- ❖ EU online buyers: 77% in 2024, up from 59% in 2014. Romania: ~60% of internet users, ~56% of total population.
- ❖ Romania exported US\$173.3M in ceramic products (HS 69) in 2024, small relative to total exports (~US\$100bn) but significant for niche crafts (UN Comtrade, 2024).

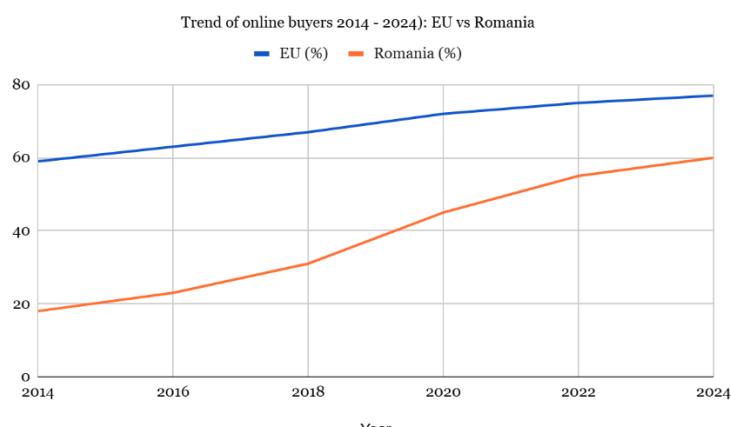


Figure 2. Trend of online buyers 2014–2024, Europe vs Romania

Source: Created by author based on Eurostat (2024). Individuals - internet use and e-commerce, share of internet users buying online, 2014–2024 (EU-27, Romania). Eurostat Database

The chart highlights the evolution of online purchasing across the European Union compared with Romania. In 2014, 59% of EU internet users reported buying online, compared to only 18% in Romania. Over the following decade, both trends rose steadily, but the gap remained significant. By 2024, the EU average reached 77%, while Romania had caught up to ~60%, still about 17 percentage points below the EU level. This trajectory illustrates two important dynamics:

1. **Convergence:** Romania has made substantial progress, more than tripling its share of online buyers since 2014.
2. **Digital gap:** despite improvements, Romanian consumers continue to lag behind the EU average, suggesting structural barriers in trust, logistics, or digital readiness.

The data confirms both the growth potential of Romania's e-commerce market and the persistent need for policies that accelerate digital adoption to close the gap with the EU-27.

4.2 Marketplace evolution

- ❖ **Etsy:** 2024 – ~95.5m active buyers, 8.1m sellers, \$12.6bn GMV. By Q1-2025, buyers declined to 88.5m, signaling saturation. New "Creativity Standards" restrict non-original 3D prints.
- ❖ **MyMiniFactory:** launched "Premium Merchant" program (2024) allowing sales of physical 3D prints; more targeted audience.
- ❖ **Amazon Handmade:** waives monthly fees for approved Handmade sellers; access to global FBA network; ~15% referral fee.
- ❖ **Shopify:** now powers >4m merchants globally, with strong traction in EMEA and advanced Markets/Checkout features for cross-border.
- ❖ **TikTok Shop:** GMV hit ~\$33bn in 2024, doubling YoY; >200m MAU in Europe. Particularly strong for visual, viral products (Harracá, 2017; Maione, n.d.; Wu & Gereffi, 2018).

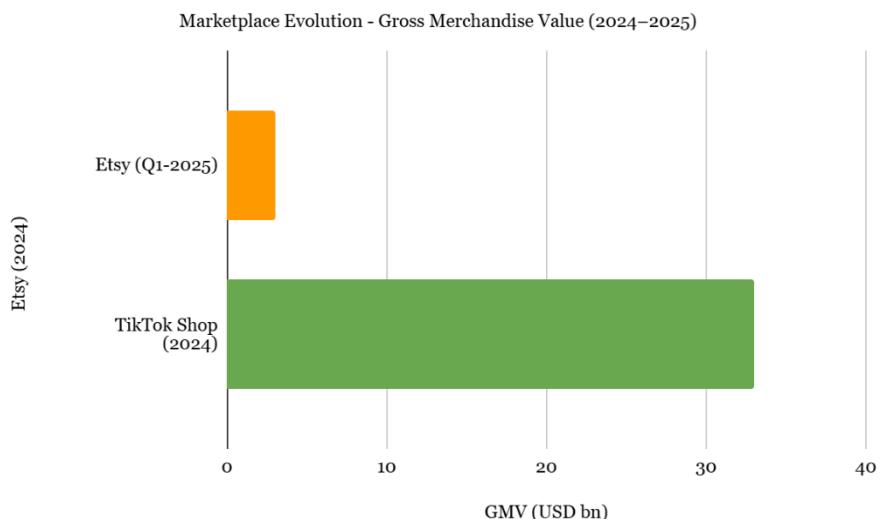


Figure 3. Marketplace Evolution – Buyers & Merchants (2024–2025)
Source: Created by author based on Etsy Investor Relations and TikTok Shop reports

Figure 3 illustrates the differences in gross merchandise value (GMV) between leading digital marketplaces in 2024–2025. Etsy reported a GMV of USD 12.6 billion in 2024, reflecting the scale of its active buyers and sellers, but showed a decline to USD 3.0 billion in Q1 2025, indicating early signs of market saturation. By contrast, TikTok Shop reached USD 33 billion GMV in 2024, more than double Etsy's annual figure, highlighting the rapid rise of social commerce and the increasing role of short-form video platforms in driving cross-border sales.

The comparison emphasizes that while Etsy remains a strong platform for niche and handmade products, TikTok Shop has emerged as a high-growth alternative with significantly higher transaction volumes. This divergence underlines the need for Romanian makers to consider channel diversification: combining stable, discovery-driven platforms such as Etsy with fast-scaling, content-driven platforms like TikTok Shop.

4.3 Romania case

Eurostat: only ~11% of Romanian enterprises sold online in 2023, vs. ~23.8% EU average.

The chart compares the proportion of enterprises engaged in online sales in Romania with the EU average. In 2023, only ~11% of Romanian enterprises reported selling online, less than half the EU-27 average of 23.8%. This stark contrast underlines the digitalization gap in Romanian business practices, especially among SMEs. (Georgescu, 2019, Ionescu & Dumitru, 2020).

Marketplace	GMV (USD bn)
Etsy (2024)	12.6
Etsy (Q1-2025)	3
TikTok Shop (2024)	33

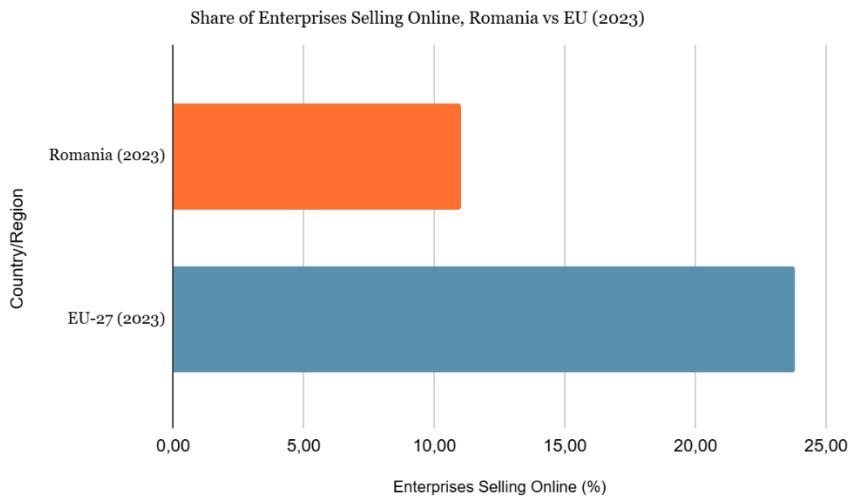


Figure 4. Share of Enterprises selling online, Romania vs EU (2023)

Source: Created by author based on Eurostat, Digital economy and society statistics - enterprises (2023)

While consumer adoption of e-commerce has grown significantly, many Romanian firms remain underrepresented in online trade channels. The gap suggests limited readiness to leverage cross-border digital opportunities and highlights the need for policy support, digital training, and infrastructure improvements to enhance competitiveness.

- ❖ Enterprises using 3D printing (Eurostat 2024): Romania below EU average, though maker-level adoption (home labs, fab-labs) is vibrant.
- ❖ Crafts + new tech synergy: Horezu ceramics (UNESCO, 2012) + 3D printed collectibles prove dual narratives of heritage + frontier production.

5. Channel Economics: Selecting the Most Advantageous Routes

Table 1. Comparative Analysis of International Sales Channels

Channel	Optimal Economy	Fees	Strengths	Risks
Etsy	Early testing, niche, custom	Listing + ~6.5% + ads	Global reach, niche search	Buyer stagnation; 3D standards restrictiveness
MyMiniFactory	MyMiniFactory	Subscription + small fees	Community-driven, 3D focusses	Narrower buyer base
Amazon Handmade	Scalable SKUs, logistics discipline	15% referral; fee waived	FBA, global reach	Strong competition; control issues
Shopify	Brand control, higher margins	Subscriptions, payment fees	Cross-border checkout, full control	Must fund traffic via SEO/ads
TikTok Shop	Viral, visual, youth-target	Commissions + ads	Explosive GMV growth, content-driven	Regulatory, volatility
Instagram/Facebook Shops	Brand-building, remarketing	Ads + fees	Social integration	Rollout/eligibility varies
Regional marketplaces (eMAG, FR/DE)	EU reach, proximity	Fees vary, but more than 15%	Faster shipping, local trust	Lower global scale

6. Strategy Framework for Makers (Playbook)

A sustainable internationalization pathway for local and 3D-printed products requires a structured, multi-channel strategy that balances discovery, scale, control, and growth. Based on comparative marketplace analysis, a complete playbook emerges:

One Discovery Marketplace

Makers should begin with a platform that maximizes visibility among early adopters and niche buyers. Etsy remains relevant for original, design-driven products, but reliance on it alone is risky due to its new creativity standards and platform saturation. For strictly 3D-printed items with unique designs, MyMiniFactory provides a more targeted and supportive ecosystem, fostering community engagement and authenticity validation. These discovery channels are not necessarily the most profitable, but they are critical for product-market-fit testing and establishing credibility.

One High-Reach Marketplace

Once a product has proven demand, expansion to a platform with scale and logistics infrastructure becomes vital. Amazon Handmade enables Romanian producers to benefit from Amazon's global reach and the Fulfilment by Amazon (FBA) network, which standardizes shipping, returns, and customer service. While referral fees (~15%) reduce margins, the trade-off is access to millions of buyers and reduced operational friction. This pillar ensures consistent sales volumes and supports international scaling.

One Proprietary Store

A Shopify-based store is essential for margin optimization and customer ownership. Unlike marketplaces, Shopify allows makers to control branding, pricing, user experience, and data. Cross-border modules such as Shopify Markets streamline payment currencies, VAT, and localized pricing. This proprietary channel provides long-term resilience by building direct relationships with customers, reducing reliance on external algorithms, and enabling remarketing through owned mailing lists and CRM systems.

One Social Commerce Channel

To accelerate growth and tap into viral dynamics, producers must integrate at least one social-first channel. TikTok Shop is currently the fastest-growing in terms of GMV, particularly effective for visual, story-driven products such as crafts and 3D-printed collectibles. Instagram Shops can complement this with remarketing capabilities and integration into established lifestyle communities. Social commerce channels have the added advantage of delivering low customer acquisition cost (CAC) when content resonates organically, though they require continuous investment in storytelling and video formats.

Operational KPIs

For sustainable scaling, makers should measure operational performance across channels. Recommended KPIs include:

- ◊ return to Ad Spend (ROAS) per channel to assess marketing efficiency.
- ◊ lead time from print to ship as a proxy for production responsiveness.
- ◊ return rate to capture product-market fit and logistics reliability.
- ◊ and review scores to signal trust and quality in competitive digital marketplaces.

These metrics allow comparison across platforms and inform decisions on where to allocate resources.

Compliance and Risk Management

Internationalization also requires compliance with platform and regulatory frameworks. Protecting intellectual property (IP) and ensuring design originality is vital to avoid delisting or disputes. Sellers must adhere to Handmade/Creativity Standards on Etsy and eligibility requirements on Amazon Handmade. Additionally, compliance with VAT and export rules (including IOSS in the EU for cross-border sales) ensures smooth customs clearance and avoids reputational damage. Collective support from Romanian trade bodies could simplify these processes through training and shared legal resources.

Together, this playbook forms a balanced strategy that reduces dependence on any single channel, maximizes exposure, safeguards brand identity, and leverages the comparative strengths of marketplaces, proprietary stores, and social commerce.

7. Policy & Program Implications

Overview:

- ◊ Romanian municipalities and chambers should co-finance GI applications and digital studio infrastructure.
- ◊ National agencies can subsidize marketplace onboarding and cross-border logistics.
- ◊ EU-level programs should track cross-border web sales as an indicator and support SME access to TikTok Shop/Amazon via collective stands.

The international success of local and 3D-printed products depends not only on the strategies of individual makers but also on the broader policy and institutional environment. Governments, municipalities, and EU programs all have a role to play in reducing barriers, building digital capabilities, and fostering competitiveness.

Local and Municipal Interventions

Romanian municipalities, county councils, and chambers of commerce can provide direct support to local producers by co-financing Geographical Indication (GI) and Protected Designation of Origin (PDO/PGI) applications. These designations are powerful trust signals in international markets, but the administrative and legal costs are often prohibitive for small producers. Municipalities can also establish shared digital studios equipped with professional photography, video, and 3D scanning tools. Such facilities would allow SMEs, artisans, and 3D-printing entrepreneurs to create high-quality digital content for marketplaces at a fraction of the cost, directly enhancing their international visibility.

National-Level Programs

At the national level, agencies such as the Ministry of Economy or trade promotion authorities should introduce subsidies and training programs for marketplace onboarding. Many SMEs lack the expertise to navigate platform requirements, VAT compliance, and international shipping rules. By offering subsidized packages that combine training, legal advisory, and logistics integration, Romania can accelerate the number of export-ready SMEs. National programs should also include support for cross-border logistics hubs—negotiating with carriers for preferential shipping rates, simplifying customs clearance for small parcels, and integrating Romania more effectively into EU distribution networks.

EU-Level Support and Policy Coordination

At the European level, the tracking of cross-border web sales should become a formal performance indicator within the Digital Single Market strategy. This would allow policymakers to measure not only domestic e-commerce but also the international reach of SMEs across member states. In addition, the EU can provide funding for collective participation in high-impact digital commerce channels, such as TikTok Shop or Amazon Handmade. This could take the form of EU-branded pavilions or collective stands, mirror traditional trade fairs but adapted to digital platforms. Such initiatives would give smaller producers visibility and credibility in competitive global marketplaces while sharing the costs of promotion.

Cross-Cutting Considerations

All levels of policy support should be emphasized:

- ❖ Digital skills training for artisans and SMEs, ensuring that traditional producers can adopt new tools such as 3D modeling and online marketing.
- ❖ IP protection and enforcement, helping creators defend original designs from imitation.
- ❖ Sustainability alignment, linking local product promotion to the EU Green Deal by encouraging eco-friendly packaging, local materials, and transparent supply chains.

By coordinating interventions across municipal, national, and EU levels, Romania can build an enabling ecosystem that transforms local heritage and emerging 3D-printed products into globally competitive exports.

8. Limitations & Future Research

Overview:

- ❖ Marketplace data is partly from investor disclosures (Etsy, Shopify, TikTok), which aggregate sellers globally, not Romania-specific.
- ❖ Craft export codes (HS 69 ceramics) are aggregated, limiting granularity.
- ❖ Future research: micro-level seller surveys in Romania, A/B tests of creative labels in digital listings, long-term GI impact on 3D/digital crafts.

The analysis presented in this paper relies on marketplace data that is largely derived from publicly available investor disclosures and industry reports (Etsy, Shopify, TikTok). While these sources provide valuable insights into global and regional dynamics, they aggregate sellers and transaction volumes at a very broad level. As such, the figures do not capture the specific scale or performance of Romanian makers within these platforms. This limits the ability to make country-level inferences beyond general trends.

Similarly, trade data on crafts and heritage products is constrained by the level of aggregation in customs classifications. For example, HS code 69 (ceramic products) encompasses a wide variety of goods ranging from industrial ceramics to artisanal crafts. This makes it difficult to isolate the exact value attributable to cultural or place-based exports such as Horezu ceramics. Without finer-grained classification, the export contribution of niche crafts remains somewhat obscured.

Given these constraints, future research should move towards micro-level data collection and experimental analysis.

Potential avenues include:

- ❖ Surveys and interviews with Romanian sellers active on digital marketplaces to capture sales volumes, buyer geographies, and perceived barriers to scaling internationally.
- ❖ A/B testing of creative labels and trust signals (e.g., “handmade,” “GI-certified,” “heritage craft”) in online listings to measure their direct effect on click-through and conversion rates.
- ❖ Longitudinal studies on the impact of Geographical Indications (GIs) for both traditional crafts and new digitally fabricated products (e.g., 3D-printed heritage replicas), to understand how formal recognition influences export performance over time.
- ❖ Firm-level econometric studies that examine correlations between digital adoption, marketplace participation, and export revenues among Romanian SMEs.

Such approaches would generate more precise evidence on how digital channels and labeling strategies affect the international promotion of local 3D-printed products, helping to refine both academic understanding and policy design.

9. Conclusion

The international promotion of local and 3D-printed products cannot be sustained through a single platform or channel. Instead, it requires a diversified and hybrid channel mix that balances discovery, scale, control, and growth. Etsy remains useful as a first step into global markets, particularly for testing new designs and reaching early adopters. However, its tightening of creative standards and signs of market saturation make it risky as the sole pillar of an internationalization strategy.

MyMiniFactory, by contrast, offers a more specialized environment tailored to 3D makers, providing community relevance and a buyer base that values originality and customization. Amazon Handmade contributes scale and logistical infrastructure through its Fulfilment by Amazon (FBA) network, allowing Romanian producers who can standardize certain product lines to access large, stable consumer markets. Shopify enables full brand ownership, cross-border checkout capabilities, and margin retention, which are critical for long-term sustainability.

Finally, TikTok Shop represents the frontier of virality-driven commerce, allowing visual, story-driven products to reach millions of consumers at comparatively low acquisition costs.

For Romanian makers, the most economically advantageous pathway is a hybrid approach that strategically integrates these channels. Marketplaces such as Etsy or MyMiniFactory should be leveraged primarily for discovery and niche validation. A proprietary store built on Shopify ensures brand control, data ownership, and long-term customer retention. Social commerce platforms such as TikTok Shop and Instagram Shops can then be deployed for growth spikes, viral exposure, and community building. This layered approach distributes risk, maximizes reach, and ensures that producers are not overly dependent on the policies or algorithms of any single platform.

At the policy level, targeted support can accelerate Romania’s convergence with EU digital trade leaders. Key interventions include improving cross-border logistics networks to reduce delivery times and costs, investing in digital upskilling programs for SMEs and artisans, and strengthening frameworks for intellectual property (IP) and Geographical Indications (GIs) to protect authenticity in online marketplaces.

Combined, these measures would allow Romanian makers not only to participate in global e-commerce, but to compete effectively by blending heritage craftsmanship with frontier production technologies such as 3D printing.

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