

The Market Potential and U.S. Entry Strategy for Youwei Group's LED-Curing Coating Technology

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Abstract

The coatings market is rapidly changing, with cost reduction, sustainability, and regulatory pressure emerging as the paramount concerns of manufacturers. LED-curing coatings are a potential alternative for conventional solvent- and heat-evaporative systems from this perspective. These technologies offer faster drying rates, lower emissions, and improved workplace safety, all of which align with the evolving demands of the industry in high-volume applications, such as furniture manufacturing. As environmental regulations tighten and energy efficiency becomes a competitive differentiator, companies like Youwei Group are developing specialized coatings that cater to these needs. Initially tested in the Chinese market, Youwei's LED-curing coating now has the potential to address similar demands in the United States, the world's largest coatings market. However, entering a new market also raises strategic questions regarding distribution, branding, and the adoption of technology. This paper examines the business case for Youwei's U.S. expansion. It proposes a licensing-based market entry strategy, highlighting opportunities for growth through complementary partnerships and positioning in the sustainable manufacturing space. Youwei should pursue a non-exclusive licensing model when entering the American market, as it allows the company to leverage existing networks and infrastructure while maintaining flexibility for future expansion.

Keywords

LED-Curing Coatings, Market Entry Strategy, Sustainable Coatings, Licensing Model, U.S. Coatings Industry

1. Introduction

The industrial coating industry has undergone a significant shift towards environ-

mentally friendly technologies over the last decade. Increased regulatory interest, particularly from the U.S. Environmental Protection Agency (EPA), has accelerated the transition from solvent-based coatings due to their release of volatile organic compounds (VOCs) (U.S. Environmental Protection Agency, 2014). Consequently, most producers have migrated to waterborne and radiation-curable systems, such as ultraviolet (UV) and light-emitting diode (LED) curing technologies (Market Research Future, 2024). In such circumstances, LED-curing coatings are a relatively new technology that addresses a range of problems simultaneously: saving curing time, energy, and reducing emissions of harmful substances.

The American coatings market is valued at nearly \$28 billion overall and is projected to grow at a CAGR of 4.8% between 2025 and 2032, creating a significant market demand for low-emission, energy-efficient technologies, driven by state-level VOC requirements (Persistence Market Research, 2025). The U.S. paints and coatings market is projected to grow from \$27.6 billion in 2025 to \$38.3 billion by 2032, as shown in Figure 1, with waterborne coatings expected to lead the technology segment, accounting for a 45.7% share. The U.S. market for waterborne coatings is expected to experience steady growth, driven by increasing demand from the furniture, automotive, and construction industries. In 2022, the market generated a total revenue of \$15.82 billion, and is anticipated to grow at a compound annual growth rate (CAGR) of 3.7% from 2023 to 2030, eventually

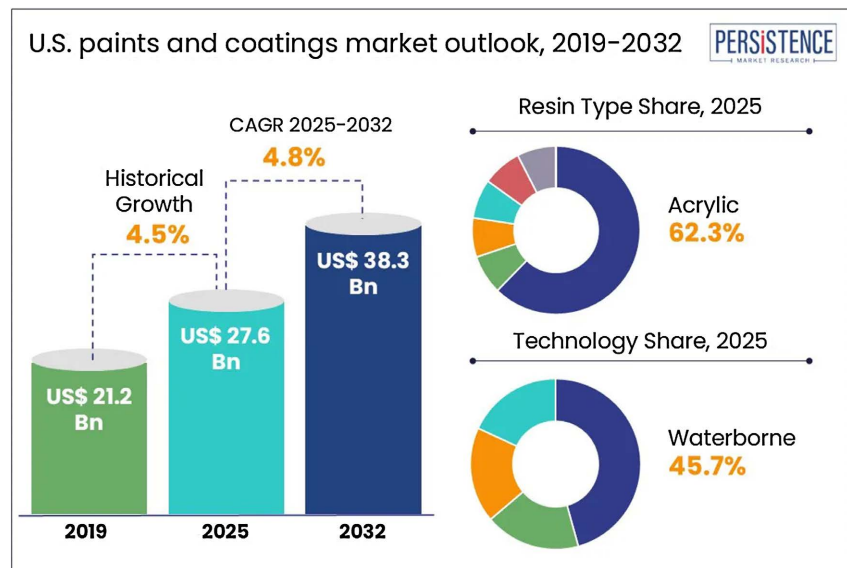


Figure 1. Infographic of projected growth of the U.S. paints and coatings market from 2019 to 2032. The market is expected to grow from USD 21.2 billion in 2019 to USD 27.6 billion in 2025, reaching USD 38.3 billion by 2032, with a compound annual growth rate (CAGR) of 4.8% from 2025 to 2032. As of 2025, acrylic resins are projected to dominate the resin segment with a 62.3% share, while waterborne coatings are expected to lead the technology segment at 45.7%. Sourced from: Persistence Market Research. (n.d.). U.S. paints and coatings market outlook, 2019–2032. Retrieved from <https://www.persistencemarketresearch.com/market-research/us-paints-and-coatings-market.asp>.

reaching \$21.09 billion in yearly revenue (Grand View Research, 2023). Youwei Group, a Chinese coatings manufacturer, has developed a proprietary LED-curing coating designed for high-volume applications, such as furniture and small appliances. While its success in the Chinese market has been promising, with the company winning the bid for the Shenzhen Metro Rail Transit Coating Project (Youwei Group, 2020), international expansion, particularly into the U.S., requires navigating a distinct competitive environment and regulatory framework. This paper examines Youwei's strategic fit within the American market and assesses a recommended approach to entry, focusing on licensing, partnerships, and integration into complementary value chains.

2. Market Entry Strategy

Youwei faces a strategic decision between two modes of entry into the U.S. market: direct entry or licensing through established players. As shown in Figure 2, Sherwin-Williams, PPG, and Akzo Nobel dominate global coatings revenues, positioning them as attractive licensing partners. According to the Uppsala Internationalization Model by Jan Johanson and Jan-Erik Vahlne, firms often begin with low-commitment approaches, such as licensing, to minimize risk and gradually deepen their market involvement as they gain experiential knowledge (Johanson & Vahlne, 1977).

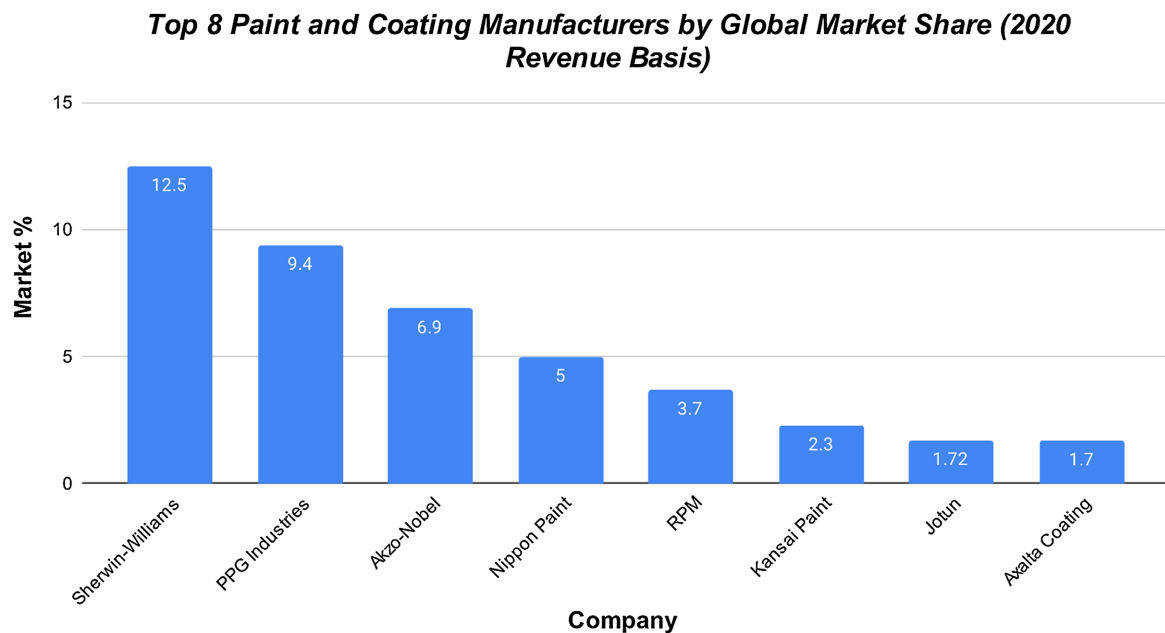


Figure 2. Global market share of the top 10 paint and coatings manufacturers based on 2020 revenue. Sherwin-Williams leads the international market with 12.5%, followed by PPG Industries (9.4%) and Akzo Nobel (6.9%). Market share percentages were calculated by comparing each company's 2020 sales to an estimated global market size of \$147.2 billion (Data compiled from Deal lab, 2021).

2.1. Direct Entry

Direct entry would allow Youwei to capture the full margin from its proprietary

technology and build brand equity in the U.S. market. Although leading Chinese venture and industrial investment institutions, including Shenzhen Innovation Investment Capital Group, Hubei Yihua Group, Guolong Capital, Tongchuang Weiye Capital, Tsinghua Tongfang Capital, and the Qianhai Zhenke Industrial Fund, back the company's share capital (Youwei Group), the absence of a significant export track record or established U.S. subsidiaries suggests limited international operational experience. Moreover, as a new entrant without prior international brand recognition, Youwei would face challenges in gaining immediate customer trust. A past example of this dynamic is Starbucks' failed expansion into Australia, where the company failed to gain traction due to cultural misalignment, rapid overexpansion, and a lack of consumer familiarity. Despite opening 87 stores within seven years, Starbucks shut down two-thirds of them by 2008, having accumulated \$105 million in losses within that period (Custus Global, 2023). Analysts attributed this failure to the company's assumption that its U.S. model could be easily replicated abroad—an error that led to disconnects with local tastes and a loss of trust in domestic coffee providers.

2.2. Licensing Strategy

Conversely, a licensing strategy provides rapid access to established distribution networks and marketing infrastructure. Licensing is also a preferred mechanism in the coatings sector for technology transfer, particularly for foreign firms seeking expedited market entry (Lysaridis, Chountalas, & Magoutas, 2024). Lysaridis et al. examined a similar situation where a comparable strategy was successfully employed by Company L, a Greek SME, which licensed its solar mounting technology to a Turkish partner. This approach enabled Company L to commercialize its innovation internationally without establishing local infrastructure, demonstrating how licensing can facilitate efficient and low-risk market expansion while preserving long-term control over proprietary technologies (Lysaridis, Chountalas, & Magoutas, 2024). This model will enable Youwei to collaborate with existing US manufacturers that have established distribution networks, regulatory experience, and a strong market presence. North American market leadership is further illustrated in **Figure 3**, which shows Sherwin-Williams and PPG generating over \$17 billion each in coatings revenue. By conceding usage rights in exchange for retaining ownership of its intellectual property, Youwei can quickly enter the market without incurring the overhead of direct entry. Given the scale of the U.S. market and the capital risks associated with direct entry, a non-exclusive licensing model is the most strategic path forward for Youwei.

In Uppsala terms, Non-exclusive licensing serves as a low-risk entry point to gain experiential knowledge about U.S. market needs, regulatory processes, and channel financials. The model's "establishment chain" enables pilots to create beneficial learning signals that guide organizations toward higher-commitment strategies, such as joint ventures and selective greenfield application labs, when their network position and uncertainty levels increase (Johanson & Vahlne, 2009).

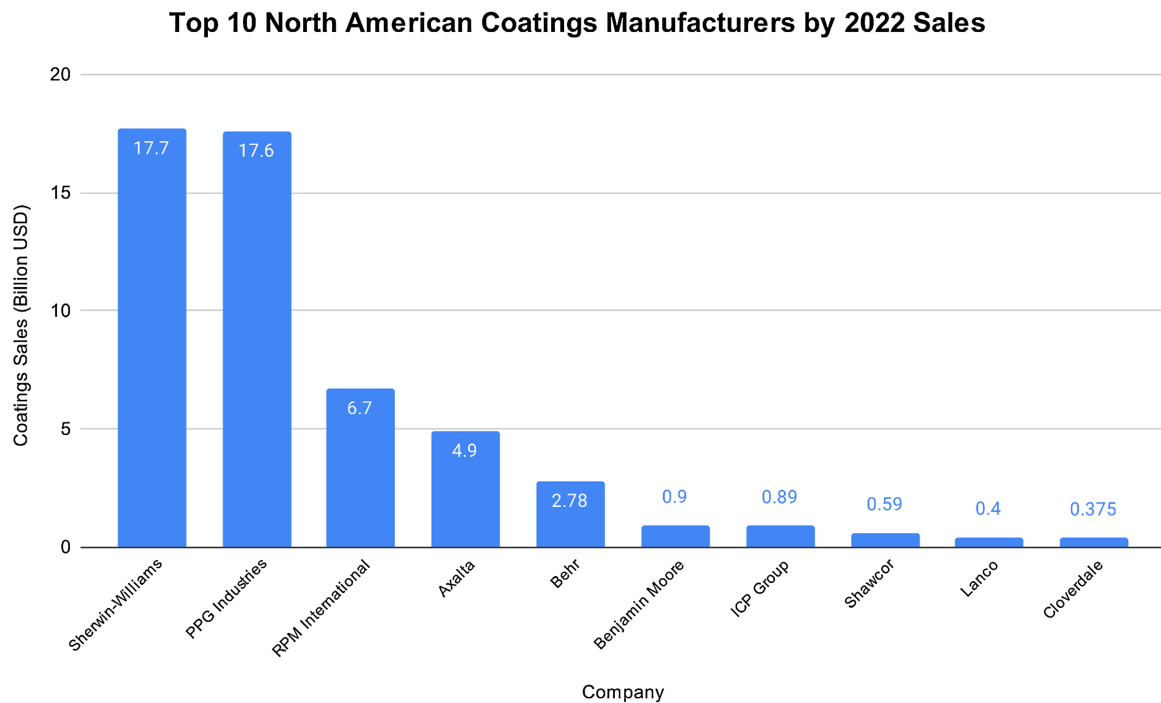


Figure 3. Coatings sales of the top 10 North American paint and coatings manufacturers in 2022. Sherwin-Williams and PPG Industries lead the market, with sales exceeding \$17.6 billion each, followed by RPM International (\$6.7 billion), Axalta (\$4.9 billion), and Behr (\$2.78 billion). These figures reflect revenue from coatings only and exclude sales of non-coatings products. Source: PCI Magazine. (2023). 2023 PCI 25: Top Paint and Coatings Companies. Data retrieved from: <https://www.pcimag.com/articles/111564-2023-pci-25-top-paint-and-coatings-companies>.

2.3. Licensing Risks and Governance

However, while a non-exclusive licensing model introduces several benefits, including low capital costs and fast access, it presents risks that Youwei must actively manage. First, quality drafts in licensees can lower brand value if the plants unevenly manage the quality of production or application (Prashant & Harbir, 2009). Second, partner dependence risks creating bottlenecks or hold-up dangers if a licensee controls critical downstream channels (Hitt, Dacin, & Levitas, 1997). Third, appropriability risks, such as knowledge leakage or imitation, have also been documented in technology alliances, particularly when monitoring costs are high or when the licensee possesses complementary manufacturing expertise (Teece, 1986). Youwei can manage these risks through staged technology disclosure, performance-contingent royalties, operator training and certification as a precondition for operation, and termination clauses for non-compliance (Anand & Khanna, 2000; Prashant & Harbir, 2009).

2.4. Partner Selection Criteria

Youwei must establish a systematic evaluation process to determine which potential partners are suitable for licensing agreements. The evaluation process should focus on market reach through regional coverage and distribution capacity across multiple states and established relationships with OEM furniture and architect-

tural wood customers; technical readiness through prior experience with LED/UV curing systems and compatible production lines; regulatory compatibility through CARB/EPA standards compliance and strong customer environmental health and safety (EHS) support; and relational reliability through successful alliances and transparent audit and quality assurance processes. The company should create a weighted evaluation rubric (e.g., 30/25/20/15/10 across dimensions) to standardize the screening process and ensure consistent evaluation of candidates while aligning partner selection with long-term strategic objectives.

3. Product Value Proposition

Youwei's value proposition comprises four pillars: operational efficiency, cost reduction, product consistency, and occupational safety.

3.1. Operational Efficiency and Cost Reduction

LED curing reduces energy consumption by 30% - 50% compared to traditional UV lamps (Persistence Market Research, 2025). As shown in **Figure 4**, LED curing offers significant operational cost savings and safety improvements compared to UV systems. LEDs have a longer operational life and require less maintenance, further minimizing downtime and capital expenses. A North American pipe manufacturer that adopted LED curing achieved zero VOC emissions, decreased energy costs per hour by 70%, and saved a total of \$59,427 in energy alone (Kelly, 2024), demonstrating the viability of LED curing in large-scale applications and the savings potential of the technology.

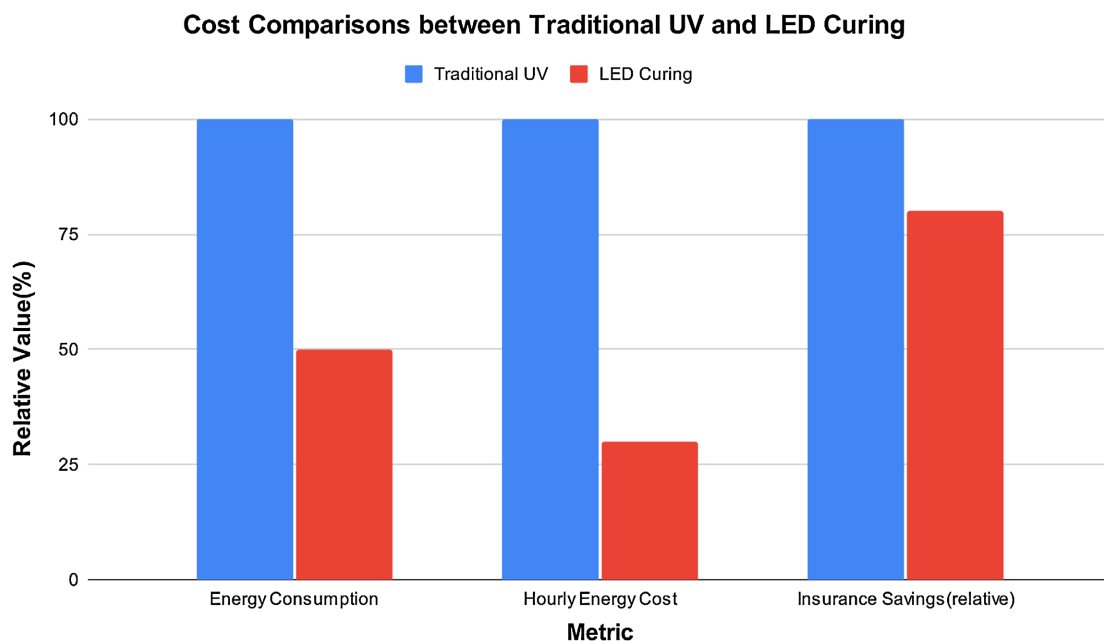


Figure 4. Comparison of operational and safety-related costs between traditional UV curing systems and LED curing technology. LED curing demonstrates significant advantages, with energy consumption reduced by up to 50%, hourly energy costs reduced by 70%, and estimated insurance costs lowered by 20% due to the absence of hazardous emissions and reduced reliance on PPE.

3.2. Consistency and Quality

LED curing also enhances product uniformity and surface quality, a key requirement in high-end furniture and decorative applications. Traditional UV lamps degrade over time, causing inconsistent spectral output and excessive heat that can warp or discolor delicate substrates. In contrast, LED systems emit monochromatic, stable light, ensuring uniform polymerization and reducing variability in film thickness, gloss, or adhesion. Unlike UV lamps, which emit infrared radiation, LEDs do not require a warm-up time and do not overheat materials critical for thin wood veneers and sensitive finishes used in furniture production (European Commission, 2016).

3.3. Health and Safety

Youwei's coating is free of formaldehyde and other carcinogenic agents. This allows companies to reduce their dependence on personal protective equipment (PPE), such as \$2400 ventilators, and lower insurance premiums. Additionally, its waterborne formulation minimizes VOC emissions, thereby further improving indoor air quality and creating a safer, more compliant working environment for factory personnel (Market Research Future, 2024). As a result, for a firm spending USD 1 million annually on insurance, this could mean savings of up to USD 200,000 (AmTrust Financial, 2023).

4. Entering the Market

To gain optimal entry into the US coatings market, Youwei must implement a non-exclusive regional licensing model. This model will enable Youwei to collaborate with existing US manufacturers that have established distribution networks, regulatory experience, and a strong market presence. By conceding usage rights in exchange for retaining ownership rights to intellectual property, Youwei can quickly enter the market without incurring the overhead of direct entry (Lysaridis et al., 2024).

These strategies have proven effective for other international companies as well. For instance, AkzoNobel has utilized strategic licensing to expand its Sikkens brand throughout North America (Floor Trends, 2003). To execute this tactic, proactive intellectual property (IP) management would be necessary, such as registration with the United States Patent and Trademark Office (USPTO). Additionally, Youwei needs to send technical starter kits, including license LED arrays, coating samples, and technical specifications, to expedite onboarding and reduce resistance among potential adopters. Strategic involvement in trade exhibitions, such as the American Coatings Show, along with industry research in trade magazines like Paint & Coatings Industry, can further help legitimize Youwei in the American market.

4.1. Competitive Landscape

The U.S. coatings market features both established players and innovatively

driven disruptors. Akzo-Nobel's Sikkens wood finishes are positioned as premium, professional-grade coatings, often retailing at approximately \$330 for a 5-gallon pail, which is significantly higher than typical mid-market alternatives. Reviews commonly describe them as "premium" and "you get what you pay for", reflecting their perceived superior performance and brand loyalty. PPG Industries' Envirocron UV line has demonstrated its effectiveness in UV-curable powder coatings; it has seen limited penetration in the OEM furniture segment, where adoption barriers include substrate compatibility and integration complexity. In contrast, Sherwin-Williams maintains a dominant presence in industrial wood coatings through its extensive product portfolio and distribution networks; however, its capabilities in LED-curing technologies remain comparatively underdeveloped, placing it at a strategic disadvantage in markets prioritizing low-VOC, energy-efficient curing systems.

4.2. Complementors

Complementary firms and sectors represent vital partnerships for Youwei's U.S. strategy. LED curing equipment providers such as Phoseon Technology and Excelitas Technologies offer systems compatible with Youwei's resin chemistry, enabling integrated deployment. Additionally, raw substrate suppliers, including Boise Cascade and Roseburg Forest Products, stand to benefit from the reduced processing times and lower energy input requirements of LED-based curing systems. Retail channels such as Ashley Furniture and platforms like The Home Depot offer downstream opportunities for white-label adoption or collaborative marketing of furniture items featuring Youwei's eco-friendly coating. Moreover, partnerships with academic institutions such as the North Dakota State University Coatings and Polymeric Materials Program provide opportunities for independent performance validation and access to skilled talent in polymer engineering and applied chemistry. A flowchart of potential upstream and downstream alliances is displayed in **Figure 5**, outlining how Youwei could integrate into the U.S. coatings ecosystem.

5. Discussion and Conclusion

Our research and analysis suggest that Youwei Group's LED-curing coating closely aligns with U.S. industry demand and regulatory shift toward using environmentally friendly, energy-saving materials. The product's low VOC emissions and fast curing times differentiate it from existing offerings, particularly in the industrial wood and furniture markets, where very few direct alternatives are currently available.

A non-exclusive licensing approach emerges as the most viable market entry strategy from a strategic standpoint. It enables the company to increase its footprint through multiple established U.S. partners by leveraging their distribution channels, regulatory expertise, and brand credibility while safeguarding intellectual property and minimizing upfront capital investments. The flexibility inherent

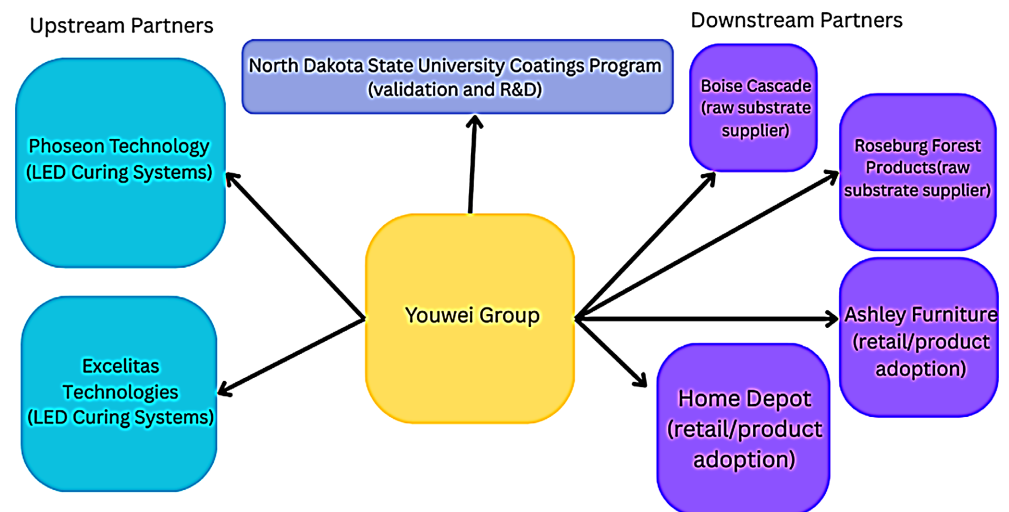


Figure 5. Strategic Partnership Ecosystem for Youwei Group's U.S. Market Entry. This diagram illustrates the upstream and downstream partnerships necessary for Youwei Group's successful market integration. Upstream LED system manufacturers such as Phoseon Technology and Excelitas Technologies offer hardware compatibility, while North Dakota State University provides validation and research support. Downstream, substrate suppliers like Boise Cascade and Roseburg Forest Products, as well as retailers including Ashley Furniture and Home Depot, represent key channels for adoption and distribution. Together, these partnerships enable Youwei to accelerate deployment, reduce entry barriers, and integrate into the broader U.S. coatings value chain.

in non-exclusive agreements also mitigates dependency risk by allowing the company to diversify its partner base across different regions and customer types.

However, the path to adoption will require more than simply signing a contract. Pilot programs with potential manufacturers and LED system integrators can serve as proof-of-concept trials, generating measurable performance data on curing speed, energy cost savings, and defect reduction under U.S. production conditions. These results can then be validated through collaborations with private labs and North American universities, eradicating potential technical skepticism within the OEM industry.

Furthermore, positioning LED curing as both a technological advancement and a regulatory compliance solution could enhance Youwei's competitive appeal in the U.S. market. Active engagement with industry associations, sustainability certification bodies, and state-level environmental regulators can help the company frame its coatings as a preferred pathway to meeting emerging environmental mandates, particularly in states with stringent VOC limits, such as California.

Long-term competitiveness will hinge on Youwei's ability to evolve in line with market needs, such as developing hybrid formulations that are compatible with both LED and traditional UV curing, ensuring relevance in facilities with mixed production infrastructures. Strengthening upstream relationships with LED equipment manufacturers and substrate suppliers could lead to co-development opportunities, deepening integration into the manufacturing ecosystem, and creating switching costs that favor Youwei's technology.

In summary, the evidence supports a layered market entry strategy, starting

with non-exclusive licensing, then expanding through targeted alliances, and consolidating via independent performance testing with these alliances. This approach aligns with current environmental and technology trends, minimizes the risk of direct market entry, and positions Youwei for scalable and sustainable business development in the U.S. coatings industry.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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