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PROFITABILITY IN CIRCULAR BUSINESS MODELS: AN ANALYSIS OF THE FURNITURE INDUSTRY

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Purpose: This study investigates the financial implications and profitability potential of Circular Business Models (CBMs) within the furniture industry, addressing the research gap in understanding timeline to profitability and economic viability of circular transitions.
Design/methodology/approach: The research employs a qualitative approach combining systematic literature review with exploratory case study analysis. Three CBMs—BuyBack, Rental, and Product-as-a-Service (PaaS)—were selected based on relevance to the furniture industry, availability of financial data, and scalability potential. Data were collected from peer-reviewed literature, company sustainability reports, and industry publications.
Findings: While CBMs require significant initial investments and extended payback periods, they demonstrate substantial long-term benefits including enhanced resource efficiency, improved customer loyalty, and stable revenue streams. Financial evaluation frameworks reveal furniture can achieve over 200% total value extraction through multiple lifecycle iterations.
Research limitations/implications: Limited access to proprietary financial data, evolving CE regulations, and focus on three CBM types constrain generalizability. Future research should incorporate quantitative financial modeling and expanded geographic scope.
Practical implications: The research provides actionable insights for furniture manufacturers exploring CBMs, including profitability pathways, operational strategies, and recommendations for design-for-circularity implementation.
Social implications: CBMs support environmental goals including waste reduction, product lifecycle extension, and resource conservation, aligning with EU Circular Economy Action Plan objectives.
Originality/value: This study is examining CBM profitability specifically within furniture industry context, integrating lifecycle perspectives from eco-design through end-of-life scenarios, and providing financial evaluation frameworks beyond traditional payback period analysis.
Keywords: circular economy, furniture industry, profitability analysis, buyback models, product-as-a-service.
Category of the paper: Conceptual paper, Research paper.

1. Introduction

In neoclassical economics, businesses traditionally prioritized profit maximization (Smith, 1776), often emphasizing efficiency over environmental and social considerations. However, as environmental concerns intensify and global resource limits are approached, businesses increasingly face pressure to balance profitability with sustainability (Geissdoerfer et al., 2017). The circular economy (CE) offers a strategic framework by minimizing waste, extending resource lifecycles, and fostering sustainable practices (Ellen MacArthur Foundation, 2013).

The traditional linear economic model's "take, make, waste" approach has resulted in significant environmental degradation, resource depletion, and unsustainable waste generation (Kirchherr, Reike, Hekkert, 2017). Current estimates suggest only 8.6% of the global economy operates on circular principles (United Nations Environment Programme, 2021), underscoring the imperative for transitioning to CE principles given climate change and resource scarcity challenges (McKinsey & Company, 2015).

This study addresses a research gap by focusing on financial viability and profitability of circular business models (CBMs) within the furniture industry. The furniture sector represents a great case study due to heavy reliance on natural resources, inherent product durability, and substantial potential for multiple lifecycles through reuse and refurbishment (Stahel, 2016). Recent research emphasizes that furniture design decisions fundamentally determine circular economy feasibility, with eco-design strategies enabling enhanced material recovery and extended lifespans (Azevedo, Godina, Matias, 2024). Despite strategic fit with CE principles, limited research examines the timeline to profitability and comprehensive economic implications of adopting CBMs in this sector (Hultberg, Pal, 2024).

By exploring three CBMs: BuyBack, Rental, and Product-as-a-Service (PaaS), this study evaluates their financial and operational challenges and potential. These models offer opportunities for reducing resource use and waste while presenting economic dynamics including revenue stability, investment requirements, and customer retention benefits (Lieder, Rashid, 2016; Lüdeke-Freund, Freudenreich, Saviuc, Stock, Schaltegger, 2018).

This research addresses the following questions: What are the financial challenges and opportunities associated with implementing CBMs in the furniture industry? How do these models impact the timeline to profitability for businesses transitioning from linear to circular approaches? What role does customer retention and resource efficiency play in CBM financial success?

The study's novelty lies in its integrated focus on financial implications of CBMs, lifecycle perspectives from eco-design to end-of-life scenarios, and specific contextualization within the furniture industry. The paper is structured as follows: Section 2 outlines methodology, Section 3 examines circular economy principles in furniture lifecycles, Section 4 analyzes three

CBMs, Section 5 discusses profitability challenges and financial frameworks, Section 6 presents discussion of barriers and opportunities, and Section 7 provides conclusions.

2. Research Methodology

2.1. Research Design

This study employs a qualitative approach combining systematic literature review with exploratory case study analysis. The research is designed as a conceptual-analytical paper examining the financial viability of three distinct CBMs within the furniture industry context, addressing the identified research gap regarding CBM profitability timelines and economic implications.

2.2. Literature Review Methodology

The literature review followed a semi-systematic approach (Snyder, 2019), balancing comprehensiveness with focused exploration of CBM profitability dimensions. Academic databases (Scopus, Web of Science, Google Scholar) were searched using keywords: "circular economy", "circular business models", "furniture industry", "profitability", "product-as-a-service", "rental models", "buyback programs", "life cycle costing", and "eco-design". Inclusion criteria encompassed peer-reviewed articles and authoritative industry reports published 2013-2024 (with seminal works included regardless of date), focusing on circular economy, business model innovation, or profitability analysis in English. Exclusion criteria eliminated non-peer-reviewed sources (except established industry authorities), studies focused exclusively on environmental impact without economic analysis, and conference abstracts without full papers. This approach yielded approximately 80 relevant sources, from which 25 were selected for in-depth analysis based on direct relevance to research questions.

2.3. Selection Criteria

CBMs were selected based on documented implementation in the furniture or related durable goods sectors based on avaliable exploratory case studies with financial data or economic analysis, the capacity for widespread adoption across market segments, and the representation of different operational complexity. This resulted in a selection of BuyBack, Rental, and PaaS models, representing primary circular approaches currently implemented in the furniture industry (Lüdeke-Freund et al., 2018; Centobelli, Cerchione, Chiaroni, Del Vecchio, Urbinati, 2020). Five case studies employed purposive sampling (Patton, 2002) targeting established companies with documented CBM implementation spanning 2-3 years, public information availability, geographic and market segment diversity

(B2C and B2B), and representation of all three CBM types. Cases include IKEA's Buyback & Resell program, CORT Furniture Rental, Steelcase Flex Rental, Leaseby, and Fernish.

2.4. Data Collection and Limitations

Data collection encompasses company websites, sustainability reports, peer-reviewed literature, industry reports, and media coverage. Analysis involved comparative assessment of revenue mechanisms, cost structures, operational complexity, customer retention strategies, and resource efficiency metrics. Limitations include restricted access to proprietary financial data, reliance on publicly available information, evolving regulatory landscape, focus on three CBM types, and predominantly European/North American geographic scope.

3. Circular Economy Principles in Furniture Lifecycle

Understanding how circular economy principles apply across furniture lifecycles provides an essential context for evaluating profitability implications. The furniture industry's transition from linear to circular models requires fundamental transformation in design, production, use, and end-of-life phases (Sumter, de Koning, Bakker, Balkenende, 2021).

Circular furniture production begins with strategic material selection determining downstream circularity potential (Azevedo et al., 2024). Material choices significantly impact both environmental performance and economic viability: FSC-certified wood ensures sustainable practices while maintaining quality for multiple lifecycles, bamboo offers faster regeneration, recycled content integration reduces virgin material costs, and bio-based alternatives replace petroleum-derived components. Material passports—detailed composition records—enable efficient end-of-life processing, with upcoming EU Digital Product Passport regulation (mandatory 2030) standardizing documentation to facilitate secondary material markets (European Commission, 2024).

Design for Circularity principles incorporate modularity (separable components enabling selective replacement), standardization (common fasteners facilitating disassembly), durability (20+ year technical lifespans), timeless aesthetics (minimizing fashion-driven obsolescence), reparability (accessible components and spare parts), and recyclability (material compatibility and separation ease) (Sumter et al., 2021; Pieroni, Blomsma, McAloone, Pigosso, 2020).

Multiple end-of-life pathways preserve value hierarchically (Reike, Vermeulen, Witjes, 2018): reuse captures 40-70% of original value through direct second-hand sale; refurbishment captures 30-50% value after cosmetic and functional restoration; remanufacturing achieves 60-80% value through complete reconstruction; component harvesting captures 10-20% value; material recycling recovers 5-15% value; and energy recovery represents final option when other pathways are exhausted.

Different furniture types present varying circular economy potentials directly impacting CBM profitability. Solid wood furniture offers exceptional durability (50+ year lifespan), straightforward repair, and high-value recycling, though high weight increases logistics costs. Upholstered furniture enables aesthetic updates through fabric replacement but faces material separation complexity and hygiene concerns. Composite furniture provides lightweight construction, reducing logistics costs but suffers from adhesive bonding preventing disassembly and limited repair possibilities. Metal furniture demonstrates extreme durability, minimal maintenance requirements, and high recycling rates (>90%) (Hultberg, Pal, 2024). This material-dependent variation suggests that CBM profitability heavily depends on product portfolio composition.

4. Circular Business Models in the Furniture Industry

4.1. The BuyBack Model

The BuyBack model involves companies offering to repurchase products from consumers after specified periods, subsequently refurbishing or recycling these products before reselling or utilizing recovered materials for new production (Lüdeke-Freund et al., 2019). By recovering materials from returned products, companies substantially reduce virgin material procurement costs by 20-40%, though varying by material type and condition (Centobelli et al., 2020). Buyback programs eliminate disposal fees and environmental taxes while meeting Extended Producer Responsibility obligations (European Commission, 2024).

Enhanced lifecycle management allows companies to derive additional value from each product. Financial modeling suggests products completing three lifecycle iterations achieve 150-200% total revenue compared to single-lifecycle linear models (Mendoza, Sharmina, Gallego-Schmid, Heyes, Azapagic, 2017). Buyback program participants exhibit 35-50% higher customer lifetime values through repeat purchases and brand loyalty (Konietzko, Bocken, Hultink, 2019). The refurbished furniture market continues expanding, driven by costconscious and environmentally aware consumers, with 73% of millennials and Gen Z expressing willingness to purchase refurbished furniture given quality assurance (World Economic Forum, 2024). Selling refurbished items at 40-70% of original prices maintains attractive margins after refurbishment costs.

However, establishing refurbishment infrastructure requires substantial initial investment. Dedicated facilities demand workshop space, equipment, and skilled labour, with capital expenditure estimates ranging €200,000-€500,000 for medium-scale operations and ongoing operational costs adding 15-25% to total product costs (Hultberg, Pal, 2024). Reverse logistics costs approx. 8-15% of product sale prices (Govindan, Soleimani, Kannan, 2015). Quality control mechanisms and inventory management add complexity and costs.

Comprehensive cost-benefit analysis indicates refurbishment becomes profitable when products resell at a minimum of 35-40% of original price after costs (Bressanelli, Perona, Saccani, 2023). Payback periods range from 3-5 years depending on product categories, refurbishment efficiency, and market acceptance. Successful programs price refurbished items at 40-70% of original prices, achieving gross margins of 25-40% (Centobelli et al., 2020).

IKEA's Buyback & Resell program, launched globally in 2020, allows IKEA Family program members to return used furniture for store credit, with items refurbished and sold in As-Is sections at reduced prices. Program expansion to multiple markets suggests positive economics (IKEA, 2024). MillerKnoll's RePurpose Program, launched 2009, coordinates donation, resale, and recycling of used office furniture, diverting up to 98% from landfills while creating secondary market revenue (MillerKnoll, 2023).

4.2. Rental Model

The rental model offers furniture as a service where customers rent items for specified durations, with furniture returning to companies for refurbishment and re-rental (Kirchherr et al., 2017). Steady revenue streams from rental fees offer predictable income compared to purchase transactions, though revenue irregularities arise from varying contract durations. Successfully rented furniture can generate 150-200% of original sale price over 5-7 years through multiple rental cycles (Lieder, Rashid, 2016).

Rental models necessitate maintaining larger inventory pools, with capital tied up in inventory typically 2-3× higher than sales-based operations (Ghisellini, Cialani, Ulgiati, 2016). Logistics costs can reach 12-20% of rental revenue (Govindan et al., 2015). Each returned item requires cleaning, inspection, and refurbishment, with ongoing costs varying by product type. Profitability modeling reveals rental models achieve positive returns when furniture completes minimum 3-4 rental cycles, with break-even around 2-3 cycles depending on product category and operational efficiency (Bressanelli et al., 2023). Successful operations price monthly rentals at 3-5% of product sale price, achieving payback in 20-33 months before additional cycles generate profit (Lüdeke-Freund et al., 2018).

CORT Furniture Rental exemplifies successful implementation offering flexible solutions for temporary needs. Scale enables economies of scope with large inventory pools supporting diverse customer needs (Lieder, Rashid, 2016). Steelcase Flex Rental adapts to evolving office workspace needs with modular furniture, addressing hybrid work trends and enabling companies to adjust configurations without capital expenditure (Ellen MacArthur Foundation, 2013).

4.3. Product-as-a-Service Model

The PaaS model shifts from traditional ownership to access-based consumption where customers subscribe to furniture services rather than purchasing outright (Tukker, 2015). This emphasizes providing functionality and comprehensive services including maintenance, customization, and upgrades throughout subscription periods. Consistent recurring revenue streams ensure highly predictable cash flows compared to sporadic sales, supporting better financial planning (Tukker, 2015). PaaS customers demonstrate 40-60% higher retention compared to traditional purchasers (Stahel, 2016; Konietzko et al., 2019). Companies retain ownership enabling strategic control over end-of-life decisions, with products refurbished and redeployed 5-7 times over technical lifespans (Lieder, Rashid, 2016).

However, PaaS requires substantial initial investments in sophisticated systems for managing subscriptions, coordinating logistics, tracking inventory, and scheduling maintenance. Digital platforms are essential but costly to develop and maintain (Ghisellini et al., 2016). Ongoing maintenance and service delivery costs can reach 20-30% of subscription revenue (Stahel, 2016; Reim, Parida, Sjödin, 2015). Complex operational logistics for coordinating delivery, upgrades, repairs, and retrieval challenge implementation (Govindan et al., 2015).

Financial modeling indicates PaaS models require 5-7 years to achieve profitability given high initial investments, but subsequently generate strong returns through ongoing subscription revenue with declining marginal costs as systems mature (Lüdeke-Freund et al., 2018). Subscription-based furniture services appeal to urban professionals with high mobility, companies seeking flexible workspace solutions, and environmentally conscious consumers, with pricing typically targeting 3-4% of product value monthly (Kirchherr et al., 2017).

Leaseby offers office furniture on flexible subscription terms, reducing upfront costs while providing high-quality furnishings. B2B focus enables larger contract values and longer subscription periods (average 3-5 years), improving economics (Lüdeke-Freund, Gold, Bocken, 2019). Fernish targets urban consumers with furniture rental accommodating varying durations and style preferences, emphasizing convenience and flexibility (Reim et al., 2015).

4.4. Comparative Analysis

Table 1. synthesizes key profitability dimensions across the three CBMs, enabling systematic comparison of trade-offs and strategic fit considerations.

Table 1.
Comparative profitability indicators across circular business models

Aspect	Rental	BuyBack	PaaS
Revenue Model	Irregular, rental-based	Irregular, resale-based	Regular, subscription
Initial Investment	Low	Moderate	High
Operational Complexity	Moderate	High	Very High
Customer Retention	Low-Moderate	High	Very High
Maintenance Costs	High	Moderate-High	Low-Moderate
Resource Efficiency	Moderate	High	Very High
Payback Period	2-4 years	3-5 years	5-7 years
CLV Multiplier	1.5-2×	2-3×	3-4×
Gross Margin	40-60%	25-40%	60-80%
Scalability	High	Moderate	Low-Moderate

Note. CLV = Customer Lifetime Value multiplier. Gross margin percentages represent profitability after operational costs including refurbishment, logistics, and maintenance.

Source: Author's analysis based on Lüdeke-Freund et al. (2018); Centobelli et al. (2020); Konietzko et al. (2019); Bressanelli et al. (2023).

This analysis reveals distinct profitability profiles. Rental offers lowest barriers to entry and fastest payback but faces revenue stability challenges and high maintenance costs. BuyBack balances moderate investment with strong customer retention, though operational complexity in managing reverse logistics demands sophisticated management. PaaS requires highest initial investments and longest payback periods but delivers superior long-term profitability through recurring revenue and exceptional customer lifetime values once operational maturity is achieved (Centobelli et al., 2020).

5. Profitability Challanges and Financial Evaluation

5.1. Profitability Challanges

CBM profitability is significantly influenced by interconnected regulatory but also technical, and market-related challenges (Caldera, Desha, Dawes, 2019). Government policies including certifications, financial incentives, waste penalties create favourable environments, with the EU's Circular Economy Action Plan establishing regulatory frameworks increasingly aligned with circular approaches (European Commission, 2024). However, inconsistent regulations across jurisdictions, VAT treatment differences between sales and rental/service models, create barriers. Extended Producer Responsibility regulations, while generally supportive, vary in implementation details and cost implications (Cainelli, D'Amato, Mazzanti, 2020).

Companies face limitations in recycling and refurbishment technologies for complex materials like composites or items with integrated non-recyclable components. Advanced recycling infrastructure remains underdeveloped in many regions, constraining material recovery economics (Stahel, 2016). Designing products for disassembly and reuse requires

significant R&D investment and fundamental shifts in design approaches, increasing product development complexity and costs by 15-30% (Sumter et al., 2021; Centobelli et al., 2020).

Despite growing sustainability awareness, many consumers remain hesitant regarding refurbished or second-hand goods. Surveys indicate 40-50% express concerns about hygiene, durability, or aesthetic condition despite warranty coverage (Mendoza et al., 2017; Hultberg, Pal, 2023). Cultural associations between newness and quality persist, requiring substantial marketing investment. Pricing strategies must balance affordability with profitability, typically positioning refurbished items at 40-70% of original prices.

High initial investments, particularly for PaaS, present barriers. Managing logistics of product returns, refurbishments, and customer service adds operational complexity, with circular operations requiring 30-50% more logistical capacity than forward-only distribution (Govindan et al., 2015). CBMs typically exhibit extended payback periods (2-7 years) compared to linear models due to substantial infrastructure investments, requiring long-term perspectives. Quality and durability requirements necessitate focus on higher-quality, more durable products costing 15-30% more to produce (Centobelli et al., 2020).

5.2. Financial Evaluation Frameworks

Comprehensive CBM evaluation requires multiple complementary frameworks addressing both short-term viability and long-term value creation (Bressanelli et al., 2023). Cost-Benefit Analysis must systematically compare costs (initial capital expenditure for infrastructure, refurbishment facilities, IT systems; operating costs for transportation, labour, facilities, materials, marketing) against benefits (revenue streams from sales, resale, subscriptions; cost avoidances from reduced material procurement, disposal fees; intangible benefits like brand equity enhancement). Net Present Value calculation provides standard framework:

$$NPV = \sum_{t=1}^{n} \left[\frac{Revenue_t - Operating_Cost_t}{(1+r)^t} \right] - Initial_Investment$$

where *t* represents time period (typically 10-15 years) and *r* represents discount rate (8-12% for furniture industry). Positive NPV indicates that CBM generates value exceeding traditional linear approaches (Mendoza et al., 2017).

Life Cycle Costing evaluates the total cost of ownership across complete product lifecycles. Example calculation for office chair demonstrates circular advantage: initial production cost €200, first refurbishment €50 after 10 years, second refurbishment €60 after 8 years, third use period 6 years, end-of-life recycling recovery €20, total €290 over 24 years (€12.08 annual cost) versus linear model requiring three separate €150 purchases total €450 over 24 years (€18.75 annual cost), revealing 35% cost advantage (Bressanelli et al., 2023).

Cascade use valuation tracks cumulative value retention through successive lifecycles. Example office chair calculation: initial sale €500, first refurbishment resale €300 (60% retention), second refurbishment €150 (30%), component recovery €50 (10%), material

recycling €25 (5%), total €1,025 (205% of original sale price). While time value of money reduces total returns, typically still exceeding 150% of initial sale price over 15-20 years (Reike et al., 2018). Customer Lifetime Value in CBMs incorporates multiple dimensions:

$$CLV_{cbm} = (SubscriptionRevenue \times RetentionRate \times Duration) + Product\ Return\ Value + Referral\ Value + Cross\text{-}sell\ Opportunity$$

CBM customers demonstrate 40-60% higher retention rates, 25-35% increased lifetime value, 2-3× referral rates, and 30-50% improved cross-selling success (Konietzko et al., 2024). A customer purchasing €3,000 lifetime furniture in traditional model may represent €5,000-€7,000 in CBM context (Lüdeke-Freund et al., 2019).

6. Discussion: Barriers and Opportunities

6.1. Barriers to Implementation

Ownership ambiguity in PaaS and rental creates legal uncertainties regarding liability for accidents, responsibility for damage, and applicable consumer protection regulations, with current frameworks primarily addressing either clear ownership transfer or short-term rentals (Reike et al., 2018). VAT treatment varies between sales, rental, and service models across EU jurisdictions, creating complexity and potentially disadvantaging circular approaches in certain markets (European Commission, 2024). Warranty and liability considerations become complex in multi-lifecycle scenarios, with Extended Producer Responsibility regulations mandating manufacturer responsibility throughout lifecycles but implementation varying significantly across regions (Pieroni et al., 2020). Cross-border challenges complicate reverse logistics and product take-back through varying national regulations regarding waste management and environmental requirements (Cainelli et al., 2020).

Reverse logistics complexity requires 30-50% more capacity than forward distribution, with furniture's bulky nature, fragility, and weight-dependent costs challenges (Centobelli et al., 2020). Geographic dispersion affects collection economics, with cost-effective collection requiring sufficient return volumes within geographic clusters. Condition variability complicates standardized operations, requiring flexible refurbishment processes. Infrastructure gaps constrain implementation, with many regions lacking specialized refurbishment facilities, trained technicians, and quality control equipment (Hultberg, Pal, 2023).

Design legacy poses challenges, with existing furniture not designed for disassembly, repair, or multiple lifecycles. Product redesign requires 3-5 year development cycles, delaying transition benefits (Sumter et al., 2021). Material complexity impedes recovery, with composite materials, adhesives, and finishes complicating separation, limiting recovery rates to 60-70% for complex furniture versus 85-95% for simple pieces (Azevedo et al., 2024). Technology

requirements create digital infrastructure demands that smaller manufacturers may lack capabilities for developing (Ranta, Aarikka-Stenroos, Väisänen, 2021). Skill gaps constrain refurbishment operations, with traditional craft skills facing declining availability (Caldera et al., 2019).

Consumer perceptions persist despite quality equivalence, with stigma associated with refurbished furniture requiring sustained marketing investment. Ownership preferences represent cultural barriers, particularly in residential markets where furniture carries symbolic meaning. Trust deficits regarding quality assurance, cleanliness, warranty coverage, and company longevity require substantial relationship building (Kirchherr et al., 2017). Price sensitivity paradoxes create positioning challenges, with consumers expecting substantial discounts while remaining quality-conscious (Centobelli et al., 2020).

6.2. Opportunities for Enhanced Profitability

Extended Producer Responsibility regulations create regulatory alignment with CBMs, with upcoming EU directives mandating furniture take-back transforming voluntary circular initiatives into compliance necessities (European Commission, 2024). Tax incentives improve refurbishment economics, with several EU countries reducing VAT rates for repair services to 5-10%. Green procurement creates stable B2B demand, with public sector organizations prioritizing circular solutions in procurement decisions. Subsidy programs support infrastructure development, with national and EU-level circular economy funds financing reverse logistics and refurbishment facilities (Caldera et al., 2019).

Sustainability consciousness drives market demand, with 73% of millennials willing to pay 10-20% premiums for sustainable products (World Economic Forum, 2024). Flexible lifestyles increase demand adaptability, with urban mobility, remote work, and smaller living spaces creating furniture flexibility demand (Ranta et al., 2021). Cost pressures drive refurbished market growth, with economic uncertainty increasing price sensitivity. Subscription normalization reduces adoption barriers, with increasing acceptance of subscription models familiarizing consumers with access-over-ownership paradigms (Konietzko et al., 2019).

Digital Product Passports mandatory from 2026 creates standardized systems for documenting product composition, maintenance history, and refurbishment cycles (European Commission, 2024). AI-powered condition assessment demonstrates 40% reduction in assessment labour costs while improving consistency (Cainelli et al., 2020). Predictive maintenance extends product lifespans 30-50% through proactive approaches (Konietzko et al., 2019). Platform economics reduce transaction costs through digital marketplaces (Ranta et al., 2021).

Strategic partnerships enable shared infrastructure distribution of costs while achieving economies of scale. Third-party reverse logistics specialists offer established networks reducing operational complexity (Govindan et al., 2015). Cross-industry synergies enable knowledge transfer from mature circular industries. Social enterprise partnerships access cost-effective

refurbishment labour while enhancing social impact (Villalba-Eguiluz, Sahakian, Etxezarreta, 2023).

6.3. Strategic Recommendations

Furniture manufacturers should implement design for circularity principles from inception, with modular designs, standardized fasteners, durable materials, and disassembly-friendly construction as default parameters. While increasing initial development costs 15-25%, these investments enable all circular models and future-proof products (Sumter et al., 2021; Azevedo et al., 2024). Hybrid approaches combining traditional sales with circular offerings manage risk while building capabilities. Positioning refurbished products as "certified pre-owned" reduces stigma while appealing to value-conscious consumers (Mendoza et al., 2017). Integrating comprehensive service bundles with PaaS offerings differentiates from simple rental while justifying premium pricing (Tukker, 2015). Investing in digital infrastructure determines operational efficiency and scalability potential (Ranta et al., 2021).

Policymakers should harmonize circular economy regulations across jurisdictions to reduce compliance complexity and enable economies of scale f.eg. supporting regional refurbishment hubs through public-private partnerships reduces SME barriers while creating green employment (Caldera et al., 2019), implementing consumer education campaigns addresses refurbished product perceptions (Hultberg, Pal, 2023). Funding R&D programs advances recycling and refurbishment technologies (Cainelli et al., 2020), incorporating circular economy criteria in public procurement creates stable demand signals (European Commission, 2024).

7. Conclusion

This comprehensive analysis of three CBMs: BuyBack, Rental, and Product-as-a-Service, reveals distinct profitability profiles within the furniture sector. While CBMs require significant initial investments (low to high) and extended payback periods (2-7 years) compared to traditional linear approaches, they deliver substantial long-term benefits including enhanced resource efficiency (achieving 150-205% total value extraction), improved customer loyalty (1.5-4× CLV multipliers), and stable recurring revenue streams particularly in subscription-based models.

Financial evaluation frameworks extending beyond simple payback analysis—including Life Cycle Costing, cascade use valuation, and Customer Lifetime Value assessment—demonstrate circular approaches achieve superior long-term financial performance despite higher upfront requirements. The integration of lifecycle perspectives spanning eco-design

through end-of-life scenarios reveals material and design decisions fundamentally determine CBM viability and profitability potential.

The BuyBack model emphasizes resource efficiency and customer loyalty, achieving moderate profitability (25-40% gross margins) with 3-5 year payback periods but faces reverse logistics management challenges. The Rental model offers operational flexibility and lower barriers with 2-4 year payback periods but struggles with revenue irregularity, succeeding particularly in B2B office furniture applications. The PaaS model guarantees steady revenue and exceptional retention (3-4× CLV multipliers) achieving highest margins (60-80%) once mature, but faces substantial initial investments and 5-7 year payback periods creating significant entry barriers.

Barriers spanning legal ambiguities, logistical complexities, technical constraints, and behavioural resistance require systematic attention. However, corresponding opportunities (including supportive policy incentives, growing sustainability-conscious consumer segments, technological enablers reducing operational costs, and partnership ecosystems distributing risks) provide pathways to overcome challenges.

The furniture industry's inherent characteristics — durable products suitable for multiple lifecycles, substantial material value, and design flexibility—position the sector advantageously for circular transitions. Companies embracing circular models proactively position themselves for regulatory compliance, market differentiation, and long-term profitability in increasingly resource-constrained and environmentally conscious markets. Future research should pursue quantitative financial modelling using detailed company data, longitudinal studies tracking profitability evolution over 10-15 years, comparative analyses across geographic regions, investigation of hybrid business models, and examination of digital technologies' impacts on circular operation efficiency.

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