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Resource Mutualization and Circular Economy in Coworking Spaces: Feasibility Perceptions and Financial Sustainability Among Emerging Professionals in Ecuador

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Abstract

The segment of emerging professionals and young entrepreneurs in developing economies faces the complex structural challenge of launching independent professional practices without compromising long-term financial sustainability. In Ecuador, the practical implementation of circular economy principles within this specific group remains in its infancy. This article analyzes how the collaborative coworking model operates as an operational catalyst for spatial circularity, evaluating feasibility perceptions regarding shared resource mutualization and fixed overhead reductions among emerging practitioners. Utilizing a quantitative, cross-sectional descriptive approach, this study examines the empirical perceptions of $n = 150$ independent entrepreneurs, final-year students, and recent graduates from the Universidad de Guayaquil (out of a target population of $N = 400$), achieving a 95.0% confidence level and a margin of error of ±6.45% using a validated 20-item psychometric questionnaire distributed across four key analytical dimensions (overall Cronbach's $\alpha = 0.90$, KMO = 0.84). The empirical findings reveal perceived operating cost reductions of 30% to 40% through resource mutualization successfully transforming rigid capital expenditures into flexible operational expenses alongside self-reported productivity enhancements of 15% to 25%. In conclusion, the strategic synergy between shared workspaces and circular economy principles functions as an essential financial buffer that mitigates early stage venture insolvency, lowers initial market entry barriers, and fosters sustainable development in emerging economies, directly supporting United Nations Sustainable Development Goals SDG 8, SDG 9, and SDG 12.

Keywords: coworking approach; resource mutualization; financial sustainability; circular economy; emerging professionals; developing economies; product service systems for sustainability (PSSS)

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1. Introduction

1.1. Contextualizing Coworking as a Catalyst for the Circular Economy in Academic and Professional Settings

In the contemporary global context, sustainability and eco-efficiency in resource management have consolidated as essential strategic imperatives, prompting coworking and the circular economy to converge as operational frameworks capable of addressing current demands for innovation and environmental responsibility [1]. In Ecuador, however, the

transition of university graduates into the formal labor market is characterized by persistent structural constraints. According to the National Institute of Statistics and Censuses [2], youth underemployment and professional unemployment have driven a substantial proportion of graduates toward independent professional activities. Although this transition stimulates entrepreneurial activity, it exposes early stage ventures to severe financial vulnerabilities. Evidence from the Global Entrepreneurship Monitor [3] indicates that while Ecuador exhibits one of the highest Total Early Stage Entrepreneurial Activity (TEA) rates in the region, its discontinuation rate exceeds 60% within the first three years, underscoring the extreme fragility of these initiatives due to the rigidity of fixed commercial real-estate costs.

Ecuador thus constitutes an essential empirical setting, further shaped by national legal frameworks such as the Organic Law on Entrepreneurship and Innovation [4] and Simplified Stock Companies (SAS) [5]. Unlike advanced economies where coworking is driven primarily by ecological or lifestyle preferences, in Ecuador it functions as an economic survival imperative and a vital financial buffer against macroeconomic volatility and high venture failure rates [3,6]. As emphasized in recent sustainability research regarding context-specific adaptation and environmental resilience [7], human and organizational systems deploy localized adaptation mechanisms to counter severe structural constraints. These constraints heavily impact emerging professional-service ventures, such as those run by final-year students and young professionals in International Business, Accounting (CPA), and Finance at the Universidad de Guayaquil, where roughly 40% independently provide financial, tax, and foreign-trade advisory. While these activities have low material requirements, their success depends heavily on professional infrastructure and networks [6,8], meaning conventional offices generate disproportionate fixed costs and insolvency risks [9].

Despite the growing literature on collaborative work, a critical scholarly gap persists regarding how spatial servitization and resource mutualization operate as operational financial buffers within service-oriented professional sectors in emerging economies. While existing research has extensively analyzed manufacturing-based circular supply chains or coworking dynamics in developed nations, empirical evidence explaining the specific micro-foundational mechanisms that alleviate structural cost rigidities for young service entrepreneurs remains scarce.

To address this gap, this study is guided by the following core research question: How does resource mutualization within collaborative coworking spaces influence the perceived financial sustainability and operational efficiency of emerging professional ventures in a developing economy? Furthermore, we explicitly test the hypothesis (H_1) that spatial servitization significantly reduces fixed overhead burdens by converting capital expenditures (CapEx) into flexible operational expenses (OpEx), thereby functioning as an essential institutional shock-absorber against early stage venture insolvency.

Grounding this investigation in Product–Service Systems for Sustainability (PSSS) and circular economy principles, the coworking model extends the lifecycle of physical assets and infrastructure through strategic reuse, sharing, and dematerialization, minimizing material waste and overall production costs [8] while building shared value networks [6]. Complementarily, spatial servitization emerges as an efficient mechanism for operational expense mitigation and workspace flexibility [9]. Beyond cutting lease expenditures, shared spaces alleviate professional isolation and foster interactive collaboration [10,11] by cultivating socio-spatial proximity and community governance, thereby catalyzing intangible knowledge exchange, co-creation [8], open innovation, and robust cooperative networks [12,13]. Institutionalizing shared infrastructure and logistical services optimizes asset utilization intensity [14,15], aligning with international eco-efficiency targets. Globally, this model gains academic prominence by enabling organizations to optimize installed capacity and enhance profit margins through cross-industry synergies [16].

Specifically, the primary theoretical contribution of this study lies in elucidating the operational mechanisms linking resource mutualization with financial sustainability through PSSS. By demonstrating how spatial servitization transforms rigid fixed operational expenditures into flexible cost structures, this research bridges a critical literature gap, illustrating how resource sharing mitigates the "liability of newness" for emerging professional service ventures in developing economies [17–20]. Ultimately, this study provides direct empirical evidence on how the synergy between coworking spaces and circular economy principles fosters sustainable development, directly aligning with United Nations Sustainable Development Goals: SDG 8 (Decent work and economic growth) by enhancing venture resilience; SDG 9 (Industry, innovation, and infrastructure) through collaborative business models; and SDG 12 (Responsible consumption and production) by optimizing underutilized assets and lowering ecological footprints.

1.2. Objectives

Analyze the potential of the coworking model as a facilitator of circular economy adoption within the Ecuadorian service sector by examining its evolution and implementation in the national context; characterizing the socio-labor profile, infrastructure needs, and initial capital constraints of final-year students, recent graduates, and young professionals from the International Business, Accounting (CPA), and Finance programs at the Universidad de Guayaquil; evaluating their perceived financial feasibility and readiness to adopt coworking through quantitative psychometric analysis, including the assessment of perceived reductions in fixed operating costs and their implications for the viability of accounting, financial, and foreign-trade consulting ventures; identifying operational circular economy practices associated with resource symbiosis, the optimization of underutilized assets, shared infrastructure, and dematerialized logistics; and establishing strategic guidelines for strengthening the role of higher education institutions in promoting circular entrepreneurship and fostering the integration of academic training with collaborative coworking platforms.

1.3. Evolution, Typologies, and Economic Dimension of Coworking

The global deployment of shared workspaces has given rise to diverse operational configurations that seek to align with the changing needs of entrepreneurial ecosystems [21]. Accordingly, it is possible to identify distinct coworking modalities that optimize infrastructure usage based on the user's profile.

1.3.1. Types of Coworking

- Flexible Coworking: A configuration designed for professionals and entrepreneurs who prioritize spatial adaptability. It allows dynamic access to shared workstations without the constraints of a fixed location, structuring versatile solutions that stimulate open innovation, the horizontal exchange of ideas, and professional scaling [20,21].
- Fixed Coworking: Oriented toward users who demand stability, permanence, and predictability in their work environment. This model provides dedicated workstations where tools and materials can be securely stored with complete convenience, while simultaneously consolidating a sense of belonging, constant interaction, and the co-creation of robust professional communities.
- Nomadic Coworking: Geared toward professional profiles characterized by high geographical mobility. Within this framework, two essential segments are clearly distinguished:
    - Digital Nomads: Professionals who leverage information technologies and global connectivity to execute their activities remotely from any geographical node equipped with internet access.

- Knowmads: Highly skilled knowledge workers who apply their transversal competencies across multiple environments, prioritizing collaborative spaces to socialize experiences, transfer intangible knowledge, and weave international cooperation networks.

- Night Coworking: A modality focused on entrepreneurs whose productivity cycles or sector demands take place outside conventional working hours. These environments typically organize networking dynamics and specialized collaborative workshops that facilitate the exchange of methodologies and project optimization during alternative schedules [22,23].

1.3.2. Impact on Operational Costs and Corporate Profitability

From a financial management perspective, the transition toward these collaborative platforms responds to the imperative need to rationalize cost structures. Contemporary organizations are compelled to absorb critical operational expenses for their survival, such as traditional real estate leasing, administrative payrolls and utility consumption [22]. In this sense, the optimization and rigorous control of these expenditures are decisive, given that they directly impact profit margins; when the burden of fixed costs is disproportionate, the self-financing capacity and overall viability of the firm suffer severe deterioration [23].

Within this explanatory framework, profitability stands as the most relevant synthetic indicator of financial sustainability. Insofar as it highlights the efficiency of income and expenditure flows, it provides strategic information for decision-making aimed at enduring equity growth. Consequently, shared spaces act as financial risk mitigation mechanisms, transforming fixed costs into variable ones through the mutualization of resources.

To delve deeper into the chronological and geographical development of this phenomenon, Table 1 systematizes the historical synthesis of global coworking development, and details the specific evolution of this model within Ecuador's socioeconomic ecosystem.

The global deployment of shared workspaces has fostered diverse operational modalities tailored to spatial flexibility, dedicated stability, technological mobility, and alternative scheduling [20–23]. Since its emergence in the 2005–2010 period with a baseline of 20 pioneering entities, the global coworking sector underwent rapid commercial expansion, growing from 2000 spaces during 2011–2015 to 20,000 enterprises in the 2016–2020 diversification phase and eventually stabilizing at approximately 30,000 global firms in the post-pandemic adaptation stage. Following the global health crisis, market competition shifted away from simple square-footage leasing toward eco-efficient circular infrastructure and digital platforms that reduce structural waste and enhance operational resilience for SMEs [24–28]. Similarly, within Ecuador, the coworking sector evolved across four distinct phases: a pre-formal emergence (2005–2010); a birth phase with the opening of initial operators in Quito and Guayaquil (2011–2015); a geographical expansion and resilience period driven by the Organic Law on Entrepreneurship and Innovation [4] and Simplified Stock Companies (SAS) [5] (2016–2020); and a post-pandemic sustainable consolidation reaching approximately 20 active operators (2021–present). This structural evolution indicates that competitive advantages in the region now depend on eco-efficient circular infrastructure and strategic higher education partnerships rather than raw spatial scale.

Table 1. Synthesized evolution of global and Ecuadorian coworking ecosystems (2005–Present).

Period	Global Development Phase	Evolutionary Dynamics & Sectoral Connectivity (Global)	Global Density (Companies)	Ecuadorian Development Phase	Evolutionary Dynamics & Key Operators in Ecuador	Ecuadorian Density (Spaces)
2005–2010	Birth and institutionalization	Model genesis driven by pioneering initiatives to mitigate professional isolation (Spiral Muse, Betahaus). Emerging socio-spatial collaboration trends.	10–20	Pre-formal emergence	Absence of structured commercial supply. Informal networks formed by independent entrepreneurs in Quito and Guayaquil to lower entry barriers.	0
2011–2015	Global expansion and commercial traction	International commercial scalability catalyzed by major operators (WeWork, Impact Hub). Validation of coworking as a flexible substitute for traditional offices.	1000–2000	Birth of formal coworking	Opening of structured hubs catering to freelancers, tech startups, and social ventures (ImpAQto Quito, Coworking Guayaquil).	3–5
2016–2020	Diversification and corporate absorption	Market segmentation toward corporate clientele (Spaces, Industrious). Ecosystem resilience supported by cost-structure flexibility under market volatility.	10,000–20,000	Geographical expansion and resilience	Decentralization into secondary cities (Workup Cuenca, LOFT Loja). Catalyzed by the Organic Law on Entrepreneurship [4] and SAS framework [5]. Transition toward virtualization.	10–15
2021–Present	Sustainable consolidation & hybrid adaptation	Strategic reconfiguration toward hybrid work models. Competitive focus shifts to servitization, eco-efficient circular infrastructure, and community value.	20,000–30,000	Sustainable consolidation & academic integration	Post-pandemic reactivation. Model consolidates as a circular economy catalyst integrated with higher education institutions (UG) to buffer early insolvency.	20–30

Note: Compiled by the authors based on international literature [1,6,21,22] and empirical mapping of the Ecuadorian entrepreneurial ecosystem [2,4,5].

As evidenced in Tables 2 and 3, the post-pandemic period marked a milestone in the sector's stabilization, recording a cumulative 75% growth rate in operational consolidation. This increase confirms that the market has evolved beyond mere quantitative expansion driven by square footage to enter a phase of qualitative maturation. Within this new paradigm, competitive advantage stems from offering eco-efficient circular infrastructures specifically mutualizing assets to lower fixed costs and establishing strong academic partnerships, thereby enabling independent professional practice for graduates in International Business, Accounting, and Finance.

Table 2. Evolution of the shared workspaces market in the post-pandemic era (2021–present).

Strategic Indicator	Quantitative Expansion Stage (2020–2021)	Qualitative Maturation Stage (2021–Present)	Operational Growth/Shift
Revenue volume/adoption	Baseline recovery following post-lockdown reopening	Consolidated operations with high demand across professional services	+33.33% in revenues/cumulative adoption
Core business model	Traditional leasing of square meters (m^2) and hot-desking	Provision of circular infrastructure, added value, and community building	Transition from commodity real estate to servitization (software/ecosystem)
Sustainability integration	Sporadic or non-existent recycling practices	Energy efficiency, asset reuse, and circular resource pooling	100% focus on eco-efficient infrastructure
Academic alignment	Limited institutional relationship with universities	Incubation hubs, graduate internships (UG), and continuous professional development	Strategic academia–industry partnerships to mitigate early stage insolvency
Primary user profile	Independent freelancers and creative industry professionals	Graduates in International Business, CPA, and Finance	Reduction in early stage venture failure rates (<60%)

Note. Adapted from various authors [3,9]. Compiled by the authors.

Table 3. Value-added distribution matrix in post-pandemic shared workspaces (2021–present).

Share (%)	Value-Added Component Description
25%	Basic physical workspace • Core square footage (m^2), dedicated desks, and basic connectivity.
35%	Eco-efficient circular infrastructure • Mutualization of logistical equipment, printing services, and office furnishings. • Reduction of fixed operating costs through shared resource consumption.
40%	Academic integration and social capital • Strategic synergies among graduates (International Business. CPA. Finance). • Specialized consulting, mentoring, and community governance.

Note. Adapted from various authors [5,15]. Compiled by the authors.

1.4. Key Theories

1.4.1. Circular Economy and Eco-Efficiency Theory

To establish a robust conceptual bridge, resource mutualization within coworking environments directly generates measurable circular outcomes by enforcing the intensive utilization of shared physical assets, office infrastructure, and digital hardware. Rather

than serving as a mere cost-saving tactic, this shared-access model operationalizes the core tenets of the circular economy by preventing premature asset obsolescence, curbing material waste from redundant individual setups, and achieving the tangible dematerialization of administrative workflows [6,29]. Grounded in closed-loop frameworks, this conceptual approach provides a lens for understanding how organizations transition away from traditional, extractive 'take–make–dispose' dynamics to maximize the operational utility of inputs while mitigating system losses. By prioritizing the conscious, cyclic, and prolonged use of resources through material reuse, recycling, and regeneration, this model not only optimizes operational resource management but also fosters long-term environmental and economic sustainability through shared value [6]. Ultimately, organizations adopting this logic directly drive systemic sustainability by reducing per capita spatial footprints and minimizing administrative waste [29].

1.4.2. Sharing Economy, Shared Access Theory, and the CapEx-to-OpEx Cost-Reduction Mechanism

This theoretical approach explains the organizational paradigm shift where economic value no longer resides in the ownership of fixed assets, but rather in the optimization of their utilization through shared platforms. From the perspective of the sharing economy, an approach is promoted that replaces the individual ownership paradigm with that of shared access to goods, infrastructure, and services, providing organizations with the structural flexibility indispensable for adapting to dynamic markets [30].

To explicitly unpack *how* resource sharing reduces fixed costs, this framework operates through a crucial micro-foundational mechanism: the transformation of rigid capital expenditures (CapEx) such as commercial real-estate leases and heavy office outfitting—into flexible operating expenses (OpEx). By externalizing fixed infrastructure overhead and leveraging shared technological assets, early stage ventures avoid front-loaded sunk costs, directly neutralizing liquidity pressures and commercial entry barriers [9,14]. Consequently, coworking establishes itself as an efficient strategic alternative for mitigating operational overhead and increasing workforce flexibility among emerging professional service ventures [9].

1.4.3. Socio-Spatial Proximity and Relational Capital Theory

From the perspective of economic geography and management sciences, it is understood how cohabitation within the same physical space and the adoption of community governance frameworks catalyze collective synergies indispensable for transitions toward sustainability [31]. From a shared-use perspective, socio-spatial proximity enables the material optimization of resources and the agile integration of eco-efficient value chains among independent professionals, overcoming the barriers of traditional isolation [32]. This environment not only facilitates knowledge transfer and the development of associative dynamics but also acts as a mitigating mechanism for the financial and operational risks typically faced by emerging ventures.

Beyond the economic benefit entailed by the reduction of operational costs, shared work environments consolidate themselves as active platforms that counteract professional isolation and stimulate dynamics of cooperation [10]. This socio-spatial closeness, combined with collective governance frameworks, allows coworking to act as a driver for the transfer of tacit knowledge and the co-design of value, thereby fostering open innovation and the structuring of robust collaborative networks [12,13]. The diverse nature of these ecosystems breaks away from traditional office setups by congregating multiple disciplines within a single space, triggering enriched social capital and cross-cutting strategic alliances [16].

Theoretical Synthesis: Coworking as a Catalyst for Circular Entrepreneurship and Risk Mitigation

The articulation of these theoretical approaches reveals that coworking operates as a physical and institutional platform that operationalizes the circular economy, constituting an unprecedented strategic opportunity for emerging professionals and university graduates. Confronted with the financing constraints and high fixed overhead that characterize the traditional corporate real estate market, coworking acts as a mechanism for the democratization of entrepreneurship and a vital institutional shock-absorber against early stage venture insolvency.

By systematically dismantling financial entry barriers and mitigating the structural liability of newness, this model enables new professionals to articulate immediate cross-sectoral associative networks where, for instance, experts in International Business, Accounting, and Finance from the Universidad de Guayaquil can co-invest and complement their service portfolios. Ultimately, shared spaces facilitate agile, low-cost business deployment with minimized initial financial risk, transforming rigid infrastructure expenditures into relational, collaborative, and eco-efficient assets.

2. Materials and Methods

2.1. Research Design and Approach

The research adopted a quantitative, cross-sectional, and descriptive-analytical design. To evaluate the rigor of the 20-item instrument, construct feasibility and sampling adequacy were assessed using the Kaiser–Meyer–Olkin test (KMO = 0.84) and Bartlett's Test of Sphericity ($p < 0.001$), confirming that the correlation matrix was suitable for factor analysis. Overall Cronbach's alpha ($\alpha = 0.90$) reached 0.90, while dimensional subscales maintained individual coefficients ranging from 0.84 to 0.89. These metrics confirm high internal psychometric reliability and sampling factorability for this descriptive framework, establishing a solid baseline without overstating complete construct validation or item non-redundancy [33–35].

2.2. Population, Sample, and Sampling Strategy Justification

To establish a rigorous empirical foundation, the study population ($N = 400$) was precisely delimited to include all graduating seniors and recent graduates from the 2025 academic cohort within the Faculty of Administrative Sciences at the Universidad de Guayaquil. Access to this specific target frame was facilitated by the authors' institutional positioning as faculty members and academic tutors across the International Business, Finance, and Accounting (CPA) programs (specifically involving researchers Maria Elena Guevara-Toscano, Henry Fred Lavayen-Yavar and Elizabeth del Carmen Calderón- Quijije), granting privileged, direct insight into monitoring professional integration pathways.

To determine the appropriate sample size, the finite population proportion formula was applied:

$$n = \frac{N \cdot z^2 \cdot p \cdot q}{e^2(N-1) + z^2 \cdot p \cdot q}$$

Utilizing a 95.0% confidence level ($z = 1.96$), maximum heterogeneity ($p = q = 0.5$), and standard statistical parameters, the formula yielded a minimum required baseline sample size of $n = 147$ participants. Rather than restricting distribution to a calculated subsample, the survey instrument was purposefully deployed across the entire target population ($N = 400$). A total of $n = 150$ valid responses were successfully collected and verified (representing an active response rate of 37.5%). This achieved sample slightly exceeds the statistical baseline requirement, thereby strengthening data robustness. Based on these parameters, the resulting corrected margin of error is calculated at ±6.45%. Notably,

most of these young professionals engage in independent practice, offering operational consulting in foreign trade, tax management, and SME finance market segments that serve as the core focus of this study.

2.3. Data Collection Techniques and Instruments

A structured survey served as the primary data collection through a digitized questionnaire comprising 20 closed-ended items, which were previously refined and validated via a pilot test. Construct responses were measured using a 5-point Likert scale (ranging from 1: "Strongly disagree" to 5: "Strongly agree"), providing an optimal metric structure for analyzing the latent dimensions of financial feasibility, resource sharing, and workspace circularity (more details within the Supplementary Materials paragraph and in the SuSy Supplementary Files).

The instrument was balanced across four analytical dimensions, distributing five items per block to evaluate the feasibility of using coworking spaces:

1. Financial and cost efficiency: Aimed at evaluating budget constraints and the viability of shared infrastructure through joint expenses.
2. Operational and associative: Designed to measure knowledge transfer and the co-creation of multidisciplinary portfolios among users.
3. Circular sustainability: Focused on eco-efficiency and the optimization of underutilized assets or shared technological resources.
4. Impact and benefits of circular work ecosystems and business connectivity: Intended to link economic viability with relational capital and the ecological sustainability of ventures.

The questions designed to evaluate the impact of the coworking model across each dimension are as follows:

Dimension 1: Financial and cost efficiency

Measures how shared workspaces mitigate initial and fixed cost barriers, reduce financial risks in pre-operational stages, and optimize budgets to deliver economic advantages over traditional offices.

1. Do initial financial costs and current fixed operating expenses represent a critical barrier to the independent development of professional projects or services?
2. Does sharing physical infrastructure expenses (utilities, maintenance, and connectivity) under a coworking model significantly improve the economic viability of organizational initiatives?
3. Could the budget currently allocated to traditional infrastructure be better optimized through shared and flexible workspaces?
4. Does access to a coworking environment reduce financial risks associated with investment in tangible fixed assets during pre-operational stages?
5. Does adopting a shared infrastructure model provide a sustainable economic advantage over the traditional model of independent offices?

Dimension 2: Operational and associative

Measures how a multidisciplinary collaborative environment streamlines problem-solving, eliminates communication barriers, drives immediate strategic alliances, and enhances operational efficiency against market demands.

6. Does integrating professional profiles from all three academic disciplines into a single physical space facilitate the immediate resolution of complex operational problems?
7. Does the collaborative environment stimulate the creation of a shared, multidisciplinary service portfolio that delivers greater value than isolated work?

8. Are operational communication and coordination barriers among different fields substantially minimized when working within a coworking ecosystem?
9. Is there optimal organizational readiness to establish immediate strategic alliances and joint projects by leveraging the core competencies of each discipline?
10. Does the associative synergy generated in these spaces enhance response capacity and operational efficiency when facing external market demands?

Dimension 3: Circular sustainability

Measures how shared infrastructure optimizes underutilized assets, reduces ecological footprints, and promotes responsible consumption, dematerializing processes in alignment with the transition toward a circular economy.

11. Does sharing physical resources and technological infrastructure significantly reduce the ecological footprint and institutional material waste?
12. Is the optimization of currently underutilized spaces and assets within the organization a key priority for enhancing ecological efficiency (eco-efficiency)?
13. Is a model based on the sharing economy more sustainable in the long term than models grounded in the exclusive ownership of resources?
14. Does the use of shared platforms and environments foster a culture of responsible consumption and the dematerialization of physical processes within the community?
15. Does the implementation of a coworking model align effectively with institutional policies for transitioning toward a sustainable circular economy?

Dimension 4: Impact and benefits of circular work ecosystems and business connectivity

This dimension connects ecological sustainability (circularity) with economic sustainability (connectivity and synergy), demonstrating that collaboration within dynamic networks is the most effective tool for new professionals to mitigate risks and scale their projects with a lower environmental impact.

16. Does integrating coworking spaces and shared resources significantly lower operational costs (rent, utilities, and maintenance) for ventures?
17. Does constant interaction and access to professional support networks within coworking spaces increase users' productivity?
18. Does implementing circular economy practices in shared environments optimize material use and the utilization of technological resources?
19. Does adopting circular principles in the workspace reduce material waste and decrease non-renewable resource consumption?
20. Does the coworking environment facilitate the creation of strategic connections that enhance business opportunities and strengthen the entrepreneurial network?

3. Results and Discussion

3.1. Empirical and Psychometric Results

The descriptive and inferential analysis of the survey items evaluates the empirical perceptions of feasibility, resource mutualization, and financial sustainability among the target cohort ($n = 150$). As established in the methodological design, all quantitative metrics reported herein represent self-reported psychometric appraisals and subjective evaluations of operational feasibility rather than direct corporate balance-sheet or financial accounting audits.

3.1.1. Internal Consistency and Psychometric Reliability

To evaluate the internal properties of the 20-item research instrument across the four conceptual dimensions, Cronbach's alpha (α) and sampling adequacy indices were computed. The comprehensive psychometric baseline is summarized in Table 4.

Table 4. Feasibility assessment of the coworking model using Cronbach's alpha coefficient.

Analyzed Metric	Symbol	Calculated Value	Status/Academic Interpretation
Number of items	K	20	Complete scale evaluated without item exclusion.
Sum of item variances	$\sum \alpha_i^2$	15.74	Controlled internal variance per indicator.
Variance of total scores	σ_x^2	109.21	Optimal dispersion of the overall cumulative scale.
Cronbach's alpha coefficient	α	0.90	High internal reliability ($\alpha \geq 0.80$).

Note: Statistical calculations processed using IBM SPSS, Statistics 22.

The overall scale yielded a Cronbach's alpha of $\alpha = 0.90$, while sampling adequacy tests reached KMO = 0.84 ($p < 0.001$). Individual dimensional subscales maintained consistent internal reliability coefficients ranging between 0.84 and 0.89. Item responses were recorded using a standard 5-point Likert scale (1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree).

3.1.2. Item-Level Descriptive Analysis

The consolidated item-level responses, arithmetic means (μ), and standard deviations (σ) across all 20 indicators ($n = 150$) are detailed in Table 5.

Table 5. Cumulative responses per item, mean (μ), and standard deviation (σ) ($n = 150$).

Item Code	Likert Scale					Total (n)	Mean (μ)	SD (σ)
	1	2	3	4	5			
Q1	5	13	19	69	44	150	3.89	1.03
Q2	2	5	11	65	67	150	4.27	0.84
Q3	3	8	17	69	53	150	4.07	0.93
Q4	4	9	24	64	49	150	3.97	0.99
Q5	2	6	15	72	55	150	4.15	0.85
Q6	5	11	25	65	44	150	3.88	1.02
Q7	1	5	12	72	60	150	4.23	0.79
Q8	6	12	21	71	40	150	3.85	1.03
Q9	2	5	17	55	71	150	4.25	0.88
Q10	3	7	19	75	46	150	4.03	0.90
Q11	3	7	14	69	57	150	4.13	0.91
Q12	1	5	13	61	70	150	4.29	0.82
Q13	2	10	16	72	50	150	4.05	0.91
Q14	5	13	24	67	41	150	3.84	1.03
Q15	2	4	16	73	55	150	4.17	0.82
Q16	0	5	17	69	59	150	4.21	0.77
Q17	0	3	14	68	65	150	4.30	0.72

Table 5. *Cont.*

Item Code	Likert Scale					Total (n)	Mean (μ)	SD (σ)
	1	2	3	4	5			
Q18	0	1	17	74	58	150	4.26	0.68
Q19	2	6	9	69	64	150	4.25	0.84
Q20	3	6	22	67	52	150	4.06	0.91
Average	3	7	17	68	55	150	4.11	0.90

Note: Absolute response frequencies shown under scale options 1–5. Overall scale mean ($\mu = 4.11$) calculated via weighted arithmetic mean.

Across the overall sample, the instrument demonstrated high affirmative consensus ($\mu = 4.11, \sigma = 0.90$). As illustrated in Figure 1, dimensional breakdowns reveal the following empirical distributions:

- Dimension 1: Financial and cost efficiency ($\mu = 4.07, \sigma = 0.94$): High consensus is concentrated in Item Q2 ($\mu = 4.27, \sigma = 0.84$; 88.00% agreement regarding shared expense benefits) and Item Q5 ($\mu = 4.15, \sigma = 0.85$; 84.67% validating financial superiority over individual leasing). Pre-operational capital risk (Q4, $\mu = 3.97, \sigma = 0.99$) and traditional rent burdens (Q1, $\mu = 3.89, \sigma = 1.03$) exhibited higher response dispersion.
- Dimension 2: Operational and associative ($\mu = 4.05, \sigma = 0.95$): Spatial flexibility (Q7, $\mu = 4.23, \sigma = 0.79$) and commercial visibility (Q9, $\mu = 4.25, \sigma = 0.88$) marked the strongest agreement. Intersectoral alliance generation (Q8) registered higher variance ($\mu = 3.85, \sigma = 1.03$; 22.00% neutral/disagreeing responses).
- Dimension 3: Circular sustainability ($\mu = 4.10, \sigma = 0.91$): Material infrastructure sharing (Q12, $\mu = 4.29, \sigma = 0.82$) and collective asset optimization (Q15, $\mu = 4.17, \sigma = 0.82$) recorded solid consensus. Digital dematerialization (Q14) formed the lowest mean score and highest dispersion within the dimension ($\mu = 3.84, \sigma = 1.03$; 28.00% neutral or negative responses).
- Dimension 4: Circular ecosystems and connectivity ($\mu = 4.22, \sigma = 0.80$): Social capital generation (Q17, $\mu = 4.30, \sigma = 0.72$) and venture retention through financial buffering (Q18, $\mu = 4.26, \sigma = 0.68$) achieved the highest and most homogeneous consensus in the study. Information security and data privacy (Q20, $\mu = 4.06, \sigma = 0.91$) marked the main point of caution.

Based on the descriptive results (n = 150), surveyed professionals perceive that circular economy-based coworking is not merely an ecological decision; it is a smart financial strategy that transforms the cost structure of independent professionals and SMEs through four key impacts (Table 6):

Immediate financial relief: Estimated at a perceived 30% to 40% reduction in fixed operating costs through the shared payment of utilities and infrastructure. This is validated by Dimension 1 (Financial), where item Q2 (shared expenditure) achieved the highest consensus in the study with an 88.00% approval rate (u = 4.27).

Elimination of dead costs: Sharing technology, common areas, and hardware improves resource utilization by 20% to 30%, eliminating capital lost on vacant offices or underutilized equipment.

Reduced startup risk: By converting fixed costs into variable costs, substantial upfront investments in furniture and rigid lease contracts are eliminated, functioning as a financial buffer against early stage insolvency.

Economic sustainability and scalable productivity: The cumulative monthly savings in rent and eco-efficiency generate an immediate liquidity injection. This growth is directly

enhanced in Dimension 4, where findings demonstrate that the collaborative ecosystem and active networking yield self-reported labor productivity gains of 15% to 25%.

Table 6. Dimensional synthesis matrix: Key findings on percentage acceptance and their impact on operational efficiency and financial sustainability (n = 150).

Dimension of Analysis	Key Findings and Acceptance	Translation into Savings and Optimization
1. Financial and cost efficiency	88.00% support expense consolidation and cost sharing. 81.33% validate budget optimization. 75.33% state that it reduces initial startup risk.	Immediate liquidity injection. Shared payments for high-speed internet, maintenance, and utilities reduce fixed overhead. This avoids tying up capital in tangible assets during initial startup stages.
2. Operational and associative	88.00% consider creating joint service portfolios viable. 84.00% support immediate strategic alliances. 74.00% report lower communication friction.	Reduction in hiring and procurement costs. Coexisting with professionals across diverse sectors (finance, marketing, and law) enables the immediate assembly of multidisciplinary projects, eliminating the costs of searching for and contracting external vendors.
3. Circular sustainability	87.33% reject maintaining underutilized assets. 84.00% support hardware sharing. 72.00% favor digital dematerialization.	Elimination of "dead costs." Wasteful spending on offices or meeting rooms that remain vacant half the time is eliminated. Sharing printers, servers and hardware reduces individual equipment and supply procurement.
4. Circular ecosystems and connectivity *(Highest-rated dimension)*	88.67% highlight productivity gains. 88.00% endorse technology cost savings. 85.33% confirm relief in startup costs.	Higher efficiency and lower technical investment. The collaborative environment and daily networking boost productivity by 15% to 25%. Additionally, direct technology savings of 20% to 30% are achieved by eliminating individual purchases of expensive software or specialized equipment.

Note: Based on the triangulation of descriptive statistical results (n = 150) and the analysis of the four dimensions of the instrument. The percentages presented correspond to the cumulative acceptance levels (Agree (4) + Strongly Agree (5)) of the most representative items in each analyzed dimension.

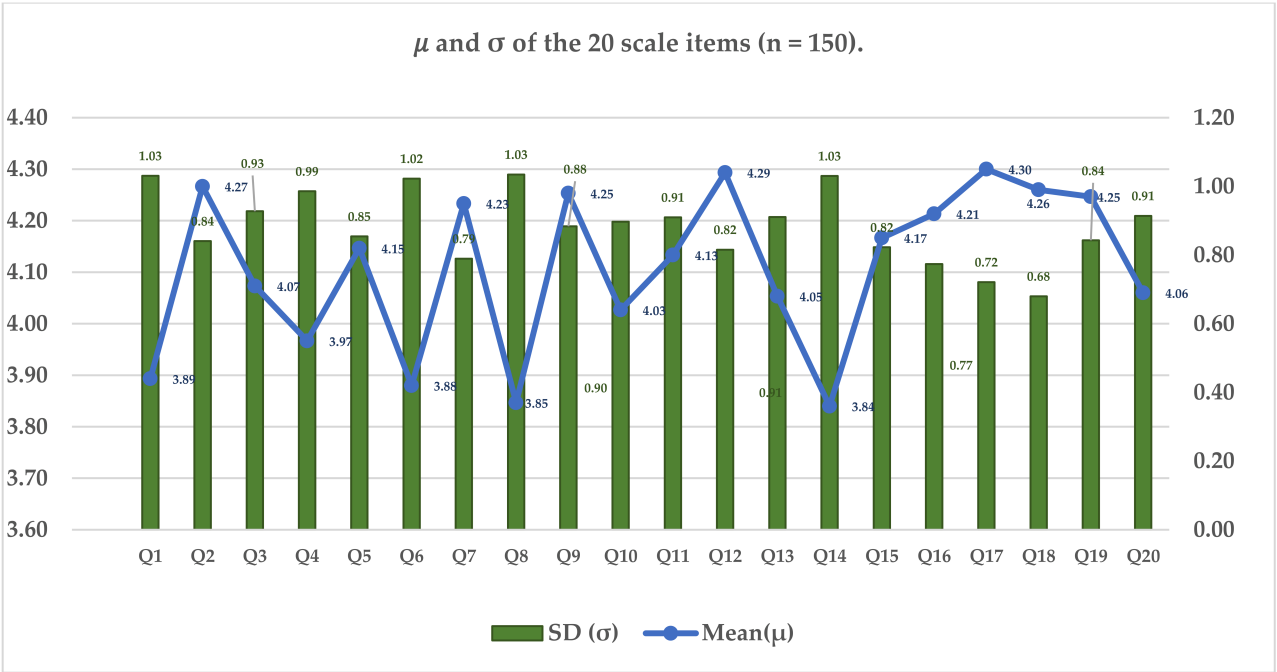

Figure 1. Absolute response frequencies shown under scale options 1–5. Overall scale mean (μ = 4.11) calculated via weighted arithmetic mean. X-axis: survey items (Q1 to Q20); primary Y-axis (**left**): arithmetic mean (μ); and secondary Y-axis (**right**): standard deviation (σ).

3.2. Discussion

The empirical evidence derived from this study illustrates how collaborative coworking spaces operate as functional catalysts for spatial circularity and financial shock-absorption within an emerging economy context [2,3,6]. Grounded in Product–Service Systems for Sustainability (PSSS) and eco-efficiency frameworks, resource mutualization directly operationalizes circular principles by driving intensive asset utilization, extending infrastructure lifecycles, and fostering dematerialized workflows [6,8,28]. Rather than functioning merely as an isolated cost-cutting practice, shared access replaces physical asset ownership with flexible service delivery, neutralizing initial capital barriers for independent practitioners [9,14,30].

A comparative analysis of our findings ($\mu = 4.11, \sigma = 0.90$) highlights a distinct socio-economic divergence when contrasted with European and North American literature [3,6,16]. In advanced economies, shared workspace adoption is predominantly driven by lifestyle preferences, flexible work–life integration, and voluntary carbon footprint mitigation [16,22]. Conversely, in Ecuador where youth underemployment remains persistent [2] and early stage venture discontinuation rates exceed 60% within three years [3]—the perceived 30% to 40% operating cost reduction through shared overhead functions as a structural economic survival imperative [3,6,9]. By converting rigid capital expenditures (CapEx) into adaptable operating expenses (OpEx), spatial servitization effectively buffers emerging service ventures against the structural 'liability of newness' [6,17–20].

Furthermore, the empirical identification of key operational bottlenecks offers critical insights into the practical limits of workspace circularity in developing regions [36]. The low score and high dispersion observed in digital dematerialization (Item Q14, $\mu = 3.84$, $\sigma = 1.03$) underscore persistent local regulatory constraints and cultural reliance on physical documentation, particularly within accounting, tax, and customs consulting domains [3,6]. Similarly, the dispersion surrounding intersectoral synergy creation (Item Q8, $\mu = 3.85$, $\sigma = 1.03$) confirms that physical co-location alone does not automatically yield active business partnerships without deliberate community governance and internal matchmaking frameworks [10,21,31].

From a methodological standpoint, these findings must be interpreted in light of recent scholarly critiques regarding collaborative workspace evaluations [21,37]. First, while psychometrically robust ($\alpha = 0.90$, KMO = 0.84), the reliance on cross-sectional perception data captures subjective feasibility evaluations rather than audited financial balance-sheet outcomes [21,37]. Perceived cost savings and self-reported productivity gains (15–25%) reflect user expectations and immediate liquidity relief, which may vary from long-term corporate survival rates [21]. Second, addressing measurement reliability in spatial and environmental frameworks requires rigorous methodological controls; as highlighted in recent sustainability research [7,38], localized human adaptation mechanisms and spatial measurement errors demand precise psychometric framing to prevent over-generalization Finally, in light of recent methodological critiques concerning collaborative workspaces [21,37], several limitations of this study must be explicitly acknowledged. First, the cross-sectional design captures a single temporal snapshot, restricting causal inferences regarding the long-term stabilization of emerging ventures. Second, the reliance on self-reported survey data, while psychometrically validated ($\alpha = 0.90$), inherently introduces subjective appraisal biases common in perceptual workplace evaluations [21]. As highlighted in international comparative literature [21,37], subjective perceptions of cost savings and productivity can sometimes diverge from audited financial realities.

4. Conclusions

4.1. Empirical Findings

The empirical evidence confirms that the collaborative coworking model functions as a vital operational and financial buffer for emerging professionals, recent graduates, and young micro-entrepreneurs in Ecuador [36]. Through resource mutualization, respondents perceive fixed operating cost reductions of 30% to 40% and self-reported productivity gains of 15% to 25%. This spatial servitization mitigates the structural vulnerability of early stage service ventures, providing immediate liquidity relief against rigid commercial real-estate costs [2]. However, the descriptive analysis also revealed two critical operational bottlenecks:

- Digital dematerialization bottleneck (Item Q14, $\mu = 3.84$, $\sigma = 1.03$): reflecting local regulatory and cultural resistance to paperless workflows.
- Friction in intersectoral synergies (Item Q8, $\mu = 3.85$, $\sigma = 1.03$): showing that physical proximity alone does not automatically translate into active collaborative alliances without structured community facilitation.

4.2. Theoretical Implications

From a theoretical perspective, these results advance the integration of Product–Service Systems for Sustainability (PSSS), Eco-Efficiency Theory, and the Sharing Economy in developing nation contexts [6,33]. By operationalizing asset mutualization, coworking converts rigid capital expenditures (CapEx) into flexible operating expenses (OpEx), directly mitigating the structural "liability of newness" for emerging service ventures [3,9]. Furthermore, when contrasted with advanced economies where shared spaces are largely driven by lifestyle or carbon footprint optimization [16,37], in developing economies like Ecuador, resource mutualization serves primarily as an economic survival imperative and an institutional shock-absorber against high venture insolvency rates [6].

4.3. Targeted Practical Recommendations

To directly address the operational bottlenecks identified in the empirical assessment (Q14 and Q8), actionable recommendations are structured for three key ecosystem stakeholders:

- For coworking operators and space managers:
  - Address the synergy governance deficit (Q8): Implement community management protocols, curated interdisciplinary networking sessions, and internal matchmaking platforms to actively catalyze cross-sectoral alliances among International Business, CPA, and Finance professionals, transforming passive co-location into strategic co-creation.
  - Mitigate the digital dematerialization obstacle (Q14): Outfit shared spaces with integrated cloud infrastructure, digital signature tools, and paperless administrative management platforms to help members overcome cultural and operational reliance on physical paper.
- For emerging entrepreneurs and independent practitioners:
  - Strategic asset mutualization: Prioritize shared access to technological hardware and administrative services over individual asset ownership, reinvesting the resulting OpEx savings into core service diversification and digital positioning.
  - Active ecosystem engagement: Transition from isolated task execution to active participation in community governance and collaborative service portfolio co-design.
- For policy makers and higher education institutions:

- Target digital transition regulatory frameworks (Q14): Establish public policies and municipal incentives that recognize green, eco-efficient shared workspaces and streamline legal paperless processes (e.g., electronic invoicing and digital tax filing for SAS companies).
- Academia-industry integration: Higher education institutions, such as the Universidad de Guayaquil, should embed circular economy frameworks and collaborative entrepreneurship incubators directly into university curricula [37,39], positioning coworking hubs as formal bridges for graduate labor market insertion.

4.4. Limitations and Future Research Directions

While these findings offer robust empirical insights into feasibility perceptions, this study is subject to specific methodological boundaries. First, in alignment with international literature on workplace perceptions [21,37], the cross-sectional, self-reported design captures subjective evaluations rather than audited financial accounting outcomes. Second, regarding external validity, the sample is bounded to $n = 150$ respondents from specific business and accounting programs at the Universidad de Guayaquil. Consequently, findings should be interpreted within this target population rather than broadly generalized to all SMEs or developing economies. Future research should expand to multi-institutional and cross-sectoral samples.

Ultimately, these findings demonstrate that coworking transcends a modern work trend; it represents a viable, strategic model for driving the transition toward circular, collaborative, and sustainable economies over the medium and long term.

5. Recommendations

Based on the empirical findings, the theoretical implications, and the specific operational bottlenecks identified during the psychometric evaluation—namely, the digital dematerialization hurdle (Item Q14, $\mu = 3.84$, $\sigma = 1.03$) and the governance friction in intersectoral synergies (Item Q8, $\mu = 3.85$, $\sigma = 1.03$)—the following evidence-based recommendations are established for key stakeholders, alongside guidelines for future research.

- 1. Evidence-based recommendations for coworking operators and space managers:
  - Address the synergy governance deficit (Q8): Because physical proximity alone does not automatically generate collaborative networks, operators must implement structured community management protocols, curated interdisciplinary networking sessions, and internal matchmaking platforms. These initiatives will actively catalyze cross-sectoral alliances among International Business, Accounting (CPA), and Finance professionals, transforming passive co-location into strategic co-creation.
  - Mitigate the digital dematerialization obstacle (Q14): To counter cultural and local regulatory resistance to paperless workflows, space managers should outfit shared environments with integrated cloud infrastructures, digital signature toolkits, and paperless administrative management frameworks.
- 2. Evidence-based recommendations for emerging entrepreneurs and independent practitioners:
  - Strategic asset mutualization and capex-to-opex conversion: Entrepreneurs should prioritize shared access to technological hardware and logistical infrastructure over individual asset ownership. Reinvesting the resulting operational expense (OpEx) savings into core service diversification and digital positioning directly mitigates initial liquidity constraints [2,3].

- Active ecosystem engagement (Q8): Practitioners must transition from isolated task execution to active participation in community governance, leveraging shared spaces as dynamic platforms for collaborative service portfolio co-design.

- 3. Evidence-based recommendations for policy makers and higher education institutions:
  - Targeted regulatory frameworks for digital transition (Q14): Public authorities and municipal entities must establish policies and regulatory incentives that formally recognize eco-efficient shared workspaces while streamlining legal paperless procedures (such as electronic invoicing and digital tax filing for Simplified Stock Companies [SAS] [5].
  - Curricular alignment with market demands: Universities, such as the Universidad de Guayaquil, must embed circularity frameworks, advanced digital tools, and joint venture incubators directly into academic degree plans [37,39]. Consequently, shared workspace hubs would serve as institutional catalysts for post-graduate career advancement and market entry.
- 4. Future research directions (longitudinal and comparative studies):
  - Longitudinal financial tracking: In alignment with international methodological critiques regarding perceptual workplace evaluations [21,37], future research should incorporate multi-source corporate accounting data and longitudinal tracking over multi-year periods. This will rigorously substantiate whether perceived cost reductions (30–40%) and productivity enhancements (15–25%) translate into audited balance-sheet growth.
  - Cross-national and sectoral comparisons: Scholars should execute comparative studies between developing and developed economies to analyze how structural economic environments shape the financial buffering capacity of shared workspaces.

Supplementary Materials: The following supporting information can be downloaded at https://www.mdpi.com/article/10.3390/su182211636/s1: File S1: Blank survey questionnaire, in both English and Spanish [40].

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Institutional Review Board Statement: Ethical review and approval were waived for this study in accordance with Article 14 of the Regulations of the Human Research Ethics Committee of the Universidad de Guayaquil (CEISH-UG), studies involving anonymous professional surveys and perception assessments (with zero clinical intervention, no biological samples, and absolute participant anonymity) automatically qualify as exempt from ethical review. As an academic perception study evaluating the feasibility of shared workspaces among professionals and business students, this research is strictly classified as presenting zero risk to human participants.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The raw data is not publicly available due to confidentiality agreements and to ensure the privacy of survey participants, who were assured that their personal information would remain protected and that technical responses would be used exclusively for statistical purposes.

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Abbreviations

The following abbreviations are used in this manuscript:

Abbreviation	Description
CapEx	Capital Expenditures
CPA-CAU	Certified Public Accounting (Audit) (Contaduría Pública Autorizada)
ICF	Internal Competitive Fund
MAATE	Ministry of the Environment, Water and Ecological Transition (Ministerio del Ambiente. Agua y Transición Ecológica, Ecuador)
n	Sample Size
N	Neutral (Likert scale)/Population Size
NIN	International Business (Negocios Internacionales)
OpEx	Operational Expenses
Pymes (SMEs)	Small and Medium-Sized Enterprises
PSSS	Product–Service System for Sustainability
SDGs(ODS)	Sustainable Development Goals (United Nations)
SDG 8	Decent Work and Economic growth
SDG 9	Industry, Innovation, and Infrastructure
SDG 12	Responsible Consumption and Production
UG	University of Guayaquil
μ	Statistical Mean
SD	Standard Deviation

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