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# Regenerative Business Models for Local Production Systems

**Dr. Juliana S. Carvalho**

Associate Professor, Federal University of Ceará (UFC), Brazil

**Abstract**

The growing interest in localized and distributed production has renewed attention to the economic, environmental, and social consequences of producing goods closer to the communities in which they are consumed. Yet localization alone does not guarantee sustainability. A production system may shorten physical supply chains while continuing to depend on virgin materials, fossil energy, disposable product architectures, weak labor arrangements, and extractive patterns of value capture. This study develops a regenerative business-model perspective for local production systems by integrating scholarship on sustainable business models, circular economy, distributed manufacturing, resource-loop strategies, and regenerative economic principles. The proposed perspective distinguishes conventional localization from genuinely regenerative production by examining whether an enterprise restores productive capacities, circulates materials at high value, strengthens ecological conditions, builds community capabilities, and retains a meaningful share of economic value within the locality.Because no primary field dataset was supplied, the empirical component is explicitly structured as a reproducible simulation rather than presented as completed field research. Twenty-four hypothetical local production units are classified into four analytical archetypes: Conventional Local, Efficiency-Led Local, Circular Local, and Regenerative Local.

A Regenerative Integration Score is simulated alongside Local Value Retention to demonstrate how a future empirical study could operationalize the framework. The simulated results show progressively higher regenerative-integration scores across the four archetypes and an illustrative positive relationship between regenerative integration and local value retention. The simulated Pearson correlation is r = 0.89, with approximately 79.5% of modeled variation in local value retention associated with variation in the regenerative-integration measure. These values are analytical demonstrations and must not be interpreted as observed real-world effects.The study contributes a practical distinction between merely producing locally and organizing production regeneratively. It argues that regenerative local production requires business models that connect material circularity, ecological renewal, distributed capabilities, community participation, repair and reuse systems, resilient sourcing, and locally anchored value distribution. The framework offers a foundation for future comparative case studies, surveys, life-cycle assessments, and longitudinal investigations of place-based production systems.

***Keywords:*** regenerative business models; local production; distributed manufacturing; circular economy; sustainable business-model innovation; local value retention; resource loops; community resilience

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## 1. Introduction

Production systems are undergoing a gradual reconsideration of the assumption that efficiency necessarily requires geographically concentrated manufacturing and globally extended supply chains. Digital fabrication, modular production, flexible manufacturing technologies, localized entrepreneurship, and distributed production networks have created new possibilities for producing selected goods nearer to their points of demand. Research on distributed manufacturing has therefore examined production configurations based on adaptable and decentralized units, while localized-production scholarship has emphasized the potential for closer relationships among producers, users, suppliers, and communities. Rauch, Dallasega, and Matt specifically associated distributed manufacturing with flexible production networks and opportunities for regional economic cycles, while Srai and colleagues later treated distributed manufacturing as a distinct form of localized production rather than merely another configuration of conventional multinational manufacturing.

Localization, however, should not be equated automatically with environmental or social improvement. Kohtala's review of distributed production emphasized that the sustainability implications of distributed systems depend on numerous contextual conditions and cannot be inferred simply from geographic proximity. A locally manufactured product may still rely heavily on nonrenewable materials, inefficient machinery, low product utilization, weak recovery systems, or resource-intensive consumer behavior. Conversely, a carefully designed localized system can combine demand-responsive production, reduced inventories, repair capability, material recirculation, and stronger connections between production and consumption. The central analytical question is therefore not whether production is local, but what kind of business logic governs the local production system.

This question becomes particularly important when circular-economy and regenerative perspectives are introduced. Geissdoerfer and colleagues describe circularity through the narrowing, slowing, and closing of material and energy loops, while the Ellen MacArthur Foundation presents circular economy as a systemic alternative to the linear take-make-waste model. Bocken and colleagues similarly show that sustainable business-model innovation can involve material efficiency, value creation from waste, renewable inputs, stewardship, sufficiency, and organizational purposes that extend beyond conventional financial optimization. Such approaches shift attention from isolated environmental improvements toward the architecture through which value is created, delivered, retained, recovered, and redistributed.

Regeneration extends this argument further, although the concept requires careful use. Morseletto's examination of restorative and regenerative terminology cautions against treating regeneration as an undefined sustainability slogan. In a rigorous business context, regeneration should therefore be operationalized through observable contributions to ecological capacity, resource renewal, social capability, productive resilience, and positive place-based outcomes rather than through promotional claims. This distinction is especially relevant for local production. A business may recycle packaging and use regional suppliers while remaining fundamentally extractive; alternatively, it may organize production so that materials retain utility, biological resources are replenished, skills remain within communities, products are repairable, and economic value reinforces the productive capacity of the locality.

The present study develops an integrated framework for examining these differences. It conceptualizes regenerative local production as a business-model configuration in which proximity is combined with circular resource management, ecological responsibility, community capability development, adaptive production, and locally anchored value capture. The paper does not claim completed field experimentation. Instead, it combines literature-based conceptual development with a transparent simulation illustrating how regenerative integration might be measured empirically. This design makes it possible to clarify constructs, propose measurable dimensions, compare alternative local-production archetypes, and establish a research platform that can subsequently be tested using real enterprises, cooperatives, maker networks, microfactories, community manufacturers, and place-based production ecosystems.

## 2. Objectives of the Study

### 2.1 Conceptual Objective: Defining Regenerative Local Production

The first objective is to establish a conceptually precise distinction among conventional local production, sustainable local production, circular local production, and regenerative local production. Geographic proximity is treated as only one structural characteristic of a production system. The study therefore asks whether the underlying business model reduces dependency on virgin resources, keeps products and components in useful circulation, restores ecological capacities where relevant, and strengthens relationships among producers, users, suppliers, workers, and local institutions.

The second component of this objective is to integrate business-model reasoning with production-system design. Bocken and colleagues' sustainable business-model archetypes demonstrate that sustainability can be embedded in the mechanisms through which firms create and capture value, rather than being restricted to downstream environmental management. Similarly, Boons and Lüdeke-Freund argue that sustainable innovation requires explicit consideration of the relationship between technological innovation and the business model through which it reaches markets and stakeholders. These insights support a regenerative interpretation in which local manufacturing technology and regenerative value logic must develop together.

### 2.2 Analytical Objective: Operationalizing Regenerative Integration

The analytical objective is to translate the conceptual framework into measurable dimensions suitable for later empirical testing. The study proposes a Regenerative Integration Score based on material circularity, ecological regeneration, renewable and resource-positive production, community-oriented governance and social value, and repair-, reuse-, and adaptation-oriented capability. Local Value Retention is treated separately so that researchers can examine whether regenerative integration is associated with a greater proportion of economic value remaining within the relevant local economy.

The simulation is intended to demonstrate the analytical logic rather than prove a causal relationship. By constructing four progressively more regenerative archetypes, the study evaluates whether the proposed measurement architecture produces interpretable differentiation among business-model configurations. The simulated model also shows how future researchers could combine survey measures, audited enterprise data, material-flow information, environmental assessments, supplierlocation data, labor indicators, and financial information when real local-production organizations are studied.

## 3. Review of Literature

### 3.1 Sustainable and Circular Business-Model Foundations

Sustainable business-model research moved sustainability analysis beyond the product or process level by examining the organizational logic governing value creation, delivery, and capture. Boons and Lüdeke-Freund connected sustainable innovation with business-model structures and emphasized that technological improvements alone are insufficient when the economic architecture surrounding them reproduces unsustainable incentives. Bocken and colleagues subsequently organized sustainable business-model innovation into recognizable archetypes, including maximizing resource efficiency, creating value from waste, substituting renewable processes, delivering functionality instead of ownership, adopting stewardship, encouraging sufficiency, repurposing businesses for social or environmental objectives, and developing scale-up solutions.

Circular business-model research develops these ideas through explicit attention to resource loops. Bocken, de Pauw, Bakker, and van der Grinten distinguish strategies that slow, close, and narrow resource flows, thereby connecting product design decisions with business-model design. Lüdeke-Freund, Gold, and Bocken later consolidated circular business-model patterns including repair and maintenance, reuse and redistribution, refurbishment and remanufacturing, recycling, cascading and repurposing, and organic-feedstock models. Pieroni, McAloone, and Pigosso further demonstrated that circular and sustainability-oriented business-model innovation had developed a substantial range of conceptual models, methods, and practical tools by 2019.

These contributions are directly applicable to localized production because small production distances do not resolve the fundamental question of what happens to materials after production and use. A local manufacturer following a single-sale model based on short-lived products may remain structurally linear. By contrast, a local producer may use repair agreements, take-back arrangements, modular design, remanufacturing, leasing, shared ownership, or secondary-material exchange to maintain resources within local or regional loops. Circular business-model scholarship therefore provides the material-flow foundation needed for a regenerative interpretation of local production.

### 3.2 Distributed Manufacturing and Place-Based Production

Distributed manufacturing represents an important technological and organizational foundation for local production. Rauch, Dallasega, and Matt examine decentralized and flexible manufacturing units as a potential approach for sustainable production in emerging-market contexts, including the possibility of producing nearer demand and supporting regional economic cycles. Kohtala, however, stresses that the environmental consequences of distributed production cannot be assumed in advance because production scale, material selection, technology, user practices, logistics, energy consumption, and product life cycles all affect the final outcome.

Srai and colleagues further conceptualize distributed manufacturing as a new form of localized production and examine its distinction from earlier forms of geographically dispersed manufacturing. Their analysis is important because it positions localization not simply as relocation of an unchanged factory but as a potentially different configuration of production capacity, supply networks, demand responsiveness, and technological organization. Such a distinction creates space for business models in which smaller production units serve geographically bounded markets, produce closer to demand, collaborate digitally, and adapt product offerings to local requirements.

Nevertheless, local production remains vulnerable to rebound effects and inefficiencies if reduced transportation is offset by poor capacity utilization, inefficient machinery, fragmented purchasing, high material losses, or premature product replacement. The literature therefore supports a conditional rather than deterministic interpretation. Localization can enable regenerative practices, but it becomes regenerative only when production architecture and business-model architecture jointly improve resource circulation, ecological outcomes, social capabilities, and economic resilience.

### 3.3 From Circularity to Regenerative Value Creation

Circular economy scholarship frequently uses regenerative terminology, yet the conceptual boundary requires precision. Geissdoerfer and colleagues define circular economy as a regenerative system in which resource inputs, waste, emissions, and energy leakage are reduced through strategies that narrow, slow, and close resource loops. The Ellen MacArthur Foundation similarly characterizes circular economy as systemic and regenerative by design. These definitions establish a strong connection between resource circulation and regeneration, but they do not automatically specify how individual enterprises should measure net-positive place-based outcomes.

Morseletto's analysis is particularly important for avoiding terminological inflation. His work shows that restoration and regeneration have often been invoked inconsistently in circular-economy discourse and that the two concepts should not be treated as interchangeable rhetorical labels. For the present study, regeneration is therefore operationalized conservatively. A local production business is regarded as more regenerative when it not only reduces negative resource impacts but also builds the capacity of ecological, productive, and social systems to continue functioning and renewing over time.

This perspective also incorporates supply-chain relationships. Geissdoerfer, Morioka, de Carvalho, and Evans connect circular business models with circular supply-chain management, demonstrating that enterprise-level value models must be supported by appropriate upstream and downstream relationships. Kirchherr and colleagues' investigation of circular-economy barriers additionally indicates that implementation cannot be explained only by technology; organizational, institutional, market, and cultural barriers also matter. A regenerative local production system therefore requires coordination among local suppliers, recovery partners, users, financial actors, public institutions, and community organizations rather than isolated environmental improvements within a single facility.

## 4. Research Methodology

### 4.1 Research Design and Analytical Position

The study adopts a conceptual-methodological design supported by simulation. The conceptual component synthesizes established literature on sustainable business models, circular economy, distributed manufacturing, and regenerative principles. The analytical component demonstrates how the resulting constructs could be operationalized quantitatively. This approach is appropriate because no verified enterprise-level dataset was provided and it would be methodologically inappropriate to invent actual respondents, geographic locations, company records, interviews, financial results, or environmental measurements.

The unit of analysis is a hypothetical local production enterprise or production unit operating within a geographically bounded production-consumption ecosystem. The framework does not prescribe a particular industry because the business-model logic may be relevant to food processing, furniture, textiles, consumer goods, fabrication, repair-intensive manufacturing, construction components, community manufacturing, or digitally enabled microproduction. Sector-specific empirical studies would, however, need to modify indicators to reflect different material cycles, regulatory conditions, technological requirements, and environmental boundaries.

### 4.2 Measurement Framework

The proposed Regenerative Integration Score is constructed from five conceptual dimensions. These dimensions deliberately extend beyond conventional operational efficiency because a regenerative model should address the condition of the wider system in which production occurs. Material circularity measures the degree to which resource value is preserved through durability, secondary inputs, take-back, reuse, remanufacture, or recycling. Ecological regeneration considers the contribution of business activities to biological or ecological renewal where such relationships are material to the business.

Renewable and resource-positive production evaluates energy and resource dependence, while community governance and social value examine participation, capability building, fair economic relationships, and local institutional engagement. Finally, repair, reuse, and adaptive capability captures whether products and production systems are designed to remain useful under changing needs rather than being replaced prematurely. Table 1 summarizes the proposed measurement structure.

**Table 1: Proposed Regenerative Integration Measurement Framework**

| Dimension | Weight | Illustrative Measurement Focus | Interpretation |
|---|---|---|---|
| Material Circularity | 25% | Secondary inputs, durability, take-back, remanufacturing, recycling, material recovery | Ability to maintain material value and reduce virgin-resource dependence |
| Ecological Regeneration | 25% | Soil, water, biodiversity, biological-resource renewal, ecological restoration where relevant | Contribution to ecological capacity rather than impact reduction alone |
| Renewable and Resource-Positive Production | 20% | Renewable energy, resource productivity, low-impact processing, energy recovery | Reduction of dependence on depletable production inputs |
| Community Governance and Social Value | 15% | Local employment quality, skills, participation, cooperative relationships, inclusive value distribution | Strengthening of local productive and social capabilities |

| Dimension | Weight | Illustrative Measurement Focus | Interpretation |
|---|---|---|---|
| Repair, Reuse, and Adaptive Capability | 15% | Modularity, maintainability, repair services, reuse channels, adaptable production | Extension of product utility and resilience of the local production system |
| Total | 100% | Weighted composite | Regenerative Integration Score: 0–100 |

**Note:** The framework is proposed for empirical validation; weights are analytical assumptions rather than universally validated coefficients.

The weighting structure assigns the greatest importance to circular material management and ecological regeneration because these dimensions directly distinguish a regenerative framework from a narrowly local or efficiency-oriented model. The remaining dimensions recognize that regenerative production also requires production technologies, institutional relationships, and product-life strategies capable of sustaining these resource improvements. Future empirical research should test alternative weighting systems using expert elicitation, factor analysis, multi-criteria decision methods, or stakeholder-based weighting.

### 4.3 Simulation Procedure and Analytical Boundaries

Twenty-four hypothetical production units were generated and allocated equally across four archetypes: Conventional Local, Efficiency-Led Local, Circular Local, and Regenerative Local. The simulation used a fixed random seed of 42 to support reproducibility. Regenerative Integration Scores were generated around archetype centroids of approximately 40, 56, 72, and 87 respectively, with controlled variation. Scores were bounded to the 0–100 conceptual scale.

Local Value Retention was modeled separately as the estimated proportion of value remaining within the locality through local labor income, local sourcing, locally retained operating surplus, local service purchasing, repair activities, and locally embedded productive capabilities. The illustrative equation used in the simulation was based on a baseline value plus a positive regenerative-integration coefficient and random variation. Values were bounded to a plausible analytical range. Because both variables are simulated, conventional statistical significance testing would be misleading; the analysis therefore emphasizes descriptive statistics, pattern interpretation, correlation magnitude, and methodological demonstration rather than empirical hypothesis confirmation.

## 5. Analysis

### 5.1 Comparative Performance Across Local Production Archetypes

The simulation produces clear differentiation among the four archetypes. Conventional Local units achieved a mean Regenerative Integration Score of approximately 37.3, indicating that geographic proximity can coexist with relatively weak circularity, regeneration, and adaptive product-life practices. Efficiency-Led Local units averaged 56.3, reflecting a model in which resource efficiency and operational improvements are stronger but broader regenerative mechanisms remain incomplete.

Circular Local units achieved an average score of 73.1, while Regenerative Local units averaged 87.2. This progression illustrates an important conceptual principle: regenerative development should be treated as an expansion of business-model ambition rather than a synonym for local manufacturing. The simulated local-value-retention results also increase across the archetypes, although meaningful within-group variation remains.

**Table 2: Simulated Archetype-Level Analytical Results**

| Local Production Archetype | Simulated Units | Mean Regenerative Integration Score | Mean Local Value Retention | SD of Regenerative Score | Analytical Characterization |
|---|---|---|---|---|---|
| Conventional Local | 6 | 37.3 | ~49.6% | 8.4 | Local production with predominantly linear value logic |
| Efficiency-Led Local | 6 | 56.3 | ~62.2% | 5.7 | Resource efficiency and localization without complete circular integration |
| Circular Local | 6 | 73.1 | ~72.9% | 3.0 | Strong repair, recovery, reuse, and circular value mechanisms |
| Regenerative Local | 6 | 87.2 | ~79.2% | 5.1 | Circularity integrated with ecological and community renewal |

**Source:** Author's reproducible simulation. Values are hypothetical and do not represent surveyed enterprises.

The table should therefore be interpreted as a model-comparison exercise rather than evidence that all regenerative firms achieve the reported scores. Its value lies in demonstrating that a measurement framework can separate qualitatively different production logics. A real empirical application would likely produce greater overlap because firms often combine linear, efficient, circular, and regenerative practices within the same organization.

### 5.2 Regenerative Integration and Local Value Retention

A central proposition of the framework is that regenerative business models may strengthen local value retention when they increase reliance on local repair services, local knowledge, regional material exchanges, local labor capabilities, and recurrent relationships with customers and suppliers. This

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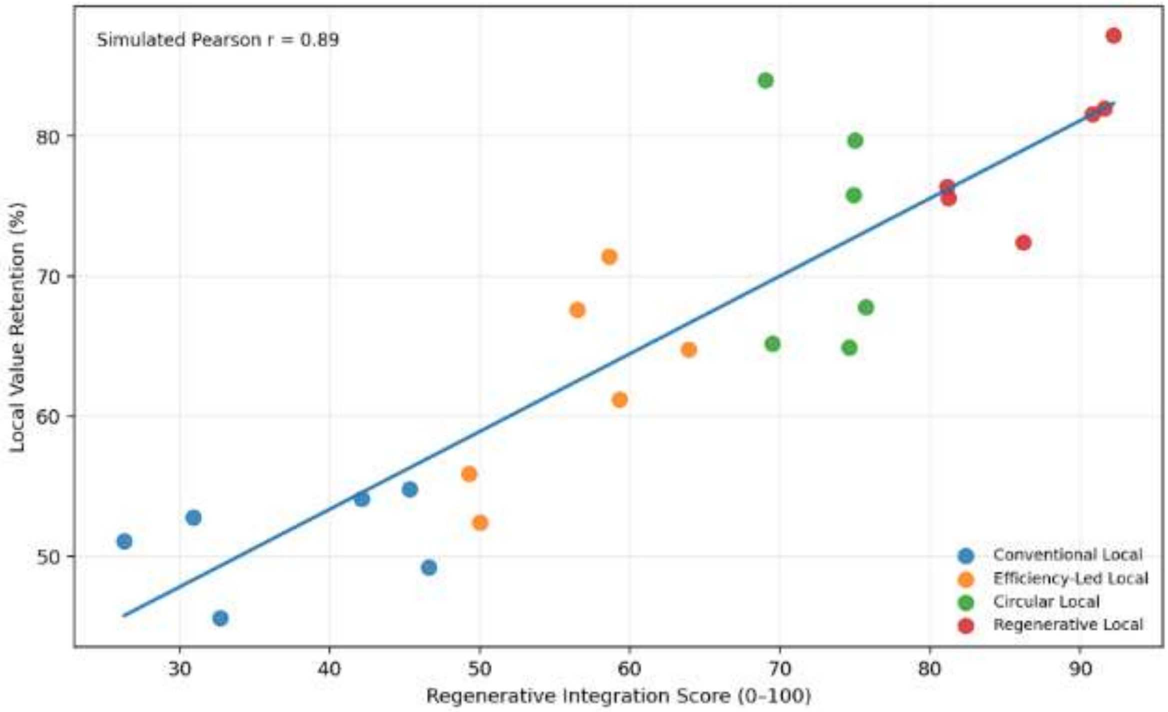
proposition is consistent with the broader logic of distributed manufacturing and circular supply chains, where value increasingly depends on networks of service, recovery, maintenance, and collaboration rather than one-directional product transactions.

The simulated dataset produces a Pearson correlation of approximately r = 0.89 between Regenerative Integration Score and Local Value Retention. The corresponding coefficient of determination is approximately $R^2 = 0.795$, meaning that about 79.5% of modeled variation in the simulated local-value variable is associated with variation in the regenerative score. These statistics result from the simulation design and cannot be generalized to real businesses. Their role is to demonstrate a testable empirical proposition.

**Graph 1: Simulated Relationship Between Regenerative Integration and Local Value Retention**




**Source:** Author's simulation using 24 hypothetical local production units.
**Note:** The plotted values are not observations from actual enterprises.

The scatter pattern also demonstrates why regenerative-business research should retain enterprise-level variability rather than relying only on archetype averages. Some simulated circular units display local-value outcomes comparable with regenerative units, while selected efficiency-oriented firms outperform weaker circular cases. Real-world relationships are likely to be similarly contingent on sector, ownership structure, local supplier capacity, market demand, labor conditions, policy support, and resource availability.

### 5.3 Business-Model Transition Logic

The simulated progression can be interpreted as a transition from proximity toward system renewal. Conventional localization primarily changes where production occurs. Efficiency-led localization additionally changes how efficiently resources are transformed. Circular localization changes how long resources retain economic utility, while regenerative localization changes the broader question of what the production system leaves behind for the place, community, and ecological system after economic activity occurs.

This distinction helps prevent local-production initiatives from relying on geographic labels as substitutes for sustainability performance. A local enterprise may import virgin resources over long distances, generate nonrecoverable waste, provide little repair infrastructure, and remove profits from the locality. Conversely, a regenerative configuration would attempt to link local or regional input strategies with high product durability, reverse flows, secondary markets, renewable production, community skills, ecological stewardship, and recurrent value relationships.

## 6. Discussion

### 6.1 Locality as an Enabler Rather Than a Sustainability Outcome

The principal theoretical implication is that local production should be understood as an enabling architecture rather than an environmental achievement in itself. Kohtala's work provides an important foundation for this position because distributed production can generate both sustainability opportunities and new environmental burdens depending on the configuration of technologies, users, material flows, and production scales. Likewise, Srai and colleagues' localized-production perspective demonstrates that distributed manufacturing involves structural changes in production organization, but such structural changes require an accompanying value logic if they are to produce sustainability improvements.

The regenerative-business-model perspective therefore introduces a second layer of analysis. The first layer concerns spatial organization: where inputs originate, where transformation occurs, and where products are consumed. The second concerns regenerative architecture: whether the activities maintain material utility, build ecological capacity, improve resilience, and reinforce social and productive systems. Both layers are necessary. Localization without regenerative architecture can reproduce linear production on a smaller geographic scale, while circularity without place sensitivity may circulate resources without strengthening the communities that host production.

This interpretation also changes the meaning of scale. A regenerative enterprise should not necessarily seek indefinite expansion of physical throughput. Growth may instead occur through replication of distributed capabilities, knowledge sharing, service intensity, repair networks, licensing of low-impact technologies, local production partnerships, or improvements in value per unit of material. Bocken and colleagues' sustainable business-model archetypes, particularly stewardship, sufficiency, and functionality-oriented models, provide theoretical support for such alternatives to conventional throughput-driven expansion.

### 6.2 Regenerative Value Creation Beyond Circular Material Flows

Circularity is necessary to the proposed framework but is not treated as sufficient for regeneration. Bocken and colleagues' loop-oriented strategies and Lüdeke-Freund and colleagues' circular business-model patterns provide strong tools for retaining material value through repair, reuse, refurbishment, remanufacturing, recycling, and cascading. These mechanisms can substantially transform local production by making proximity economically useful for reverse logistics and after-sales relationships.

A regenerative model, however, additionally asks whether those circular loops improve the capacity of the surrounding social-ecological system. A repair business may extend product life yet offer unstable work and contribute little to local capability development. A recycling enterprise may recover material while consuming excessive nonrenewable energy. A bio-based local producer may use renewable materials while degrading soil or biodiversity. Circularity must therefore be assessed alongside ecological quality, labor and community outcomes, renewable-resource management, and institutional resilience.

Morseletto's conceptual caution is useful here. Regeneration should not become an unmeasured superlative attached to every circular initiative. The present framework responds by treating regenerative performance as a multidimensional construct requiring evidence. An enterprise should be able to demonstrate what is being renewed, strengthened, restored, circulated, or retained and through which measurable processes.

### 6.3 Implications for Local Enterprise Strategy and Governance

For local enterprises, the framework suggests that business-model redesign should begin with the value proposition but extend through the entire production ecosystem. A regenerative value proposition may emphasize long product life, repairability, product upgrading, locally meaningful customization, shared access, recovered materials, ecological stewardship, or community resilience. These promises must then be supported by appropriate value-creation structures such as modular design, skilled repair labor, material tracking, reverse logistics, renewable energy, local supplier development, and collaborative production infrastructure.

Value capture also requires reconsideration. Conventional business models frequently associate value capture with the financial surplus retained by the focal firm. A regenerative model requires a broader perspective in which part of the generated value strengthens the system that makes future production possible. This may occur through supplier capability development, workforce training, ecosystem restoration, local reinvestment, shared infrastructure, community ownership, or durable customer relationships. Geissdoerfer and colleagues' integration of circular business models and supply chains reinforces the need to analyze such interorganizational relationships rather than studying the focal firm in isolation.

Governance conditions will determine whether these models can scale. Kirchherr and colleagues found that circular-economy implementation barriers are not purely technological, highlighting the importance of broader organizational and institutional conditions. For local regenerative production, municipalities, development agencies, universities, cooperatives, financial institutions, technical centers, waste-management organizations, and community actors may therefore function as co-producers of the enabling ecosystem.

## 7. Conclusion

This study has developed a business-model framework for distinguishing regenerative local production from production that is merely geographically localized. The central argument is that proximity has strategic potential but does not independently guarantee sustainability. A local production unit becomes progressively more regenerative when its value architecture combines circular resource management, ecological renewal, renewable or resource-positive production, community capability development, repair and reuse systems, and locally anchored economic value.

The literature provides strong foundations for this integration. Sustainable business-model scholarship demonstrates how environmental and social objectives can be embedded into value creation and capture, while circular-economy research provides the mechanisms needed to slow, narrow, and close resource loops. Distributed-manufacturing research contributes the spatial and technological architecture required for adaptable localized production. Regenerative thinking adds the further requirement that economic activity strengthen, rather than merely consume less from, the systems on which future production depends.

The simulation illustrates how these concepts might be empirically operationalized. Across 24 hypothetical production units, the modeled archetypes show increasing Regenerative Integration Scores from Conventional Local through Efficiency-Led Local and Circular Local to Regenerative Local. The simulated relationship between regenerative integration and local value retention is strong and positive, but the values are intentionally presented only as methodological demonstrations. They do not constitute evidence that real enterprises will display identical relationships.

Future empirical research should validate the proposed dimensions using primary data from actual local-production ecosystems. Comparative case studies could examine industries with different material intensities; surveys could test relationships among regenerative integration, resilience, profitability, community outcomes, and local value retention; life-cycle assessment could verify environmental performance; and longitudinal research could investigate whether regenerative practices remain financially viable over time. Such evidence would allow regenerative local production to move from a promising conceptual proposition toward a measurable and managerially actionable production paradigm.

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