

# Patrick Geddes on Sustainable City Life

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## Abstract

This article reinterprets Sir Patrick Geddes's work to illuminate contemporary challenges in sustainable urban logistics from a service-oriented perspective. Analysis of his two major works shows that Geddes viewed the city as a living organism, structured around essential logistical operations—supply, production, distribution, and disposal—that are inseparable from daily urban life. Such perspective is placed in dialogue with research on urban metabolism and sustainable supply chains, highlighting the limitations of approaches focused solely on carbon reduction. The analysis argues that disconnections between logistical infrastructures, inhabited spaces, and social practices undermine urban coherence and generate social tensions often hidden by algorithmic optimization. Revisiting Geddes's Place-Work-Folk triad emphasizes the strategic value of integrating collective vitality, functional proximity, and social cohesion into urban logistics and service systems. Geddes's insights, though sometimes overlooked, provide a robust theoretical framework for designing sustainable service networks that align operational efficiency with social and territorial value creation.

## Keywords

City, Geddesian Perspective, Urban Flows, Supply Chain Management, Sustainable Logistics, Territorial Integration

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## 1. Introduction

Every morning in Paris, Rome, or Madrid, hundreds of delivery trucks crowd narrow city-center streets, while courier scooters and bicycles weave between haphazardly parked cars, trams, and buses. The concentration of urban traffic is widely recognized as a source of congestion, pollution, and resident stress, prompting municipalities to introduce traffic restrictions, low-emission zones, and micro-hubs aimed at reducing delivery vehicles through pooling policies (McKinnon, 2023). Efforts to streamline last-mile delivery through peripheral platforms and

algorithmically optimized routes increasingly reveal logistically saturated cities, marked by weak coherence between infrastructure, uses, and living space. Even highly sophisticated technical solutions struggle to integrate everyday urban realities and inhabitants' needs. Treating the issue as a recent phenomenon linked to post-1970s "metropolization" would be misleading. As early as the beginning of the twentieth century, Sir Patrick Geddes posed a question that remains central today: *How can goods circulate without devitalizing the urban spaces that receive them?* Service studies on temporary cities, including Alotaibi et al.'s (2020) analysis of the Mina tent city during the Hajj, show that planning flows and services for large mobile populations requires careful optimization of infrastructure location and close attention to daily movements to limit congestion and ensure equitable access. Well before the emergence of sustainable urban logistics as a formal field, Geddes linked material circulation to social and territorial vitality.

At a time when rapid urbanization, industrialization, and health crises were transforming major European cities, Geddes examined material movements, infrastructure, and daily practices with remarkable rigor. Trained as a biologist, he conceived the city as a living organism in which supply, production, transformation, and waste disposal interact to sustain urban life. Unlike engineers or planners focused on isolated architectural forms, he emphasized the concrete chains through which materials and energy circulate. Retail spaces, warehouses, and industrial workshops shape both urban morphology and social relations, making it essential to assess the impact of each intervention on the urban fabric. His Place-Work-Folk triad and survey method foreground the relationships between territories, activities, and populations prior to intervention, anticipating later sustainability-oriented approaches. By unifying *Nature* and *Civilization* through an evolutionary interpretation of urban processes, Geddes laid the foundations of human ecology and a holistic understanding of urban phenomena (Kraus, 2016). Re-examining ideas that have since faded from mainstream planning sheds light on today's service challenges in urban logistics, including flow saturation, last-mile fragmentation, and algorithmic optimization that frequently overlooks social realities. Such a perspective invites a rethinking of the city not as a neutral network of circulating people and goods, but as an organism requiring organization attentive to lived uses.

Despite the abundance of research on urban logistics, Geddes's work remains marginal in analyses of the contemporary organization of urban flows. Existing scholarship largely addresses these issues through techno-economic or environmental frameworks centered on efficiency, digital integration, and emissions reduction, leaving limited room for alternative conceptual readings (Corvello et al., 2026). The aim of this article is to underline how Geddes's organic conception of the city, attentive to interactions between material flows, social practices, and territories, provides a relevant service framework for understanding urban saturation, last-mile fragmentation, and the limits of purely algorithmic logistical optimization. The argument advanced here is that contemporary logistical difficulties

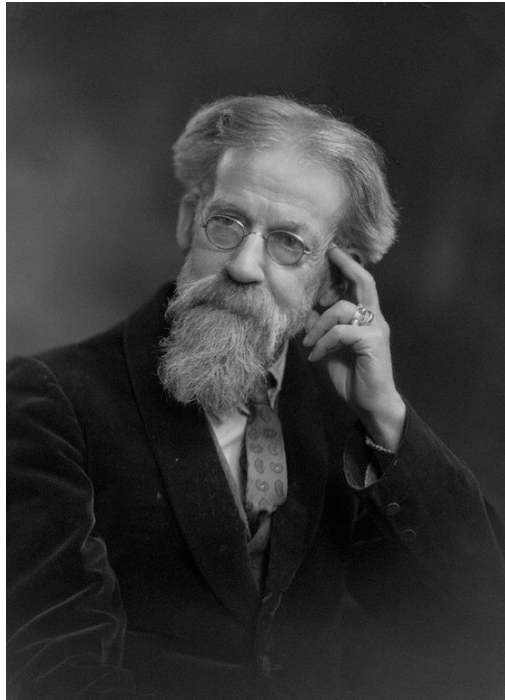
stem less from insufficient technical efficiency than from systemic imbalances between places, activities, and populations. By exploring Geddes's writings considering current debates, the article seeks to enrich theoretical reflection on service management through an integrated approach to flows. It further establishes a conceptual bridge between urban planning, logistics, and urban metabolism, while highlighting the implications of such a reading for interpreting contemporary urban policies.

## 2. City as an Organism

Sir Patrick Geddes (1854-1932) occupies a distinctive position in the intellectual landscape of the late nineteenth century (see [Figure 1](#)). Born in Scotland, he was initially trained in biology, notably in London under Thomas Henry Huxley, a leading figure of Darwinism ([Lyons, 2012](#)). This scientific background deeply shaped his thinking, even after he moved beyond laboratory work to focus on human societies. From an early stage, Geddes rejected rigid disciplinary boundaries. He described himself at different times as a biologist, sociologist, educator, geographer, and urban planner, consistently refusing confinement within a single professional identity. His career reflects sustained engagement with the concerns of his time. He taught, founded educational institutions, and participated actively in urban projects, particularly in Edinburgh, as well as in India and the Middle East. Geddes's life unfolded amid rapid transformations in European cities, still regularly marked by health and social crises. In contrast to dominant engineering approaches, he addressed these transformations through a scientific perspective rooted in natural history and field observation. Such a position accounts for both the richness of his work and the difficulty of assigning it to a single discipline. His role as a *marginal sécant*, i.e., an influential outsider or "*intellectual smuggler*," to borrow [Crozier & Friedberg's \(1980\)](#) formulation, helps explain the diversity and internal coherence of his writings, whose interdisciplinary trajectory is directly reflected in both form and content.

Geddes's status as a *marginal sécant* is a significant asset for contemporary studies of logistics and urban planning because it highlights the value of interdisciplinarity in addressing complex problems. By moving fluidly between biology, sociology, geography, and urban planning, Geddes developed a remarkable ability to detect patterns and correlations across seemingly disparate fields—a skill directly applicable to the analysis of modern logistics systems. In the context of contemporary urban logistics, where material flows, social practices, environmental constraints, and technical infrastructures interact dynamically, this intellectual mobility fosters an integrated, holistic perspective. Planners and scholars can draw inspiration from his approach to combine quantitative and qualitative data, incorporate residents' perceptions and local practices, and simultaneously evaluate operational efficiency alongside social and environmental impacts. In short, Geddes's cross-disciplinary vision enables a deeper understanding of the complex interrelationships that structure urban life and guides the design of logistical and

urban solutions that are both efficient, resilient, and socially coherent. This intellectual flexibility naturally sets the stage for examining the conceptual tools and methodological principles that Geddes developed to study cities as living organisms, including his prolific writings.



Source: © National Portrait Gallery, London (1989).

**Figure 1.** Sir Patrick Geddes in 1931.

Geddes's body of work includes books, articles, lectures, and reports, often produced in connection with specific intervention contexts. Among his most frequently cited publications is *Cities in Evolution* (Geddes, 2018 [1915]), which advances a dynamic interpretation of urban development grounded in historical continuity and gradual transformation rather than abrupt rupture. *City Development* (Geddes, 1973 [1904]) is also central, alongside numerous essays devoted to civic education and social reform. Geddes is further known for his conceptual tools, notably the Place-Work-Folk triad, structuring analysis of relationships between environment, economic activities, and populations. This framework is complemented by a core methodological principle, the survey, understood as an in-depth investigation of territory and uses it as a prerequisite for action. Studholme (2007) notes that Geddes thereby develops a distinct sociological approach, examining how individuals and communities actively shape social and environmental realities. A recurring principle guiding his work is “*diagnosis before treatment*,” a concise formulation of the survey's purpose. Although he wrote little on industry in a narrow sense, he consistently examined the material conditions of urban life at five levels: food, housing, work, resources, and nuisances. Sustained attention to these dimensions supported a broader reflection on the city itself, understood

as an *organism*.

Applied to a contemporary context, the survey method cannot be confined to the collection of technical or quantitative data typically employed in supply chain management (Toivonen et al., 2006). From a Geddesian perspective, the preliminary diagnosis requires a nuanced observation of the practices, rhythms, and relationships that govern urban flows. A modern logistics planner must therefore gather unconventional data, encompassing local temporalities—such as business hours, peak activity periods, and social rhythms—daily delivery and receiving routines, conflicts arising from competing uses of public space, and even the perceptions and attitudes of residents toward logistical operations and associated nuisances (Amaya et al., 2021). In addition, attention must be paid to informal organizational structures, local networks, and existing cooperative arrangements, as well as to territorial continuities: the spatial and functional links between production and consumption spaces, reliance on external resources, and vulnerabilities related to procurement disruptions. Far from being a purely technical exercise aimed at optimizing flows, the survey's goal is to understand how logistical processes are embedded within the living fabric of the city, interacting with social, spatial, and environmental systems. Only through this richly contextualized diagnosis can interventions be devised that are sensitive, and capable of supporting sustainable equilibrium, rather than imposing isolated technical solutions detached from the realities of urban life.

The city as an organism is neither poetic metaphor nor simple analogy. It derives directly from Geddes's biological training and reflects a functional conception of living systems. An organism, in his view, rests on dynamic relationships among structures, functions, and environment. Applied to the city, this perspective invites consideration of urban space not as an assemblage of buildings or networks, but as a living whole shaped by social, economic, and logistical interactions. The urban organism performs essential functions: feeding itself, producing, transforming, distributing, and eliminating, supported by concrete systems such as markets, workshops, infrastructure, and housing, as well as by social practices. Geddes emphasizes their systemic interdependence, arguing that no function can be analyzed in isolation without disturbing overall balance. Excessive growth or disconnection from the local environment weakens the whole, for instance by undermining food supply. Such reasoning contrasts sharply with mechanistic views of the city as a machine open to unlimited optimization. The urban organism remains dependent on its environment and vulnerable to imbalance, leading naturally to close attention to the material and logistical flows that sustain urban life (Amati, 2018).

In his writings, Geddes does not employ today supply chain terminology, yet he offers detailed analyses of material movements traversing the urban organism. Water, food, and energy supply, along with waste and sewage disposal, constitute structuring dimensions of urban life in his work. These flows shape urban morphology, sanitary conditions, and the social relations embedded within them in a

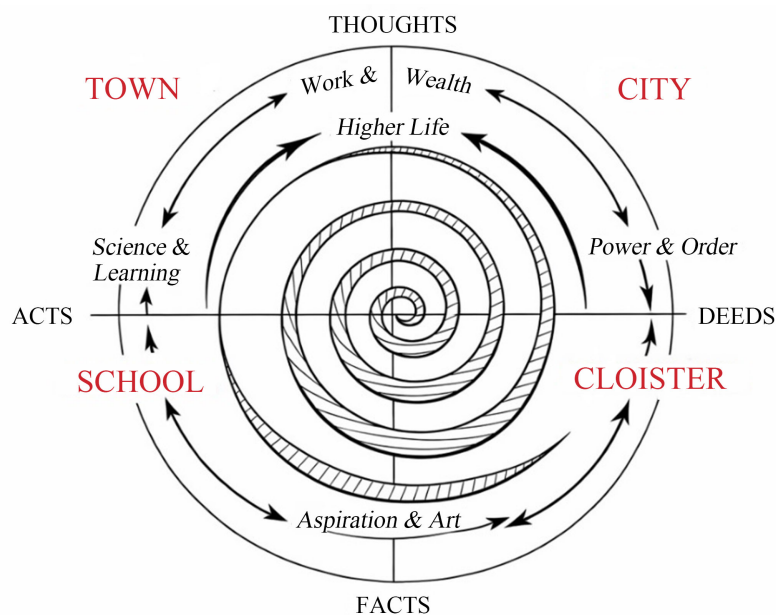
service system. Batty & Marshall (2009) emphasize that Geddes anticipated an “evolutionary” approach to urban planning, in which interventions in the physical environment aim to regulate flows and preserve social equilibrium. He observed that industrialization profoundly altered such dynamics: modern cities increasingly drew resources from distant territories while exporting pollution beyond their immediate boundaries, producing spatial separation between consumption, production, and disposal and generating persistent, often invisible imbalances. Geddes also explored possibilities for reintegrating certain materials into local cycles, notably through links with agriculture or urban uses, anticipating principles later associated with short supply chains and industrial ecology. Without formalizing a theory of sustainable urban logistics, he raised a fundamental question concerning the location, transformation, and reintegration of flows within the city. Both material and systemic, this question forms a discreet yet essential foundation of his thinking on urban evolution.

### 3. Urban Operations and Material Flows

In his urban writings, Geddes approaches the city through its elementary operations. Young (2017) underlines that feeding populations, transporting water, enabling production, organizing exchange, and absorbing waste constitute the primary entry points of his analysis. Both *City Development* and *Cities in Evolution* illustrate his sustained interest in the logistical processes underpinning city life. Geddes details the systems associated with material operations, including points of sale, processing facilities, storage spaces, transport infrastructure, and sanitation networks. Their spatial distribution determines travel distances, traffic patterns, and the costs or nuisances borne by residents. Logistical organization thus becomes a structuring element of urban morphology, and the city is conceived as a sequence of successive service operations rather than a simple juxtaposition of functions. Each stage—entry, processing, distribution, and disposal—involves social choices and shapes the urban environment as operations overlap, complement one another, or come into conflict (Young, 2017). To formalize his perspective, Geddes developed a spiral diagram representing the development of human life and society (Geddes, 1927). Organized into quadrants and categories such as *Town*, *School*, *Cloister*, and *City*, and analytical dimensions including *Acts*, *Facts*, *Deeds*, and *Thoughts*, the model depicts movement toward higher levels of consciousness and urban evolution, highlighting the interconnections between material activities, social organization, and urban transformation (see Figure 2).

Although Geddes did not explicitly propose such a reading, the four quadrants of the notation of life may nonetheless be interpreted as a relevant analytical framework for linking fundamental social forms to the logistical operations that ensure the material reproduction of the city. *Town* refers to functions of proximity, where the everyday flows of essential goods are organized through local markets, short supply chains, and basic distribution infrastructures, characterized by limited distances and dense social interaction. *School* corresponds to the pro-

cesses of knowledge transmission and coordination, which, from a logistical standpoint, translate into the standardization of practices, the diffusion of technical norms, the training of stakeholders, and the collective learning required for effective supply chain management. *Cloister*, commonly understood as a space of withdrawal and regulation, can be associated with functions of storage and long-term planning, where flow control, inventory management, foresight, and resilience to external risks and shocks are exercised. Finally, *City* synthesizes these dimensions at a systemic scale, embodying the integration of production, transport, and exchange networks, within which material flows become instruments of urban governance. Far from being pure abstract, Geddes's categories thus provide a conceptual lens through which logistics can be understood as a progressive articulation among local practices, cognitive mechanisms, institutional arrangements, and territorial organization.



Source: Adapted from Geddes (1927).

**Figure 2.** The notation of life.

A central theme in Geddes's vision lies in his analysis of interactions between production, exchange, and subsistence, understood as the core of urban functioning. The distribution of fresh agricultural products in cities, for instance, relies on complex cold-chain logistics, confirming that the organization of material flows extends beyond technical efficiency and must account for actor diversity, food security, product quality, and social and environmental impacts (An & Han, 2015). Such observations closely align with Geddes's emphasis on the interdependence of activities, territories, and populations. The city is not treated as a site of final consumption, but as a space of transformation, redistribution, and coordination of material processes. Every industrial, artisanal, or commercial activity produces cascading effects on surrounding flows, attracting or displacing populations and

generating specific material and energy movements. Geddes never isolates such dynamics within a specialized domain; they are examined as integral components of the complex urban organism. As Renwick (2010) notes, the approach rests on an evolutionary perspective in which each intervention reshapes the entire social and territorial fabric. Excessive separation of functions, such as distancing production from living spaces, lengthens supply chains, multiplies transfers, and weakens urban cohesion. Conversely, closer articulation among production, exchange, and subsistence strengthens social continuity, revealing the city as a system of material coordination in which flow organization directly conditions collective well-being.

**Table 1.** Geddes's urban triad and operations.

Urban Triad		
	Description	Socio-Territorial Impact
<i>Place</i>	Physical environment, infrastructure, streets, public spaces	Shapes distances traveled, traffic patterns, accessibility, and neighborhood cohesion
<i>Work</i>	Forms of activity and production, including industrial, artisanal, and commercial operations	Structures flow organization, influences local economies, and integrates or fragments social interactions
<i>Folk</i>	Populations, residents, workers, and service providers	Determines social cohesion, participation in urban flows, and collective well-being
Urban Operations		
	Material and Logistical Components	Socio-Territorial Impact
<i>Entry</i>	Points of sale, reception areas, supply inflows	Influences congestion, accessibility, and integration of goods into neighborhoods
<i>Processing</i>	Warehouses, production facilities, sorting and transformation centers	Affects efficiency of flows, local employment, and social interactions
<i>Distribution</i>	Transport networks, delivery systems, micro-hubs	Shapes traffic patterns, pollution levels, and service reliability
<i>Disposal</i>	Waste management, recycling, sanitation systems	Impacts environmental quality, urban health, and neighborhood equity

Source: The Author.

The Place-Work-Folk triad, introduced earlier, enables a relational interpretation of the city without isolating circulation as an autonomous sphere. *Place* refers to physical and environmental conditions; *Work* designates forms of activity and production; *Folk* encompasses populations and social practices. The analytical strength of the triad lies in its capacity to reveal interdependence among these dimensions. Movements of goods, resources, and people emerge from the configuration of environments, activities, and populations, while any modification of one element reshapes the entire service system. Productive activities poorly aligned with environmental constraints or residents' needs generate longer, costlier, and more conflict-prone journeys. Geddes frames such issues not in terms of efficiency, but of urban equilibrium. The triad also supports a critique of rigid functional zoning. Strict separation between spaces of production, residence, and disposal

fragments urban space and complicates material connections. Geddes therefore advances an integrated understanding of urban organization, in which flows are not treated as an independent object of analysis, but as the concrete manifestation of territorial, productive, and social relationships (Mercer, 1997). **Table 1** synthesizes Geddes's triad alongside the corresponding urban operations and material flows, highlighting their interdependencies and socio-territorial impacts.

#### 4. Geddesian Lessons for Contemporary Urban Logistics

Contemporary urban logistics relies heavily on large platforms located on city outskirts, designed to consolidate flows and reduce unit processing costs, then relayed through micro-hubs dispersed across urban space (Paché, 2024). Such an arrangement follows the logic of industrial optimization, yet it produces a growing dissociation between living spaces, production sites, and distribution points. Cities increasingly function as spaces of final consumption, supplied by long and opaque supply chains that depend heavily on transport infrastructure. This configuration closely echoes Geddes's critique of excessive functional specialization. As early as the beginning of the twentieth century, he highlighted the destabilizing effects of separating activities from territories, noting that the remoteness of essential operations weakens urban equilibrium. Peripheral concentration of logistics increases geographical distances and vulnerability to climatic or social disruptions (Holl & Mariotti, 2018). Geddes would likely have acknowledged the need for dedicated infrastructure, while questioning its territorial integration. Logistical systems disconnected from urban fabric tend to externalize social and environmental costs. The issue, therefore, concerns not only platform efficiency, but also their contribution to coherent service system. Such territorial disarticulation becomes particularly visible at the last-mile level within dense and constrained urban spaces.

The expansion of e-commerce and on-demand services has profoundly reshaped urban distribution. The last-mile management now concentrates a multiplicity of actors, vehicles, and delivery timeframes, producing an unprecedented fragmentation of flows. Express deliveries, segmented routes, temporary micro-warehouses, and digital platforms coexist within limited space, generating congestion, nuisances, and conflicts of use. Such dynamics closely mirror the imbalances identified by Geddes in his analysis of poorly coordinated urban operations. As shown by Pellicano et al. (2019), value co-creation practices in smart cities demonstrate that urban performance depends not only on infrastructure and technology, but also on coordination and active involvement of local actors, enabling better flow organization and reduction of logistical dysfunctions. A proliferation of weakly coordinated flows signals a lack of integration between activities, territories, and uses, whereas Geddes stressed the importance of functional continuity. When transformation and distribution are disconnected from living spaces, circulation becomes a source of friction rather than service. Fragmentation of the last mile also reveals declining clarity in urban organization, as capillary flows overlap without hierarchy and progressively saturate public space (Bosona, 2020). A Geddesian

perspective shifts attention away from delivery modes alone toward the disordered sequencing of logistical operations. The issue lies less in delivery itself than in its integration into an overarching service system. Unfortunately, reliance on digital tools increasingly obscures such coordination failures.

A hypothetical scenario helps clarify the divergence between algorithmic optimization and a genuinely Geddesian approach. Faced with rising demand for food deliveries along a densely populated central avenue, an AI-driven model would typically prioritize the consolidation of flows through a peripheral platform, combined with route optimization based on travel times, vehicle capacities, and recipient delivery windows, even at the cost of increased traffic volumes and heightened pressure on urban infrastructure (Rismanto & Judijanto, 2025). A Geddesian perspective would lead to a different operational decision: rather than extending the supply chain, it would favor the partial relocation of processing, storage, and distribution functions closer to points of consumption, for instance through neighborhood markets or cooperative platforms embedded in the urban fabric. The objective would not be the immediate minimization of transport costs, but the reduction of cumulative urban frictions, the stabilization of material flows, and the reinforcement of territorial continuity. Whereas algorithmic systems optimize a predefined short-term performance function, the Geddesian reading invites an assessment of the long-term effects of logistical choices on everyday practices, the use of public space, and local resilience. Performance is thus measured not only in miles traveled or delivery times, but in the system's capacity to sustainably support urban equilibrium.

While promising efficiency gains, these tools often abstract flow from their territorial and social contexts. Applications of artificial intelligence in supply chain management aim not only to optimize routing, but also to enhance overall service performance through demand forecasting, stakeholder coordination, and waste reduction (Mohsen, 2023). Urban space is thus treated as a set of technical constraints, conceived as a neutral medium for circulation. Yet no city can be understood independently of its environment. Urban systems function as open systems, traversed by exchanges of matter, energy, and information, whose equilibrium depends on human behavior and regulatory frameworks (Yang & Zeng, 2008). Such an abstraction resonates with the skepticism Geddes would likely have expressed toward forms of urban "intelligence" detached from places and uses. As Garau et al. (2016) note, Geddes insists on understanding the city as a complex organism in which identity, community, and local interactions underpin systemic coherence. Whereas algorithmic optimization frames traffic as a purely technical problem, Geddes interprets flows as dynamic relationships between territories, functions, and populations. Apparent short-term performance may therefore conceal deeper structural imbalances that erode urban vitality. Returning to Geddes reintroduces a situated intelligence attentive to rhythms, practices, and environmental limits, preventing flow-centered governance from undermining urban coherence. **Table 2** highlights key Geddesian insights alongside contemporary urban logistics

challenges, illustrating how his principles inform the design and management of integrated, socially attuned flow and service systems.

**Table 2.** Geddesian insights and contemporary urban logistics.

<b>Geddes Insights</b>	<b>Contemporary Applications</b>	<b>Implications for Urban Logistics</b>
<i>Integration of Place, Work, and Folk</i>	Peripheral platforms and micro-hubs often separate production, distribution, and living spaces	Necessitates designing logistics that preserve proximity and integrate infrastructure with social and territorial context
<i>Functional continuity and coordination</i>	Fragmented last-mile delivery with multiple actors, temporary hubs, and segmented routes	Highlights the need for coordinated flows and sequencing to prevent congestion, conflicts, and inefficiencies
<i>Flows as embedded in social and territorial systems</i>	Algorithmic route optimization abstracts flow from local context	Calls for situated intelligence that accounts for human behavior, community rhythms, and environmental constraints
<i>Material operations underpin urban equilibrium</i>	Lengthy supply chains, multiple transshipments, and opaque networks	Emphasizes minimizing unnecessary distance to maintain urban cohesion and reduce social and environmental costs
<i>Systemic vision of the city</i>	E-commerce and on-demand services increase flow complexity	Encourages holistic planning linking distribution, and urban life to enhance service quality and social well-being

Source: The Author.

## 5. Discussion

As Geddes conceives the city as a living organism in which material flows, economic activities, and populations interact within a dynamic, interdependent system. Contemporary smart cities illustrate that urban growth and performance rely not only on infrastructure integration and technological innovation but also on the active engagement of citizens and local stakeholders (Polese et al., 2019). This systemic perspective reinforces Geddes's argument that material, economic, and social flows cannot be understood in isolation from their territorial and human context. As Mehmood (2010) observes, an organic approach frames the city not as a mere collection of buildings or networks but as a series of concrete operations—production, transport, distribution, transformation, and waste management—through which each intervention reshapes urban morphology and service systems. Logistical choices, including infrastructure placement and circulation patterns, directly influence distances, traffic, and neighborhood cohesion. In the context of increasingly fragmented supply chains, Geddes's insights remain relevant: urban efficiency cannot be reduced to technical optimization alone but must account for everyday practices and lived experience. Ignoring these interactions risks territorial fragmentation and weakened social ties. By emphasizing flows within socially inhabited territories, Geddes provides a robust framework for planning adaptive, resilient, and integrated urban systems. In this sense, his work continues to inform contemporary approaches to urban logistics and systemic design.

Geddes highlights the structuring role of proximity in sustainable urban life,

portraying human and material flows as active forces that shape social solidarities, regulate temporal and spatial rhythms, and mediate complex interactions among stakeholders. His analysis of urban metabolism reveals the interdependencies linking functions, territories, and activities, showing how each operation—whether distributing food, transporting goods, or delivering everyday services—produces cascading effects throughout the city. Excessive separation or fragmentation of these functions disrupts connections, undermining urban coherence, diminishing service efficiency, and eroding quality of life. In Geddes’s framework, infrastructure and circulation are not neutral technical tools but constitutive elements of urban vitality, mediating interactions, shaping experiences, and sustaining resilience. Contemporary studies of urban metabolism similarly oscillate between material analysis and ecological metaphor, emphasizing the centrality of flows for both functional performance and social cohesion (Gandy, 2025). Attentive observation of micro-interactions, local routines, and the balance of daily rhythms provides a foundation for context-sensitive, empirically grounded readings of urban logistics. By integrating these insights, planners can anticipate how interventions in infrastructure or service networks influence both material efficiency and the social fabric of neighborhoods, thereby supporting more coherent, resilient, and inclusive urban systems.

Several decades later, Jacobs (2011 [1961]) extended this perspective by meticulously observing residents’ everyday use of urban space, demonstrating that urban vitality depends as much on local interactions as on overall spatial structure. Jane Jacobs enriches the Geddesian framework by bringing a deeply empirical understanding of everyday dynamics. While Geddes emphasizes the city as an organism, focusing on material flows, infrastructure, and systemic integration, Jacobs highlights residents’ practices, the density of interactions, and the ways neighborhood vitality emerges from these social exchanges, or the “*sidewalk ballet*”. Her approach shows that urban efficiency is not merely a technical optimization problem but depends on residents’ capacity to interact, build solidarity, and regulate public space collectively. In contemporary logistics, this insight implies that flows of goods and delivery operations must be considered alongside social rhythms, conflicts over space use, and informal practices. Integrating Jacobsian observations into the Geddesian framework adds an empirical and normative dimension, emphasizing that both material flows and social interactions are critical in planning. Together, these perspectives provide a robust methodological lens for designing sustainable, resilient, and socially coherent urban logistics, where operational performance and territorial vitality are inseparable and mutually reinforcing.

When Jacobs examined American cities, her critique appeared novel yet resonated with many of Geddes’s observations. Both opposed abstract, centralized planning that prioritized the unimpeded movement of people and goods. While Geddes analyzed urban metabolism, Jacobs focused on the sidewalk ballet, capturing the density, timing, and complexity of everyday interactions. In both

frameworks, logistics—explicit in Geddes, implicit in Jacobs—structures daily life, shapes rhythms, and fosters neighborhood cohesion. Jacobs contributes a strong empirical and normative dimension through careful observation of local practices, while Geddes, trained as a naturalist and systems thinker, conceptualizes interdependencies across functions and territories. Their intellectual continuity underscores the importance of considering material flows and social interactions jointly, as highlighted in the concept of social metabolism developed by nineteenth- and twentieth-century sociologists (Padovan, 2015). This integrated perspective demonstrates that flows and infrastructure acquire meaning only when embedded in inhabited territories and that urban planning must balance efficiency, vitality, and social cohesion. By combining Geddes's systemic analysis with Jacobs's empirical lens, contemporary planners gain a comprehensive framework to address both the technical and social dimensions of urban logistics and city life.

## 6. Conclusion

Revisiting Geddes offers a valuable framework for analyzing contemporary urban logistics and its sustainability challenges, extending beyond narrowly techno-environmental approaches to flows. A substantial body of green supply chain research focuses on measuring and reducing carbon emissions by examining production, transport, and storage through global performance indicators. Such work plays a crucial role in objectifying climate impacts and informing research agendas and public policy. As Apolaagoa et al. (2023) underline, green supply chain practices can reduce environmental impacts while supporting economic performance and social sustainability. Yet flows are often treated as abstract processes, detached from territorial, social, and everyday contexts. At the urban scale, such abstraction quickly reaches its limits. Peripheral mega-platforms, last-mile fragmentation, and growing reliance on algorithmic optimization illustrate how technical efficiency may become disconnected from lived realities. Residents, shopkeepers, and workers frequently participate, sometimes informally, in regulating urban traffic, revealing that logistics involves *situated social organization* rather than performance metrics alone.

From this perspective, Geddes's metabolic reading of the city allows logistics to be understood beyond an instrumental lens. Recent work on urban metabolism similarly argues that flows cannot be separated from the infrastructures, uses, and territories they traverse, organize, and sometimes destabilize (Pernice, 2022). Logistics planning therefore raises questions not only of carbon optimization or efficiency, but also of collective vitality, accessibility, safety, and neighborhood coherence. Geddes's writings remain strikingly relevant in showing that sustainable urbanism depends on maintaining functional proximity. Failure to do so risks tensions with far-reaching consequences, as illustrated by the Yellow Vest protests in France in 2018-2019 (Fulconis & Paché, 2020). Every technical intervention—whether traffic regulation, infrastructure redesign, or relocation of logistical activities—must be evaluated considering its social effects. Otherwise, the city risks

fragmenting into an archipelago of isolated and self-contained enclaves. A systemic approach thus provides a necessary compass for rethinking contemporary urbanism by balancing logistical efficiency, environmental sustainability, and quality of life under growing urban strain.

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### Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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