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Transport in Mikrorayons: Accessibility and Proximity to Centrally Planned Residential Districts during the Socialist Era, 1957–1989

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Abstract

Residential housing compounds known as mikrorayons were enclosed within vast housing estates and served as central features of socialist urbanism in the Eastern Bloc. To reduce daily travel, designers located the communities on well-considered metropolitan sites and proposed embedded commercial opportunities and community services. This article examines, twenty-five years after the disintegration of the Union of Soviet Socialist Republics (USSR), the vision and implementation of transport planning in these modernist residential districts. A novel source of information is a rich literature, published during the operative years of the USSR, which explains and promotes contemporaneous socialist urbanization. This literature is enhanced with subsequently published critique and commentary to explore commuting, mobility, and transport-land use interaction vis-à-vis the legacy of central planning for housing estates. Findings suggest that various elements of built environments that were vital to access and mobility significantly lagged the timing, quality, and completeness of housing construction. The Soviet system substituted proximity for mobility in certain aspects of urban life, but incomplete service networks in residential districts meant that the promises of propinquity were unrealized.

Keywords

access, housing, microdistrict, microraion, mikrorayon, mobility, residential development, socialism, Soviet Union, sustainability, transport, travel, urban planning

> A microdistrict is the most convenient and hygienic form of housing development. A microdistrict facilitates solution of the creation problem, provides comprehensive cultural and public services, and isolates dwellings from heavy traffic thoroughfares.[1]

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In a socialist regime, centrally planned systems and government ownership of land make possible a unified vision of urbanization and its on-the-ground realization. The socialist industrialization program that began in the Union of Soviet Socialist Republics (USSR) after the success of the Bolshevik Revolution and in Central and Eastern Europe (CEE) after Soviet victory in World War II was interlinked with rapid urbanization.[2] Housing estates were built in a staggering expansion of residential space to help modernize cities and to support industrial economies. Lacking a capitalist market system, all resources were collectively owned and the economy was meticulously planned by central authority. Command economies required planned cities, and the provision of housing—which directly supported the industrial economy—was a vital and totalitarian aspect of the socialist regime.

The conclusion of World War II ushered in an era in which housing provision was of utmost importance in the ideology of the socialist system.[3] The aftermath of the war exposed an urgent need to improve housing to address living space that was deficient and undersupplied, since many people were living in squalor in communal apartments. Housing systems became firmly embedded in larger political and economic structures in the socialist regime[4] and the state's possession of a monopoly over housing production demanded a highly centralized institutional, administrative, and financial system for providing new housing.[5]

In the USSR, town planning was part of the production process, and because state socialism regarded a city as an "engineering system rather than a social organism,"[6] authorities had complete control over all aspects of built environments. With state ownership of most urban land, real-estate resources, and means of production, the development process occurred under central authority. Political machinery was pervasive and powerful. For workers, the foundation of a socialist society, industrial enterprises at which they were employed provided the entry point to housing, and the system guaranteed, in theory, equal access to virtually free housing for all Soviets[7] through generous government subsidies.

Vast centrally planned housing estates were built to fulfill housing needs of the working class. A key building block of modern, planned cities was an architectural ensemble known as a *mikrorayon or microraion* (or "microregion," herein mikrorayon), a master planned and self-sufficient neighborhood unit intended to provide a high standard of living by subdividing space into functional zoning areas for residences, commerce, and social space.[8] Envisioned as integrated neighborhoods, mikrorayons were designed to rationalize townscapes by imposing deliberate control of functions[9] and redressing an unending insufficient supply of housing in the USSR,[10] a phenomenon that was an outcome of an oppressive shortage economy.[11]

Urban workers who provided critical support to the regime needed residences and jobs [often in the industrial sphere (in agriculture, chemical plants, mining and resource extraction) or military sphere] and access opportunities that connected the two. The state assumed responsibility for providing transport for Soviets, and planning for new housing estates exploited proximity opportunities; at the same time, a strict hierarchical spatial order helped ease travel needs. Transport was thus a vital part of the socioeconomic structure of cities.

Housing estates, especially those built in the Soviet system, are roundly criticized, however, due to their soulless environments, monotonous and repetitive architecture, and association with oppression. In this article, however, I revisit the theories underlying transport and land use interaction in these homogeneously planned housing estates, including the reasons for prioritizing nonmotorized travel and public transport. An aim in the former Soviet Union (FSU) was to create compact and integrated environments in which a majority of needs could be met on foot or using public transport. While there was a place for automobile use in post–World War II housing estates, automobiles were never intended to dominate urban travel; under state socialism, there was no capacity to produce enough cars (and inadequate resources for the populace to gain private ownership of them).

This article returns to explore the vision and motivators for integrated mixed-use districts built in the 1950s–1980s under an extreme political regime. I reconsider the objectives and outcomes related

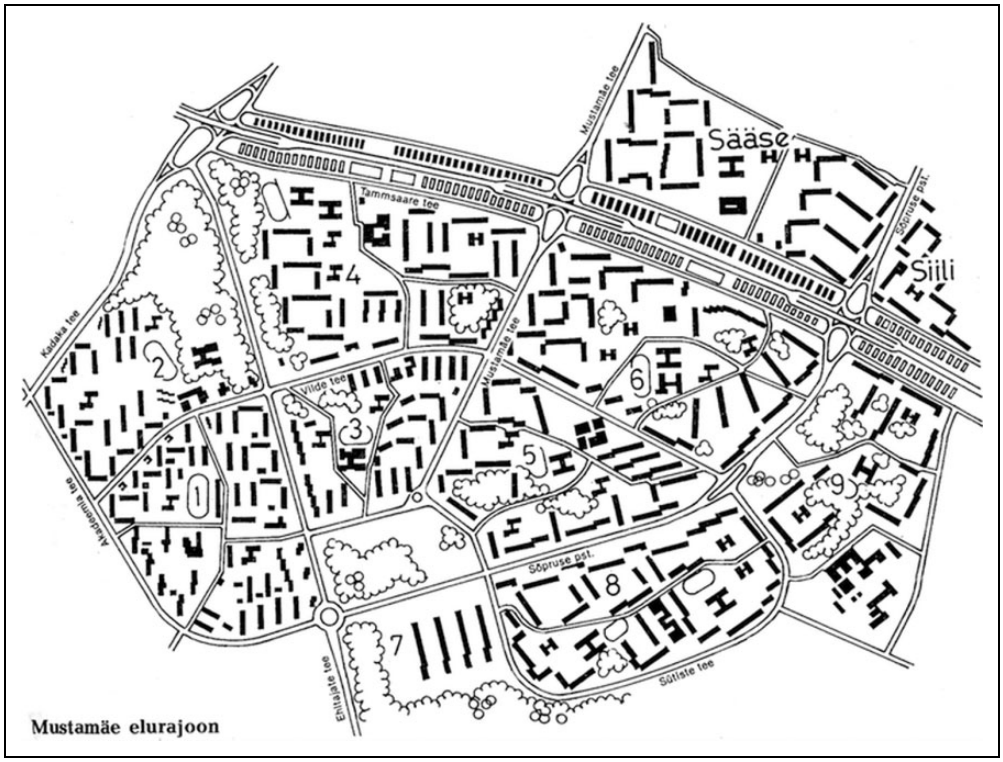

Figure 1. Plan for a residential district in Mustamäe (Tallinn, Estonia) composed of nine mikrorayons. The figure ground shows the form and density of apartment blocks and the relationship to green space. Major roads encircle each mikrorayon and only smaller access roads penetrate the superblocks. Large parking garages planned for the periphery (but mostly never built) helped to further define the interiors of the superblocks as pedestrian precincts. *Source*: Museum of Estonian Architecture, used with permission.

to the provision of access to and mobility systems within socialist residential districts and especially the built environments that supported urban movements, an underrepresented topic in scholarly literature about socialist cities. Socialist housing estates are commonly viewed today as unpleasant living environments with unattractive features,[12] however, there is a timeless quality to planning for access and mobility—by de-emphasizing automobiles, promoting walking and public transport, and replacing, where possible, travel with proximity—that is, worth revisiting in light of its compatibility with today's vision for ecological city planning and sustainable transport.

New Residential Districts in Cityscapes

Mikrorayons have their origin in 1950s state programs for large-scale residential construction in CEE.[13] To meet high demand for housing in post–World War II war-ravaged cities, Nikita Khrushchev, Premier of the Soviet Union, undertook a massive and immediate expansion of the Soviet Union's housing supply.[14] Soviet socialism thoroughly embraced modernist architecture, which was seen as a vehicle for standardizing the USSR's residential design and construction, raising living standards, improving housing conditions, modernizing infrastructure, and emphasizing orderliness. This would be accomplished by creating new urban forms distinctive to socialism as tangible elements of modernized cities[15] (see Figure 1). The urbanization project occurred at breakneck speed to respond to a housing crisis in which dwellings were urgently

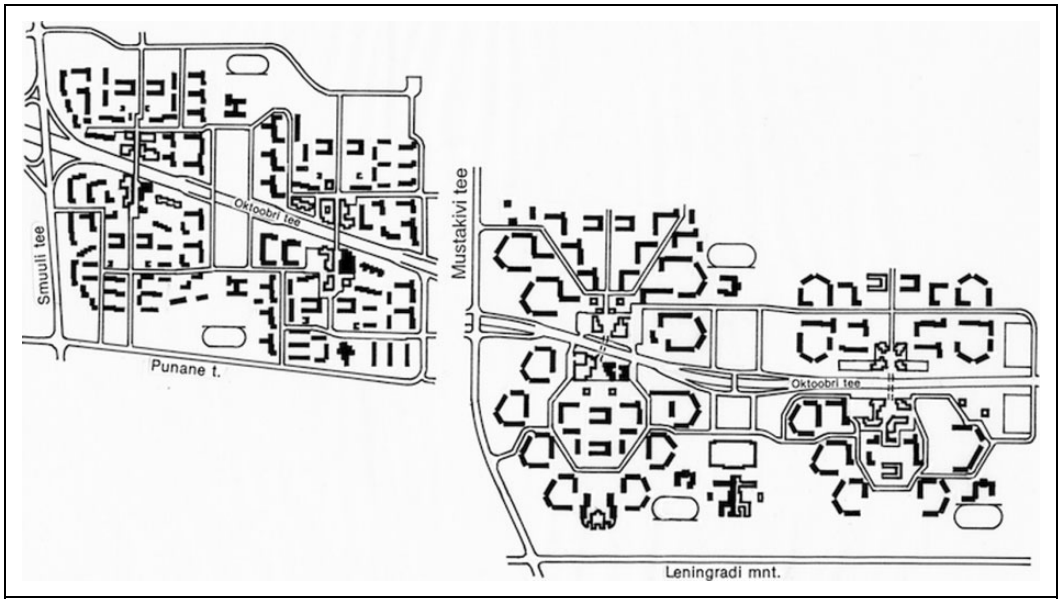

Figure 2. Plan for a housing estate at Lasnamäe (Tallinn, Estonia) composed of several mikrorayons. Daily life was centered around kindergartens, schools, and mikrorayon service centers, and commuting to employment occurred on buses serving the central corridor, Oktoobri tee (now known as Laagna tee).
Source: Museum of Estonian Architecture, used with permission.

needed to accommodate immigration[16] and a rural-to-urban worker migration (when labor was rapidly imported to cities from villages and countrysides).[17]

Superblocks were built on greenfield sites in peripheral urban space, taking advantage of "free massive sites of unused land,"[18] to avoid property assembly constraints typical of built-up areas.[19] Mikrorayons included, as depicted in Figure 2, separate zones for residences, daily services, social and cultural amenities, and municipal centers; necessities for creating a self-sufficient living complex were situated nearby. The importance of individualism and even family life was reduced and collectivism was stressed in a system that sought to "destroy bourgeois society."[20] Commercial and social opportunities were conveniently situated within walking distance of modern housing.[21] Key transport routes linked mikrorayons with city centers, where residents could reach higher-order administrative, commercial, and cultural services.[22]

Comparisons are apt between, on the one hand, the socialist system and, on the other hand, contemporaneous modernist neighborhood planning to support resettlement schemes in North America and Great Britain.[23] The ideologies supporting modernist residential district planning moved from country to country in the early and mid-twentieth century.[24] In the Soviet Union, planning for mikrorayons borrowed principles from British new towns,[25] planned unit developments in the United States,[26] and Scandinavian tower-in-the-forest suburban settlements.[27] The superblock approach, common to all schemes, was seen as an efficient way to link infrastructure with standard housing. The scheme provided a system of spatial organization centered on comingling housing and services, thereby exploiting proximity opportunities by creating neighborhoods which stressed accessibility, and a scientific approach for prescribing minimum distances between origins and destinations.[28] Vital to the neighborhood unit principle is a hierarchical spatial order or "nesting" feature in which cubic building blocks are aggregated in modular fashion to produce larger districts.

Transport Access to Housing Estates

Construction of mikrorayons was the principle driving force shaping urbanization during the Soviet years; housing estates were master planned to optimize interaction between urban systems. Mobility is a crucial urban function because it links economic development with urbanization; people's quality of life is affected by daily travel, which itself is shaped by transport opportunities.[29]

Soviet workers were envisioned as a distinctly mobile society.[30] With small apartments and modest living quarters, access outside the home to rich networks of sports, entertainment, and dining possibilities was seen as critical to engaging in a socialist life that celebrated communal rather than individual identity.[31] Service networks were intended to bring shops, services, and daily needs in close proximity to residents, thereby reducing daily travel.

Transport systems were tightly intertwined with housing systems, since access was subsumed into the socialist housing program and state-supported urban transport undergirded the industrialization project. The ability of workers to travel to jobs and to conduct daily business was critical to the Soviet pursuit of an industrial society; due to industrialization and rehousing, there were increases in the amount of commuting (or "pendular movements" in Soviet parlance) in the USSR in the 1950s–1970s.[32] Upward social mobility was a motivator for commuting to more distant jobs, and such daily movements were viewed during socialist times as "temporary aberrations to be corrected by future additions in housing stock within central cities, wide distribution of services and other measures to reduce the need for circulation."[33]

While various discrepancies between the ideal vision of Soviet-era city planning and the reality of day-to-day life are firmly established in scholarly literature,[34] few works have explored the contradictions concerning access to and mobility in master-planned socialist housing estates. Given rigidity in the system and the strong pressure to favor housing expansion above all else, I explore in significant detail the contradictions between the promises of Soviet planning and reality through this question: Despite the well-developed promises of Soviet town planning, to what extent were town planners able to deliver rational access and mobility systems in newly built housing complexes at the time of mikrorayon construction in the 1960s, 1970s, and 1980s? Addressing this question will develop new political–historical knowledge related to transport system development and aid in understanding the supply of transport infrastructure in socialist residential districts vis-à-vis propagandistic promises made.

Research Plan

Four key literatures are combined in this inquiry. First, while criticism of Soviet cities written *before* the disintegration of the Soviet Union,[35] and even after,[36] offers insight about transport and access, a novel source of information for this study is the use of written material—sometimes propagandistic—explaining (and promoting) socialist urbanization and published during the operative years of the USSR.[37] Such works often celebrate mikrorayons as the ideal way—a utopian vision—to organize a city's residential landscape.[38] Second, related works from the same period illuminate—often normatively—city planning in the Soviet Union[39] and, more broadly, governance in the USSR.[40] Third, the research considers key works about cities during Soviet times[41] and housing systems in the Soviet Union.[42] Fourth, studies about commuting patterns[43] and mobility phenomena[44] are used to explore the principles that created space for transport–land use interaction; central to the study of transport relating to housing estates, these works offer reflection about transport access during state socialism (and even after). The intent is to more deeply understand spatial phenomenon of socialist cities by retroactively analyzing the principles that supported transport–land use interaction, and the works from the 1950s through 1980s have not previously been synthesized to gauge the effects on transport–land use relations of state-altered development.

This historical literature captures the vision, aims, and intent of transport systems in socialist housing estates. This article enhances the usefulness of this literature by assessing outcomes of the system and then integrating the views of "outsiders"—critics of socialist cities writing after the demise of the USSR—with published works by "insiders" during Soviet times. For example, H. Wright's "A Visit to Russia" in *Town Planning Review* (1958) provides a travelogue from a city planner about the built form (and underlying urban policies) of Soviet cities that were little known to those outside the USSR.[45]

The geographic focus of this research—on CEE and countries of the FSU—is purposely broad to capture various realities of mikrorayons in the diverse settings in which they occurred, however, a reliance on English-language sources focuses this research partly on specific literature from the Soviet era written within the USSR with an outward aspect for an international audience. As visual exemplars, I rely on housing estates in the Baltic Republics (Estonia, Latvia, and Lithuania),[46] since urban areas in these countries expanded significantly to house Russian-speaking immigrants, mostly during the 1960s–1980s.[47]

Exploiting Proximity and Access in the Built Environment

Access to employment was a preeminent city planning consideration, given the dominance of industry, and access was often achieved through—in lieu of travel—propinquity. Locations for new housing opportunities were carefully selected to provide access to jobs through direct proximity (or even adjacency) with little or no need to travel but always with a possibility to rely on state-supported public transport.[48]

The preferred location in which to establish a new communal live work environment was a greenfield site on an urban fringe, even when central space for development was possible.[49] Virgin land was readily available in peripheral locations on parcels of considerable size,[50] since new residential districts were space consumptive. Sites for new housing estates were often chosen near specialized factories (or housing combines) where prefabricated components were manufactured; on-site assembly of building components served to economically optimize construction-related transport. Perhaps most importantly, greenfield sites were aligned with the modernist view that attractive living environments required pastoral settings removed from the congestion of central cities.[51]

By emphasizing proximity in access considerations for directing urbanization, Soviet administrators hoped to justify constructing the smallest possible amount of transport infrastructure[52]—part of an explicit goal to minimize urban construction costs—since residents would reach many places on foot.[53] In fact, a comprehensively planned district-focused scheme at the metropolitan scale was itself thought to reduce traffic congestion that would appear with market-driven development.[54] But unlike a market economy, where land speculation appears organically, socialism removed value from property, producing an "absence of incentives to recycle land."[55] Consequently, new locations on the periphery were used to establish housing complexes and central areas were seldom targeted for redevelopment.[56]

The period of mature state socialism (1950s–1980s) represent an important time in the Soviet Union for urbanization and urban population growth. Critical effects on urban structure stemmed from the administrative allocation of land.[57] With no free-market housing and all housing painstakingly allocated by central authorities,[58] those seeking housing waited in queues; further, there was no "free-choice" housing mobility, and it was nearly impossible to change residences (except for specific circumstances like a change in family size, possibly allowing a housing "exchange"). Labor markets were local, and in socialist states with few opportunities for job mobility and housing mobility, people tended to stay in place for a long time, if not their entire work career or lifetime. Consequently, families were bound to their housing location and households were, unlike in market economies, unable to make location decisions to balance housing needs and transport costs.[59]

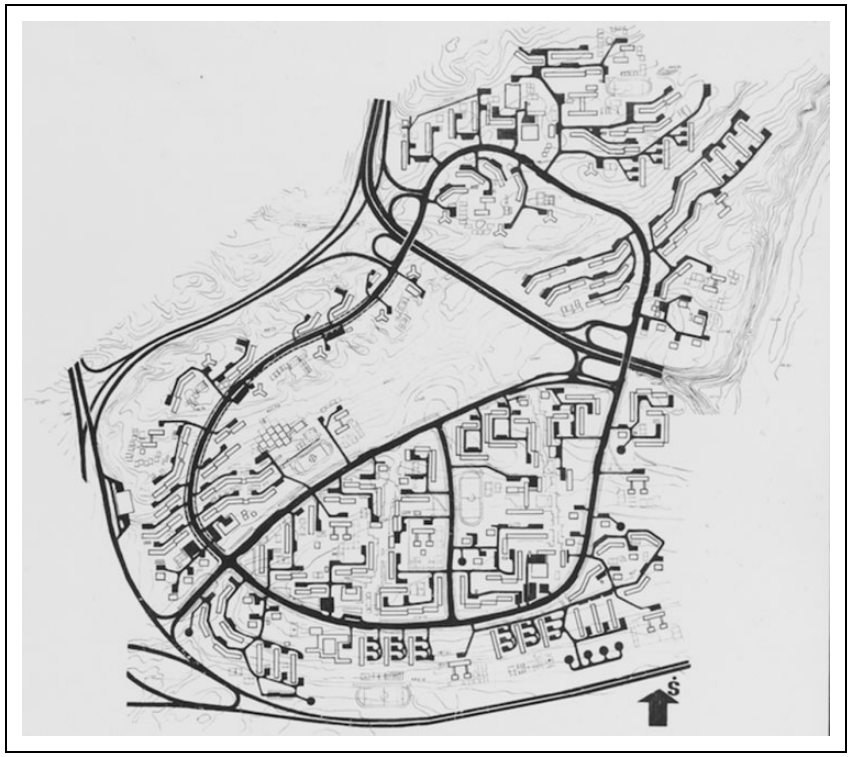

Figure 3. Plan of Lazdynai residential district (Vilnius, Lithuania; 1969). L-shaped and U-shaped apartment blocks form protected interior courtyards for pedestrian paths, playgrounds, and other outdoor activity. *Source*: Virtualus Architecturos Muziejus (www.archmuziejus.lt), used with permission.

Built Environments Shape Urban Travel Opportunities

Access and mobility were important organizational principles explicitly reflected in the spatial arrangement of key components of mikrorayons, and an integrated ensemble of land uses was designed for "rationalized internal movement."[60] In perhaps the most significant change for the interaction of street rights-of-way and adjacent land uses, traditional city blocks were dissolved into Corbusian superblocks.[61] Buildings were not arranged facing street rights-of-way along traditional property boundaries but were instead distributed in "free" inward-oriented schemes, so that the buildings looked upon enclosed courtyards and shared communal space (see Figure 3). Irregular building placement prevented a "building wall" from developing along street rights-of-way and gardens; consequently, structures were disconnected from property frontage and buildings turned their backs on streets.[62] Designers sought conceptual shapes for physical configurations of built environments that promoted access, where residential buildings lined the exterior and services concentrated at the center.

In true modernist fashion, no buildings expressly faced thoroughfares.[63] Apartment buildings were built in square or rectangular forms or polygonal shapes, but the buildings did not include inner passageways and courtyards like traditional European urban apartment buildings did. The new spatial arrangements in socialist housing estates provided space between buildings and considered climatology by maximizing daylight and ventilation[64] but also inhibiting close relationships between streets and sidewalks, commercial opportunities, and residential buildings. In this scheme, buildings were situated to provide "a maximum of daylight, to allow for the proper ventilation of the

Figure 4. Broad Streets serve residential buildings in Väike-Õismäe, Tallinn, Estonia. An encircling ring road is designed to accommodate motor vehicle travel, preserving the makrorayon interior for pedestrian movement. Photograph by Johannes Külmet.
Source: Museum of Estonian Architecture, used with permission.

area, and for the best use of the natural slope of the land"[65]; it was important to avoid wind effects and to create protected and welcoming courtyards.

A superblock with free-plan towers thus became a key unit of development and was considered to be a dramatic improvement over the heretofore—in a successive architectural periodization—notorious Khrushchëvka arranged barracks-like on tightly gridded streets.[66] Soviet architects argued that mikrorayons would eventually replace conventional city blocks completely,[67] signaling a new modernist vision of cities composed of large towers, broad streets, and vast open space—or "waste territories"[68]—not unlike tower-in-the-park progressive visions of Le Corbusier and his contemporaries[69] (see Figure 4).

Pathway Systems Provide Critical Access for Pedestrians

A mikrorayon was designed to function essentially as a "pedestrian precinct"[70]; five- to six-minute walking trips (400–600 m) for accessing standard goods and services would supplant the need for motorized transport (see Figure 5). Streets and pathways within mikrorayons produced a significant reimagining of the purpose and form of traditional urban access, since streets in the Soviet Union were commonly viewed as "dangerous, chaotic, and generally inhospitable environments."[71] A new modernist approach to street and highway planning was viewed as a way to rigidly separate pedestrians from vehicles and avoid pedestrian street crossings,[72] and separation of pedestrians from vehicles became "one of the main principles in planning the town of the future."[73]

Pedestrian walkways provided space for vital internal mobility within mikrorayons. A resident could, in theory, access a majority of daily needs within a mikrorayon, including libraries, post offices, shops, and childcare. Winding pedestrian pathways linked buildings and were designed specifically to be segregated from vehicular zones: "in the interests of safety and tranquility [pathways] are free of any kind of vehicles"[74] (see Figure 6).

Figure 5. Lazdynai residential district (Vilnius, Lithuania; 1967). High-density panel apartment buildings surround community services in the housing estate. Pathways connect important origins and destinations and bus transport.
Source: Virtualus Architecturos Muziejus (www.archmuziejus.lt), used with permission.

Moving the Masses on Public Transport

Officials regarded public transport as a key link between people's residences and employment sites, and public transport was designed to be the primary means of daily commuting when walking was not possible or did not suit travel needs.[75] Public transport would also connect residential districts with city centers.[76] The Soviets thus developed primarily bus systems and tram/streetcar networks but also trolley bus and, in the largest cities, subway connections (see Figure 7). This occurred despite financial constraints, since it was recognized during the Soviet era that "substantial increases in funding of high-speed local transport appear unlikely in the immediate future."[77]

The accessibility strategy for the planning of mikrorayons was, like other domains of life, egalitarian: In the spirit of societal homogeneity, all residents should have equal access to goods and services, with access measured by distances or travel times via public transport.[78] Like other aspects of planning for mikrorayons, norms were established for public transport access; for example, the maximum walking distance to reach public transport from trip origins should be 500 m.[79]

For public transport to function effectively, a "critical mass" of passengers is generally needed to support investments, but this was seldom a concern in the Soviet Union due to a lack of alternatives for nonwalking trips; buses operated at capacity. Public transport also operates most effectively when it serves an intensity of activities focused on both residential and commercial density nodes. Mikrorayons provided such intensity nodes, to a degree, since great numbers depended exclusively

Figure 6. Žirmūnai residential district in Vilnius, Lithuania (1990). Pedestrian paths, sidewalks, and roadways converge on central features of the Žirmūnai residential district, where apartment buildings surround the central core.
Source: Statyba ir architektūra, used with permission.

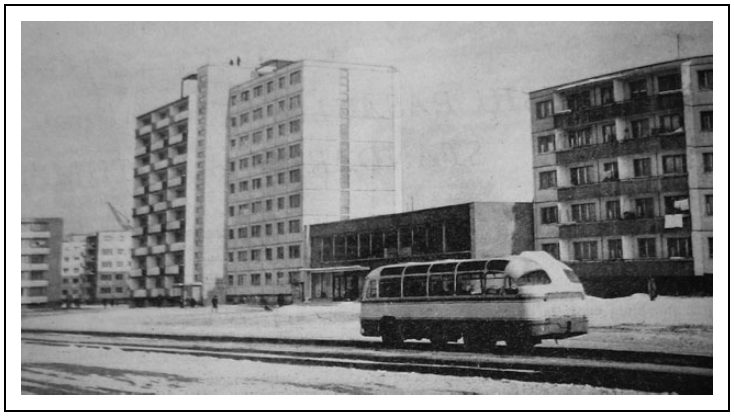

Figure 7. Žirmūnai residential district in Vilnius, Lithuania (1966). A bus serves the new residential district during winter weather.
Source: Statyba ir architektūra, used with permission.

on public transport for traveling between their residences and employment sites, although these sites were spatially dispersed. Public transport also served intraregional mobility needs, including weekly and seasonal travel to countryside summer home districts.

Place of residence was, in theory, highly connected to employment[80] and commuting was free or heavily subsidized in the Soviet Union. Many people commuted daily for work to places outside

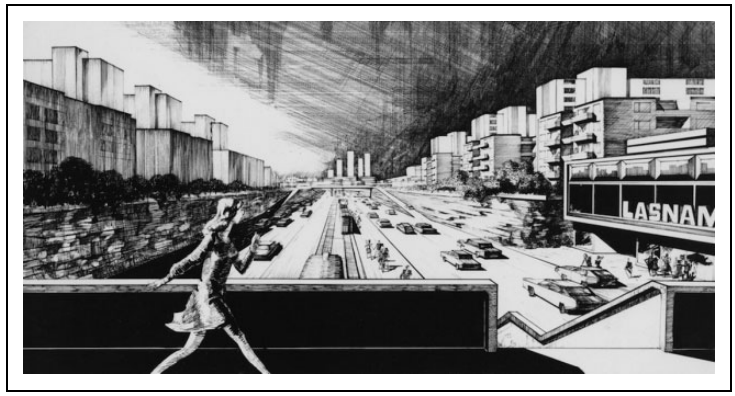

Figure 8. Sketch of a pedestrian overpass providing access to the commercial center of Lasnamäe. A promised high-speed rail connection between the city center of Tallinn, Estonia, and Lasnamäe, a large 1980s housing estate, was never built, despite construction of a sunken highway built to carry it.
Source: Museum of Estonian Architecture, used with permission.

the administrative district of their residence, and up to 90 percent of commuters during the 1970s traveled on public transport.[81] Others continued to live in villages or the countryside as they awaited allocated housing in cities, but in the meantime they commuted by public transport to urban worksites.[82] It was recognized during socialist times that burdensome commuting led to lower work productivity and insufficient time to participate in community and social activities.[83] In addition, public transport was notoriously undersupplied due to limited state budgets. More ambitious public transport connections were usually prescribed in mikrorayon founding plans than were ultimately provided (see Figure 8).

Street Networks and Pedestrian Zones

Traditional urban streets were viewed by Soviet administrators to be unsafe,[84] and superblocks were intended to remove community life from the "presumed tyranny of the street."[85] Consequently, residential areas were purposely located to avoid industrial traffic and through traffic—major arterials and highways did not traverse *through* mikrorayons but instead skirted them—and this isolation was explicitly intended to improve the quality of residential environments.[86] Isolation of travel modes was deliberately achieved through stringent social control on streets and places, and vertical separation of travelers on various levels reduced the need for stopping traffic.[87] Major thoroughfares formed the boundaries of residential housing districts, and only access roads directly penetrated mikrorayons (see Figure 9).[88] Safety considerations dictated that vehicular traffic be separated from nonmotorized traffic, and community facilities and children's play areas were consequently located strictly in district interiors.[89]

Modernist roadway design favored grade separation over at-grade controlled intersections,[90] easing restrictions for automobile travel and permitting higher travel speeds. In Russia, strict hierarchies traditionally defined streets by classification and physical characteristics. Likewise, within mikrorayons, right-of-way widths—which were usually generous—were proportional to functional classification of roadways, although not proportional to travel demand, as private automobiles during Soviet times were scarce.[91] Consequently, road density in a mikrorayon was generally lower than road density in a traditional urban district.[92] With traffic largely excluded from residential housing districts, smaller-size roads led to buildings and shops. It was estimated during the Soviet years that a lack of traditional street networks within a mikrorayon yielded a cost-savings of thirty to forty rubles per square meter of new housing.[93]

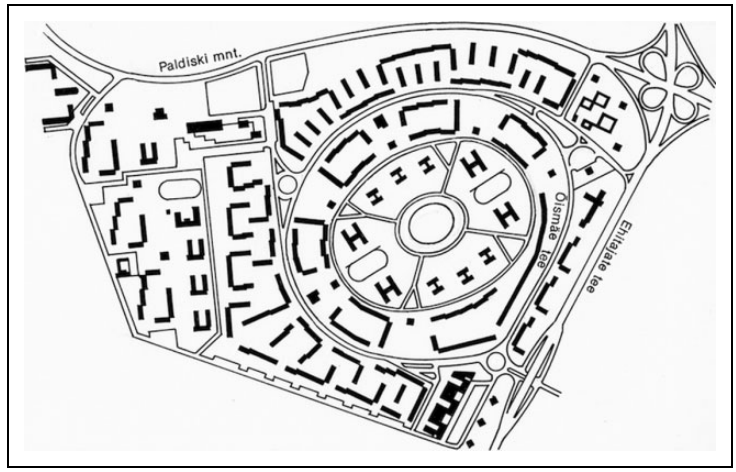

Figure 9. Plan of Väike-Õismäe (Tallinn, Estonia), preserving the center of a circular makrorayon for pedestrian-only access. The architects combined three mikrorayons in the original plan to form a single macrorayon to maximize protected vehicle-free space in the interior. However, with two encircling ring roads, many residents had to cross a wide thoroughfare to reach the center.
Source: Museum of Estonian Architecture, used with permission.

Discussion and Criticisms

The construction of socialist housing estates ceased in the early 1990s after the demise of the USSR, and the built reality of socialist housing estates did not meet the vision of socialist–industrial utopias expounded by Soviet officials. During the height of industrial growth in the USSR, Soviet administrators devoted much energy to determining the location and design of residential, recreational, and industrial areas. Community facilities and means of access were critical aspects of residential district design; though they considered transport an important component of the function of cities, Soviet architects regarded transport planning to be subordinate to land use planning.[94]

Failures Become Apparent

By the time perestroika materialized in the late 1980s, many of the shortcomings of mikrorayons and the housing construction program were acknowledged, even within the Soviet Union.[95] The failings of cheap construction cannot be understated as an explanation for the defects of many residential buildings and districts. Critics argued that faulty construction methods and cheap materials—owing to "famously shoddy goods"[96]—would produce short-lived buildings and districts suitable only for the present generation, requiring remodeling for the following generation.[97]

Panel buildings and even entire mikrorayons and residential districts were perceived as sterile, lifeless, and monotonous. During planning, design, and construction, authorities were preoccupied—given the urgent need to house Soviets—with conforming to standards and with quantity rather than quality. While mikrorayons were intended to quickly provide housing and efficiently solve urban problems, standardized housing introduced other problems, including socioeconomic segregation (which socialism explicitly attempted, in theory, to avoid) and ethnic stratification.[98] Nevertheless, the enormous European housing building program[99] was thought to be an improvement over life in contemporaneous central cities, and many people possessed positive impressions of socialist housing estates, especially compared to alternatives at the time.

Despite a focus on planning for accessibility—by arranging land uses such that a number of important places were conveniently reachable on foot—Soviet architects did not pay adequate attention to livability.[100] Pathway systems were often unbuilt or incompletely landscaped,[101] forcing many to negotiate on foot through places without landscaping and near nuisances like railroad tracks. Although they were intended to be efficient and orderly, mikrorayons were incomprehensible to outsiders[102] and it was difficult to find the location of shops and services (which were often poorly signed).

Conflicting Development Aims Complicate Transport–Land Use Relationships

Selection of a travel mode for the basis of city planning strongly affects the arrangements of land uses within urban space.[103] In the Soviet Union, a land use arrangement was first chosen—modernist "tower-in-the-park"-style arrangements of panel buildings[104]—and then transport connections were devised to serve access needs. Consequently, Svetlichnyi[105] and others suggest a failure both centrally and locally in Soviet town planning to give proper attention to how transport systems affect city structure. Disconnections between dwellings and city centers and key employment sites were often severe; since gaps in transport systems were not adequately addressed through subsequent intervention, they hampered efficient metropolitan functioning.

The sectors in which central planning and state intervention occurred required employment over vast physical spaces—especially defense and agriculture (whereas industry could, to a degree, be spatially concentrated). Labor catchment areas were often enormous[106] and dispersion was challenging to serve with state-subsidized transport. Furthermore, general suburban roadway development in Eastern Bloc cities often fell short,[107] and an undersupply of roadways and transport connections[108] exacerbated traffic congestion at various "choke points" as residents traveled outward from mikrorayons. Urban bypass roads in formerly socialist cities were also undeveloped, forcing traffic to traverse directly through a metropolitan region and its centrum (instead of skirting it) to reach the far side.[109]

During the Soviet regime, the sanctioned form of urbanization produced low-density urban–industrial environments—often referred to as "para-urbanization"[110]—deliberately eroding distinctions between city and country[111] in a popular Marxist–modernist rejection of traditional city form. In the Soviet Union, central cities were moderately preserved (or, more accurately, left untouched) while gigantic new residential districts were constructed on the outskirts. Because expansion of housing opportunity occurred only on urban peripheries, new and—given the large numbers of residents and high population densities—significant demand was placed on intraurban transport systems to serve trips at ever-increasing lengths and durations to connect cities with distant housing estates.

Accessibility was not capitalized into the value of dwellings as it is in a market system; individuals did not give consideration to accessibility benefits and their realization in property value. People could not express individual preferences for residential location, and this often produced "involuntary commuting"[112] from assigned housing to assigned employment.[113] While all housing units were, at least in theory, comparable, amenities in housing districts were built to various states of completion, and the service availability surrounding housing units helped define their perceived quality. Furthermore, individuals or groups did not attempt to improve properties for financial gain, since land was owned collectively and housing was not an economic asset worthy of self-investment; consequently, many Soviets felt apathy toward their housing and living environments.

Consistent with modernist thought, segregation of incompatible land uses—especially segregating residences from industry—was an important goal in planning for mikrorayons. For example, residences were sited in places that reduced possibilities for industrial pollution to spoil living environments.[114] At the same time, the Soviets introduced a somewhat conflicting aim: home and

factory should be relatively near each other to minimize transport costs (measured in both time and expense).[115] Thus, location decisions attempted to divert urban growth and reduce the distance between place of work and place of residence,[116] furthering communist ideals: "labour efficiency may be impaired by lengthy journeys to work, inadequate recreational provision and difficulties in the retail sphere."[117] Interplay between the metropolitan locations of mikrorayons and their access challenges illustrates another conflicting Soviet aim, in which access to worksites (with rather limited transport opportunities connecting residences and employment) would be achieved by nearness, yet at the same time, mikrorayons should be located in peripheral locations possessing lower aggregate residential densities than traditional urban settlements.

Conclusion

The literature summarized provides evidence for addressing the central research question of this study: various elements of the built environment that were vital to access and mobility—especially landscape design and rational pedestrian paths—significantly lagged the timing, quality, and completeness of housing construction.[118] The incompleteness of these elements jeopardized transport connections within and to mikrorayons, creating travel burdens for residents. The addition of monolithic housing estates on the outskirts produced "a total attack on the notion of urban hierarchy"[119] by establishing high residential densities on urban peripheries rather than within and near city centers (and with decreasing density moving away in all directions from a city center). A disregard for travel costs in location decisions created an artificial environment for transport–land use interaction and this complicated rational metropolitan-wide access and mobility.

Although mikrorayons were envisioned as residential compounds that offered ample embedded services and access to nearby employment, travel times from mikrorayons to center cities was still an important consideration for Soviet architects in metropolitan location decisions. Central cities in the Soviet Union did not lose their importance, in part because promised services did not appear in peripheral housing estates. Administrative restrictions on urban growth also helped influence the metropolitan location of residential housing districts,[120] and criticism from the late 1970s suggests that new mikrorayons built on urban peripheries contributed to sprawl: "massive areal expansion is, however, attracting major criticism in view of the costs of transport and of the necessary infrastructure."[121] Such unresolved conflicts perhaps foreshadow the poor performance of certain aspects of mikrorayons.

Today, cities in the FSU are complex, possessing presocialist, socialist, and postsocialist urban spaces. Approximately two-thirds of the USSR population was rehoused between 1960 and 1975[122] and one-half to two-thirds of all new housing construction in CEE countries between the 1960s and 1990s occurred in mikrorayons.[123] With 40–50 percent of all dwelling units in the FSU located in large housing estates,[124] challenges related to the supply of urban housing inherited from state socialism is one of the largest problems facing CEE countries.[125] However, we cannot singularly blame architects for failures of socialist housing estates because the system in which they were embedded abruptly collapsed.

After the end of socialism, the government quickly withdrew from involvement in the housing sector[126] when housing production and housing distribution became a market economy function.[127] There has been little demolition in mikrorayons in CEE cities; in these places, housing was not oversupplied since the economic fortunes of countries produced only a limited supply of alternatives (especially single-family detached homes). In some places, new housing options other than high-rise flats have been emphasized during the postsocialist years in acknowledgment of the stigma of residing in high-rise apartment block.[128] Housing estates continue to play a fundamental role in urban housing markets, and the built form of housing structures created under central authority during the Soviet period strongly shapes today's metropolitan form.

Public transport—which previously captured a large share of urban travel[129] due to its lower overall costs—was neglected during the 1990s in favor of street and road network expansion throughout Eastern Bloc countries. At the same time, growing motorization was accompanied by a high number of traffic fatalities in CEE countries,[130] and a rise in urban traffic volumes exacerbated noise and pollution.[131] Incomplete public transport connections between mikrorayons and city centers continue to make private automobiles more convenient.[132] Urban transport improvements must generally be funded by local governments, for which budgets are already stretched (European Union funds generally target regional transport investments). Private investment has been used to improve various aspects of built environments of housing estates but not transport enhancements.[133]

Large housing estates were the product of "idealist thoughts, futuristic views and great expectations"[134] and a highlight of city planning when architects entrenched in a socialist system hoped to profoundly shape cities. The findings from this research suggest that the vision for urban transport in utopian industrial residential districts in socialist cities was consistent with the Marxist–Leninist view of shared resources and state intervention. When the vision was realized, however, several incompatible aspects of mikrorayons dampened their performance. The antiurban focus of modernist housing estates attempted to blur the distinction between city and country, yet it was difficult to effectively serve dispersed residences and jobsites using only public transport when automobile ownership was impossible for most people. The Soviet system substituted proximity for mobility in certain aspects of urban life but incomplete service networks in residential districts meant that the promises of proximate opportunities were incompletely realized. Thus, neither part of the "dual" system for urban transport in housing estates—walking trips for everyday and local needs and public transport for employment commuting and more distant travel needs—was effective.

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