

Shaping Future Cities: The Impact of Generational Changes on Urban Planning and Key Priorities for Adaptive Strategies

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Abstract

This study explores the transformative impact of generational shifts on urban planning, shaped by global events, technological acceleration, and evolving social behaviors. By adopting an interdisciplinary approach grounded in sociological and psychological theory, the research investigates how intergenerational dynamics and rapid technological change reshape urban environments. The theoretical framework draws on key thinkers such as Karl Mannheim, Pierre Bourdieu, and Alvin Toffler to contextualize generational identity and conflict in contemporary cities.

Through a comprehensive literature review and thematic analysis, the study identifies a transition in urban planning paradigms—from the growth-oriented models of the 20th century to adaptive frameworks that emphasize resilience, digital infrastructure, and economic flexibility. Particular attention is paid to recent disruptive events, such as the pandemic, which have accelerated the need for inclusive, responsive, and multifunctional urban strategies.

The findings highlight the necessity of periodic updates to planning instruments—such as master plans and policy frameworks—to accommodate the distinct values, behaviors, and expectations of different generational cohorts. Ultimately, the study advocates for urban policies that promote social cohesion, equitable access to resources, and environmental sustainability. These adaptive strategies aim to foster inclusive cities capable of addressing the complex and shifting demands of both current and future generations.

Keywords: generational shifts, urban planning, adaptive strategies, pandemics, wars, multi-functional spaces, technological acceleration, social contagion, inclusive cities, intergenerational, transformation of cultural and social concepts

1. Introduction

The primary mission of urban planning in the modern era and beyond is to regulate the relationship between humans and their surrounding environment in a way that enhances the quality of life for citizens and fulfills their physical and spiritual needs in all aspects. The Industrial Revolution, as one of the turning points in human history, altered the way humans interact with their environment, making human needs more apparent within urban communities. Cities transformed into the primary living spaces for humans, and the utopias of the twentieth century were planned and designed to meet the needs of all urban groups, from children to the elderly. Various plans and urban development projects were implemented to address needs and respond to human challenges, evolving over time in accordance with social requirements and desires.

Throughout the historical progression of urban planning, the focus and priorities of urban designs have shifted according to the needs and demands of cities and their citizens. Following the Industrial Revolution, industrial and employment areas were prioritized in development due to the importance of economic growth in society. However, as issues stemming from industrialization and related environmental and social risks emerged, environmental protection and sustainable development became priorities in subsequent periods. In the Information Age, electronic and communication infrastructures were added as key elements of cities, leading to the rise of the smart city approach. Nevertheless, cities have always served as the stage for social and economic interactions, with urban

environments providing the main platform for human and intergenerational communication in both social and economic domains.

The emergence of the Information Age and the cybernetic revolution significantly transformed human interactions. The unprecedented speed of technological development and its impact on human relationships have posed challenges to social life. Human interactions are no longer defined solely by person-to-person contact; they can also include simulated representations of human or non-human interactions. Virtual communications have redefined human interaction, allowing people to share experiences without being physically present in the same place at the same time. This challenge is particularly pronounced in intergenerational communication, leading to a wider generational gap than in previous eras.

Generational differences have long existed across both urban and rural societies, dating back to ancient times. Even Plato referenced the divide between fathers and sons, attributing it to the inadequate upbringing of youth. While such differences are not unique to the present era, the underlying factors driving generational change have evolved significantly in modern times. These evolving factors have intensified the generational gap and shortened the intervals between successive generations. Due to rapid generational shifts, new generations now emerge approximately every five years, creating a need for urban planning that accommodates diverse age groups and emphasizes adaptable spaces, flexible policies, and multifunctional urban areas.

The revolution in information circulation and the expansion of virtual communications are the most significant phenomena resulting from technological growth in the modern era. What has caused the greatest changes in human life is the unprecedented impact of technology on various aspects of life, and the advent of the internet has enabled the newer generation to surpass the previous one. The pace of change is so rapid that even among similar age groups, gaps have formed, and the generational gap has widened due to individuals' varying experiences with technology and the rapid changes in societal values. New and diverse media tools, as the primary channels of information exchange and communication, have become part of the globalization process, and human life is no longer confined to geographical and cultural boundaries.

Before the advent of virtual communications, public and semi-public spaces in cities played a major role in social life, but in the modern era, these spaces have lost their former importance. Virtual spaces and associated social networks have emerged as competitors, influencing human life. Technological progress, population growth, virtual communications, and the diminishing concept of physical boundaries have led to the social segregation of different groups and have made interaction spaces more individualized, both in the virtual and physical worlds.

The emergence of digital and virtual platforms has significantly altered people's lifestyles; urban spaces as places for service provision can no longer operate in the traditional form and require updates and changes to meet the needs of different generational groups. Traditional urban planning models, characterized by fixed and unchangeable functions, are increasingly ineffective in addressing the dynamic needs of contemporary society, particularly among younger generations who have grown up amidst the cybernetic revolution. The younger generation, born during the cybernetic revolution, desires cities that are based on the latest global technologies and are drawn to spaces that are dynamic in terms of physical structure and activities while offering functional diversity. In light of the rapid pace of technological advancement and information dissemination, urban planners and designers must adopt flexibility and responsiveness in design to ensure the relevance and acceptance of urban environments.

Conversely, older generations must adapt their behaviors and patterns to engage with the technology-driven services that are increasingly prevalent. As a result, urban design must simultaneously address the diverse needs of various demographic groups, including children, adolescents, young adults, middle-aged individuals, and the elderly.

Consequently, there is an urgent need to design and plan cities in alignment with the diverse needs and preferences of various generations while acknowledging generational gaps. Urban planning must focus on addressing human requirements across living, working, and recreational environments. Urban land-uses should redesign based on new pattern of behavior to be functional and economic. Currently, urban development strategies are based on long-term and medium-term plans that span 15 to 20 years, guiding policies for economic, social, and physical development. However, human behavioral and cultural patterns—along with the needs of urban space users—are increasingly influenced by factors such as technology and globalization, leading to rapid changes within much shorter timeframes.

The central objective of the study is to investigate how future cities can be designed to accommodate generational diversity, minimize spatial and functional inefficiencies, and promote social cohesion. This includes identifying planning strategies that are both adaptive and anticipatory, capable of aligning with behavioral trends and cultural

transformations. The research further aims to contribute to the theoretical discourse on urban flexibility, while offering practical design guidance rooted in evidence and generational analysis.

2. Method

This study adopts a qualitative, theory-building methodology to explore the influence of generational change on urban planning. Rather than relying on quantitative data or experimental design, the research emphasizes interpretive analysis and conceptual synthesis. The methodology consists of two integrated components: a systematic literature review and theoretical analysis grounded in sociological and psychological frameworks.

2.1 Conceptual Approach and Data Sources

The study begins with a comprehensive literature review to identify the sociocultural, psychological, and technological factors that drive generational shifts. Sources include peer-reviewed journal articles, theoretical texts, urban planning frameworks, and policy documents. Key theorists such as Karl Mannheim, Pierre Bourdieu, and Alvin Toffler provide the conceptual foundation for defining 'generation' and tracing its transformation across historical and technological contexts.

2.2 Analytical Strategy

Using a thematic content analysis approach, the study categorizes and synthesizes patterns related to generational behavior and their spatial and functional implications in urban contexts. The aim is to map relationships between generational characteristics and urban planning elements—such as land use, public space, mobility systems, and digital infrastructure. The analysis is conceptual and comparative, not statistical, and seeks to extract generalizable patterns through iterative reading and coding of textual data.

2.3 Theoretical Framework Development

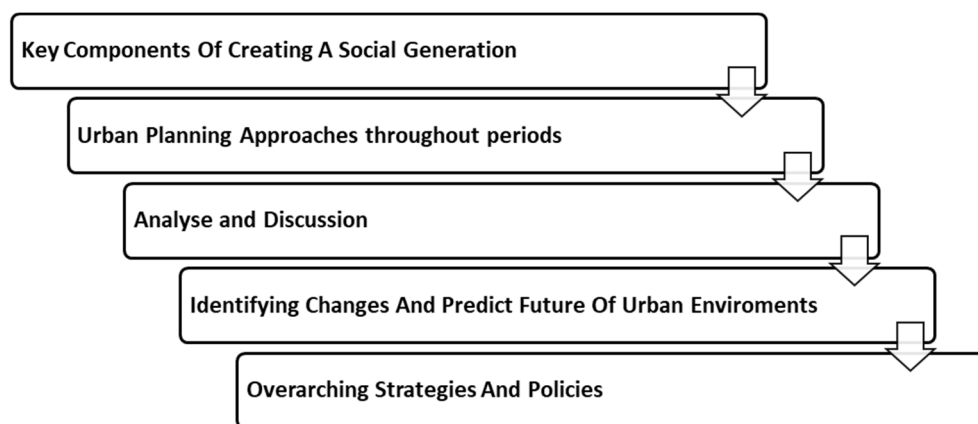
Findings from the literature review are integrated into a generational–spatial interaction model that reflects the dynamic influence of generational expectations on urban form. This model is used to propose strategic urban planning directions that can adapt to generational transitions, especially in the context of rapid technological and societal change.

2.4 Validity and Reliability

Although the study does not involve human participants or empirical sampling, efforts to ensure rigor include the use of diverse sources, theoretical triangulation, and transparency in the development of conceptual categories. The process is designed to be replicable by other researchers working in urban theory or planning.

2.5 Research Process Flow

The process of this study followed a step-by-step conceptual and analytical framework, as illustrated below:



- 1) Key Components of Creating a Social Generation: Identifying theoretical foundations and sociological/psychological drivers behind generational formation.
- 2) Urban Planning Approaches Throughout Periods: Reviewing historical and contemporary planning models in relation to generational needs.
- 3) Analysis and Discussion: Thematic interpretation of the relationship between generational shifts and urban form and function.
- 4) Identifying Changes and Predicting Future Urban Environments: Projecting how generational dynamics will

influence future urban development.

5) Overarching Strategies and Policies: Proposing adaptive planning strategies and policy recommendations for inclusive and flexible cities.

This sequence guided the structure and logic of the research, ensuring that each step builds on the previous one to generate a comprehensive theoretical framework for future-oriented urban planning.

3. Literature Review

A review of the existing literature reveals that while several studies explore generational influences on urban planning, many predate the full integration of digital technology into everyday life or focus narrowly on specific age groups or spaces. For instance, Moos, Pfeiffer, and Vinodrai (2017) highlight the contradictions faced by millennials—such as economic instability versus aspirations for homeownership—and argue that these tensions reshape urban environments in ways that require a reevaluation of traditional planning paradigms.

Giachino et al. (2022) investigate Generation Z's perception of nature-based solutions (NBS) in urban areas, showing that Gen Z values NBS initiatives for enhancing cultural and natural heritage, particularly in leisure and tourism contexts. Similarly, Elzinga (2023) explores how urban public spaces in Groningen can better support Gen Z's mental health, revealing a strong preference for greenery, heritage, and street-level interventions like public benches and sustainable street designs.

Toma et al. (2023) address Generation Z's role in smart city governance. Their findings from a quantitative survey in Bucharest show that Gen Z students are not only aware of but also eager to participate in smart city initiatives—highlighting the importance of involving younger generations in future-oriented urban management.

Despite these insights, the literature lacks a comprehensive examination of intergenerational dynamics within urban planning. Most studies either focus on one age group or discuss technological impacts (e.g., smart cities, tourism) without addressing how planning can mediate generational differences. This study aims to fill that gap by exploring practical, inclusive strategies for integrating diverse generational needs into urban development frameworks.

4. Theoretical Framework

4.1 Generation Concept by Scholars

Karl Mannheim pioneered the sociological concept of generations, moving beyond genealogical or chronological definitions. In *The Problem of Generations* (1928), he argues that generations are shaped by their historical and social environments, which influence their collective experiences and perspectives. Mannheim differentiates between "actual generations," who share direct experiences of historical events, and "potential generations," who share age and social conditions but not identical experiences. Generational consciousness arises from these shared experiences, shaping beliefs, values, and attitudes, which explains differing interpretations of the same events across generations. His concept of the "generational unit" (Mannheim, 1952) highlights how historical context and social cohesion create collective identities and foster generational consciousness that drives social change.

In contrast, Pierre Bourdieu approaches generational relations through the lens of power and resource competition. He sees intergenerational conflict not as a subjective difference in experience, but as an objective struggle over access to economic and cultural resources within social fields (Bourdieu, 1990; 1993). Bourdieu frames generations as social constructs formed by conflicts rooted in their strategic positions regarding resource distribution.

Henk Becker builds on Mannheim's concept of generations by emphasizing the influence of rapid technological change and globalization on generational values and experiences. He argues that discontinuous historical events—sudden, significant disruptions—have a greater impact on shaping generations and sub-generations than ongoing macro events, leading to diverse experiences within broader generational cohorts (Becker, 2000; 2008).

Alvin Toffler's *Future Shock* (1970) explores the psychological effects of rapid technological advancements, describing future shock as the social and individual disruption caused when change outpaces people's ability to adapt. Toffler's concept remains relevant today amid the Third Industrial Revolution, characterized by innovations like quantum computing, AI, robotics, and nanotechnology. These developments are transforming global resource distribution and social systems, potentially inducing a modern form of future shock on an unprecedented scale (Toffler, 2021; Jackson, 2019).

Alvin Toffler (2021) proposed several strategies for adapting to rapid social and technological change, such as fostering continuous learning, developing flexible thinking, and embracing technological advancements. He emphasized the importance of cultivating resilience and adaptability in individuals and organizations to navigate

emerging trends and better prepare for the future. While Toffler's focus is on coping with accelerating change, William Fielding Ogburn (1922) introduced the foundational concept of cultural lag, which describes the delay between rapid technological innovations (material culture) and the slower adjustment of society's values, beliefs, norms, and institutions (non-material culture). Ogburn's concept highlights a key challenge that remains relevant today: society's non-material culture often struggles to keep pace with technological advances, creating tensions that can be intensified when generational values differ significantly.

Building on these foundational ideas, Everett Rogers (2003) incorporated cultural lag into his theory of the Diffusion of Innovations. Rogers stressed the crucial role of communication and education in bridging the gap between new technologies and cultural acceptance. He identified five categories of adopters—Innovators, Early Adopters, Early Majority, Late Majority, and Laggards—whose varying readiness to embrace innovation provides a useful framework for understanding how technological change can define and differentiate generational cohorts.

Expanding the generational perspective to a global scale, Edmunds and Turner (2005) explored the emergence of global generations through the lens of Mannheim's theory. They highlighted two main factors shaping these global generational identities: the globalization of trauma via electronic media, which allows people worldwide to experience significant events simultaneously regardless of language, and increased physical mobility driven by tourism, education, and global labor markets. Together, these elements contribute to an interconnected, networked society in which communication technologies and physical travel reinforce one another, shaping contemporary social and generational dynamics.

4.2 *Generation Components*

Research identifies two primary factors shaping generations and their differences: historical-cultural events (or traumas) and technology. Historical events cause widespread social changes, while competition for economic and cultural resources influences intergenerational conflicts (Bourdieu, 1990; Mannheim, 1928). Technology profoundly affects lifestyles, behaviors, and needs, requiring educational approaches to address adaptation challenges and prevent "cultural lag" (Ogburn, 1922).

This study examines recent traumatic events—namely the COVID-19 pandemic and ongoing conflicts in Europe and the Middle East—as key influences on contemporary generational identities and perceptions. These events shape how generations interpret social realities, affecting fields like urban planning. Rapid technological evolution further demands adaptive strategies to meet emerging societal needs.

4.2.1 *Historical Events and Traumas*

Generations are not only defined by age but also by shared experiences of historical traumas, which have global reach due to communication technologies. Modern generations indirectly experience large-scale traumas, reshaping their collective needs and identities (Becker, 2000).

- **Pandemic:** The COVID-19 pandemic, as a defining 21st-century event, has transformed lifestyles and social interactions globally through measures like social distancing. It affected all age groups differently, necessitating detailed analysis of generational impacts on urban living and mobility.
- **Wars:** Post-World War II conflicts are now globally experienced through mass media, extending the sense of threat beyond those directly involved. Contemporary wars, including the Russia-Ukraine conflict and Israel-Gaza hostilities, have revived bipolar global tensions reminiscent of the Cold War era. In a simple classification, two generational groups have emerged worldwide: one directly involved in the conflict and one that feels the anxiety of potential war experiences. For the first group, survival and the continuation of life are priorities, while the second group focuses on prevention and reducing potential damage in the event of war. This research focuses on the second group.

4.2.2 *Technology Acceleration*

Whilst humans, as biological entities, have evolved slowly over time, technology appears to have developed at an accelerating rate. While paper was invented in China around 2000 years ago, the Gutenberg printing press in the mid-fifteenth century, and the first digital computers in the early 1940s; in the last 50 years alone, man has landed on the moon (1969), a sheep has been cloned (1996), computers have become common-place in the home (from 1980s), social media (2000s) has become omnipresent and 5G global rollouts are commencing (2019) (Harwood & Eaves, 2020). The foundation of the upcoming robust era include technologies like deep learning (DL), machine learning (ML), internet of things (IoT), mobile computing, big data, blockchain, sixth-generation (6G) networks, WiFi-7, industry 5.0, robotic systems, heating ventilation, and air conditioning (HVAC), digital forensic, industrial control systems, connected and automated vehicles (CAVs), electric vehicles, product recycling, flying Cars, pantry backup, calamity backup and vital integration of cybersecurity to keep the user concerns secured (Javed, et

al., 2022).

Human history has witnessed three major technological revolutions: the Agricultural, Industrial, and Cybernetic Revolutions. The latter, which began around 1950, is marked by two defining developments: (1) the rise of advanced information technologies and (2) the creation of self-regulating systems capable of operating independently of human intervention (Grinin, Grinin, & Korotayev, 2020). This era has accelerated generational shifts, transforming economic systems, social behaviors, and cultural expectations—particularly in the 21st century.

Technology-driven change has notably impacted Generation Z, whose behavioral patterns sharply contrast with those of previous cohorts. Generational theorists such as Toffler (2021) and Rogers (2003) emphasized that adaptation to technological innovation varies by age group, often categorizing youth as “early adopters” and older populations as “late majority” or “laggards.” These disparities create generational gaps, influencing values, priorities, and daily practices.

A key outcome of technological advancement is increased life expectancy. By 2030, one in six people globally will be aged 60 or older, with the population of those over 80 expected to triple to 426 million by 2050 (World Health Organization, 2024). This demographic shift will fundamentally alter the service economy, labor markets, and investment patterns. As older generations prioritize health, pharmaceuticals, and care services, economies will transition from consumer-driven to longevity- and well-being-oriented models (Grinin et al., 2020). Older adults, typically more conservative and less innovation-driven, tend to invest in long-term security and healthcare rather than consumer products, reducing the overall emphasis on growth through consumption.

In contrast, younger generations—born into the digital world—value speed, flexibility, and continuous transformation. These digital natives experience life through rapidly evolving digital environments, where immediacy and connectivity dominate. They are accustomed to short-form content, multitasking, and a virtual lifestyle deeply embedded in their social and work interactions. This fast-paced orientation will become a defining feature of future urban life and governance, necessitating responsive and tech-integrated urban planning.

The proliferation of communication technologies has also compressed generational spans. Where generations were once defined by broad, decades-long experiences, modern generations emerge and diverge more frequently due to the rapid evolution of digital platforms, tools, and norms. A significant example lies in generational media habits: one generation may have relied on linear television viewing after work, while the next consumes on-demand content via YouTube or TikTok at any time. The question arises: can the leap from Facebook to Snapchat—or from pre-AI to AI-native generations—constitute a meaningful generational divide?

The integration of artificial intelligence (AI) and the Internet of Things (IoT) further exemplifies this divide. Individuals exposed to AI from early childhood will likely develop distinct cognitive frameworks, interaction patterns, and decision-making behaviors compared to those encountering such technologies later in life. These differences will manifest across domains—from education and employment to urban engagement and lifestyle preferences—shaping the structure and function of future societies.

In summary, based on the studies and reviews discussed, the first part of the theoretical framework for this research is defined with the criteria summarized in the diagram below. These criteria will be used to examine the relevant components of urban planning.

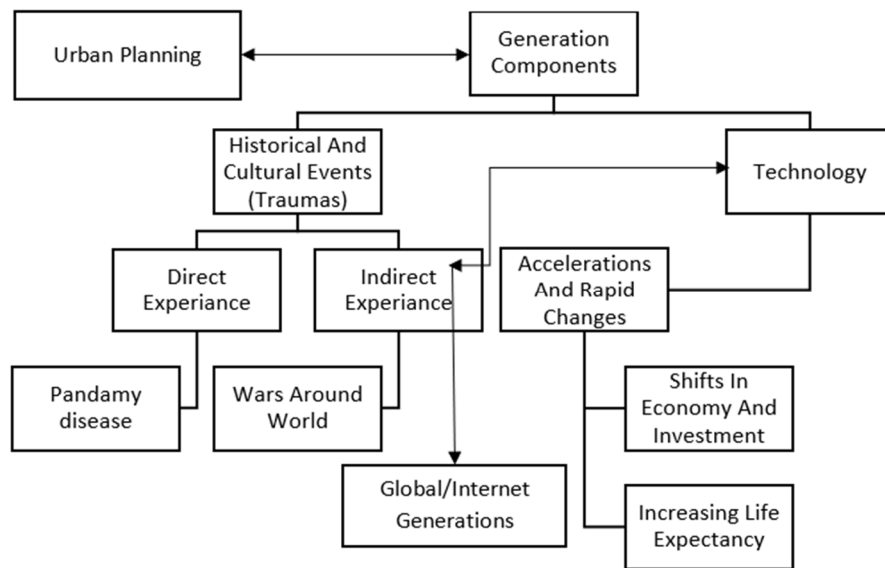


Figure 1. Theoretical framework

5. Discussion

In light of its interdisciplinary nature, urban planning has evolved through diverse approaches over various historical periods. However, it is possible to trace connections between the core strategies of each era and the distinct societal and generational characteristics of the time. Generational shifts play a crucial role in shaping urban planning practices, as each new cohort brings unique values, needs, and expectations that influence how cities are envisioned, designed, and managed.

A review of urban studies indicates that the key issues in cities have shifted from economic growth in the 20th century to smart cities and resilience in the 21st century. The rapid pace of changes in urban communities compared to the past has highlighted the need for forecasting future actions in urban planning, raising the question: How should the approach to urban planning evolve in the future to meet the needs of different generations?

5.1 Urban Planning Approaches in the 20th and 21st Centuries

In the 20th century, major approaches to urban planning were primarily based on the role and importance of the economy. The city was considered a growth machine and the main center of industry, and planning models were guided by economic factors because the lifestyle of that generation was defined by hard work and comfort in retirement. The city and its architecture were designed with a focus on work and commercial areas, maintaining similar functions to previous eras and undergoing gradual changes influenced by human progress in industry and transportation.

With the advent of the 21st century and the information revolution driven by technological advancements; globalization emerged. This phenomenon became a significant cultural factor in human life. Behavioral and cultural patterns changed, and geography was no longer the sole determinant of communities. The information age has somewhat strengthened the sense of demand among individuals, encouraging each person to seek a role in shaping the collective future of society. The emergence and emphasis on participatory urban planning approaches stem from the generational shift and a new outlook on society. This generation no longer wishes to live like the previous one or follow in their fathers' footsteps; they prioritize quality of life and, unlike the preceding generation, they work to live rather than live to work. Comparing generational characteristics with contemporary urban planning approaches shows that during this period, the focus on urban environmental quality, social aspects of urban projects, and global cities have become key approaches in urban planning and design. These major objects are being trend in urban planning science.

In late two and three decades, the characteristics of smart cities and optimal resource management have been evaluated in urban planning to respond to the needs and changes of the new generation. Addressing environmental challenges, which are the legacy of the lifestyles of previous generations and technological growth, forms a significant part of urban planning projects and must be taken into account. The diagram below illustrates the trends in urban planning researches from the 20th century onwards. (Haghani, et al., 2023)

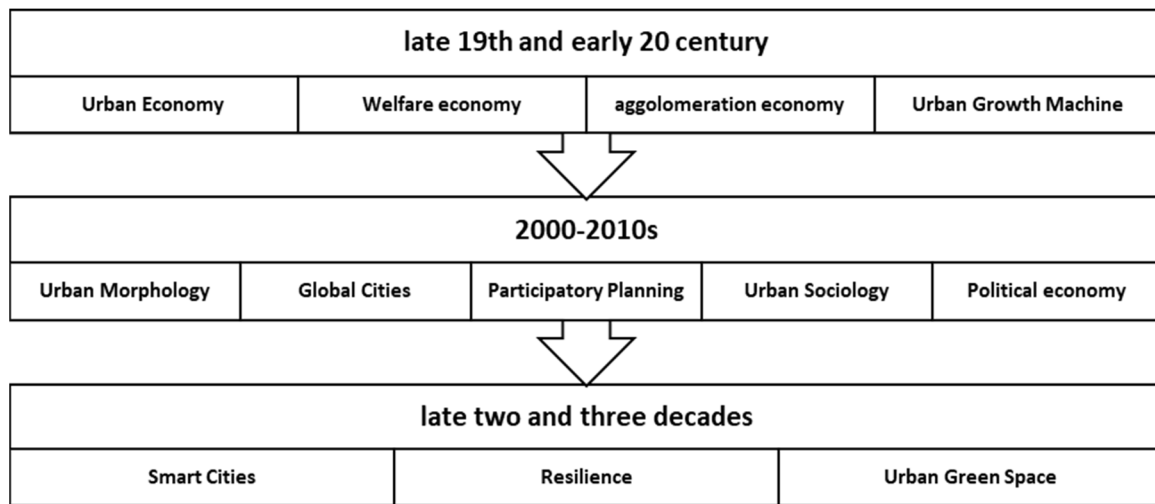


Figure 2. The evolution of key issues in urban planning studies can be outlined as follows (Haghani, et al., 2023)

Urban planning involves guiding land use, urban environments, infrastructure, and human services to maximize economic development, quality of life, resource management, and infrastructure efficiency. Technological advancements have significantly transformed human services and will continue to do so rapidly, requiring future urban planning to adapt accordingly. Generational competition over resources highlights the importance of effective resource management in cities.

The development of smart cities relies on integrating advanced technologies like AI, IoT, and cybersecurity within a comprehensive framework (Javed et al., 2022). These technologies have fundamentally reshaped human experience in urban spaces, much like cars and trains did in previous centuries. Digital tools such as social media, GPS, and augmented reality have altered perceptions of space and social relations, creating both opportunities and challenges. Cultural nuances and generational differences—both inter- and intra-generational—are central to addressing smart city challenges (Han & Hawken, 2018).

As an interdisciplinary field, urban planning must consider these evolving dynamics. This research primarily seeks to identify forthcoming challenges and to alert policymakers and urban planners to these critical issues, ensuring that future urban planning remains aligned with ongoing developments and does not fall behind emerging trends.

5.2 Urban Future

The integration of advanced technologies and the global repercussions of the pandemic like COVID-19 have profoundly transformed urban lifestyles, yielding significant implications for urban planning and societal dynamics. The pandemic served as a catalyst for the rapid adoption of digital technologies, driving a surge in remote work, e-commerce, and virtual social interactions. These developments have disrupted traditional urban patterns, such as daily commuting and centralized office spaces, necessitating a reimagining of urban design to support hybrid work models and an increasing dependence on robust digital infrastructure. Moreover, the pandemic highlighted the critical need for adaptable public spaces and resilient health systems, prompting urban planners to prioritize flexibility and health-conscious design. Public spaces are being reconceptualized to accommodate dynamic uses, ensuring their utility in times of both crisis and normalcy. This shift underscores the importance of integrating technology into urban frameworks, ensuring equitable access to digital services, and designing multipurpose spaces that can meet the evolving needs of urban populations. The convergence of these factors underscores the necessity for cities to adopt forward-thinking strategies, emphasizing sustainability, resilience, and inclusivity in their planning paradigms.

5.2.1 Economy and Market in Urban Future

Since a significant part of human identity is defined by work, the economy of a city plays a crucial role in urban development as a bidirectional component. The economic structures of a city form an essential part of the city's identity so manifesting in various forms throughout the history of urbanization worldwide. Studies on generational differences have shown that work and employment hold different levels of importance and priority for different generational groups. In one generational period, individuals may live primarily for work, while in another, work may lose its priority, with personal life and individual desires guiding one's existence. This phenomenon can also

be observed in the urban planning approaches mentioned earlier throughout history.

According to a World Bank report, the digital economy accounts for over 15 percent of global GDP and has grown 2.5 times faster than the GDP of the physical world over the past decade. (worldbank, 2024) Therefore, a significant portion of urban economies in the future will be shaped by this. The digital economy process, accelerated by the emergence of pandemic in 21th century, this drama transformed the workspace and commerce, altering lifestyles in many cities around the world. Even after the pandemic, many major companies have continued to adopt remote work policies. COVID-19 has impacted urban spaces and ways of living, and these changing patterns can, in turn, shape future development paths. (Bereitschaft & Scheller, 2020)

It is essential to address this issue in the preparation of comprehensive and strategic urban plans, and to develop policies aimed at enhancing cities in this domain. The share of cities in the digital economy should be determined as an influential factor in urban development and sustainability, and planning should be conducted by establishing global standards for cities in various rankings.

Online sales have played an increasingly significant role in retail. In 2022, e-commerce accounted for nearly 19% of retail sales worldwide. Forecasts indicate that by 2027, the online sector will constitute nearly a quarter of total global retail. (Mosby, 2024)

While online shopping has eliminated the need for physical storefronts, it has created a demand for extensive warehouses and distribution centers throughout cities, enabling the swift delivery of goods. Cities that possess these features are likely to host major e-commerce companies.

As this trend continues, the methods of product delivery have also evolved, with robots and drones being incorporated into the process. To effectively adapt urban environments for robotic delivery systems, cities must implement critical changes across infrastructure, regulatory frameworks, and technological integration. These modifications aim to improve efficiency, safety, and public acceptance, ensuring seamless operation for delivery robots and drones.

5.2.1.1 Infrastructure Adaptations

- **Dedicated Pathways:** Developing exclusive lanes for delivery robots and drones minimizes traffic congestion and enhances safety for all road users. Such measures help reduce potential conflicts between traditional vehicles, pedestrians, and robotic systems
- **Charging Stations:** Establishing accessible charging infrastructure for electric delivery robots and drones is essential for promoting sustainable operations. This initiative supports continuous operation while reducing carbon footprints (Kaauwen & Duin, 2018)
- **Smart Traffic Management:** The deployment of intelligent traffic signals and sensor networks optimizes the movement of delivery robots. These systems can enhance efficiency by reducing delays and preventing bottlenecks in urban logistics networks (Law, Fan, Li, & Mo, 2023).

5.2.1.2 Regulatory Frameworks

- **Testing Environments:** Governments should create dedicated living labs or pilot zones to test robotic delivery systems under real-world conditions. Such environments enable the collection of valuable data to refine regulations and operational protocols
- **Safety Regulations:** Establishing clear and enforceable safety guidelines is crucial to building public trust and ensuring the secure operation of robotic delivery systems in urban settings (Kaauwen & Duin, 2018)

5.2.1.3 Technological Integration

- **5G Connectivity:** The adoption of 5G networks facilitates high-speed, real-time communication between delivery robots and control centers. This connectivity improves operational efficiency and responsiveness (Law, Fan, Li, & Mo, 2023).
- **Path Planning Algorithms:** Advanced algorithms designed for obstacle avoidance and optimal route planning significantly enhance delivery reliability and reduce transit times. These technologies play a pivotal role in ensuring timely and efficient deliveries (Shahzaad, Alkouz, Janszen, & Bouguettaya, 2023). Path planning analyses should be evaluated and predicted in urban documents especially in capitals and metropolitan areas around the world.

The outlined considerations must be integrated into urban development plans and subjected to thorough evaluation to ensure their effectiveness and sustainability. Incorporating creative and innovative solutions by urban planners

and designers can significantly enhance the development of cities, fostering smarter and more adaptive urban environments.

While these adaptations offer significant opportunities to optimize urban logistics, it is equally important to address potential challenges, including public acceptance and the displacement of traditional delivery jobs. A balanced approach that accounts for societal, economic, and ethical dimensions is vital to achieving a successful and inclusive transition to robotic delivery systems.

5.2.2 Land Use in Urban Future

Urban land use is undergoing a profound transformation in response to the growing prevalence of remote education and work. The traditional model of single-use spaces, such as schools, offices and even residential is giving way to innovative, multifunctional environments that integrate virtual and physical activities. Urban planners should foster harmony between aging populations and younger generations by creating mixed-use spaces that cater to diverse needs. Developing areas with healthcare, recreational, and community facilities within easy reach will benefit elderly residents, while spaces for work, innovation, and social gatherings will appeal to younger individuals. With the increasing prevalence of remote work and study, especially in the aftermath of the pandemic, companies and educational institutions are no longer reliant on large physical spaces and offices, thereby significantly transforming the landscape of work and education.

These hybrid spaces would be an important and essential element for creating dynamic urban spaces. Such spaces enable students to transition seamlessly between online learning, in-person collaboration, and hands-on activities, thereby enhancing the educational experience. These environments are not confined to classrooms but extend to spaces that facilitate social interaction, creativity, and community engagement, reflecting what urban theorist Jane Jacobs termed 'the organized complexity' of urban life. By blending digital tools with physical infrastructure, these spaces represent a paradigm shift in the relationship between education and the built environment, offering solutions to modern urban challenges. According to the conducted studies, the spatial organization plan of a school in future cities is presented in Figure 3. To integrate these hybrid educational spaces into the broader urban fabric, planners are increasingly advocating for mixed-use developments that promote accessibility, social interaction, and sustainability. Lower floors of these spaces are designed to engage directly with the urban environment, incorporating cafes, libraries, coworking areas, and public plazas that activate street life and encourage cultural exchange. This approach echoes the vision of Jan Gehl, who emphasized the importance of 'life between buildings' in creating vibrant urban spaces. The design of such hybrid facilities embodies the principles of resilient urbanism, which prioritize multi-functionality and the efficient use of land. By blurring the boundaries between education, work, and leisure, these spaces contribute to the vitality of the city and foster a sense of community. As noted by urban planner Kevin Lynch, these dynamic and interconnected spaces enhance the 'imageability' of the urban landscape, making it more meaningful and navigable for its inhabitants. This new approach to urban land use not only addresses the immediate needs of remote education and work but also reflects a forward-thinking vision of sustainable, inclusive, and interconnected cities.

The diagram presents a forward-thinking concept for a multi-functional school designed to align with the evolving demands of future urban environments. It integrates diverse spaces that support education, creativity, and social engagement, creating a dynamic and inclusive hub. The key components include:

- **Classroom and Library Spaces:** Positioned at the top, these areas offer structured learning environments with access to educational resources, promoting both individual and collaborative study.
- **Shared Workspace:** A flexible area that fosters innovation and interdisciplinary collaboration, adapting to the evolving needs of students and professionals alike.
- **Gaming & VR Zone:** Providing immersive digital experiences, this space enhances technological literacy and interactive learning.
- **Restaurant & Coffee Shop:** Serving as a social hub, this space is open to both students and the wider community, encouraging informal learning and social interaction.
- **Workshops (Painting, Pottery, etc.):** Accessible to all age groups, these spaces promote hands-on creativity and lifelong learning, fostering cross-generational engagement.
- **Art Gallery:** A cultural platform that not only showcases artistic work but also attracts public interest, enhancing the school's role within the community.

- Amphitheatres: Beyond serving educational and cultural functions, the amphitheatres can play a crucial role in passive defence strategies, acting as a shelter during crises or emergencies, offering a safe space for the community.
- Outdoor Movie Screening: Open to the public, this space enhances cultural and recreational opportunities, integrating the school into the urban lifestyle.

Traditional schools in future urban settings must undergo significant transformation in both “form and function” to remain relevant and useful for all age groups. They should evolve into multi-purpose spaces that serve educational, social, and economic functions. By incorporating adaptable designs, such schools can become economically viable, generating revenue through community-driven activities while ensuring resilience and preparedness for potential urban challenges. By integrating these spaces into the urban environment, the school transforms into a dynamic, multi-purpose hub that serves individuals of all ages and generations. It fosters lifelong learning, cultural exchange, and social interaction, ensuring adaptability to the changing needs of future cities.

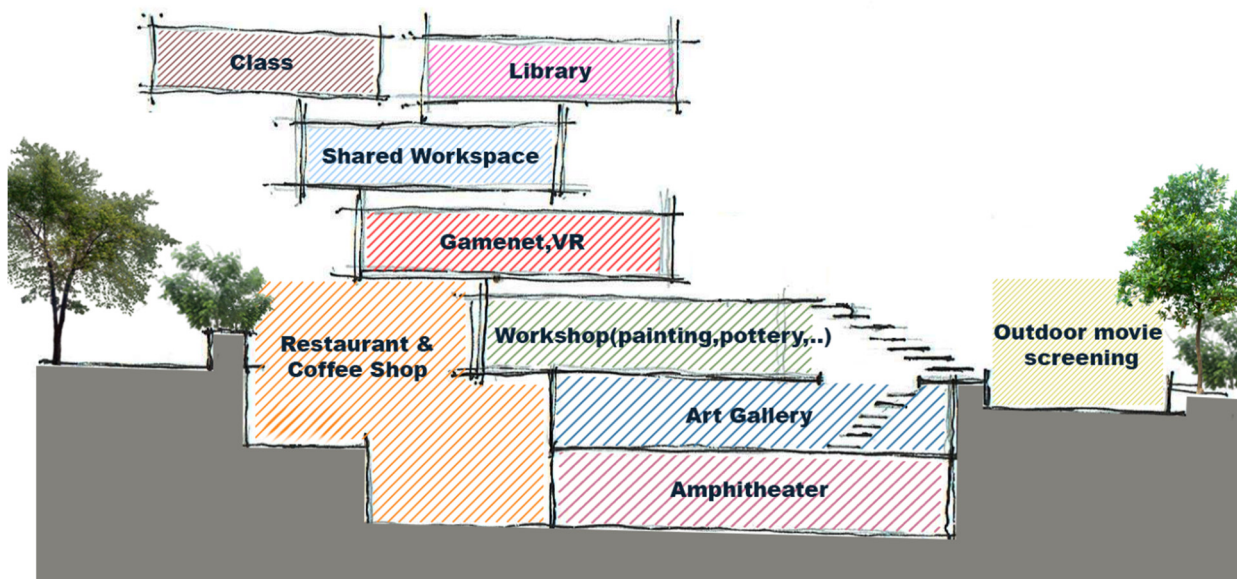


Figure 2. The proposed spatial organization of an educational place for future cities

The evolution of business conditions, influenced by technological advancements and global pandemics, has led to significant transformations in office spaces, a trend that continues to expand. The future of government administrative services and buildings is poised for transformation, driven by advancements in technology and the rise of remote work. Traditional government offices, which historically centralized administrative functions, are increasingly being reimagined as flexible, technology-integrated spaces. These spaces aim to optimize efficiency, accessibility, and public engagement while reducing the need for expansive physical infrastructure. The integration of virtual government services through online platforms has significantly reduced the reliance on in-person visits, enabling citizens to access services remotely. This shift aligns with the principles of 'smart cities,' where technology enhances governance and service delivery. As urban planner Carlo Ratti argues in *The City of Tomorrow* (2016), technology allows us to 'rethink the physical footprint of bureaucracies,' enabling a more distributed and responsive public service model.

Government buildings of the future are likely to adopt a hybrid approach, where smaller physical hubs coexist with robust digital infrastructures. These hubs, strategically located in urban centers, will function as multifunctional spaces that combine administrative services, co-working areas, and community engagement zones. Lower floors may house public-facing services, while upper levels are designed for flexible office use, incorporating modular layouts to accommodate varying workforce needs. This model not only reduces operational costs but also fosters transparency and inclusivity. Drawing from the ideas of William Mitchell in *e-topia: Urban Life, Jim—But Not as We Know It* (1999), the integration of digital and physical systems in governance can 'empower communities by decentralizing access and decision-making.' The result is an administrative system that

is resilient, adaptive, and capable of meeting the demands of modern urban life. These innovations ensure that government buildings remain vital, functional components of the urban fabric, even as remote work reshapes traditional office paradigms. (Figure 4)

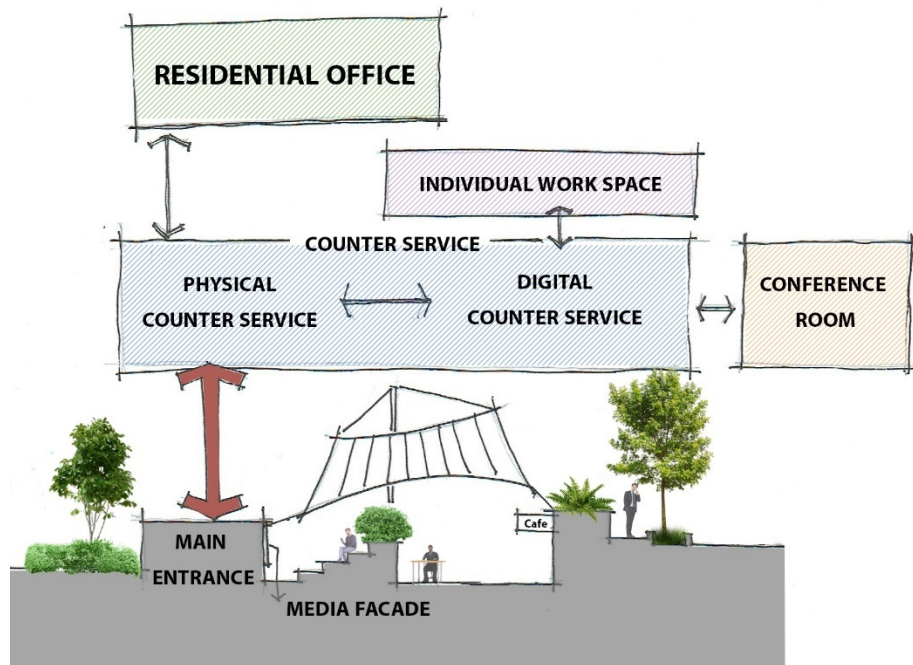


Figure 3. The proposed spatial organization of administrative services and buildings

This diagram presents a forward-looking vision for the transformation of administrative and office spaces in future urban environments, emphasizing the impact of remote work and the need for multi-functional adaptability. Traditional office structures are evolving to accommodate new work patterns, integrating physical and digital services to enhance efficiency and accessibility.

Key elements of the proposed spatial organization include:

- **Residential Office**– A flexible work environment that allows employees to balance professional and personal life seamlessly, reducing commute times and fostering productivity.
- **Counter Services (Physical & Digital)**– A hybrid service model that provides both in-person and online support, ensuring accessibility for diverse users and streamlining administrative processes.
- **Individual Workspaces**– Designed to cater to focused tasks and private work, these spaces support the growing trend of hybrid and remote work models.
- **Conference Room**– A dedicated area for collaboration and meetings, combining physical presence with digital connectivity for remote participants.
- **Main Entrance & Media Facade**– The integration of an inviting public-facing space, incorporating digital displays and communication tools to engage visitors and provide real-time updates.
- **Café & Outdoor Spaces**– Informal gathering areas that encourage social interaction and relaxation, promoting a healthier and more engaging work environment.

By merging digital infrastructure with physical spaces, the modern administrative office evolves into a multi-tasking hub that serves diverse functions and age groups. This adaptive approach ensures resilience, economic sustainability, and a deeper connection with the urban environment. Future offices must prioritize flexibility, inclusivity, and sustainability, offering solutions that meet the demands of a rapidly changing workforce while enhancing the overall urban experience.

5.2.3 Public Space in Urban Future

The internet, as a shared archetype, has profoundly influenced the formation of global generations and cultural commonalities, particularly among younger generations. With the advent of digital technologies and social media,

geographical boundaries are gradually dissolving, and local cultures are increasingly influenced by global flows. Younger generations have become accustomed to rapid communication and diverse interactions, making these characteristics an integral part of their identity. Scholars such as Manuel Castells, through the concept of the "network society," argue that information technologies have fundamentally transformed social and economic structures, to the extent that individual identities are now shaped more than ever within online platforms.

In this context, Sherry Turkle has examined how the internet and virtual interactions have redefined human relationships. She asserts that despite the proliferation of digital communication, younger generations face challenges such as loneliness, diminished social skills, and dependency on virtual identities. In their pursuit of speed and diversity, these generations have shifted their interactions to the virtual world, often at the expense of deeper, more meaningful human connections. This shift presents a significant challenge for urban designers and planners, as individuals' needs and desires are evolving rapidly, whereas urban infrastructures lack the flexibility to adapt at the same pace.

Overall, the internet and digital technologies have created an unprecedented global shared space, fostering cultural convergence and intergenerational commonalities. However, the rapid pace of change and the shrinking generational gap necessitate a reevaluation of urban and social policies. Addressing these transformations requires an adaptive approach capable of keeping pace with technological advancements, ensuring the development of flexible and responsive cities that meet the diverse needs of new generations.

What is crucial in this context is that, despite the dominance of technology, direct human interactions should not be eliminated from daily life. Digital communications have become a crucial aspect of life in the 21st century, eliminating the necessity for physical presence to facilitate social interactions. As a result, public spaces in cities are likely to lose their current functions or undergo a transformation in their nature in the near future.

In the digital age, people still need human connections and physical presence in urban environments to establish social interactions based on their identity traits. This aspect must be preserved in cities, highlighting the importance of natural environments and the preservation of places that foster collective memories.

However, these urban spaces must be updated according to the behavioral characteristics of the new generation to remain appealing. Multi-functionality, speed, and excitement will be key design factors to attract this generation. Consequently, passive public spaces should be removed or fundamentally altered in urban development plans.

Caring for and maintaining the quality of life for the elderly and retirees will be one of the challenges faced by modern societies. For digital migrants, the increasing digitalization of daily life will pose challenges as they age. While one of technology's goals has been to simplify human life, for the older generation—who tend to be more conservative, adapting to innovation may not be easy.

If current urban regeneration plans focus on facilitating movement and leisure for the elderly, then smart city planning must soon redefine how the elderly interact with digital urban environments. Using the Internet of Things, public spaces are undergoing transformation and cannot remain static. Urban management centers must be able to monitor these spaces with online surveillance systems and prepare them for organizing inclusive and memorable events. This strategy constitutes an essential part of urban planning documents.

Thus, urban studies and environment design must consider how all generational groups engage with embedded technologies, necessitating the creation of appropriate checklists and standards for local communities. Planners can promote community cohesion by designing intergenerational spaces, where elderly individuals can participate in social and cultural activities with younger generations. These spaces foster connection and understanding, which can mitigate competition for resources.

To encourage inclusivity and diversity, urban plans should integrate community feedback mechanisms, such as surveys or community councils, to capture diverse perspectives and respond to changing needs. Including regular community engagement can bring to light emerging trends and ensure that planning priorities reflect the community's voice. This approach not only enhances adaptability but also fosters a sense of ownership among residents, helping to create vibrant, responsive, and resilient urban spaces that meet the needs of all generations.

To operationalize this adaptive framework in real-world urban planning, Table 1 presents targeted strategies based on Rogers' innovation adoption model, mapping urban interventions to generational readiness.

Table 1. Urban planning strategies mapped to Rogers' innovation adoption categories

<i>Adopter Category</i>	<i>Definition</i>	<i>Urban Planning Strategy</i>
Innovators	Risk-tolerant individuals or institutions who embrace radical change and experimentation.	Establish urban pilot zones integrating emerging technologies such as AI, IoT, and digital twins. These zones serve as testbeds for high-tech governance, transport automation, and energy optimization.
Early Adopters	Visionaries and opinion leaders who guide others by adopting innovations early.	Promote sustainable and smart infrastructure, e-governance platforms, sensor-based mobility systems—to signal commitment to future-ready development.
Early Majority	Pragmatic stakeholders who adopt innovation once it is proven and cost-justified.	Scale up mixed-use developments and adaptive transit systems that integrate digital services while preserving urban familiarity. Support gradual but visible transformations in everyday urban experience.
Late Majority	Skeptical or cautious groups who adopt only when widely accepted and pressure mounts.	Retrofit existing infrastructure with digital access points (e.g., digital kiosks in public transport) and emphasize familiarity. Maintain cultural and spatial continuity while enabling tech access.
Laggards	Traditionalists with strong resistance to change; usually adopt only under necessity.	Ensure inclusion via low-tech or assisted digital services (e.g., in-person help desks, analog-friendly city services). Focus on equity, trust-building, and cultural continuity in planning.

5.2.4 Resilience in Urban Future

To strengthen urban resilience against pandemics like COVID-19, cities must adopt integrated strategies that emphasize health, environmental sustainability, and effective governance. The pandemic revealed significant vulnerabilities in urban systems, highlighting the necessity for adaptable and inclusive urban planning. Central to resilience is incorporating sustainability into recovery plans through green infrastructure and carbon footprint reduction (Callenberg, Barnwal, & Bakarr, 2024).

COVID-19 has transformed urban living patterns, influencing future development trajectories (Bereitschaft & Scheller, 2020). Despite advancements in health regulations and medical technologies, many cities were unprepared for the pandemic, underscoring the need to prioritize infrastructure that supports social distancing—such as pedestrian-friendly spaces, improved public transport ventilation, and sanitation systems. The concept of de-densification has brought renewed focus to suburban areas and secondary employment centers, requiring urban plans tailored to each city's unique demographics and behavioral traits. For instance, retired populations may prefer suburban living, while younger groups tend to stay in urban centers, necessitating multi-family housing designed for safety and competitiveness with single-family homes and home offices. Urban renewal efforts should also target deteriorated areas with these factors in mind.

Public spaces must be integral to neighborhood planning, ensuring accessible green areas that promote healthy lifestyles, especially during quarantine or mobility restrictions (Bereitschaft & Scheller, 2020). Additionally, urban layouts should be redesigned with a health-centered approach, focusing on improving air quality and minimizing disease transmission risks through strategic spatial planning (Sara, Soufiane, & Ahmad Nia, 2024).

In commercial centers of the city, pedestrian areas should be expanded to reduce human congestion, and during pandemics, businesses (especially restaurants) should be allowed to use these spaces for low-density commercial activities. (Bereitschaft & Scheller, 2020)

Governance reforms are crucial in fostering resilience, with the implementation of flexible governance structures that engage interdisciplinary experts being essential for enhancing crisis responsiveness (Mierzejewska, et al., 2024). These structures, which incorporate diverse areas of expertise, enable more effective and adaptive responses during times of crisis. Equally important is the active involvement of communities in decision-making processes, as citizen engagement ensures that a wide range of needs and perspectives are addressed, further strengthening resilience (Yan, et al., 2024). Together, these strategies create a more adaptive and responsive framework for tackling challenges.

Technological advancements offer additional pathways to resilience through the adoption of smart technologies for communication and resource management, as well as data-driven approaches to monitor health trends and optimize resource allocation (Omar & El Sayary, 2024). However, while these strategies provide a robust framework for addressing urban vulnerabilities, it is crucial to acknowledge the disparities in cities' capacities to implement such measures. Economic inequities may limit the ability of some urban areas to adopt these comprehensive approaches, highlighting the need for tailored strategies that consider local contexts and resource availability.

The COVID-19 pandemic has deepened generational differences in urban planning. Based on Karl Mannheim's theory of generational consciousness, these shared traumas have shaped collective experiences, pushing planners to address changing generational needs. The pandemic increased demand for flexible, sustainable, and adaptable urban spaces. Pierre Bourdieu's view on resource competition shows how economic inequalities worsened by the pandemic have affected generational access to housing, healthcare, and public services, urging planners to rethink fair resource distribution.

At the same time, rapid technological change, as noted by Henk Becker and Alvin Toffler, poses new challenges for post-pandemic cities. Remote work and digital connectivity have reshaped urban life. However, William Fielding Ogburn's concept of "cultural lag" highlights the struggle older generations face by adapting to these changes. These tensions require intergenerational strategies that balance fast tech adoption with inclusivity, ensuring cities develop innovatively yet remain culturally cohesive. Urban planning thus becomes a dynamic effort to align generational priorities with resilience in an uncertain world.

6. Conclusion

Studies have shown that historical and cultural events (traumas) and the rise of technology in everyday human life have led to significant changes in social layers, such that citizens of different age groups and with vastly different demands coexist in urban environments. The generational gap has decreased, and this issue presents a challenge in designing desirable and universally accessible urban spaces.

The internet, as a global common archetype, has had a profound impact on the formation of new generations and cultural commonalities, especially among younger generations. Today, characteristics such as a preference for speed, diversity, and instant communication are recognized as shared traits of digital generations. The emergence of phenomena like cultural globalization, media convergence, and digital identity can also be attributed to the influence of the internet.

This research highlights how generational components, as defined by scholars like Karl Mannheim, Pierre Bourdieu, and Alvin Toffler, are essential to urban planning's adaptation in the face of evolving socio-cultural landscapes. Urban planning is critical in bridging generational gaps by addressing the diverse needs and expectations of each cohort within society. Mannheim's theory emphasizes shared historical experiences that create generational identities and expectations, implying that urban planning must be adaptable to accommodate the values and demands of each generation. Bourdieu's notion of resource competition underscores the need for equitable access to urban amenities, as generational groups often compete over economic and social resources. This study reveals that urban planning must prioritize inclusivity to prevent generational conflict over limited resources, particularly as cities evolve to meet the expectations of both younger, digitally connected generations and older, retiring ones who might prioritize stability and security.

One of the notable strategies is the design of multifunctional urban spaces, which can meet the demands of various age groups in society and, in times of crisis such as war or disease, fulfill the physical and psychological needs of citizens. The multifunctionality of urban spaces can be achieved through their use at different times, with the nature of the space changing accordingly. Studies indicate that urban functions should be designed and planned to be multidimensional in the near future. Therefore, this research examines the spatial organization and design of educational and administrative spaces in future cities.

The COVID-19 pandemic and ongoing conflicts have further accelerated the need for urban planning to account

for these generational differences, as rapid change introduces new behavioral patterns and shifts in urban needs. Technological advances have reshaped passive defense strategies in cities, with indirect experiences of war and conflict increasingly transmitted through media and digital platforms. Exposure to conflicts in real-time has led younger generations to prioritize safety and disaster preparedness, particularly in urban contexts.

Incorporating Alvin Toffler's concept of "future shock," the study underscores the urgency for urban planning to address rapid technological and environmental changes, as these shifts disproportionately affect different generations. Younger generations, more accustomed to digital integration, seek flexible, tech-friendly urban spaces, whereas older generations face the "cultural lag" outlined by William Ogburn, highlighting a gap in adapting to new technologies. Urban planners face an increasingly complex challenge as they work to create adaptable and inclusive cities that meet the needs of both aging populations and younger, dynamic generations like Gen Z.

The rise of the digital economy is profoundly influencing urban development, with e-commerce projected to reach nearly a quarter of global retail sales by 2027. This transformation necessitates a reevaluation of urban spaces to accommodate the growing demand for distribution centers and warehouses, enabling swift delivery of goods. The integration of robotic delivery systems represents a significant shift in logistics, prompting urban planners to design neighborhoods that facilitate efficient delivery routes and ensure accessibility to essential services. By welcoming these changes, cities can not only enhance their economic viability but also respond to the evolving preferences of residents who prioritize convenience and efficiency in their daily lives.

To prevent generational gaps in urban planning, it's crucial for urban documents to adopt a flexible, iterative framework that incorporates frequent feedback, community engagement, and education. Such plans must be adaptable to periodic updates, with short-term programs every 3–5 years, to reflect demographic shifts, technological advancements, and community preferences. Based on the Rogers' adoption categories, urban planning can strategically engage each group, fostering enthusiasm among Innovators and Early Adopters while gradually increasing acceptance among more cautious groups like the Late Majority and Laggards. Community feedback mechanisms, such as surveys and councils, can highlight emerging trends and ensure that policies reflect the collective voice. This inclusive, layered approach helps prevent the pitfalls of cultural lag and generational divides, creating resilient urban spaces that cater to the dynamic needs of all citizens and build a sense of shared ownership in the evolving urban landscape.

Consequently, urban planning strategies must include smart city technologies that cater to these differing needs while maintaining cultural coherence. The study recommends that urban planners and policymakers establish adaptive frameworks that respect generational differences in behavior and priorities, ensuring sustainable growth and resilience in urban design. By integrating these theoretical insights, future urban planning can better address the specific needs of each generational group, fostering cities that are responsive, inclusive, and resilient to future societal shifts.

References

- Baysal Berkup, S. (2014). Working with generations X and Y in generation Z period: Management of different generations in business life. *Mediterranean Journal of Social Sciences*, 5(19), 218–225. <https://doi.org/10.5901/mjss.2014.v5n19p218>
- Becker, H. A. (2000). Discontinuous change and generational contracts. In I. A. Attias-Donfut (Ed.), *The myth of generational conflict* (pp. 114–132). London, England: Routledge.
- Becker, H. A. (2008). Karl Mannheim's "Problem der Generation"—80 Jahre danach. *Zeitschrift für Familienforschung*, 20(2), 203–221.
- Bereitschaft, B., & Scheller, D. (2020). How might the COVID-19 pandemic affect 21st century urban design, planning, and development? *Urban Science*, 4(4), Article 56. <https://doi.org/10.3390/urbansci4040056>
- Bourdieu, P. (1990). *In other words: Essays towards a reflexive sociology*. Stanford, CA: Stanford University Press.
- Bourdieu, P. (1993). *The field of cultural production: Essays on art and literature*. New York, NY: Columbia University Press.
- Callenberg, M., Barnwal, A., & Bakarr, M. (2024). *COVID-19 pandemic and sustainable urban transformation: Perspectives on city-level actions and a framework for the future* (Working paper No. 1093). <https://doi.org/10.3390/land13071093>
- Edmunds, J., & Turner, B. (2005). Global generations: Social change in the twentieth century. *The British Journal of Sociology*, 56(4), 551–567. <https://doi.org/10.1111/j.1468-4446.2005.00076.x>
- Elzinga, R. (2023). *Exploring the elements of public spaces and its effects on the mental health of generation Z*

(Doctoral dissertation).

- Giachino, C., Bollani, L., Truant, E., & Bonadonna, A. (2022). Urban area and nature-based solution: Is this an attractive solution for Generation Z. *Land Use Policy*, 112, Article 105828. <https://doi.org/10.1016/j.landusepol.2021.105828>
- Grinin, L., Grinin, A., & Korotayev, A. (2020). A quantitative analysis of worldwide long-term technology growth: From 40000 BCE to the early 22nd century. *Technological Forecasting and Social Change*, 155, Article 119955. <https://doi.org/10.1016/j.techfore.2020.119955>
- Haghani, M., Sabri, S., De Gruyter, C., Ardeshtiri, A., Shahhoseini, Z., W. Sanchez, T., & Acuto, M. (2023). *The landscape and evolution of urban planning science* (Report No. 136). <https://doi.org/10.1016/j.cities.2023.104261>
- Han, H., & Hawken, S. (2018). Introduction: Innovation and identity in next-generation smart cities. *City, Culture and Society*, 9(1), 1–4. <https://doi.org/10.1016/j.ccs.2018.07.001>
- Harwood, S., & Eaves, S. (2020). Conceptualising technology, its development and future: The six genres of technology. *Technological Forecasting & Social Change*, 150, Article 119793. <https://doi.org/10.1016/j.techfore.2019.119793>
- Jackson, B. (2019). Future shock revisited. *Postmodern Openings*, 10(3), 12–24.
- Javed, A., Shahzad, F., Rehman, S., Zikria, Y., Razzak, I., Jalil, Z., & Xu, G. (2022). Future smart cities: Requirements, emerging technologies, applications, challenges, and future aspects. *Cities*, 129, Article 103794. <https://doi.org/10.1016/j.cities.2022.103794>
- Kaauwen, G., & Duin, R. (2018). Robotisation of urban freight transport.
- Kirimtat, A., Krejcar, O., Kertesz, A., & Tasgetiren, M. (2020). Future trends and current state of smart city concepts: A survey. *IEEE Access*, 8, 86448–86467. <https://doi.org/10.1109/ACCESS.2020.2992441>
- Law, W., Fan, K., Li, K., & Mo, T. (2023). Applied design and methodology of delivery robots based on human–robot interaction in smart cities. *EAI Endorsed Transactions on Smart Cities*, 7(2), e6. <https://doi.org/10.4108/eetsc.2649>
- Mannheim, K. (1928). The problem of generations. *The Sociological Review*, 22(3), 292–305. <https://doi.org/10.1111/j.1467-954X.1928.tb00501.x>
- Mannheim, K. (1952). *Essays on the sociology of knowledge*. London, United Kingdom: Routledge & Kegan Paul.
- Mierzejewska, L., Sikorska-Podyma, K., Szejnfeld, M., Wdowicka, M., Modrzewski, B., & Lechowska, E. (2024). New urban governance as a way of building city resilience to pandemic-caused stress (COVID-19). *Bulletin of Geography. Socio-economic Series*. Advance online publication. <https://doi.org/10.12775/BGSS-2024-0020>
- Moos, M., Pfeiffer, D., & Vinodrai, T. (2017). *The millennial city, shaped by contradictions*. New York, NY: Routledge. <https://doi.org/10.4324/9781315295657>
- Mosby, A. (2024). *100 online shopping statistics 2024*. Retrieved from <https://www.yaguara.co/online-shopping>
- Ogburn, W. F. (1922). *Social change with respect to culture and original nature*. New York, NY: B. W. Huebsch.
- Omar, O., & El Sayary, S. (2024). The resilience principles of the built environment in light of climate change and the post-pandemic era. In A. Cheshmehzangi, M. Sedrez, T. Li, H. Zhao, T. Heath, & A. Dawodu (Eds.), *Resilience vs pandemics (innovations in public places and buildings)* (pp. xx-xx). Singapore: Springer. https://doi.org/10.1007/978-981-99-8672-9_9
- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York, NY: Free Press.
- Sara, B., Soufiane, B., & Ahmad Nia, H. (2024). Unveiling urban health resilience in the COVID-19 pandemic: A systematic PRISMA exploration of key parameters and strategies. *Proceedings of the International Conference of Contemporary Affairs in Architecture and Urbanism-ICCAUA*, 7, 533–539. <https://doi.org/10.38027/ICCAUA2024EN0149>
- Shahzaad, B., Alkouz, B., Janszen, J., & Bouguettaya, A. (2023). Optimizing drone delivery in smart cities. *IEEE Internet Computing*, abs/2304.14622, 1–8. <https://doi.org/10.1109/mic.2023.3267266>
- Toffler, A. (2021). *Future shock* [E-book]. Random House.
- Toma, S. G., Gradinaru, C., Hudea, O. S., & Modreanu, A. (2023). Perceptions and attitudes of generation Z

students towards the responsible management of smart cities. *Sustainability*, 15(18), Article 13967. <https://doi.org/10.3390/su151813967>

Wawer, M., Kalina, G., & Dorota, J. (2022). Smart mobility in a smart city in the context of generation Z sustainability, use of ICT, and participation. *Energies*, 10(15), Article number not provided.

World Bank. (2024). *Digital development overview*. Retrieved from <https://www.worldbank.org/en/topic/digitaldevelopment/overview>

World Health Organization. (2024, October 1). Aging and health. Retrieved from <http://www.who.int>

Yan, J., Fang, Z., Chen, L., Tang, J., Lu, Q., & Lin, X. (2024). Rethinking the city resilience: COM-B model-based analysis of healthcare accessing behaviour changes affected by COVID-19. *Journal of Housing and the Built Environment*. Advance online publication. <https://doi.org/10.1007/s10901-024-10120-x>

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