URBAN THRIVE

BUILDING SUSTAINABLE FAMILY-FRIENDLY CITIES

ABOUT ECA

The Abu Dhabi Early Childhood Authority (ECA) is a government entity, based in Abu Dhabi, that supports holistic early childhood development. We do this by developing policies and laws, informing decision-making through research and transforming behavior.

The ECA promotes optimal child development and well-being through four sectors—Health and Nutrition, Child Protection, Family Support, and Education and Early Care—from the early stages of pregnancy to the age of eight. We influence policies, inform decision-making through research, incubate innovative ideas, all while enabling the Early Childhood Sector and navigating the impact it's making.

Our vision is that every young child can flourish to their full potential in a safe and family-friendly environment.

WED MOVEMENT

World Early Childhood Development (WED) Movement is redefining the global perspective on early childhood development starting with the child and extending to their community and the entire ecosystem.

WED Movement is a flagship initiative by the Abu Dhabi Early Childhood Authority, which unites together global experts, partners, and disruptors for innovation to advance Early Childhood Development in Abu Dhabi and beyond.

Through WED Movement we are curating, developing and inspiring solutions that positively impact young children's lives and enhance early childhood outcomes.

Future challenges and opportunities faced by young children in Abu Dhabi and around the world are tackled through the creation and implementation of innovative outputs and knowledge co-creation led by WED's multi-disciplinary experts.

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EXECUTIVE SUMMARY

This report explores how urban spaces can be designed to foster the holistic well-being of children, with a particular focus on the developmental needs of children aged 0 to 8 within increasingly urbanized environments. It draws on global best practices from over 40 cities and more than 85 academic articles, and outlines recommendations for creating child-friendly cities that include imaginative play areas, integrated mobility solutions, and sustainable green spaces. By examining key elements such as safety, education, and community engagement, the report highlights how well-designed urban spaces can support children's cognitive, emotional, and physical development.

The framework revolves around four core pillars: Engaging and Inclusive Spaces, Integrated and Connected Mobility, Sustainable and Green Infrastructure, and Feeling of Safety. Each pillar is designed to promote children's holistic development, while simultaneously addressing key urban challenges like insufficient nature spaces, air pollution and changing weather patterns, inadequate safe routes for walking and cycling, and limited community integration across diverse populations. The global best practice perspective is complemented by a focus on Abu Dhabi, showcasing the city's ongoing efforts, such as the development of family hubs, interactive parks, and child-friendly transport solutions. By aligning Abu Dhabi's urban planning with these child-centric design principles, the report envisions a city that not only meets the needs of its youngest residents but also sets a precedent for sustainable, inclusive urban development worldwide.

To implement the changes envisioned in this report, a clear set of next steps is essential. This includes setting key performance indicators (KPIs) and measurable goals that track progress toward building safer, more inclusive, connected, and sustainable urban spaces for children.

Additionally, creating new processes and mechanisms—such as community engagement platforms, cross-sector partnerships, and pilot programs—will be critical for driving collaboration and ensuring the framework is adaptable to evolving needs.

Bringing this framework to life will involve sustained commitment from urban planners and designers, academia, policymakers, and the community, with regular progress assessments to ensure that the city continues to evolve in a way that prioritizes the well-being of its youngest residents. By focusing on these next steps, Abu Dhabi can lead the way in creating urban environments that support the holistic growth of future generations.

01
CHAPTER

Shaping Cities for
Our Youngest Residents

> **Understanding urban spaces and their impact on child growth and well-being is of paramount importance in today's increasingly urbanized world. The developmental trajectory of children is profoundly influenced by their surroundings. During their formative years, children absorb vast amounts of information, develop problem-solving skills, and establish foundational behaviors and emotional responses. The environment they grow up in plays a crucial role in achieving these developmental milestones. Therefore, it is essential to thoroughly understand and proactively engage with the complexities of children's environments.**

Today, urbanization trends highlight a significant demographic shift, with approximately 56% of the global population, or 4.4 billion individuals, living in urban areas as of 2022.[1] This number is projected to rise to nearly 5.2 billion by 2030.[2] Notably, children aged 0 to 8 years are expected to make up 15% of urban populations by 2030, translating to over 730 million children globally.[3] This demographic projection underscores the critical importance of urban environments in shaping the developmental outcomes for this age group.

Despite this, current urban planning paradigms often fail to adequately consider the specific needs of young children. As urbanization rates continue to rise, it's more important than ever to advocate for urban planning and design that are inclusive of children's needs and secure the optimal conditions for their well-being.

FROM RURAL TO URBAN LIVING: EXPLORING OPPORTUNITIES AND RISKS OF CITY LIVING

Globally, the shift from rural to urban living has been dramatic, with over half of the world's population now residing in cities, driven by the allure of better job opportunities, advanced health care, and diverse educational prospects. Abu Dhabi mirrors the global movement, as the city's rapid development and modernization attract individuals seeking a higher standard of living. This shift is transforming the lifestyle of our children, their upbringing, and lifetime journey.

Cities serve as hubs of economic activity, innovation, and cultural exchange. They provide diverse opportunities for employment, education, and social interaction, fostering personal and professional growth. The concentration of resources and infrastructure in cities broadens access to health care, transportation, and recreational facilities, improving overall quality of life. Furthermore, cities are typically culturally diverse and dynamic.

This concentration of resources and recreational and educational opportunities can contribute positively to a child's well-being, enriching their social and cognitive development, and promoting their cultural awareness and adaptive social skills.

Despite its benefits, urban living poses several challenges for young children if not planned and designed efficiently and with their needs in mind. Outcomes can differ significantly from one city to another, or even within a city and its neighborhoods, due to a range of factors including economic development, social infrastructure, access to nature, cultural and socioeconomic diversity, and public policies. In most cases, particularly for cities with sub-optimal designs, urban spaces are characterized by higher levels of pollution and limited access to natural spaces, which can contribute to respiratory problems and negatively impact physical and mental health. Safety concerns are prevalent, with increased risks from traffic, crime, and excessive screen time. Additionally, the urban lifestyle—characterized by heavy reliance on cars, small, high-rise apartments, perceived safety concerns, and over-structured routines—often leads to sedentary behaviors, reduced physical activity, and unhealthy diets. The competitive educational environment, peer pressure, overcrowding, and fast-paced life can result in stress, anxiety, and social isolation among children.

As more families move from rural to urban settings, planners should be mindful of four essential shifts:

From Rural Openness to Urban Confinement

Historically, children in rural environments enjoyed extensive interaction with nature and community, which facilitated intrinsic learning about the ecosystem and its components. This unrestricted access to vast natural spaces supported physical health, fostered creativity, and nurtured independence. In contrast, urban children often encounter spatial limitations. High-density living conditions in most cities restrict children's physical activities to designated areas, impacting their physical

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1   World Bank: Urban Development Overview.
2   United Nations Department of Economic and Social Affairs: World Urbanization Prospects.
3   Based on data from the United Nations Department of Economic and Social Affairs: World Population Prospects.

health and limiting spontaneous play, which is crucial for developing problem-solving skills and creativity.[4] Even within urban spaces, children in the past had a larger degree of freedom to discover their neighborhood relative to children today. Nowadays, car-centric developments, high-density housing without social infrastructure, and increased social diversity and risk perceptions are all leading to an increase in urban isolation.[5]

From Farm-to-Table to Processed Foods

The dietary habits of children have markedly shifted due to urbanization. Rural lifestyles previously supported diets rich in fresh, locally sourced foods, directly influencing children's nutritional intake and awareness of food origins. Urban settings, however, have a mixed impact on healthy diets. While they sometimes offer access to a wider variety of food options, they also tend to promote and accelerate the consumption of processed foods for convenience and keeping up with the fast pace of city life. This results in increased consumption of fast food and pre-packaged meals, contributing to rising rates of childhood obesity and related health issues.[6] In the UAE and other Gulf countries, rapid urbanization and socioeconomic changes have contributed to poor dietary habits, with high-fat, calorie-dense foods becoming more accessible, affordable, and convenient. Women, in particular, face challenges in maintaining healthy diets due to balancing work, family, and traditional gender roles, while university students often opt for unhealthy foods, citing convenience, cost, and accessibility on campus.[7]

From Community-Centric Living to Limited Social Interaction

Social structures have evolved with urbanization. Rural communities typically feature robust, interdependent relationships among residents, providing babies and children with a strong sense of community and belonging. Urban environments, by contrast, often lead to more isolated living conditions. Although digital platforms in urban settings facilitate broad social connections, these interactions can not replace the depth and developmental benefits of face-to-face interactions, which are critical for emotional and social development.[8]

From Hands-On Learning to Structured Educational Settings

Educational experiences for children have also transformed with urbanization. Rural environments often allow for experiential learning, where children are engaged directly with their surroundings and take part in hands-on experiences that promote practical understanding. Urban education, meanwhile, is predominantly structured and classroom-based, heavily reliant on technology and formal curricula. This tends to narrow the learning context, potentially stifling the development of critical thinking and problem-solving skills that are enhanced through diverse, real-world experiences.[9]

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4   Kytta (2004). "The extent of children's independent mobility and the number of actualized affordances as criteria for child-friendly environments."
5   Tim Gill (2007). "Why we need to set our kids free."
6   Popkin (2006). "Global nutrition dynamics: the world is shifting rapidly toward a diet linked with non-communicable diseases."
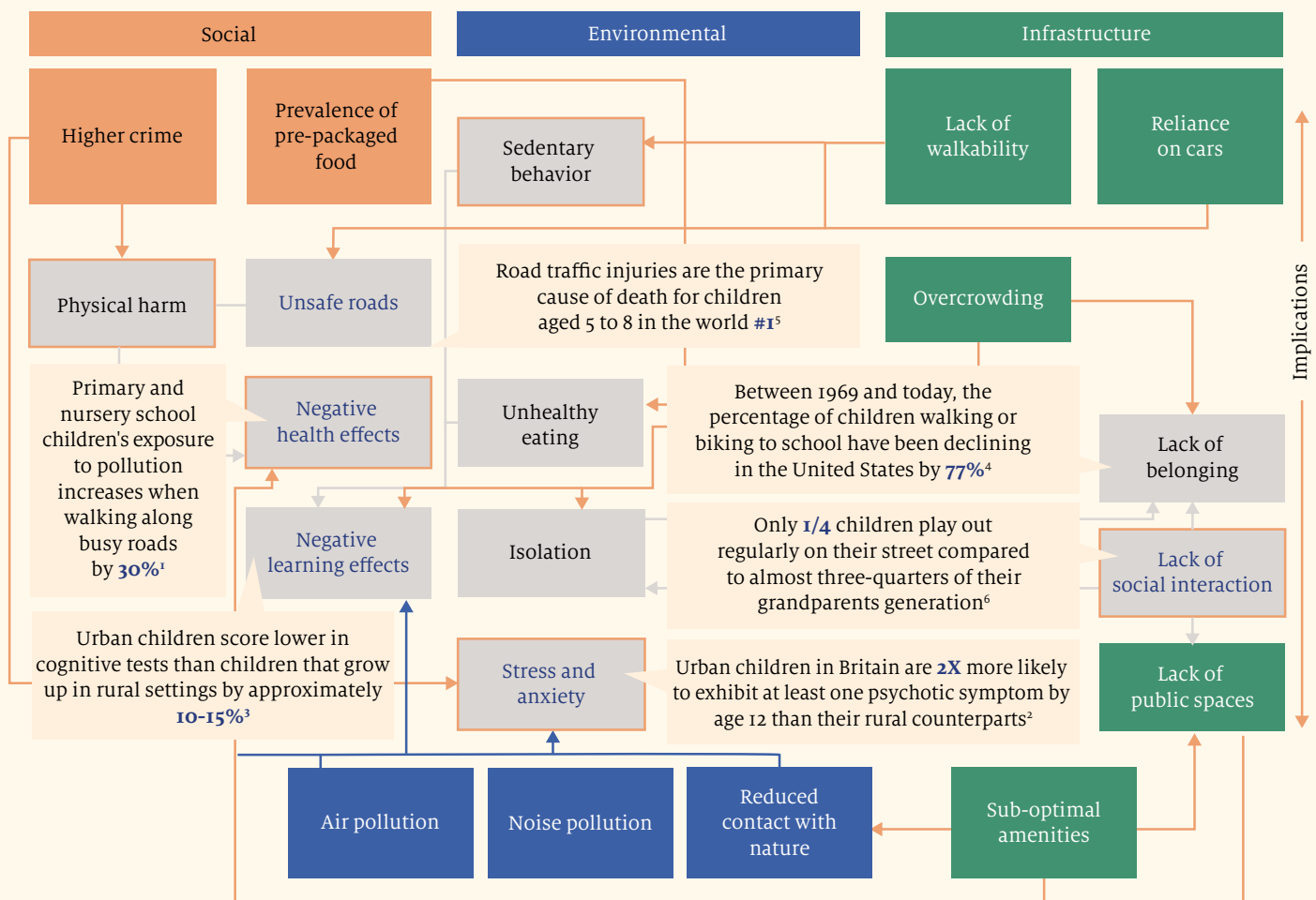7   AlBlooshi, Khalid, and Hijazi (2022). "The Barriers to Sustainable Nutrition for Sustainable Health among Zayed University Students in the UAE."
8   Putnam (2000). "Bowling Alone: The Collapse and Revival of American Community."
9   Hart (1997). "Children's Participation: The theory and practice of involving young citizens in community development and environmental care."

Exhibit 1: The impact of rural vs urban living on children's development

Social	Environmental	Infrastructure

Higher crime

Prevalence of pre-packaged food

Sedentary behavior

Lack of walkability

Reliance on cars

Physical harm

Unsafe roads

Road traffic injuries are the primary cause of death for children aged 5 to 8 in the world #1[5]

Overcrowding

Negative health effects

Unhealthy eating

Between 1969 and today, the percentage of children walking or biking to school have been declining in the United States by 77%[4]

Lack of belonging

Primary and nursery school children's exposure to pollution increases when walking along busy roads by 30%[1]

Negative learning effects

Isolation

Only 1/4 children play out regularly on their street compared to almost three-quarters of their grandparents generation[6]

Lack of social interaction

Urban children score lower in cognitive tests than children that grow up in rural settings by approximately 10-15%[3]

Stress and anxiety

Urban children in Britain are 2X more likely to exhibit at least one psychotic symptom by age 12 than their rural counterparts[2]

Lack of public spaces

Air pollution

Noise pollution

Reduced contact with nature

Sub-optimal amenities

Implications

[1] Global Action Plan Organization (2020) as cited on Impact on Urban Health website.
[2] Newbury (2016). "Why are children in urban neighborhoods at increased risk for psychotic symptom."
[3] Woldehanna et al. (2017). "The effect of early childhood stunting on children's cognitive achievements: Evidence from young lives Ethiopia."
[4] National Household Travel Survey (2020) as cited in Rutgers University website.
[5] WHO Global Status Report on Road Safety (2018).
[6] Save the Children UK (2022).

In light of these observations, there is a pressing necessity to adapt our cities' urban planning and design to mitigate for these challenges. Such recalibration should aim to explicitly incorporate the perspectives and needs of children, thereby fostering urban environments that are adaptive and inclusive.
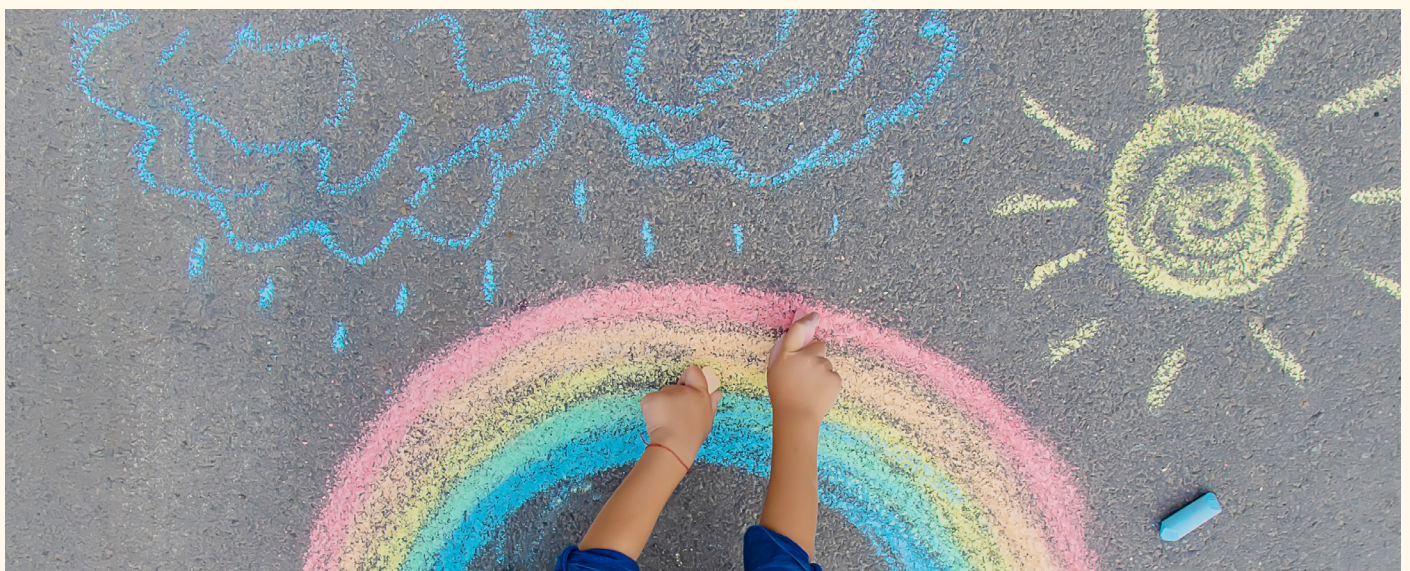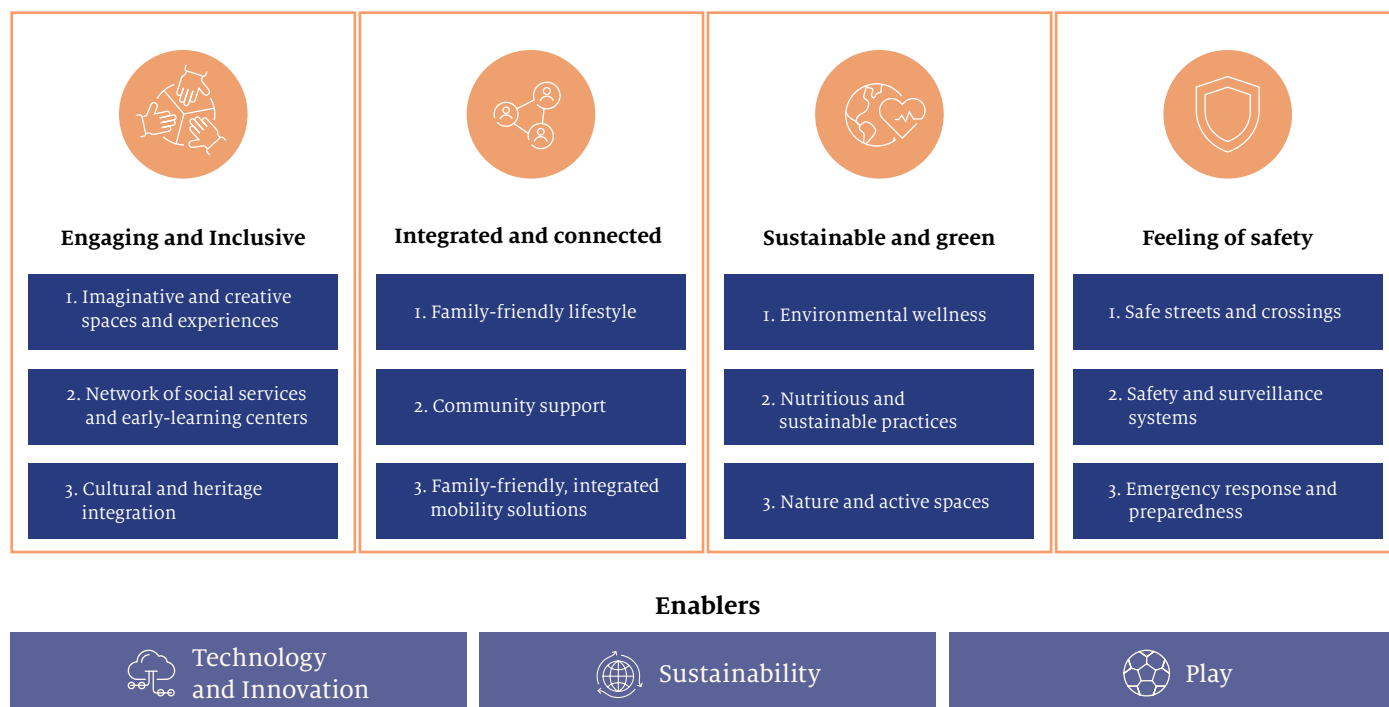
02
CHAPTER

Holistic Framework for Children's Urban Well-Being

For centuries, the purpose and challenges of cities have continuously evolved, with urban centers becoming complex ecosystems where human needs and aspirations intersect. Today, we stand at a critical juncture where advancements in data analytics, Internet of Things, human-centered design, and sustainability technologies offer a unique opportunity to redefine the city in a way that prioritizes people, particularly children. These innovations allow us to adopt a more inclusive and holistic approach to urban planning, ensuring that cities are not just functional but also nurturing spaces that support the development of their youngest residents.

In designing this child and family-focused framework, we conducted a comprehensive review of over 85 academic articles, examined benchmarks from more than 40 cities globally, and analyzed reports from leading organizations like UNICEF and Urban95. This research allowed us to extract key lessons and trends while understanding the enablers of successful urban projects tailored to children's well-being. The framework directly addresses critical challenges faced in cities worldwide—such as unsafe streets, limited independent mobility for children, and fragmented community engagement—while being adaptable to Abu Dhabi's unique urban context.

By integrating global best practices with local insights, the framework offers a conceptual model that addresses present challenges and anticipates future urban needs. It centers around four key pillars—**Engaging and Inclusive Spaces, Integrated and Connected Mobility, Sustainable and Green Infrastructure, and Feeling of Safety.** These pillars are designed to create an urban environment that holistically supports the physical, cognitive, and emotional development of children. Moreover, they tackle pressing issues like tree coverage, safe mobility routes, and fostering active community participation.

Exhibit 2: Urban framework for children's well-being

Engaging and Inclusive	Integrated and connected	Sustainable and green	Feeling of safety
1. Imaginative and creative spaces and experiences	1. Family-friendly lifestyle	1. Environmental wellness	1. Safe streets and crossings
2. Network of social services and early-learning centers	2. Community support	2. Nutritious and sustainable practices	2. Safety and surveillance systems
3. Cultural and heritage integration	3. Family-friendly, integrated mobility solutions	3. Nature and active spaces	3. Emergency response and preparedness

Enablers

Technology and Innovation	Sustainability	Play

"Engaging and Inclusive" pillar calls for vibrant, imaginative and creative public spaces like art centers and interactive museums to foster cognitive and emotional development, while integrating cultural and heritage elements to enrich children's understanding and appreciation of their community's history and diversity. This pillar also calls for the establishment of accessible early-learning centers and adventure-driven experiences to encourage exploration, risk-taking, and problem-solving, laying a strong foundation for academic success.

"Integrated and Connected" pillar focuses on designing urban spaces that support family activities and cohesion, fostering a nurturing environment for children's growth. It also emphasizes building strong community networks for social support and connecting community members using child-friendly, integrated mobility solutions.

"Sustainable and Green" pillar emphasizes creating clean, pollution-free environments and promoting nutritious, sustainable eating habits to support children's overall well-being and physical growth. It also involves developing parks and recreational areas to encourage physical activity and interaction with nature, essential for healthy development.

"Feeling of Safety" pillar focuses on designing safe streets and crossings to protect children from road and traffic hazards, implementing robust safety and surveillance systems to create secure environments, and establishing efficient emergency response systems to ensure prompt incident management and children's well-being. This comprehensive approach ensures that children can navigate urban areas safely and confidently.

These pillars can be integrated and enabled through three transformative elements:

• **Technology and Innovation:** Leveraging technological advancements to enhance safety, learning, and play environments for children.

• **Sustainability:** Ensuring that urban development is sustainable and environmentally friendly, preserving resources for future generations.

• **Play:** Emphasizing the importance of play in child development by integrating play opportunities throughout urban spaces.

This framework not only responds to the current gaps in urban planning and design but also positions Abu Dhabi to set a new global standard for family-friendly cities. It serves as the foundation for the specific solutions and actions detailed in the report, ensuring that the city can unlock its potential as a model for inclusive, safe, and vibrant urban spaces that prioritize the well-being of young children.

THE CASE OF ABU DHABI

Abu Dhabi, a city celebrated for its safety—ranking #1 globally on the Numbeo safety index for six consecutive years—has a unique opportunity to transform itself into a family-centric urban environment. Despite substantial investments in arts, technology, and city activation projects, resident participation in these offerings remains uneven, and the city's more than 200 nationalities experience limited community engagement. One key area for improvement is creating integrated, safe, and family-friendly streets, where children can navigate freely and enjoy active play.

Currently, only 9% of children in Abu Dhabi walk or cycle to school, with 78% of parents expressing discomfort with allowing their children to do so due to the lack of safe, independent mobility options. Many children spend more time in cars than in parks, play areas, or physical activity hubs. In addition, tree coverage in urban areas remains limited, reducing environmental quality and cooling potential of outdoor spaces.

In response, Abu Dhabi's Department of Municipalities and Transport (DMT) launched the Dream Neighbourhood Survey, following a Quality of Life Survey completed by over 200,000 residents between 2020 and 2022. These initiatives aim to gather resident feedback on how to enhance urban living, particularly in developing family-friendly, community-focused public spaces. With these insights, Abu Dhabi is poised to reshape its urban landscape into a more inclusive, vibrant environment for all its residents, especially its youngest.

03

CHAPTER

Engaging and
Inclusive

1. IMAGINATIVE AND CREATIVE SPACES

Creating imaginative and creative spaces for children and families is essential for fostering innovation, creativity, and cognitive development. These environments should inspire exploration, learning, and play, catering especially to the needs of young children aged 0 to 8. Urban designs that incorporate interactive public spaces, cultural quarters, and "maker" spaces offer numerous developmental benefits, such as stimulating problem-solving, creativity, and hands-on learning. Adventure-based experiences—programs focusing on outdoor survival skills, hiking, and camping—foster resilience, teamwork, and a deep appreciation for nature.

Designing public spaces with interactive and sensory elements can significantly stimulate children's imagination and creativity. These playgrounds, which often feature musical instruments, water play areas, and tactile surfaces, provide environments that enhance cognitive and motor skills, promoting holistic development.[10] Integrating natural elements such as trees, water features, and varied terrain can encourage exploration, risk-taking, and problem-solving, providing children with opportunities to engage with their environment in meaningful ways.

Additionally, establishing cultural and creative quarters within cities encourages children to engage in arts, crafts, and cultural activities. These quarters, which are often home to galleries, theaters, and workshop spaces accessible to families, foster engagement in creative arts, which has been linked to improved problem-solving skills and emotional intelligence in children.[11] Furthermore, incorporating maker spaces and learning labs within community centers and schools encourages children to experiment with technology, engineering, and crafts. These spaces, equipped with the necessary tools and materials, allow for hands-on learning and creativity, fostering innovation from an early age.[12]

Copenhagen presents a successful example of the integration of nature-based adventure playgrounds, offering natural elements, climbing structures, and water-play areas, providing children with diverse opportunities for adventurous play. The city also supports forest schools that offer outdoor learning experiences, fostering a strong connection to nature.[13] Berlin's Labyrinth Kindermuseum provides a model for how urban spaces can foster creativity, offering interactive exhibits and creative workshops designed to engage children's imaginations, encouraging exploration and hands-on learning.[14] Similarly, Toronto's Maker Kids program offers maker spaces where children can learn coding, robotics, and electronics in a hands-on environment, providing them with essential skills and preparing them for future technological advancements.[15] In terms of outdoor activities, forest schools and nature preschools also support children's physical and emotional well-being by improving attention spans, reducing stress, and increasing a sense of environmental stewardship.[16] One example is Portland's Westmoreland Nature Play Area, which is designed to inspire adventurous play and environmental awareness.[17] These initiatives serve as excellent models for other cities aiming to enhance their urban environments to better support children's creative and cognitive development.

[10]   Chancellor, Barbara. "Public spaces for play: Creating natural playspaces for children 8-12 years in urban landscapes that support free, imaginative and creative play." International Journal of Humanities 5.4 (2007): 55-58.
[11]   Grodach, Carl. (2017). "Urban Cultural Policy and Creative City Making."
[12]   Zhang et al. (2023). "Interactive Design of Children's Creative Furniture in Urban Community Space."
[13]   Burgess, E., & Ernst, J. (2020). "Beyond Traditional School Readiness: How Nature Preschools Help Prepare Children for Academic Success."
[14]   Scott, A. J. (2006). "Creative Cities: Conceptual Issues and Policy Questions."
[15]   Bianchini, F., & Parkinson, M. (Eds.). (1993). "Cultural Policy and Urban Regeneration: The West European Experience."
[16]   O'Brien, L., & Murray, R. (2007). "Forest School and Its Impacts on Young Children: Case Studies in Britain."
[17]   Storli, R., Sandseter, E. B. H., & Sando, O. J. (2020). "Children's Involvement in Free Play and the Use of Play Materials in the Outdoor Early Childhood Education and Care Environment."

THE CASE OF ABU DHABI

The importance of integrating creative, adventure-driven and imaginative spaces is recognized by Abu Dhabi. Efforts have been made to incorporate these elements into the city's landscape. Parks like Umm Al Emarat and Jubail Mangrove Park have been equipped with structures that encourage imaginative play and physical activity within an immersive, natural experience. These areas are designed to be safe and engaging for young children, fostering their development through play. Louvre Abu Dhabi offers educational programs and workshops that introduce children to art and culture. These programs are designed to inspire creativity and provide hands-on experiences with various art forms. Additionally, initiatives like the Tech Shop Abu Dhabi provide spaces where children can engage with technology and engineering in a creative environment. These hubs offer workshops and resources that promote hands-on learning and innovation. In addition to traditional "destination parks," Abu Dhabi is also home to parks that are not integrated within residential communities. In 2022, the city's municipality opened several neighborhood parks in Khalifa City, including Al Raneem, Al Mishtal, Al Hemma, Al Sadeem, and Al Talaal.

These parks provide integrated recreational spaces and services aimed at fostering an inclusive community by empowering families of people of determination within a positive and supportive framework.[18]

To go even further, Abu Dhabi can:

A. Develop Creative Quarters

Establish more creative quarters within Abu Dhabi, offering spaces for arts, crafts, and design activities to trigger and nurture children's creative potential. These areas should be family-friendly and accessible, providing regular workshops, events that engage children in creative pursuits, and structured and unstructured play opportunities overlayed with historical and cultural themes.

B. Promote Maker Spaces and Learning Labs

Expand the availability of maker spaces and learning labs within community centers and spaces. Equip these spaces with tools and materials that enable children to experiment with technology, engineering, and crafts. Ideally, the city will have different themed spaces to trigger creativity, such as "fantasy forest," "tech town," "art alley," and "construction corner," among others.

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[18] Aletihad (2023). "Abu Dhabi's Khalifa City blossoms with 23 new parks."

2. NETWORK OF SOCIAL SERVICES AND EARLY-LEARNING CENTERS

Integrating early-learning centers within urban environments is essential for providing young children with opportunities for hands-on learning. By hosting workshops, providing interactive spaces, and offering tailored educational programs, these centers can effectively foster early childhood development.

A study by Bottini and Grossman (2005) found that learning centers teach children skills that can be used beyond the classroom, such as collaborating with others, making decisions, working with their hands, and engaging fully in their learning environment.[19] These factors should be considered when designing early-learning centers, which should include multifunctional spaces where various activities are supported, such as robotics, arts, and science workshops. These environments encourage young children to explore different subjects and develop diverse skills, while significantly enhancing their cognitive development and social skills.[20] Reggio Emilia in Italy adopts a similarly innovative approach, integrating art studios, outdoor play areas, and interactive learning environments into its early-learning centers. This approach encourages self-directed learning and exploration, providing a model for holistic early education.[21]

Children's learning experience can be made more engaging and dynamic by incorporating technology, such as interactive whiteboards, tablets, and robotics kits, into the early-learning centers. When used for the purpose of learning and meeting developmental objectives, technology-enhanced education environments promote problem-solving abilities and technological literacy, which are crucial for success in future education.[22] KinderLab Robotics makes the case for screenless, play-based coding using KIBO, its offline STEAM robotics kit. Based on early-childhood development research, KIBO encourages children to think critically, draw conclusions independently, understand the engineering design process, communicate, and collaborate.[23]

Technology should be complemented with access to outdoor learning spaces, such as gardens and natural play areas, to support environmental education and physical activity. Nature-based learning has been linked to improved attention spans, creativity, and overall well-being in children.[24] Among the world leaders in academic performance and educational equity,[25] Helsinki integrates early-learning centers within community hubs that offer a range of services, including health care, family support, and recreational activities. This holistic approach ensures that children receive comprehensive support for their development.[26]

[19] Bottini, M., & Grossman, S. (2005). "Center-Based Teaching and Children's Learning: The Effects of Learning Centers on Young Children's Growth and Development."

[20] Gopnik, A., & Wellman, H. M. (1994). "10 The Theory Theory"; Edwards, C., Gandini, L., & Forman, G. (Eds.). (2011). "The Hundred Languages of Children: The Reggio Emilia Experience in Transformation."

[21] Edwards, C., Gandini, L., & Forman, G. (Eds.). (2011). "The Hundred Languages of Children: The Reggio Emilia Experience in Transformation."

[22] O'Byrne, William Ian, et al. (2018). "Digital Storytelling in Early Childhood: Student Illustrations Shaping Social Interactions"; Clements, D. H., & Sarama, J. (2003). "Young Children and Technology: What Does the Research Say?"; Karoly, Lynn A., M. Rebecca Kilburn, and Jill S. Cannon. (2005). "Proven Benefits of Early Childhood Interventions."

[23] KinderLab Robotics website.

[24] Louv, R. (2008). "Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder"; Shonkoff, J. P., & Garner, A. S. (2012). "The Lifelong Effects of Early Childhood Adversity and Toxic Stress."

[25] Ustun, U., & Eryilmaz, A. (2018). "Analysis of Finnish Education System to Question the Reasons behind Finnish Success in PISA."

[26] Kangas, J., et al. (2019). "Playing to Learn in Finland: Early Childhood Curricular and Operational Contexts."

THE CASE OF ABU DHABI

Abu Dhabi has made notable progress in integrating early-learning centers within its urban framework. This is exemplified by the establishment of the Zayed University Early Childhood Learning Center (ECLC), which offers a variety of workshops and educational programs focusing on arts, science, and technology. The center's design includes flexible learning spaces that can be adapted for different activities, fostering an environment of exploration and creativity. Abu Dhabi Department of Education and Knowledge (ADEK) supports the capabilities of Abu Dhabi's early-learning centers by introducing advanced technological tools, such as robotics kits and interactive learning platforms, to enhance learning experiences and engage young learners. Moreover, several early-learning centers in Abu Dhabi have incorporated gardens and outdoor play areas into their design.

To build on these efforts, Abu Dhabi can:

A. Increase Accessibility to Multi-Functional Learning Spaces

Develop public spaces as a means for interactive learning and educational activities, in order to ensure proximity and inclusive access to all children, across its different neighborhoods. These could include community gardens where students, parents, and the elderly can grow food together, fostering a sense of community and teaching students about local plants, animals, and ecological practices.

B. Promote Nature-Tech Based Learning

Develop more outdoor learning environments within early-learning centers that are integrated with technological experiences, such as virtual reality experiences, coding workshops, and interactive labs. This approach can include sensory gardens, outdoor classrooms, and nature trails with tech-driven discovery games to enhance children's learning experiences. Abu Dhabi could also combine STEM with nature-based activities; for example, building weather stations and allowing children of different ages to monitor and analyze changes.

3. CULTURAL AND HERITAGE INTEGRATION

Incorporating cultural and recreational opportunities in urban design is beneficial for children's cognitive and social development, while engaging and integrating them within their communities.

Research by Moreno reports on the positive impacts after even brief periods (20 days) of music training, boosting verbal intelligence and executive functions in 90% of the children between 4 and 6 years old.[27] The impacts of cultural and artistic urban venues are compounded by the integration of play. Recognized as a universal children's right by the UNCRC (United Nations Convention on the Rights of the Child) in 2013, play and recreational opportunities are an integral part of children's learning and development.[28] Research by Affandi et al. confirms that, in the context of early childhood, engaging in arts and culture is a form of play and communication that contributes to cognitive development and socialization.[29] It can also improve academic performance by as much as 15%.[30] Affandi et al.'s 2019 review of the intersection of art and the accommodation of children in the city suggests that active participation in art projects cultivates community bonds and a sense of attachment to the facility in which the project takes place.[31]

Establishing museums and cultural heritage sites within the city can provide opportunities for learning and adventure to deepen the connection between the city and its youngest residents and create magical moments in families' lives. These sites can offer interactive exhibits, workshops, and cultural programs that engage children and families.

Research indicates that exposure to cultural heritage can enhance children's sense of identity and community pride.[32] Integrating these cultural elements into urban design not only educates but also fosters a sense of belonging among residents. For example, City Gallery Wellington, a hub of contemporary art in New Zealand's capital, has been offering art education experiences for over 20 years. The Gallery provides a dynamic and stimulating learning environment where students engage with contemporary art to spark curiosity, stimulate creativity, and enhance their understanding of the world. The programs are led by trained visual-arts teachers using enquiry-based methodologies (e.g., Visual Thinking Strategies, Philosophy for Children) and are aligned with the New Zealand National Curriculum. In some programs, students explore historic and contemporary art, discussing how it reflects New Zealand's national identity, and study Māori artists. The Gallery also offers school holiday programs, art activities, and teacher resources with key information about artists' ideas, techniques, and processes.[33] By creating spaces that celebrate and preserve cultural heritage, cities can strengthen community bonds and enhance the overall well-being of their residents.

[27]   Moreno (2011). "Short-Term Music Training Enhances Verbal Intelligence and Executive Function."
[28]   Wilhelmsen et al. (2023). "Developing child-friendly cities: Young children's participation in urban planning."
[29]   Affandi et al. (2019). "Place-Making a Child-Friendly Urban Environment Through Artworks."
[30]   Graziano (1999). "Enhanced Learning of Proportional Math Through Music Training and Spatial-Temporal Training."
[31]   Affandi et al. (2019). "Place-Making a Child-Friendly Urban Environment Through Artworks."
[32]   Hooper-Greenhill, E. (2007). "Museums and education: Purpose, pedagogy, performance."
[33]   City Gallery Wellington website.

Incorporating public art and monuments that reflect the community's cultural heritage can create visually stimulating environments and foster a sense of pride and belonging. Public art projects that involve community participation can strengthen social ties and promote cultural awareness.[34] These initiatives can transform public spaces into vibrant, inclusive areas that celebrate the unique identity of the community. Kyoto is a model for preserving and integrating cultural heritage within an urban environment. The city maintains its historic temples, traditional houses, and cultural festivals, ensuring that residents and visitors can experience its rich cultural legacy. Kyoto's approach to cultural heritage integration includes educational programs and community events that involve children and families, promoting cultural understanding and continuity.[35] By engaging the community in the creation and maintenance of public art and cultural sites, cities can build stronger social bonds and foster a deeper appreciation of their cultural heritage.

Organizing cultural festivals and events in public spaces can celebrate a community's diverse cultural heritage and provide opportunities for social interaction and cultural exchange. These events can enhance community cohesion and offer children and families meaningful cultural experiences.[36] By bringing people together in a festive atmosphere, such initiatives can strengthen community bonds and foster a deeper appreciation of cultural diversity. Oregon's annual Shakespeare Festival (OSF) offers a prime example of integrating arts and culture with family-friendly urban design. Taking place on a campus adjacent to Lithia Park, OSF features theatres and an open central court known as "The Brick," and hosts nightly Green Shows from June through September. The festival attracts around 70,000 students annually from around the globe and includes programming like "Family Days," offering discounted tickets for children aged 6 to 14 and educational pre-show talks that help children understand the significance of the plays they're about to watch. This approach demonstrates how cultural festivals can provide enriching experiences for children and families while promoting community cohesion and cultural exchange.

34   Sharp, J., Pollock, V., & Paddison, R. (2005). "Just art for a just city: Public art and social inclusion in urban regeneration."
35   Matsushita, D. (2023). "Population decline and urban transformation by tourism gentrification in Kyoto City."
36   Quinn, B. (2005). "Arts festivals and the city."

THE CASE OF ABU DHABI

Cultural institutions such as Louvre Abu Dhabi and the Qasr Al Hosn Fort provide residents with access to both world-class and local cultural and historical exhibits. These institutions offer educational programs and workshops that engage young children and families in learning about their cultural heritage. Additionally, Abu Dhabi has launched public art initiatives—for example, Art Abu Dhabi—that reflect the emirate's cultural heritage and contemporary identity through works like murals and sculpture. Another example is the Abu Dhabi Canvas initiative by DMT, which aims to transform urban spaces in collaboration with local artists, enhancing public areas through creative and artistic interventions. These projects involve local artists and community members, fostering a sense of ownership and pride. The emirate also hosts numerous cultural festivals and events, such as the Abu Dhabi Festival, Al Dhafra Festival, Qasr al Hosn Festival, and the Early Childhood Development Fair, which celebrate the UAE's cultural heritage and provide opportunities for community engagement and cultural exchange.

Majlisna, an outcome of the World Early Childhood Development Forum 2.0, is an adaptable set of hardware and digital solutions (both permanent and movable) aimed at introducing interactive elements in urban design, transmitting Emirati culture and heritage through play, and turning daily routines into healthy and joyful journeys. Inspired by the Emirati tradition of 'Majlis', social spaces open to all, a network of Majlisna locations will help unlock intergenerational connections and meaningful play experiences across the Emirate of Abu Dhabi and beyond. Two pilots are currently underway to bring the concepts to life, encouraging outdoor play and supporting the integration of the Emirati culture among children and families.

As such, Abu Dhabi can:

A. Enhance Public Art Projects

Continue to support and expand public art projects that reflect the community's cultural heritage. Encourage community participation by involving individuals, including young children, in the design and creation of art pieces to foster a sense of ownership and pride. Implement interactive and digital art installations that engage children and families in exploring cultural themes. Ensure these installations are accessible and inclusive, catering to diverse community needs and enhancing the urban environment with visually stimulating and educational elements.

B. Promote Year-Round Cultural Events

Promote a calendar of year-round cultural events and festivals that celebrate the emirate's diverse heritage. Ensure these events are family-friendly and accessible to all residents. Include smaller events within neighborhoods, and recurring events to foster ongoing engagement with cultural heritage and strengthen community bonds. Integrate cultural performances, traditional crafts, and culinary experiences to provide immersive cultural encounters.

04

CHAPTER

Integrated and
Connected

1. FAMILY-FRIENDLY LIFESTYLE

Family hubs or family-friendly urban spaces are neighborhoods or cities that ensure all daily needs of families are easily accessible within a 10- to 15-minute range.[37] By providing a centralized location for essential services, these hubs can reduce the stress and time associated with accessing multiple services at different locations.

For example, Sheffield Plan outlines a strategy for the city's growth and development through 2039, aligning with Sheffield City Council's goal of fostering a fairer city for all residents. One key aspect of the Plan is the introduction of the '20-minute neighborhood' concept, where most daily needs can be met within a 10-minute walk or bike ride from home.[38] This approach is supported by a policy which sets minimum standards for access to essential local facilities in new developments of 10 or more homes.[39] The newly approved Sheffield's Community Parenting Strategy, effective until 2026, aims to transform the city into an ideal environment for children to grow up in.[40] Moreover, the city offers Family Hubs that provide activities for children aged 0 to 5 and support for parents and carers of children aged 0 to 19, or up to 25 for those with special educational needs and disabilities. Sheffield has seven Family Hubs that, along with community venues, outreach sites, and network centers, serve all areas of the city.[41]

City and neighborhood-level interventions play a crucial role in creating family-friendly urban environments. Various initiatives, plans, and ongoing projects emphasize the importance of designing public spaces that cater to the needs of children and families. Co-creative design processes involving children and parents, as well as bottom-up neighborhood design initiatives, highlight the growing demand for family-oriented spaces within cities. Traditionally, urban areas have catered to adults and cars, not children. However, gentrification has shifted this focus, especially in family neighborhoods, fostering new public parenting practices. Families, as consumers, are promoting the development of child-directed, family-directed, and child- and family-friendly public spaces.[42]

Copenhagen, Denmark, serves as an excellent example of inclusive urban design. The city's urban planning prioritizes safe, accessible, and enjoyable public spaces, with numerous parks and playgrounds located in residential neighborhoods. These spaces are equipped with family-friendly amenities such as family restrooms and breastfeeding stations, enhancing outdoor activities and social interaction. Copenhagen's approach has led to high satisfaction among residents and serves as a model for family-friendly urban design.[43] By incorporating inclusive and accessible features into playgrounds and public spaces, cities can create environments that support the physical and social development of all children.

Providing support services such as child care, health clinics, and counseling within community hubs can address the diverse needs of families. Outreach programs that connect residents with these services can enhance access and utilization, contributing to overall community well-being (Campbell & Cornish, 2010). By centralizing these services in easily accessible locations, families can more effectively receive the support they need, fostering a stronger, healthier community.

Mumbai's Jai Vakeel School Park and Victoria Memorial School for the Blind exemplify this approach by catering to differently abled and visually impaired children and adults. These facilities provide accessible play areas that strengthen community bonds and create a sense of belonging for all children, regardless of physical or mental abilities. The designers involved the children, teachers, and therapists in the planning process through focus groups and interviews to ensure the play areas met their specific needs. This comprehensive approach demonstrates how thoughtfully designed community hubs can effectively address the varied needs of families, enhancing both individual and community well-being.

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37 UNICEF (2018).
38 Sheffield City Council. (2022). "Sheffield Plan: Our City, Our Future; Part 1: Vision, Spatial Strategy, Subarea Policies and Site Allocations."
39 Sheffield City Council. (2023). "Sheffield Plan: Our City, Our Future; Consultation Report: Summary of Comments and Council Response."
40 SheffNews: Sheffield City Council news and events (2024).
41 Sheffield City Council: Sheffield Family Hubs.
42 Krishnamurthy et al. (2018). "Child-Friendly Urban Design: Observations on Public Space from Eindhoven (NL) and Jerusalem (IL)."
43 Gehl, J. (2010). "Cities for People."

THE CASE OF ABU DHABI

Abu Dhabi is actively working towards the creation of 15-minute cities, as part of broader sustainability and urban planning initiatives through projects like Masdar City and Zayed City. The development of parks such as Khalifa Park and Umm Al Emarat Park, equipped with playgrounds, picnic areas, and sports facilities, significantly enhances recreational opportunities for families in Abu Dhabi. These parks provide safe and engaging spaces in which children and their families can spend quality time together. Additionally, centers like the Abu Dhabi Family Development Foundation's facilities offer a range of services and activities, including child care, health services, and educational programs, serving as community hubs that support family well-being and foster social connections. Furthermore, the establishment of the Family Care Authority (FCA) aligns with the vision of the Department of Community Development (DCD) in Abu Dhabi to enhance social sector services and improve the quality of life for families. FCA provides integrated family care services through a unified database and a single point of contact. By partnering with public, private, and third sectors, the FCA supports family care services, addresses diverse family needs, and helps develop social sector skills. Additionally, the Al Ghazal project aims to establish a multifaceted service delivery ecosystem that offers a variety of public and private services and programs across Abu Dhabi, providing a foundation from which every child and parent can flourish, from the prenatal stage through three years old.[44]

These efforts are bearing fruit, with Abu Dhabi ranking as the most livable city in the region by the Economist Intelligence Unit.[45] In fact, the city conducts surveys to optimize its offerings. One notable example is the Dream Neighbourhood Survey, which gathers insights from residents to understand their preferences and aspirations for the ideal living environment, focusing on aspects such as safety, amenities, green spaces, and community engagement to help shape future urban planning and enhance the city's livability. Abu Dhabi can build on these efforts and undertake more initiatives that instill a neighborhood feel across the different communities, such as:

A. Expand Family Hubs

Increase the number of family hubs that bring together different services and amenities required by families in a 'one stop shop,' within a 10-to-15-minute range of residential areas. These hubs typically provide resources and services specifically for families, including parenting advice, early education programs, health care services, and social activities aimed at strengthening family units and helping children thrive. This expansion can ensure that all families have access to essential services and community support within their neighborhoods. Consider partnerships with private sector entities to develop multifunctional hubs that offer additional services such as fitness centers and co-working spaces; as well as activating these hubs through community engagement activities and events.

B. Strengthen Community Events

Organize regular family-oriented community events, such as neighborhood fairs, cultural festivals, and family activity days, specifically designed to promote family-friendly lifestyles. These events should encourage participation from all age groups, offering activities like parent-child workshops, family sports challenges, and interactive play zones for children. Collaborate with local schools, child care centers, and family-focused businesses to ensure the events cater to families' diverse needs. Additionally, provide opportunities for families to contribute their ideas and talents, such as hosting family cooking demonstrations or organizing children's performances, fostering a strong sense of community ownership and belonging.

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44   ECA, Al Ghazal Project: "Enriching Parent, Child & Community Relationships Through Integrated Service Delivery."
45   Department of Municipalities and Transport (2021). "Abu Dhabi ranked the most liveable city in the region by the Economist Intelligence Unit survey's global liveability index."

2. COMMUNITY SUPPORT

Social interaction is a crucial element of urban design, and can be enhanced by incorporating and activating multi-use public spaces. Community spaces create opportunities for interactions among children of various ages and social backgrounds and are vital for fostering social dynamics, thereby compounding physical and social developmental benefits.[46] Social spaces can enable children to develop important social skills like cooperation, conflict resolution, and communication, enhancing their social adaptability and emotional intelligence.[47]

Research indicates that well-designed public spaces can increase community interaction and reduce social isolation.[48] By incorporating elements that encourage people to gather and engage, these spaces can foster a stronger sense of community. In addition to public spaces such as streets and plazas, community centers that offer a variety of programs and activities for all age groups enhance social cohesion and support networks. These centers can host social events, support groups, educational programs, and recreational activities, fostering a sense of community.[49] Such initiatives have been shown to improve mental health and well-being by providing a space for social interaction and community engagement.[50]

For example, the Gabriela Mistral Center (GAM), a contemporary cultural hub located in the historic heart of Santiago, exemplifies community support through its extensive cultural offerings and inclusive programs, fostering social interaction and cohesion. Spanning 22,000 square meters, GAM provides spaces for theater, dance, music, visual arts, and conferences, along with five public squares and BiblioGAM, a performing arts library. With free universal access, GAM encourages cultural participation through workshops, talks, and special shows, particularly targeting audiences with limited cultural access. Its programs include early childhood art audience formation, leveraging cultural heritage to promote family cohesion and offering activities for children and their families, such as reading promotion, guided visits, live storytellers, and interactive workshops. GAM's efforts to decentralize culture and emphasize Chilean creations, both nationally and internationally, demonstrate its commitment to fostering community engagement, inclusivity, and social development.[51]

Multi-use public spaces provide opportunities for socializing, learning, and recreation for all age groups. These outdoor and indoor spaces act as vital hubs for community interaction, offering a range of programs and facilities that cater to diverse needs. Singapore's "Our Tampines Hub" is an exemplary model of an integrated community and lifestyle center that offers a variety of spaces and services, including sports facilities, a library, health care, and social areas. This hub demonstrates how multi-use community centers can enhance community support and engagement, making it a model for urban design aimed at fostering community well-being.[52] By providing a centralized location for various activities and services, "Our Tampines Hub" strengthens community bonds and supports the overall health and happiness of its residents. This approach illustrates the significant impact that well-designed community centers can have on creating cohesive and supportive urban environments.

46   Zhang et al. (2023). "The Impact of a Child-Friendly Design on Children's Activities in Urban Community Pocket Parks."
47   Yogman et al. (2018). "The Power of Play: A Pediatric Role in Enhancing Development in Young Children."
48   Francis, J et al. (2012). "Creating sense of community: The role of public space."
49   Kearns et al. (2009). "Loneliness, social relations and health and well-being in deprived communities."
50   Putnam, R. D. (2000). "Bowling Alone: America's Declining Social Capital."
51   Gabriela Mistral Center (GAM) website.
52   Yuen, B. (1996). "Creating the Garden City: The Singapore Experience."

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Abu Dhabi has made notable progress in fostering community support through various initiatives. The city has developed numerous parks and public spaces designed to encourage social interaction and community activities. These spaces provide residents with opportunities for recreation, relaxation, and socialization, contributing to a stronger sense of community. Additionally, Abu Dhabi offers a range of support services, including counseling, health services, and social programs aimed at addressing the diverse needs of residents. Outreach programs help connect families with these services, ensuring that all community members have access to essential support.

The Al Ghazal project will develop purpose-built hubs serving large community areas. Each hub will provide a core set of services and culturally relevant programs, along with optional offerings based on the needs and interests of the parents who live in the community (e.g., intro to parenting, open play areas, coworking spaces). The project will also include purpose-built facilities and partners serving local neighborhoods (e.g., parks, play centers, allied health clinics, community majlis).[53] Another initiative, led by the ECA, is the Al Falah tactical intervention, which aims to promote early childhood development through public realm interventions that foster positive interactions between family members. To go even further, Abu Dhabi can:

A. Expand Community Centers

Increase the number of community centers in residential areas, ensuring that all residents have access to social, recreational, and support services. These centers should offer a diverse range of programs tailored to the needs of different age groups and communities. They should be integrated within public spaces, including parks and plazas, with features that promote socialization, such as communal seating areas, playgrounds, and sports facilities. Abu Dhabi can leverage its Dream Neighborhood Survey to ensure these community centers reflect people's needs and preferences.[54]

B. Strengthen Support Services

Expand the range and reach of support services offered within community centers, including mental health services, counseling, and educational programs. Implement targeted outreach programs to ensure that all residents, particularly those in vulnerable groups, have access to these services.

AL FALAH TACTICAL INTERVENTION

ECA launched an initiative to promote early childhood development in Abu Dhabi through public realm interventions aimed at improving outdoor spaces for children and caregivers, while encouraging positive behaviors. The design of public spaces influences how **people** move through, use, and perceive the environment. This initiative seeks to leverage the built environment to encourage healthier lifestyles through behavioral change.

A framework assessment tool was developed to evaluate the same space over time, testing design solutions against targeted behavioral outcomes. The Al Falah pilot, the first of its kind in Abu Dhabi, was built to test this framework and observe behaviors to inform the future design and implementation of Al Falah village center as a community hub.

In Village Centre 1, there was a limited presence of children, minimal play, and few interactions with adults, highlighting a lack of infrastructure to support emotional, cognitive, and social growth. ECA responded with a spatial and programmatic plan, using some key design principles to test behavioral nudging through elements such as:

Picnic tables: Encouraged prolonged social interactions across age groups, creating a comfortable communal space.

Hammocks: Provided unique seating options, playful elements, and contributed to the site's identity.

Moveable play equipment: Fostered independence in toddlers and allowed them to explore together.

Cycling and sports equipment: Encouraged playful physical activity, while floor paintings of playful routes guided children to cycle around the plaza.

3X
More children on site

97%
Increase in play activity

42%
Reduction of people using electronics

Source: ECA

3. FAMILY-FRIENDLY, INTEGRATED MOBILITY SOLUTIONS

Family-friendly mobility refers to solutions that prioritize children's journeys, designed for the safety, comfort and accessibility of children and their caregivers. These systems typically include features such as dedicated spaces for strollers, child seats on public transport, low-entry buses or trams, well-marked pedestrian pathways, and micromobility options like bicycles and scooters that are safe and manageable for families. The integration of these features into urban transportation systems helps ensure that all members of the community, including the youngest, can navigate the city safely and efficiently.[55]

Research has shown that children's brain development is significantly impacted by the urban mobility solutions available in their cities, both positively and negatively. Properly planned transportation systems are essential for ensuring that pregnant women, babies, and young children can access resources necessary for healthy development, such as nutritious food, medical check-ups, child care, and safe play areas.[56] It therefore becomes imperative for cities to consider the child as a key stakeholder when designing mobility solutions. One successful example is TransMilenio, Bogota's bus rapid transit system. The network incorporates features that improve accessibility for all passengers and provides extra space for pregnant women, young children, and the elderly.[57]

Beyond safety measures, cities can also incorporate play areas within modes of transport to encourage children and their families to use them, as they allow children to pass time while traveling and provide their caregivers with accommodations to make the journey easier. In Switzerland,[58] for example, trains are equipped with play areas and family zones; in the Czech Republic, trains include cinema-style compartments where children can watch movies.[59] Play elements can also be embedded outside the mode of transit, in stations. In Montreal, Canada, bus stops have musical swing sets, each of which triggers a specific note; together the swings create a piece of music.[60] Similarly, Istanbul's airport has designated itself as a child and family-friendly airport, with playgrounds spanning 700 square meters of space, infant care facilities for feeding and changing, family priority security checkpoints for travelers with children aged 0 to 5 years, and the Children's Train—a small train with four carriages for children to ride while waiting.[61]

Cities have also been developing infrastructure specifically dedicated to children and their families. In Copenhagen, a miniature version of the city's roads, called a traffic playground, was built so that children could practice using the infrastructure safely and learn about road rules before they are old enough to use it on their own.[62] The Cycling Embassy of Denmark has launched several initiatives to encourage children to use bicycles as their main mode of transport, including the development of games that teach children how to ride bicycles in different types of terrains and with obstacles, as well as bicycle playgrounds where children can learn by doing.[63]

[55] Institute for Transportation and Development Policy, "Access and Babies, Toddlers, and Their Caregivers" (2022).
[56] Institute for Transportation and Development Policy, "The Effects of Transportation on Early Childhood Development" (2019).
[57] World Bank's Public-Private Infrastructure Advisory Facility (PPIAF).
[58] Swiss Federal Railways (SBB), "On the train with children."
[59] Heinrich-Böll-Stiftung Brussels, "The mobility of families: a key factor in the transition towards emissions-free cities and transport" (2022).
[60] Good News Network, "Swings Placed Near Bus Stop Make Music When People Move in Harmony" (2012).
[61] Istanbul Airport, "Child and Family-Friendly Airport."
[62] University of Oregon, "Copenhagen: A city built for kids, families, and big kids." (2023).
[63] Cycling Embassy of Denmark, "Cycling children – cycle training and traffic safety."

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Abu Dhabi's buses accommodate children and their families with priority seats for pregnant women, elderly passengers, and people of determination, foldable seats to create extra space for traveling families, and designated spaces for strollers at the front or middle of the bus. The buses also have a low-floor design and are equipped with ramps, which facilitate easy boarding for families with strollers or young children.[64] Despite these accommodations, Abu Dhabi residents remain heavily reliant on private cars for transport—public transport journeys account for less than 5% of the total.[65] This has led to the rise of women- and family-only taxis across the emirate to accommodate families' needs.[66]

Abu Dhabi's Transportation Mobility Management (TMM) Strategy 2030 is a detailed plan aimed at boosting the efficiency, sustainability, and accessibility of the city's transport network. It includes a range of initiatives focused on enhancing mobility, easing traffic congestion, and advancing sustainable transport solutions.[67] Among its initiatives are requiring all schools in the emirate to have a TMM plan by 2030, featuring safe routes to and from schools, traffic calming measures around school zones, optimized school bus routes, and seamless integration with the wider transport network by providing convenient bus stops and safe walking paths from public transport hubs to schools. Although it is making considerable progress with regards to safe and accessible mobility, Abu Dhabi can undertake more initiatives to make its transport solutions child and family-friendly, such as:

A. Make Travel More Fun

Travel time can be used wisely to incorporate elements of both play and learning. This can be done in the form of play-based learning spaces across bus stations, featuring elements such as swings, science-based early learning spaces, or interactive and even immersive technologies that react to children in real time. While traveling, foldable infrastructure could be used as coloring stations, and prompts and nudges can be sent to caregivers to promote play between them and their children. Such considerations would not only allow children to enjoy the journey—and therefore develop positive associations with public transport—but would also reduce stress for caregivers.

B. Prioritize Active Travel and Accessibility for Families

Abu Dhabi can build on its existing Surface Transport Master Plan and Integrated Transport Strategy by prioritizing green, family-friendly mobility routes. This would include enhancing pedestrian pathways, cycling tracks, and stroller-friendly walkways that connect residential areas to parks, schools, and recreational facilities, ensuring safe, eco-friendly routes for families. Doing so would require collaboration between authorities, schools, parents, and their children, as well as the utilization of technologies such as GPS and spatial and probability analyses. It would also require rethinking how journeys take place from the perspective of caregivers, who are predominantly women, and who typically make several stops while running errands and attending to the child's needs, and who generally embark on these journeys during non-peak hours.

[64] UNESCWA, "U.A.E Universal Design Code."
[65] London School of Economics and Abu Dhabi University, "Roads as Tools for (Dis)connecting Cities and Neighborhoods: A Socio-spatial Study of Abu Dhabi."
[66] UAE Government, "Transport and parking facilities for women."
[67] Abu Dhabi Department of Transport, "Abu Dhabi Transportation Mobility Management Strategy."

05

CHAPTER

Sustainable
and Green

> **Creating a healthy and active urban environment is essential for the development of children, from reducing pollution and ensuring clean air and water, to enabling nutritious and active lifestyles.**

1. ENVIRONMENTAL WELLNESS

Creating healthy and thriving public spaces involves reducing pollution, ensuring clean air and water, promoting physical activity, and controlling noise pollution, among other things; all of which are essential for children's healthy development. Children's exposure to environmental contaminants can vary significantly as they progress from infancy through childhood and adolescence. These variations in exposure are due to both behavioral changes and rapid physiological development. Consequently, children's vulnerability to certain environmental contaminants changes at different stages of their growth. Pregnant women, and consequently their children, who are exposed to polluted air and water face higher risks of respiratory issues,[68] cardiovascular complications such as hypertension and preeclampsia,[69] premature births,[70] birth defects[71] and gastrointestinal infections.[72] This increased vulnerability, coupled with higher exposure levels, can result in a greater risk of adverse health effects in children compared to adults exposed to the same contaminants. Since 1995, the U.S. Environmental Protection Agency (EPA) has mandated that children must be specifically considered in risk assessments during public health decision-making processes.[73]

Studies have shown that exposure to pollutants, contaminants, poisons, and toxins can have long-term negative effects on children's health, potentially leading to developmental damage and delays in early life.[74] A review of urban pollution-reduction interventions shows that urban planning measures, such as increasing vegetation on roadsides or on school premises, have the potential to reduce harmful airborne particulate matter concentrations by as much as 60%.[75]

68   Rebecca A. Reynolds et al. (2020). "Exposure to Ambient Air Pollution and Respiratory Health in Pregnant Women."
69   Laura A. Adar et al. (2021). "Air Pollution and Cardiovascular Health in Pregnant Women: A Systematic Review."
70   Maria A. Rodriguez et al. (2019). "The Effects of Air Pollution on Pregnancy Outcomes."
71   C. H. Sharpe et al. (2020). "Environmental Pollution and Birth Defects: A Review."
72   Naomi A. Zahran et al. (2018). "Effects of Drinking Water Contamination on Pregnancy and Neonatal Health."
73   U.S. Environmental Protection Agency. (2014). "Child-specific exposure scenarios examples (Final Report)".
74   Landrigan et al. (2019). "Pollution and children's health."
75   Diener (2021). "How can vegetation protect us from air pollution? A critical review on green spaces' mitigation abilities for air-borne particles from a public health perspective - with implications for urban planning."

Children tend to receive higher doses of air pollutants than adults because of their faster breathing rates and greater air intake per kilogram of body weight. Common sources of these pollutants include traffic emissions, coal-fired power plants, and forest fires.[76] Implementing measures to reduce air pollution, such as promoting public transportation and green energy, can significantly improve air quality, thereby improving lung-function growth in children and reducing the number of children with insufficient lung capacity by as much as 50%,[77] measured as forced expiratory volume in 1 second (FEV1) and forced vital capacity (FVC). Such initiatives are essential in urban environments where vehicle emissions contribute significantly to air pollution. Turin's School Streets project is an initiative developed by concerned parents to address the city's high levels of air pollution around schools. Relying on volunteers and grassroots organization, the project measured the pollution levels of the top 100 home-to-school paths for children, creating a heat map of air pollution levels and identifying 'red zones' that pose the highest health risks.[78] The project results are being used to convince authorities to pedestrianize children's school routes in hopes of decreasing their exposure to nitrogen dioxide and PM10 (particles under a hundredth of a millimeter).

Paris's pedestrianization initiative is a precedent for what Turin may eventually achieve. The "rues aux ecoles" scheme in the French capital has introduced more than 150 pedestrianization projects to tackle air pollution, reduce vehicle journeys, and implement '15-minute city' standards. The scheme has focused on the welfare of children, permanently pedestrianizing 11 streets outside schools in the fall of 2021 alone, adding 3,400 square meters of greenery and planting 64 new trees.[79]

Environmental wellness for children extends beyond air quality, to include noise emitted from highways and traffic and access to clean water. Noise-reduction strategies like sound barriers and green buffers have proven to be effective. The decline of long-term memory and reading comprehension impairments in children aged 10 in Riem, a mixed-use borough in Munich, after the relocation of Munich airport to the outskirts of the city, is clear evidence for the impact of noise pollution on children's development.[80] Similarly, numerous studies have found that increased access to clean water is linked to better child health,[81] with investments in water and sanitation coverage for entire households potentially resulting in the avoidance of 2.2 million child deaths annually in the developing world.[82]

Moreover, initiatives that aim to deepen children's understanding of sustainable practices and increase their environmental awareness result in positive outcomes on psycho-physical well-being, on connectedness to nature, and on pro-social behavior.[83] Such evidence encourages countries like Finland to emphasize sustainability as a fundamental value in the national core curricula of their early childhood education and care system—driven by the principle that all children have the right to develop values, knowledge, and skills for living a sustainable life.[84]

76   Brumberg et al. (2021). "Ambient Air Pollution: Health Hazards to Children."
77   Gauderman et al. (2015). "Association of Improved Air Quality with Lung Development in Children."
78   Urban95 (2018).
79   Child Health Initiative & FIA (Fédération Internationale de l'Automobile) Foundation (2022). "School Streets: Putting Children And The Planet First."
80   Evans et al. (1998). "Chronic noise exposure and physiological response: a prospective study of children living under environmental stress", as cited in Stansfeld & Clark (2015). "Health Effects of Noise Exposure in Children."
81   Setyari, N. P. W., et al. (2022). "The Impact of Clean Water Access on Children's Performance in Indonesia."
82   Günther, I., & Fink, G. (2011). "Water and Sanitation to Reduce Child Mortality: The Impact and Cost of Water and Sanitation Infrastructure."
83   Pirchio, S., et al. (2021). "The Effects of Contact with Nature During Outdoor Environmental Education on Students' Wellbeing, Connectedness to Nature, and Pro-Sociality."
84   Furu, A. C., & Valkonen, S. (2021). "Gearing Up for Sustainability Education in Finnish Early Childhood Education and Care (ECEC): Exploring Practices and Pedagogies by Means of Collegial Reflection and Discussion."

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Abu Dhabi faces significant air pollution challenges that impact its residents. According to IQAir, the city's average levels of PM2.5 (very small toxic particles that can penetrate deep into the lungs and easily enter the bloodstream) are more than three times the recommended level, reaching an average of 38.2 μg/m³ in 2023.[85] This situation poses significant risks to citizens, exacerbating respiratory issues, and is believed to be the cause of 1,872 deaths annually.[86] Children are particularly vulnerable to air pollution, which could explain why 13% of the UAE's children aged 6 to 13 suffer from asthma,[87] compared to the global average of 9 to 11%.[88] In response, the city has launched several mitigation and climate change resilience initiatives, the most important of which is the Abu Dhabi Climate Change Strategy, aimed at reducing carbon emissions by 22% by 2027,[89] and the planting of 44 million mangroves since 2022, which offsets 233,000 tons of carbon emissions annually, equivalent to the energy consumption of more than 25,000 homes.[90]

Despite these efforts, including the broader UAE Net Zero by 2050 strategic initiative, the urban environment continues to pose risks to children, with greater negative consequences seen in those who spend more time outside or live closer to highways, power plants, and factories.[91] To complement Abu Dhabi's existing efforts, the following initiatives can be launched:

A. Create Eco-Friendly Zones with Green Buffers

Abu Dhabi's green parks play a crucial role in reducing urban temperatures. Building on the success, green buffers of dense vegetation can act as natural air filters, especially if placed in proximity to Abu Dhabi's schools, day care centers, and health care institutions. These buffers, consisting of native trees and shrubs, absorb pollutants and provide a barrier against traffic emissions. The buildings themselves would feature green roofs and walls, further enhancing air quality and providing additional green space for children. Eco-friendly pathways would connect these green zones to nearby parks, encouraging walking and cycling while reducing vehicular traffic and protecting children from air pollution.

B. Introduce Renewable Energy-Powered Public Spaces

Spaces such as plazas and playgrounds powered entirely by renewable energy sources such as solar panels and wind turbines can strike a balance between environmental protection (reducing greenhouse gas emissions) and providing play opportunities. These playgrounds include kinetic play equipment that generates energy as children play, powering interactive educational displays and lighting. The playgrounds also feature shaded areas with solar-powered cooling systems to provide comfortable play environments during hot weather.

85   IQAir website (accessed 2024).
86   World Health Organization estimates, as reported by Human Rights Watch (2023).
87   Human Rights Watch (2023).
88   Garcia-Marcos (2022). "The burden of asthma, hay fever and eczema in children in 25 countries: GAN Phase I study."
89   Abu Dhabi Environment Agency (2023).
90   Abu Dhabi Media Office (2023).
91   The Guardian (2023).

2. NUTRITIOUS AND SUSTAINABLE PRACTICES

Urban children are more likely to consume diets higher in fats and sugars and engage in less physical activity, leading to increased rates of obesity, diabetes, and cardiovascular diseases from a young age.[92] Not only does poor nutrition impact physical health, but it can also exacerbate poor behavior, such as aggression in school and daycare.[93] In contrast, better access to markets with varied foods and fresh produce improve nutritional habits and outcomes for children and families.[94] Given the far-reaching developmental implications of nutritional access, urban design and policies should ensure that food services and supply chains foster healthy and sustainable eating habits and norms.

City officials can enact zoning laws that limit fast-food outlets near schools and promote the establishment of grocery stores, thereby improving children's access to healthy food and reducing childhood obesity rates.[95] This approach not only curbs the availability of unhealthy food options but also encourages healthier eating habits among children. In London, a total ban on fast-food takeaways opening within 400 meters of schools was introduced in 2017 to combat childhood obesity. A survey of more than 2,400 children showed that 27% would not bother buying takeaway if they had to walk for more than eight minutes, while 37% said they would only visit fast-food shops after school.[96] This effort is complemented

by the Healthier Catering Commitment, a voluntary scheme for restaurants that ensures the reduction of saturated fat, salt, and sugar in the food sold on their premises.[97]

Other policy tools include the promotion of healthy eating programs throughout the city, using schools and existing infrastructure to deliver and market healthy foods.

Meal programs that provide healthy meals in schools and daycare centers can significantly improve children's nutrition. Amsterdam's Healthy Weight Approach serves as a prime example of this strategy. To address rising childhood obesity rates—in 2013, one in five children in the city were found to be obese—the initiative has implemented several measures. These include banning the marketing of unhealthy food products to children at sports events and developing the Jump-in program, which helps schools enforce healthy food mandates, and affects more than 25,000 school children. By 2018, the BMI of 0–10-year-olds in the city decreased to just 5% above the national average.[98] These projects can also benefit from including parents and caretakers, as the likelihood of healthy eating increases when children are involved in the preparation of their meals. Van der Horst's research on children aged 6 to 10 shows a 76% increase in the consumption of salad by children who prepare their meals with their parents.[99]

92   Gracey (2002). "Child health in an urbanizing world."
93   Ferguson et al. (2013). "The physical environment and child development: An international review."
94   Hirvonen et al. (2017). "Children's diets, nutrition knowledge, and access to markets."
95   Ashe (2003). "Land Use Planning and the Control of Alcohol, Tobacco, Firearms, and Fast Food Restaurants."
96   BBC (2017).
97   Association of London Environmental Health Managers website (accessed 2024).
98   Amsterdam Municipality website (accessed 2024).
99   van der Host (2014). "Involving children in meal preparation. Effects on food intake."

Given the potential for improved eating habits when children are involved in meal preparation, having children contribute to urban agriculture and community farming initiatives is equally promising. Besides improving food security and sustainability, research shows that community gardens are associated with a 24% increase in fruit and vegetable intake for those that take part.[100] These initiatives can be specifically tailored for young children, as seen in Kulang, a town in Malaysia. Through its community farm, "Eats, Shoots & Roots," Kulang aims to foster a love for growing food in early childhood. Fueled by parents' concerns over their children's eating habits, the program has introduced urban farms on the grounds of six preschools and five primary schools since 2018.[101]

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The importance of making healthy and nutritious food available to children is recognized by Abu Dhabi officials and has been the topic of numerous urban and behavioral initiatives. These projects address the city's sub-par health and nutrition statistics: 17% of children aged 6 to 17 suffer from obesity[102] and only 44.3% of infants below the age of six months are exclusively breastfed[103] (the WHO recommendations weaning babies only after they pass six months of age). Additionally, research shows that less than half of children aged 6 to 23 months meet the minimum meal frequency recommended by experts, with many children being fed snacks containing sugar in between meals.[104] In light of these statistics, Abu Dhabi has undertaken several ambitious projects. These include the introduction of the National Nutrition Strategy (2022–2030), which aims to improve overall nutritional standards by controlling advertisements targeting children and unifying guidelines in school canteens across the country.[105] Additionally, a nutritional guide for parents has been prepared to advise on the requirements of balanced diets for children.[106] Furthermore, regulatory laws promoting sustainable agriculture and food security measures have been drafted under the National Food Security Strategy 2051, supported by the Emirates Council for Food Security.[107] These comprehensive initiatives reflect Abu Dhabi's commitment to enhancing the nutritional well-being of its residents.

Abu Dhabi can also:

A. Make Interactive Urban Farming Centers the Future of Abu Dhabi's Food Security

Interactive urban farming education centers located throughout Abu Dhabi can be specifically designed for young children, featuring small-scale farms where they can learn about growing their own food. The centers would include hands-on activities such as planting seeds, tending to crops, and harvesting produce. Children can take part in cooking classes that teach them how to prepare healthy meals using the food they've grown. The centers could also offer workshops for parents on how to plant and tend home gardens and cook for a balanced diet, thereby improving the city's food security and increasing the availability of fresh produce for all residents.

B. Launch a Fleet of Mobile Nutrition Education Units

Mobile units—perhaps called "Nutri-Mobiles"—traveling through Abu Dhabi's neighborhoods, equipped with kitchens and interactive learning stations, could bring nutrition education directly to communities. Nutri-Mobiles would offer cooking demonstrations, hands-on cooking classes for children and parents, and nutrition workshops. Each visit would include activities tailored to young children, such as making healthy snacks and learning about the food groups through games and storytelling. Nutri-Mobiles would also distribute breastfeeding guides and resources, healthy food samples, and recipe booklets to encourage families to try new, nutritious foods at home.

[100] Litt et al. (2011). "The Influence of Social Involvement, Neighborhood Aesthetics, and Community Garden Participation on Fruit and Vegetable Consumption."
[101] Free Malaysia Today (2024).
[102] Gulf News (2022).
[103] Taha et al. (2018). "Patterns of breastfeeding practices among infants and young children in Abu Dhabi."
[104] Taha et al. (2020). "Complementary feeding practices among infants and young children in Abu Dhabi, United Arab Emirates."
[105] Gulf News (2022).
[106] Early Childhood Authority (2023).
[107] Emirates News Agency (WAM) (2023).

3. NATURE AND ACTIVE SPACES

Nature and open spaces that provide safe and creative play opportunities are consistently considered the most important urban design feature of child-friendly cities[108] and are associated with improving social and emotional skills among children.[109] Access to nature spaces contributes to improved physical health, as highlighted by research conducted by Wolch et al. The research done on children aged 9 to 10 shows a negative correlation between the distance to the nearest green space and the child's home and their Body Mass Index (BMI), a measure of pediatric obesity. The research suggests that placing green spaces at a 500-meter radius from children's homes leads to optimum health results.[110]

Research shows that creating public spaces such as parks, playgrounds and pedestrian streets within walking distance of residential areas and integrating nature more broadly across the public realm encourage outdoor play and physical activity.[111] For example, Zurich has put in place effective urban planning policies that prioritize access to green spaces, ensuring that all residents are within just 300 meters of high-quality green parks.[112] These parks and playgrounds are designed with young children in mind, featuring playgrounds, sandpits, water play areas, and safe walking paths. Research indicates that

implementing programs that promote the use of green spaces, such as organized sports and outdoor educational activities, can improve children's engagement with nature, leading to enhanced mental health and social skills.[113] Moreover, a study published in 2020 analyzing more than 600 Belgian students aged between 10 and 15 found that a 3% increase in the greenness of their neighborhood raised their IQ scores by an average of 2.6 points and resulted in a 2.0-point reduction in behavioral problems.[114] As such, creating diverse and engaging play areas that cater to various age groups can enhance children's physical and social development. Santiago's Bicentennial Children's Park is a precedent for thoughtful urban design that prioritizes children's engagement and access to adequate green space. The park integrates the city's topography into an interactive playground featuring 60 slides, water features, and swings.[115] This innovative design addresses the scarcity of green public spaces in the city— Santiago offers only 4 square meters of public space per inhabitant, compared to London's 44 square meters[116]— while ensuring safe and engaging play opportunities for children. Additionally, the park offers amenities such as coffee shops, flower shops, and a kiosk, along with storage facilities for essential items and equipment.[117] This initiative not only provides a top-notch playground for children but also acts as a catalyst for social equality, enhancing the quality of life for many Santiago residents.

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[108]   Wilhelmsen et al. (2023). "Developing child-friendly cities: Young children's participation in urban planning."

[109]   Johnstone et al. (2022). "Nature-Based Early Childhood Education and Children's Social, Emotional and Cognitive Development: A Mixed-Methods Systematic Review."

[110]   Wolch et al. (2011). "Childhood obesity and proximity to urban parks and recreational resources: a longitudinal cohort study."

[111]   Cohen et al. (2006). "Public Parks and Physical Activity Among Adolescent Girls."

[112]   Browning et al. (2024). "Measuring the 3-30-300 rule to help cities meet nature access thresholds."

[113]   McCurdy (2010). "Using Nature and Outdoor Activity to Improve Children's Health."

[114]   Bijnens et al. (2020). "Residential Green Space and Child Intelligence and Behavior Across Urban, Suburban, and Rural Areas in Belgium: A Longitudinal Birth Cohort Study of Twins."

[115]   Landezine (2023).

[116]   Wallpaper magazine (accessed in 2024).

[117]   Rethinking The Future (2022).

THE CASE OF ABU DHABI

Despite the proven benefits of nature spaces, most cities tend to fall short on providing adequate access to them. Research from the Barcelona Institute for Global Health reveals that 62% of Europeans live in areas with less nature and green space than recommended by the WHO.[118] This is also the case in Abu Dhabi, where official statistics show that there is only three square meters of green space per resident,[119] three times lower than the nine-square-meter standard set by the WHO.[120] Recognizing these shortcomings, the city has set impressive goals. Abu Dhabi plans to open 150 new parks throughout 2024, equipped with smart features such as free internet, smart sensors, and AI-powered management systems.[121] Additionally, research on the urban benefits of nature and green spaces is being conducted, exemplified by Mohamed Bin Zayed University's AI-backed study on Masdar Park's mitigation of the urban heat island effect, which has reduced temperatures by 2.2°C in the surrounding area.[122] The city has also designed and opened Al Fay Park, the first public park designed to reflect the local environment and ecology.[123]

A survey conducted by Masdar (500 respondents were interviewed, 72% of which are Abu Dhabi residents) reveals that 28% of Abu Dhabi residents who don't visit parks regularly cite the lack of nature and green spaces as the primary reason preventing them from doing so, followed closely by the lack of facilities and long travel distances to available parks.[124] Further insights from the survey show that most residents visit nature public spaces to relax, enjoy nature, and spend time with friends and family, underscoring the need to increase access to green areas that can serve as community spaces for families and their children.

As such, Abu Dhabi can:

A. Inject Greenery Into the City Using Vertical Playgrounds and Urban Green Towers

Urban Green Towers can be designed to maximize green space in Abu Dhabi's high-density areas, with each floor featuring terraced gardens and play areas with slides, climbing structures, and interactive water features specifically designed for young children. The towers would be connected by sky bridges that provide safe, elevated pathways from which families can explore the greenery. These vertical playgrounds not only offer unique play experiences but also offer relief from the urban heat island effect and improve air quality. It's important to note, however, that these towers will require design adaptations to address the hot climate and limited water resources, such as passive cooling systems, greywater recycling, water-efficient irrigation techniques, and hydroponic or aeroponic systems to maintain greenery while conserving water.

B. Introduce Community-Centric Smart Parks with Interactive Play Areas for Families

Community-centric smart parks with interactive play areas can adapt to children's needs, with sensor-embedded equipment that adjusts based on age and abilities. A family-friendly obstacle course, for example, could change hurdles and tasks to suit all ages. Interactive screens offer educational games about nature and the environment. These parks ensure inclusive, engaging, and fun play for everyone in a safe, stimulating space.

[118]   Barcelona Institute for Global Health website (2021).
[119]   Based on data from the UAE Federal Competitiveness and Statistics Centre (accessed 2024).
[120]   World Health Organization (2012).
[121]   Abu Dhabi Media Office (2024).
[122]   Gulf News (2024).
[123]   Abu Dhabi Media Office (2021).
[124]   The National (2020).

06
CHAPTER

Feeling of Safety

1. SAFE STREETS AND CROSSINGS

According to UNICEF, road traffic injuries are a significant threat to young children. In 2022, nearly 220,000 children and adolescents aged 0 to 19 years died due to road traffic injuries. For younger children, especially those aged 0 to 8, these injuries are particularly preventable with proper safety education and interventions.[125] Research shows that urban interventions have the potential to decrease near-school pedestrian injuries by up to 44%, illustrating how infrastructure improvements such as sidewalks, bicycle lanes, and safe crossings can have life-saving benefits.[126] Current urban transport system limits the independent mobility of children, decreasing access to the city's amenities and stunting their development and growth.[127] To address the shortcomings and risks of urban mobility, safety measures and artificial intelligence can converge to ensure urban areas provide adequate levels of protection against harms of all sorts. Interactive crosswalks and driver monitoring systems, are not fictional concepts but impending reality for many of the world's cities.

Sweden has developed a Vision Zero policy aimed at eliminating all traffic fatalities and severe injuries through reduced speed limits, the redesign of roadways to prioritize pedestrian safety, and the strict enforcement of traffic laws. The initiative also includes creating pedestrian-only zones in urban areas and installing safe crossing points with raised crosswalks, pedestrian signals, and speed bumps near schools and playgrounds, all of which have been associated with a 53-60% reduction in the rate of child pedestrian injuries.[128]

The creation of the Safe Routes to School (SRTS) program by the US Congress successfully encouraged active transportation for school children across different states, increasing walking and biking by 31% and reducing traffic-related injuries by 44%.[129]

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125   UNICEF (2023).
126   Audrey & Batista-Ferrer (2015). "Healthy urban environments for children and young people: A Systematic review of intervention studies."
127   Shaw et al. (2015). "Children's Independent Mobility: an international comparison and recommendations for action."
128   Tester et al. (2004). "A Matched Case–Control Study Evaluating the Effectiveness of Speed Humps in Reducing Child Pedestrian Injuries."
129   McDonald (2014). "Impact of the Safe Routes to School Program on Walking and Bicycling."

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Between 2008 and 2018, road accidents were the leading cause of child deaths in the UAE, accounting for over 60% of fatalities among children under nine.[130] The emirate has therefore taken serious steps to reduce road deaths, lowering the number of accident fatalities from 8.85 per 100,000 in 2013 to 4 per 100,000 in 2023.[131] These initiatives include the installation of AI-powered traffic cameras to monitor pedestrian crossings in 2023,[132] the enforcement of a "holistic seat belt" law in 2017 requiring children under four to use suitable car seats, and the publication of the "Safety of Children in Vehicles Guide" in 2024.[133] The city has also been championing the development of pedestrian-only neighborhoods to increase the safety of children and families. The Sustainable City, built by Aldar on Yas Island, is a community where all internal roads are exclusively car-free which allows children to play freely and explore the various elements of the neighborhood safely. Despite these measures, there has been a recent 5% increase in traffic injuries, including pedestrian accidents, reaching 1,850 in 2023.[134] Abu Dhabi has yet to achieve its 2021 target of reducing fatalities to just 3 per 100,000 citizens.[135]

To build on existing efforts and reach that goal, Abu Dhabi can:

A. Create Safer Crosswalks and Traffic Lights that Ensure Children's Safety

High-tech crosswalks equipped with motion sensors and LED lights could be positioned around schools and high pedestrian traffic areas. These smart crosswalks detect pedestrians and light up to alert oncoming vehicles. Connected to an intelligent traffic management system, they adjust traffic lights in real time to prioritize pedestrian safety. The AI-powered cameras can extend beyond monitoring and surveillance and can send warnings to drivers and emergency-response teams as needed when potential threats or accidents are detected.

B. Roll Out Driver Monitoring Systems in Private Cars and School Buses

Advanced functions like gaze monitoring and fatigue detection can enhance driver focus and alert authorities to reckless driving, especially when children are in the vehicle. The system can remind drivers to secure young children correctly before starting their journey and help implement ECA's vehicle safety guidelines. Additionally, integrating this system with vehicle-to-everything (V2X) technology allows real-time data sharing between vehicles, alerting bystanders of high-risk drivers and reducing the chance of fatal accidents.

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130   Sheikh Shakhbout Medical City (2022).
131   Abu Dhabi City Municipality (2023).
132   Gulf News (2023).
133   Early Childhood Authority and the Abu Dhabi Public Health Center (2024).
134   The National (2024).
135   UAE government website (accessed in 2024).

2. SAFETY AND SURVEILLANCE SYSTEMS

A range of urban design strategies, supported by empirical evidence, emphasizes the importance of thoughtful design and community involvement in reducing safety risks. By enhancing street lighting, implementing smart security systems, fostering community policing, and creating safe zones, cities around the world are protecting their younger residents and strengthening the social fabric, making them more resilient to the challenges of modern urban life. Additional targeted security measures can be implemented at locations where children spend significant time, such as nurseries, schools, and homes, including secure access control systems, monitored entry points, and surveillance cameras. These measures play a crucial role in protecting children by preventing unauthorized access and ensuring a swift response to potential threats, thereby creating a safer environment for all.

Improved street lighting is a straightforward urban design intervention that can reduce overall crime rates by 21%, which is especially useful for areas surrounding playgrounds.[136] Surveillance systems have the potential to decrease the incidence of crime by as much as 51%, as noted by analyses of CCTV schemes in the US and UK.[137] In London, which has one of the most extensive CCTV networks in the world, cameras are installed throughout the city to monitor public spaces and enhance security. These cameras are connected to centralized monitoring centers where trained personnel can observe live feeds and respond quickly to any suspicious activities.

Police departments have also increasingly adopted predictive policing to forecast criminal activities. This method uses advanced computer systems to analyze extensive datasets, including historical crime data, to optimize police deployment and identify individuals likely to commit or become victims of crimes.[138] The Los Angeles Police Department (LAPD) pioneered this approach in 2008, using a crime forecasting model to direct police patrols to dynamic hotspots, successfully reducing crime rates.[139] The Dubai Police Department also implemented a Crime Prediction Solution, achieving a 25% reduction in major crimes within months of deployment in 2023, highlighting the effectiveness of predictive policing in enhancing urban safety.[140]

Safety-oriented urban design interventions are not limited to passive design elements, but also include active participation of the community and police. One community-based measure is the creation of designated safe zones for children, monitored by volunteers or equipped with emergency tools. Safe zones can significantly enhance security and reduce incidents of harm by 25%, as evidenced by the success of programs like Safe Place.[141] Tokyo, for instance, utilizes the Koban system, which consists of small police stations located throughout neighborhoods. These stations are staffed by officers who are familiar with the local community and are easily accessible to residents. Officers engage with the community through regular patrols and public safety education, and address local concerns, fostering trust and a sense of security.

136   Welsh & Farrington (2008). "Effects of Improved Street Lighting on Crime."
137   Welsh & Farrington (2009). "Public area CCTV and crime prevention: An updated systematic review and meta-analysis."
138   Brennan Center for Justice: Predictive Policing Explained.
139   U.S Department of Justice – Crime Solutions (2022).
140   Arabian Business (2023).
141   National Safe Place Network (2018).

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Abu Dhabi has consistently ranked first on Numbeo's safest cities list since 2017.[142] This achievement is largely due to the city's numerous urban safety measures, including the Safety and Security Planning Manual (SSPM), which integrates various safety protocols such as surveillance, physical security measures, and adequate lighting requirements.[143] Additionally, the installation of the Falcon Eye system, which provides live feeds from surveillance equipment to relevant entities, further enhances the city's safety infrastructure.[144] The launch of the Dama Al Aman Child Protection Policy also plays a crucial role in creating a safe environment for children, protecting them from abuse, and ensuring high-quality social and protection services.[145]

Abu Dhabi can maintain its international edge in protection and surveillance, and can leverage the power of emerging technology and automated measures, in the following ways:

Build Smart, Unmanned Community Safety Hubs, Powered by Digital Patrols

Community Safety Hubs scattered throughout Abu Dhabi's neighborhoods can function as unmanned police stations, featuring digital interfaces where residents can report concerns, access safety information, and request special assistance for child-related concerns. The hubs communicate to police officers and response teams who use digital patrols, employing drones equipped with cameras and sensors to monitor large areas efficiently. These drones can quickly respond to incidents, providing a bird's-eye view and relaying real-time information to ground units.

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142   Numbeo Safety Index by City (2024).
143   Abu Dhabi Urban Planning Council (2013).
144   UAE government website (2016).
145   Early Childhood Authority (2023).

3. EMERGENCY RESPONSE AND PREPAREDNESS

It is essential to create emergency-preparation measures that are tailored to children as their needs are often different than those of adults; not only are they vulnerable to direct trauma but their familial support systems are also subject to disruption.[146] A review of disaster preparedness programs for children and families shows that 70% of them have positive impact on disaster knowledge and behavior, proving the effectiveness of having pre-emptive programs in place.[147]

Adequate training for emergency professionals on dealing with pediatric patients should be a dedicated and essential part of medical training, as research from Taiwan suggests that only 52% of hospital residents and emergency physicians feel confident managing acute pediatric visits, despite the fact that children make up 20 to 30% of all emergency department patients.[148] This lack of confidence highlights the need for specialized training and protocols to ensure the effective treatment of pediatric patients in emergency situations. Seattle's EMS system serves as a benchmark in this regard, as it includes specific protocols for pediatric emergencies. These protocols ensure that paramedics are trained in handling medical situations involving young children, including the use of pediatric-sized equipment and supplies on all emergency vehicles.

Similarly, developing safe evacuation plans that are children-centric is critical, as effective evacuation drills can reduce evacuation times by 40%.[149] For example, Tokyo's disaster preparedness program includes regular earthquake and fire drills designed specifically for young children. These drills are conducted in a calm and educational manner to avoid causing fear, using age-appropriate language and activities. The program also encourages families to create and practice emergency plans that include provisions for the needs of young children, such as emergency contact information, safe meeting points, and supplies like diapers and baby food.

Because most children face lasting consequences after disasters and other emergencies, and access to mental health services remains a challenge due to cost and stigma, it's vital to explore more inclusive interventions that go beyond traditional clinical approaches.[150] One such example is provided by the NGO Save the Children, which develops designated Child Friendly Spaces to give children a protected environment in which to play, socialize, learn, and express themselves as they rebuild their lives in the aftermath of an emergency or disaster. These areas provide care during the restoration of family, community, and social structures. They encourage parents and caregivers to actively participate, share knowledge, offer advice, and build self-confidence in protecting and nurturing children.[151]

146   Danese (2019). "Child and adolescent mental health amidst emergencies and disasters."
147   Ronan (2015). "Disaster preparedness for children and families: A critical review."
148   Chen (2022). "Assessing the effectiveness of pediatric emergency medicine education in emergency medicine residency training: A national survey."
149   National Fire Protection Association (2015).
150   Schonfeld, D. J., et al. (2015). "Providing Psychosocial Support to Children and Families in the Aftermath of Disasters and Crises."
151   Save the Children. (2008). "Child Friendly Spaces in Emergencies: A Handbook for Save the Children Staff."

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The founding of the Abu Dhabi Emergency, Crisis and Disaster Management Center (ADCMC) in 2019 is a testament to the city's commitment to preemptively prepare for urban disasters and catastrophes.[152] This commitment is most evident in several key initiatives: establishing the Automated Crisis Management System, which integrates 18 entities across the city to ensure timely and effective responses during crises;[153] attaining the International Organization of Standardization certification for Abu Dhabi Police's state-of-the-art personnel training and emergency preparation program; and conducting regular drills, exercises, and simulations to ensure readiness across various scenarios, including bad weather. Despite these efforts, recent events such as the severe flooding in the UAE and Oman in April 2024 highlight the need to increase preparation for extreme weather conditions brought about by climate change. The floods—caused by the heaviest downpour ever recorded in the region—resulted in the deaths of 23 people, including 10 children, in the Arabian Peninsula.[154] To further prepare for emergency situations, Abu Dhabi can take the following additional initiatives:

A. Improve Abu Dhabi's Resilience Against Floods through Advanced Emergency Response and Preparedness

Enhancing flood emergency response and preparedness in Abu Dhabi involves leveraging advanced technologies and proactive planning. By integrating real-time flood monitoring, predictive modeling, and early-warning systems, the initiative aims to mitigate the impact of extreme weather events. Comprehensive preparedness plans, including community education, efficient evacuation procedures, and inter-agency coordination, will ensure a swift and effective response to flooding, protecting both people and infrastructure while promoting long-term resilience. Child-friendly communication tools and designated safe routes and shelters will ensure families with children are specifically considered during emergencies.

B. Employ Drone-Assisted Search and Rescue Operations, with Special Training for Pediatric Care

Drones with thermal imaging, GPS, and real-time communication are the new reality of search and rescue missions, improving the rate of success of finding and saving children in disasters. These drones can swiftly locate children in dangerous situations like collapsed buildings, or trapped cars during flash floods, sending live footage and exact locations to rescue teams for faster assistance. They can also air drop emergency supplies to those in hard-to-reach areas, providing crucial help in emergencies. This initiative will need the support of well-trained emergency personnel (doctors, first responders, etc.) that are proficient in pediatric care and treatment.

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152   The Abu Dhabi Emergency, Crisis and Disaster Management Center website (2024).
153   Khaleeji Times (2019).
154   The National (2024).

CONCLUSION

Understanding urban spaces and how they can support children and families is of paramount importance in today's increasingly urbanized world. Urban environments present both opportunities and challenges, highlighting the need to design spaces such as parks, playgrounds, green corridors, and community centers to support the holistic development of children, especially babies and toddlers. As cities grow denser, ensuring access to safe, stimulating environments becomes essential to fostering children's physical, cognitive, and social development, emphasizing the importance of child-friendly urban planning.

The framework presented in this report underscores the importance of catering to the specific needs of young children, their families and future generations. In addition, this is an opportunity for cities to improve the prospects and daily experience of all of their inhabitants. By integrating the four pillars—Engaging and Inclusive, Integrated and Connected, Sustainable and Green, and Feeling of Safety—cities can create a nurturing and supportive environment that fosters healthy lifestyles and stimulates holistic development of the physical, cognitive, and emotional lives of its citizens. These efforts will be enabled by three transformative dimensions—Technology and Innovation, Sustainability, and Play—which are essential in creating dynamic and resilient urban spaces. By analyzing current trends and the existing efforts in Abu Dhabi, and envisioning the Emirate's future development, this report offers a comprehensive overview of the urban landscape from a child's development perspective. Abu Dhabi has the potential to support and enable the immediate well-being of children but also set the foundations for healthy, productive, and happy generations to come.

By prioritizing and designing for the needs of young children and families, Abu Dhabi can serve as a model for other locations worldwide, demonstrating that family-friendly urban environments are both achievable and transformative for today's children and tomorrow's society.

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Aldar is the leading real estate developer, manager, and investor in Abu Dhabi, with a growing presence across the United Arab Emirates, the Middle East and North Africa, and Europe. The company has two core business segments, Aldar Development and Aldar Investment.

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