Kurdish Studies
April 2018
Volume: 6, No: 1, pp 180-187
ISSN: 2051-4883 (Print) | ISSN 2051-4891 (Online)
www.KurdishStudies.net

Submission Date: 12 Jan, 2018
Acceptance Date: 04 feb, 2018
DOI: 10.53555/ks.v6i1.3884

Inclusive Urban Development: The Evolving Role of Architects in a Rapidly Changing World

Ar. Tauseef Rahi[1*] and Ar. Parwati[2]

[1*]Assistant Professor, School of Architecture (ITM University), Gwalior, Madhya Pradesh, India
[2]Assistant Professor, DY Patil School of Architecture, Lohegaon, Pune, Maharashtra, India

***Corresponding author:** Ar. Tauseef Rahi, School of Architecture (ITM University), Gwalior, Madhya Pradesh, India.
Email- tauseefrahi2010@gmail.com

Abstract
As the world's population is growing fast, it is assumed that it will become almost ten billion by the end of 2050 and due to this population increment, the role of an architect is changing dramatically. They not only design buildings and spaces, but also play a key role in sustainable development, socially inclusive progress and in implementation of new technology in the buildings. More than fifty percent of the Indian population will be urbanised by 2050. This research will utilise available trends and data to discuss how architectural practices and our built environment will change by 2050, and put forward an active approach to confront the challenges of the next few decades as multidimensional problems.

Keywords: urban development, sustainable development, social inclusive, new technology, resilient structure

Introduction

The world is facing huge challenges on the issues of climate change, fast-growing cities, new innovations in technology and changing the perception of society. Earlier, architects used to design buildings aesthetically, but these days, they are also working on green buildings, sustainable development, social equality, and technology integration in their design.
This is the turning point in global development. By the year 2050, the proportion of the urban population in the world would exceed 68%. The rural population of the world has grown slowly since 1950 and is expected to reach its peak in a few years. The global rural population is now close to 3.4 billion and is expected to rise slightly and then decline to 3.1 billion by 2050. Africa and Asia are home to nearly 90% of the world's rural population in 2018. India has the largest rural population (893 million), followed by China (578 million) (UN DESA). In India, more than half of the population will be in the cities and as a result, it will put pressure on cities, their facilities and services. Previously, architects were considered only as building designers, but now architects also get to be recognised for their wider ability to build resilient and inclusive environments that can adapt to climate change. There are positive and negative consequences of this rising population as far as the development of urban areas is concerned.

1. Aim and Objectives

This research intends to examine the work of the architects, Planners and other Professionals in city development so that urban growth will gradually result in equal access to urban resources and other facilities for every person by the end of 2050. This resulted in the development of four objectives. These are as follows:

i. To explore the responsibilities of the architects and planners in the planning and design of urban spaces by the year 2050.

ii. To identify various key challenges to achieve inclusivity in urban design for all genders, including the economically weaker section and the differently abled.

iii. To evaluate and examine the role of inclusive design in urban areas, whether it improves the quality of life and social inclusion of users by the end of 2050.

iv. To suggest optimal design practices in achieving an accessible, equitable, and inclusive environment for everyone.

2. Methodology

This research paper has a mixed-methods approach integrating both qualitative and quantitative techniques to address the possible issues which the world will face by the end of 2050. The methodology is totally based on literature review, data analysis and synthesis.

3. Literature review

Recent studies in architecture show the importance of sustainability and social responsibility. According to the survey conducted by the American Institute of Architects (AIA), 75% of the people think that sustainability is a key factor in design decisions (AIA 2018). It is also seen in the report published by the World Green Building Council that buildings designed with sustainability can save up to 30% of electricity and up to 50% of water (World GBC, 2018).

According to the United Nations, India is expected to have 416 million more city dwellers by the year 2050. This sudden population growth tells the level of strains on existing urban buildings, which would create issues like housing shortage, traffic congestion, pollution, including an increase in global warming (Table 1).

Year	Urban Population (%)	Housing Units Needed (millions)
2020	56	1500
2030	61	1800
2040	65	2100
2050	68	2500

Table 1: Urban Population Growth and Housing Demand projection (2020-2050) |Source: UN

Those who migrate from rural to urban areas usually live in informal housing lacking basic services, amenities and security, with barriers in accessing public spaces and facilities, especially for differently-abled and senior citizens.
This rapid urbanisation and demographic shift show complex challenges:

- The global urban population are set to increase by a total of 2.5 billion by the end of 2050, where 85% of this growth is expected to take place in Asia and Africa (UN DESA, 2018) (Table 2).

- 16% of the world's population will be aged 65 years and above by the end of the year 2050 (UN, 2018).

Region	Urban Population (2018)	Projected Urban Population (2050)
North America	82%	89%
Europe	75%	84%
Asia	50%	64%
Africa	43%	59%

Table 2: Projection of Urbanisation Growth by Region (2018-2050) |Source: UN DESA (2018)

Such shifts in urbanisation suggest the architects to design a flexible urban environment for both mixed-use developments and inclusive environments to embrace various age groups and cultures (Figure 1).

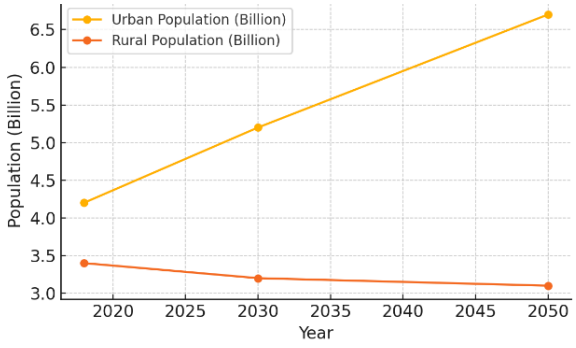

Figure 1: Urban vs Rural population projection (2018-2050) |Source: UN DESA (2018)

3.1 Statistical Projections of expected issues by 2050

- **Urban Population**: The population increased by 34% in 2018 to more than 50% by 2050, representing an increase of 416 million people (Figure 2).

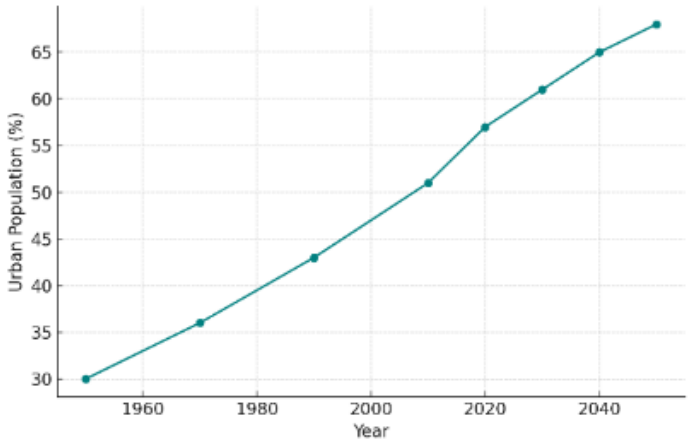

Figure 2: Global Urban Growth (1950-2050) |Source: UN DESA (2018)

- **Housing Demand**: Chronic shortage of 18.78 million units of urban housing- this increases by as much as 35 percent by the end of 2050 (Figure 3).

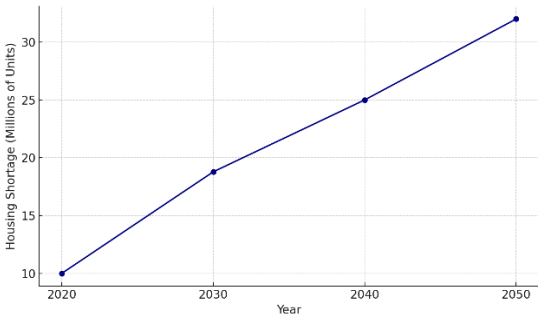

Figure 3: Projected Urban Housing Shortage (2020-2050) |Source: UN DESA (2018)

- **Public Transport**: In 32 years (by 2050), demand for inclusive means of transport is projected to rise by 150 per cent.
- **Climate Impact**: Urban areas will experience a temperature rise of 2-3°C, which increases the demand for climate-responsive urban design.
- **Greenhouse Gases:** Global greenhouse gas emissions need to be reduced by 43% to limit global warming to 1.5 °C (IPCC).
- **Rise in Sea Level:** According to the Intergovernmental Panel on Climate Change (IPCC) report, sea levels could rise by up to 1 meter by 2100, threatening coastal cities. By 2050, an estimated **1.4 billion people** may be displaced due to climate-related events (UN Department of Economic and Social Affairs) (Table 3).

Year	Sea Level Rise (cm)	Coastal Displacement (million)
2020	0	0
2030	10	100
2040	30	300
2050	50	490

Table 3: Projected Sea Level Rise and Coastal Displacement (2020-2050) |Source: IPCC, UN DESA

- **Carbon Emissions:** Existing buildings are responsible for emitting about 39% CO_2 on the Earth (World Green Building Council). The built environment plays a major role in climate change, where it is estimated to contribute up to 39% of global carbon emissions (existing buildings – 28%, construction processes – 11%) (Table 4).

Sector	Percentage of Total Emissions
Building Operations	28%
Construction	11%
Transportation	24%
Industry	21%
Agriculture	9%
Other	7%

Table 4: Global Carbon Emissions by Sector |Source: WGBC (2017)

Architects will need to design buildings and spaces that can resist and adapt to the impacts of abrupt climate change, including a rise in sea levels. They will deal with technological advancements in building design and issues related to the environment by 2050.

- **Depletion of Natural Resources:** By 2050, global demand for construction materials such as steel, cement, and timber is projected to increase by **70-80%** (World Resources Institute). This will lead to increased costs and environmental degradation.

Urbanisation significantly contributes to the Urban Heat Island (UHI) effect by replacing natural landscapes with concrete and asphalt, resulting in temperature rises of up to 7°C in urban areas compared to their rural areas. This increase in temperature leads to an increase in energy demands for cooling. In addition, the decline of green cover is evident in cities like Pune (India), which has experienced a 34% reduction in carbon sequestration capacity from 2013 to 2018 due to urban sprawl. This loss of green spaces not only diminishes the city's ability to mitigate flooding but also contributes to biodiversity loss, underscoring the environmental challenges posed by rapid urban development.

4. Findings and Discussion

By 2050, the role of an architect in shaping the world will likely evolve significantly with the integration of technology, climate change imperatives, and shifting social needs. Here's a breakdown of the anticipated roles and responsibilities:

4.1 Embrace High-Density and Mixed-Use Design

Urban infill and vertical living are essential strategies for maximising limited land resources by focusing on the design of taller buildings, infill developments, and the adaptive reuse of existing structures. This approach not only optimises space but also promotes sustainability. Additionally, the creation of mixed-use communities, which integrate residential, commercial, and recreational spaces, fosters walkable neighbourhoods that significantly reduce urban sprawl and dependence on cars. By intertwining these elements, we can create vibrant, interconnected environments that enhance the quality of life for residents while making efficient use of available land.

4.2. Public Transport:

4.2.1 Sustainable and Resilient Design Leader

By 2050, architects won't just design structures—they'll shape how people move, interact, and live. Their role in public transport will be central to building inclusive, climate-positive, and technologically integrated societies.

- **Net-zero transportation hubs:** Architects will lead in designing carbon-neutral transit infrastructure using renewable materials, energy-efficient systems, and passive design.

4.2.2 Urban Integration and Mobility Strategist

- **Seamless urban fabric:** Architects will ensure public transport infrastructure blends with housing, workspaces, and green areas, reducing dependence on cars.

- **Multi-modal hubs:** They will design hubs that connect high-speed rail, e-bikes, vehicles, and pedestrian routes in a single ecosystem.

- **15-minute cities:** Contributing to city planning that ensures all essential services are within a short walk or ride, reducing transit demand.

Cities will show high-density mixed use with better connections to public transport and green corridors. Walkable neighbourhoods can reduce vehicle movement travelled by **up to 40%** (EPA).

- **Promoting Mixed-Use Development**: Integrating the design of neighbourhoods in such a way that the residents, the commercial spaces, and the recreational spaces are all contained in one space to promote socialisation and minimise the lengthy commutes.

4.3 Climate Impact

Urban sustainability will be the priority:

- Up to 30% of Energy-efficient buildings are expected in new urban construction by 2050 (IEA, 2018).

4.4 Rise in Sea Level

4.4.1 Designing Resilient Structures

To address the challenges posed by flooding, it is essential to utilise elevated design strategies, such as stilts and floating buildings, which help protect structures from rising water levels. Up to 80% of damage caused by floods in urban areas could be minimised with the use of nature-based solutions such as wetlands and green roofs (World Bank, 2017). The concept of dynamic building envelopes with modular constructions in urban areas should be considered.

Additionally, incorporating flood-resistant materials and techniques into the design can further enhance resilience against water damage. It is also important to plan for various scenarios based on site-specific risk levels, whether that involves retreating from vulnerable areas, accommodating potential flooding, or implementing protective measures to safeguard the built environment.

4.4.2 Urban and Regional Planning

To address the challenges faced by vulnerable coastal areas, it is essential to collaborate with city planners, architects and engineers to implement effective zoning strategies. Advocating for the establishment of buffer zones, wetland restoration, and the integration of green infrastructure will play a crucial role in absorbing storm surges and mitigating flooding risks.

Additionally, it is important to influence the relocation and redesign of critical infrastructure, including hospitals, transportation systems, and utilities, to enhance resilience against climate-related threats and ensure the safety and well-being of communities.

4.5 Carbon Emissions

Achieving net-zero and carbon-negative design will be the main aim of the architects. These designs will be achieved by incorporating the concept of passive design strategies like the use of renewable energy, energy-efficient techniques, and biophilic design. Adaptive reuse and the use of recycled materials will become best practices in building design. Green infrastructure, like green building and vertical garden concepts, will play a vital role in urban resilience techniques to absorb 30 tons of $\mathbf{CO_2}$ per hectare per year. Figure 4 projects the growth in green building certifications till 2025.

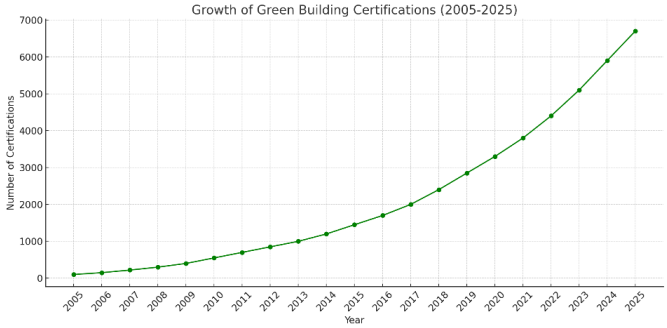

Figure 4: Growth of Green Building Certifications (2005-2025) |Source: WGBC

The adoption of recycled and bio-based materials is expected to rise by **50-60%** by 2050, but current production capacities are insufficient, creating challenges in supply chain management.

- **Sustainable Practices**: Including green building practices and a sustainable urban drainage system to reduce environmental effects and enhance living standards.

4.6 Technology Integration

Architects will deal with technological advancements in building design and issues related to the environment by 2050. According to the current scenario:

To improve the performance and efficiency of buildings, Architects will integrate the use of BIM, artificial intelligence, parametric design, AI-powered generative design, and IoT in their design techniques to offer a comfortable experience to the users. The use of these techniques will revolutionise the architectural processes. The following data gives a tentative idea about the benefits of the use of these techniques.

- 90 % of the major constructions will adopt Building Information Modelling (BIM) by the year 2030 (Allied Market Research, 2017) (Figure 5).

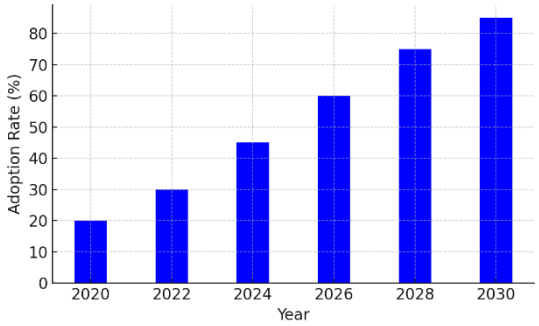

Figure 5: Adoption of BIM Across the Globe (2020-2030 Projection) |Source: Allied Market Research (2017)

- The market for 3D printing construction is estimated to be $1.4 billion in 2018 and will continue to increase to $5.3 billion by 2030 (Grand View Research, 2017).

This data shows the increase in the use of 3D printing in construction (Table 5).

Technology	Cost Reduction	Time Saving	Emission Reduction
3D Printing	30%	50%	60%
Modular Construction	20%	40%	35%

Table 5: Increase in 3D printing in construction (2018-2030) |Source: Grand View Research (2018)

Moreover, smart buildings equipped with IoT allow reducing the use of energy by 30% percent, enhancing the operational efficiency.

4.7 Inclusive Planning

Buildings will be designed with the objectives of enhancing social equality, accessibility and inclusivity with public spaces and community facilities (Figure 6).

These can be achieved by adopting the following parameters in the design criteria:

- **Designing Accessible Infrastructure**: Making sure buildings, streets and modes of transport are easily accessible to all age groups, including the differently abled.

- **Creating Safe Spaces by the use of technology**: Installation of facilities like sufficient lighting, CCTVs, and IBMS to create safe spaces for all.

- **Gender sensitive design:** to promote safety, particularly for women and children. About 70% of architecture firms say that they are developing partnerships with data analysts, ecologists, and social scientists (AIA Futures Survey).

Figure 6: Concept Diagram of an Inclusive City Layout featuring mixed-use neighbourhoods, accessible public transit hubs, green spaces, and modular housing clusters.

4.8 Advocacy and Ethics

Participatory design processes will ensure that developments are equitable and contextually appropriate. Community engagement processes are more than **61%** of new building projects in developed countries (World Bank, 2016).

4.9 Education and Skills

Architectural education must evolve:

- Over **65%** of architecture schools are integrating sustainability and digital literacy into core curricula (Royal Institute of British Architects).

Learning programs based on climate resilience, Artificial Intelligence and ethics will be crucial, seeing the current scenario.

4.10 Social Inclusion through Design

The idea of social inclusion in urban design defines how spaces are interconnected to each other and usable by various categories of users for all age groups. Key principles include:

- **Universal Design**: Developing the environments that are designed to accommodate individuals with differently abled without any adaptation (Figure 7).

- **Participatory Planning**: Engaging the community in the planning to make sure that community needs and preferences are taken into consideration during the planning process.
- **Equitable Distribution of Resources**: Ensuring that amenities like parks, schools and health care facilities are evenly distributed in all the socio-economic zones.

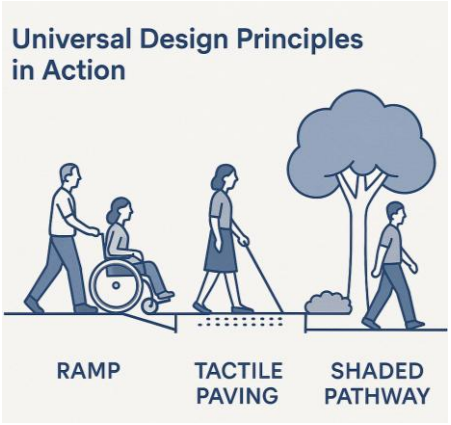

Figure 7: Universal Design Principles in Action – street sections illustrating ramps, tactile paving, and shaded pathways for inclusive mobility.

4.11 Smart and Responsive Spaces

The building performance will be optimised through smart technologies.

- The global adoption of smart buildings is expected to reach $201 billion by 2030 (Markets and Markets, 2018).

Sensors and AI will make buildings dynamic in meeting the users' needs in response to various environmental conditions, and it will improve energy consumption, as well as indoor comfort.

4.12 Future Design Innovations for 2050

To achieve the goals of inclusive urban development, future design could include:

- **AI-Powered Urban Management**: The use of artificial intelligence in monitoring urban infrastructure, predicting maintenance needs and optimization of the resource distribution to underserved areas.

- **Modular construction**: Introducing prefabricated and modular housing units to swiftly shelter migrants and low-income citizens.

- **Augmented Reality (AR) Navigation Systems**: AR helps differently abled persons in navigating urban spaces through AR-enabled applications in various electronic gadgets.

- **Climate-Responsive Urban Design**: Designing climate-responsive urban design, shaded pedestrian routes, vertical gardens and green roofs to overcome urban heat and enhance comfort for the users.

- **Smart Inclusive Playgrounds**: Smart Inclusive Playgrounds: Designing interactive, technology-oriented play grounds that are suitable for all types of children, encouraging social integration (Figure 8).

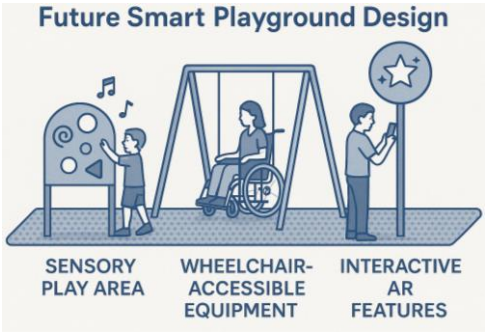

Figure 8: Future Smart Playground Design integrating sensory play areas, wheelchair-accessible equipment, and interactive AR features.

4.13 Policy Framework

India has approved various frameworks for the development of urban areas in an inclusive manner, i.e., Smart Cities Mission, Accessible India Campaign, and the legislation of the Rights of Persons with Disabilities Act, 2016. However, Successful implementation seems difficult due to political barriers and funding constraints.

5. Conclusions and Recommendations

As India is moving into an era where more than half of the population may be living in urban areas by 2050, the relevance of inclusive urban planning cannot be overlooked. Architects, planners and environment professionals are at the front leading

this transformation and play an important role in creating sustainable and socially inclusive cities. Their involvement is not only confined to physical structure, but also determines how people interact among themselves and with the spaces.
Inclusive urban environments play a crucial role in bringing equity and dignity to all groups of people, such as economically weaker section migrants, people with disabilities, senior citizens, women, and children.

Urban spaces are created with the concept of inclusivity to remove barriers, promote accessibility, and enhance the quality of the user's life. This involves the design of public spaces which are friendly, accessible, and safe by providing an interconnection between transport and infrastructure.

The built environment is a major tool of social inclusion. It has the potential to bridge the societal gaps, increase interaction and help to build resilient communities. In this regard, the responsibility of architects is not confined to aesthetic design but also towards a human-centred development. Inclusivity in urban planning and design helps to create cities which would serve the needs of all, creating a path towards a more equitable and harmonious urban future.

6. References

1. 2018 | Department of Economic and Social Affairs. (n.d.). https://www.un.org/development/desa/dpad/2018/
2. The American Institute of Architects. (n.d.). AIA Home. https://www.aia.org/
3. International Energy Agency et al., "2018 Global Status Report Towards a zero-emission, efficient and resilient buildings and construction sector," 2018.
4. United Nations. (n.d.-a). 2018 Revision of World Urbanization Prospects | United Nations. https://www.un.org/en/desa/2018-revision-world-urbanization-prospects
5. United Nations. (n.d.-b). United Nations | Peace, dignity and equality
on a healthy planet. https://www.un.org/uk
6. Global warming of 1.5 oC —. (n.d.). Global Warming of 1.5 oC. https://www.ipcc.ch/sr15/
7. Centre for Study of Science, Technology and Policy (CSTEP), J, A., Venkata Ramana, S., M S, P., & S, V. (2017). Sea level rise scenarios and inundation maps for selected Indian coastal cities. In CSTEP (Ed.), CSTEP [Report].
8. Embodied Carbon - World Green Building Council. (2018, January 16). World Green Building Council. https://worldgbc.org/climate-action/embodied-carbon/
9. World Resources Institute - Research for People & Planet. (2017, Decemebr). World Resources Institute. https://www.wri.org/
10. NUTP, Roy, P., Sachdeva, P., Gandhi, S., Arora, A., Varma, R., Sheth, Y., Sharma, S., Jawed, F., Interface for Cycling Expertise (ICE), Aggarwal, A., Samarthayam, Transport Research And Injury Prevention Programme (TRIPP), IIT Delhi, Choudhury, A. R., Centre for Science and Environment, Hingorani, A., Oasis Designs, Inc., INTACH, Delhi Chapter, . . . Lall, N. (2010). Street Design Guidelines. UTTIPEC, Delhi Development Authority, New Delhi.
11. International Energy Agency (IEA). (n.d.). Energy.gov. https://www.energy.gov/ia/international-energy-agency-iea
12. World Development Report 2017: FINANCE for an Equitable Recovery. (n.d.). World Bank. https://www.worldbank.org/en/publication/wdr2017
13. Allied Market Research, https://www.alliedmarketresearch.com/. (n.d.). Building Information modeling market size, share, competitive landscape and trend analysis Report, by component, by deployment mode, by building type, by application, by End-User : Global Opportunity Analysis and Industry Forecast, 2017 - 2018. Allied Market Research. https://www.alliedmarketresearch.com/building-information-modeling-market
14. 3D Printing Construction Market Size & Share Report, 2017. (n.d.). https://wwdesaw.grandviewresearch.com/industry-analysis/3d-printing-constructions-market
15. The American Institute of Architects. (2017, January 23). AIA Firm Survey Report 2017. https://www.aia.org/resource-center/aia-firm-survey-report
16. PPIAF, Jamieson, J., & Germany. (2018). Annual Report 2016. https://documents1.worldbank.org/curated/en/099433011162311647/pdf/IDU002e5d5a10eb5e047280aaf2088a5c6f0f2f4.pdf
17. Royal Institute of British Architects. (n.d.). https://www.architecture.com/
18. Smart Buildings Market Size, Trends & Growth Drivers | MarketsandMarkets. (n.d.). MarketsandMarkets. https://www.marketsandmarkets.com/Market-Reports/smart-building-market-1169.html