Executive Summary

In this paper, we examine some of the prominent trends and technologies that are affecting the real estate industry, describe innovative solutions that are being deployed and explore new models that could become major business disruptors.

Chapter 1 begins by analyzing the main demographic trends that will affect the demand for housing:

• Immigration: In the near future, the increase in the number of housing units will be determined by the arrival of foreign citizens and their offspring. Metropolitan areas that have larger inflows of foreign populations will unambiguously experience higher average housing prices and rents.

• Aging: Numerous innovations will permit a growing elderly population to age in place. For seniors with more intensive care requirements, we forecast a move away from isolated, stand-alone assisted-living facilities and toward residences that are more integrated with their communities. As a consequence of an aging population, we expect robust real estate development of hospitals, outpatient care buildings and end-of-life care facilities. An additional, interesting trend to watch will be the evolution of retail environments to accommodate the tastes and spending patterns of senior citizens.

• Household Composition: The secular decline in the number of persons living in each home has been one of the historical drivers of real estate demand. However, this force is slowing down over time. New typologies will emerge to cater to the needs of single-parent families.

• Red vs. Blue: The economic implications of urban success are strongly mediated by the housing market. In cities with many barriers to new construction, economic success will be translated into very expensive homes, pricing out many people. Economically successful metro areas where real estate development is easy will continue to grow demographically.

• Consumer Cities: The cities that offer a compelling package of amenities and leisure-oriented services will keep attracting highly skilled workers. An increased concentration of creative workers will continue favoring attractive consumer cities that are heavily exposed to the medical, high-tech, IT, media and design sectors.

In Chapter 2, we explore the current housing affordability problem. The problem arises partly because of the increase in income inequality.
Furthermore, the productivity of the housing construction sector is growing less rapidly than with other manufactured goods. As a consequence, construction costs have been rising relative to the costs of other consumer goods. Also, some of the most popular cities in the United States, which have better amenities, access to education, and valuable, better-paying jobs, happen to be severely constrained in the land available for real estate development. In this chapter, we highlight some potential solutions to the affordability problem:

• Urban Redensification and Reuse: In our most expensive cities, we will have to use land more intensively. This includes the adaptive reuse of existing underutilized structures. Local governments are more likely to upzone land in exchange for affordable housing production. Urban infill projects are more likely to move forward.

• Suburban Strategies: Industrial suburbs or smaller cities within thriving metropolitan areas may revive and be repurposed as affordable residential areas. NIMBY pressures will need to be redirected, perhaps by way of comprehensive suburban master planning that replaces degraded areas with beautiful town centers providing amenities to all residents.

• New Forms of Living: Some families and individuals in pricey markets will accept smaller residential spaces, such as micro-units or tiny homes. Co-living arrangements will facilitate the use of underutilized bedrooms.

• Social Economy: Some initiatives will involve users themselves in the production of affordable housing via sweat equity or in building cooperatives. A new breed of mixed for profit/non-profit entrepreneurs and funds seeking triple-bottom returns can have large impacts.

• Construction Costs: Other efforts will be geared toward reducing construction costs. Some cities may engage unions to negotiate alternative rules and new affordable products. A large number of technological innovations are bound to accumulate and make construction more cost-effective.

Chapter 3 turns to the impact of innovations in the design and use of the built environment. We identify key examples of new real estate concepts that are allowing firms to rewrite the physical future of workplaces, buildings and cities. Key examples include:

• Trends in Leisure: Hotels will evolve in diverse ways to personalize the guest experience. Flexible retail layouts will allow the American mall to reinvent itself every couple of months or so.
Artisan 3-D production on-site will turn some shops into a mix of industrial and retail establishments.

- **Green Real Estate:** Many space users will demand buildings that save energy and that have lower carbon footprints. The focus here will move away from certification as a ultimate objective, and toward adopting interventions at minimum cost and maximum environmental benefit.

- **New Products:** Data centers will move toward new computer and data storage solutions. Some construction materials will adapt in shape, color, and texture to suit environmental conditions or the emotional state of the occupants. The robotization of some tasks will require architects to design with the flow of automaton occupants in mind. A number of real estate solutions will arise to address the last-mile problem in logistics. And some tall buildings will comprise aspects of a vertical city.

- **Self-driving Cars:** The adoption of autonomous electric vehicles will act as a densifying force in the urban core: thus, we will require fewer cars and parking spaces there. Nevertheless, automated vehicles could actually rekindle a revival of edge cities in suburban environments.

- **Creativity and Space:** Open office-space layouts will keep evolving in order to foster collaboration in highly skilled occupations. Biophilic design will make our work space closer to the environments that our human nature craves. Hot-desking within organizations will increase workplace flexibility, and the sharing economy will allow for the short-term marketization of leisure and work space.

**Chapter 4** focuses on the implications of smart buildings and Internet—connected devices to support data-driven decisions, thereby making buildings and cities “smart.” The applications to real estate are numerous. “Smart buildings,” which incorporate sensors and programmable algorithms, will allow managers and users to improve operational efficiency and the enjoyment of space:

- **Commercial Buildings as Automatons:** Sensors linked to computers will automatize building performance. Smart buildings will use programmed feedback loops or learn from user preferences. Lighting, heat, electricity consumption, air flows, doors and curtains will gradually respond to the environment for optimal comfort and economic efficiency.
• Big Data: Data patterns research will allow statistically trained humans to enhance building performance and worker productivity. A creativity explosion will allow for ever more sophisticated uses of building data.

• Smart Homes: Sensors and appliances will make our lives easier. A big push for the standardization of smart home technologies will probably necessitate the consolidation of a few big industry players.

• Customers and Users: Beacons and sensors will sometimes monitor use of space by users in buildings and by customers in retail environments. Sensor information may be combined with productivity or sales data. Smartphone applications will allow for some customers in the mall to get information and receive discounts in real time, while providing intelligence to retailers.

• Urban Information Systems: Governments will combine data from a number of sources: administrative, tax, sensors, crowdsourcing and citizen complaints. The opportunity is there for the productivity of municipal governments to grow by providing more targeted service with less waste. Predictive analytics can anticipate problems before they happen (e.g., epidemics, crime). Programmable lamp-posts, traffic lights and urban signs—all equipped with sensors—can react to needs in real time. Online tools could improve citizen participation in urban planning and local government processes.

Chapter 5 turns to new technological applications powered by online connectivity that are transforming how we transact, perceive, invest and manage existing properties, without necessarily changing the bricks and mortar. We collectively refer to them as Real Tech: the wave of exciting technologies that help connect property buyers, sellers, managers, operators and investors more productively to each other. The chapter reports on:

• Transactions: The rise of transactional websites and software will keep pace in residential and commercial arenas. Better algorithms will facilitate the matching of buyers and sellers. Records of sales and leases will be more widely accessible online in government websites, private exchanges or distributed ledgers. New online property markets and exchanges will develop for subleasing and other complex contracts (e.g., rent-to-own structures, home mortgages with capital appreciation participation by the lender, derivatives based on real estate indexes).

• Transparency: Statistical and data techniques in real estate will continue to improve, allowing us to better underwrite risk and extending the use of automated valuation models. Real estate
indexes and data-driven measurements of the performance of portfolios will make commercial property markets much more transparent.

- **Crowdfunding:** There will be a proliferation of web-based investment platforms to fund local development projects. The need for such instruments may be exacerbated by increasingly strict banking regulations. Funds of crowdfunded investments will emerge, playing the laws of large numbers. The real estate crowdfunding industry will grow in size and follow a trend toward a smaller number of reputable players offering standardized investment contracts at decreasing management fees.

- **Virtual and Augmented Reality:** Many real estate buyers will virtually visit the properties they are interested in. Virtual reality will become an important tool to envision and design real estate projects. Simultaneous, frequent virtual visits to the planned facilities will facilitate the communication between building professionals—architects, designers, contractors—and their customers.

- **Development Software:** Software solutions will integrate all aspects of the development process, such as predevelopment, zoning, design, phasing and construction management. Communication between the numerous players will be facilitated and mistakes avoided.

- **Asset Management:** We will see more software and technology to optimize space utilization in buildings and to manage assets in their financial, legal, leasing and administrative aspects.

- **Consolidation:** The proliferation of incompatible apps, software, databases and websites offering services to the real estate industry will generate opportunities for consolidation. New large players may emerge from the IT world, and existing large real estate service providers will likely move aggressively into this market.