SHARED ADVANTAGE

Promoting Healthy Communities

CBRE

August 2017

Dear Colleagues:

Since 2015, CBRE has undertaken steps to institutionalize and advance its many activities that promote community well-being into a program called Shared Advantage. Understanding that commercial real estate is at the intersection of many of today's global issues, CBRE sought to gain insight on the unique opportunities of a Shared Advantage approach to improving well-being within the communities it serves.

A team of researchers from the David Geffen School of Medicine at UCLA, the UCLA Fielding School of Public Health, the UCLA Luskin School of Public Affairs, and UCLA Anderson School of Management conducted research to illustrate the associations between the built environment, particularly commercial properties, and the health of communities. The team also studied informative practices by CBRE and other corporations.

This report reflects findings from this research. It is our hope that our report will inspire, provide answers, offer direction and give commercial real estate and other fields the mechanisms for adopting Shared Advantage approaches in their businesses.

As the research suggests, a dedicated business approach sensitive to the needs of the communities we serve can be mutually beneficial and improve well-being for all.

Michael A. Rodriguez, MD, MPH
Principal Investigator
Professor, David Geffen School of Medicine at UCLA and UCLA Fielding School of Public Health

David L. Pogue
CBRE, Global Director
Corporate Responsibility

Authors

Michael A. Rodriguez, MD, MPH[1,2,3]; Anne M. Dubois, BA[3]; Magali Delmas, PhD[4]; Michelle B. Maurer, DrPH, MPH[1,3]; M. Paloma Giottonini, PhD (c)[5]; Brian Cole, DrPH, MPH[2]

Author Affiliations

[1]David Geffen School of Medicine at UCLA
[2]UCLA Fielding School of Public Health
[3]UCLA Blum Center on Health and Poverty in Latin America
[4]UCLA Anderson School of Management
[5]UCLA Luskin School of Public Affairs

Citation

Rodriguez MA, Dubois AM, Delmas M, Maurer MB, Giottonini MP, Cole B. *CBRE Shared Advantage: Promoting Healthy Communities.* Los Angeles, CA: The UCLA Blum Center on Poverty and Health in Latin America. August 2017.

Contact

Michael A. Rodriguez, MD, MPH
Professor and Vice Chair, UCLA Department of Family Medicine
Professor, UCLA Department of Community Health Sciences
Director, UCLA Blum Center on Poverty and Health in Latin America
10945 Le Conte Avenue, Suite 2120
Los Angeles, California 90095
310.794.0394
blumcenter@ucla.edu

UCLA BLUM CENTER on Poverty and Health in Latin America

UCLA

©2017 UCLA Blum Center on Poverty and Health in Latin America

Acknowledgments

This project was sponsored by CBRE. We greatly appreciate the following individuals, who served as members of our research team; they offered guidance, critical thinking and support throughout this project: Dave Pogue, Global Director of Corporate Responsibility, CBRE; Lisa Colicchio, Director of Corporate Responsibility, CBRE; Tsilah Burman, Senior Director, CBRE Global Investors; Abbey Ehman, Senior Associate, Trammell Crow Company; Brian Jennings, Managing Director, Asset Services; Hal Myers, Consultant, CBRE. We also thank Ruhani Sandhu who provided research assistance to the research team. Many thanks to CBRE business lines contributing photos in this report, including: 1900 Sixteenth Street - Asset Services; Atlantic Station - Asset Services; MetPark - CBRE Global Investors; Brickyard - Trammell Crow Company; 2000 Avenue of the Stars - Trammell Crow Company.

Table of Contents

Introduction - - - - - 5
Shared Value - - - - - 6
Shared Advantage - - - - - 8
Study Aims - - - - - 11
Built Environment and Community Well-being - - - - - 11
Linking to the United Nations Sustainable Development Goals (UNSDGs) - - - - - 14

Research Methodology - - - - - 15
The UCLA Research and CBRE Teams - - - - - 16
Case Study, Stakeholder Identification - - - - - 17
Stakeholder Interviews - - - - - 17
Research Challenges - - - - - 18
Data Analysis - - - - - 18

Research Findings - - - - - 19
Case Studies - - - - - 20
Findings Aligned with Socioecological Model and Linked to UNSDGs - - - - - 22
Literature Findings and Assessment Tools - - - - - 30
Other Achievements: Emerging Practices to Implement Shared Advantage - - - - - 31

Recommendations for CBRE Shared Advantage - - - - - 33
Potential Next Steps and Implications - - - - - 36
CBRE and Shared Advantage - - - - - 36
Future Research Agenda - - - - - 36

Conclusion - - - - - 37

References - - - - - 38

Appendices
Appendix 1. United Nations Sustainable Development Goals (UNSDGs)
Appendix 2. Internal Interview Questions
Appendix 3. List of Interviews Conducted
Appendix 4. Methodology
Appendix 5. Case Study Descriptions: CBRE and External Companies
Appendix 6. Published Findings on Health Outcomes Affected by Indoor Elements (Table 1) and Outdoor Elements (Table 2) of the Built Environment
Appendix 7. Community Health Metrics

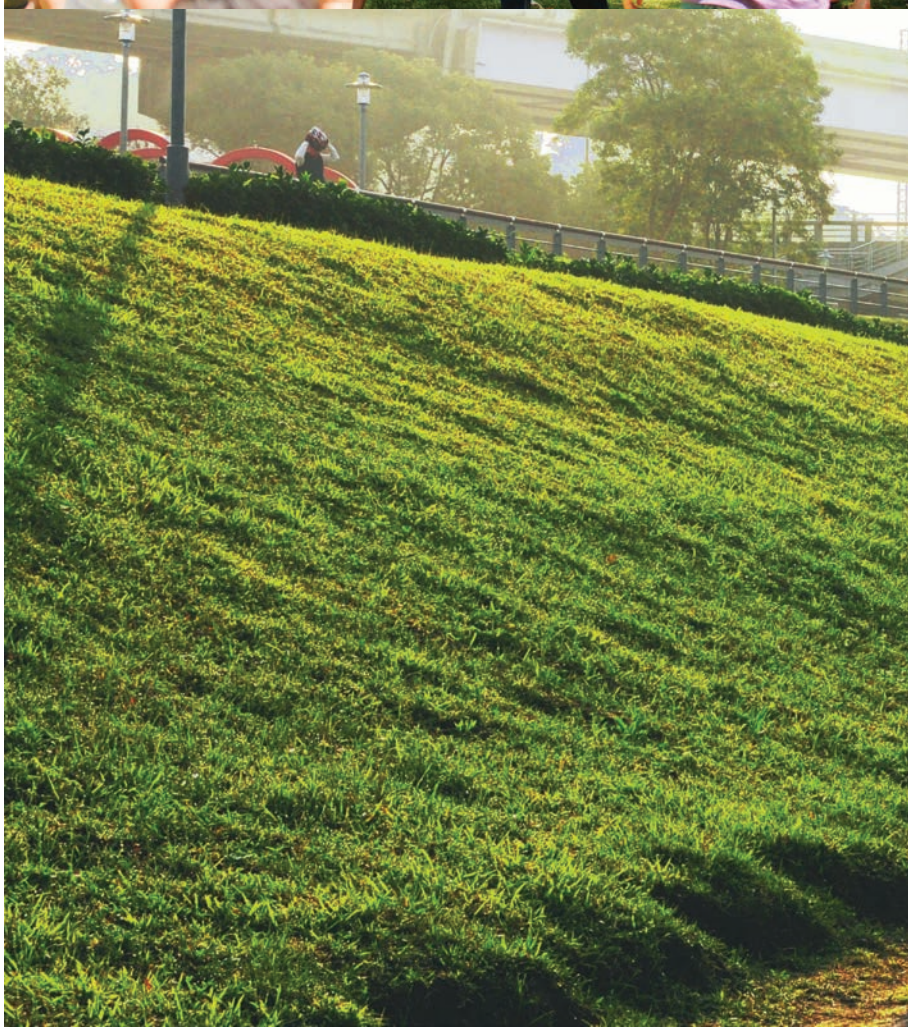
FIRSTwestern
ReadyTalk

Introduction

The economic impact of the commercial real estate industry is well-known and frequently measured by its positive contributions to gross domestic product, jobs, and income generated from operations. Commercial real estate provides places for businesses to grow and thrive, consumers to shop and residents to live. Notwithstanding these clear positive economic and social impacts, commercial development can also have negative impacts on other sectors of a community, including the natural environment, where its significant use of resources, generation of waste and carbon emissions have negative effects. The real estate industry has recognized that fact and for some time has been implementing a series of sustainability practices that address the pressing environmental issues, while also improving the bottom line of specific projects. While many of these actions are accomplished independently, often the actions are disconnected from a broader corporate goal. In this report, we identify business practices that provide a shared value by positively addressing environmental and social issues to promote healthy communities while doing business in this way that benefits the company as well.

Shared Value

Companies in many industries are realizing that, to achieve and maintain economic success, it is important to advance the concept of corporate responsibility as a company-wide management strategy where economic opportunities go hand-in-hand with addressing related social needs.[1] This "shared value" approach prioritizes opportunities that provide economic value and competitive advantage to a company while addressing social problems related to the company's business or products at the same time.[2] Shared value can take many forms: resource conservation and environmental stewardship; encouraging public involvement in company-sponsored events by working with community stakeholders to identify and address community concerns; and more. To be most effective, these engagements should also be purposeful, comprehensive and sustainable in form and practice. They should inform the actions of the organization and be viewed as advancing the company's interests. As shared value has risen in prominence, so has the need to assess and track performance in different arenas of shared value. The Global Real Estate Sustainability Benchmark (GRESB), the Dow Jones Sustainability Index (DJSI), and the Global Reporting Initiative (GRI) Standards are a few examples of such metrics. Coupled with traditional metrics of business



performance, these emerging metrics of shared value and sustainability are being used to guide business and investment decisions around the world.

The shared value approach springs from a broader awareness of the inter-connectedness of different sectors, of people and the environment, and of businesses and communities. This interconnectedness is reflected in the Sustainable Development Goals (SDGs) laid out in the United Nations' *2030 Agenda for Sustainable Development*[3], which recognize that addressing the societal challenges of the 21st century requires strong collaborative partnerships. Shared value is one part of these global efforts to advance economic, social and environmental well-being.

The commercial real estate industry presents unique opportunities to incorporate shared value into their business practices, as the industry plays a key role in building the economic and social fabric of communities. Some commercial real estate services firms, such as Grosvenor Group and JLL, have begun using a shared value approach. For example, Grosvenor Group has instilled a "Living Cities" philosophy that aims to contribute toward the success of cities and communities in which it operates. More recently, JLL released its 2016 CR/ Sustainability Report, *Building a Better Tomorrow*. This report describes their new intent to embed sustainability approaches into the advice and services they offer to clients. In addition, JLL seeks to provide productive and healthy environments for their employees while improving their built environments. Thus, through strategic portfolio management and an innovative approach to the workplace, property design and development, and management services for owners and building occupants, commercial real estate firms are affecting the vitality of client businesses and their communities. Their success, in turn, produces value and new opportunities for commercial real estate. These reciprocal economic benefits provide a solid foundation to advance a shared value approach.

Shared Advantage

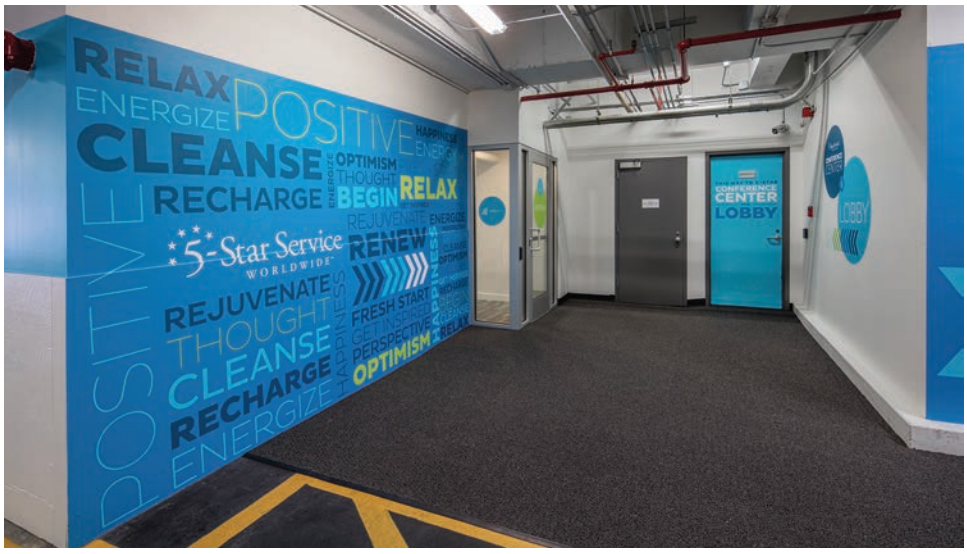
CBRE, the world's largest commercial real estate services firm, has recognized the opportunities that could be realized through a shared value approach. At each step of the real estate process, opportunities exist to thoughtfully apply practices that can mitigate identified negative impacts while, importantly, adding additional value to not only the communities they serve but their own bottom line. CBRE's branded approach for promoting shared value, *Shared Advantage*, aims to identify and pursue the kind of win-win opportunities for each of their business lines that are the hallmark of shared value. For CBRE, many of the potential Shared Advantage opportunities are linked to producing benefits to places and communities. At its highest form, Shared Advantage promotes: enhanced and strengthened communities; healthy and productive places to live, work and play; and strong financial returns.

The Annenberg Space for Photography

Community Defined

Through Shared Advantage, CBRE seeks to improve the well-being of the communities that it serves. CBRE defines community broadly, ranging from the micro-environment of employees in a single office space, to all those working in the building in which that space is found, to the surrounding business community where the building is located, as well as the entire community affected by the building or the development of a new or existing real estate project. CBRE also expects to advance the recognition that few actions are narrowly confined to the place where they occur, but rather most actions have influences well beyond. The ripple effects of both positive and negative impacts must be considered. Within these communities, Shared Advantage offers ways to collaborate, foster trusting, caring relationships and, ultimately build both businesses and communities in positive directions.

Some of CBRE's seven primary business lines have already undertaken activities or projects consistent with a Shared Advantage approach to contribute toward community well-being. In 2004, CBRE Global Investors pioneered a new approach to enhance the typical workplace for professionals across the country. Also, Trammell Crow Company (TCC) has taken a leadership role in redefining its definition of sustainability and creating a more community-focused development approach. This type of commitment is also seen in Asset Services, which has developed a framework for occupant well-being and has also extended its reach to members of the community through neighborhood enhancements and activities.



Study Aims

To better understand how the built environment impacts community health and wellness, the aims of the UCLA research effort were to: 1) conduct a review of the published and grey literature on the built environment and its relationships to health; and 2) identify evidence-based strategies and best practices for promoting a CBRE Shared Advantage approach to promoting healthy communities.

In this report, we focus on the results of our research related to the second aim, which included identifying Shared Advantage approaches for design elements, programming strategies, and other tools that the commercial real estate industry can use to promote community health. We also review the research and other literature to identify measurement tools that may be leveraged for future efforts to monitor and assess the impact of Shared Advantage. Finally, we present recommendations to inform further development of Shared Advantage throughout CBRE and its business lines.

Built Environment and Community Well-Being

The relationship between health and the built environment (defined as the physical place where we live, work and play[4]) is a research topic that has been motivated by concern about the negative health effects of the built environment, and has often focused only on the spread of infectious diseases in urban areas.[5] Health problems have been associated with adverse conditions in urban areas, such as overcrowding, inadequate sanitary infrastructure, hazardous workplaces, slums and the hazardous conditions of some types of developments.[6]

During the last 20 years or so, the focus of research on the built environment and health has shifted from preventing harmful exposures to individuals to promoting community well-being, including physical, mental, and social well-being,[7–9] as illustrated in Table 1 (under review for publication in a peer-reviewed journal). Today, communities face chronic diseases (obesity, diabetes, cancer, psychological distress) that are shaped by our environments in ways that are distinct from threats of infection.[10]

Table 1. Evolution of research on the effects of the built environment on health

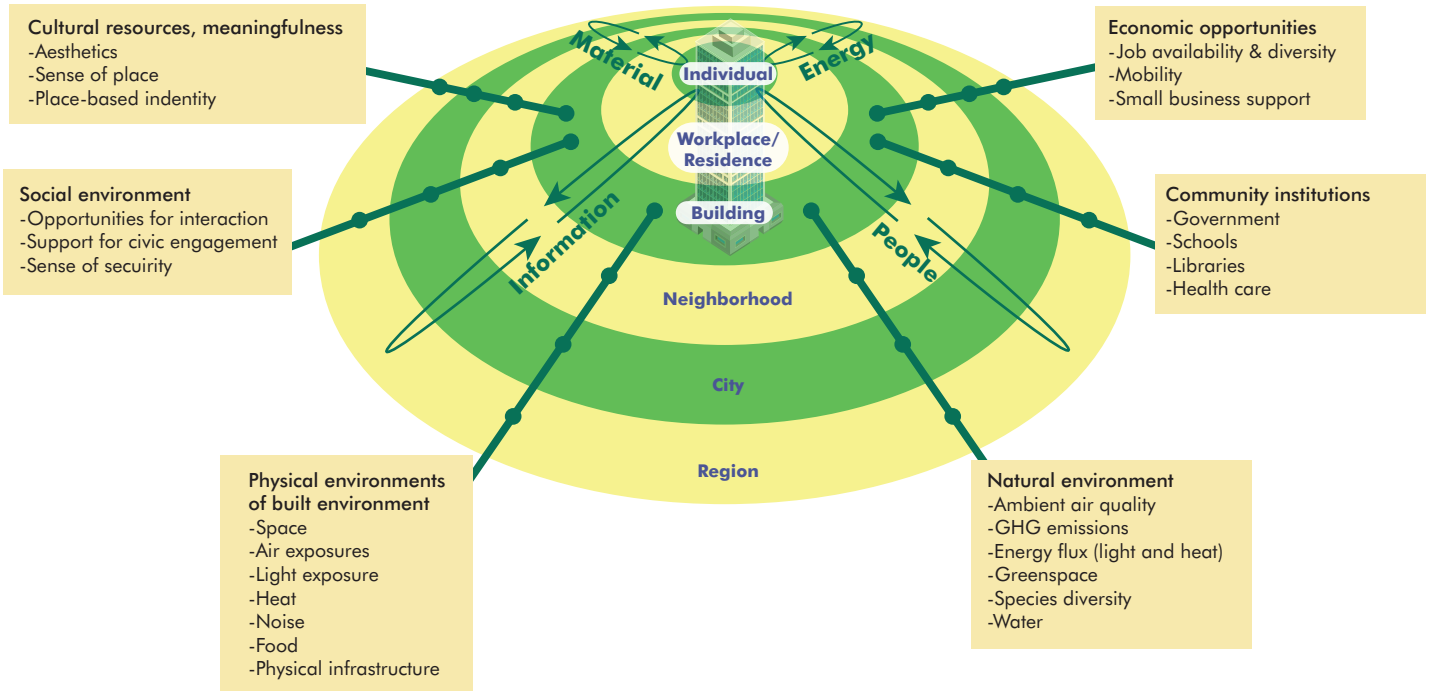
Preventing Harmful Exposure (workplace and residential) 1900-1969	Assets for Performance (workplace and school) 1970-1999	Assets for Well-being (workplace and residential) 2000-forward
Disease Prevention Physical Health	⟷	Promotion of Well-Being Physical, Mental, Social Well-Being
-Indoor air quality (sick building syndrome, asthma prevention) -Sufficient lighting -Noise effects on sleep -Dampness (residential) -Crowding in residential settings	-Productivity effects of workplace lighting -Noise effects on workplace task performance and student learning -Opportunities for collaboration, social interaction -Exposure to greenspace, views of nature -Thermal comfort	-Effects of indoor lighting on mood and well-being -Exposure to natural light -Active workplaces -Mental health benefits of increased security and status as a result of building retrofits -Spaces for relaxation and stress relief -Visual, auditory and olfactory aesthetics

In a separate report, our research team presents details from published findings on the relationships between buildings and other elements of the built environment and community health. Key findings include positive outcomes attributable to inside spaces of the built environment including: improved health conditions and productivity levels,[11] decreased absenteeism,[12] and improved mental well-being.[13] We also found that the published literature on the impact of buildings within the built environment on community health was limited. Nevertheless, research findings identify the benefits of architectural features, walkability, neighborhood attractiveness and accessibility, and aesthetic and functional elements related to community health and well-being.[15-20] Research findings also include the need to address noise, crowding, neighborhood disorder and lack of access to natural settings and thus, limit stress and life stressors within the community.[14]

Our team conducted the review of the literature guided by a socioecological framework (Figure 1) that focuses on the interrelationships of buildings in the built environment, various sectors of a community, and factors that affect health. Much of the published research addressed the myriad of factors shown in Figure 1 and provide rationale for understanding how buildings in the built environment can take these factors into consideration to promote community health and well-

being. Likewise, for Shared Advantage, the term "community" encompasses the wide range of clients that are served and affected by a commercial property, as illustrated in Figure 1. That is, a community may refer to the occupants of one office, one floor of a building, the entire building, and/or neighboring buildings, but importantly, community also refers to the individuals outside of the building that are proximal to a building due to where they live or where their regular activities take place (i.e. grocery stores, schools, etc.). Whether buildings are used as a workplace, residence or commercial enterprise, as shown in Figure 1, their positions in the community affect the environment (physical, social and natural), economic opportunities, cultural resources and other community institutions at four different levels: building, neighborhood, city and region. Each level is connected by energy, materials, people and information. As the research suggests, when these elements are leveraged positively, individuals and communities can see improvement in worker productivity as well as health outcomes, including mental health.

Figure 1. Socioecological Model on Buildings and Health



Source: Cole, 2016, adapted from Dahlgren G, 1991.[21]

Linking to the United Nations Sustainable Development Goals

The United Nations Sustainable Development Goals (UNSDGs)[3] are part of a global plan of action to end poverty, protect the planet and ensure prosperity for all. The 17 goals apply to all nations and people, and seek to tackle inequalities while leaving no one behind. The UNSDGs are wide ranging, and include promoting healthy lives and well-being, ensuring sustainable consumption and production, and promoting peaceful and inclusive societies.

The UCLA team linked its research findings to the UNSDGs to demonstrate how the Shared Advantage initiative is well-aligned with societal needs, market potential and policy action to add to the development of a sustainable and inclusive path to economic growth, prosperity and well-being. Specifically, Shared Advantage can potentially contribute to 11 of the 17 UNSDGs as shown in Table 2. Appendix 1 provides information for all 17 UNSDGs.

Table 2. UN sustainable development goals addressed by Shared Advantage

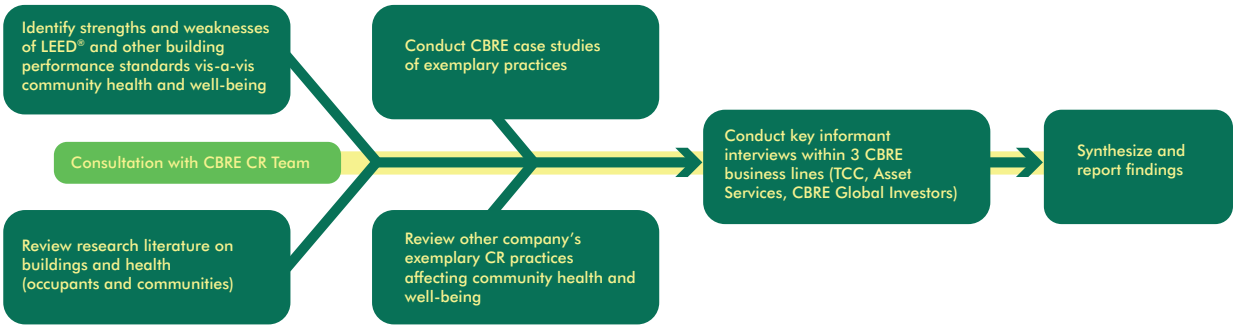
Goal #	UNSDG	Objectives of Goal[21]
3	Good health and well-being	Ensure healthy lives and promote well-being for all at all ages
4	Quality education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
6	Clean water and sanitation	Ensure availability and sustainable management of water and sanitation for all
7	Affordable and clean energy	Ensure access to affordable, reliable, sustainable and modern energy for all
8	Decent work and economic growth	Promote inclusive and sustainable economic growth, employment and decent work for all
9	Industry, innovation and infrastructure	Build resilient infrastructure, promote sustainable industrialization and foster innovation
11	Sustainable cities and communities	Make cities and human settlements inclusive, safe, resilient and sustainable
12	Responsible consumption and production	Ensure sustainable consumption and production patterns
13	Climate action	Take urgent action to combat climate change and its impacts
16	Peace, justice and strong institutions	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
17	Partnerships for the goals	Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

Research Methodology

The research team used multiple methods and data sources to assess current activities and potential directions for future efforts, including review of research literature on the built environment and health, review of reports from CBRE and other companies, and key informant interviews with personnel in three CBRE business lines (Figure 2).

To provide evidence of the impact of Shared Advantage, our research team sought to understand current practices related to this initiative both within CBRE and elsewhere in the private sector where we could identify opportunities for both learning and growth. To do this, our research built on the literature review conducted earlier by selecting and assessing case studies, examining websites

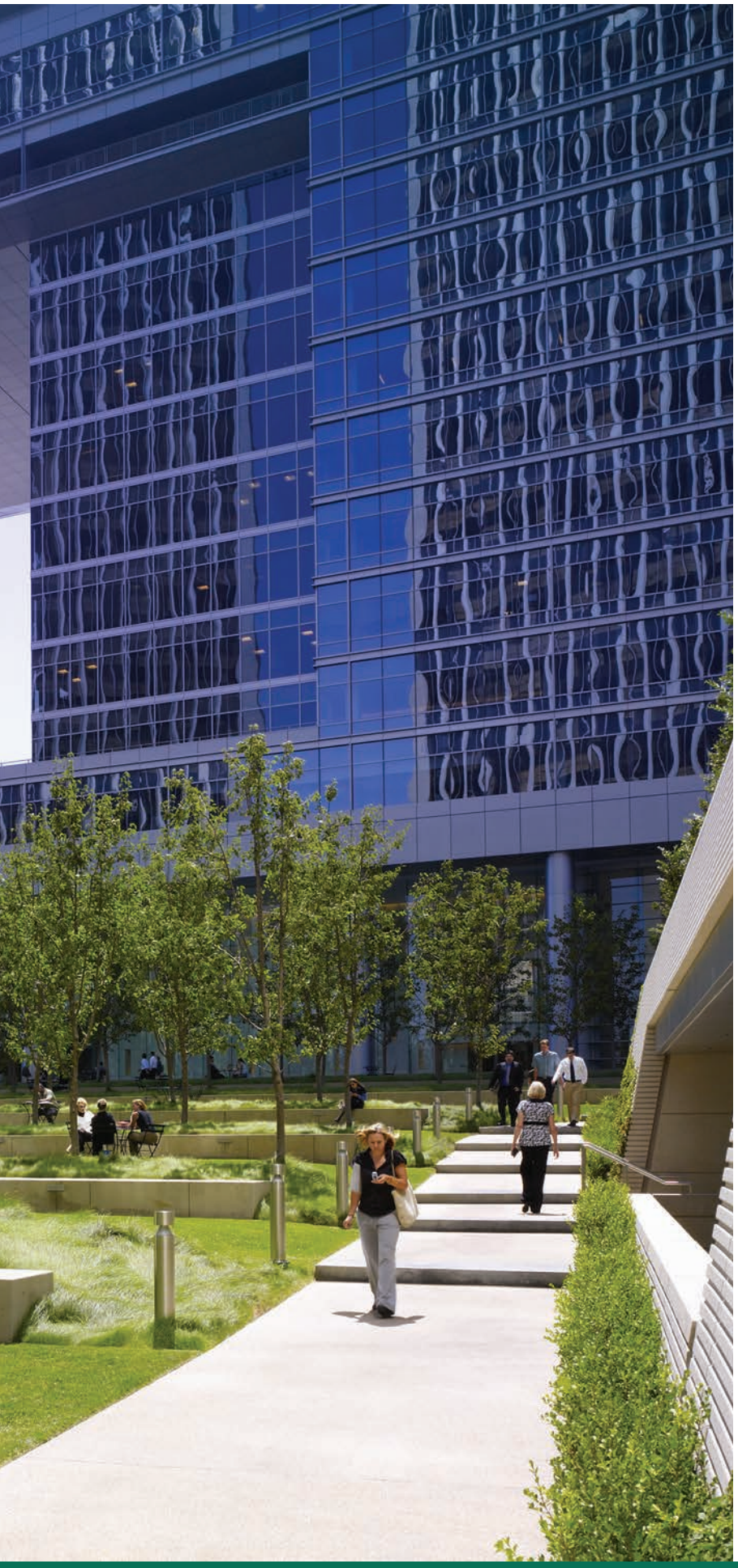
Figure 2. Multiple elements of the CBRE-UCLA research approach



and other materials related to the cases, and incorporating an assessment of other relevant materials (e.g., UNSDGs, measurement tools, etc.). From the case studies, we identified key stakeholders and conducted in-depth interviews to seek information on implementation and practices for company efforts aligned with Shared Advantage. The questions and analysis of the questions were informed by the larger research project, which included a review of the literature on the built environment and health.

The UCLA Research and CBRE Teams

The UCLA research team brings global research and expertise in medicine, public health and business through a team of senior researchers from the David Geffen School of Medicine at UCLA, UCLA Fielding School of Public Health, and the UCLA Anderson School of Management. The research team met regularly with CBRE leadership to present concepts and discuss ideas gained from research investigations. CBRE leadership represented the Division of Corporate Responsibility, as well as three different business lines: Trammell Crow Company, Asset Services and CBRE Global Investors.



Case Study, Stakeholder Identification

For the case studies, the research team identified commercial real estate properties with informative practices on how they incorporate policies and processes that bring health and well-being benefits to the community inside their building and/or those in the community outside the buildings. Six case studies from three CBRE business lines that have incorporated Shared Advantage were identified.

In addition to these CBRE case studies, we also analyzed the work of six global companies that have been recognized for corporate social responsibility efforts, in particular, using a shared values approach: CalPERS, Coca-Cola, Grosvenor Group, Unilever, Kellogg's and Morgan Stanley. In our analysis, we highlight common guiding strategies that can inform the future of Shared Advantage.

Stakeholder Interviews

We conducted stakeholder interviews, using an interview protocol designed to elicit responses to questions on how health and well-being efforts were incorporated into business practices. The interview questionnaire can be found in Appendix 2.

For each CBRE case study, one or two stakeholders participated in an interview to share how business practices were defined, developed, and/or implemented through various levels of the corporate environment, and how many of these practices have been institutionalized. We interviewed nine participants, including executive leadership, supervisors, managers, or program coordinators who were knowledgeable on project implementation and the health and wellness effects of their company's project. Appendix 3 includes information about each case study included in this part of our research.

Research Challenges

The ease of recruitment of key informants within CBRE varied, depending on their familiarity with the research team's work. Several interviewees initially often had difficulty recognizing how their activities may have benefitted community health and well-being. Attempts to identify key informants from non-CBRE companies to participate in interviews were only partially successful prior to this publication. Efforts to recruit additional participants are ongoing.

Data Analysis

Interviews were transcribed and coded by trained staff members including masters- and doctoral-level student research associates. Each coder was provided with a reference guide and project-specific training on data analysis. Two coders were assigned to code each interview to assess inter-coder reliability. The project director adjusted for any discrepancies.

More details on interview protocol, data analysis and other methods can be found in Appendix 4.

Research Findings from the Case Studies

From our research activities, we identified two common themes to inform Shared Advantage: 1) The Value of Being Part of the Community; and 2) Practices that Improve Community Well-being. A third area, Research and Assessment Tools, while not a theme from the case studies or interviews, surfaced as an important area of focus during our monthly UCLA-CBRE meetings when the need for assessment tools to determine effectiveness of a Shared Advantage approach was expressed. In this section, we demonstrate how the two themes and their subthemes are linked to the literature and the UNSDGs, and explain the need for research and assessment. These findings provide support for strengthening Shared Advantage activities through CBRE business lines.

Another important byproduct of this UCLA research effort was the increased awareness of Shared Advantage throughout the company. During the period of our engagement, we have seen Shared Advantage grow in several

areas. First, CBRE leadership recognized that shared value activities were taking place throughout the company but were being carried out in a disparate fashion. A vision, mission, goals and naming convention, Shared Advantage, brought these shared value approaches together under one umbrella. Shared Advantage was then introduced in meetings with the global CR Steering Committee to develop an understanding of the concept, secure their support and gain enthusiasm for the initiative. Additionally, the concept has been shared with members of the board of directors both directly and through the Board liaison. Shared Advantage language has been introduced into appropriate corporate communications companywide, including the 2015 and 2016 CR Reports. We have also found that the business lines involved in our research (Trammell Crow, Asset Services, CBRE Global Investors) have developed understanding and appreciation if not commitment for the Shared Advantage approach. Another consequence of this project was the realization of how some company actions are already aligned with Shared Advantage action areas and this research gave additional impetus to continue in that direction. An important realization is the fact that many specific aspects of a Shared Advantage management approach are already in place, although often more indirect, sporadic and not applied in a systematic or comprehensive fashion.

Case Studies

We analyzed six projects from CBRE that incorporated Shared Advantage approaches and studied six corporate social impact efforts from other global corporations recognized for their work in this area. From CBRE we studied the following projects: The Brickyard (Trammell Crow Company); Atlantic Station (Asset Services); Metropolitan Park (CBRE Global Investors, Asset Services); 2000 Avenue of the Stars (Trammell Crow Company); Acorn Development (Asset Services); and 1900 Sixteenth Street (Asset Services) In addition, we studied six projects from other companies, chosen because they related to several of the elements from the socioecological model driving our research (Figure 1): natural environment (CalPERS, Unilever, Kellogg's, Coca Cola) community institutions, economic opportunities and social environment (Grosvenor Group, Morgan Stanley).

Table 3 provides an overview of our findings from the cases and links the information to the two major themes arising from our research. Appendix 5 provides additional details on each case.

Table 3. Company projects and activities enhancing community health

Project	General Scope	Contributions to community health	Themes [a]
Internal-CBRE			
The Brickyard	Neglected brownfield converted to an industrial space that encourages economic activity	Improved neighborhood attractiveness	1
		Improved productivity (job creation)	2
		Support for education	2
Atlantic Station	Mixed-use property converted from brownfields site; now used by approximately 15,000 people daily	Newly created neighborhood functional elements (irrigation system)	2
		Community engagement and leadership	1
		Accessibility to open spaces and play spaces	2
Metropolitan Park	Renovation of disenfranchised area now includes two office buildings and emphasis on community participation	Neighborhood attractiveness (additional open and green spaces)	1
		Community engagement	2
		Activities encourage social well-being	2
2000 Avenue of the Stars	Revitalization of formerly isolated area dedicated to the entertainment industry converted to office towers, park, dining and cultural arts pavilion	Neighborhood attractiveness (additional open and green spaces)	2
		Cultural pavilion for social and mental well-being	2
		Established relationship with community members and local government	1
Acorn Development	Campus of 19 office buildings with coordinated tenant activities	Building-supported activities open to all (charitable events, special event)	2
		Neighborhood attractiveness (greenspace and landscaping)	2
		Neighborhood accessibility (shopping, bus, bike lanes)	2
1900 Sixteenth St.	First multi-tenant office building with LEED Platinum certification in Colorado	Improved neighborhood attractiveness	1
		Reducing environmental impact	2
		Activities encourage physical well-being	2
External			
CalPERS	Global governance program with goals related to environmental, social and governance issues	Physical well-being: use of natural resources and buildings	2
		Financial stability: public and private investments	2
		Productivity: human capital and labor practices	2
Coca Cola	Access to clean drinking water	Physical well-being, safely returning to communities and nature an amount of water equal to that used in finished products	2
Grosvenor Group	Living Cities philosophy to contribute to the success of cities; the Living Cities Community Fund to support community projects	Community engagement by supporting activities	2
		Job security	2
		Creating community cohesion for social well-being	1
Unilever	Making sustainable living commonplace	Efforts to conserve water, especially in water-scarce nations	2
		Reducing environmental impact	2
Kellogg's	Reducing energy use, water use, recycling	Impact of environmental resources (recycling)	2
		Support of local economy (local farmers used for products)	2

[a] Common themes: 1, Value of being part of the community; 2, Practices that improve community well-being

Findings Aligned with Socioecological Model and Linked to UNSDGs

The responses collected from our interviews with key stakeholders illustrate how and why CBRE business lines incorporate community well-being activities into their projects. Each of the two themes - The Value of Being an Engaged Part of the Community and Informative Practices Designed to Improve Community Well-being – have sub-themes or dimensions that further provide rationale for the contributions of a Shared Advantage approach to business.

The Value of Being an Engaged Part of the Community

This theme had three dimensions: socially responsible decision-making to build trust with the community, building or strengthening the community, and developing mutually beneficial relationships. Most of the activities of this theme are related to UNSDGs #16 (peace, justice and strong institutions) and #17 (partnerships for the goals). Aligned with the socioecological model, the diverse activities cited through the interviews address the six components of the built environment: physical elements, social environment, cultural resources and meaningfulness, community institutions, economic opportunities, and the natural environment.

Socially responsible decision-making to build trust with the community

At times, commercial real estate development faces opposition from the communities targeted for development, which, if not addressed, may lead to project failure. All interviewees mentioned that creating and maintaining a good relationship with the community is a good business decision for the company. Gaining the trust, respect and support of the community were cited frequently for maintaining good relationships. For example, TCC representatives mentioned that, while being a good neighbor can bring benefits to the bottom line, it is also a key driver that helps to avoid delays in entitlement, permitting and construction processes:

> *"with the Brickyard, from both planning commission and city council, [we received] unanimous approval... there were no votes against our project, and we believe it's because we were able to engage the community... and get them to come out and support the project."* (Trammell Crow Company)

CBRE Global Investors has also shown a commitment to local communities surrounding its investments nationwide. As an example, each year, properties host a Backpack Drive to collect school supplies for local grade school children. Others interviewed described building a track record of trust, responsibility, reliability and respectability to become part of the community.

"There are 14 leadership principles, one of those is earning trust, and it's not just earning trust with your employees, but it's also earning trust in the community." (Asset Services)

For some, company success was attributable to socially responsible decision-making that resulted in outcomes such as gaining a reputation for being good stewards for society (TCC), creating benchmarks for other properties (Asset Services); and activating indoor and outdoor spaces to create new community connections (CBRE Global Investors).

"We've reached out to our surrounding neighbors on what we can offer them, whether it's by participating in our free classes, utilizing the space to host events, or offering overflow parking or bike storage. Whatever we can do to be a part of something more than just ourselves." (CBRE Global Investors)

Building or strengthening the community

From our interviews, we found ways that commercial real estate development, as well as conscious building ownership, are contributing to strengthening the surrounding community. Through community engagement during the development process, TCC works in tandem with neighborhood leaders and residents to identify opportunities to improve the area. Through building management, Asset Services has developed policies that promote stakeholder involvement in decisions affecting their community. Coordinating with local organizations, CBRE Global Investors supports their tenant community and the communities surrounding their buildings through educational scholarships for tenants, philanthropic efforts at properties, and community-wide activities.

Advocacy is another way CBRE business lines strengthen the community. "We also become a very vocal advocate of issues that sometimes individual citizens can't be on their own," said one interviewee from Trammell Crow Company. Another cited experience in working with government agencies and regulations, and stressed the importance of being responsive to the community's needs:

"... we're able to find alignment of interests with our neighbors and then use our [shared power] to advocate for those [services]. And that's a great alignment of interest between health and the community...but we only find it [common interests] if we're actually listening to the community... to identify those opportunities." (Trammell Crow Company)

For development projects, communities can benefit from upgrading their infrastructure, widening streets or improving sidewalks. These are actions where commercial real estate development can take a leading role in securing support from local authorities, or providing these improvements as part of their project. In other instances,

developers can identify what services are required by the community and facilitate the introduction of those services through their development initiatives.

"Real estate development is about solving supply and demand imbalances. Most of the issues that we see in our communities at many levels are results of these imbalances... real estate development is an opportunity to bridge those...create jobs...build more health care facilities and bring doctors closer to communities...build multi-family housing projects and increase the supply of housing overall...when you take a step back and look at it, real estate development is about solving those imbalances." (Trammell Crow Company)

Developing mutually beneficial relationships

The interview data revealed how mutual relationships often grew out of the property's ability to address certain community needs and adding positive elements to any of the components of the built environment. For example, in a few cases, the projects worked toward economic opportunities by creating sources of employment or supporting local employment training activities. Others enhanced the physical and natural environment by improving walkability (dedicated walking paths), neighborhood attractiveness (greenspaces and parks), and neighborhood function (access to transportation).

"We incorporated wellness paths that make it easier for people to get around our property and enjoy their own neighborhoods... contribution to a little league field ... stayed involved and active with that particular group over the years....if we have the opportunity to contribute either through capital improvements or through our efforts or through support... we certainly like to take them." (Trammell Crow Company)

Interviewees agreed that developing strong engagement with internal building communities has mutually beneficial results for tenants, employees and building owners. CBRE Global Investors creates that engagement through tenant surveys, a full-time personalized assistant on-site, building-wide philanthropic initiatives, outdoor workspaces, co-working spaces, health-related and social tenant events and programming, on-site gyms, and accessible conference centers. Others agreed that having a healthy relationship with the community and staying engaged with community members could result in several benefits. One cited the outgrowth of long-term contracts when tenants enjoyed a sense of community with those who live and work in the areas around the buildings.

"We want to make things exciting for tenants. Right now, on a macro-level, tenants are responding to things like community involvement and engagement with other tenants. People are responding to unique experiences

created at the building throughout the work day that don't exist in other places." (CBRE Global Investors)

Repeatedly, interviewees shared an understanding of the importance of mutually beneficial relationships and each discussed ways of engaging the local community by supporting an environment for community members to be heard, which translated to mutually beneficial action. For TCC, for example, that meant answering the need to create jobs by writing a development agreement with the city that included a commitment to increasing new hires and a job training program.

"...it's very important on all of our projects to make sure that we're listening to the communities to help shape the project and incorporate appropriate public benefits that fall back to the community." (Trammell Crow Company)

Informative Practices Designed to Improve Community Well-being

In this theme, we categorized responses into five dimensions: prioritizing community needs; seeking opportunities for partnerships; companywide strategies; direct and continuous communication; and place-making / sense of place (Table 4). Furthermore, the informative practices cited throughout the interviews addressed six of the 17 UNSDGs and are exemplified by a few specific comments:

UNSDG 3, Good health and well-being: "…we installed a track in some of that greenspace as well, so that you can teach your children to learn how to ride bikes." (Asset Services)

UNSDG 4, Quality education: "We're giving back in various ways …supporting the schools, or job training, or other career development opportunities." (Trammell Crow Company)

UNSDG 6, Clean water and sanitation: "Beneficial re-use system of water was elected to use the water for irrigation." (Asset Services)

UNSDG 11, Sustainable cities and communities: "The more we get people involved and create a sense of community between the buildings, the

Table 4. Informative practices designed to improve community health

Informative Practice	Resulting in Improved…	Health Impact
1. Prioritize community needs	Accessibility	Physical health
	Neighborhood attractiveness	Mental health
	Economic opportunities	Social well-being
	Education / training	Mental health
	Cultural resources	Social well-being
2. Seek opportunities for partnerships	Goodwill to the community	Social well-being
	Food accessibility	Physical health
3. Embrace company-wide strategies committed to shared value	Trust and confidence in development project	Social well-being
	Dedication to improving quality of life and day-to-day living of those inside and outside building	Physical and mental health; social well-being
4. Engage in direct and continuous communication with local community	Policies to conduct community outreach	Social well-being
	Face-to-face meetings between developer and community	Social well-being
5. Create community places	Interaction and civic engagement	Social well-being
	Sense of security	Mental health
	More abundant open spaces	Physical and mental health
	User-friendly activity areas	Physical health
	Architectural features designed to create sense of place	Physical health, mental health and social well-being

more people can share, feel comfortable, and enjoy where they are…" (CBRE Global Investors)

UNSDG 13, Climate change: " [our] goal is to reduce electric use and utility consumption to a certain standard by 2030. [We] get together monthly and report to each other to show our progress, what initiatives we've taken on, share information…" (CBRE Global Investors)

UNSDG 15, Life on land: "The incorporation of greenspace is something that we do religiously." (Trammell Crow Company)

Prioritizing Community Needs

Results from our interviews indicated a strong need for, and importance of, an understanding of the existing community and its members around a project. Community priorities were aligned with the six elements of the built environment; the most often-cited included: physical elements related to accessibility and to spaces that enhanced utility for both tenants and community (e.g., street and sidewalk repairs and requests for more open space or improving existing parks); and more complex areas such as economic opportunities (e.g., ensuring better job access); community institutions (e.g., education and training); and cultural resources (e.g., more activities for children or the elderly).

Interview data also illustrated different approaches on how and when to identify the needs of the community. One approach was to work with local leaders of civic and owners' associations and other internal community teams to gain input on decisions for property development. Another approach was developing relationships with County elected officials to assess the needs of a community. Listening to the community was cited as an important element and lesson learned over the years:

"... the biggest thing is listening to them and hearing what they want...I think three years ago ... we were trying to tell them how we were going to do the job, not listen to what they wanted." (Trammell Crow Company)

Seeking opportunities for partnerships

Developing partnerships with other entities was a common practice among the interviewees. In some cases, these partnerships arose from prioritizing community needs and working with local groups who are already in motion to address the need. Two examples follow:

"We partnered with Canstruction in the two office buildings this year and provided space for their exhibits, which ended up donating ... over 3,000 cans of food. ... We have donated space in the buildings for Digital Atlanta." (Asset Services)

"... in partnership with Pike's Place Market, we do a very mini-market ... 4-5 different vendors ... flowers, vegetables ... people love it. ... We do those throughout the year." (CBRE Global Investors)

Company-wide strategies

Overall, strategies implemented in the case studies and apparent through the interviews reflected a company's core values and incorporated knowledge gained through successful, and sometimes unsuccessful, but nevertheless informative experiences. Strategies also reflected values of staff in positions who leveraged leadership opportunities to create win-win propositions. Strategies took the form of company values, missions, and goals, as well as design elements and building practices, but transparency, innovation and quality appeared to be grounding elements of many programs.

For example, reflecting on transparency, one interviewee said,

"the community could have confidence that the commitments we were making as part of the public process would be written down and agreed upon and signed between us and the city ... it was really about credibility and transparency." (Trammell Crow Company)

Another looked at innovation as vital to success by saying,

"... we are tasked to continuously

be creative and improve on our offerings. [we] have a creative group at the property who are always talking and listening to people." (CBRE Global Investors)

Finally, most agreed that quality of life and improving the day-to-day lives of people inside and outside the building were paramount to a successful project, as demonstrated by one interviewee's comment:

"We believe that a property should be developed into its highest and best use. But as part of that process, it is very important to engage the local communities and make sure that we're giving back for that opportunity to develop the project in those communities. It is very important for all of our projects to listen to the community, to help shape a project and be able to incorporate appropriate local public benefits that flow back to the community." (Trammell Crow Company)

Direct and continuous communication with the local community

For developers, building operators and owners, the need for direct communication with the local community from all sectors, including government leaders, association leaders, educators, neighborhood leaders, and business leaders, was stated frequently. For example, CBRE Global Investors partnered with neighborhood and business organizations in social, philanthropic and other pursuits; Trammell Crow Company incorporated policies to conduct community outreach as a project got underway. It was also discussed that the importance of face-to-face meetings between the primary developer and community versus sending outreach consultants to gain community input, was an important approach not only to improve relationships but also to ensure accurate interpretations of community voices.

"Misinformation is one of the biggest challenges that we face," said one interviewee, "It is all about listening, and also, to be heard." (Trammell Crow Company)

Creating community spaces

Another practice that was found through case study analyses and repeated in interview data was the need to create spaces that improved the social environment with opportunities for interaction, support for civic engagement and a sense of security, as noted on the socioecological model and supported in the literature.[15-17] Real-life settings reported by the CBRE business lines included: 1) creating substantial open space that did not previously exist; 2) creating an environment that fosters collaboration and connection (e.g., leisure-friendly common areas, as well as educational, social, health-related and philanthropic programs); and 3) architectural features that fit with the neighborhood to create a sense of place.

Literature Findings and Assessment Tools

Literature Findings

From the literature review and as discussed in our previous report, Built Environment and Health: Understanding the Role of Commercial Buildings in Community Health, the research field related to the built environment and community health, as defined by health outside of the building, is in an early development phase. In our search of published articles, of the 399 articles on the built environment, only 22 of these articles focused on the built environment and community health and 13 focused on the built environment and individual health. For more details, see Appendix 6, Published Findings on Health Outcomes Affected by Indoor Elements (Table 1) and Outdoor Elements (Table 2) of the Built Environment; these tables and the report are currently under review for publication in a peer-reviewed journal.

Assessment Tools

As part of our research efforts, we researched, identified and described instruments being used by companies and organizations to measure the impact of programming on: 1) community health inside the building; 2) community health outside the building, and 3) overall community health.

Table 5a. Assessment tools for the built environment inside the building (see Appendix 7 for additional metrics)

Indicator	Metric	Source
Occupant comfort	Occupant Comfort Survey	USGBC: http://www.usgbc.org/credits/eq51
Air quality	Air Quality Index	EPA: https://airnow.gov/index.cfm?action=aqibasics.aqi
Happiness	Oxford Happiness Questionnaire	Oxford University: http://www.meaningandhappiness.com/oxford-happiness-questionnaire/214/
Daylight	Daylight Factor	Industry (buildings.com): http://www.buildings.com/article-details/articleid/6340/title/a-new-better-way-to-calculate-daylight
Interpersonal support	Interpersonal Support Evaluation	Fetzer Institute: http://fetzer.org/sites/default/files/images/stories/pdf/selfmeasures/Self_Measures_for_Social_Support_INTERPERSONAL_SUPPORT_EVALUATION.pdf
Green building benchmarks	WELL Building Standard	Delos: https://www.wellcertified.com/sites/default/files/resources/WELL%20Building%20Standard%20September%202015_0.pdf
Quality of worklife	Quality of Worklife Survey	CDC: https://www.cdc.gov/niosh/topics/stress/qwlquest.html
Health and work performance	Health at Work Survey	WHO: https://www.hcp.med.harvard.edu/hpq/ftpdir/HPQ%20Employee%20Version%2081810.pdf
Building assessment survey	Building Assessment Survey and Evaluation	EPA: https://www.epa.gov/indoor-air-quality-iaq/building-assessment-survey-and-evaluation-study

Table 5b. Assessment tools for the built environment outside the building (see Appendix 7 for additional metrics)

Indicator	Metric	Source
Walkability	Walk Score	Walkscore.com: https://www.walkscore.com/methodology.shtml
Bike paths	Bike Score	Walkscore.com: https://www.walkscore.com/bike-score-methodology.shtml
Sidewalks and streets	Sidewalks and Street Surveys	AARP: http://www.aarp.org/content/dam/aarp/livable-communities/plan/assessments/the-how-to-guide-for-sidewalks-and-streets-survey-aarp.pdf
Building core and shell development	Project Checklist for LEED 2009 for Core and Shell Development	USGBC: http://www.usgbc.org/resources/core-and-shell-v2009-checklist-xls
Sustainable development indicators	Sustainable Urban Development Indicators for the United States	Penn Institute for Urban Research: http://penniur.upenn.edu/uploads/media/sustainable-urban-development-indicators-for-the-united-states.pdf
Urban design – walkability	Urban Design Qualities	Active Living Research: http://activelivingresearch.org/files/FinalReport_071605.pdf
Streets connecting pedestrian walkways	Building a Reliable Measure for Unobtrusive Observations of Connecting Pedestrian Walkways	Academic research: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242860/
Transit quality	AllTransit Performance Score (0-10)	AllTransit: http://alltransit.cnt.org/metrics/
Park metrics	Parks and Recreation Needs Assessment	L.A. County: http://losangeles.urbdezine.com/2016/07/17/parks-recreation-needs-assessment-l-county-story/
Building design and construction	LEED-New Construction and Major Renovation	USGBC: http://www.usgbc.org/resources/leed-v4-building-design-and-construction-checklist

Table 5a, 5b and 5c illustrate indicators and metrics used for assessment and Appendix 7 provides more details on each.

Other Achievements: Emerging Practices to Operationalize Shared Advantage

The partnership between CBRE and UCLA resulted in evidence identifying the effects of buildings in the built environment on community health while also demonstrating how Shared Advantage can be an integral player in a companywide business approach that benefits both community and the company. Shared Advantage brings the company into new light as an important community partner. As mentioned, an unexpected outcome was the beginning steps of socializing Shared Advantage throughout CBRE, and recognition that Shared Advantage can place CBRE as a leader in this area. A few examples of these emerging practices through CBRE and three of its business lines involved in the research include:

CBRE: The company is making positive movement to adopt and meet standard key performance indicators (KPIs) and Dow Jones Sustainability Index (DJSI) goals. All business lines are being asked to be guided by DJSIs and eventually KPIs, by incorporating the concepts of Shared Advantage into business practices, many of these benchmarks will be reached.

Trammell Crow Company: Shared Advantage and sustainability were featured at the TCC Leadership Conference. As a result, all 15 business units across the United States are being asked to incorporate the six action areas of governance, economic, wellness, environment, transportation, and social and to identify activities related to their business practices. Other materials are in development to continue to socialize Shared Advantage: website updates, training materials, procurement packages, and internal tools.

Asset Services: During the past decade, Asset Services has developed a program of Global Standards specific to sustainability and designed to measure, mitigate and report on a number of environmental and operational aspects of buildings. These standards were founded on the principles of cost-effective and environmentally conscious property management for all CBRE-managed buildings, and have gained high-performance recognition. The program strives to minimize the carbon footprint and operational impact of these properties through rewarded behaviors. To boost both tenant and client results, Shared Advantage can offer a way to more consistently apply these and other services. A simplified toolbox to rollout Shared Advantage could allow all levels of management (from those managing smaller buildings to those managing larger, sophisticated building complexes) to incorporate Shared Advantage action areas into everyday business practice.

CBRE Global Investors: A revised environmental, social and governance policy now includes a discussion on Shared Advantage, thus socializing the concepts to guide decisions and procedures throughout the company.

Table 5c. Assessment tools for the built environment community health **(see Appendix 7 for additional metrics)**

Indicator	Metric	Source
Safety	Healthy Living Toolkit - Framework for Planning Community Safety and Well-Being	Ontario Association of Chiefs of Police: http://www.oacp.on.ca/Userfiles/StandingCommittees/CommunityPolicing/ResourceDocs/1%20-%20Framework%20for%20Community%20Safety%20PlanningJune20.pdf
Sense of community	Sense of Community Index	Industry (Community Science): http://www.communityscience.com/pdfs/Sense%20of%20Community%20Index-2(SCI-2).pdf
Quality of life	RAND Quality of Life Survey	RAND: https://www.rand.org/content/dam/rand/www/external/health/surveys_tools/mos/mos_core_survey.pdf
Healthy neighborhoods	HealthScore	Healthy Neighborhoods Equity Fund: http://www.hnefund.org/projects-eligibility-screening/
Housing affordability	Common Affordability Metrics	Fannie Mae: http://www.fanniemae.com/resources/file/research/datanotes/pdf/housing-insights-111215.pdf
Health & safety, multimodal, equity, education, access, infrastructure, economic development, placemaking	Active Transportation Performance Measures	Fehr & Peers: http://www.fehrandpeers.com/wp-content/uploads/2016/09/ATP-Measures-ReportELECTRONIC_31Aug.pdf
Design of highways	McGrath Highway Corridor HIA	PEW Charitable Trusts: http://www.pewtrusts.org/en/multimedia/data-visualizations/2015/hia-map/state/massachusetts/hia-of-mcgrath-highway-corridor
Access to goods and services, healthy food, health care and community services	Health Impact Assessment-Richmond Highway Transit Center	Fairfax County Health Department: http://www.fairfaxcounty.gov/hd/hdpdf/health-impact-assessment.pdf

Recommendations for CBRE Shared Advantage

Based on the collective information that we gathered through the literature, interviews and case studies, we provide recommendations to further develop Shared Advantage.

We have suggested approaches, identified relevant measures, and highlighted the advantages of assessment to illustrate progress toward achieving Shared Advantage.

Value Recommendation: Creating a Companywide Vision for Shared Advantage. A specially developed version of Shared Advantage should be adopted by each significant business line. This will first require an understanding of the basic tenets of the shared values concept followed by a recognition of the specific impacts related to the individual business line. As discovered with the business lines engaged in this initial work, most business lines already have several policies and practices that are addressing specific impacts. One challenge will be to again develop a more consistent and comprehensive application of these principles as well as a method for measuring and reporting on the results.

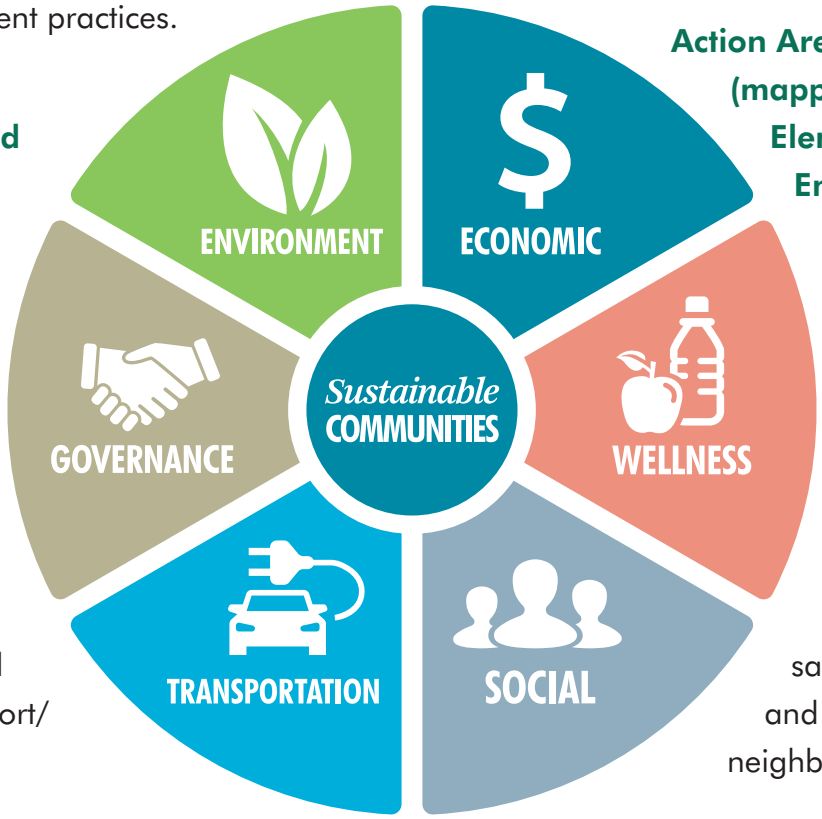
While a comprehensive operational plan will be needed, a roadmap or toolkit can be one mechanism that will help each business line implement activities to help meet the priorities of this company-wide change. To promote Shared Advantage, a communication plan will be useful to engage business line leaders and employees with programming targeted to distinct business groups, from board of trustees, to senior management, to buyers, employees and all those who work to deliver CBRE products and services.

Policy Recommendation: Institutionalizing Shared Advantage. Once business line applications are more common, Shared Advantage can be operationalized throughout the company by developing standard Shared Advantage training modules to be incorporated into company orientation for new staff, vendors or others.. Specific trainings should be conducted to help business lines incorporate action areas of Shared Advantage appropriate to the products and services of that business line. Over time and as needed, programmatic and policy changes will need to be made within a business line to facilitate adoption of Shared Advantage. Emphasis should be given to identifying and promoting successes, both internally and externally, especially as part of marketing and promotional efforts.

Practice Recommendation: Understanding the Components of Shared Advantage. Action areas could be developed by CBRE to guide this work. This project began work on six action areas and their corresponding elements of the socioecological model. The action areas are defined on page 35 based on work being completed by three CBRE business lines.

Action Area 1: Environment (mapped to Natural Environment). Work in this area includes: considerations related to sustainable design, construction materials and processes, building certifications, emission controls and measurement, energy management, and sustainable building management practices.

Action Area 2: Economic (mapped to Economic Opportunities). Work in this area includes: community prosperity and reinvestment; community employment opportunities; increased jobs; and local business support/ procurement.



Action Area 3: Wellness (mapped to Physical Elements of Built Environment, Social Environment, Cultural Resources). Work in this area includes: wellness design elements; fitness facilities; responsible building material and product selection; health education and services; and other exercise and fitness opportunities.

Action Area 4: Social (mapped to Social Environment). Work in this area includes: providing open spaces; dedicated art and entertainment space; community gathering spaces; supply chain diversity; and coordination of special events.

Action Area 5: Transportation (mapped to Physical Elements of Built Environment). Work in this area includes: convenient access to public transportation; infrastructure for alternative transit modes, rideshare and bike share; planning for autonomous vehicles; traffic and safety considerations; and shuttle services to neighboring amenities.

Action Area 6: Governance (mapped to Community Institutions). Work in this area includes: infrastructure, zoning and policy; government engagement; community advocacy, and engagement and stewardship.

Potential Next Steps and Implications

Guided by the results of this research and the input of several CBRE business lines, we have assembled a series of activities for consideration to further advance Shared Advantage. We provide both general and business line-specific next steps.

CBRE and Shared Advantage

Through discussions with our partners at CBRE, several next step activities emerged and will be prioritized in an operational plan providing step-by-step implementation details. Key activities include: developing an implementation plan with well-defined goals and objectives; identifying and testing appropriate measurement tools; developing an assessment plan as well as a communication plan; and instituting policy change that supports the goals of Shared Advantage. These activities would have multiple components that address implementation of Shared Advantage from the granular level (at each property) to systemic change at the corporate level.

Building on this current research describing strategies that promote healthy communities, another recommended next step is to convene experts on the built environment, commercial real estate, research, policy, planning to discuss how to encourage healthy communities within the commercial real estate industry.

Future Research Agenda

Additional research to inform this field should address the health and economic effects of Shared Advantage in communities as well as the design elements of commercial real estate projects that promote community health. Research is also needed on how global corporations measure their contributions to health and well-being, and an assessment of measurement tools that are used for community well-being. In addition, development efforts are needed in the areas of tools, approaches, and components of projects internally and externally to promote Shared Advantage. Finally, creating a business case for Shared Advantage will define the value of commercial real estate investments in community well-being.

Conclusion

This body of work further defines the relationship between commercial real estate and community health and well-being through a review of the literature, analysis of case studies, and interviews with key informants. While these findings are informative, more research is needed to address and answer additional questions on this topic. CBRE, the field of commercial real estate, as well as the larger field of corporations, have advanced beyond general corporate responsibility and are now incorporating company-wide social impact into their work. Shared Advantage is being embraced in practice, and the next step is to create ways for it to be supported by policies. In this way, CBRE will set the bar for commercial real estate and other fields to move in this direction.

References

1. Porter ME, Kramer MR. Strategy and society: the link between competitive advantage and corporate social responsibility. *Harv Bus Rev.* 2006;84(12):78-92, 163. PMID:17183795.

2. Porter ME, Hills G, Pfitzer M, Patscheke S, Hawkins E, Hills G. Measuring Shared Value How to Unlock Value by Linking Social and Business Results. 2011. Boston, MA: FSG. Last accessed July 22, 2017 from http://www.hbs.edu/faculty/Publication%20Files/Measuring_Shared_Value_57032487-9e5c-46a1-9bd8-90bd7f1f9cef.pdf

3. United Nations. Transforming Our World: The 2030 Agenda for Sustainable Development.; 2015:1-35. Last accessed July 21, 2017 from https://sustainabledevelopment.un.org/post2015/transformingourworld

4. Centers for Disease Control and Prevention. Fact Sheet. Impact of the Built Environment on Health. 2011. Last accessed July 21, 2017 from https://www.cdc.gov/nceh/publications/factsheets/impactofthebuiltenvironmentonhealth.pdf

5. Corburn J. Confronting the challenges in reconnecting urban planning and public health. *Am J Public Health.* 2004;94(4):541-546. https://doi.org/10.2105/AJPH.94.4.541. PMID:15053998.

6. World Health Organization. Constitution of The World Health Organization. 45th ed.; 2006. https://doi.org/12571729.

7. Bluyssen PM. Towards new methods and ways to create healthy and comfortable buildings. *Build Environ.* 2010;45(4):808-818. https://doi.org/10.1016/j.buildenv.2009.08.020.

8. Shin J hye. Toward a Theory of Environmental Satisfaction and Human Comfort: A Process-Oriented and Contextually Sensitive Theoretical Framework. Vol 45. Elsevier Ltd; 2016. https://doi.org/10.1016/j.jenvp.2015.11.004..

9. Brunsgaard C, Fich LB. 'Healthy Buildings: toward understanding user interaction with the indoor environment. *Indoor Built Environ.* 2016;25(2):293-295. https://doi.org/10.1177/1420326X16636489.

10. Egger G, Dixon J. Beyond obesity and lifestyle: a review of 21st century chronic disease determinants. 2014; Article ID 7316/8. http://dx.doi.org/10.1155/2014/731685

11. Ries R, Bilec MM, Gokhan NM, Needy KL. The Economic Benefits of Green Buildings: A Comprehensive Case Study. 2006; 51 (3). https://doi.org/10.1080/00137910600865469..

12. Zuo J, Zhao ZY. Green building research-current status and future agenda: a review. *Renew Sustain Energy Rev.* 2014;30:271-281. https://doi.org/10.1016/j.rser.2013.10.021.

13. Hwang T, Kim JT. Effects of indoor lighting on occupants' visual comfort and eye health in a green building. *Indoor Built Environ.* 2011;20(1):75-90. https://doi.org/10.1177/1420326X10392017.

14. Taylor AF, Kuo FE, Sullivan WC. Coping with ADD: the surprising connection to green play settings. *Environ Behav.* 2001;33(1):54-77. https://doi.org/10.1177/00139160121972864.

15. Brown SC, Mason CA, Lombard JL, et al. The relationship of built environment to perceived social support and psychological distress in Hispanic elders: the role of "eyes on the street". *J Gerontol B Psychol Sci Soc Sci.* 2009;64(2):234-246. https://doi.org/10.1093/geronb/gbn011. PMID:19196696.

16. Carlson C, Aytur S, Gardner K, Rogers S. The importance of the "local" in walkability. *Buildings.* 2015;5(4):1187-1206. https://doi.org/10.3390/buildings5041187.

17. Giles-Corti B, Bull F, Knuiman M, et al. The influence of urban design on neighbourhood walking following residential relocation: longitudinal results from the RESIDE study. *Soc Sci Med.* 2013;77:20-30. https://doi.org/10.1016/j.socscimed.2012.10.016. PMID:23206559.

18. Lovasi GS, Bader MDM, Quinn J, Neckerman K, Weiss C, Rundle A. Body mass index, safety hazards, and neighborhood attractiveness. *Am J Prev Med.* 2012;43(4):378-384. https://doi.org/10.1016/j.amepre.2012.06.018. PMID:22992355.

19. Ochodo C, Ndetei DM, Moturi WN, Otieno JO. External built residential environment characteristics that affect mental health of adults. *J Urban Health.* 2014;91(5):908-927. https://doi.org/10.1007/s11524-013-9852-5. PMID:24464242.

20. Wood L, Frank LD, Giles-Corti B. Sense of community and its relationship with walking and neighborhood design. *Soc Sci Med.* 2010;70(9):1381-1390. https://doi.org/10.1016/j.socscimed.2010.01.021. PMID:20189699.

21. Dahlgren G, Whitehead M. *Policies and Strategies to Promote Social Equity in Health.* Background document to WHO – Strategy paper for Europe. Institute for Futures Studies.1991.

Appendix

CBRE Shared Advantage: Promoting Healthy Communities

Appendix 1. United Nations Sustainable Development Goals (UNSDGs)

Appendix 2. Internal Interview Questions

Appendix 3. List of Interviews Conducted

Appendix 4. Methodology

Appendix 5. Case Study Descriptions: CBRE and External Companies

Appendix 6. Published Findings on Health Outcomes Affected by Indoor Elements (Table 1) and Outdoor Elements (Table 2) of the Built Environment

Appendix 7. Community Health Metrics

Appendix 1. United Nations Sustainable Development Goals (UNSDGs)

United Nations Sustainable Development Goals - Defined

SDG 1: End poverty in all its forms everywhere

SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

SDG 3: Ensure healthy lives and promote well-being for all at all ages

SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

SDG 5: Achieve gender equality and empower all women and girls

SDG 6: Ensure availability and sustainable management of water and sanitation for all

SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all

SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

SDG 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

SDG 10: Reduce inequality within and among countries

SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable

SDG 12: Ensure sustainable consumption and production patterns

SDG 13: Take urgent action to combat climate change and its impacts

SDG 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

SDG 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

SDG 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

SDG 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development

Appendix 2. Internal Interview Questions

Interview Guide

Objective of Interviews

The purpose of the CBRE Shared Advantage Project is to identify company-wide best practices to promote healthy communities. The rationale for this research project is that companies and organizations are interested in how their work can create a shared value, defined as generating economic value in a way that also produces value for society by addressing its challenges. Health, defined by the World Health Organization as a complete state of physical, mental, and social well-being, is in some regards a quintessential shared value. As a result, we seek to identify the ways that major companies can promote a shared value that contributes towards healthier communities.

-Please tell me about your role at your company and your involvement in this project.

-Please tell me about any routine company operations that contribute towards community well-being. Are efforts to benefit community well-being part of corporate responsibility plans?

-Please tell me about how this project has contributed towards the well-being of the community around it.

-Could you tell me about any partnerships of your company with public agencies and institutions, community-based organizations or non-profits, or other community engagement activities that may have contributed to community well-being in this particular project?

-How were the activities of this project that contributed towards community well-being determined?

-What were the steps involved in planning this project? Can you tell me about some decision making points that may have helped promote the outcome of community well-being for this project?

-Did you face any obstacles internally in regards to the community well-being activities of this project?

-What are other things that could have been done in this project to benefit the community? Do you have any lessons learned, advice or insight to share?

-Is there a business case in this line of business for efforts to benefit community well-being?

-Has your company developed any performance indicators that address community well-being? Have you faced any challenges/obstacles when prioritizing health and wellness activities at your company?

-We tend to think of health and its determinants very broadly. I'm going to list a few key areas that we see as important factors contributing to the well-being of communities and individuals. I have a list of five of these. Could you describe two or three specific things your company does that might affect each of these and consequently community well-being? Some might not really apply, so if nothing comes to mind, that's fine:

-Physical and natural environment, including greenspace, air quality, noise?

-Social environment, such as social interaction and civic engagement?

-Economic opportunities?

-Community institutions, including libraries, schools and public services?

-Cultural resources, aesthetics and sense of place?

-Can you share the names of other people or colleagues who are doing similar work, or projects that aim to have a similar community benefit, within or outside of your company?

Appendix 3. List of Interviews Conducted

Property Name	Property Location	CBRE Business Lines Involved	Number of Individuals Interviewed
The Brickyard	Compton, CA	Trammell Crow Company	2
2000 Avenue of the Stars	Century City, CA	Trammell Crow Company	1
Atlantic Station	Atlanta, GA	Asset Services	2
Acorn Development	Seattle, WA	Asset Services	1
1900 Sixteenth Street	Denver, CO	Asset Services	1
Metropolitan Park	Seattle, WA	CBRE Global Investors, Asset Services	2

Appendix 4. Methodology

Research Design

This was a three-pronged research design that included qualitative data collection, case study analysis, and supplemental material analysis. This was a qualitative exploratory study of semi-structured individual 1:1 interviews with leaders in commercial real estate. An interview protocol was designed to elicit responses to questions on how health and wellness efforts were designed, planned and implemented for each case study.

Case Studies and Key Informants

This study targeted five case studies from CBRE and CBRE business lines, as well as five case studies from external companies. For each case study, 1-2 possible key informants participated in qualitative interviews. Participants included individuals from executive leadership, supervisors, managers, or employees from the field. In all, 9 interviews were conducted from CBRE business lines.

Inclusion Criteria for Case Studies

Inclusion criteria for CBRE case studies and external companies were to target projects or initiatives that have a significant, positive impact on the health or well-being of a community. For CBRE case studies, specifically, the project was required to not only impact building occupants, but also individuals in the surrounding community. A working definition of health or well-being of a community is any action by a commercial property that contributes towards the social environment, cultural resources/meaningfulness, community institutions, economic opportunities, or natural or physical elements of the built environment within a community.

Inclusion Criteria for Key Informants

Qualitative interviews were conducted on case studies from each of the three CBRE business lines that have been recruited into the CBRE Shared Advantage Project: Trammell Crow Company, Asset Services, and CBRE Global Investors, resulting in a total of six case studies from CBRE. The key informants who were interviewed discussed one commercial real estate project that affected the health or well-being of the community outside or adjacent to a building or development. The key informants were CBRE employees who were knowledgeable on the health and well-being impacts of their company's project, and the process by which health and well-being were incorporated into the project.

Participant Recruitment and Consent

Together with CBRE, potential case studies and key informants were identified by assessing each organizational structure and task force within CBRE business lines and external companies. Once potential participants were identified, they were contacted up to three times via invitation letter or phone inviting them to participate. If key informants expressed interest in participating in the study, an interview date and time was determined. Participants were recruited on a rolling basis. Prior to the interview, participants were emailed the informed consent document to review, and were asked for their verbal consent to participate in the interview prior to the start of the interview. In addition, participants were asked if they give their consent for the interview to be recorded with a digital voice recorder for qualitative data analysis purposes.

Interview Process

Although participants had the option of conducting the interview in person, all interviews took place over the phone. Participants were provided the interview guide in advance to have an expectation of the topics that were going to be discussed. The interview was conducted in a private space where the phone conversation could not be overheard. Interviews had a duration of approximately thirty to sixty minutes.

Interviews consisted of questions that capture information on:
1. The role of the key informant on the case study of interest
2. Policies or programs within the company or for a specific project that impact community well-being
3. Any commitment shown by the company to prioritize community well-being and recognize employee efforts towards community well-being
4. The impact of the case study on community well-being
5. Involvement with outside institutions or partners that affect community well-being
6. How community well-being was intertwined into this case study
7. Steps involved in planning this case study and decision-making points that led to community well-being
8. Obstacles faced by the key informant or colleagues to intertwine community well-being activities into this case study
9. Potential other opportunities to impact community well-being for this case study or other projects
10. The financial or company incentive of incorporating community well-being into this case study
11. Health outcomes specific to physical and natural environments, social environments, economic opportunities, community institutions, and cultural resources as a result of this this case study
12. Suggestions for additional participants for qualitative interviews
13. Regular activities of the company aimed to benefit community well-being
14. Goals and aspirations of the key informant for future community well-being activities within the company

Data Analysis

Collected interview data were transcribed and coded by four trained staff members and students. Each coder was provided with a reference on qualitative data analysis as well as a guide that addressed common questions regarding the coding process. During the training, coders were asked to code an excerpt of an interview to assess accuracy in their coding. Two coders were assigned to code each interview to assess inter-coder reliability. Discrepancies were adjusted for by the project director.

Thematic analysis was used to conduct qualitative data analysis. Data was first coded using a guide that provided supplemental context for each interview question. Data was then further organized using thematic analysis. Thematic analysis facilitated the identification of common themes from participant responses that illustrated approaches and priorities used for CBRE case studies to incorporate community well-being into commercial real estate projects.

Appendix 5. Case Study Descriptions

CBRE Case Studies

The Brickyard – Developer: Trammell Crow Company

The Brickyard is an industrial property that was built in 2016 and is located in Compton, California. This property, at 59 acres in size, was the largest land sale in Los Angeles County since 2006. As it was previously used for brick-making and other types of manufacturing, the property presented environmental concerns and had limited possibilities for use.

During the entitlements process, community concerns regarding the proposed project were brought to light. In addition, the community had a very different vision for the property, which created resistance in being supportive of the proposed development project. Working closely with local residents and the city government, Trammell Crow Company created plans for a development project that addresses local concerns and needs, and also contributes significantly to the infrastructure of Los Angeles County.

Benefits for the community:
- Aesthetically pleasing contribution to the community by removing a long-time vacant lot used for the disposal of construction and demolition debris and other waste
- Potential improvement of air quality
- Street repairs and widening
- Repaired, continuous sidewalks that include a meandering walkway, encouraging physical activity
- Job training for local residents
- Priority of hiring local residents
- Designated funds that contribute towards local schools and recreational spaces

Benefits for the company:
- Through a continuous communication with the community, local government representatives and other stakeholders, the company avoided the community's opposition to their project, which translates into a shorter entitlement process, saving costs for the developer
- Good relations with community members and local government, which can lead to future development opportunities in the community

Atlantic Station – Property Manager: Asset Services

Atlantic Station is a mixed-use property that was built in 2005 and is located in Atlanta, Georgia. This property is comprised of a retail district, office space, townhomes, condominiums, and apartment buildings. This space, at 138 acres, is located on a former brownfields site, and is now utilized by approximately 15,000 people daily.

As the manager of this property, CBRE has illustrated endless possibilities in creating a space that people truly want to live, work, and play. The leadership overseeing this property is constantly guided by this vision, which has resulted in amenities and features that are unique to Atlantic Station. With guidance from and collaboration with the local civic and owner's associations, the community has a meaningful role in the activities, attributes, and design of Atlantic Station, keeping this property true to its mission and preserving the culture that it has created.

Benefits for the community:
- Avenues to communicate concerns and suggestions related to the community to achieve tenant and resident happiness and satisfaction
- Forward-thinking leadership that welcomes change for the betterment of the community

- Addition of more open space and safe areas for children to ride their bikes
- An elective water reuse irrigation system
- Shuttle service onsite and offsite that reduces the need to drive a car
- Electric vehicle charging stations
- Bicycle valet

Benefits for the company:
- Satisfied residents and tenants lead to faster occupation, higher rates of occupied real estate and secure renewing of leases
- The company builds on their public perception, serving as an example of how mixed-use facilities can lead to happy tenants and residents

Metropolitan Park – Investment Manager: CBRE Global Investors; Property Manager: Asset Services

Metropolitan Park (MetPark) is comprised of two office buildings that were renovated in 2015 and are located in Seattle, Washington. This property is owned by CBRE Global Investors, who was instrumental in reshaping the image of the buildings in the Seattle community. As these buildings are located in a part of Seattle that was once considered to be disenfranchised, the activation of interior and exterior space through physical improvements, staffing, and the addition of amenities and programming led to the popularity and uniqueness of MetPark.

CBRE Global Investors worked with Asset Services to implement CBRE Global Investors' 5-Star Worldwide program and culture to reinvent MetPark and to create tenant loyalty and retention. The property manager is very accessible and involved in the activities of each tenant, fostering an engaging community within the property. In addition, MetPark hosts events that encourages and invites community participation, making the office park a staple for the social well-being of community members.

Benefits for the community:
- New greenspace and open space (patios, terraces) available for tenants and the public
- Community activities open to the general public, such as a farmer's market, movies in the park, and other such activities
- Retail stores that are open past business hours to be accessible to the public, not only to tenants
- Responsiveness to tenant needs and feedback from tenants to achieve a high level of tenant and employee satisfaction
- Monthly activities for building tenants
- Building-wide philanthropic efforts that benefit local non-profits and educational institutions
- Citywide shuttle service for employees, resulting in less congestion, fewer emissions, and decreased demand for parking in the community
- Electric vehicle charging stations
- Bike storage for tenants
- On-site locker rooms and showers

Benefits for the company:
- Satisfied tenants lead to higher retention rates and quicker re-leasing when a space becomes available, both of which result in strong income returns
-Community engagement and support enhances the work environment, generates support of the on-site retail and dining establishments and provides opportunities for employee engagement in the community
- Serves as an example of how an office park can have a positive impact on its tenants and the surrounding community

2000 Avenue of the Stars – Developer: Trammell Crow Company

2000 Avenue of the Stars is a mixed-use property that was built in 2007 and is located in Century City, California. This property is comprised of two office buildings, a cultural pavilion, and restaurants, which surround a 4-acre park that is utilized by tenants and the public. This development was the product of an ambitious vision for Century City, as this location was considered to be isolated from other business centers.

Trammell Crow Company, the developer, sought to create a property that would bring tenants from other parts of Los Angeles, as well as address the community's concerns to include a major cultural facility in the plans of the project. The development was replacing a space that was occupied by ABC studios and the Shubert Theatre, which both once held a strong presence in the Los Angeles community. In Trammell Crow Company's efforts to preserve the revered status of the geographical location, the development of 2000 Avenue of the Stars ultimately revitalized Century City, drawing tenants, residents, and visitors from near and far.

Benefits for the community:
- Addition of greenspace for tenants and the public in an area that currently lacks open spaces
- Addition of cultural pavilion to the community
- Aesthetically pleasing contribution to the community
- Contributed to the revitalization of Century City, which was perceived as being deteriorated and losing tenants to more attractive markets at that time

Benefits for the company:
- Good relations with community members and local government, which can lead to future development opportunities in the community
- Avoided community opposition, which generally leads to permit and construction delays, saving money for the developer

Acorn Development – Property Manager: Asset Services

The Acorn Development property in Seattle, Washington is an office park of 11 buildings that were built in 2012 and are managed by CBRE. CBRE also manages 8 additional Acorn Development buildings throughout the city, which ensures consistent tenant experience. This property supports many local initiatives and events in Seattle, utilizing its location and the parks on the property to contribute to the community. In 2014, there was shift in the collaborative efforts of CBRE and Acorn Development to carry out a vision for the future of the property. Bringing together expertise and creativity in brainstorming next steps, CBRE and Acorn Development have made great strides in making the presence of these properties in Seattle meaningful and a place that is exciting to members of its community.

Benefits for the community:
- Community building activities open to all, such as Farmer's markets, 4th of July fireworks, and other
- Greenspace and landscaping for tenants and the public
- Retail stores that are open past business hours to be accessible to the public
- Campus-wide opportunities for employee participation in charitable activities
- Citywide shuttle service for employees
- Protected bike lane and ample bike racks

Benefits for the company:
- Tenants that are happy can lead to higher rates of occupied real estate and renewing of leases
- Serves as an example of how an office park can have a positive impact on its tenants and the surrounding community

1900 Sixteenth Street – Property Manager: CBRE Asset Services

1900 Sixteenth Street in Denver, Colorado is the first multi-tenant office building with a LEED Platinum certification in Colorado, and is managed by CBRE. What makes this property more unique is that in addition to being a LEED Platinum certified building, it is LEED Core and Shell Gold certified and is 100% LEED certified interiors, is therefore the only multi-tenant office building in the world with these three specifications. In the design and development of this project, the property envisioned in a way that is similar to a master-planned community.

The intention was to bring the tenants into the community and make the property enjoyable for all.

The CBRE initiative, Premier Properties, was incorporated in the property to engage with tenants through various activities that include a wellness expo and opportunities for physical activity.

Benefits for the community:
- Located near mass transit options
- Access to greenspace
- Building-wide opportunities for employee participation in charitable activities

Benefits for the company:
- Tenants that are happy can lead to higher rates of occupied real estate and renewing of leases
- Serves as an example of how an office building can have a positive impact on its tenants and the surrounding community

External Case Studies

CalPERS

Shared value for health: Natural environment (climate change and energy efficiency)

CalPERS has a global governance program that helps achieve goals related to environmental, social, and governance factors through sustainable investing. The global governance strategy is comprised of six strategic initiatives: data and corporate reporting standards; UN PRI Montreal Pledge engagement; diversity and inclusion; manager expectations; sustainable investment research; and private equity fee and profit sharing transparency. Three forms of capital are moving this initiative further: physical, which includes use of natural resources and buildings; financial, which includes equity, debt, public and private investments; and human capital, which includes labor practices. These three forms of capital help link sustainability to fiduciary duty. CalPERS' priorities include climate change, new forms of energy, and energy efficiency.

Coca-Cola

Shared value for health: Natural environment (access to clean drinking water)

Coca-Cola established the following goal by 2020: "Safely return to communities and nature an amount of water equal to what we use in our finished beverages." This water replenishment program started in 2005 and was a collaborative effort with communities, governments, and third parties to support projects in which local water needs were addressed through "safe water access, watershed protection, and water for productive use." In order to assess vulnerabilities in the communities, source water protection plans were developed and partnerships for community water projects were made. The goal for 2020 was achieved 5 years early in 2015, where Coca-Cola gave back 115%, or equivalent to 191.9 billion liters (B liters) of water, to 248 community water projects in 71 countries. They used 300.19B liters of water in 2015, and returned 337.7B liters, including 191.9B liters from replenish projects and 145.8B liters of treated waste water.

Grosvenor Group

Shared value for well-being: Community institutions, economic opportunities and social environment (sustainable cities)

Grosvenor Group has a "Living Cities" philosophy which is about creating, managing, and investing in properties that will last long-term. Grosvenor founded this project and collaborated with the London Community Foundation in launching the "Living Cities Community Fund." The goal of this fund is to provide support for grassroots organizations in London to increase access to funding for community activities, finding employment, and helping to create community cohesion.

Unilever

Shared value for health: Natural environment (water)

The purpose of Unilever is to "make sustainable living commonplace." The ways in which they focus on this is through the Unilever Sustainable Living Plan (USLP), a plan that helps Unilever reach its goals as it continues to grow as a company, while making a positive impact in the community. The plan includes meeting three big goals which include, "Improving the health and well-being for more than 1 billion by 2020," "Reducing environmental impact by half by 2030," "Enhancing livelihoods for millions by 2020." The USLP aims to achieve all 17 United Nations Sustainable Development Goals (UNSDGs), and specifically, the water use plan of the USLP aligns with UNSDGs 6, 8, 9, 12, 13, and 17. Current focuses of the water use plan include using resources on further development of products, devices, and services in order to meet the water needs for consumers in countries that are water scarce. Unilever is working to reduce the quantity of water needed to grow crops in these countries, and are working with suppliers. Across the world they are also working to decrease water use in their factories.

Kellogg's

Shared value for health: Natural environment (reduce emissions, energy use, water use, recycling)

Kellogg's has made significant progress in sustainability initiatives. The Chief Sustainability Officer and Board of Directors' Social Responsibility Committee ensure this commitment through guidelines for sourcing activities, making sure there are attainable goals to not only reduce emissions, but also waste, energy use, and water. In order to utilize and sustain the best agricultural practices, they work in partnership with local growers and millers. Furthermore, the GreenBlue's Sustainable Packaging Coalition program, "TheHow2Recycle Label" is a project set out to make the most of the packaging material used for Kellogg's products.

Morgan Stanley

Shared value for well-being: Community institutions (education)

Morgan Stanley prioritizes sustainable investing, as seen through their Institute for Sustainable Investing. One activity of this institute is the Sustainable Investing Challenge, through a partnership with the Kellogg School of Management. The EduIndia Fund, the winner of the 2017 Sustainable Investing Challenge, is a project where an investment vehicle was designed to increase access to high-quality schools in India with the hopes of attracting private investors through achieving market competitive returns. The motivation of this project was to reduce the cycle of poverty by investing in education. The program has a two-part plan to help with financial obstacles that are a barrier to attending school: 1) The EduIndia Fund, which would give private schools capital to increase the number of new students, and 2) providing help to families who cannot pay school fees by working with local microfinance institutions.

Appendix 6. Published findings on Health Outcomes Affected by Indoor Elements (Table 1) and Outdoor Elements (Table 2) of the Built Environment

TABLE 1. PUBLISHED FINDINGS RELATED TO HEALTH OUTCOMES AFFECTED BY OUTDOOR ELEMENTS THE BUILT ENVIRONMENT

Author and Year	Title	Location	Scale	Setting	Domain: Specific Effect
Mental Health Effects					
Ward Thompson et al. (2012)[1]	More green space is linked to less stress in deprived communities: Evidence from salivary cortisol patterns	Other OECD	Block/ Street/ Neighborhood	Public	Effects of greenspace on stress levels
Alcock et al. (2014)[2]	Longitudinal effects on mental health of moving to greener and less green urban areas	Other OECD	Block/ Street/ Neighborhood	Residential	Effect of greenspace proximity on self-reported mental well-being
Astell-Burt et al. (2014)[3]	The association between green space and mental health varies across the life course. A longitudinal study	Other OECD	Block/ Street/ Neighborhood	Residential	Association between greenspace proximity and self-reported mental health
Guite et al. (2006)[4]	The impact of the physical and urban environment on mental well-being	Other OECD	Block/ Street/ Neighborhood	Residential	The association between mental health and perceptions of neighborhood safety, noise and social interaction
Brown et al. (2009)[5] porches, windows	The relationship of built environment to perceived social support and psychological distress in Hispanic elders: The role of "eyes on the street"	U.S./ Canada	Building-Exterior Design	Residential	Effects of architectural features on social Interaction
Ochodo et al. (2014)[6]	External built residential environment characteristics that affect mental health of adults	Other OECD	Building-Exterior Design	Residential	Association between mental health conditions and housing (design elements, residential density and proximity to waste disposal sites)
Taylor et al. (2011)[7]	Coping with ADD: The surprising connection to green play settings	U.S./ Canada	Block/ Street/ Neighborhood	Public	Effect of greenspace exposure on learning and concentration among children with ADD
Physical Health Effects					
Giles-Corti et al. (2013)[8]	The influence of urban design on neighbourhood walking following residential relocation: Longitudinal results from the RESIDE study	Other OECD	Block/ Street/ Neighborhood	Residential	The effect of changes in neighborhood destinations and pedestrian infrastructure on self-reported walking
Carlson et al. (2015)[9]	The importance of the "local" in walkability.	U.S./ Canada	Block/ Street/ Neighborhood	Public	Effect of pedestrian infrastructure on perceptions of destinations being "walkable"
Lovasi et al. (2012)[10]	Body mass index, safety hazards, and neighborhood attractiveness	U.S./ Canada	Block/ Street/ Neighborhood	Public	Effects of neighborhood attractiveness and safety on individual-level Body Mass Index (BMI)

TABLE 1. PUBLISHED FINDINGS RELATED TO HEALTH OUTCOMES AFFECTED BY OUTDOOR ELEMENTS THE BUILT ENVIRONMENT

Author and Year	Title	Location	Scale	Setting	Domain: Specific Effect
Giles-Corti (2006)[11]	People or places: What should be the target?	Other OECD	Block/ Street/ Neighbor-hood	Public	The joint effect of environ-mental and cognitive factors on walking
Roult et al. (2014)[12]	The mobilizing effects and health benefits of proximity sport facilities: Urban and environmental analysis of the Bleu, Blanc, Bouge project and Montreal North's outdoor rink	U.S./ Canada	Block/ Street/ Neighbor-hood	Public	Effects of sports facility on social identity and physical activity
Gao et al. (2015)[13]	Association between social and built environments and leisure-time physical activity among Chinese older adults–a multilevel analysis	Other OECD	Block/ Street/ Neighbor-hood	Public	The association between self-reported physical activity and neighborhood walkabili-ty and social cohesion
Bello and Oyedemi (2009)[14]	The impact of abattoir activities and management in residential neighbourhoods: A case study of Ogbomoso, Nigeria	Emerging Country	City	Com-mercial	Reported impact of an abat-toir on neighborhood air and water pollution, and health symptoms
Social Well-being					
Kondo et al. (2015)[15]	A difference-in-differences study of the effects of a new abandoned building remedia-tion strategy on safety	U.S./ Canada	Building-Exterior Design	Public	The effect of abandoned building remediation on neighborhood crime
Tweed and Sutherland (2007)[16]	Built cultural heritage and sustainable urban development	Other OECD	City	Public	Residents' valuation of herit-age sites for quality of life
Multiple Outcomes					
Kuo and Sullivan (2001)[17]	Environment and crime in the inner city: Does vegetation reduce crime?	U.S./ Canada	City	Public	The effects of neighborhood greenness on violent behav-ior and fear
van den Berg et al. (2010)[18]	Green space as a buffer be-tween stressful life events and health	Other OECD	Block/ Street/ Neighbor-hood	Public	Mental health, stress, physical health
Lee and Maheswaran (2011)[19]	The health benefits of urban green spaces: A review of the evidence	Other OECD	Block/ Street/ Neighbor-hood	Public	Physical health, mental health, social interaction, social isolation
Pretty et al. (2005)[20]	The mental and physical health outcomes of green exercise	Other OECD	City	Public	Mental health, physical health
Sugiyama et al. (2008)[21]	Associations of neighbourhood greenness with physical and mental health: Do walking, social coherence and local social interaction explain the relationships?	Other OECD	Block/ Street/ Neighbor-hood	Public	Mental health, physical health
Wood et al. (2010)[22]	Sense of community and its relationship with walking and neighborhood design	U.S./ Canada	Block/ Street/ Neighbor-hood	Com-mer-cial, Public	Mobility, physical activity, social interaction

TABLE 2. PUBLISHED FINDINGS RELATED TO HEALTH OUTCOMES AFFECTED BY INDOOR ELEMENTS OF THE BUILT ENVIRONMENT

Author and Year	Title	Location	Scale	Setting	Domain: Specific Effect
Mental Health Effects					
Veitch et al. (2007)[23]	A model of satisfaction with open-plan office conditions: COPE field findings	U.S./ Canada	Building-Indoor Design	Workplace	The association between job satisfaction and environmental satisfaction
Kamaruzzaman et al. (2015)[24]	Occupants' satisfaction toward building environmental quality: Structural equation modeling approach	Developing Country	Building-Indoor Design	Workplace	Effects of building characteristics on worker's satisfaction and productivity
Agha-Hossein et al. (2013)[25]	Post-occupancy studies of an office environment: Energy performance and occupants' satisfaction	Other OECD	Building-Indoor Design	Workplace	Effects on worker productivity and satisfaction after moving to a refurbished green building
Thomas (2010)[26]	Evaluating design strategies, performance and occupant satisfaction: A low carbon office refurbishment	Other OECD	Building-Indoor Design	Workplace	Effects on worker satisfaction, perceived productivity and health after moving to a refurbished green building
Allen et al. (2016)[27]	Associations of cognitive function scores with carbon dioxide, ventilation, and volatile organic compound exposures in office workers: A controlled exposure study of green and conventional office environments	U.S./ Canada	Building-Indoor Design	Workplace	Effects of green building and indoor carbon concentration on workers' cognitive scores and worker productivity
Menadue et al. (2013)[28]	The effect of internal environmental quality on occupant satisfaction in commercial office buildings	Other OECD	Building-Indoor Design	Workplace	The association between green building characteristics and perceived workers comfort
Hwang and Kim (2011)[29]	Effects of indoor lighting on occupants' visual comfort and eye health in a green building	Other OECD	Building-Indoor Design	Workplace	The association between daylighting and psychological health and productivity
Physical Health Effects					
MacNaughton et al. (2016)[30]	Environmental perceptions and health before and after relocation to a green building	U.S./ Canada	Building-Indoor Design	Workplace	Health effects of improved air quality after relocating to a green building
Collinge et al. (2013)[31]	Indoor environmental quality in a dynamic life cycle assessment framework for whole buildings: Focus on human health chemical impacts	U.S./ Canada	Building-Indoor Design	Workplace	Effects of air quality and toxics exposure on respiratory health and cancer toxicity
Chan (2011)[32]	Assessment of air quality and performance of central ventilation system	Other OECD	Building-Indoor Design	Commercial	Effects of an improved air quality management system on number of sick days
Brunsgaard et al. (2012)[33]	Evaluation of the indoor environment of comfort houses: Qualitative and quantitative approaches	Other OECD	Building-Indoor Design	Residential	Heat, thermal comfort

TABLE 2. PUBLISHED FINDINGS RELATED TO HEALTH OUTCOMES AFFECTED BY INDOOR ELEMENTS OF THE BUILT ENVIRONMENT

Author and Year	Title	Location	Scale	Setting	Domain: Specific Effect
Multiple Outcomes					
Zuo and Zhao (2014)[34]	Green building research-current status and future agenda: A review	Other OECD	Building-Exterior Design	Commercial	Effects of green building standards on thermal comfort, worker productivity, and physical health
Ries et al. (2006)[35]	The economic benefits of green buildings: A comprehensive case study	U.S./ Canada	Building-Exterior Design	Commercial	Improvement of workers productivity and health after relocating to a green facility

References

1. Ward Thompson C, Roe J, Aspinall P, Mitchell R, Clow A, Miller D. More green space is linked to less stress in deprived communities: Evidence from salivary cortisol patterns. *Landsc Urban Plan*. 2012;105(3):221-229. doi:10.1016/j.landurbplan.2011.12.015.
2. Alcock I, White MP, Wheeler BW, Fleming LE, Depledge MH. Longitudinal effects on mental health of moving to greener and less green urban areas. *Environ Sci Technol*. 2014;48(2):1247-1255. doi:10.1021/es403688w.
3. Astell-Burt T, Mitchell R, Hartig T. The association between green space and mental health varies across the lifecourse. A longitudinal study. *J Epidemiol Community Health*. 2014;68:578-583. doi:10.1136/jech-2013-203767.
4. Guite HF, Clark C, Ackrill G. The impact of the physical and urban environment on mental well-being. *Public Health*. 2006;120(12):1117-1126. doi:10.1016/j.puhe.2006.10.005.
5. Brown SC, Mason CA, Lombard JL, et al. The relationship of built environment to perceived social support and psychological distress in hispanic elders: The role of "eyes on the street." *Journals Gerontol - Ser B Psychol Sci Soc Sci*. 2009. doi:10.1093/geronb/gbn011.
6. Ochodo C, Ndetei DM, Moturi WN, Otieno JO. External built residential environment characteristics that affect mental health of adults. *J Urban Heal*. 2014. doi:10.1007/s11524-013-9852-5.
7. Taylor AF, Kuo FE, Sullivan WC. Coping with ADD: The surprising connection to green play settings. *Environ Behav*. 2001;33(1):54-77. doi:10.1177/00139160121972864.
8. Giles-Corti B, Bull F, Knuiman M, et al. The influence of urban design on neighbourhood walking following residential relocation: Longitudinal results from the RESIDE study. *Soc Sci Med*. 2013. doi:10.1016/j.socscimed.2012.10.016.
9. Carlson C, Aytur S, Gardner K, Rogers S. The importance of the " local " in walkability. *Buildings*. 2015;5:1187-1206. doi:10.3390/buildings5041187.
10. Lovasi GS, Bader MDM, Quinn J, Neckerman K, Weiss C, Rundle A. Body mass index, safety hazards, and neighborhood attractiveness. *Am J Prev Med*. 2012. doi:10.1016/j.amepre.2012.06.018.
11. Giles-Corti B. People or places: what should be the target? *J Sci Med Sport*. 2006;9(5):357-366. doi:10.1016/j.jsams.2006.06.021.
12. Roult R, Adjizian JM, Lefebvre S, Lapierre L. The mobilizing effects and health benefits of proximity sport facilities: urban and environmental analysis of the Bleu, Blanc, Bouge project and Montreal North's outdoor rink. *Sport Soc*. 2014;17(1):68-88. doi:10.1080/17430437.2013.828698.
13. Gao J, Fu H, Li J, et al. Association between social and built environments and leisure-time physical activity among Chinese older adults--a multilevel analysis. *BMC Public Health*. 2015;15:1317. doi:10.1186/s12889-015-2684-3.
14. Bello YO, Oyedemi DTA. The impact of abattoir activities and management in residential neighbourhoods: A case study of Ogbomoso, Nigeria. *J Soc Sci*. 2009;19(2):121-127.
15. Kondo MC, Keene D, Hohl BC, MacDonald JM, Branas CC. A difference-in-differences study of the effects of a new abandoned building remediation strategy on safety. *PLoS One*. 2015;10(7):e0129582. doi:10.1371/journal.pone.0129582.
16. Tweed C, Sutherland M. Built cultural heritage and sustainable urban development. *Landsc Urban Plan*. 2007;83(1):62-69. doi:10.1016/j.landurbplan.2007.05.008.
17. Kuo FE, Sullivan WC. Environment and crime in the inner city: Does vegetation reduce crime? *Environ Behav*. 2001;33(3):343-367. doi:10.1177/0013916501333002.
18. van den Berg AE, Maas J, Verheij RA, Groenewegen PP. Green space as a buffer between stressful life events and health. *Soc Sci Med*. 2010;70(8):1203-1210. doi:10.1016/j.socscimed.2010.01.002.
19. Lee ACK, Maheswaran R. The health benefits of urban green spaces: A review of the evidence. *J Public Health (Bangkok)*. 2011;33(2):212-222. doi:10.1093/pubmed/fdq068.
20. Pretty J, Peacock J, Sellens M, Griffin M. The mental and physical health outcomes of green exercise. *Int J Environ Health Res*. 2005;15(5):319-337. doi:10.1080/09603120500155963.
21. Sugiyama T, Leslie E, Giles-Corti B, Owen N. Associations of neighbourhood greenness with physical and mental health: do walking, social coherence and local social interaction explain the relationships? *J Epidemiol Community Health*. 2008;62(5):e9. doi:10.1136/jech.2007.064287.
22. Wood L, Frank LD, Giles-Corti B. Sense of community and its relationship with walking and neighborhood design. *Soc Sci Med*. 2010;70(9):1381-1390. doi:10.1016/j.socscimed.2010.01.021.
23. Veitch JA, Charles KE, Farley KMJ, Newsham GR. A model of satisfaction with open-plan office conditions: COPE field findings. *J Environ Psychol*. 2007;27(3):177-189. doi:10.1016/j.jenvp.2007.04.002.
24. Kamaruzzaman SN, Egbu CO, Zawawi EMA, Karim SBA, Woon CJ. Occupants' satisfaction toward building environmental quality: structural equation modeling approach. *Environ Monit Assess*. 2015;187(5). doi:10.1007/s10661-015-4447-0.
25. Agha-Hossein MM, El-Jouzi S, Elmualim AA, Ellis J, Williams M. Post-occupancy studies of an office environment: Energy performance and occupants' satisfaction. *Build Environ*. 2013;69:121-130. doi:10.1016/j.buildenv.2013.08.003.
26. Thomas LE. Evaluating design strategies, performance and occupant satisfaction: A low carbon office refurbishment. *Build Res Inf*. 2010;38(6):610-624. doi:10.1080/09613218.2010.501654.
27. Allen JG, MacNaughton P, Satish U, Santanam S, Vallarino J, Spengler JD. Associations of cognitive function scores with carbon dioxide, ventilation, and volatile organic compound exposures in office workers: A controlled exposure study of green and conventional office environments. *Environ Health Perspect*. 2016;124(6):805-812. doi:10.1289/ehp.1510037.
28. Menadue V, Soebarto V, Williamson T. The effect of internal environmental quality on occupant satisfaction in commercial office buildings. *HVAC&R Res*. 2013;19(8):1051-1062. doi:10.1080/10789669.2013.805630.
29. Hwang T, Kim JT. Effects of indoor lighting on occupants' visual comfort and eye health in a green building. *Indoor Built Environ*. 2011;20(1):75-90. doi:10.1177/1420326X10392017.
30. MacNaughton P, Spengler J, Vallarino J, Santanam S, Satish U, Allen J. Environmental perceptions and health before and after relocation to a green building. *Build Environ*. 2016;104:138-144. doi:10.1016/j.buildenv.2016.05.011.
31. Collinge W, Landis AE, Jones AK, Schaefer LA, Bilec MM. Indoor environmental quality in a dynamic life cycle assessment framework for whole buildings: Focus on human health chemical impacts. *Build Environ*. 2013;62:182-190. doi:10.1016/j.buildenv.2013.01.015.
32. Chan KH. Assessment of air quality and performance of central ventilation system. *J Perform Constr Facil*. 2011;25(August):326-335. doi:10.1061/(ASCE)CF.1943-5509.
33. Brunsgaard C, Heiselberg P, Knudstrup M-A, Larsen TS. Evaluation of the indoor environment of comfort houses: qualitative and quantitative approaches. *Indoor Built Environ*. 2012;21(3):432-451. doi:http://dx.doi.org/10.1177/1420326X11431739.
34. Zuo J, Zhao ZY. Green building research-current status and future agenda: A review. *Renew Sustain Energy Rev*. 2014;30:271-281. doi:10.1016/j.rser.2013.10.021.
35. Ries R, Bilec MM, Gokhan NM, Needy KL. The economic benefits of green buildings: A comprehensive case study. *Eng Econ*. 2006;51(3):259-295. doi:10.1080/00137910600865469.

Appendix 7. Community Health Metrics

Inside the Building

1. Indicator: Occupant Comfort

Metric: Occupant Comfort Survey / Source: USGBC. Provides assessment of building occupant's comfort as it relates to thermal comfort, acoustics, indoor air quality, lighting levels, building cleanliness, and any other comfort issues. Survey must be collected from representative sample of building occupants making up at least 30% of total occupants, and it must include an assessment of overall satisfaction with building performance and identification of any comfort-related problems.

Link: http://www.usgbc.org/credits/eq51

2. Indicator: Air Quality

Metric: Air Quality Index (AQI)/ Source: EPA. Assesses pollution in the air, and what associated health effects might be of concern. EPA calculates AQI for five major air pollutants regulated by Clean Air Act: ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide.

Link: https://airnow.gov/index.cfm?action=aqibasics.aqi

3. Indicator: Happiness

Metric: Oxford Happiness Questionnaire / Source: Oxford University. A survey consisting of 29 questions with response options ranging from 1-6 (strongly disagree to strongly agree). The participant's final score indicates his/her current level of happiness.

Link: http://www.meaningandhappiness.com/oxford-happiness-questionnaire/214/

4. Indicator: Daylight

Metric: Daylight Factor / Source: buildings.com. Daylight factor is defined as a ratio of outside illuminance over inside illuminance. The higher the daylight factor, the more natural light that is available in the room. The U.S. Green Building Council LEED rating systems, in Indoor Environment Quality: Credit 8.1, requires a minimum of a 2% daylight factor.

Link: http://www.buildings.com/article-details/articleid/6340/title/a-new-better-way-to-calculate-daylight

5. Indicator: Interpersonal Support

Metric: Interpersonal Support Evaluation / Source: Fetzer Institute. A 12-item measure of perception of social support. This measure is a shortened version of the original ISEL (40 items; Cohen & Hoberman, 1983). This questionnaire has three different subscales designed to measure three dimensions of perceived social support. These dimensions are (1) Appraisal Support, (2) Belonging Support, (3) Tangible Support. Each dimension is measured by 4 items on a 4 point scale ranging from "definitely true" to "definitely false."

Link: http://fetzer.org/sites/default/files/images/stories/pdf/selfmeasures/Self_Measures_for_Social_Support_INTERPERSONAL_SUPPORT_EVALUATION.pdf

6. Indicator: Green Building Benchmarks

Metric: WELL Building Standard / Source: Delos. Focuses predominantly on occupant health; there are no credits for energy or water conservation. The standard specifically takes a biological systems approach and incorporates the following components of health-air, water, nourishment, light, fitness, comfort, and mind. There are credits for ventilation, air quality, lighting, acoustics, and thermal comfort. WELL also included requirements for carbon filters (air and water), drinking water quality, sleep quality, and ergonomic factors. WELL also extends the chemical focus to include environmentally persistent organohalogen and semi-volatile compounds, limiting the use of flame retardants, polyfluorinated chemicals, and phthalates. There are 4 levels of achievement: Core and Shell Compliance, Silver Certification, Gold Certification, and Platinum Certification. For Core and Shell Compliance, one optimization must be achieved from each concept. For Silver, no optimizations must be achieved.

Link: https://www.wellcertified.com/sites/default/files/resources/WELL%20Building%20Standard%20September%202015_0.pdf

Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4513229/

7. Indicator: Quality of Worklife

Metric: Quality of Worklife Survey / Source: CDC. Goals of the Quality of Worklife Survey are to measure how worklife and work experience have changed since the earlier employment surveys and to establish benchmarks for future surveys. Categories and constructs include: job level (41 items), Culture/Climate (11 items), Health Outcomes (9 items), Hours of Work (2 items), Work/Family (4 items), Supervision (3 items), Benefits (1 item), and Union (1 item).

Link: https://www.cdc.gov/niosh/topics/stress/qwlquest.html

Link: https://www.cdc.gov/niosh/topics/stress/pdfs/qwl2010.pdf

8. Indicator: Health and Work Performance

Metric: Health at Work Survey / Source: WHO. Categories include: (A): Your Health, (B): Your Work, and (C): Demographics.

Link: https://www.hcp.med.harvard.edu/hpq/info.php (has all surveys)

Link: https://www.hcp.med.harvard.edu/hpq/ftpdir/HPQ%20Employee%20Version%2081810.pdf

9. Indicator: Building Assessment Survey

Metric: Building Assessment Survey and Evaluation / Source: EPA. The Building Assessment Survey and Evaluation (BASE) Study is a cross-sectional study of public and commercial office buildings across the U.S. The information collected in this study provides normative IAQ data and symptom incidence in typical office buildings. The BASE Study covers three major areas: (1) Environmental and comfort measurements,(2) Building and heating, ventilation and air-conditioning (HVAC) systems characterization, (3) Building occupant demographics, symptoms and perceptions.

Link: https://www.epa.gov/indoor-air-quality-iaq/building-assessment-survey-and-evaluation-study

Link: https://www.arb.ca.gov/research/seminars/girman/girman.pdf

Outside the Building (Urban Planning)

1. Indicator: Walkability

Metric: Walk Score / Source: Walkscore.com. Measures walkability of any address with patented system, and analyzes routes to nearby amenities. Scores range from 0-100, and scale consists of 0-24, 25-49, 50-69, 70-89, 90-100.

Link: https://www.walkscore.com/methodology.shtml

2. Indicator: Bike Paths

Metric: Bike Score / Source: Walkscore.com. Measures whether area is good for biking. Measures bike infrastructure (lanes, trails, etc.) hills, destinations, and road connectivity, and the number of bike commuters. Scores range from 0-100, and scale consists of 0-49, 50-69, 70-89, 90-100.

Link: https://www.walkscore.com/bike-score-methodology.shtml

3. Indicator: Sidewalks and Streets

Metric: Sidewalks and Street Surveys / Source: AARP. Various surveys: A: Mapping Out Your Walk Survey Area; Section B: Crossing the Street (Intersections); Section C: Sidewalks; Section D: Driver Behavior; Section E: Safety; Section F: Comfort and Appeal; Section G: Overall Ratings and Observations. Each section ranks streets or intersections as excellent, good, fair poor.

Link: http://www.aarp.org/content/dam/aarp/livable-communities/plan/assessments/the-how-to-guide-for-sidewalks-and-streets-survey-aarp.pdf

4. Indicator: Building Design and Construction

Metric: Project Checklist for LEED 2009 for Core and Shell Development / Source: USGBC. Refers to building design and construction, including building mechanics, electrical, plumbing, and fire protection systems.

Link: http://www.usgbc.org/resources/core-and-shell-v2009-checklist-xls

5. Indicator: Sustainable Development Indicators

Metric: Sustainable Urban Development Indicators for the United States / Source: Penn Institute for Urban Research. Dimension of Sustainable Urban Development: Social Well-being, Economic Opportunity, and Environmental Quality. Main questions answered by the metric are: 1) Is there at one least indicator related to each of the 20 elements? And how much selection/variety is there within the indicators that cover each element? (Page 20-25 in the link below)

Link: http://penniur.upenn.edu/uploads/media/sustainable-urban-development-indicators-for-the-united-states.pdf

6. Indicator: Urban Design – Walkability

Metric: Urban Design Qualities / Source: Active Living Research. These include imageability (number of buildings with identifiers and noise level), enclosure (number of long sight lines and proportion sky across the street), human scale (number of long sight lines), complexity (number of primary building colors and number of accent colors), tidiness (debris condition and landscape condition). Page 40 describes the qualitative definitions of urban design qualities. See Appendix 3 (pg. 52) for the criteria.

Link: http://activelivingresearch.org/files/FinalReport_071605.pdf

7. Indicator: Streets Connecting Pedestrian Walkways

Metric: Building a Reliable Measure for Unobtrusive Observations of Connecting Pedestrian Walkways / Source: Academic research. Streets connecting pedestrian walkways were defined as those providing pedestrian-only (non-vehicle) access that connected two or more streets, which involved defined paths at least 20 meters in length, and which were on public land (i.e., were the responsibility of the City Council). Inter-rater reliability in the 20 randomly selected walkways was favorable with Kappa scores for 15 items as "very good" or higher, "good", "moderate" or "fair", and "poor". Those items with agreement less than "good" (Kappa <0.6) were the exact number of lights at the start of the walkways, number of lights on route, and the presence of any guttering.

Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242860/

8. Indicator: Transit Quality

Metric: AllTransit Performance Score (0-10) / Source: AllTransit. Overall transit score that looks at connectivity, access to land area and jobs, and frequency of service.

Link: http://alltransit.cnt.org/metrics/

9. Indicator: Park Metrics

Metric: Parks and Recreation Needs Assessment/ Source: L.A. County. Find how much parkland a community has per 1,000 residents. Questions include: What percentage of the population lives within a half mile of a park? How much parkland is available to residents in the area surrounding each park? What amenities are available at each park? What is the condition of each park and its amenities?

Link: http://losangeles.urbdezine.com/2016/07/17/parks-recreation-needs-assessment-l-county-story/

10. Indicator: Building Design and Construction

Metric: LEED-New Construction and Major Renovation / Source: USGBC. Total possible points=110. Categories include: Location and transportation (16), Sustainable sites (10), Water efficiency (11), Energy and atmosphere (33), Materials and resources (13), Environmental air quality (16), Innovation (6), and Regional priority (4). In order to be certified, Silver=40-49; Gold=60-79; Platinum=80-110.

Link: http://www.usgbc.org/resources/leed-v4-building-design-and-construction-checklist

Community Health

1. Indicator: Safety

Metric: Healthy Living Toolkit - Framework for Planning Community Safety and Well-Being / Source: Ontario Association of Chiefs of Police. Encourages municipalities to plan for community safety and well-being at four levels of intervention: social development, prevention, risk intervention, and emergency response. Scale from 1-5: 1=commitment at the highest level; 2=collaborative; 3=risk focused; 4=asset-based; 5=measurable outcomes.

Link: http://www.oacp.on.ca/Userfiles/StandingCommittees/CommunityPolicing/ResourceDocs/1%20-%20Framework%20for%20Community%20Safety%20PlanningJune20.pdf

2. Indicator: Sense of Community

Metric: Sense of Community Index / Source: Community Science. Most frequently used quantitative measure of sense of community in the social sciences. It has been used in numerous studies and among different cultures. The SCI is based on a theory of sense of community presented by McMillan and Chavis (1986) that stated a sense of community was a perception with four elements: membership, influence, meeting needs, and a shared emotional connection. Survey consists of 24 questions with a scale from Not at All, Somewhat, Mostly, and Completely. Subscales include adding certain questions together for the categories.

Link: http://www.communityscience.com/pdfs/Sense%20of%20Community%20Index-2(SCI-2).pdf

3. Indicator: Quality of Life

Metric: RAND Quality of Life Survey / Source: RAND. There are 6 sections: Section 1: Health and Daily Activities; Section 2: Physical Health; Section 3: Pain; Section 4: Daily Activities; Section 5: Your Feelings; Section 6: Social Activities.

Link: https://www.rand.org/content/dam/rand/www/external/health/surveys_tools/mos/mos_core_survey.pdf

4. Indicator: Healthy Neighborhoods

Metric: HealthScore / Source: Healthy Neighborhoods Equity Fund. The HealthScore Rating System is based on a rating of 0-100, with a weighted average of (1): Neighborhood screening criteria, and (2) Project screening criteria. Neighborhood screening criteria measures the need and opportunity for healthy development (25% of total healthscore). Project screening criteria measures how well the project meets the need and capture the opportunity (75% of total healthscore). The factors include: neighborhood walkability, transformative impact, housing choice and affordability, community safety, economic opportunity, green space and recreational access, transit-supportive development, healthy food access, indoor air quality, and building and site performance. The minimum healthscore in order to be considered for investment is 50.

Link: http://www.hnefund.org/projects-eligibility-screening/

5. Indicator: Housing Affordability

Metric: Common Affordability Metrics / Source: Fannie Mae. Measurements include: (1) Housing Cost-to-Income Ratio, and (2) Residual Income Approaches. Common market level affordability measures relate household income levels to some qualifying level of income needed to afford a mortgage on a home. The National Association of Relators housing Affordability Index (HAI) assumes a 20% down payment, and 25% qualifying ratio (i.e., that monthly mortgage and interest payments are 25% of income.

Link: http://www.fanniemae.com/resources/file/research/datanotes/pdf/housing-insights-111215.pdf

6. Indicator: Placemaking

Metric: Active Transportation Performance Measures / Source: Fehr & Peers. Creating vibrant and public spaces for people to live, work, and play. Placemaking efforts contribute to the enjoyment people experience in a given space. Performance Measures: public art and events, community investment, landscaping.

Link: http://www.fehrandpeers.com/wp-content/uploads/2016/09/ATP-Measures-ReportELECTRONIC_31Aug.pdf

7. Indicator: Infrastructure

Metric: Active Transportation Performance Measures / Source: Fehr & Peers. Tracking the quantity and quality of active transportation infrastructure within a study area can help quantify the success of a transportation plan or study in enhancing the area's walkability and bike ability over time. Infrastructure performance measures evaluate street network facilities and the monetary and maintenance investments they require. Performance Measures: street network, network quality, supportive facilities, financial investment, and maintenance.

Link: http://www.fehrandpeers.com/wp-content/uploads/2016/09/ATP-Measures-ReportELECTRONIC_31Aug.pdf

8. Indicator: Design of Highways

Metric: McGrath Highway Corridor HIA / Source: PEW Charitable Trusts. Massachusetts Department of Public Health conducted an HIA to evaluate how alternative designs of the Route 28/McGRath Highway corridor may affect the health of residents. The HIA focused on health impacts related to new park space, multimodal access to region, improvements in air quality and enhanced connectivity between neighborhoods. The HIA examined the ways the expected impacts related to de-elevation of the highway (e.g., air quality, mobility and connectivity, noise, public safety and land use) might influence respiratory and cardiovascular disease, obesity, and stress, among other outcomes. Performance Measures: air quality, mobility and connectivity, noise, public safety, land use and economic development.

Link: http://www.pewtrusts.org/en/multimedia/data-visualizations/2015/hia-map/state/massachusetts/hia-of-mcgrath-highway-corridor

9. Indicator: Access to Good and Services, Healthy Food, Healthcare and Community Services

Metric: Health Impact Assessment-Richmond Highway Transit Center / Source: Fairfax County Health Department. Food environment index is a measure ranging from 0 (worst) to 10 (best) which equally weights two indicators: access to healthy foods and food insecurity.

Link: http://www.fairfaxcounty.gov/hd/hdpdf/health-impact-assessment.pdf