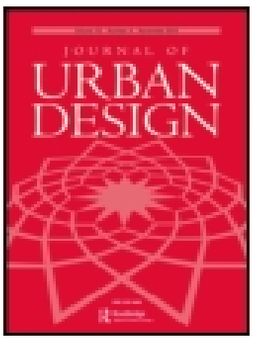

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Place value: place quality and its impact on health, social, economic and environmental outcomes

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ABSTRACT

This paper explores the link between the quality of the built environment and its value, in health, social, economic and environmental terms. This is theorized as 'place value' which, alongside 'place quality', is conceptualized as existing within a virtuous loop in which quality dictates value and value defines quality. To test this, a systematic review brought together wide-ranging international research evidence. The work confirmed a range of definitive associations between the quality of place and its place derived value. It also makes a clear link back from the evidence on place value to the sorts of qualities that enhance or detract from that value. These, in turn, define the constituent elements of place quality.

Introduction

The urban places that most of us inhabit are made up of buildings, streets, spaces and landscape, various land uses and a community of users. 'Place' is therefore a socio-physical construct, and numerous claims are made about the power of place.

The international literature suggests that whoever we are, our everyday engagement with the places in which we live, work and play will influence, for good or ill, the lives we lead, the opportunities available to us, and our personal and communal happiness, identity and sense of belonging (Speck 2012; Montgomery 2013). Place underpins cultural activities and social opportunities. Place is political, influencing provision of and access to common assets, including to grey, green and social infrastructure (Tonkiss 2013; Inam 2014). The quality of places influences and is influenced by housing conditions, real estate markets and our use of technology, and the experience of place is fundamental to our physical and mental health and sense of well-being (Adams and Tiesdell 2013; Barton 2017). Place has an impact on the way we govern ourselves, on our democracy and local decision making, on community togetherness and empowerment (Netto 2017), and on much, much more.

This paper reviews the empirical evidence in order to explore whether the types of benefits outlined above are merely a woolly wish-list of desired benefits advocated by those already convinced about the importance of investing in a high quality built environment, or whether they are statements of fact supported by robust and convincing evidence. If the

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evidence is clear, then arguably policy makers, developers and built environment professionals would be foolish not to make the pursuit of a high quality built environment a top priority. First, however, the evidence needs to be clear, and second, it needs to be presented in a manner that allows the connection to be made between particular qualities of place and the types of value they give rise to for users of the built environment.

To do this the concept of 'place value' is theorized and linked to the allied notion of 'place quality'. The inter-relationships are conceptualized, before the approach taken to the research – a systematic review – is discussed. The evidence is summarized against four policy arenas: health, social, economic and environmental, with each summary concluding with what the evidence tells us about the types of value that place can deliver in each field. By necessity these sections are highly curtailed as space does not permit discussion of the large number of sources used, but the 'raw' data can be found in a more expansive form in a new open source wiki: www.place-value-wiki.net. Finally, some overarching conclusions are drawn out of two types. First, concerning what types of place qualities (design principles) the growing body of evidence reveals as most likely to deliver greatest place value, and second, with regard to overarching findings on the value / quality nexus and the significance and coherence of the collective evidence.

What is meant by place value?

Value is most generically defined as 'a measure of the worth of something' (Carmona et al. 2001b, 14), but this generality means that the concept suffers from an unavoidable 'spread of opinion over meaning' (Eccles 1996). Concepts of value have been most comprehensively developed in the field of economics, and while economic value is only one way of defining and measuring value, it is useful to help explain how people establish preferences and make choices that involve trade-offs in allocating resources (Carmona et al. 2006).

Here, the conceptual distinction between 'exchange' and 'use' value is often made. In economics, exchange value is related to market price as determined by supply and demand and would be derived from some observation of market behaviour of the good which may or may not reflect any universal intrinsic value of the good. Use value, on the other hand, expresses the simple notion that goods can be useful – offer benefits to people – and this reflects the use to which a good can be put. These two values will often be quite different, and, for the same good or service, can even accrue to different parties.

A third and more avowedly 'public' conception of value is described by Abelson (2000, 5) when discussing the impact of heritage buildings as a public benefit. In doing so he draws on a 'common distinction in economics – between internal and external impacts'. In this respect public benefits are the external benefits that cannot be directly appropriated by the owner.

These three notions of value are rooted in classical and neo-classical economics and so tend not to take into account (or do so inadequately) the social and cultural understandings of the term (Eccles 1996). Taking a broader notion of value, one that extends the public conceptions of value, the former Commission for Architecture & the Built Environment (CABE 2006) in England identified six different types of value that can be delivered by the built environment:

- Exchange value: parts of the built environment can be traded;
- Use value: the built environment impacts on the activities that go on there;
- Image value: the identity and meaning of built environment projects, good or bad;

- Social value: the built environment supports or undermines social relations;
- Environmental value: the built environment supports or undermines environmental resources;
- Cultural value: the built environment has cultural significance.

These conceptual notions demonstrate a much broader scope of the concept than that associated with exchange, although still relate poorly to the types of very tangible policy and practice agendas within which politicians, built environment professionals and policy makers typically operate (Mulgan et al. 2006). An entirely different way of thinking about value, therefore, is more straightforwardly the degree to which the different qualities of the built environment impact, either positively or negatively, on different public policy goals. As the intention when embarking on this review was to create findings that were immediately useful to those considering the case for investing in place quality, this was the view taken in the study. This notion, which might be called 'Place value', reflects the idea that a complex but inter-related basket of benefits accompanies any intervention in the built environment and ultimately flows to those with a stake in the place: local residents, investors and developers, everyday users, business owners, public authorities, and so forth. Place value can therefore be defined as 'The diverse forms of value generated as a consequence of how places are shaped'.

The analysis that follows gathers research evidence together under four 'big ticket' policy arenas that governments (national and local) everywhere are typically concerned with: health, society, the economy and environment. These are the areas on which elections are won and lost as they impact so directly on the daily lives of citizens. Testing the extent to which these arenas are influenced by the quality of the local built environment is therefore a legitimate means to make a judgement about the value, broadly defined, of investing in the quality of the built environment; in other words, how do the qualities of place deliver value with regard to enhanced health outcomes, greater societal well-being, economic success and environmental sustainability. If a higher quality built environment adds value in and across these policy arenas, it follows that an intelligent approach to public policy should have a clear place quality dimension at its heart.

What is meant by place quality?

The other side of the coin is place quality. Again, the literature points to a host of over-lapping and poorly defined terms that all have relevance. Liveability, sense of place, urban environmental quality, physical capital, urban design, urbanism and even sustainability are all concepts / fields which are related, which overlap, and which incorporate ideas about the quality of the built environment. Equally, they are frequently contrasted or used as repositories in which almost anything fits (Massen 2002; Van Kamp et al. 2003; Brook Lyndhurst 2004).

The different conceptualizations owe their origins to different policy / practice traditions, each being multi-dimensional and multi-objective and often subject to their own normative prescriptions for what is a liveable place, high quality urban design, sustainable development, etc. Thus Witold Rybczynski (cited in Moore 2000, 208) describes such notions as being like an onion:

> It appears simple on the outside, but it's deceptive, for it has many layers. If it is cut apart there are just onion-skins left and the original form has disappeared. If each layer is described separately, we lose sight of the whole.

By way of example, taking just one such conceptualization, Carmona and de Magalhaes (2009) define 12 measurable elements of 'local environmental quality': clean and tidy, accessible, attractive, comfortable, inclusive, vital and viable, functional, distinctive, safe and secure, robust, green and unpolluted, and fulfilling. Each of these elements, in turn, represents a complex amalgam of issues, that is experienced in a relative manner (in the sense that the experience of it can be either positive or negative), whilst the complexity of the whole spirals on and on.

Cutting through this complexity and relating the issue back to the discussion of value, one way of answering the question 'what is meant by place quality?' might simply be that a high quality place is one which returns the greatest value to its users with regard to meeting and sustaining them in healthy, socially rich and economically productive lifestyles that touch lightly on the environment. Reflecting this position, a deliberately broad and unconstrained notion of 'place quality' was adopted to guide the systematic review, with studies included as long as they related some measurable aspect of public and/or private value to one or more tangible 'qualities' of the built environment, for example, the presence of trees, a mix of uses, walkability, and so forth.

In fact, many of the research studies examined in the review define what they mean by 'place', 'urban design', 'urban quality', 'environmental quality' or a whole host of other descriptors of the built environment quite differently, and most focus on particular very limited aspects or dimensions of what is a broad set of concerns. One consequence of this is that whilst place quality might be strongly associated with the quality of design in the built environment, it also goes well beyond by incorporating the processes and outcomes of development, regeneration and the long-term management of places (as well as their design); in other words the complete place-shaping process (Carmona 2014). In turn, this provides further support for the strategy adopted during the systematic review of seeking and including evidence that expands beyond the purely physical built environment to the social workings of place and to environmental sustainability.

Theorizing place value

The discussion so far can be represented in a simple conceptual framework (Figure 1). This has three elements:

- Policy goals from different policy arenas are mediated through particular qualities embodied in the built environment;
- In helping (or not) to meet those goals, value is added (or deducted), defining a collective 'place value';
- Measures that add place value can in turn be used as a gauge for place quality, aka the desirable qualities of the built environment.

Following this logic, prioritizing a high quality built environment in decision making and associated public and private investments can (in theory at least) positively influence the delivery of a broad range of public policy goals, just as a disregard can detract from it. There is also (potentially) a virtuous loop, with the degree to which environments deliver value (and facilitate key public policy goals), determining whether they are intrinsically high quality or not. The question the research asks is, what does the empirical evidence say, and is this really the case?

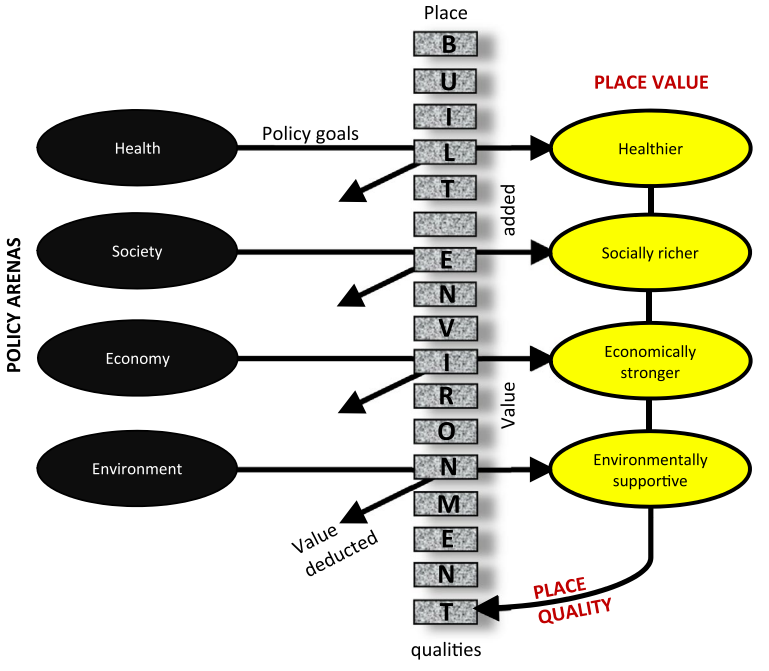

Figure 1. Place value framework.

The research

Systematic reviews are a standard approach used in the sciences to establish what is known and what is not known about a particular topic. They are particularly popular in the medical sciences where different studies can present conflicting findings on an issue and where there is a need to gauge the sum total of knowledge quickly and effectively in order to draw robust and reliable overarching conclusions (Brown et al. 2012). In recent years, these methodologies have also become more popular in the social sciences, driven by the spread of evidence-based policy in the 2000s (The Cabinet Office 2001).

Systematic review

Typically, systematic reviews begin with the identification of a key question or issue in order to focus the search. In this case the review focused on mapping out and presenting the wide range of research on the value added by the quality of place. This was guided by the relationships expressed in the conceptual framework in that research was sought that explicitly conflated aspects or qualities of the built environment with aspects of the public policy goals already outlined. The full range of the public policy dimensions eventually covered by the research is included in Figure 2, although it is important to note that at the start the list was more narrowly defined. The categories emerged as the review developed and as evidence coalesced around certain themes.

To start the review, appropriate search terms were identified and entered into a database of likely evidence sources. The narrower the search and the more specific the terms, the more straightforward a review is likely to be. In this case the terms 'value' and 'place' are

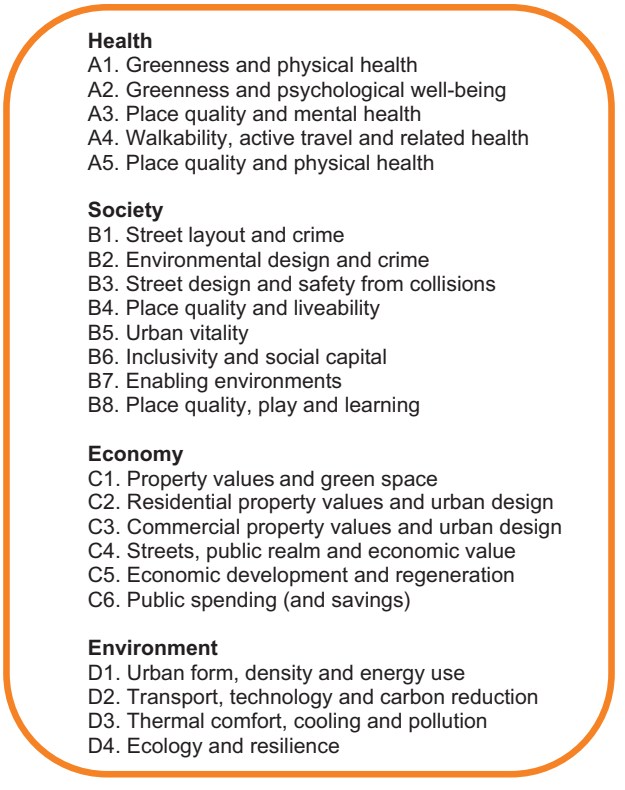

Figure 2. Public policy dimensions covered.

widely used generic terms with broad meanings, and so initial searches using the Science Direct and Sage Databases narrowed the field down by using these terms alongside other identifiers such as urban design, planning, health, crime, social benefits, social inclusion, place-making and added value.

The search was conducted with a cut-off date of March 2017, with a simultaneous search of academic publications through Google Scholar taking the work up to July 2017. Combined, the initial hunts revealed approximately 3300 possible studies. A later search focusing specifically on environmental evidence was undertaken in late 2017. Using Science Direct, that search used 21 unique combinations of terms including: urban design, place, quality, value, pollution reduction, carbon reduction, conservation of built heritage, hydrology, sustainability and so forth. A review of approximately 6300 potential studies were identified from this work (once duplicate results across searches were removed). However, relatively few of these focused at the urban scale (as opposed to that of the building) or on factors that could be linked directly to particular urban qualities.

Concurrently, earlier similar reviews were examined, including Carmona et al. (2001a); (2002) and Woolley et al. (2004) that had been commissioned in the early 2000s by CABE. Since these reviews were conducted, research on the subject has ballooned, as have the scope of studies, the range of primary disciplines within which it is published, and the methodologies employed by researchers. This greater diversity was immediately obvious on launching the new review and informed the decision to take the broader view of 'place

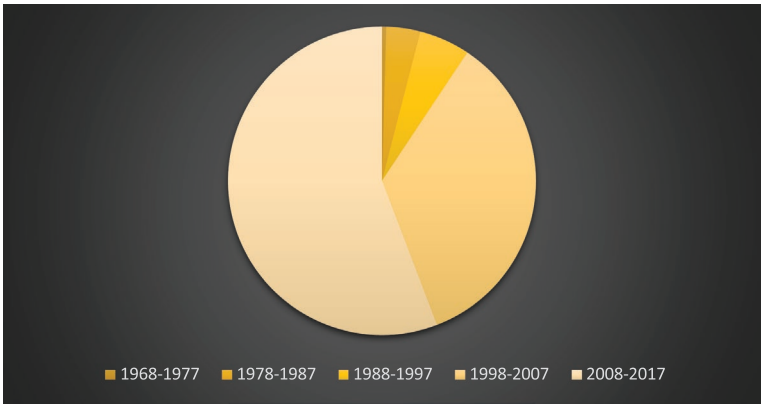

Figure 3. Percentage of studies by decade.

quality' rather than 'design quality' which had been adopted in the earlier studies (Carmona 2016). It was starkly revealed in the percentages of studies from across the decades covered by the review (Figure 3), with the quantity of studies conducted in recent years spiralling. Undoubtedly this is also linked to the greater availability of journals electronically via the World Wide Web in recent years.

Whilst systematic reviews in the medical sciences avoid including publications that have not been through a peer-reviewing process, in the built environment field much valuable research is produced by companies, charities and public sector organizations and distributed via reports. As long as such work met the inclusion criteria discussed below, this 'grey' literature was also included in the review. Once a relevant study was identified, Google Scholar was further consulted in order to identify at least the first 20 related studies. This exercise often tapped into a broader body of similar research that was not always revealed using the key terms alone.

Together, these searches (of earlier similar reviews, the grey literature and related studies) revealed approximately 10,800 records. After removing the duplicates between this and the earlier search results, 13,700 records were identified for possible inclusion in the review.

Inclusion (and exclusion) criteria

From this long list of possible studies, a series of inclusion and exclusion criteria were applied to narrow the selection down across three levels: first, through more critically reviewing the title of the publication to determine its relevance; second, at the level of the abstract; and third by exploring the text in full. Four inclusion criteria were used:

- The study needed to investigate the relationship, whether positive of negative, between some quality of place, and at least one form of value relating to health outcomes, social well-being, economic success and environmental sustainability.
- It needed to report on original research. Review articles were included but only if they drew out a clear new conclusion from a rigorous analysis of the literature.
- The research reported needed to result in a clear conclusion relating to place quality and value. Other conclusions from the various studies examined (e.g., relating to process

issues or policy recommendations) were not considered relevant for the purposes of this research.
- The research methodology needed to be clear and robust. In this respect the grey literature was more carefully examined to ensure studies had used a rigorous methodology or drew from research that had.

When a research project resulted in more than one paper by the same research team looking at a closely related aspect of the work, only the more comprehensive paper was included in the review. The review also excluded research studies that focused exclusively on the construction or internal spaces of buildings, as well as that with only strategic (city-wide or regional) relevance. In other words, there was a scale limitation to the studies included, which needed to be 'urban' and 'place' focused.

All 13,700 studies were examined against the inclusion criteria and in total, 271 studies were considered worthy of inclusion in the review – approximately 2% of the studies identified. These were classified against the four related public policy dimensions and the various sub-categories already set out (Figure 2). Here it is important to note that a significant proportion of the research spanned more than one of the sub-categories, and occasionally (as will be discussed) more than one of the policy arenas.

Whilst the evidence reviewed was truly international in its origins, the search itself was restricted to English language articles and this inevitably biased the results. Of the 271 studies, 38% derived from the USA and 34% from the UK. Other significant contributors to the evidence base included other European countries (notably The Netherlands), Australia, China, South Korea and Canada. Whilst there was a remarkable consistency in many of the findings across very different cultural and environmental contexts, inevitably the research reviewed is dominated by a Western, Anglo-Saxon perspective, and so care needs to be taken in extrapolating the findings to other contexts.

The collective evidence on place value

This is not a review article that relates and discusses in detail the literature on a subject, nor is any claim made that every study included in the review was equally rigorous and definitive in its findings. Space simply does not permit a source by source discussion, and instead the contribution of the paper is in bringing together a large number of empirical studies to examine collectively what they reveal.

In this section, the evidence is brought together in four extended tables.[1] Similar studies are (as far as possible) grouped, and observations are made about the nature and scope of the evidence in the different categories and what, collectively, it tells us about the nature of place value. This is followed, as anticipated in the place value framework (Figure 1), by a discussion of the nature of place quality that the revealed dimensions of value in turn expose.

The evidence on place value and health outcomes

There is a large and rapidly growing body of evidence on the importance of place quality for health outcomes, primarily using scientific methodologies to explore the field (Table 1). A diverse range of physical qualities, and perceptions of those qualities, are studied, ranging from intangible issues such as the importance of a positive sense of place to very

Table 1. The health evidence.

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
A1. Greenness and physical health			
Ulmer et al. (2016)	Health benefits of urban tree canopy	Urban tree cover	lower obesity, better social cohesion, less type 2 diabetes, high blood pressure and asthma
Maas et al. (2006)	Green space benefits by socio-economic group	Presence of local urban green space	Improved general health
World Health Organization (2016)	Urban green spaces and health	Access to urban green space	Improved mental health, reduced cardiovascular morbidity and mortality, obesity and risk of type 2 diabetes, and improved pregnancy outcomes
Lee and Maheswaran (2011)	The health benefits of urban green spaces	Quality and accessibility of green space	Degree of physical activity
de Vries et al. (2003)	Greenspace and self-reported health	Living in a green environment	General population health
Liu et al. (2017)	Urban park accessibility, physical activity and mental health	Park accessibility	Enhanced physical and mental health (self-confidence, energy levels, self-perceived health, mood restoration and relaxation)
A2. Greenness and psychological well-being			
Ulrich (1984)	View through a window and recovery	View from a window onto a natural scene	Shorter post-operative hospital stays and less medical intervention
Burton, Mitchell, and Stride (2015)	Viewing green space and older people's well-being	A green view from living spaces	Enhanced general well-being
Hartig et al. (2003)	Restoration in natural and urban field settings	Sitting in a room with tree views and walking in green space	Decline in diastolic blood pressure
Velarde, Fry, and Tveit (2007)	Health effects of viewing landscapes	Viewing greener landscapes over more urban ones	Short-term recovery from stress or mental fatigue, faster physical recovery from illness, long-term overall improvement in health and well-being
Seresinhe, Preis, and Moat (2007)	The health impact of scenic environments	Scenicness of the local environment	Better general health
Ulrich (1981)	Natural vs. urban scenes and emotional state	Presence of nature and especially water in views	Enhanced psychophysiological state
Van den Berg, Koole, and van der Wulp (2003)	Environmental preference and restoration	Viewing natural environments	Improvement in mood, concentration, restoration from mental fatigue and anxiety-based stress
Lohr and Pearson-Mims (2006)	Emotional responses to trees and tree forms	Urban scenes with trees, and tree shape (rounded not conical)	Positive emotional responses: happier, friendlier, more attentive, less angry, less sad and less fearful
Ulrich (1979)	Visual landscapes and psychological well-being	Urban scenes with natural elements	Less stress and feelings of affection, friendliness, playfulness and elation
Kaplan (2001)	The psychological benefits of natural views from the home	Natural views of gardens, flowers, and well-kept landscaped areas	Increased neighbourhood satisfaction

(*Continued*)

Table 1. (*Continued*).

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
Stigsdotter et al. (2010)	Associations between green space and stress	Easy access to and use of green space	Better general health and reduced stress
Taylor et al. (2015)	Street tree density and anti-depressants	Presence of street trees	Reduced use of prescription anti-depressants
Javad Koohsari et al. (2018)	Open space size, location and depression	Larger and more accessible public open space	More walking and associated health benefits
A3. Place quality and mental health			
Shahirah, LeVasseur, and Michael (2017)	Neighbourhood amenity and depression	Higher neighbourhood amenity	Lower depression
Ellard and Montgomery (n.d.)	Urban quality, mood and physiological arousal	High visual permeability and greenness	Higher levels of positive mood
Ellaway et al. (2009)	Environmental quality, incivilities and mental health	High perceived street-level incivilities and absence of environmental quality and amenities	Increased anxiety and depression
Golembiewski (2017)	The urban environment and severe psychosis	Negative, yet demanding phenomenological experience from the built environment	Severe psychoses (including schizophrenia)
McKenzie, Murray, and Booth (2013)	Urban versus rural impacts on mental health	Relative urbanity	Higher rates of prescriptions for psychotropic medication for anxiety, depression and psychosis
Peen et al. (2010)	Urban / rural differences in psychiatric disorders	The urban environment (against rural ones)	Psychiatric disorders, and for mood disorders and anxiety disorders
White et al. (2010)	Blue space preference and restorative potential	Natural and built scenes containing water	Higher perceived restorativeness (relief from stress)
Williams and Kitchen (2012)	Perceptions of place and mental health	Sense of place	Self-perceived mental health
Guite, Clark, and Ackrill (2012)	The physical environment and mental well-being	Neighbour noise, sense of over-crowding in the home, lack of green spaces and community facilities, and fear of crime	Reduced mental well-being
Kent, Ma, and Malley (2017)	Happiness and the built environment	Perceived walkability, aesthetic quality and sense of a well-connected community	Increased happiness
A4. Walkability, active travel and related health			
Giles-Corti et al. (2013)	Local infrastructure availability and walking	Increased access to public transport and recreational destinations	Increased walking and associated health benefits
Sinnett et al. (2011)	Investment in the walking environment	Street improvements	Increased pedestrian use, reduced traffic collisions
Giles-Corti et al. (2003)	Environmental factors and obesity	Living on a highway, poor pedestrian facilities, poor access to recreation and shopping facilities	Increased obesity
Saelens et al. (2003)	Neighbourhood-based differences and physical activity	Higher residential density, land use mix, street connectivity, better aesthetics and safety	More physical activity and had lower obesity prevalence

(*Continued*)

Table 1. (*Continued*).

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
Lee et al. (2015)	Street pattern (walkability) and obesity-related diseases	More walkable environments	Reduced abdominal obesity, lower hypertension and diabetes
Berrigan and Troiano (2002)	House age as a surrogate for walkability	Walkable street environments (in pre 1973 environments)	Increased walking with associated health benefits
Frank, Andresen, and Schmid (2004)	Mixed use, travel and obesity by ethnic group	Increase in land-use mix	Increased walking and reduction in obesity
Cervero and Duncan (2003)	Urban landscapes qualities, walking and bicycling	Higher land-use diversity, neighbourhood density, and better design	Increased walking and bicycling
Garfinkel-Castro et al. (2017)	Built environment variables and active travel decision-making	Diversity of land uses, design quality, destination accessibility, lower distance to public transport, higher density	Increased active travel decision making
Ewing et al. (2014)	Relationship between urban sprawl, physical activity and health	Greater urban sprawl	Less minutes walked, higher obesity and prevalence of hypertension
Alfonzo et al. (2014)	Walking, obesity and urban design	Connected urban form, presence of parks, public spaces, and pedestrian and cycle amenities, better personal and traffic safety, and aesthetics	Higher walking and lower BMIs
Ameli et al. (2015)	Urban design qualities and walkability	Higher imageability and transparency, and more human scale	Increased walkability
Roberts-Hughes (2013)	Urban quality and perceptions of walkability	Greenery, and streets and parks designed to be safer and more attractive	Better general health and higher perceptions of walkability
Sung, Lee, and Jung (2014)	Built environment and walking in a high density environment	Higher land-use mix and greater access to public transport	Higher levels of walking
Cervero and Gorham (1995)	Pedestrian modal share and urban form	Transit-oriented communities — availability of public transport	Higher pedestrian modal share and use of public transport
Cervero et al. (2009b)	Street design and active travel for utilitarian and leisure purposes	Reserved lanes for bicycles and pedestrians and greater connectivity and density of streets	Higher utilitarian cycle and pedestrian travel
Papas et al. (2007)	The built environment and obesity	Design of the built environment	Body weight (higher or lower)
Zhang et al. (2014)	Neighbourhood commuting environment and obesity	Higher neighbourhood automobile dependency and longer commuting	Increased obesity in urban areas
Frank et al. (2005)	Physical activity and urban form	Increased land-use mix, residential density and intersection density	Higher walkability and exercise
Talen and Koschinsky (2014)	Compact, walkable, diverse districts and health	Compact, walkable, diverse districts	Better general health and more social interaction and safety
A5. Place quality and physical health			
Gebreab et al. (2017)	Neighbourhood social cohesion, food stores and type two diabetes	Higher neighbourhood social cohesion and lower density of unfavourable food stores	Lower incidence of type 2 diabetes

(*Continued*)

Table 1. (*Continued*).

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
Timperio et al. (2017)	Neighbourhood environments and children's physical activity	Higher mix of land uses and availability of playgrounds and sport venues	Less television viewing and higher physical activity
Frank et al. (2006)	Neighbourhood design and air quality	Increase in walkability	Increased time spent in physically active travel and reduced BMI and reduced emission of oxides of nitrogen and volatile organic compounds
Frumkin (2002)	Urban sprawl and health	Presence of urban sprawl	Negative health consequences in obesity, inactivity, social stratification, loss of social capital, higher air pollution and heat stress (although mental health benefits from peace and greenery)
Weden, Carpiano, and Robert (2008)	Perceived neighbourhood quality and adult health	Higher perceived neighbourhood quality	Better general health
Jackson (2003)	Neighbourhood design and human health	Higher-density neighbourhoods, including access to public buildings, open space, mixed land uses, pedestrian walkways, greenery (visually and physically) and urban infrastructure	Increased physical exercise and enhanced civic life
Droomers et al. (2016)	Place-based regeneration and health	Regeneration programmes that focus on place	Better general health

tangible issues, including the presence of fast food stores in neighbourhoods. Some place qualities were investigated by multiple studies, notably the impact of greenery and landscape resources (including parks) on the physical and mental well-being of populations. The related issue of walkability was extensively researched, with a focus on whether the design of the built environment can encourage people out of their cars through the creation of attractive, safe settings within which people can walk to a mix of local facilities and amenities. Between these issues there was a tension, as lower density car-dependant environments integrate more greenery (often in private space) but discourage walking. By contrast, higher density walkable places encourage greater exercise, but with potentially negative health impacting side effects including noise, pollution and the absence of greenery.

Collectively the health evidence was remarkably consistent in its direction of travel, demonstrating that the way places are designed can play a major role in delivering place value care of the wide range of positive health benefits that can be delivered. These include:

- Better physical health: lower obesity, less type 2 diabetes, lower blood pressure, reduced heart disease, lower rates of asthma and respiratory disease, faster recovery from illness, and from fatigue.
- Better mental health: less stress and more psychological restfulness, reduced depression, anxiety and anger, reduced psychosis.

- Better general fitness: increased walking (for both travel and recreation), increased exercise, sport and recreation, and more cycling.
- Greater daily comfort: reduced air pollution, heat stress, traffic noise and poor sanitation, and reduced exposure of lower socio-economic groups to the effects of debilitating neighbourhoods.
- Enhanced quality of life: increased sense of emotional well-being and satisfaction, greater happiness, reduced fear and higher energy levels.

The evidence on place value and social outcomes

The research relating to social outcomes was more diverse than the health research, and more reliant on social scientific rather than scientific methodologies to explore the links (Table 2). In this arena much is written, and many assertions are made in the literature, but the evidence is often open to a greater degree of interpretation, with more studies that failed to meet the inclusion criteria on the basis of a lack of research rigour. Large bodies of evidence were nevertheless collected relating to the impact of aspects of the design of the built environment on crime (notably burglary), on dimensions of social inclusion and social capital, and on the impact of design on urban liveability. Less, but still significant, evidence is available on road safety in the street environment, the creation and impact of urban vitality, and designing for play, learning and for physically enabling environments.

Whilst there was some contrasting evidence relating to issues of street layout, and its impact on crime and sociability, in general the social evidence demonstrated that the way places are shaped has a major impact on delivering aspects of place value through social benefits that range from lower fearfulness to greater happiness. The social evidence is powerful in what it reveals, notably that the manner in which places are designed has the potential to deliver:

- Fewer accidents: reduced collisions and casualties on the road, and reduced fearfulness of accidents.
- Social integration: reduced stratification and greater integration of social groups and larger social networks locally, with stronger social support.
- Lower rates of crime: reduced burglary from homes, lower street crime, less fear of crime, and stronger perceptions of safety.
- Better educational outcomes: increased child independence and positive play behaviours, and enhanced learning and educational achievement.
- Enhanced street level vitality and sociability: a richer public life, enhanced social interaction, and greater longevity of use in urban streets and spaces.
- Stronger civic pride: an increased sense of pride, local morale, social resilience and community life, and enhanced social capital (social and political engagement) generally.
- Greater inclusiveness: enhanced use of the city by marginalized and socio-economically disadvantaged groups, and greater female empowerment and acceptance of cultural and social difference.
- Enabling environments: in older age and for those with disabilities.

Table 2. The social evidence.

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
B1. Street layout and crime			
Johnson and Bowers (2010)	Permeability and burglary risk	Increased permeability and presence on major roads	Elevated burglary risk
Nubani and Wineman (2005)	Street connectivity and crime	High local street integration, connectivity and density	Higher crime in areas of low home ownership (lower in areas of high ownership)
Hillier (2004)	Street layout and crime	Higher permeability, lower street integration and intervisibility and presence of secondary access	Higher burglary
Hillier and Sahbaz (2008)	Layout, vitality and crime	Higher through movement, and number of sides exposed, and lower ground level densities, population densities, local movement, numbers of dwellings in street segments, and mix of uses	Raises residential burglary and on street robbery
Cozens (2008)	Rear parking courts, lanes and crime	Parking in rear lanes and parking courts and more permeable residential street networks	Higher levels of crime
Armitage, Monchuk, and Rogerson (2011)	Layout, parking and crime	Cul-de-sac layouts (vs. through roads and leaky cul-de-sac) and rear parking courts	Reduced levels of crime (in true cul-de-sacs) and highest in leaky cul-de-sacs and in association with rear parking courts
Shu (2000)	Housing layout and crime vulnerability	Global or local segregation in residential layouts and street segment length	Higher property crimes (in segregated areas and shorter cul-de-sacs)
Cozens, Hillier, and Prescott (2002)	Crime and characteristic British housing designs	Absence of defensible space characteristics, signs of decay and dereliction, multiple dwelling units	Higher levels of crime and fear of crime
Chang (2011)	Spatial factors and burglary rates	Intelligible (legible) areas with good permeability (visual and physical)	Reduced vulnerability to crime
B2. Environmental design and crime			
Loukaitou-Sideris et al. (2001)	Measuring the effects of the built environment on bus stop crime	Good visibility of the bus stop from its surroundings, existence of bus shelters, lower traffic and parking, absence of environmental decay	Lower crime rates
Loukaitou-sideris (1999)	Hot spots of bus stop crime and the environment	Coexistence and combination of negative environmental attributes and a general lack of defensible space	Higher public nuisance and crime rates
Nasar and Fisher (1993)	Hot spots of fear and crime	Physical environments that allow concealment for offenders, and blocked prospect and escape for victims	Crime and fear of crime concentrates in these 'hot spots'
Austin, Furr, and Spine (2002)	Housing, neighbourhood conditions and personal safety	Deteriorated neighbourhood conditions	Increased concerns for safety and decreased levels of satisfaction with the neighbourhood physical environment
Casteel and Peek-Asa (2000)	Crime prevention through environmental design and retail robberies	Crime Prevention Through Environmental Design (CPTED) strategies	Reduced robbery rates
Armitage and Monchuk (2011)	Secured by Design	Secured by Design (SBD) crime reduction strategies	Reduced burglary rates
Seo and Lee (2017)	Crime prevention through design and social activity	Crime Prevention Through Environmental Design (CPTED) strategies	Increased social activities, sociability, external play, and sense of community and reduced disorder and fear of crime
Painter and Farrington (1997)	Improved street lighting and crime	Improved street lighting	Reduced crime and victimization

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Table 2. (*Continued*).

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
Painter and Farrington (1999).	Improved street lighting, crime and displacement	Improved street lighting	Reduced crime and no displacement to adjacent areas
Welsh and Farrington (2008)	Improved street lighting and day time and night time crime	Improved street lighting	Increased community pride and reduced night-time and day time crime
Farrington and Welsh (2007)	Improved street lighting and crime prevention	Improved street lighting	Reduced crime, increase in perceived public safety and greater use of public space
Kuo and Sullivan (2001)	Crime rates and vegetation	Greenness in the built environment	Fewer property crimes and violent crimes
Maruthaveeran and Konijnendijk van den Bosh (2015)	Fear of crime in urban parks	Concealment (vegetation), being alone, signs of physical disorder, presence of social incivilities, familiarity, prior information about crime, and previous crime experience	Higher fear of crime
Schweitzer, Kim, and Mackin (1999)	The built environment, crime and fear of crime	Physical characteristics of urban blocks, including presence of a nearby convenience or grocery store and of porches and shared driveways	Higher levels of crime and fear of crime
Foster, Giles-Corti, and Knuiman (2010)	Residents' fear in new suburban housing developments	More walkable neighbourhoods	Less fearfulness and a greater sense of safety
Christian et al. (2011)	Built environment, BMI and perceived safety from crime	Environmental factors, including walkability	Higher BMI and perceived crime
Kowaltowski and Granja (2011)	Desired security in social housing	Design for security in the external residential environment	Perceptions of well-being
B3. Street design and safety from collisions			
Dumbaugh and Gattis (2005)	Street liveability and safety	Liveability streetscape treatments	Enhanced roadway safety
Dumbaugh and Rae (2009)	Street design and collision incidences	Disconnecting local street networks and relocating non-residential uses to arterial thoroughfares	Increased incidences of traffic-related crashes and injuries (reduced incidents in traditional, pedestrian-scaled retail configurations)
Ewing, Scheiber, and Zeeger (2003)	Urban sprawl and pedestrian fatalities	More compact and less sprawling development	Reduced all-mode traffic and pedestrian fatality rates
Ewing and Dumbaugh (2009)	Road design and safety	Dense urban development with less 'forgiving' design treatments, such as narrow lanes, traffic-calming measures, and street trees close to the roadway	Increased traffic safety, fewer miles driven, lower speeds, less fatalities
Mohammad Rifaat, Tay, and de Barros (2010)	Street pattern and crash severity	Loop and lollipop street patterns	Stronger traffic calming effect and reduced fatality risk, but reduced sight distances leading to increased probability of injury to pedestrians and cyclists
Marshall and Garrick (2011)	Street network design and safety	Denser street networks with higher intersection counts	Fewer crashes across all severity levels and higher levels of walking (additional lanes lead to more crashes)
MVA Consultancy (2009)	Shared space, impact and use	Shared space street design	Better visual amenity, economic performance and perceptions of personal safety. No safety benefit or dis-benefit. Difficulties for some visually impaired people

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Table 2. (*Continued*).

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
MVA Consultancy (2010a)	Shared spaces in operation	Shared space street design	Reduced traffic speed, more careful driver behaviour
MVA Consultancy (2010b)	Shared space and user perceptions	Shared space street design	Poor user experience with a preference for clearly demarcated areas for vehicles and pedestrians
B4. Place quality and liveability			
Venerandi et al. (2016a)	Well-being and urban form	Well-connected and easily accessible, characterized by green areas and predominance of historic properties, a dense street network, grid-shaped	High levels of well-being, walking, sociability, less pollution and stress, feelings of safety and better eating habits
Gilderbloom, Riggs, and Meares (2015)	Walkability and social resilience	Walkability	Reduced foreclosures and crime, greater social resilience and higher housing values
Jansen (2014)	Values and preferences in housing environments	Innovative residential design, mixed neighbourhoods, urban settings	Greater self-direction in resident character (less concern for security, family, traditional design)
Appleyard and Lintell (1972)	Traffic and street liveability	Traffic intensity on urban streets	All aspects of perceived liveability – absence of noise, stress and pollution; levels of social interaction, territorial extent and environmental awareness; and safety – correlate inversely (with more traffic)
Hart and Parkhurst (2011)	Traffic and social interaction	Traffic intensity on urban streets	Reduced social interaction, friendships, home territories, child independence (with more traffic)
Sauter and Huettenmoser (2008)	Traffic and neighbourhood contacts	Slower traffic speeds	Greater personal development, contentment and social integration
Shafer, Lee, and Turner (2000)	Green links and quality of life	Urban greenway trails	Better community quality of life through resident fitness, resident pride, reducing pollution, reducing transportation costs and providing better connectivity
Weber et al. (2017)	The impact of urban greenways	Proximity to greenways	Raising property values, providing places for outdoor recreation and social spaces for gathering
Thompson et al. (2004)	Urban woodlands and quality of life	Urban woodlands	Raises quality of life capital, child education
Byravan et al. (2017)	Quality of life from sustainable development	Reduced air pollution and resource use in construction	Quality of life improvements
Klichowski and Patrício (2017)	The human brain, ICT and the outdoors	Opportunities for outdoor recreation and play	Human cognitive satisfaction
B5. Urban vitality			
Whyte (1980)	Social life in spaces	Public space pedestrian accessibility, integration (with the street network), comfort, and adaptability	More social spaces
Gehl (2010)	Cities for people	Increased pedestrianization, reduced traffic and parking, and cycle lane provision	Longer and more sociable use of public spaces and greater bicycle use

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Table 2. (*Continued*).

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
Carmona (2014)	Determinants of space occupancy and use	High levels of transient use, microclimate control, grass to sit on, movable seating, and presence of 'amenities' — cafes / restaurants, shops, big screens, band stands, kiosks, markets, sports facilities, toilets, seating, etc. — and 'features' around and in a space — fountains, paddling pools, street pianos, public art, sculptural furniture, play equipment, skating opportunities, etc.	Space animation through engagement with the space, learning through play, informal social exchange, longer use (visual permeability though spaces have little impact)
Anderson et al. (2016)	Lively social space, well-being activity, and urban design	Small-scale public realm improvements	Increased community users and life
Sullivan, Kuo, and Depooter (2004)	Vital neighbourhood spaces	Green space provision (vs barren spaces)	Increased use and social activity (particularly amongst women) and reduction in anti-social behaviours
B6. Inclusivity and social capital			
Thompson, Corkery, and Judd (2007)	Community gardens and happy communities	Presence of community gardens	Enhancing physical, emotional and spiritual well-being through opportunities to relax, undertake physical activity, socialize, mix with neighbours, learn environmental practices, food production
Thompson and Kent (2014)	Connecting and strengthening communities	High quality, safe streets and spaces and contact with nature	Significant to health, social interaction and community building
Worpole and Knox (2008)	The social value of public spaces	Presence of local 'everyday' public spaces	'Feel-good' buzz from a busy street scene; therapeutic benefits of quiet time spent on a park bench; places where people can display their culture and identities and learn awareness of diversity and difference; opportunities for children and young people to meet, play or simply 'hang out'.
Palaiologou and Vaughan (2014)	Sociability of the street interface	Narrow building plots and high threshold frequency, functional mixture, morphological and building mixture, short street segments	Vibrant street life, pedestrian flows and co-presence on the street
Bramley et al. (2009)	Social sustainability and urban form	Higher density neighbourhoods	Reduced neighbourhood pride and attachment, stability, safety, environmental quality, and home satisfaction. Higher use of local services, including transport. Higher social interaction and group participation (up to a point)
ActionAid (2015)	Women's empowerment and the city	Improved urban infrastructure and pedestrian-focused street lighting and safety	Empowering women in cities
Carlson et al. (2011)	Public support for street-scale urban design practices	Quality of local street design	Influences public engagement and civic action in the built environment (and amount of physical activity)

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Table 2. (*Continued*).

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
Talen (2006)	Designing for diversity	Strong edges, grids with commercial corridors and mixed housing types	Facilitates community (social and cultural) diversity
Page (2000)	Social housing and resident satisfaction	Public housing estate modernization	Higher morale of estate residents and enhanced social capital
Leyden (2003)	Social capital and the residential design	Walkable, mixed-use neighbourhoods	Higher social capital (compared with those in car-oriented suburbs), social and political engagement and trust in others
Richard et al. (2009)	Neighbourhood qualities and social participation	Perceptions of neighbourhood user-friendliness	Higher social participation
Holtan, Dieterlen, and Sullivan (2015)	Social life and tree cover	Density of urban tree cover	Higher social capital
Roberts (2007)	Designing for mixed income communities	Tenure blind design	Facilitates a degree of social interaction between different income groups
Freeman (2001)	Urban sprawl and social ties	Sprawl and vehicle based urbanism	Undermines social ties among neighbours
Hochschild (2015)	Cul-de-sacs and social cohesion	Cul-de-sac based housing layouts	Increased neighbourliness (particularly in 'bulb' shaped cul-de-sac)
Alidoust and Bowman (2017)	Sociability of Masterplanned communities for ageing	Increased safety, walkability, accessibility (including to 'third places') and the provision of soft edges within developments	Better social health amongst older aged residents (greater segregation undermines health)
Brown et al. (2008)	Older people and social support	Low levels of positive front entrance features	Reduced sociability and poor physical functioning amongst elders
McCarthy and Saegert (1978)	High-rise and social withdrawal	Living in high-rise residential building environments	Social overload manifested in perceptions of crowding, less control, safety, and privacy, problematic social relationships, and dissatisfaction with the residential environment
Gifford (2007)	Well-being and high-rise living	Living in high-rise residential building environments	Less satisfaction amongst low income residents, greater behaviour problems amongst children (reflecting their play opportunities), fewer friendships and greater fear of crime
Rosenburg Weinreb and Rofè (2013)	Emotional responses to the built environment	Areas that are verdant and cared for, offer natural views and show signs of children's play (vs. areas perceived to be ugly, dirty, unkempt, uncared for, neglected or abandoned)	Generate positive feelings (vs. negative feelings)
Florida, Mellander, and Stolarick (2011)	Beauty and community satisfaction	Urban beauty in communities	Perceived community satisfaction (economic security, better schools, and social interaction)
Venerandi et al. (2016b)	Urban form and the tendency to gentrification	Traditional, fine-grained, perimeter block-based urban form, with calm, internal streets at their cores, and strong connection to main amenities and transport	Tendency to gentrification

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Table 2. (*Continued*).

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
Mouratidis (2017)	Urban form and social relationships	Shorter distances to the city centre, higher densities, and presence of mixed land uses, including 'third places'	Greater satisfaction with personal relationships, larger local networks and social support, overall social well-being
B7. Enabling environments			
Clarke, Ailshire, and Lantz (2009)	Disability and the built environment	Pedestrian friendly (as opposed to car dependent) environments	Lower mobility disability in old age, particularly amongst women and those with lower education
Clarke et al. (2008)	Mobility, Disability and the built environment	Poor street condition (characterized by cracks, potholes, or broken curbs)	Leads to much greater mobility disability among adults with more severe impairment in neuromuscular and movement-related functions
Rosso, Auchincloss, and Michael (2011)	Older mobility and disability in the built environment	Higher street connectivity. Better street conditions and safety against traffic. Proximity to amenities	Greater mobility
Clarke and George (2005)	Built environment and the disablement process	Limited land-use diversity	Greater dependency amongst older adults and greater car dependence
Grant (1997)	Pedestrianization and disability	Pedestrianization	Offer greater freedom for mobility impaired groups
Blackman, Van Schaik, and Martyr (2007)	Dementia and the outdoor environment	Segregation of pedestrian space from motor traffic and use of clear text based signage	Enhances self-reliance amongst those with dementia
B8. Place quality, play and learning			
Hochschild (2012)	Cul-de-sacs and children's play	Cul-de-sacs street layouts	Greater perceived safety and therefore freedom for children (to play) and less deviant activities amongst children
Othman and Said (2012)	Cul-de-sac design and play	Cul-de-sacs street layouts and vegetation	Encourages sociality and opportunities for children to play
Foreman (2017)	Residential street design and play	Home zones (Woonerfs), cul-de-sacs, traffic-calmed streets, safe networks (with little or no traffic	All facilitate increased play (to some degree)
Biddulph (2012)	Home zones vs. traffic calming	Home zone residential street layouts	Facilitate children's external play, and allow adults to relax and socialize in their streets
Biddulph (2010)	Home zones, liveability and play	Home zone residential street layouts	Gave rise to lower traffic speeds and continued low or reduced numbers of traffic accidents, perceived safety for children to play out, and reduced levels of crime and antisocial behaviour
Tanner (2000)	Learning environments and academic achievement	Clearly defined pathways, positive outdoor spaces, and a positive overall impression in school design	Predictors of high academic attainment
Coopers (2001)	School capital investment and pupil performance	Better designed teaching environments	Higher staff morale and willingness to spend time after school. Greater pupil motivation, pride in their surroundings and enhanced parental support.
Britain (2005)	Design value in higher education	Well-designed campus buildings and environments	Better recruitment of staff and of students, and better perceived performance, particularly amongst staff

The evidence on place value and economic outcomes

Evidence relating to the economy was most numerous, accounting for almost 100 of the 271 studies selected as meeting the inclusion criteria (Table 3). Research methods here were diverse, but often related particular place quality dimensions to large-scale quantitative analyses of property datasets with the intention of extracting key explanatory variables for how and when economic value was added. In this task a wide range of studies sought to compare economic value with dimensions of greenness and open space provision, whilst other qualities of the built environment, for example, street layout, permeability, architectural design, and so forth, are typically examined separately in studies that focus on particular property sectors, notably residential or commercial. A smaller but relatively coherent group of studies focused on the impact that streetscape improvements have in their surrounding areas, whilst a more diverse collection of studies focused on the impact of the built environment on larger processes of economic development and regeneration, or on public spending (including on healthcare and social care costs).

In this policy arena there was a remarkable confluence in the research, with very little conflicting evidence. This growing body of work suggests strong private as well as public benefits from place quality, and that this is, again, overwhelming given the richness of the available evidence. Caution is required, however, when interpreting the results as certain outcomes such as rising property values, may not always be considered desirable outcomes in every context; for example, where property values are already high and certain users and / or uses are being priced out of the market. Collectively the evidence suggests that how places are shaped can deliver:

- Property uplift in the residential sector: influenced by access to views, trees and open space, lower pollution, mixed use (up to a point and as long as homes are not too close to retail), walkability, neighbourhood character, access to public transport (if not too close to homes), external appearance, public realm quality, connectivity and vitality.
- Property uplift in the retail sector and reduced vacancy: influenced by urban greenery, walkability, public realm quality, external appearance, street connectivity, frontage continuity; all leading to increased retail viability.
- Property uplift in the office sector, and reduced vacancy and depreciation: influenced by walkability, external appearance, design innovation and street connectivity.
- Viable investments and extended regeneration benefits: by making investment more attractive, enhancing competitiveness through differentiation, and strengthening community support for development.
- Reduced public expenditure: through reduced capital and maintenance costs for roads infrastructure, reduced public realm maintenance and management (including security) costs, support for the historic built environment and urban regeneration, lower crime and policing costs, and reduced health and social care expenditure (thanks to reduced levels of medication, prescriptions and hospitalization).
- Higher local tax take: through attracting new development, and generating a greater willingness to pay for place services from businesses and communities alike.
- Lower costs of living: through lower car use and public transport costs (more viable / cost effective public transport), and lower costs for health insurance, and reduced energy consumption and smaller carbon footprints (from transport, infrastructure and buildings).

Table 3. The economic evidence.

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
C1. Property values and green space			
Benson et al. (1998)	The value of a view	Good views from buildings	Views have economic value and the willingness to pay for a good view can be high
Anderson and Cordell (1988)	Trees and residential sales prices	Housing in the vicinity of landscaping with trees (especially large trees)	Trees raise property values and property tax revenues
Wolf (2007)	City trees and property values	Trees and forest cover in development growth areas	Homes with trees are generally preferred to comparable homes without trees. Trees on the building plot and adjacent to it raise market prices
Mohamed (2006)	Paying for nature	Residential developments with stronger landscape integration	Carry a market premium, and assuage concerns about higher density
Li et al. (2016)	Air pollution, nature and housing values	Urban amenities and accessibility factors such as air pollution, forest coverage, quality of public schools, and commuting cost	Air pollution and the lack of forest coverage have the most significant and detrimental effect on housing values
Nilsson (2014)	Natural open space and house price variation	Open landscape amenities in residential areas	Open land is valued higher where undeveloped land is scarce and home densities are relatively high
Peiser and Schwann (1993)	The value of open space in residential areas	Presence of structural green space in residential areas	Perceived as having aesthetic, exercise and play functionality and as adding value to homes
Correll, Lillydahl, and Singell (1978)	Greenbelt proximity and residential values	Greenbelt areas in neighbourhoods	Properties adjacent to the greenbelt fletch a premium
CABE Space (2005)	The value of parks	Presence of a high quality park	Overlooking or being close to a high quality park adds economic value
Anderson and West (2006)	Open space and residential property values	Proximity to open space	Proximity adds economic value. Values are higher in neighbourhoods that are dense, near the central business district, high-income, high-crime or home to many children
Lutzenhiser and Netusil (2001)	Open space types and housing values	Type and size of open spaces	All open space types have a positive impact on property values (natural area parks the highest)
Kong, Yin, and Nakagoshi (2007)	The amenity value of open green space	Accessibility to parks and plazas	There is a positive value impact of greater accessibility to green spaces, with larger proportions of green space adding greater value
Zhang et al. (2012)	Public green space and property values	Residential proximity to green spaces	Proximity to parks adds economic value
Cho, Bowker, and Park (2006)	Open space, water bodies and housing values	Proximity to parks and water bodies	Natural and constructed amenities are valuable attributes in housing demand and positively impact sale prices
McCord et al. (2014)	Green space availability and residential value	Urban green space proximity	A significant positive impact on residential properties sale price for the terrace and apartment sectors, much less for detached and semi-detached sectors
Curran (2001)	Economic benefits of natural green space protection	Natural open space proximity	Proximity has a positive effect on real estate values that residents will pay to protect

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Table 3. (*Continued*).

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
Smith (2010)	Valuing greenness	Presence and amount of parkland space	Proximity increases house prices as does the quantity of local green space
Irwin (2002)	Valuing absence (of development)	Presence of permanently preserved open space in residential areas	A premium associated with permanently preserved open space over other types
Dewaelheyns et al. (2014)	Valuing open space continuity	Size and continuity of open space in residential areas	Larger and contiguous open spaces are valued more highly
McConnell and Walls (2005)	Value of open space in urban locations	Types of open space (parks, greenways, forests, and other natural areas) and location relative to households	There is value to preserving all types of open space in urban locations. Values vary with the size of the area, proximity to residences, and the type
Kopits, McConnell, and Walls (2007)	Private versus public open space	Size and location of open space	Adjacency to open space has a positive effect on house price, as do increases in open space size
C2. Residential property values and urban design			
Boys Smith, Venerandi, and Toms (2017)	Urban form and the value of amenities	Quality of green space (as opposed to quantity or proximity), proximity to heritage, walkability, connected street networks, diversity in form, land use and transport	High quality street based urbanism carries an economic premium. But homes located adjacent to low quality green space suffer a depreciation in value
Diao and Ferreira (2010)	Residential property values and auto dominance	Auto dominance (and accessibility to public transport and jobs, connectivity and walkability)	Property values are positively associated with accessibility to public transport and jobs, connectivity and walkability and negatively related to auto dominance
Dittmar et al. (2007)	Valuing sustainable urbanism	Qualities of sustainable urbanism	Enhances development value in all markets (particularly when low demand)
Savills (2010)	The value of residential layout	Permeability, connectivity, street layout	More permeable and connected street networks exhibit higher property values (connections at the local level only reduce value)
Asabere (1990)	The value of residential street layout	Cul-de-sac streets layouts	Generated a premium over grid street patterns
Savills (2016a)	The value of place-making	Investing in place-making	Investing early in high quality place-making rises values
Song and Knaap (2004)	Mixed land uses and housing values	Mixing land uses and parks into residential areas	Housing prices are higher where non-residential land uses are evenly distributed. Parks and neighbourhood store create an economic premium if in walkable distance
Matthews and Turnbull (2007)	Neighbourhood layout, access to retail and property value	Proximity to retail sites	A significant positive effect in grid street neighbourhoods, but none in curvilinear and cul-de-sac based layouts.
FPDSavills Research (2003)	The value of housing design and layout	Density, proportions of open space, sense of place, design innovation	Design innovation, higher proportions of open space and built form that creates a sense of place add an economic premium. Density does not necessarily decrease value

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Table 3. (*Continued*).

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
Tu and Eppi (1999)	The value of new urbanism	New Urbanist housing principles (public space, interconnected street networks, pedestrian oriented design, a mix of uses and neo-traditional architecture)	Consumers are willing to pay a premium
Lacy (1990)	Market appreciation and neo-traditional housing	Neo-traditional development	Yields a higher rate of return on investment over conventional development
Buitelaar and Schilder (2017).	The economics of style (in housing)	Architectural styles in residential developments	Neo-traditional styles and buildings that refer to traditional styles fetch a premium
Ahlfeldt and Mastro (2012)	Valuing proximity to iconic (residential) design	Proximity to iconic heritage buildings in residential areas	A premium is paid up to 50 m from iconic units
Thorsnes (2000)	Internalizing neighbourhood externalities	Size of residential developments	Larger developments allow developers to internalize neighbourhood externalities and generate a premium
Bowes and Ihlanfeldt (2001)	Connectivity to rail and property values	Presence and proximity of rail stations in residential areas	Houses very close to stations suffer reduced property values from negative externalities (e.g. higher crime), but those at an intermediate (one-quarter to three miles) distance benefit from the transportation access
Bartholomew and Ewing (1995)	The value of pedestrian and transit-oriented development	Transit-oriented development	Adds a premium from the accessibility benefits, and also from the other amenity benefits of TOD
Levine and Inam (2004)	The market for smarter growth	Pedestrian- and transit-oriented development	An inadequate supply leads to a market premium of non-standard development layouts and forms
Groves and Niner (1998)	External improvements and housing markets	Public investment in the exterior of properties	Revives areas with a weak housing market
Nase, Berry, and Adair (2016a)	Real estate value and quality design in residential properties	Connectivity and vitality associated with building density, appropriateness of material quality, and fenestration and massing in relation to the surroundings	Add real estate value to residential properties
RICS (2016)	Place-making and value	Better place-making in residential areas	Place-making adds economic value although the size of the premium varies widely
Yang, Song, and Choi (2016)	Commercial land use and residential values	Commercial activity in residential areas	Beyond a very local area marked by negative externalities, higher land values are supported
Cervero and Duncan (2004)	Land use diversity, land values and taxation	Land-use diversity in residential areas	Land-use diversity contributed positively to residential land values and land taxation receipts
Cervero et al. (2009a)	Elevated freeway removal, traffic impacts and property prices	Replacement of elevated freeways	Freeway-to-boulevard conversions yield net positive benefits (including in house prices) without sacrificing transportation performance
Whitbread (1978)	Trade-off qualities in the residential environment	Proximity to bad neighbour uses or eyesores	Removal of eyesores within residential contexts represents a valuable investment. House price change is an indicator of overall quality change

(*Continued*)

Table 3. (*Continued*).

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
C3. Commercial property values and urban design			
Sohn, Moudon, and Lee (2012)	Density, mix and value	High development density, land use mix and walkability	High development density can increase retail values. Pedestrian infrastructure and land use mix increases residential rental property values
Cervero and Duncan (2002)	Public transport connectivity and commercial values	Proximity to public transportation	Substantial capitalization benefits for commercial land parcels near light and heavy rail stops
Pivo and Fisher (2011)	The walkability premium in commercial investments	Greater walkability	The benefits of greater walkability are capitalized into higher office, retail and residential values, but not in the industrial property sector
Nase, Berry, and Adair (2011)	Exterior design quality and office rents	External design quality	Higher exterior design quality leads to a price premium in the office rental market, even in times of depression
Nase, Berry, and Adair (2016b)	Real estate value and quality design in commercial office properties	Higher design quality specifications across interior, exterior and urban scales	Higher specifications across all scales generates a rent premium. Connectivity, materials quality,- and building facade distinctive-ness enhance corporate image
Cheshire and Dericks (2014)	'Iconic design' as deadweight loss	Trophy architect design	Trophy architects seem able to squeeze more space on to a given sit leading to a value premium
Baum (1993)	Quality vs. depreciation in the office property market	Building quality (configuration and external design factors)	There is a positive relationship between building quality and return on investment, notably from the resistance of rental values to depreciation
Vandell and Lane (1989)	The economics of office architecture	Architectural quality	A strong positive influence of design on rents and vacancy
Hough and Kratz (1983)	Good architecture and the market	Architectural (aesthetic) excellence	New architecturally significant office buildings carry a significant premium (not associated with old office buildings)
Baum (1994)	Quality and retail property performance	Retail design (plan layout, durability, aesthetics)	Better configuration leads to higher income and capital return through rental growth. Better external appearance leads to a higher capital return through yield.
Joye et al. (2010)	Urban greenery, retail experience and spend	Urban greening, especially trees	Trees were associated with higher ratings of amenity and visual quality. Trees are consistently associated with higher price points and higher levels of patronage
Wolf (2003)	Urban greenery and retail valuations	Urban greenery	Higher price valuations are mediated by inferences of district character and product quality, notably the presence of urban greenery
Nase, Berry, and Adair (2013)	High street retail properties and quality of design	Aspects of quality design (connectivity, frontage continuity and variety, material quality and massing appropriateness)	All these aspects of quality add to real estate value

(*Continued*)

Table 3. (*Continued*).

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
Roberts (1995)	The value of public art on buildings	Public art on buildings	Public art makes buildings distinctive, and contributes to securing quality tenants and minimizing void rental periods
Fuerst, McAllister, and Murray (2011)	Signature architecture and value	Buildings designed by signature architects	Office buildings designed by signature architects have higher rents and sell for higher prices
C4. Streets, public realm and economic value			
UN UN Habitat (2013)	Streets as drivers of prosperity	Presence of quality street space	Quality street space drives productivity, infrastructure development, environmental sustainability, quality of life, and equity / social inclusion
Lawlor (2013)	Better streets and retail performance	Walkability, streetscape quality, vehicle access	Better streets for walking can significantly boost footfall and trading. Walkers spend more than drivers
Carmona (2015)	The value of mixed street corridors	Mixed use street environments	Support large-scale employment, social well-being and physical and economic development and strategic growth potential
We Made That & LSE Cities (2017)	High street economic opportunities	Traditional high street qualities	The economic capacity of high streets is highly adaptive, hosting large-scale employment opportunities and social welfare and health benefits, particularly for the vulnerable and elderly
CABE Space (2007)	The value of good street design	Public realm quality	Improvements in streetscape quality lead to direct increases in retail rents and residential apartment prices. Pedestrians are willing to pay through higher council tax or public transport fares for improvements
New York City, Department of Transportation (2012a)	Economic benefits from investing in streets	Bike paths, expanded walking facilities, new parks, streetscape improvements, bus transit facilities	Variously the public realm improvements delivered reduced commercial vacancy and higher retail sales
New York City, Department of Transportation (2012b)	Economic benefits of sustainable streets	Improved accessibility and a more welcoming street environment	Improvements in retail sales data
Carmona et al. (2017)	The value of street-based improvements	Public realm improvements on mixed high street locations	Benefits to everyday users of streets, and to the occupiers of and investors in surrounding property: office and retail rental value uplift, boost in static and active street activities (particularly leisure based street activities), and strong perceptions of improvements, including to general vibrancy (no residential value uplift or alterations to traffic flows)
CBRE & Gehl Architects (2017)	The value of public realm	Public space improvements	Value uplifts (sometimes substantial) from improved image and character, a new destination for commercial or recreational facilities, added versatility for events, improved experience (comfort, enjoyment and willingness to dwell)

(*Continued*)

Table 3. (*Continued*).

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
Savills Research Report to the Cabinet Office (2016b)	Street-based value in estate regeneration	Redevelopment of post-war Modernist housing with street based urbanism	Potential for far greater densities and more housing, plus enhanced neighbourhood, community and commercial facilities
C5. Economic development and regeneration			
Worpole (2000)	The value of architecture	High quality architecture	Flagship architectural projects have a clear economic impact, and impact on people's perception of an area and decisions to locate there
Places Matter (2009)	Good design in a downturn	Aspects of architectural design in a downturn (appearance, space and layout)	In a challenging economic environment, good design had a positive effect on rental and capital values and on occupancy and take-up rates
Bell (2005)	Masterplans, property markets and value	Masterplanned development	Economic benefits are perceived by promoters of development from designing a public realm that is seen as higher quality by potential users
English Heritage (2002).	The heritage dividend	Heritage based regeneration	Heritage based place-making can lever in funding many times the original investment, including in economic development
Ahlfeldt, Holman, and Wendland (2012)	Conservation area designation and property values	Heritage based designation	Residential properties fetch a premium and appreciate faster
Brennan and Tomback (2013)	The use of historic buildings in regeneration	Retention and investment in heritage buildings	Investment in historic buildings generates a substantial premium in the local economy
Designed to Move (2015)	Active cities and competitiveness	Low cost health based physical interventions (to encourage physical activity)	Reduced health insurance, better health and cuts in noise and expenditure on fuel
Spencer and Winch (2002).	Design and occupier productivity	Well-designed buildings (that better meets occupier needs)	Well-designed buildings deliver substantial productivity boosts
Carmona et al. (2001b)	The value of urban design	Better urban design (more attractive, accessible, legible, connected, mixed, resilient, etc.)	A wide range of economic and social benefits, including higher returns on investments (rental returns and capital values); responding to occupier demand; helping to deliver more lettable area; reducing management, maintenance, energy and security costs; more contented and productive workforces; differentiating places and raising their prestige; boosting civic pride and enhancing civic image
McIndoe et al. (2005)	The value of better urban design	Better urban design (local character, connectivity, density, mixed uses, adaptability, high quality public realm)	Attracts skilled workers, assists in promotion and branding; reinforces a sense of identity; increases vitality and viability of local services; encourages walking and cycling and greater social cohesion; reduces pollution; enhances social equity and economic activity; encourages safe use of space, civic pride and engagement.

(*Continued*)

Table 3. (*Continued*).

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
La Rosa et al. (2017)	Spreading regeneration benefits further	Greater permeability, compactness and mixed use	Net positive benefits spread to surrounding areas by connecting regenerated areas to existing urban fabric
Ryan and Weber (2007)	New development in distressed neighbourhoods	Urban design types and preferences	Infill housing is more highly valued than either enclave or traditional neighbourhood development (TND) housing. Residents prefer greater integration with the surrounding neighbourhood
C6. Public spending (and savings)			
Willis and Osman (2005)	Economic benefits of accessible green spaces	Accessible, attractive and well-cared for greenspace	Substantially lower social costs from physical activity, lower obesity and psychological quality of life benefits
Zapata-Diomedi, Herrera, and Veerman (2016)	Built environment attributes and health care costs	Density, land use mix, availability of destinations, distance to public transport, design and neighbourhood walkability	Each attribute can lead to significant health care cost savings due to preventable physical activity-related diseases, with associated health adjusted life year benefits
Pineo (2016)	The value of healthy places	Healthy and unhealthy neighbourhoods	Many expensive 'lifestyle diseases' are preventable, and are strongly influenced by the built environment, leading to high health costs and loss of productivity. Poor people are also more likely to live in neighbourhoods which are worse for health
Litman (2004)	Economic value of walkability	Increased walkability	Increases the access (of people to goods) and decreases consumer costs, notably in personal travel, alongside significant health care savings to society
Leinberger and Alfonzo (2012)	The economics of walkability	Increased walkability	Increase a place's triple bottom line: profit (economics), people (equity) and planet (environment). Notably in office, residential and retail rent premiums and capital values. In higher retail sales and lower transportation costs, but also higher housing costs
Sheldon et al. (2007)	Valuing the urban realm	Good, bright, even lighting after dark; vehicles prohibited from parking on the pavement; direct green man crossings; and pavements with no cracks and which are even	People are willing to pay for street improvements through increased local taxation or public transport fares to enhance the quality of streets
MVA Consultancy (2008)	Valuing urban realm qualities	Design responses focused on personal security, good street lighting, the quality of environment generally, and good maintenance	Improvements in these qualities increased sale prices for residential apartments and increased shop rental values. Business users are willing to pay higher business rates (taxation) to see the street environment improve
Ewing et al. (2009)	Compact city savings	Compact city (over sprawl) urban structures	Reductions in vehicle miles travelled, CO^2 emissions, and infrastructure costs

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Table 3. (*Continued*).

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
Glaeser and Gottlieb (2008)	Compactness and negative amenities	Compact city urban structures	Little evidence of a negative impact of population due to urban disamenities (e.g. higher crime, pollution and congestion)
Mittman and Kloss (2014)	The economic benefits of green infrastructure	Green infrastructure in urban developments	A cost-effective solution to storm water management with energy savings, air quality, and climate-related benefits
CABE Space (2009)	The real value of park assets	Green infrastructure (including public parks)	Green infrastructure is consistently undervalued, leading to an associated undervalue of their worth
Landscape Institute (2014)	Housebuilders and landscape investment	Sustainable urban drainage (SuDS) and open space in relation to development	Developers are willing to pay a premium for land in close proximity to open space. SuDS bring considerable savings over traditional drainable solutions in both capital and maintenance costs
Ekblom et al. (1996)	Safer cities and the cost of burglary	Reducing crime risk through design	Preventing burglary through design is less than the financial cost of that burglary to victims and the state
Zhan & Chui (2016)	Life cycle net benefits of low impact development	Benefits of low impact development (LID) practices (green roofs, bioretention systems and porous pavements)	Large potential net economic, environmental and social benefits are possible annual and life cycle
Nicol, Roys, and Garrett (2015)	The cost of poor housing	Poorly constructed and designed housing	The total cost of poor quality housing on health is similar to that of smoking or alcohol
Simmons, Desyllas, and Nicholson (2006)	Failed design	Bad design (that which fails)	Design that fails carries huge potential costs, economically, socially and environmentally. Those who pay for bad design are typically the community in general.

- Higher productivity: more efficient property and workers, easier recruitment of employees, the enabling of higher density development and more efficient land use, greater adaptability of buildings and spaces over time, and avoiding the unnecessary costs associated with bad design.

The evidence on place value and environmental outcomes

The final grouping of evidence was also the thinnest with regard to the quantity of robust evidence uncovered (Table 4). This may seem surprising given the quantity of energy related research being conducted globally, but can be explained by the place focus at the urban scale, which excluded in the process the very large number of studies from the sustainability literature that relate to technical construction / building design issues, the many transport related studies that focus on transport modal choices, energy studies focusing on strategic energy generation and use, and the extensive range of generic landscape and ecology focused studies without a clear place dimension. Of those that remained, evidence on the

Table 4. The environmental evidence.

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
D1. Urban form, density and energy use			
Ewing and Rong (2008)	Sprawl and energy use	Urban form, house type	Residential energy use varies with house type and house size and these vary with the degree of urban sprawl. The average household consumes less energy (and emits less carbon) if living in a compact locality
Ratti, Baker, and Steemers (2005)	Energy consumption and urban texture	Urban form / geometry / texture	The variation of energy consumption relating to urban geometry (or texture) has a tremendous impact on the energy use, particularly in hotter and colder climates where more compact building forms are less wasteful
Chen et al. (2011)	Urban form and energy consumption	Land fragmentation vs. compact forms	As urban size increases energy consumption increases. Fragmented urban land use patterns are correlated with increased energy consumption
Wilson (2013)	Residential density and energy consumption	Urban form characteristics	Urban form characteristics matter at the micro-scale: compact residential development provides opportunities to manage electricity consumption, and by extension, greenhouse gas emissions. Higher density leads to less energy consumption
Ward et al. (2015)	Carbon release and urbanization	Urbanization vs. vegetated ecosystems	Annual CO_2 exchange among urbanized study sites is many times that of vegetated ecosystems
Lee and Lee (2014)	Urban form and carbon emissions	Urban form, household travel	More compact, mixed-use urban forms dramatically reduce CO_2 emissions and energy consumption
Makido, Dhakal, and Yamagata (2012)	Compactness and carbon emissions	Compact development, urban form regularity, density	Greater compactness and less irregularity correlated with lower CO_2 emissions, but extreme density and mono-centrism lead to higher CO_2 emissions
Jones and Kammen (2014)	City size, density and carbon emissions	Urban form, density, population	Lower household carbon footprints are found in urban core cities. Population density exhibits a weak but positive correlation with carbon footprints until a density threshold is met
Fang, Wang, and Li (2015)	The shape of cities and greenhouse gas emissions	Shape complexity of cities (perimeter-to-area ratios)	Integrated (compact) urban forms with regular shapes lowered greenhouse gas emissions
Liu, Song, and Song (2014)	Compactness and CO_2 emissions efficiency	Compactness, social infrastructure	Optimizing efficiency requires a balance between compactness and investment in public services to manage the resulting high population density
D2. Transport, technology and carbon reduction			
Tiwari, Cervero, and Schipper (2011)	Integrating transport and urban design strategies	Transport mode, place-making	Rapid bus and light rail show significant reductions in carbon emissions and better place-making than 'business as usual'

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Table 4. (*Continued*).

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
Nakamura and Hayashi (2013)	Low-carbon urban transport and land uses	Low-carbon transport strategies, urban development and land use	Encouraging density, transit oriented development and transit corridor development coupled with economic interventions such as road pricing may significantly reduce CO_2
Alawadi (2017)	Generating sustainable form-based strategies	Form-based urban design strategies and environmental, social, and economic coherence	Moving to a compact city model leads to reduction in infrastructure and service expenses; reduced heat gain and cooling load during daytime hours; and facilitating passive cooling strategies
Liu and Sweeney (2012)	Housing form and energy use	Land uses, urban form, density, building age	Domestic energy use is sensitive to land use type; age; size of housing; household density. Newer, smaller, apartments in denser built areas consume less energy
Zhou et al. (2013)	Mixed use, density and energy consumption	Mixed use, density, transport energy	Mixed-use developments with greater density lead to lower transportation energy consumption
Ishii et al. (2010)	Carbon reducing technologies and urban form	Technological interventions, land uses and density	Integrating technological interventions in medium scale development reduces greenhouse gas emissions most significantly
Wang et al. (2017)	CO_2 emissions in megacities	Urban structure, public transport	Reductions in urban sprawl and more integrated public transportation networks reduce CO_2 emissions
D3. Thermal comfort, cooling and pollution			
Yahia et al. (2017)	Urban design and thermal comfort outdoors in warm-humid climates	Building height, tree cover	Areas with low-rise buildings suffer from greater heat stress in urban spaces. Dense trees help to enhance the thermal comfort conditions
Bowler et al. (2010)	Cool towns and cities	Parks and trees	Green sites are cooler than non-green sites. Larger parks are cooler than smaller ones. Shade from trees lowers temperatures. Cooling extends beyond a green area's boundaries
Xu et al. (2017)	The cooling and energy saving effect of landscape	Shading and trees	Optimal cooling benefits can be obtained by a combination of manmade and natural elements, notably designed shading and trees
Swinbourne and Rosenwax (2017)	Tree canopy, comfort and value	Tree coverage, street maintenance	Greater street tree canopy coverage reduces urban heat, and costs of maintenance, and increases property values
Akbari, Pomerantz, and Taha (2001)	Energy, cool surfaces and shade trees	Cool surfaces and urban trees	Cool surfaces (cool roofs and cool pavements) and urban trees can have a substantial effect on urban air temperature, reducing cooling-energy use and smog
Ward and Grimmond (2017)	Surface cover and energy use	Urban greening, building height	Building upwards has a smaller impact on the urban energy balance than building on vegetated areas. Greening has the greatest effect

(*Continued*)

Table 4. (*Continued*).

Study	Study focus	Dimensions of place quality	Aspects of value added (deducted)
Ko and Radke (2014)	Urban form and reducing energy load through cooling	Higher population density, east-west street orientation, higher green space density, and a higher sum of tree heights on the east, south and west side of houses	All have a statistically significant effect on summer cooling energy consumption
Jamei et al. (2016)	Urban geometry, greening and outdoor thermal comfort	Street-level greening, building form, density and placement	The placement, density and distribution of buildings affects the creation of heat islands by the shaping the flow of air and sunlight exposure. Street-level greening cools urban environments by providing shade and mitigating heat build-up
Honold et al. (2012)	Pollution and resident behaviours	Traffic noise, air pollution, greenery	Neighbourhood satisfaction scores are strongly impacted by levels of traffic noise, air pollution and availability of green space. Perceived air pollution has the biggest impact on health behaviours
Braubach and World Health Organization (2011)	Traffic noise exposure and health	Road traffic noise	Road traffic noise is a significant risk factor for ischaemic heart diseases
Shield and Dockrell (2003)	Community noise exposure and stress in children	Neighbourhood noise	Children living in relatively noisy neighbourhoods have raised blood pressure, heart rates, levels of stress hormones, and reduced motivation leading potentially to 'learned helplessness' syndrome
D4. Ecology and resilience			
Liao, Le, and Van Nguyen (2016)	Urban design principles for flood resilience	Design for flooding	Designing for flooding leads to a greater sense of well-being and an appreciation of the positive side of flooding and nature
Li (2012)	Eco-hydrology and good urban design	Eco-hydrology, green space, place-making	Increasing greenspace, using water and other natural features as place making devices and incorporating more permeable surfaces in the built environment facilitates storm water management
Tratalos et al. (2007)	Ecosystem performance and density	Density, ecosystem management, trees and greening	High density urban developments are associated with poor ecosystem performance, but at any given density, there is substantial scope for maximizing ecological performance
McKinney (2008)	Urbanization and species richness	Urbanization, density	Extreme urbanization (representative of urban cores) almost always reduces species richness. Moderate (suburban) urbanization leads to greater richness
Ye et al. (2015)	Green/blue space availability and energy use	Density, green and blue space access	The benefits of compactness may be offset by household distance to greenspace and water bodies. Better access can positively impact urban energy use
Flynn et al. (2016)	Eco-cities and sustainable lifestyles	Sustainable communities, resident behaviours	Reduced energy consumption in communities built as sustainable exemplars derives principally from improved technology, not lifestyle change

relationship between the environment and quality of place relied on a mix of natural and social scientific data which were categorized into four types. Most prolific were energy studies relating to particular urban form / density profiles and studies with a focus on urban cooling and thermal comfort. Smaller categories of studies focused, respectively, on transport integration and use and on questions of local ecology and resilience.

A remarkable consistency in what the evidence revealed helped to overcome its relative paucity, with many of the findings strongly reinforcing those associated with the other policy arenas. Collectively the research pointed to multiple potential environmental benefits from how places are shaped, including:

- Reduced energy use and associated carbon (greenhouse gas) emissions: through the creation of urban forms that need less heating and cooling and require less private (vehicle) travel.
- Adaptive reuse: buildings, spaces and urban infrastructure that is adaptable over time and more able to support the changing needs of society within the existing built fabric (and its embodied energy).
- A viable local exchange network: with local facilities, amenities and employment opportunities reducing the need to travel further afield and supporting local economic and social resilience.
- Reduced heat stress and enhanced thermal comfort: particularly for pedestrians through greater greening and shading in urban areas.
- Reduced waste: through a lower demand for construction materials and a reduction in construction waste.
- Reduced pollution: including atmospheric pollution and noise pollution (with knock-on health and well-being benefits).
- Greater resilience: through accommodating and managing hydrological cycles and working with (rather than against) natural phenomena.
- Ecological diversity: through supporting a greater diversity of species and a greener built environment.

The collective evidence on place quality

As well as revealing much about the nature of place value through the lens of the different policy arenas, the collective evidence also revealed a good deal about the types of places that deliver that value, and more specifically about the qualities of the built environment that do that. As was argued earlier, this can be seen as one way of defining what is meant by place quality, in other words, those places that deliver greatest value, in all its guises, are by implication of high quality. They may not be particularly unique, innovative or remarkable in any way, but day-to-day they successfully influence positive health, social, economic and environmental outcomes.

Whilst, in order to relate the evidence to the constituent policy arenas, these different forms of value have been separated and discussed individually, much of the research evidence cuts across the different arenas and sub-categories. A few studies cut across three of the arenas (e.g. Carmona et al. 2001b; McInloe et al. 2005; Leinberger and Alfonzo 2012) and explore triple bottom line benefits of investing in place quality. A much larger group connects

two policy arenas, reinforcing the multiple potential benefits from well-designed interventions in the built environment[2]:

- Health and environmental: notably tying a greener and less polluted environment to better general health across the generations, e.g. Shield and Dockrell (2003); Braubach and World Health Organization (2011); Honold et al. (2012).
- Health and social: linking the health benefits of more exercise with that of a safer, more sociable and inclusive public realm, e.g. Jackson (2003); Talen and; Brown et al. (2008); Clarke et al. (2008); Sinnett et al. (2013); Koschinsky (2014); Ulmer et al. (2016); Venerandi et al. (2016a).
- Health and economic: tying the benefits of better health to reduced health care and insurance costs, e.g. Designed to Move (2015); Pineo (2016); Zapata-Diomedi, Herrera, and Veerman (2016); McKenzie et al. (2017).
- Social and economic: linking a range of social benefits, including less crime, social inclusion, general well-being, and vibrancy, with property value uplift and enhanced economic performance and productivity, e.g. Ekblom et al. (1996); Bowes and Ihlanfeldt (2001); Britain (2005); UN Habitat (2013); Venerandi et al. (2016b); Carmona et al. (2017); CBRE & Gehl Architects (2017); Weber et al. (2017).
- Social and environmental: demonstrating the association between green space and community quality of life, but also the learning opportunities provided by nature, e.g. Shafer, Lee, and Turner (2000); Kuo and Sullivan (2001); Thompson et al. (2004); Liao et al. (2016); Thompson et al. (2007).
- Economic and environmental: with large numbers of studies revealing the links between greenspace and property values, and smaller numbers other associations such as the potential to reduce infrastructure costs, e.g. Lutzenhiser and Netusil (2001); Dewaelheyns et al. (2014); Li et al. (2016); Swinbourne and Rosenwax (2017); Alawadi (2017).

Looking across the 271 studies, many are highly focused on particular types of intervention and particular outcomes. Collectively, however, the results can be aggregated in order to determine which associations between Place value and the different qualities of place are stronger, which weaker and which are negative, or simply still uncertain given the available evidence.

There is, for example, a *VERY strong positive* association between place derived value of all types (health, social, economic and environmental) and six qualities: greenness in the built the environment (notably the presence of trees and grass, water, and open space – the latter if of good quality); a mix of uses (notably the diversity of land uses within a neighbourhood); low levels of traffic; the walkability and bikeability of places (derived from their strategic street-based connectivity and the quality of the local public realm); the use of more compact (less sprawling and fragmented) patterns of development; and ready convenient connection to a good public transport network. These can be seen as first order highly desirable qualities that also happen to be very tangible and objective and therefore measurable qualities. By implication, therefore, if the will is there, they can be readily articulated and specified by policy makers through the formal tools of design governance (Carmona 2017) in a manner that can 'require' their delivery.

Next there is a *strong positive* association between place derived value of all types and fifteen often less tangible, sometimes subjective, and generally more difficult to measure qualities of place. Whilst the evidence on each of these remains powerful, it is not definitive,

in the same way as it is for the qualities already discussed. Partly this seems to be because the more 'difficult' nature of these qualities makes researching them more challenging, and so there is often less research available on which to make a definitive assessment. There are also greater challenges in specifying exactly what quality means in these areas, making the evidence that is available more equivocal.

These second order desirable qualities include: visual permeability; sense of place (distinctiveness); pedestrian scale (of streets and buildings); façade continuity; natural surveillance (the creation of defensible space); presence of street level activity / background movement; good street lighting; a denser street network (urban grain); low traffic speeds; low neighbourhood noise; presence of attractive / welcoming / comfortable / adaptable public spaces; positive (sociable) public/private threshold features; integration of built heritage; integration of natural features and a diverse ecosystem; and perceived architectural quality and beauty generally in the built environment. Whilst some of these, for example, façade continuity or traffic speeds are relatively easily specified, most need more careful interpretation in the light of local circumstances and this will lend itself more easily to control through the informal tools of design governance (Carmona 2017). They are therefore likely to be 'aspirational' rather than required qualities.

The other side of the coin are those place qualities where the collective research evidence reveals a *VERY strong negative* association with place derived value of all types. Here the strength of the evidence is just as strong as for the 'first order' qualities already discussed, but in the opposite direction as qualities to be 'avoided' when shaping the built environment. Eight of these negative qualities were identified: car dependent and extensive forms of suburbanization; relentlessly hard urban space (absence of local green space); too much very local permeability; the presence of rear parking courts and other segregated areas; poor maintenance / dilapidation (including of green spaces); a sense of overcrowding in residential areas; the presence of unfavourable food stores; and the impact of roads with higher traffic loads and speeds, wider carriageway widths, or which are elevated. Like the first order qualities, these qualities are largely tangible and measurable and therefore capable of direct control (in a preventative manner) through the formal tools of design governance.

A final category encompasses those place qualities for which the research evidence is conflicting, and in connection with which it is not possible to be definitive about the value added (or not) by particular qualities. There are nine of these:

- Different architectural styles (about which the evidence is simply unclear).
- Higher versus lower densities of development (where within the health research, and with regard to sociability versus perceived crime, the evidence conflicts).
- Extreme densities (where conflicting evidence is apparent relating to carbon reduction, social welfare and ecological richness).
- High-rise living (where the evidence is unclear, although tending to warn against families living in such circumstances).
- Street length and pedestrian connectivity (where divergences are apparent within the evidence on health versus crime).
- Cul-de-sacs (where, within the evidence on crime and safety and with regard to property value, sociability and children's play, conflicts are apparent).
- Vehicle / pedestrian separation (about which the evidence is weak and indecisive).

Figure 4. Ladder of place qualities.

- Use of shared spaces (where conflicts are apparent, particularly with regard to the evidence on actual and perceived safety).
- The economic impact of the proximity of retail to residential properties (about which conflicts exist on the relative size and impact of negative externalities sometimes associated with local retail).

On all these qualities, more research is required, and care should be taken when seeking, without very good reason, to be prescriptive on such issues in policy or guidance. This might include, for example, requiring the use of high-rise residential blocks in urban areas or cul-de-sacs in suburban ones.

It is possible to envision these different qualities as sitting on a ladder (Figure 4) that climbs from those place qualities to be avoided when shaping the built environment (because of their very possible negative impact on place value); to those where the impact is as yet unknown (and where care should be taken to avoid any negative side effects); to second order place qualities that are strongly associated with the delivery of place derived value of all types (and which should be the aspiration of built environment policy and development-related decision making); to those first order qualities which are fundamental and which should be required as a means to maximize place value through good design.

Conclusions

This paper has examined the notion that place quality and place value are inherently interlinked. It was first theorized that high quality places deliver greater value to their users in terms of the positive impact those places have on the delivery of a large number of health, social, economic and environmental public policy goals. It was also theorized that there is a virtuous loop, with the degree to which environments deliver value (and facilitate key public policy goals) determining whether they are intrinsically high quality, or not. The question the research asked was: what does the empirical evidence say, and is this really the case? Three overarching conclusions can be drawn to address this.

The first reflects the overwhelming nature of the evidence, the very large majority of which points in the same broad direction, that better place quality adds value economically, socially and with regard to health and environmental outcomes. The impacts of place are profound, contribute benefits to society over short, medium and long-term time horizons, and reverberate throughout the lives of citizens across all socio-economic strata and globally.

Second, whilst the different types of value listed under each of the sub-headings in Tables 1 to 4 may not be directly comparable (e.g. mental well-being versus return on a property investment), may flow differentially to different stakeholders and over different time horizons (e.g. short-term profit to developers versus long-term health benefits to society), and perhaps not to those who paid for them at all (e.g. the impact of street trees may not be truly felt until they are fully grown); all are important and can be considered together as a varied and ever changing basket of place value. In this, value of different types flows from the qualities of place, and feeds into a virtuous loop in which quality dictates value and value defines quality.

Finally, in a context where the governance of design (and place) is increasingly a shared endeavour encompassing critical inputs from public, private, third and community sectors, such a shared perspective on the importance of place quality is all the more important and (where it exists) powerful in its impact. Place quality is not a mysterious and luxurious aspiration only to be considered when things are good or only for the wealthy. Instead, as the evidence collected in this paper shows, it is a basic necessity of urban life with profound and far-reaching impacts on the lives of citizens today and tomorrow. It is so important to our basic well-being that it should be the expectation of all. Fortunately, it is also a field of knowledge about which we know a good deal, including the essentials of what makes a good place, and how the way we shape places can add value.

We can use this knowledge to advance the case for quality when place-shaping policy, project or investment decisions are being made. Or we can ignore it and suffer the consequences.

Notes

1. See www.place-value-wiki.net for a more extensive abstract of each study and link to the original source.
2. For convenience and clarity, cross-cutting research was located in only one of the Tables 1 to 4, reflecting the dominant focus of each study.

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