

A Basis for Inquiry into Policy Considerations for Increasing the Application of Biophilic Urbanism

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Abstract Urban design that harnesses natural features (such as green roofs and green walls) to improve design outcomes is gaining significant interest, particularly as there is growing evidence of links between human health and wellbeing, and contact with nature. The use of such natural features can provide many significant benefits, such as reduced urban heat island effects, reduced peak energy demand for building cooling, enhanced stormwater attenuation and management, and reduced air pollution and greenhouse gas emissions. The principle of harnessing natural features as functional design elements, particularly in buildings, is becoming known as ‘biophilic urbanism’. Given the potential for global application and benefits for cities from biophilic urbanism, and the growing number of successful examples of this, it is timely to develop enabling policies that help overcome current barriers to implementation. This paper describes a basis for inquiry into policy considerations related to increasing the application of biophilic urbanism that captures and integrates knowledge from lived experience around the world. The paper draws on research undertaken as part of the Sustainable Built Environment National Research Centre (SBE_{nrc}) in Australia. The paper discusses the emergence of a qualitative, mixed-method approach that captures lived experiences and extends beyond the literature and documented journeys of international cities that have encouraged biophilic urbanism. Stakeholder workshops provide context and scope to research to ensure it is targeted, and a meta-narrative is developed to extract key learnings of relevance.

Introduction

Globally, a convergence of complex and rapidly evolving challenges is likely to force significant shifts in the design and function of cities, including climate change, resource shortages, population growth and urbanization, and financial pressures.

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The scale of change needed to respond to such challenges, and the timeframe available in which to make such change, is unprecedented [5, 6]. With increasingly globalized knowledge transfers, there is also an unprecedented opportunity to learn from international experience to adopt demonstrated approaches to addressing these challenges. For example, the High Line park in New York was inspired by the Promenade Plantée in Paris, and is now inspiring similar developments in St Louis, Philadelphia, Jersey City, Rotterdam and Sydney [3, 4]. New York is considering Sydney's waste management strategy, which was itself based on London's approach [7].

However this process of learning by example has inherent problems, as the Oxford Programme for the Future of Cities notes [7],

We are now confronted with overwhelming amounts of information about urban life. Ideas and innovations are continually assembled, mobilized and translated within and across cities by means of different networks and gatekeepers... Yet, these processes of learning and knowledge transfer are continuously confronted by the dissociation of mundane and scholarly, policy and technical, lay and scientific.

With these challenges in mind, The Oxford Programme raised two key questions for researchers that are relevant to the focus of this paper:

How can we prompt methodological advancements that overcome these dichotomies, trace different urban discourses, and promote fruitful learning in and among cities?

How can these knowledge networks better respond to the governance and socio-economic challenges we see emerging in cities today? [7]

Within this context, this paper presents a basis for a targeted inquiry into policy considerations to increase the application of biophilic urbanism, based on a method developed and refined through a project undertaken with funding from the SBEnrc in Australia. The research team proposed a method combining stakeholder workshops to provide scope and direction, literature review to provide a foundation of base knowledge, an interview series to provide context and capture lived experiences, and the development of a meta-narrative to identify emergent themes and learnings. From this, a practical evidence-base could provide a robust foundation for visioning; gaining public, political and industry support; risk assessment and mitigation; development of specifications and guidelines; and capacity building.

This paper provides context for such an inquiry, highlighting that the challenges facing society today require holistic solutions that address the underlying system failures that have led to this point. The background to the existing investigation is discussed, providing insights into the authors' experience of what is possible when working within the global context of urgent and challenging times. The emergent basis for inquiring into policy considerations is then presented, along with the lessons learnt through this work.

Complex Problems and Synergistic Solutions

Cities are facing critical decisions over how to enhance, replace and repair infrastructure in the face of emerging and serious challenges to provide essential services and ensure urban environments are liveable and functional [11]. Biophilic urbanism is an emerging design principle capable of considering the multi-dimensional and interdependent complexities of urban systems and infrastructure, including storm-water management, electricity demand, urban heat island mitigation, air pollution, food production, biodiversity preservation, congestion management, and place making (see [10]). Through the use of natural design features, biophilic urbanism can meet society's inherent need for contact with nature, and assist efforts to respond to these mounting pressures. The principle directs the creation of urban environments that are conducive to life, and that deliver benefits to a range of stakeholders including governments, developers, building owners, occupiers and the surrounding community [10].

A growing number of cities around the world are developing and implementing mechanisms to encourage and require the use of biophilic elements, although as yet these remain generally *ad hoc* and largely disconnected [8]. However, by learning from these emerging experiences, knowledge can be developed to potentially fast-track implementation of similar policies elsewhere within the necessary timeframes to adapt and build resilience to the rising urban challenges.

Creating a Basis for Inquiry

As part of the SBEnrc project, the research team undertook rigorous, iterative consultation with key stakeholders in Australian government, industry and academia, and identified the following clear needs for the research to provide [10]:

1. An understanding of how biophilic urbanism can be practically applied;
2. Key considerations in design and application and how to mitigate risks;
3. Expected performance, and how to value and compare this performance to conventional approaches to urban design; and
4. How to optimize the process of developing and implementing policies to enable biophilic urbanism so these are effective, timely and well accepted.

It was concluded from this stakeholder engagement that a pragmatic and novel approach was needed to gain a deeper understanding of the emerging experience and knowledge with biophilic urbanism, including insights into the processes of gaining public, industry and government support for biophilic urbanism, experiences in policy development and implementation including risk mitigation, addressing challenges, and what was learnt from aspects that worked well and those which didn't. It was clear that a method to gain such knowledge must extend beyond commonly available information in the literature and the internet.

In the recent UN Habitat Urban Patterns for a Green Economy: Working with Nature publication, this need was confirmed from a global perspective, noting that, “Increasingly, city managers wish to learn by example. Rather than more theory and principles, they want to know what has worked, what has not, and which lessons are transferrable to their own contexts. There is much information available, but little time.” [13] As this quote highlights, information is not always useful, nor does it always represent the reality of the situation but rather the interpretation of the party presenting the information. Reports and reviews of case-study cities typically focus on outcomes rather than processes, reporting for example the number of trees planted, square footage of green roofs developed, or the size of the budget allocated [2]. This is of little value to cities elsewhere seeking to understand how to overcome challenges and barriers to achieve similar outcomes, how to reduce the political and financial risks and leverage opportunities, and what policies and programs are most appropriate for their circumstances. Furthermore, cities tend to discuss their successes and not aspects that haven’t worked, such that those seeking to use such cities as a model cannot learn from these mistakes through literature alone.

Hence, the project team developed the following method, informed by previous work as part of the Townsville Solar City Program, in collaboration with Townsville City Council and Ergon Energy to create an innovative electricity demand reduction program, that included the study of international case studies of similar programs and interviews with program proponents [12]. The research used a grounded research approach, based on the best existing knowledge and practice in the field, and which continues to evolve as knowledge and experience grow. As shown in Fig. 1 and outlined below, four key phases provide a basis for developing targeted knowledge.

The method shown is designed as a series of layers of inquiry that provide an ever-deepening understanding of the complexity of the relationships between the challenges, the wide ranging benefits provided by biophilic urbanism, and the political, social and economic systems that interplay with each. The method is reflective, considering the broad field and the current state of knowledge and practice, and drawing on the personal experiences and reflections of interviewees, to provide new and important perspectives and insights into the journey towards biophilic urbanism of the city in which they worked. Each of the method phases is outlined in greater detail below.

Phase 1: Develop a Foundation of Understanding

In this phase, the critical literature and knowledge are gathered, as well as details of leaders in the field. This is not just about the ‘what’ and the ‘why’, but also the ‘who’. It is essential to map the existing knowledge and practice in the field. This establishes the ‘what’s so’ of available tools, technologies, policies and systems, and a vision of ‘what’s possible’ by learning from the experiences of others elsewhere. This is not to suggest that other cities or initiatives are more ‘advanced’



Fig. 1 Method for inquiry into policy considerations to increase the use of biophilic urbanism

or sustainable. Rather, as the challenges faced around the world vary, as do the opportunities, there may be an emergence of unique knowledge and practice that can inform strategies for cities elsewhere to respond to new or similar challenges imposed by rapidly changing conditions in the world today.

In the case of the SBEnrc project, this entailed investigating how nature could be integrated as design features into the built environment at various levels, what benefits this provided, and what challenges this presented. Existing case studies, city reports, historical data, industry reports and academic research were reviewed. This provided a detailed mosaic of ‘biophilic elements’ (specific applications of biophilic urbanism), along with a range of benefits specific to each element and those common to all elements [8].

Phase 2: Identify Specific Challenges and Opportunities

Knowledge of the availability of alternative options is rarely sufficient to cause their actual use. More commonly, an array of challenges prevents their integration into mainstream practice. Uncovering specific challenges and potential opportunities requires considering the perspective of multiple stakeholders, including government representatives, industry practitioners, academics, and citizens or citizen groups. The Collective Social Learning (CSL) methodology developed by Emeritus Profes-

sor Valerie Brown for addressing ‘wicked’¹ problems in society [1] is proposed as a structure for uncovering perspectives and insights from each stakeholder group, to uncover challenges to be addressed, and key strategies and opportunities to enable this to occur.

The CSL methodology steps workshop participants through four questions, requiring them to consider alternative perspectives of the problem at hand. These steps are described here, as used in stakeholder workshops for the SBEnrc project:

- What should be? Participants share ideals through a visioning exercise of what an ideal biophilic city would look like, uninhibited by existing barriers.
- What is? Participants establish the facts of the current situation, considering the enablers and disablers to biophilic urbanism in Australia.
- What could be? Participants discuss strategies and considerations for bridging the gap between ‘what should be’, and ‘what is’—in this case, strategies and opportunities for biophilic urbanism, including potential components of an economic framework to value the benefits provided.
- What can be? This stage inspires collaborative action from participants, as key stakeholders in the issue. Participants in the workshop developed commitment statements to take actions to further the biophilic urbanism in Australia.

Phase 3: Capture Existing Knowledge

Information readily available about initiatives taken by cities to encourage biophilic urbanism is typically focused on outcomes rather than processes of developing such initiatives, providing little insight to those seeking to learn from these experiences. Further, the challenges and misguided attempts that may have occurred as part of developing the policies and programs are not frequently publicized, yet are vital learnings. Finally, many such initiatives are *ad hoc* rather than systemic and intentional, and stem from contextual circumstances that may not exist elsewhere. This context must be understood as background to a case study and learnings taken from it.

Thus, identifying and gathering critical information must actively engage key actors who can reflect on the processes, challenges, and systems that influenced the outcomes. This critical information includes ‘what’ (policies, programs and outcomes), ‘who’ (key actors), ‘how’ (processes for overcoming barriers, enhancing opportunities, gathering support, and developing and implementing policies and programs), and ‘why’ (key drivers and contributing circumstances).

¹ A ‘wicked problem’ has been variously defined by many authors since being comprehensively described by University of California Berkeley scholars, Rittel and Webber in 1973, and can be summarized as a class of problems, which are poorly defined; where the information is confusing; where there are many stakeholders with conflicting values; and where changes to one aspect of the system can lead to unexpected and non-linear change to other parts of the system. There is no clear solution to such problems, they have inter-dependencies and often multi-causalities and are socially complex [9].

Multiple case studies are hence developed using a mixed-methods approach involving desktop review and semi-structured interviews that seek to answer a set of key questions that provide insights into the processes of developing initiatives, that would inform efforts elsewhere key questions include:

- What were the principle drivers for the initiatives, and what contextual factors enabled these initiatives to emerge?
- Were there challenges or barriers to these initiatives, and how were these overcome?
- What opportunities or benefits catalysed these initiatives?
- What policy tools, planning frameworks or legislative measures have been used to underpin the application of biophilic urbanism?
- To what extent was an economic argument used to support or justify the development of these policies and programs? and
- Have there been any unexpected benefits, or consequences?

Interviews are often with policy makers, program leaders, industry representatives, and academics that developed and/or reviewed initiatives.

Phase 4: Develop a Meta-Narrative

Case studies can provide significant insights. However these occur within a specific set of contextual circumstances, defined by factors including climate, population and socio-economic descriptors, governance structures, history, environment, culture, and individuals. Attempting to replicate the processes that have been successful elsewhere is unlikely to produce the same outcomes without contextualisation. It can be valuable to develop a meta-narrative to consider emergent patterns, gaps, and themes across multiple case studies. This can provide an indication of the developing maturity of the field, what new knowledge is needed; identifies patterns in language and practice; and synthesizes common factors and considerations that have contributed to the success or failure of initiatives around the world, under certain circumstances. Links between key challenges faced in various case studies, and the mechanisms used for overcoming these can be identified, and the potential for this understanding to inform efforts elsewhere can be discussed. The process of developing this meta-narrative is qualitative, with the researcher reflecting on the previous three phases of investigation. In the SBEnrc project, the findings from the case studies were viewed from the perspective of application to the Australian context, as described by the stakeholders, to determine what findings are of particular relevance. The process is subjective and reliant on the researcher to observe emerging themes, complex relationships and relevant patterns.

Conclusions

Implications for Policy Development

The emergent method described in this paper provides a basis for a rigorous, efficient and transparent process for investigating and learning from lived experiences around the world. It addresses common issues associated with learning by example, including a need for information on processes, not just outcomes; to investigate failures as well as successes; and to tailor research to give insights into overcoming specific and localised challenges. It requires the researcher to seek to identify emergent patterns, themes and gaps in global knowledge and practice that can inform policy development and application.

Given the scale of the challenges faced and the urgency of addressing these within the coming decades, this method provides a significant opportunity for decision makers to reduce risks and shorten timeframes for developing and implementing policies and programs. Furthermore it connects researchers, practitioners and advocates in the field, allowing for ongoing collaboration and collective learning to further enhance the speed and depth of the cycle of learning and practice.

Beyond Biophilic Urbanism—Implications for Other Challenges

This method has been applied to the context of enabling biophilic urbanism in Australian cities, however there is an opportunity to apply this methodology to addressing similar policy challenges in other rapidly emergent fields, such as structural adjustment for reduced greenhouse gas emissions, responding to peak-oil and other resource shortages, and climate change adaptation. These challenges are similarly complex, or ‘wicked’, and require policy development to occur within more contracted timeframes than has historically been possible.

Using the presented method to address these challenges may produce the possibility of enhanced global cooperation to find and apply innovative solutions, and change expectations around the timeframes, and scale, of change that is possible. Whilst the method is intended to be flexible and to be adapted to the circumstances of each unique challenge it is used to address, it is anticipated that having a broad framework will provide guidance for a tested pathway to learning from lived experience around the world.

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