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Assessing Design Value systems: fragmentation, competition, and crisis in a global industry

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Abstract: Measuring Design Value has always been a difficult task for architects. This paper begins to describe the landscape of design value tools currently utilised across the globe. Inherent in assessing design value are questions of its definition, measurability, and implementation. The identification of factors which contribute to design value includes economic, environmental, and cultural factors. Rather than seeking, or highlighting a single Design Value methodology—as so-called silver bullet—this paper provides an overview and a critique of the global industry that surrounds different notions of Design Value. This overview is by no means exhaustive. This is the paper's principal aim. Predominant and well known value frameworks and rating tools are identified, critiqued and summarised. These frameworks include CABE in the UK, The DQI, Leesman and multiple frameworks associated with Sustainability, Green Rating Systems and Post Occupancy Evaluation are surveyed. A number of policy frameworks developed by Australian Government architects are also discussed. The paper contends that the global industry that surrounds all these frameworks is highly fragmented, contested and competitive. This viewpoint arises because Design Value is not a fixed construct that cannot be easily templated and isolated from socio-technical contexts.

Keywords: Design Value, Metrics, Rating Systems.

1. INTRODUCTION

Measuring Design Value has always been a difficult task for architects. The measurement of design value seems to be a holy grail that many architects have sought. For architects definitions and explanations of design value help to justify their existence. This discourse often tends to be centred on broad, ambiguous and unanswerable questions: What is design? What is value? (CABE 2002, 2006). Many different debates and tools appear to centre on these questions. This discourse often encompasses a range of questions concerning definitions, measurability, and process implementation. But it also ranges across economic, environmental and cultural factors, which are also seen to contribute to design value. As a result, the Design Value discourse can be regarded as a fragmented landscape consisting of competing and conflicting models of Design Value.

In developing an overview and a map of the Design Value landscape as a phenomenon the limitations of these various methodologies and frameworks are highlighted. Through the numerous Design Value frameworks, systems and metrics developed and undertaken across the globe a kind of industry has developed. This industry appears to have emerged from different jurisdictions, academies and universities, as well as from a range of disciplinary and professional discourses such as architecture, construction, management, Corporate Real Estate, Facilities Management and sustainability. This range of approaches points to the fact that that Design Value as a discipline, and discourse both in theory and practice itself is a highly fragmented, contested and unstable field of knowledge.

In beginning to map this landscape, it is worth bearing in mind a few primary points of reference. These points have been selected as the starting point for this global mapping. These points would include the work of CABE in the UK, the DQI, the widely used Leesman index and various frameworks associated with Post Occupancy Evaluation and sustainability. This paper adopts a different approach by placing a number of different tools side by side in order to see what emerges across this landscape. This research is not merely a futile attempt to make a detailed and fine-grained effort to compare "apples with oranges." This approach would suggest that there is an answer or a comprehensive way to explain and instrumentalise the complexity of design itself.

This paper begins to describe the landscape of design value tools currently utilised across the globe. This is the paper's principal aim.

2.   DQI

The Design Quality Indicator (DQI) developed in the early 2000s in the UK represents a key point of reference in the debates and questions centred on Design Quality and how this is measured. In developing the DQI Gann and Whyte (2003) sought to make a break with previous positivist design measurement approaches. The ambition of the DQI was broad, and its authors claimed it would help to understand "the value of buildings in relation to their design for different uses and in meeting a wide variety of physical, aspirational and emotional needs of occupiers and users." They argued that at that time simplistic time and cost metrics "says little about the design quality embedded in the products or outputs of the construction process - the buildings themselves." The Design Quality Indicator employed a weighted questionnaire to gather data. By 2006 the DQI had been used by the designers of the Welsh Assembly building, for the Future Program, the UK Office of Government Commerce and adopted by the Commission for Architecture and the Built Environment (CABE). Before its restructuring in 2011, CABE (1999-2011) actively promoted the use of the DQI and employed this instrument to determine parameters of good design. In fact, CABE used the DQI to review over 300 design proposals independently.

Arguing that the importance of DQI was because it accounted for how different stakeholder views Gann and Whyte (2003) could be accounted for. In doing so, Gann and Whyte (2003) identified three different approaches to design value a "judgement-based approach" relying on expert opinion; a positivist "manage and measure approach" underpinned by the notion that designers "can make rational responses to social, economic and environmental needs." The third approach lies between these two poles and is described as a "a rational-adaptive approach." This approach points out that "the future is uncertain and that measurement is difficult, but at the same time that advances can be made in developing tools for thinking about the impact of design." Not surprisingly, Gann and Whyte (2003) argued that pre-existing "measurement efforts" said little about design quality. These efforts potentially implied a danger that "the value of product design might be lost in the drive for process improvement...by 'value' it is meant the benefits that accrue to users through ideas developed in the design process and then acted on through production."

The DQI, despite the effort to seek a wide range of Design Value factors, was not without its critics. Markus (2003) argued that the DQI elided ideas around spatial syntax and did not conceptualise buildings as a social whole or community. He argued that the DQI in its current form celebrates the individual experience, but not that of a group or society. It celebrates individual spaces, but not that of a spatial structure. His most trenchant criticism was to decry that, because of the DQI's focus on the individual, that the DQI,

> "celebrates individual spaces, but not that of a spatial structure. Are these reflections of Margaret Thatcher's now famous, alleged statement, 'There is no such thing as society'"? (Markus, 2003).

3.   PARALLEL HISTORIES OF THE DQI

The DQI and the debates that surround it are a useful string point for considering the global industry of design value metrics and various rating tools that have now emerged since the early 2000s. The DQI appears to have instigated an unprecedented interest in design quality and measurement tools in the early to mid-2000s. In the UK the DQI has had both a pre-history and a parallel history as new tools have arisen since its inception in 2003.

Emerging alongside the development of the DQI a number of approaches and previously emerged concerning the measurement of design quality. For example, The Design Quality Manual developed by the UK Building Research Establishment was based on a series of design quality matrices. The Manual was based on five criteria of quality under the areas of architecture, environmental engineering, user comfort conditions, whole-life costs, detail design and user satisfaction. The manual allows for these to be "scored" through a "visual" survey and "professional judgement" the resultant scores are then "augmented by scientific measurement where possible." Earlier, approaches in the previous decade include Levermore (1994) who employed a questionnaire and rating scale to assess indoor environments. The method created a score for individual buildings and what it called a footprint for each building. This footprint normalised the responses for each building. The approach took into account noise, light, ambient air temperature and other aspects of thermal comfort. Intangible elements covered by the questionnaire include responses to and whether or not the occupant liked or disliked their colleagues and managers.

4.   CABE

From 1999 onwards CABE produced a number of publications focused on qualitative notions of around Design Value. (CABE 2001, CABE 2002, CAEB 2003a, CABE 2003b, CABE 2005, CABE 2006, CABE 2007, CABE 2010a, CABE 2010b). One of CABE's first initiatives was to develop The Building for Life tool in 2001. The tool comprised 20 questions, or criteria, to assess the design quality of new housing developments, resulting in a numerical score. The criteria reflect the importance of functionality, attractiveness and sustainability in well-designed homes and neighbourhoods. The tool was linked to BREEAM, the EcoHomes standard and the Code for Sustainable Homes. Central to CABE's policy approach and work was the CABE design quality framework, presumably, developed by Macmillan, framework appears to bear similarities

with Bourdieu's theory of cultural capital. In the CABE model, there are a number of categories including, Exchange value, Use value, Image Value, Social Value, Environmental Value (environmental impact and intergenerational equity) and Cultural Value (the building's contribution to culture). Bourdieu suggests that the exposure to and internalisation of social conditions influence the way individuals act in the world (habitus). This allows individuals to accumulate different levels and types of cultural resources (capitals). He identifies four types of capital: economic, social, cultural, and symbolic capital, which function differently according to their context, or in what Bourdieu (1984) calls "semi-autonomous social fields." In his book Distinction, Bourdieu suggests that the volume and composition of economic capital (wealth) and cultural capital (knowledge and demeanour) position individuals in social space.

5. EVIDENCE BASED DESIGN

Another methodology that appeared during the CABE years was the Evidenced Based Design (EVB) approach. This approach, in contrast to the DQI, which did not examine intangible or qualitative data. Writing at that time, the researchers involved in EVB stated: "we do not have a well-developed understanding of what design quality means or how to measure it." EVB did not examine seemingly subjective or intangible components related to urban and architectural design, the aesthetics of materials, spatial qualities or planning (Lawson and Phiri 2004a, 2004b). The EVB approach was in line, and echoed, by Ulrich et al. (2008) later assertion that what was needed was researchers to connect "rigorous empirical studies that link the design of hospital physical environments with healthcare outcomes." (Ulrich et al. 2008, Ulrich et al. 2004). A sentiment that continues to this day across the world in relation to healthcare design. Macmillan (2009) describes how the (EVB) became an area of significant architectural research in the areas of workplace design, education, and healthcare. The EVB approach taught to correlate the specific value of good design by matching previous design outcomes and built precedents to the design of new buildings. It was in healthcare that this approach gained currency and the academic sponsors of this approach pushed for a new approach to looking at healthcare facilities and design value in the early 2000s.

Writing in 2013 Lawson (2013) looked back and summarised the Evidence-Based Design field and its impact on healthcare environments. He summarised the opportunities that had been lost in the healthcare field where EVB and not been incorporated into He concluded that EVB had been hampered by an architectural profession that knew very little about research methods. He concluded by arguing for a synthesis "so far to design evidence-based hospitals there is a danger that such designs become authoritative in the eyes of major clients who then instruct their architects to replicate them. We need a form of evidence-based design that never the less allows for creative innovation" (Lawson, 2013).

6. DESIGN VALUE IN WORKPLACE DESIGN

Another group that merged and began to develop new techniques and metrics, particularly in workplace design, was DEGW. DEGW, founded by John Worthington, operated between 1971 until it merged with Davis Langdon and then AECOM in 2011. DEGW was an international research-based design company that pioneered new ways of thinking about architecture and the built environment generally. DEGW pursed a research-led knowledge approach towards achieving innovation in workplace design. Central to DEGW's approach was to not view architectural typology as a static and fixed method of organisation. Instead, the approach was to see type as a not being "fixed but dynamic and unstable" (Dawe, 2017). This theory was particularly important in the area of workplace design. DEGW developed its Building Appraisal Method which accounted for sociological, organisational and user information. DEGW was then able to aggregate data on both buildings and organisations. The method focused on key criteria: "Criteria included: location, accessibility & image; quantity of space; quality of space; level of building services, and land services & amenities" (Dawe, 2017).

DEGW's strategic consulting methods were to match architectural design, typological, spatial and programming knowledge with workplace design. However, other later and more recent approaches appear to have discarded the complexities of spatial theories and design in favour of a metrics led approach. The most successful of the metric led approaches is the Leesman index. Unlike the DQI and EVB Leesman originated outside of the government policy, academia and industry nexus. Emerging from industry and strategy consulting Leesman was founded in 2010 by an accountant, an interior designer and strategy consultant. The Leesman index is based on a strategic management methodology that measures workplace effectiveness and is the "world's largest resource of consistent workplace effectiveness data" To do this Leesman employs a "standardised workplace effectiveness survey." Since its inception, Leesman has had a wide uptake and acceptance across the Corporate Real Estate industry. As a result, Leesman has aggregated a substantial amount of workplace data. Leesman proclaims to be the "industry's first unified and truly independent workplace effectiveness benchmark tool" Leesman has also developed strong relationships with a number of consulting partners who are directly involved in the design of workplaces. (Leesman 2017)

7. GLOBAL RANKING TOOLS

Also arising out of the strategic consulting Industry are a plethora of City ranking metrics and tools. Whilst these tools operate at the scale of a City rankings different scale to those methods focused on single buildings or facilities. Design value and

associated metrics are also to be found in the ranking of cities and even nations. There a currently a number of city ranking measures that contribute and sued for the purposes of place branding, marketing as well as policy formulation and strategic decision making. (Gififnger et al. 2010). In a 2015 report, it was noted that most of the City ranking metrics and indices emerged out of the strategy consulting and sizeable integrated service consulting firms. (Leff and Peterson 2015). This report identifies the different methodologies used in city rankings. Ranging from what they' describe as "comprehensive" rankings such as the AT Kearney methodology; or niche rankings, which they describe as having more focused methodologies based on macroeconomic data. In a Spanish study in 2017, Garcia, Ordonez and Pisonera (2017) note how the ranking tools, centred around the idea of global cities, have begun to include data and information about cultural services within them. These authors asked if global cities rankings were a " neoliberal urban planning tool" and argue that these ranking systems are being used in ways that are inappropriate. They summarise and analyse 10 cite indexes and ranking tools including the Global Cities Index, Project Global Economic Power Index, AT Kearney Global Cities Index, World Liveable Cities, Global Power City Index, Global City Competitiveness Index, Cities of Opportunities, Global City Survey and the The Wealth Report (Garcia, Ordonez and Pisonera 2017).

But the global city rankings point to some of the elements of Design Value that sometimes go unaccounted for. The City rankings are often related to the concept of the 'Bilbao effect' where rankings are improved via an investment in iconic architectural design (Sklair 2005) (This phenomenon takes its name from the landmark Guggenheim museum designed by Frank Gehry to revive the city of Bilbao.) In theory, the 'Bilbao effect' increases in economic benefits to a place through design. But these claimed benefits, and their relation to design, are rarely quantified, except via the city ranking systems.

Alongside the Design Quality tools, the related area of Post Occupancy Evaluation studies is also another area where Design Value issues come to the fore. These studies can be regarded as what Gann and Whyte (2003) name as a "manage and measure" approach. In a wide-ranging study of Post-occupancy Evaluation practice in the sustainability arena Peixian Li, Thomas M. Froese, Gail Brager (2018) undertook a quantitative and descriptive statistical analysis of 146 POE projects and 13 existing POE protocols. This study had a clear focus on POE categories concerning sustainability such as water, energy, acoustics, light and then design. Many POE approaches have been proposed across the globe, particularly in western jurisdictions such as the UK, the US and Canada. Notably, these authors apply basic notions of innovation theory to the field. They argue that POE can be regarded as a technology and that the adoption or non-adoption of POE can be understood using the Technology Adoption Lifecycle (TAL). These authors argue that TAL can explain why there is a plethora of POE projects and protocols. They theorise that this is because there is a chasm between early and late adopters in the field. They argue that many POEs are the result of, or associated with one-off studies and that POEs should be integrated with going building management. For example, links might be created between building automation control systems and occupant satisfaction surveys.

Across the globe, there have been many different studies related to POEs and Design Value. For example, in America, the Federal Facilities Council examined POE processes with the strategic aim of proposing a "proposed a broader view of POEs-from being simply the end phase of a building project to being an integral part of the entire building process." This work encompassed a state of the practice survey which looks at the origins of POE instruments and research, notions of universal design evaluation, POEs and organisational learning and structures, and the emerging role and possibilities to facilitate POE techniques.

8.   GREEN RATING TOOLS

Green rating systems are also another area where Design Value emerges and is contested and interpreted in different ways. The primary green rating systems are LEED (US), BREAM (UK) as well as lesser known ones such as CASBEE (Japan) ESTIDAMA (ARABIA) and Green Star (Australia). As Peixian Li, Thomas M. Froese, Gail Brager note worldwide there is a range of green building certification systems. The claim there are around 150 different tools and methodologies for building assessment. In Australia, The Green Building Council of Australia (GCBA) established the pioneer of green star tools framework was limited to a range of criteria including material selection, indoor air environment quality, water efficiency, waste avoidance, re-use and recycling. In a comprehensive study of green rating tools, Zoo and Zhao (2014) argue that many of these could better focus on social sustainability. In recent work Doan et al. (2014) note how the global establishment of various green rating systems is now evident. They identify the common core elements of across these different tools as being related to Indoor Environment Quality, Energy, and Material.

9.   SOCIAL VALUE MEASUREMENT

Another area that has emerged is in the area of social sustainability. As Spinks (2015) rightly notes in her BREAM study, there is no established consensus on what "sustainability means." In Denmark measures of social sustainability y have been developed in the area of social housing neighbourhoods. A model has developed with included12 indicators related to "social cohesion; participatory processes; and accessibility to living opportunities." It is then argued that these indicators can and should be integrated with systems that only account for physical functional indicators.

On other work focused on infrastructure Doloi (2018) attempts to bridge the gap between qualitative notions of community and a social value metric. This approach is in an attempt to quantify intangible notions of social value. Dolio (2018) uses survey instruments and interview transcripts via a social network analysis to quantify and argue for a consideration of what he names as the social value in infrastructure projects. Central to this is understanding the relationship between a project and a community. He argues that firstly, there is "Numerous examples of expensive but failed infrastructure projects around the world have shown that there is a clear need for appropriate mechanisms to incorporate the needs and requirements of the community in the planning process." While Doloi contends that "iconic projects...contribute enormous value" this iconicity needs to be thought about alongside the "perceptions of end-users (who) contribute to the long-term social value creation over the project lifecycle." As a result, Dolio concludes that infrastructure projects "must also incorporate evolutionary soft functions and real-time information processing based on community preferences and active participation."

10. AUSTRALIAN POLICY DEVELOPMENTS

In Australia, the primary approaches that have been taken to quantify design quality have mostly been achieved through government policy. However, these approaches have been by and large qualitative. State-based Australian government architects (ACT, QLD, NSW, Victoria, SA, Tasmania and WA) have also promoted good design guidelines. In NSW the Government Architect promotes the Evaluating Good Design framework. This is a qualitative framework. In Victoria, there is the Fact Sheet for Universal Design which is also a qualitative framework built around seven criteria. In South Australia, a Design Review system is coordinated by the Office for Design and Architecture. The SA Design Review program is a qualitative and voluntary program that relies on expert advice to assess the Design Value for projects over AUD 10M in value. Guiding this process are The Principles of Good Design which relate to 6 qualitative criteria. In Queensland, there are design guidelines for better buildings which are devised around three key objectives and 23 criteria. In Western Australia, there is Better Places and Spaces policy through which the Government architect a set of design standards.

 In Australia, the $16.2B Commonwealth's Building the Education Revolution (BER), program was instigated to provide a fiscal stimulus to the economy after the Global Financial Crisis. The follow-up Audit indicates how Decision makers often view design Value in Australia. The report was commissioned by the Commonwealth to assess if the BER delivered Value for Money and Design Quality. The criteria adopted by the BER task force in comparing cost outcomes are based on initial capital cost per square metre. In the report Quality of Design is defined in a rudimentary quantitative fashion as the delivery of school buildings which are "fit for educational purpose, comply with relevant building design and construction standards and achieve the agreed project scope." The weighted assessment framework developed by the report allocates a total 30% (outcomes are 50%) of its scoring methodology to the idea of Quality (ranked from 1 to 6) which is defined as: 'Fitness for purpose (15%), Meets required design and quality standards (7.5%), and Compliance with agreed scope (7.5%)"

Policy initiatives in Australia have also emphasised qualitative measures: criterion-based selection, design reviews, design workshop methods and design competitions. In contrast to the UK experiences and the BER methodology, these approaches have been mostly qualitative. For example, in Victoria, a series of Good Design guides were produced in 2007 by the Office of the Victorian Government Architect (OVGA) setting out some performance principles and corresponding values for what constitutes good design. The guide argues for the principle of 'Flexibility in structure and plan, long life loose fit' and the corresponding values of 'adaptability for future needs and changing uses, longevity in the primary structure.' Since then the OVGA has sought to build design principles into procurement guides for government clients. In SA the Government's Integrated Design Commission, formed in 2011, is an organisation not unlike CABE in the UK. The SA Commission's remit is to pursue a 'design-based approach to design, planning and development that acknowledges the interconnectedness of the built and natural world.' The commission promotes research using case-based knowledge and evidence-based design.

One area in Australian cities in which Design Quality has become problematic is in the field of higher-density housing. This is problematic because housing densification has met with resident opposition, including high rates of third party planning objections and appeals. Moore, Martel and Horne (2015) developed an extensive report on a 2014 study into the Value of Design in apartment housing. These authors undertook a comprehensive survey of "value criteria on good design for residential apartments" perceptions of good design are problematic. As they note:

> "There is a false perception that good design is an optional extra with additional costs and limited benefits or value to the entity that must bear the initial cost increase. Without a rigorous evidence base, the arguments for good design may be easily dismissed as part of a discipline-based "belief" system and any additional costs that arise deemed unnecessary. There have been a few notable attempts to address this lack of evidence (e.g. CABE in the UK), but limited research has been undertaken in Australia."

In this report, the authors argue that different categories of "evidence" are needed to qualify and establish "the case" for design linking outcomes to design processes. This includes econometric evidence and "experiential evidence process-related evidence – analysis of design in the built environment processes which may lead to improved value outcomes."

11. DISCUSSION

The field of Design Value and its measurement, as suggested by this limited survey, is characterised by—and embedded in-- disparate approaches leading to a fragmentation of methodologies, tools and methods. Unresolvable arguments, caught between positivist and relativist positions, about what the essential elements of these tools should be abound. In few instances is there integration between academia, policy makers and industry is lacking. Some tools predominate in some geographies and not in others. Some of these tools are more predominant and are used more often than others. Some only appear to have a limited lifespan. Many design value ex-ante and ex-post measurement methods originating in academia are not used in practice or used as the basis for policy or in procurement decision making contexts. In other words, Many of the policy frameworks or design value systems that have been developed are not linked to useful working tools, industry methodologies and workflows. Moreover, Design Value instruments and are not linked to policy frameworks or national Design Value systems—if these systems exist at all.   Notably, the most successful approaches such as the Leesman index have emerged entirely out of the Corporate Real Estate milieu.

Fragmentation across the globe in regards to Design Value rating tools may be explained because of the recurring discourse around perceptions of design thinking. In European research PI Volker (2010) has examined the procurement of design services and Design Quality in the European public building tenders. She argues that Design Quality scoring systems are problematic because they conflict with 'natural processes' of design thinking and decision making. She contends that accounting for subjectivity is essential in judging Design Quality. As she notes, there are no standards or performance specifications that account for seemingly intangible characteristics in Design Quality models. For Volker, it is important that efforts be made to develop models in which intangibles (e.g. uniqueness, recognisability, meanings and associations) are identified and measured concerning individual designs. Nevertheless, this should be done in a way that avoids the 'Bilbao' style debates that predominate in the architectural media around the status of star-architects and the globalisation of architectural services (Hartoonian 2002, Sklair 2005).

The situation in Australia is reflective of this global fragmentation and a lack of policy integration, alongside price competition, across the design and construction industry. In Australia, design quality is often misunderstood or only understood subjectively. Currently, no comprehensive and cross-disciplinary design quality evaluator or index exists. There is no Design Value system in Australia. Currently, design quality tools and policies in Australia are functionally separate and fragmented as governments at all levels pursue different paths. As a result, governance is ad-hoc and fragmentary. In Australia, alongside the work of the Government architects, there is a range of approaches such as, Performance-based residential design guides, including the role of neighbourhood character in these codes, the Green Building Council of Australia (GCBA) green star tools, and Value for Money (VfM) tools such as Public Sector Comparators.

12. FUTURE RESEARCH

The scope of this paper has its focus on the built environment. This limitation of scope is not to say that evaluation techniques arising out of the disciplines of Landscape Architecture and Urbanism are to be disregarded. On the contrary, it could be argued that these disciplines and the way that the way they have approached the issues of design value and evaluation metrics offer necessary and urgent methodologies that architects should encompass in their own discourse and future research should undoubtedly pursue this.

Many more tools and approaches could be mapped, described and compared. However, such an effort will only lead to an identifying in more detail the fragmentation that exists in the field and would by no means holy grail of a systematic and wholistic Design Value tool. It is also possible that all of these existing tools will be overtaken by developments in technology such as the Internet-of-things, and scanning technologies. This is hinted at in the POE field where the potentials of linking new technologies and big data to POE processes have been noted. (Peixian Li, Thomas M. Froese, Gail Brager 2018). Emerging areas of future research into the area of Design value must account for new methods to capture data, create databases and employ data visualisation to communicate POE results. These new methods will change the way we view both intangible and tangible measures of Design Value.

In the global landscape efforts to quantify design and its value through more specific bottom-up approaches, particularly from industry, also seem to have achieved more success. Arguably the Leesman metrics model, and before that the DEGW consulting model, both suggest ways forward. This success suggests the importance of architectural first to each develop their own Design Value metrics, and strategic methodologies linked to a firm IT architecture with data.

13. CONCLUSION

The pursuit of Design Value has resulted in a landscape of different methodologies, methods and metrics that is fragmented, unstable and a site of competition amongst value measurement providers. These different approaches indicate that the measurement of Design Value is in crisis. The degree to which these competing tools and methods are useful, deserve widespread acceptance or even elucidate what Design Value is, remain open questions. More worrisome is the thought, untested in this paper, that this plethora of approaches are ineffective in advocating the importance of architectural design in neoliberal markets.

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