Teaching the Value of Architecture

SCHRÖPFER, VERONIKA LILLY META[1] SANCHIS HUERTAS, ANA[2] CARREIRA DE ROSSO, LARISSA[1]
NAVARRO ESCUDERO, MIRIAM[2]

[1]Architects' Council of Europe, Brussels, Belgium
[2] Instituto Valenciano de la Edificación, Valencia, Spain

ABSTRACT: There is an intrinsic understanding that 'good' architecture defines the long-term functionality, resilience and performance of buildings, going beyond the building scale, affecting its occupants, owners, investors, district, city and nature. However, it is not considered 'measurable' and it rarely features as a quantifiable value driver in investment cycles and legislation. A vital aspect of the discussion is the degree to which the value of architecture is taught at architecture schools, i.e. if the architect is not aware about the value s/he might bring to a project, how can an occupant or other stakeholder perceive such a value? This paper reports on a study within the EU-funded research project TripleA-reno. The research set out with a literature review in order to identify and categorise criteria, which can be influenced by 'good' architecture. All categories were allocated to seven value areas: economic, ecological, heritage, health and well-being, social, functional and cultural. These areas have been used as a basis for an online survey amongst European architecture schools. The aim was to investigate to which extent these aspects of 'good' architecture are taught to students and being researched. The data was complemented with qualitative data from partnering universities in Hungary, Italy, Slovenia and Spain.
KEYWORDS: Value of architecture, architectural value, education, awareness, architectural training for sustainability

1. INTRODUCTION

Architectural value cannot be simply calculated in money, as the value of design varies per stakeholder (subject) and scale (object) completely. On the one hand, according to the subject valuating, it is measured in money for an investor, in terms of higher rental value, increased asset value, less maintenance and better resale value, just to mention an few [1]; whereas, the developer profits of good design in terms of quicker permissions, a more efficient and safe construction process, increased public support and generating a good reputation; and for the occupant the benefits include e.g. fewer disruptive moves, reduced security expenditure, reduced maintenance costs, greater accessibility, increased occupier prestige, better health and well-being [2].

On the other hand, according to the object covered by the valuation, i.e. its scale, it is measured in e.g. functionality terms for building units; values of coexistence at the building scale; the security of the district public spaces; the economic development of the city, or the sustainability and preservation of the environment and nature beyond.

At the same time, it is affected by the value definition itsef: the subjective theory considers that value is not determined by any inherent property of the good, such as size, orientation, or amount of labour necessary to produce it (defended by the objective theory of value), but instead by its goodness for the achievement of desired ends (shelter, income, reputation).

Finally, the units used to measure can vary over space and time (e.g. money), limiting their comparability scope. As a result, an investigation into the value of architectural design is a rather complex task, which requires consideration of the various profiles, scales, types and units.

In this context, the question is: *whose (and which) value are we looking at?* It has been stated that value is very subjective and depends on the stakeholder. However, even in each stakeholder group the value varies depending on subjective hierarchy of consideration. Moreover, research on the final user, i.e. building occupant, and their interests has been limited. Furthermore, it has to be noted that many studies addressing user concerns (on sustainability, but even more on health, comfort and well-being) are focused on tertiary buildings. Thus, studying architectural value, reliability and measurement in the residential context reinforces the approach of the EU funded project TripleA-reno, in which framework this research has been conducted. One of the main aims of the project is to enhance the renovation rate, which is lagging behind in Europe, in the context of energy efficiency improvement for decreasing cities carbon footprint coming from buildings (accounting for 36% of global final energy use and 39% of energy-related carbon dioxide CO_2 emissions when upstream power generation is included).

As a result, the focus of this study was to determine how to measure the value of good architecture for the

occupants of existing residential buildings in the need of renovation, or currently being renovated.

2. Seven criteria of architectural value

Good architecture is something that we all seek, and which is difficult to define: a combination of multiple criteria that equate to a multitude of values individuals may not completely agree upon. Vitruvius (circa 80-15 B.C.) insisted that three fundamentals should be present: function, structure, and beauty – which remains true until today.

Others might argue the relationship of a building with its surroundings, cultural context and society's expectations at the time are also important. Value for money might be added, based on cost-benefit evaluation that variously includes tangible and intangible components. Finally, Sir Alexander John Gordon, in his role as President of the Royal Institute of British Architects, defined 'good architecture' in 1972 as buildings that exhibit 'long life, loose fit and low energy' [3]. These characteristics, nicknamed by Gordon as the 3L Principle, are measurable.

The idea of building for permanence, incorporating flexibility to accommodate future change, minimising energy footprint throughout its physical life in an aesthetic built result, is surely the ultimate holistic objective for the architecture profession [4]. Today these objectives may be summarised as *durable, adaptable, sustainable and aesthetic.* Good architecture should reflect these properties, and not merely be works of public art or a monument to their designers, technological prowess or the financial wealth of their owner [5].

To ease the overview of the various values of good design, found in literature, e.g. [6] and [2], they were grouped into economic, ecological, social, functional, cultural, health and heritage values. It appears that good architectural design, as defined in this paper, has the potential to influence all seven areas.

2.1 The economic value

The economic value of good architecture could bring a prime cost reduction. Skills and expertise of the architect can provide cost-effective solutions to complex problems, not only saving money during renovation and in use, but providing extra benefits in terms of increased space, easier access, more efficient working and living conditions, which have an economic value attached to them [7]. Additionally, lifecycle costs can be reduced, since clients are interested not just in the productivity of the building process, but also in the occupancy costs in relation to their own economic objectives. Clients are now becoming interested in a new and most important concept: measuring the productivity of building use through time [8]. Costs can also be saved through better management, bringing together a multi-disciplinary team consisting of designers, cost consultants, representatives from client organisations, end users, stakeholders, and, in some circumstances, members of the wider community in order to identify the purpose of the project itself and the activities it has to accommodate [8].

2.2 The ecological value

Sustainability is related to the ecological value of architecture, taking greater regard for the orientation of the site, local topographical and environmental factors, and designing and fine-tuning buildings that take advantage of these to minimise energy use and provide comfortable and pleasant environments in which to work and live [9]. From an ecological perspective, [10] resilience was initially defined as a 'measure of the ability of ecological systems to absorb changes of state variables, driving variables, and parameters, and still persist'. Therefore, resilience, as well as sustainability, is not a specific building attribute, which could be quantified, but a complex management process of the built environment dealing with the long-term evolution of buildings and infrastructures [11]. Good architecture contributes to building resilience against extreme weather conditions, such as heat waves and floods, but also against critical events such as earthquakes.

2.3 The social value

Social value of architecture lies in delivering more liveable, sociable spaces [2]. Good design may lead to lower crime rates, lower demand on health provision, and possibly even better educational attainment in the long term [12]. A UK initiative, the Research Practice Leads are working with the RIBA to develop a toolkit for the measurement of the social value of architecture [6]. When looking at national policy papers, it can be noted that in Sweden the government states that planning and design have a positive impact against social segregation and decline [13]. There have been studies trying to quantify the social return of investment, for instance in a health care center in the UK [14].

2.4 The functional value

Most criteria found in literature are related to the functional value of good architecture. Good design layouts could support a longer lifecycle of the building. Examples could be an enhanced functionality, fit for purpose, or loose fit. The functional value can also be raised by improving daylight access; considering the floor to ceiling height in order to improve the user's experience, allow better air flow, and lighting conditions. The use of building mass to improve thermal comfort can be influenced by design. In addition, the safety for occupants 5prevent fire, minimise earthquake/flood damages) and

construction workers (health and ssafety on construction site) can be improved by good architecture of the functional design.

2.5 The cultural value

Architecture's cultural value lies in its nature as a public good or externality, affecting positively or negatively both the inside and the surroundings. These effects are usually determined by those who commission the building, often through a lack of awareness or care. The cultural value of good architecture is increasing the community value and is hence strongly linked to the social value. It could be found for instance in an improvement of the public realm quality, a raise of the community cohesion and activities, or the provision of better public amenities (i.e. parks, fountains, electrical charging, benches, sport facilities). [15] emphasises the important influence of the design and relationships between objects and their built and natural surroundings on our quality of life. The so-called 'Baukultur' is an application of conscious, well-debated design to every building and landscaping activity, prioritising cultural values over short-term economic gain.

2.6 The value for health and well-being

The value area of health and well-being and its relation to productivity is direct, given the ability of buildings to provide heat and coolness, light and shade, companionship and sanctuary, excitement and rest. It has been demonstrated that buildings, which actively pursued sustainable design, have also enhanced the occupants' perception and use of the building, which in turn has increased its economic value, as well as its social sustainability [16]. The health-related value of an architectural design is most vital for the user/ occupant. In recent years, the sustainable building design has moved from an energy efficiency centric to an occupant experience centric approach [17] trying to link sustainability rating systems with comfort of occupants and conservation of natural resources [18]. The research in the area of sustainable building design and the well-being of the user focus on energy performance, daylight, ventilation, acoustics and occupant feedback [19].

2.7 The value for built heritage

Architects add value to cultural built heritage in terms of an increase in building resilience and durability by protecting the building character, enhancing the building preservation and proposing an integration with the surrounding environment. This design value is based on the conception that every age has a certain spirit or set of shared attitudes reflecting its intellectual and cultural climate, a certain worldview, sense of taste, collective consciousness or unconsciousness that is in fact utilised when designing

[20]. Therefore, the built heritage is part of our culture and history, and safeguarding it is vital for future generations.

In 2018 ACE has signed the Davos Declaration [15] with Ministers of Culture and Heads of Delegations of the European Cultural Convention, UNESCO, the European Commission, ICOMOS International and Europa Nostra, amongst others, highlighting that '*The value and irreplaceability of Europe's landscapes and cultural heritage must be underlined, with the emphasis not only on cities and urban areas but also on peripheral and rural areas and their interconnectivity.*'

3. Teaching the value of architecture for building performance

This research set out by defining various sets of criteria, which are influenced by 'good' architecture. Although they have differing units/ currencies in which to measure the value of good architecture, it is evident that good architecture has the potential to raise the value of buildings in relation to these previously discussed seven areas. The criteria have been used as a basis for an online survey amongst European architecture faculties.

Figure 1: Participating EU Architecture Schools in the survey

The aim was to investigate to which extent these aspects of 'good' architecture are taught to students and researched. The Architecture Schools participating in the survey are depicted in Figure 1.

3.1 Methodology

The study set out by first defining the areas in which architectural value is most perceived, mainly from the point of view of a building user/ occupant undergoing a renovation. Literature review was applied as a method to categorise the areas into the seven groups, which are elaborated in the previous section 2. [21] states that a literature review should be carried out in order to demonstrate an understanding of existing knowledge in the subject area, to identify central issues and build bridges between them in order to fill the gap in knowledge.

Surveys were applied as main research method in this study. Firstly, questionnaires are a more efficient tool to observe a lager sample in a shorter amount of

time, compared to e.g. interviews [22]. Another advantage of survey research is that the outcome is more reliable than the one of more qualitative methods, through a standardised way of asking questions [22; 23]. For instance, in interviews the researcher does not formulate the same question in exactly the same way to all interviewees. Hence, the same question could be understood, interpreted and thus answered in different ways. This is very unlikely to happen with questionnaires, as the questions are formulated the same for everyone.

As a result a questionnaire was designed and implemented as an on-line survey, distributed through the TripleA-reno partnership newsletters, partners' networks, social media and most of all the European Associatian for Architectural Education (EAAE).

The survey was complemented by more detailed answers derived mainly from a set of universities related to the TripleA-reno project. Other research centers are also represented in the sample, adding a degree of dispersion for deconcentration and attempting to avoid bias representation. Nevertheless, it is to be noted that the sample is not as diverse and stratified as to be representative for the aimed population of this study (EU Univerisities an Research centers teaching and researching on architectural value). However, it can still be treated as a clustered sample for EU member states, where on each cluster we will find the students', professors' and researchers' perceptions for the seven areas.

Data was gathered and saved in a unique spreadsheet file containing the values for all the variables, on which descriptive statistical analysis was performed in order to summarise and better understand results, and then inference was used to learn about the population that the sample of data was thought to represent. Main descriptive measures were relative frequency for each variable on each country and for the EU.

The quantitative data was supplemented by qualitative data in form of comments that could be added to the questionnaire.

3.2 Results

Figure 2 depicts the answers for each participating country for the main seven areas. The economic value is most taught in the United Kingdom. The University of Reading is currently conducting a Value Study for the Architects' Council of Europe, which might be related to the question of the economic high value of architects and the other high values found in the responses of the UK.
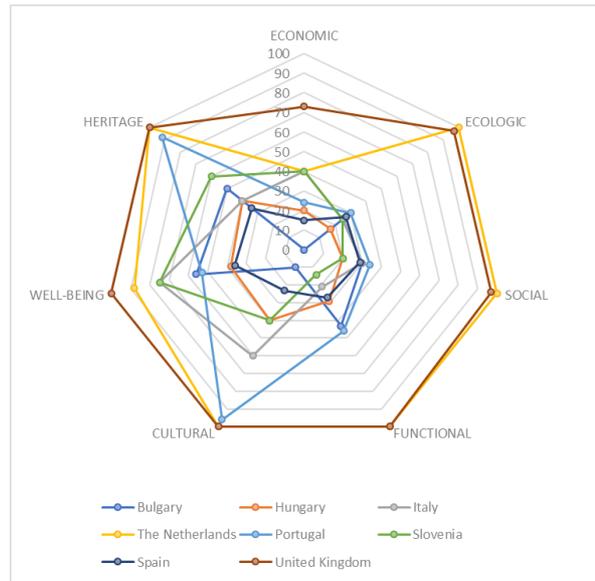

Figure 2: Taught Criteria Areas of good architecture per country

The Netherlands replied with 100% to almost all areas, which only speaks about the quality of teaching at the participating University of Delft and the role of architects in the country. In Bulgaria and Hungary, the value of architects appears to be not well perceived. In Italy the cultural and well-being factors are the most perceived, whereas in Portugal the cultural and heritage value an architect brings seems to be vital. The well-being and heritage areas are also the most taught ones in Slovenia, while in Spain all value criteria seem to be taught at a small amount.

When looking at the most taught area overall in the survey results, it is the heritage criteria. This is followed by well-being and cultural on second and third place.
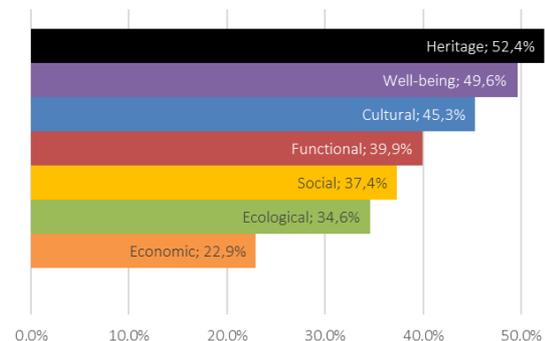

Figure 3: The ranking of the seven main areas of 'good' architecture taught at EU Architecture Schools

All subject areas were further divided into sub-categories and themes related to the specific value. The sub-categories derived from literature review. This way the questionnaire was easier to respond to as the potentially tought topics became more tangible. In addition to this, it offered a more elaborated analysis.

The heritage subject was further divided into: integration of the surroundings; building preservation, heritage value/ legacy; building character; resilience and durability of the built heritage building. Nevertheless, there are only small deviations between these four areas, which allows the conclusion that they are almost taught to the same extent.
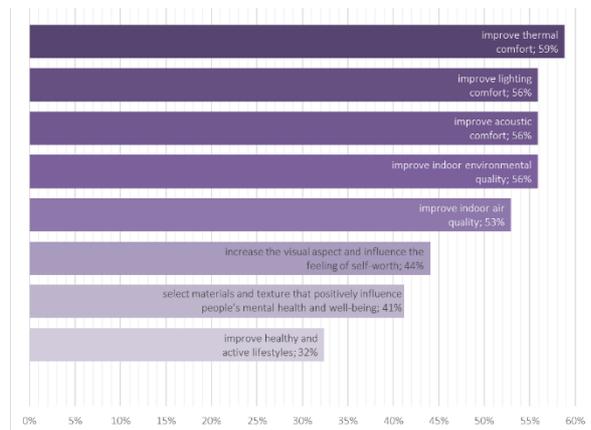

Figure 4: Sub-categories of the Well-being area of 'good' architecture taught at EU Architecture Schools

Thereafter, the second most taught value was analysed. Interest in well-being is well in line with recent research and literature as defined in section 2. This value category was divided into: improve healthy and active lifestyles; select materials and texture that positively influence people's mental health and well-being; increase the visual aspect and influence the feeling of self-worthiness; improve indoor air quality, acoustic comfort, lighting comfort and thermal comfort, resulting in improved indoor environmental quality.

The results shown in Figure 4 present a threshold on the well-being value interests between objectively measurable concepts (e.g. illuminance, pollution levels) and subjetive concepts (i.e. healthy lifestyle, feelings). This could be explained by the difficultness of measuring subjective perceptions and lack of directly related normative in the construction sector to be referred and applied to the taught architectural process.

On the other hand, the economic value is the least taught value at the participating EU architecture schools. This value category was further divided into the following five sub-categories: increase in real estate value; raise occupant productivity in tertiary buildings; facilitate real estate project funding/ investment; lower the risk of gentrification; and ensure a cost- efficient budget/construction process.
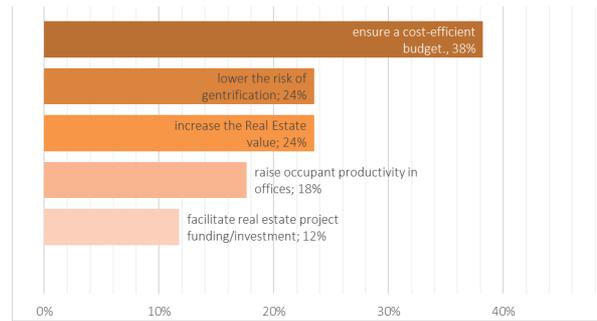

Figure 5: Sub-categories of the Economic area of 'good' architecture taught at EU Architecture Schools

The results are presented in Figure 5, where one can see two natural breaks The most taught area is the one on ensuring the cost-efficient budget of a project. This is evidently an important skill for future architects. However, only 38% of respondents answered they teach or research in this area. When looking at the two lowest numbers in this category, the occupant benefits of good architecture are only tought/ researched at 18%, and the facilitation of investment is only at 12%. The co-benefits of high quality architecture when it comes to for instance better productivity in offices and schools, or quicker recovery times in hospitals are an area where more research is required in order to proof the advantages an architect could bring. The benefit of gaining investment for a high-quality design project should be more evident, yet the results show it is not communicated to the students. These two sub-categories are also overall the least taught and researched.

Qualitative comments to the teaching/ research on the economic value of good architecture came for instance from a university in Portugal: '*Being 'design-centred' and 'free of constraints' like costs, there is no subject on costs, energy efficiency nor indoor air quality.*' Another Portuguese student added: The '*Economic value is more present at the urbanism level (taught in the 5th year of the course) and not as much at the architectural level, more focused in the artistic, historical and technical qualities of architecture.*'

The results on the subject of economic value of architecture could relate back to the comparable low salaries of architects as well. Assuming that if an architect knew about her/ his economic value the salaries would be higher. The average of all European architects' earnings is at only €32 700 (adjusted for Purchasing Power Parity). For an up-dated survey of EU wide architecture salaries the ACE Sector Study can be consulted under: https://www.ace-cae.eu/?id=999

4. CONCLUSION

This paper first investigated the different values that 'good' architecture might bring to a construction project and built result, including its occupants and surrounding environment, in order to then assess

whether these values are being taught in architectural schools and examined by research centers.

It set out with an overview of the various perceived values of architecture, the different perceptions of stakeholders, the plethora of scales, levels and metrics used to measure it. The criteria found in literature are categorised into seven main areas: economic, ecological, heritage, health and well-being, social, functional and cultural.

The paper then moves on to focus on the extent to which the value of architecture is taught at European Architecture Schools to future architects. This is a vital aspect of the discussion, as in case the architect is not aware about the value s/he might bring to a project, how can an occupant or other stakeholder perceive such a value? Analyses of a survey undertaken amongst European Architecture Schools is presented. A noteworthy result of the survey is that the economic value of architecture is the least taught area in the participating universities, while heritage is the most taught area. An investigation into the links between these results and the comparably low salaries of architects could provide interesting results.

Research limitation can be found in the low participation of the survey on how the value of architecture is taught. It is recommended to repeat the survey with a longer time frame in order to receive more respondents from more countries. Further research recommendations include strengthening the overall research design by conducting follow-up interviews with the universities on why the economic value of architecture is not taught enough.

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