The Windows are in!

Perceptions of sustainable interior architecture in the competition content of a prominent design magazine: **A window into practice.**

The Windows are in!

Perceptions of sustainable interior architecture in the competition content of a prominent design magazine: **A window into practice.**

Tessa Dean
798736

Aalto University
School of Arts, Design and Architecture
Department of Design
Master of Arts, Creative Sustainability

2021

Supervisor: İdil Gaziulusoy
Advisor: Anahita Rashidfarokhi

Pages 92 + 23

Aalto University
School of Arts, Design
and Architecture

AUTHOR: Tessa Dean

TITLE OF THESIS: **The Windows are in!**
Perceptions of sustainable interior architecture in the competition content of a prominent design magazine: A window into practice.

SCHOOL: Aalto University School of Arts, Design and Architecture

DEPARTMENT: Department of Design

DEGREE PROGRAMME: Master of Arts, Creative Sustainability

YEAR: 2021

NUMBER OF PAGES: 92 + 23

LANGUAGE: English

ABSTRACT

In interior architecture, the pressure to adopt more sustainable practices in response to environmental crises has spurred the development of various strategies and principles that could promote sustainable development. The level at which practitioners engage with these strategies is uncertain as research on the topic is scarce.

The objective of this research is to start uncovering where the practice is succeeding or lacking when it comes to applying sustainable design strategies. In doing so, it contributes to knowledge regarding sustainability in the interior context and provides insights that educators and practitioners can use to develop the capabilities of the practice.

A method of media content analysis informed by a literature review was used to identify what perceptions of sustainable interior architecture are prevalent in prominent interior design competition entries. Being the first to review the topic using this approach and medium, the method has been adjusted in order to identify how sustainable design theory manifests in communication and practice through the chosen content.

The findings indicate that the practice is mainly focused on strategies of material substitution, life cycle extension, and improvements to indoor environmental quality, signalling a more insular and technocentric approach to sustainability. Less prevalent are interventions that highlight social and systemic considerations, suggesting a lack of more holistic forms of sustainability integration. As a result, the thesis suggests that to enable the application of more ambitious forms of sustainable interior architecture, its education on all levels could take part in promoting holistic perceptions of sustainability as a design driver.

KEYWORDS: Sustainable interior architecture, design strategy, design for sustainability, design awards, qualitative media content analysis, education in sustainability

Aalto University
School of Arts, Design
and Architecture

KIRJOITTAJA: **Tessa Dean**

TYÖN NIMI: **Ikkunat sisällä!**
Käsityksiä kestävästä sisustusarkkitehtuurista merkittävän muotoilumedian kilpailutöissä: Katsaus käytäntöön.

KOULU: Aalto-yliopisto, Taiteiden ja suunnittelun korkeakoulu

LAITOS: Muotoilun laitos

KOULUTUSOHJELMA: Taiteen maisteri, Creative Sustainability

VUOSI: 2021

SIVUMÄÄRÄ: 92 + 23

KIELI: Englanti

ABSTRAKTI

Paine vastata ympäristökriiseihin on ajanut sisustusarkkitehtuurin alaa kehittämään erilaisia strategioita ja periaatteita, joilla voitaisiin edistää kestävää kehitystä. On kuitenkin epävarmaa, millä tasolla alan ammattilaiset näitä hyödyntävät, koska aihetta käsittelevää tutkimusta on tehty vain vähän.

Tämän tutkimuksen tavoitteena on hahmottaa kuinka alan ammattilaiset onnistuvat kestävän muotoilun strategioiden soveltamisessa ja kestävän kehityksen edistämisessä. Tätä kautta tutkimus pyrkii tarjoamaan alan työntekijöille ja harjoittajille uutta tietoa, jota voidaan hyödyntää alan kehittämisessä ja kriittisen itsearvioinnin edistämisessä.

Tutkimusaihetta lähestyttiin ensin kirjallisuuskatsauksen kautta. Katsauksen pohjalta kehiteltiin sisällönanalyysi, jota sitten sovellettiin merkittävän muotoilumedian järjestämään kilpailuun osallistuneisiin töihin sen selvittämiseksi, millaisia näkemyksiä kestävästä sisustusarkkitehtuurista niissä esiintyi.

Analyysin tulosten perusteella alalla keskitytään pääasiassa materiaalien korvaamiseen, elinkaaren pidentämiseen ja sisäympäristön laadun parantamiseen tähtääviin strategioihin, mikä viittaa verrattain kapeaan ja teknosentriseen käsitykseen kestävästä kehityksestä. Vähemmän esillä olivat toimenpiteet, joilla voitaisiin tuottaa laajempia hyötyjä kestävän kehityksen näkökulmasta, mikä viittaa puutteisiin kokonaisvaltaisemman kestävän kehityksen käsityksen hyödyntämisessä.

Jotta kunnianhimoisempien kestävän sisustusarkkitehtuurin muotojen käyttö yleistyisi, ehdotetaan tämän tutkimuksen perusteella, että muotoilualan koulutuksen tulisi kaikilla tasoillaan edistää kokonaisvaltaista kestävän kehityksen ideaa suunnittelun lähtökohtana.

AVAINSANAT: kestävä sisustusarkkitehtuuri, muotoilustrategia, kestävä muotoilu, muotoilukilpailu, design awards, laadullinen mediasisällönanalyysi, kestävän kehityksen koulutus

DEAR READER

With a bachelor degree in interior architecture, I worked three years in the field completing projects for a range of public and commercial clients before applying to Master's studies in Creative Sustainability. The experiences that drove me to pursue further studies were the same that inspired the topic of this thesis. In the following excerpt from my Master's studies application I explain this motivation:

> ''Having worked as an interior architect for some years, I know how hard it can be for designers to find necessary information or guides and guidelines on sustainable design when there is limited time and energy to do so. (...) Such an important issue shouldn't get neglected due to the lack of time and resources for self-education. Nor should designers be content with their best guess. (...) As a result of my active involvement in the master's studies in Creative Sustainability, I expect to build a deeper understanding of what constitutes sustainable design as a whole and gain the ability to develop sustainable practices in my work and field. In addition, I want to become an active agent in spreading knowledge, not only through the design choices I make, but throughout my working environment and industry.''

Tessa Dean

ACKNOWLEDGEMENTS

This thesis completes a journey that started in August 2019. Half a year later, a global pandemic forced each of us to adapt to a new normal. I would like to thank all the staff and teachers at Aalto, who have made an exceptional effort to enable the continuation of our studies. Likewise, I thank all my fellow students who made me feel like part of a community despite the distance between us.

The process of writing this thesis has had its ups and downs. I thank Angela Hernandéz and Timo Sulkamo for lending their expertise at the beginning of this journey, my advisor Anahita for the smiling support during it, my supervisor İdil Gaziulusoy for inspiring me throughout my studies, and Núria Solsona for introducing me to new possibilities.

Lastly, I thank Marjut Alitalo for doing the dishes and my parents I thank for everything.

TABLE OF CONTENTS

GLOSSARY

Absolute consumption:
The total amount of resources (including products) that are consumed by human activity at a period in time.

Interior architecture practice:
The combined knowledge, customs, methods, theories and practitioners that constitute the discipline of interior architecture and steer its output.

Interior architecture practitioner:
A person with a degree in interior architecture, who designs interiors as their profession. In this thesis, I will use the term 'practitioner' to refer to anyone who designs interiors as part of their profession, including interior designers and other designers who may not have a distinct degree in interior architecture or design.

Resource:
In this thesis, I use this term when referring to any and all material and non-material input that is required to produce an output. Here, 'output' refers to the result of an action that has consumed resources. Potential resources can include both renewable and non-renewable materials, as well as products, energy, labour, capital, human capital and time. What is being referred to will depend on the context in which the term is used.

Sustainability & Sustainable development:
The Oxford lexicon defines sustainability as ''Avoidance of the depletion of natural resources in order to maintain an ecological balance''. In this thesis, the concept of sustainability refers to the ability of humans to extend a state of thriving existence over time and incorporates consideration of environmental, social, and economic domains to the extent that they contribute to achieving, maintaining and extending a thriving existence.

Sustainability-oriented:
Because sustainability itself is a relative concept, it is impossible to establish a constant concept of sustainable design or to deem an output truly sustainable. Therefore, designs that seek sustainability improvements in comparison to the baseline - the mainstream status-quo - will be referred to as sustainability-oriented or minded rather than sustainable design. However, I will use the term 'sustainable' when referring to contexts or concepts in which sustainability is, or has been, the differentiating factor between comparable actions/outputs, and/or an important factor driving the action/output.

SDS: Sustainability-oriented design strategies
DfS: Design for Sustainability
VoC: Volatile organic compounds
HVAC: Heating, ventilation & air-conditioning.
LCA: Life cycle assessment

1. INTRODUCTION: THE OPENING

In this thesis I aim to identify some of the prevalent perceptions of sustainable interior architecture (SIA) within the interior architecture practice, by analysing how approaches to sustainable design manifest and are communicated in design competition entries.

The main domains of knowledge that are relevant to this thesis are design research, design for sustainability, sustainability transitions, and design culture with a special focus on interior architecture. The most significant audiences for this research are interior architecture practitioners and the design media as well as design students and educators in design, especially in interior architecture and sustainability studies.

1.1 TOPIC & STARTING POINT

To contribute to sustainability transitions, the design discipline faces pressure to break away from design motives that solely encourage consumption and instead shift towards the kind of design work that supports the goals of sustainable development and aids society in adapting to more sustainable lifestyles.

The necessity to pursue a transformation of the practice stems not only from existential and legislative pressure, but from growing customer demand for sustainable solutions (Stieg, 2006). In order to answer demand with meaningful solutions, practitioners should hold a level of sustainability understanding that allows them to create evidence-based solutions with credibility.

In the field of interior architecture (IA), the pressure to change has brought forth a multitude of approaches such as sustainability rating systems and assessment tools (f.i. LEED, BREEAM, BEES, RTS Environmental rating), standards (f.i. ISO 1400 & ISO 14020), certifications and eco-labels (f.i. FCS, Green Guard, The Nordic Swan Ecolabel), as well as new technological and material innovations such as water saving equipment or fully recyclable carpet systems (Hernandéz, 2020).

However, integrating sustainable design practices into the discipline has not been straightforward as there is a lack of sufficient knowledge & know-how to engage with sustainability integrations within the available time and budgetary constraints of IA projects (Hernandéz, 2020; Stieg, 2006).

Furthermore, demand for more sustainable products has resulted in a plethora of supposedly sustainable solutions that can contain hidden trade-offs (Byggmästar, 2014; Stieg, 2006). As claimed by Byggmästar (2014), many of the tools that aid designers in developing supposedly more sustainable interiors are in fact only twisting the sustainability agenda into a form fitting for business as usual (p.11). Although information about product options is increasing, the available data is often limited in transparency, inconsistent and even contradictory (Stieg, 2006). Time-constrained practitioners may struggle to find time for assessing the validity and reliability of claims attached to supposedly more sustainable product alternatives or for staying up to date on new developments within the industry (Stieg, 2006).

According to Jones (2008, p.75) a study conducted in 1999 by the International Interior Design Association (IIDA) revealed that there were major differences in how practitioners perceive environmentally responsible design and how they practice it. The study found that only 37 percent of practitioners were able to offer sustainable solutions to their clients despite 83 percent finding this their moral responsibility. The clear majority of surveyed practitioners stated that the key obstacle was ‘’a lack of consistent and credible information’’ (Coleman, 2000, as cited in Jones, 2008, p.75).

In an effort to streamline the complexity involved in the process of sustainability integration, many design studios and practitioners have developed their own approach to applying sustainability considerations into their designs (Hernandéz, 2020; Sorrento, 2012). Lacking a clear blueprint for how to practice sustainable design (Stieg, 2006), the result may fail to incorporate sustainability considerations in a holistic manner.

By designing interiors that facilitate various activities, interior architects can influence the behaviour of occupants (Sorrento, 2012; McCoy, 2012; May, 2012) and take part in shaping the built environment which has an intrinsic role in facilitating more sustainable lifestyles (Berardi, 2013; Roosa, 2010). According to Block & Bokalders, (2009) fostering sustainable built environments calls for architects and planners who can ‘’think holistically and have a comprehensive grounding in all aspects of sustainable building’’ (p.xi). For interior design, it means cultivating a wider understanding of approaches to sustainability that move beyond technical, performance based approaches (Sorrento, 2012). This, in turn, entails the adoption of integrative design processes and the reassessment of practitioners ‘’technical skills and psychological and cultural literacy’’ (Sorrento, 2012, p.xx) while research should aim to support the adoption and evolution of a more sustainable design practice (Sorrento, 2012; Stieg, 2006).

Developing the capability and credibility of the IA practice in responding to growing sustainability concerns and criteria, calls for understanding how interior architecture is currently situated in terms of supporting sustainability transitions. Due to the high amount of actors and interrelations involved in socio-technical systems, evoking transformative change is a complex undertaking (Loorbach et al., 2017; McPhearson, Iwaniec, & Bai, 2016; Tschakert, Tuana, Westskog, Koelle, & Afrika,

2016; Scupelli, 2015) and calls for collaborative action across disciplinary boundaries (Gaziulusoy & Öztekin, 2018; Sangiorgi, 2011). While it is unlikely that interior architects can achieve meaningful change if acting alone, they can embrace the effort by analysing how the current practices or ‘’available measures’’ are positioned in terms of supporting the ‘’more sustainable future’’ that is being pursued (Sharpe, Hodgson, Leicester, Lyon, & Fazey, 2016).

Extensive literature exists to explain the various sustainable design tools, strategies and principles that can aid interior architects in the creation of more sustainable designs (f.i. Bergman, 2012; Moxon, 2012; Winchip, 2011; Roosa, 2010; Berardi, 2013; Block & Bokalders, 2009; Brooker & Stone, 2008; Jones et al., 2008, etc.).

The literature contributes to available knowledge in the field by introducing concepts and frameworks such as Cradle-to-Cradle design, the Triple bottom line and Life Cycle Assessment, and lays out principles and justifications for instance for improved indoor environmental quality, energy efficiency, resource conservation and waste reduction. However, it is uncertain as to what degree practitioners are applying these strategies.

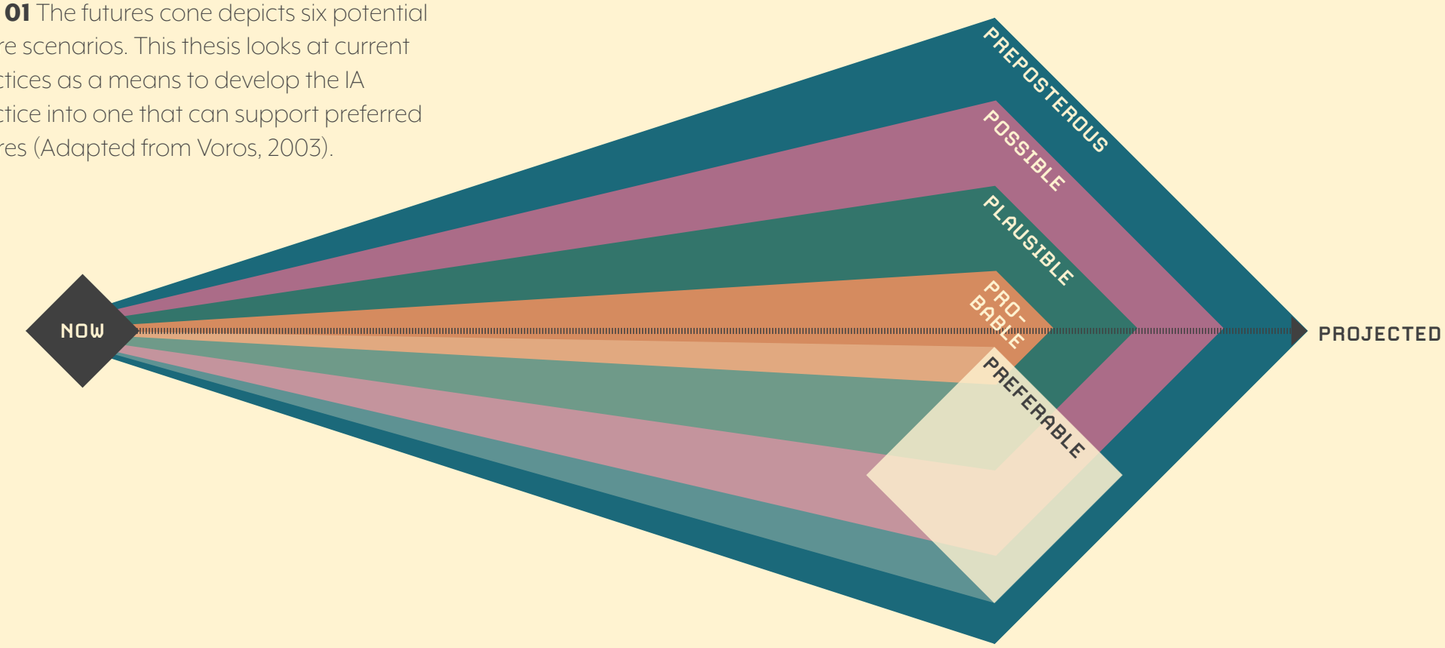
Research on the level of engagement with sustainable interior architecture is scarce, and so it is difficult to establish an idea of where the practice is currently positioned in terms of rising to the call of systemic challenges. Further research that analyses current practices could provide significant insights for delineating steps towards transforming the practice (Sharpe et al., 2016) and reveal some of the aspects where cross-disciplinary collaboration is most needed for evoking change.

By analysing an array of projects from various countries, my thesis contributes to knowledge on where the field of interior architecture succeeds or is lacking when it comes to applying sustainable design principles in a project context; drawing attention to design approaches that are either inhibiting or supporting the practice in creating more sustainable built environments. Practitioners and educators can use this research when developing strategies for improving practices and establishing a more coherent and holistic sustainability narrative within the practice.

Insights drawn from the examination can also be used to nurture critical reflection among practitioners. In this manner, I try to support the transformation of the practice towards one that can produce meaningful sustainability benefits with increasing credibility and reflexivity. In doing so, I do not attempt to push for a top-down transformation of the building industry, but rather a bottom-up transformation that begins with the practitioners themselves becoming more aware and critical of their own work.

I hope that by nurturing this reflection, the thesis can help shift more focus onto design ideals that support sustainable development. In this way, practitioners may begin to appreciate, inspire and pursue work that is not only beautiful, but also ambitious in its sustainability contributions.

Fig. 01 The futures cone depicts six potential future scenarios. This thesis looks at current practices as a means to develop the IA practice into one that can support preferred futures (Adapted from Voros, 2003).



1.2 OBJECTIVES & RESEARCH QUESTIONS

In this thesis, my intention is to open a window into the practice of interior architecture using media content analysis, and in this way, contribute towards building a better understanding of how interior architects approach sustainable design and engage with sustainable design strategies (SDS). Ultimately, the objective of this thesis is to take part in the transformation of IA practice by critically examining how ideas of sustainable design manifest in the practice. In this context, the main research question takes the following form:

RQ 1:
What perceptions of sustainable interior design are prevalent in prominent interior design competition entries?

The main research question seeks an understanding of the SDS applied in the field as they appear in the analysed media content. Its aim is to reveal potential hierarchies and trends in their application. The main research question is supported by three sub-questions that approach the main RQ from thematic focus points of Theory, Practice and Communication. The sub-questions are used to gather background and data necessary for forming an informed answer to the main research question.

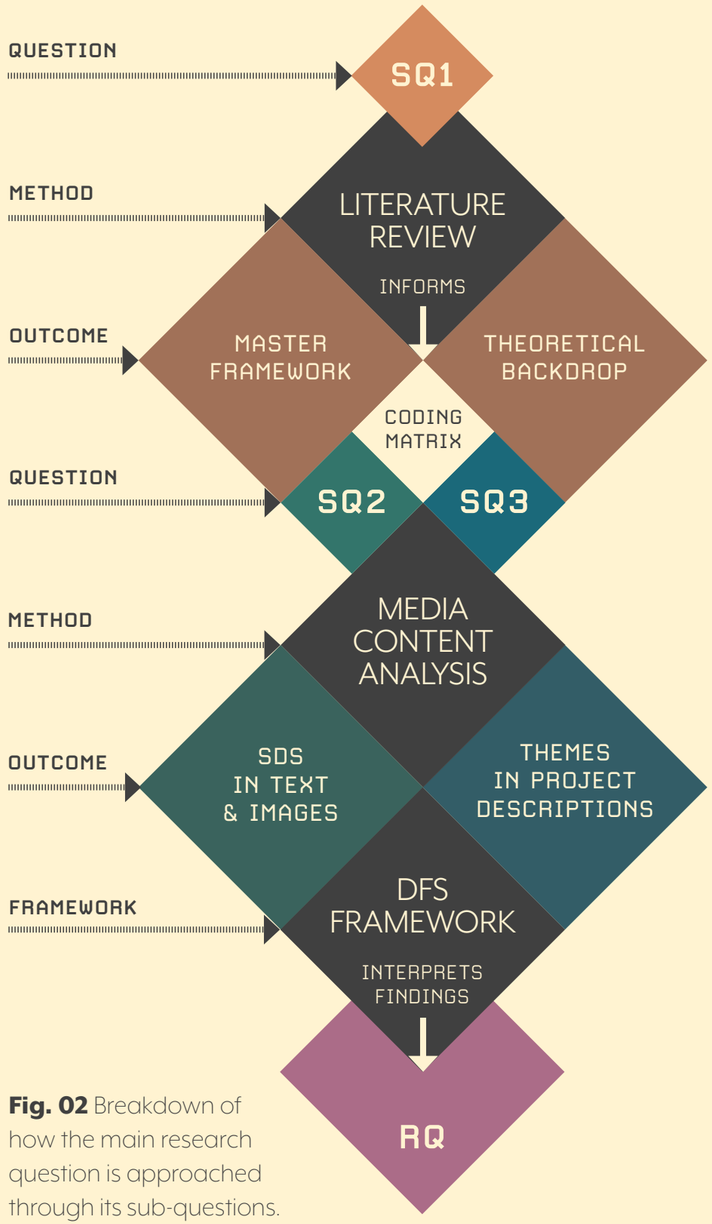


Fig. 02 Breakdown of how the main research question is approached through its sub-questions.

SUB-QUESTION 1 (SQ1) - THEORY:
What guidelines, principles, and strategies of sustainable design (SDS) are known in interior architecture practice?

Answers to this question are approached through a literature review of relevant work discussing sustainability within interior architecture and the built environment. The SDS mentioned in these works are gathered into a master framework that forms categories for the coding matrix of the media content analysis. The reviewed literature also functions as a theoretical framework for assessing the results.

SUB-QUESTION 2 (SQ2) - PRACTICE:
How are SDS implemented in the competition entries?

This question is approached through media content analysis by assessing whether the text and images of competition entries display qualities of SDS gathered in the coding matrix and master framework. The findings are used to gain an idea of the popularity of different SDS in practice and go on to inform answers to the main research question.

SUB-QUESTION 3 (SQ3) - COMMUNICATION:
How are SDS communicated about in the competition entries?

To formulate answers to this question, themes in the project descriptions of competition entries are assessed through the media content analysis. The findings are used to gain an understanding of what design characteristics practitioners choose to highlight and help form an idea of the intended level of engagement with different SDS.

1.3 METHODOLOGY

Below I have shortly described the approaches I used to address the research question. I chose the methods for their suitability to produce relevant findings to the research question and sub-questions.

1.3.1 LITERATURE REVIEW

To introduce the topic domain and provide a theoretical framework for analysing the media content, I conducted a review of literature with the guidance of Sub-question 1. Some of the key work I used consists of literature on sustainable building (Berardi, 2013; Bergman, 2012; Block & Bokalders, 2009; Roosa, 2010), sustainable interior design (Brooker & Stone, 2008; Jones et al. 2008; Moxon, 2012; Smith, Lommerse, & Metcalfe, 2014; Winchip, 2011), and sustainable design (Ceschin & Gaziulusoy, 2020) as well as thesis work from the same topic domain by Hernandéz (2020) and Byggmästar (2014).

Keywords used to search for material included sustainable AND/OR sustainability AND/OR interior AND/OR design AND/OR architecture AND/OR building AND/OR social AND/OR environmental AND/OR practice.

The choice of literature reflects the main purpose of this method, which is to provide an overview of central sustainability approaches and principles for sustainable design that are recognised and practised within the discipline. From here on the thesis will refer to the aforementioned as sustainable design strategies (SDS). They include design guidelines and design attributes that characterise sustainable building, which share theories and historical developments that inform sustainability science and related design methodologies.

The resulting overview of relevant background has two key functions in the scheme of the larger thesis. Firstly, it introduces the topic domain, key themes, and issues within the industry for the reader. Secondly, it functions as a theoretical framework for analysing content and interpreting results.

1.3.2 CONTENT ANALYSIS

In this thesis, a qualitative content analysis method is adapted from Krippendorff (2018) & Elo, Kääriäinen, Kanste, Pölkki, Utriainen, & Kyngäs, (2014) to analyse media content in order to provide insights for Sub-questions 2 and 3 (Practice & Communication).

In social sciences content analysis is used to analyse the meanings of specified data for a defined social group (Krippendorff, 1989). The method combines qualitative and quantitative approaches for gathering and processing the data because both the occurrence and context of relevant concepts is meaningful for the analysis.

In this work, the qualitative content analysis focuses on what approaches to 'sustainable interior architecture' are being applied and how they are expressed by the practitioners who submit the entries. The analysed sample consists of a total of 155 competition entries to the interior design categories of the Dezeen Awards (See e.g. Dezeen, n.db), with each analysed entry including a short text (typically less than 200 words) and one photograph depicting a part of the designed interior.

The application of the method lends from critical discourse analysis (CDA) (See e.g. Wodak & Meyer, 2009) insofar as it studies social phenomena (i.e. the prevalence of sustainability in IA practice and communication) surfacing in images and text (Wodak & Meyer, 2009).

I chose qualitative media content analysis for its ability to produce quantitative data which can later be useful for analysing trends and comparing material from different years. With the guidance of Sub-questions 1-3, I adapted the method so that it can respond to the main research question; Sq1 provides the theoretical framework for the coding matrix, whilst Sub-questions 2 and 3 provide form and focus to the matrix by delineating what type of data needs to be gathered in order to address the main research question.

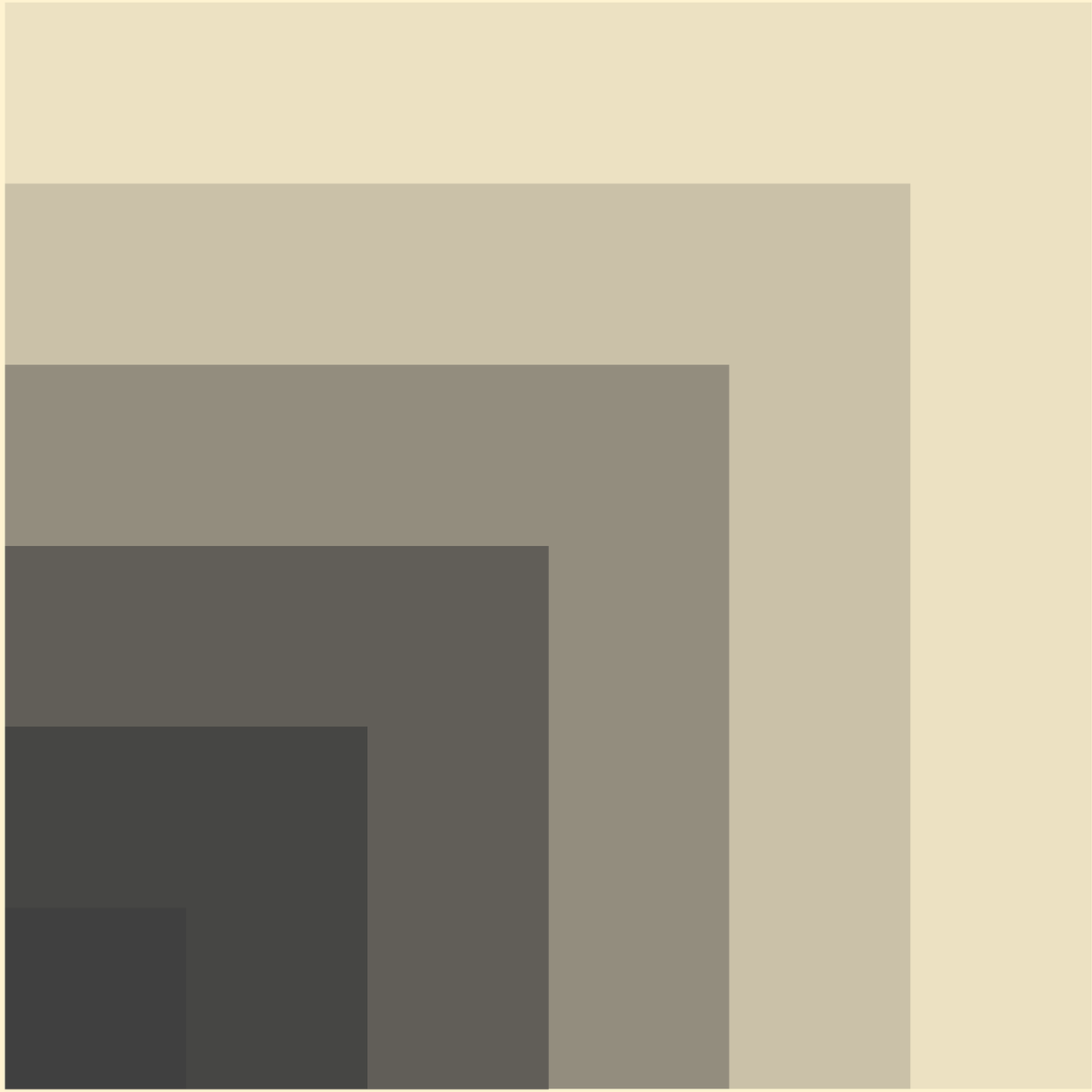
By comparing theory to examples from practice in this manner, I hope to build a representation of the practice that is not an idealised image of its potential, nor an realistic depiction of an objective truth, but a subjective depiction drawn from what practitioners choose to communicate to the wider public. While this thesis ultimately aims to contribute to the reflexivity of the interior architecture practice, it is important to note that the intention is not to create a generalised characterisation of that practice, but rather provide a viewpoint that complements a wider understanding.

I will give a more detailed description of the application of media content analysis in a dedicated chapter, which also introduced the Design for Sustainability framework.

1.3.3 DESIGN FOR SUSTAINABILITY AS A THEORETICAL FRAMEWORK

When discussing findings as a means to produce insights for the main research question - the prevalent perceptions of sustainable interior design - I will use the Design for Sustainability (DfS) Multi-Level framework (DfSf) by Ceschin & Gaziulusoy (2020) as a theoretical framework.

The framework was originally developed for synthesising the historical evolution of design approaches that contribute to sustainability and visualises how these approaches relate to each other in terms of their problem framing and the targeted scope of intervention (Ceschin & Gaziulusoy, 2020). The reflection serves to provide an idea of how the SDS that manifest within the analysed content fit within the wider framework of design for sustainability and the various approaches to sustainability that exist within it, which can provide an idea of where the practice is succeeding or lacking when it comes to considering sustainability in a holistic manner.



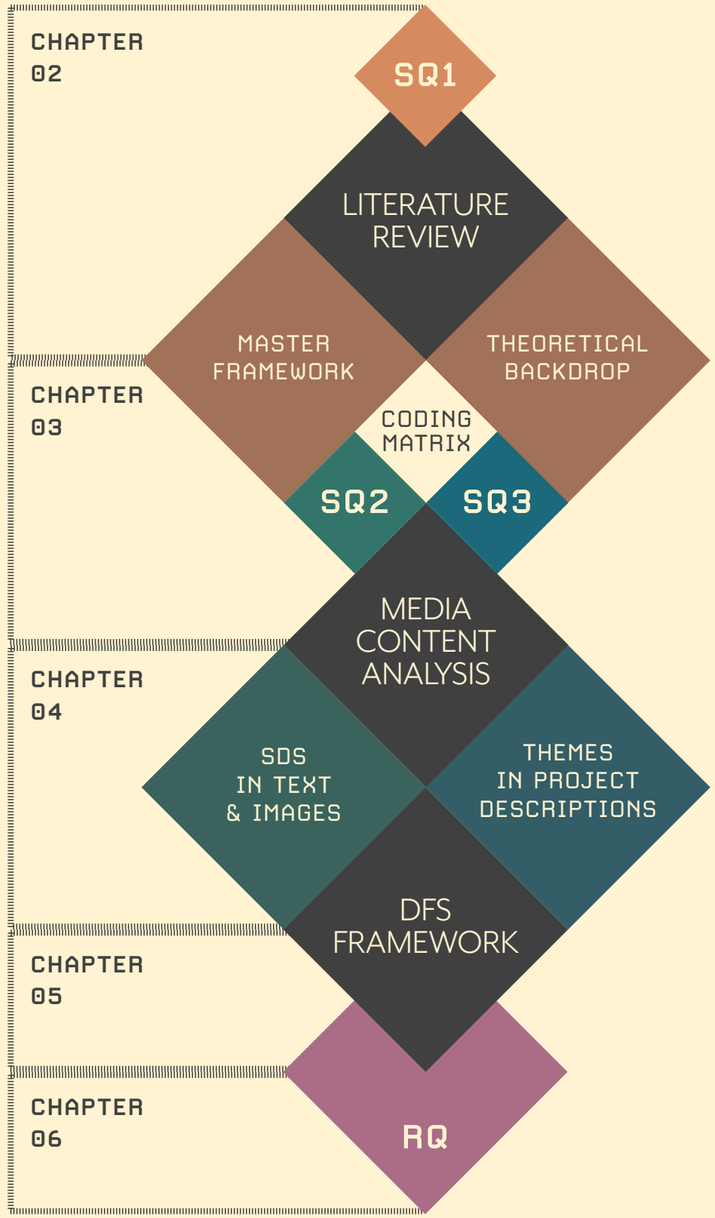


Fig. 03 Breakdown of the approach to the main research question through its sub-questions.

1.4 STRUCTURE & SCOPE

The thesis follows a structure in which key themes are first discussed via literature review to familiarise the reader with the necessary historical and theoretical background on which the content analysis and discussion will later build on.

In Chapter 2, which consists of a literature review, I explore the common principles and approaches connected to integrating sustainability considerations into interiors, and by reflecting on these, develop general conclusions for the practice. The topics I explore in this section are mostly focused on environmental dimensions of sustainability, as the reviewed literature does not address the social and economic dimensions in the same length.

In Chapter 3 I use the theoretical groundwork as the foundation for creating a framework for analysis. This framework will be used in analysing competition entries to the Dezeen awards. The chapter also introduces the Design for Sustainability framework by Ceschin & Gaziulusoy (2020), which provides a theoretical framework for the discussion taking place in Chapter 5.

In Chapter 4 results from the content analysis will be presented and synthesized before further discussion.

Chapter 5, ’Discussion’, reflects on the findings from the analysis and evaluates their significance for the domains of interior architecture and education.

Chapter 6 brings the thesis to a close by revisiting the research and summarising findings. It includes a reflection on potential limitations and suggests opportunities for further research.

2. LITERATURE REVIEW: THE WINDOW FRAME

Through a review of background literature, this section provides a preliminary idea of how the interior architecture practice operates and the different ways in which sustainability considerations manifest in those operations. Rather than aiming to provide an in-depth analysis of the entire scene of interior architecture, I discuss the practice on a more general and international level in order to provide the flexibility needed for assessing diverse project typologies.

Due to standardisation within the building industry, many of the principles, design methodologies and design influences that shape the practice are shared across continents (Roosa, 2010). Although context-specific variations to best practices and design ideals do exist (Roosa, 2010; Julier, 2017), for the purpose of this thesis it makes sense to focus on the shared aspects and only highlight those context-specific variations that serve to demonstrate relevant limitations, challenges and potential inequalities involved in integrating sustainability into interior environments.

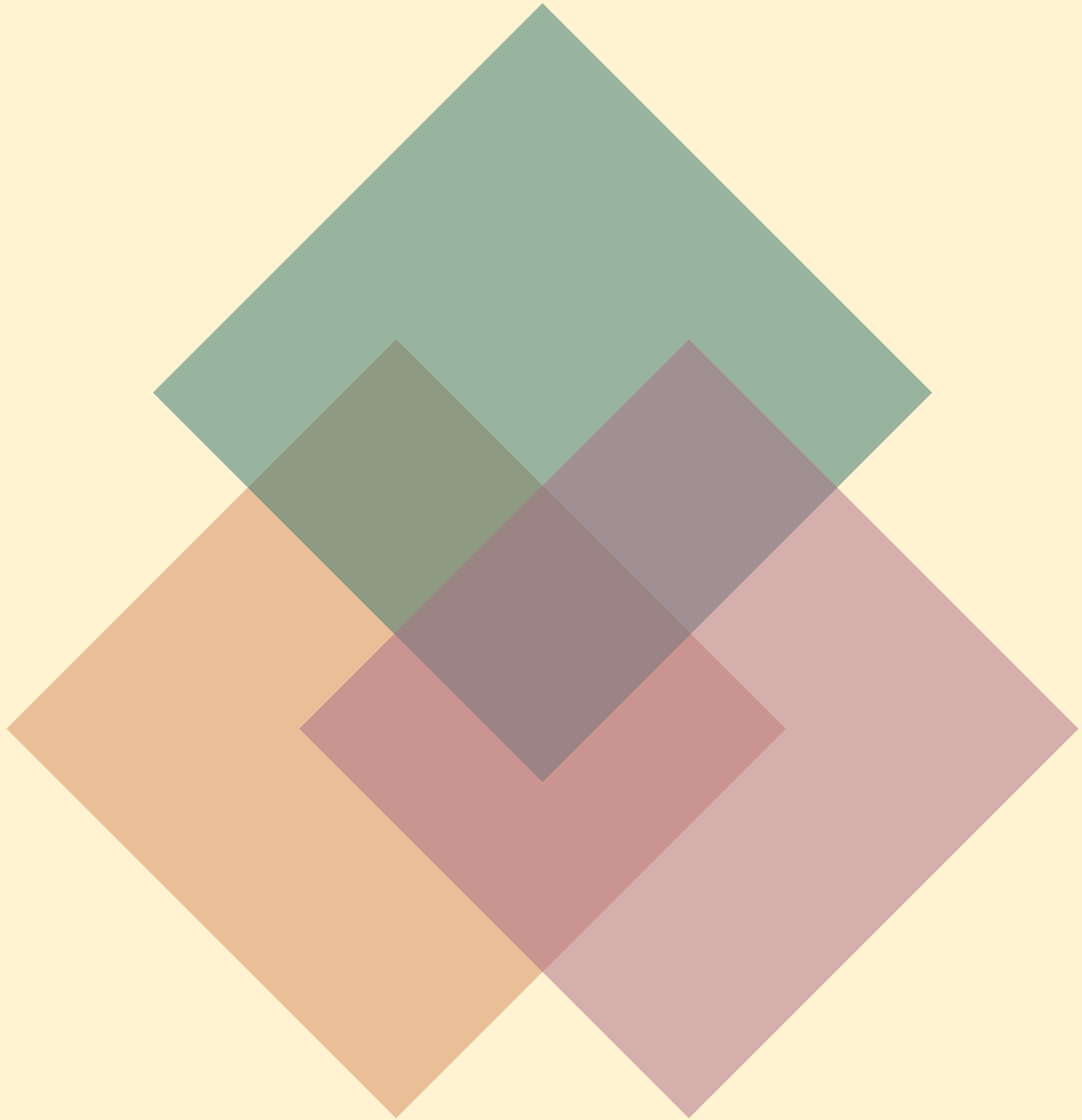
2.1 EVOLUTION OF SUSTAINABLE DESIGN PRINCIPLES

Before one can begin to grasp the contradiction that is sustainable building, it is important to recognise that the concept of sustainability is a social construct (Geels, 2010). What is considered sustainable is subject to evolution; perceptions of sustainability are connected to our value hierarchies as well the timeframe in relation to which we expect to ‘’sustain ability’’.

In the case of interior architecture and the building industry, how sustainability is understood relates closely to how society perceives sustainable development, which in its own right has been considered a vague concept without an absolute definition (Hopwood et al., 2005; Berardi, 2013). One of the most widely known definitions was put forth by the Brundtland Commission in 1987, stating that ‘’sustainable development is development which meets the needs of the present without compromising the ability of future generations to meet their own needs’’ (WCED, 1987).

Although related, the concepts of sustainability and sustainable development are not exactly the same. The prior refers more to a ‘’capacity for continuance into the long-term future’’ (Porritt, 2007, as cited in Berardi, 2013, p.41) while the latter can be considered as an ongoing process to extend wellbeing into the future, or nurture ‘’sustainability’’ (Berardi, 2013, p.41).

The next subchapters explore how sustainability science has evolved and shaped the principles for pursuing sustainability in the design of built environments.



2.1.1 ADOPTION OF EFFICIENCY IMPROVEMENT AND REDUCTION STRATEGIES

Contemporary architecture leans on an impressive amount of existing knowledge accumulated throughout history (Winchip, 2011). Building practices that uphold certain qualities above others have been shaped by evolving climates, fashions, technologies, beliefs, politics and available materials (Jones, 2008; Winchip, 2011). Similarly, notions of sustainable design in the building sector have changed and adapted in relation to the evolving concept of sustainability itself (Berardi, 2013) .

According to Winchip, (2011) many of the more sustainable materials, building features and construction techniques that are known today predate the distinction of sustainability as an expressly pursued characteristic. Unwitting sustainability features are perhaps most prevalent in examples of vernacular architecture, where construction techniques have evolved in response to the regional ecology and physical limitations. Due to limited means of transport and labour, construction relied on fewer resources, including local materials and skills. Some of these practices have resulted in highly durable materials and craftsmanship that have lasted for millennia.

As a result, examples of early vernacular architecture include highly regional characteristics, some of which have gone on to inform the principles of sustainable architecture. Age-old inventions such as passive ventilation, steep roofing, daylighting, and even underfloor heating are all techniques that, when applied appropriately, can improve the sustainability of a building (Winchip, 2011)

The sustainability ideologies that drive sustainability-oriented design today started gaining momentum in the mid-20th century. Revelations about the effects of pesticides in Rachel Carson's Silent Spring (1962) raised awareness of the harmful consequences of human activity, while images of Planet Earth's physical boundaries captured by the crew of Apollo 8 in 1968, showcased the fragile ecological balance on which human society depended on.

The latter inspired the famous ''Spaceship Earth'' analogy by Buckminster Fuller, an American architect and inventor (See e.g. Fuller, 1969). The analogy depicted the planet as a bounded system in which humans carry a responsibility to protect the vital Earth functions that enable them to thrive (Fuller, 1969; Ceschin & Gaziulusoy, 2020). This ideology gained pertinence by the publication of the Limits to Growth (LtG) by Meadows, Meadows, Randers & Behrens in 1972, which brought forth the potential consequences of untapped resource consumption within the bounded system (Meadows et al. 1972).

A year after the publication of LtG, the very real consequences of a resource shortage were experienced in Western nations as a result of the OPEC oil embargo (Hernandéz, 2020). The 1973 energy crisis prompted public interest towards various forms of energy-conservation and resulted in a surge of designed solutions focused on improving energy efficiency and reducing dependence on fossil fuels (Winchip, 2011; Jones, 2008). Solutions included enhancements to building performance through improved insulation, passive solar energy technologies, and energy-efficient windows (Winchip, 2011). In accordance with 1980s design concepts of green design (See e.g. Burall, 1991) and ecodesign - these 'green buildings' represent a lower impact alternative that focuses on efficiency improvements, impact reduction and the conservation of resources (Berardi, 2013; Ceschin & Gaziulusoy, 2020).

Gradually, efficiency improvements in the building sector expanded into water conservation technologies and material manufacturing, while building site strategies were developed in a more sustainable direction (Hernandéz, 2020). At the same time, rising concern regarding the effects of modern building products on occupant health directed attention towards indoor air quality (Winchip, 2011; El Khouli, John, & Zeumer, 2015). This has led to the replacement of toxic or hazardous material ingredients with less harmful alternatives while the importance of proper building ventilation as a means to maintain an optimal level of humidity, thermal comfort and overall indoor air quality is highlighted (Bergman, 2012; Hernandéz, 2020; Jones, 2008; Moxon, 2012; Winchip, 2011).

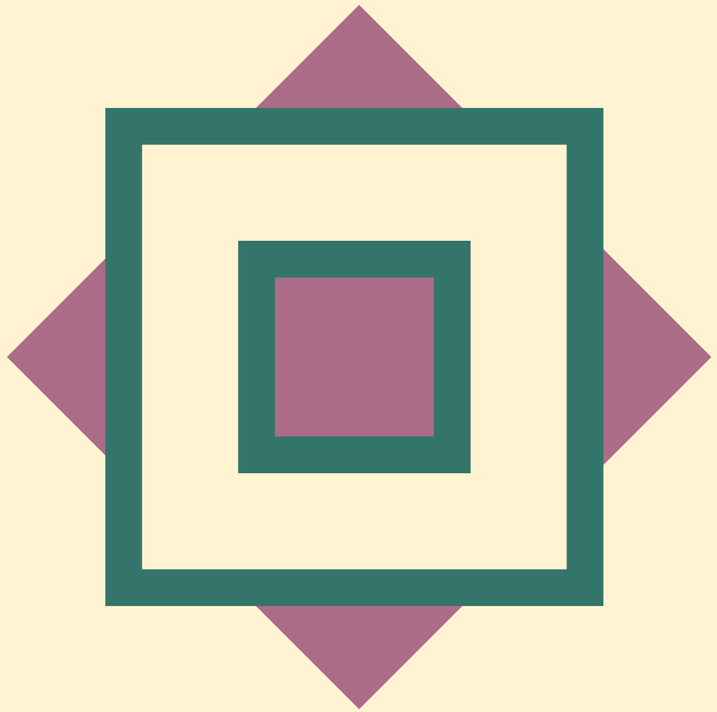
2.1.2 INTRODUCTION OF SOCIAL CONSIDERATIONS

In 1971, Victor Papanek published the first edition of his influential book: Design for the Real World: Human Ecology and Social Change (Papanek, 1985, 1st ed.: 1971). Papanek's book was one of the first to suggests that, in order to steer the design discipline away from contributing to ecological and social degradation, practical improvements alone (such as improvements to individual product characteristics) would prove insufficient, and instead, a transformation of the wider design profession would be required (Ceschin & Gaziulusoy, 2020; Papanek, 1985).

Calls for a transformation in behaviour were further echoed on the international stage. In 1987 the World Commission on Environment and Development (WCED) put forth their famous definition for 'Sustainable Development' in the report titled Our Common Future. Along with the report came recommendations for ''A long-term agenda for action and inspirational goals for the world community'' (WCED, 1987, p.11, as cited in Winchip, 2011, p.11). Echoes of the WCED's agenda are still present in the United Nations (UN) Sustainable Development Goals (SDGs), introduced in 2015. The goals delineate actions that are needed across all sectors of society in order to nurture more sustainable futures. Goal 11 calls explicitly for making ''cities and human settlements inclusive, safe, resilient and sustainable'' (UN, n.da).

According to the United Nations Environment Programme (UNEP), the building sector currently accounts for nearly 40% of global CO2 emissions when construction industry emissions are included (UNEP, 2020). Some of the strategies that governments and non-governmental organisations have seized as a means to point the industry in the right direction include clarifying regulation regarding construction products and energy-efficiency, developing guidelines and assessment systems for low carbon or ''green building'', and encouraging processes that can reduce the amount of harmful construction waste.

In the 1990s the UK-based Building Research Establishment introduced the first assessment standards for sustainable building (BREEAM), and copious others have followed, such as the LEED (Leadership in Energy and Environmental Design) -green building certification programme, which was introduced by the United States Green Building Council (USGBC) in 1994. LEED and BREEAM have since become two of the most widely used green building rating systems on Earth, but several others also exist. Thesis work by Hernandéz (2020) identifies at least another 27 different rating systems relating to the building industry (See e.g. Hernandéz, 2020).



Across sectors of society, the pursuit of SDGs has revealed that practical improvements, such as energy efficient buildings, can only go so far when fostering more sustainable futures. As anticipated by Papanek, navigating through the complex interrelatedness of social, environmental, and economic dynamics calls for sensitive responses that evoke and support more sustainable lifestyles without feeding inequitable power-imbalances (Papanek, 1985).

Similarly, the principles of sustainable building have stretched from an emphasis on resource-efficiency, occupant safety and durability into considering wider social, environmental and economic impacts and influences that the buildings may have on the surrounding communities, users and environment (Jones, 2008; Sorrento, 2012; Winchip, 2011). In their handbook for sustainable building, Block & Bokalders (2009) agree that the considerations involved in sustainable building should include ‘’the whole impact of a building – on the environment, people’s health and social wellbeing – throughout its whole lifetime’’ (p.xi). What makes a building sustainable is not the sum total of its reduced impact, but, as echoed by Berardi (2013), its ability to nurture more sustainable lifestyles (Berardi, 2013. p.51).

As sustainability thinking in design has moved from a focus on the kind of eco-efficiency to regenerative design, what is considered sustainable building is increasingly linked to the relationship of that building with the larger, systemic, metabolism that surrounds it (Reed, 2007; Sorrento, 2012). Within this context, sustainability becomes a balancing act between social wellbeing and planetary boundaries (See e.g. Steffen et al,. 2015). To steer society towards this balance, Kate Raworth proposes the adoption of a new economic model which operates within the planetary boundaries delineated by Steffen et al. (2015) and is grounded on an array of social foundations that foster liveability and human wellbeing in an equitable manner (See e.g. Raworth, 2017). According to Berardi (2013), building industry practices are still far away from being able to champion sustainability from a regenerative perspective, as doing so would require the building to become a contributor to the natural replenishment of resources, rather than solely consuming them (Berardi, 2013).

In summary, throughout history, the adoption of sustainable building practices has responded to historical events and trends that underline the fragile balance from which humanity extracts and builds on. During these years, the concept of sustainable building has evolved from one focusing on efficiency and conservation to one that hopes to nurture more sustainable lifestyles. As a result, an array of tools, methods and design principles (from here on referred to as sustainable design strategies [SDS]) have been introduced to the design discipline. Their adoption and utilisation can help practitioners create more sustainable designs. The following chapter will introduce some of the key SDS that are familiar to the field of interior architecture.

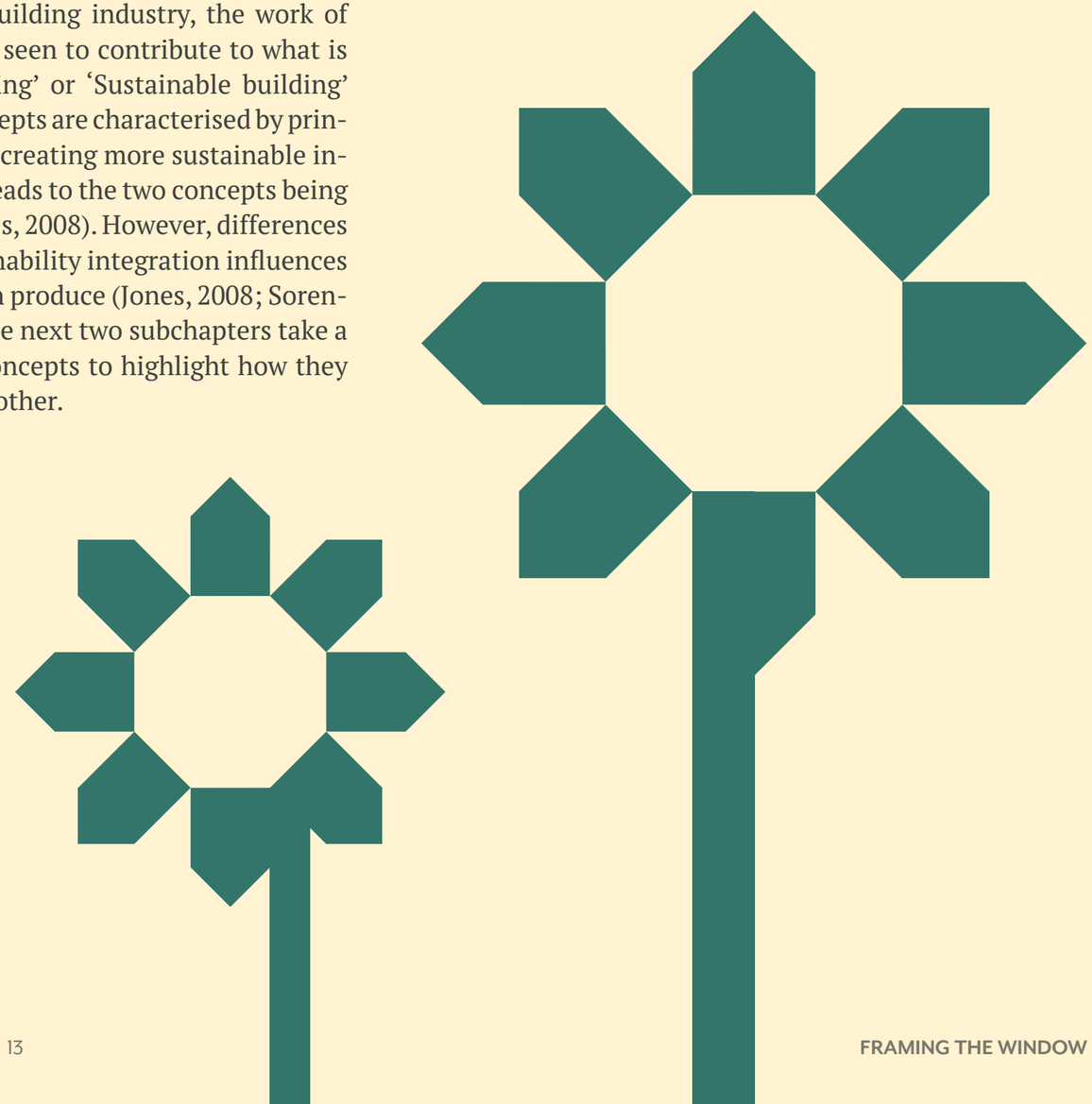
2.2 PRINCIPLES OF SUSTAINABLE INTERIOR ARCHITECTURE

From the vast array of opportunities for sustainability integration that have surfaced over the years, some general principles have been gathered that guide best practice. Sustainable interior architecture shares most of its design principles, such as resource efficiency, maximising life cycles and nurturing behavioral change, with the wider design discipline.

To understand the array of design principles and methods that characterise sustainable design, Ceschin & Gaziulusoy (2020) delve into the evolution of different approaches to design for sustainability. The approaches introduced by Ceschin & Gaziulusoy (2020) inhabit and cross-over different 'innovation levels' and vary in terms of the scope of the design intervention and framing of the design problem. Following a similar logic as the scales of vision introduced by Ashby (2016a p.217), the innovation levels, referring to the scale that the design intervention targets, grow in complexity as they move from the material/component level to the spacio-technical system level (Ceschin & Gaziulusoy, 2020; Ashby 2016a). As the object of design moves up the levels, growing in complexity, greater multidisciplinary knowledge and competency is required from the innovation team (Ceschin & Gaziulusoy, 2020).

In interior architecture, most design interventions take place within the built environment. Working in this context, interior architects come in contact, and can potentially influence, multiple levels of sustainability innovation. Much like the wider design discipline, there are many ways in which interior architects approach and respond to challenges related to sustainability. The sustainability impact of these approaches varies depending on the initial framing and scope of the intervention (Ceschin & Gaziulusoy, 2020).

As operators within the building industry, the work of interior architects is often seen to contribute to what is perceived as 'Green building' or 'Sustainable building' (Sorrento, 2012). Both concepts are characterised by principles that are relevant for creating more sustainable interiors, which sometimes leads to the two concepts being used interchangeably (Jones, 2008). However, differences in their approach to sustainability integration influences the level of impact they can produce (Jones, 2008; Sorento, 2012; Berardi, 2013). The next two subchapters take a closer look at these two concepts to highlight how they diverge and relate to each other.



2.2.1 GREEN BUILDING

Firstly, as noted in the previous chapter, green buildings utilise a range of reduction or conservation strategies (Winchip, 2011) that aim to lower the environmental impact of the building over its life cycle. In this respect, the approach manifests the principles of green design and eco-design, which operates mainly on the material/component innovation level (Ceschin & Gaziulusoy, 2020) and takes less of a stand in socio-technical system dynamics (Ceschin & Gaziulusoy, 2020; Berardi, 2013).

Despite its shortcomings, green building provides a foundation on which more evolved approaches can build on. The EPA (2010, as cited in Winchip, 2011) lists some of the advantages of green built environments (See. Fig. 04). They advocate for minimising the consumption of a variety of resources, both renewable and nonrenewable, by seeking efficiency improvements and reducing their overall use. In this manner, green building can cut down on embodied emissions from resource-extraction and manufacturing, including the felling or harvesting of natural resources (Winchip, 2011). Reduction strategies such as these aim to do the most with the least in order to push back the negative effects of untapped consumption (Bergman, 2012).

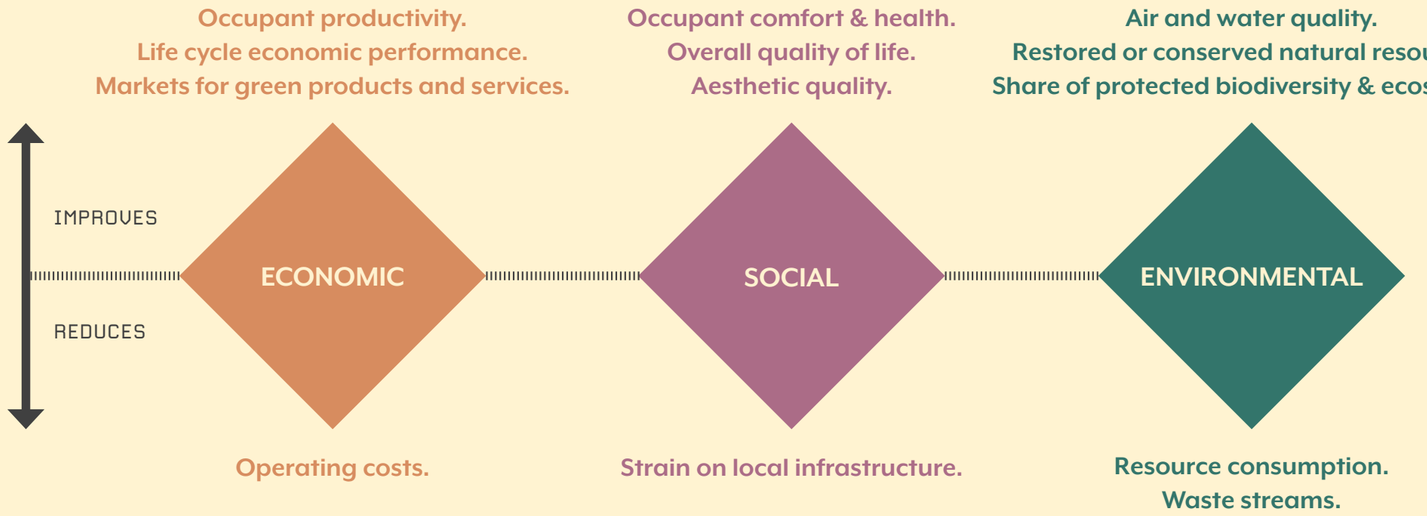


Fig. 04 Advantages of green built environments according to the EPA (2010, as cited in Winchip, 2011).

Cradle-to-cradle design (See e.g. Braungart & McDonough, 2002), and the concept of a Circular economy (Ashby, 2016a) both revolve around the efficient utilisation of materials and lend theories to green building. Strategies of resource conservation for both renewable and non-renewable resources are seen as vital for protecting natural habitats, slowing down environmental degradation, conserving resources for future generations, and ensuring a more equitable and safe access to resources on a globe of more than 7.5 billion people.

Hand in hand with resource reduction, green building seeks to minimize atmospheric emissions by preferring renewable energy options, improved energy efficiency, and a variety of passive or low-energy approaches to thermal comfort and air circulation (Winchip, 2011). These reduction efforts span across the building's life cycle, meaning that attention is also paid to emissions from transportation and supply chains, site works and end-of-life demolition and recycling practices (Roosa, 2010). In order to gain an idea of a product's life cycle impacts, practitioners can utilise Life cycle assessment tools, which look at ''all the inputs and outputs throughout the life of a material or product'' (Bergman, 2012, p.120). These life-cycle stages include everything from raw material acquisition to fabrication, distribution, usage, and the product's end of life (Bergman, 2012, p.120).

Due to its size, the building sector has a great responsibility when it comes to reducing atmospheric GHG concentrations. According to the IPCC (2021), atmospheric concentrations of CO2 were higher in 2019 ''than at any time in at least 2 million years''(IPCC, 2021, p.9), and that scientist agreed that the observed increases in these concentrations were ''unequivocally caused by human activities'' since around 1750 (IPCC, 2021, p.5). With implications such as growing global surface temperature, melting ice caps, rising sea levels, species loss and increasing extreme weather events, global warming is considered a great existential threat to the human species itself.

Actions to reduce the share of building sector emissions holds significant importance when addressing this issue. Estimates by the International Energy Agency (IEA) indicate that direct building emissions would need to fall by 50%, and indirect by 60%, to reach net-zero carbon building stock by 2050 (UNEP, 2020). To achieve these dramatic reductions the UNEP (2020) puts forward that: ''... All actors across the buildings value chain need to increase decarbonisation actions and their impact by a factor of five.'' For this reason, strategies of energy efficiency improvement in the building sector are often emphasized. For interior architects however, the ability to impact these characteristics is sometimes limited (Winchip, 2011). Instead, focus may shift towards finding ways to reduce the interior's embodied energy.

Green buildings also pursue minimal damage to ecosystems surrounding the site (Roosa, 2010). Reaching this goal requires careful planning of site work and preferring urban infill as opposed to urban expansion. With existing transportation networks, services and infrastructure, urban infill projects require less manipulation of the environment in order to connect the building with the surrounding area (Winchip, 2011). Green cover lost in the process can also be returned in part by installing green roofs and walls in addition to landscaping.

To help practitioners navigate through this myriad of considerations, Grumman (2003, as cited in Roosa, 2010, p.199) lists general strategies that can reduce the environmental impact of buildings:

- Minimal consumption—due to reduction of need and more efficient utilisation—of nonrenewable natural resources, depletable energy resources, land, water, and other materials.
- Minimal atmospheric emissions having negative environmental impacts, especially those related to greenhouse gases, global warming, particulates, or acid rain.
- Minimal discharge of harmful liquid effluents and solid wastes, including those resulting from the ultimate demolition of the building itself at the end of its useful life.
- Minimal negative impacts on site ecosystems.
- Maximum quality of indoor environment, including air quality, thermal regime, illumination, acoustics, noise and visual aspects.

These strategies place special attention on aspects that reduce environmental impacts while maximising the quality of the indoor environment for the users (Hernandéz, 2020). Healthy users who feel comfortable within their surroundings and are able to make sustainable choices are a key ingredient for improving occupant health and efficiency (Bergman, 2012; Sorrento, 2012). Therefore green building pays attention to comfortable illumination, indoor air quality, thermal comfort, the acoustic environment and aesthetics (Roosa, 2010).

2.2.2 SUSTAINABLE BUILDING

As the focus moves from green building to a more comprehensive concept of sustainable building, the complexity of considerations grows (Jones, 2008). This growth can be compared to a growth in the ''scale of vision'' (See e.g. Ashby, 2016a, p.217), indicating a shift in how sustainability is perceived. In the context of these scales, green building with its efficiency improvement can be seen as a from of 'Design for environment' (Ashby, 2016a), whereas sustainable building adopts a perspective of sustainable development (Berardi, 2013). After assessing various perceptions of sustainable building, Berardi (2013) summarises the concept in the following manner:

> *A sustainable building has to be a healthy facility designed and built in a cradle-to-cradle resource-efficient manner, using ecological principles, social equity, and life cycle quality value, and which promotes a sense of sustainable community (p.52)*

Along with this summary, Berardi (2013, p.53) lists a set of phenomena that a sustainable building should increase:

- Demand for safe building, flexibility, market and economic value.
- Neutralisation of environmental impacts by including its context and its regeneration.
- Human well-being and occupants' satisfaction.
- Social equity, aesthetics improvements, and preservation of cultural values.

What differentiates this approach is a stronger emphasis on contextual awareness and social equity on a global scale (Jones, 2008, p.86). According to Berardi, these requirements are still ''scarcely considered in current sustainability assessment systems'' (Berardi, 2013, p.53) and lack representation when references to sustainable building are made.

In other words, developing more sustainable built environments relies on an understanding of project-specific geographical, geophysical and cultural context as well as the local and international regulations that define which approaches are acceptable for application. In practice, it calls for practitioners to show interest in the local environment and truly engage with local communities and stakeholders in order to assess the real needs of the context and to create meaningful solutions that nurture well-being in all domains of sustainability (Sorrento, 2012; Winchip, 2011; Bergman, 2012). Furthermore, enhancing the sustainability of the designs requires collaborating with a wide network of actors across sectors of society (Stieg, 2006). To facilitate this collaboration, practitioners can adopt an attitude of active agency by practicing what they preach within and beyond the project context (Stieg, 2006). This includes gathering and disseminating knowledge about how to apply sustainability considerations to designs, as well as openly advocating for the integration of holistics perspectives to sustainability into design and the wider discipline (Stieg, 2006).

Similar collaboration would also be needed for furthering the adoption of more sustainable practices within the construction industry (Berardi, 2013). When working on a project, practitioners can ask suppliers to provide more information on their supply chain, request collaborators to agree to a guiding set of principles, monitor and evaluate the adoption and success of the aforementioned principles (Winchip, 2011), and search for further opportunities to widen the scope and framing of a project's sustainability intervention.

To summarise, the sustainable design strategies that circulate within interior architecture are related to those known to the wider design discipline. By adopting a holistic understanding of sustainable building (i.e. a wider scale of thinking [Ashby, 2016a]), which includes consideration of socio-technical system dynamics, interior architects can pursue change on a wider spectrum of innovation levels (Ceschin & Gaziulusoy, 2020). However, in order to push for transformational change, interior architects need to embrace cross-sectoral collaboration while pursuing more increasingly sustainable solutions within their area of expertise (Jones, 2008; Stieg, 2006).

2.3 SUSTAINABLE DESIGN STRATEGIES IN INTERIOR ARCHITECTURE

When responding to the demands of the built environment, interior architects need to navigate across a diverse set of available tools, frameworks and theories that aid the development of holistic solutions (Stieg, 2006; Hernandéz, 2020). The main areas for SDS application mentioned in literature (Bergman, 2012; Brooker & Stone, 2008; Hernandéz, 2020; Jones, 2008; Moxon, 2012; Winchip, 2011) include: site practices, water efficiency, energy efficiency (Passive and Active techniques), indoor environmental quality (including indoor air quality, functionality and daylighting), material and product applications, and the design process itself, with a focus on participatory or integrative approaches, ongoing evaluation and adaptation.

The considerations involved in achieving sustainability benefits in these areas depend on the applied approach (f.i. Resource conservation, low impact construction methods and materials, renewable energy use, rainwater harvesting, passive or active techniques for efficiency improvement, and context-driven design and material specification, application of socially responsible resources, human-centered or participatory design, and local empowerment) and its context of application (f.i. Design process, implementation process, construction site, layout design, interior surfaces, furnishing, finishes, lighting, hvac systems and structural components of the interior).

The various sustainable design strategies (SDS) and the considerations involved in their different contexts of application have been gathered in Appendix II in accordance with their main areas of focus. The sustainability criteria that green building rating systems look for reflect the sustainability principles that circulate the practice (Stieg, 2006).

Today various products claim to contain sustainability characteristics. Due to differences in existing certification procedures, the claims made by product providers can be confusing and even misleading (Stieg, 2006; Hernandéz, 2020; Bergman 2012). Amidst an abundance of available information and tools, figuring out the right approach is often left up to the practitioner (Shedroff, 2009), and so a preliminary understanding of the tools and procedures that are out there can help orient the search (Stieg, 2006). In the next subchapter I take a closer look at green building rating systems and different types of certifications that interior architects come in contact with as these certifications can influence the impact, form and effectiveness of applied SDS (Stieg, 2006).

2.3.1 GREEN BUILDING RATING SYSTEMS

Projects seeking to gain added value from integrating sustainability into the design may opt to apply for so-called green building certification.

In her thesis, Hernandéz (2020) charts various rating systems in order to highlight their main characteristics and compare their differences. According to Hernandéz (2020) the rating systems vary in the manner in which they approach and evaluate sustainability performance, often including some mixture of social, economic and environmental criteria (Hernandéz, 2020, p.53). In general, green building certificates are based on a multiple attribute rating system, in which several elements that influence the sustainability of the finished result are measured in order to determine the sustainability performance of the building (See e.g. Winchip, 2011; Hernandéz, 2020).

Table.01 presents categories for which the LEED v.4.1 ID+C for interior design and construction (LEED, 2021) affords credits, their weighting differs depending on whether the construction is a new build, hospitality interior or retail interior as well as according to the characteristic of the construction that is being assessed. Many of these subcategories have gone on to inform the coding matrix utilised for the content analysis in Chapter 3 (pp. 45-67).

CREDITS	CREDITS	CREDITS	Prerequisite: P
1	1	1	**INTEGRATIVE PROCESS**
18	18	18	**LOCATION AND TRANSPORTATION**
18	18	18	LEED for Neighborhood Development Location
8	8	8	Surrounding Density and Diverse Uses
7	7	7	Access to Quality Transit
1	1	1	Bicycle Facilities
2	2	2	Reduced Parking Footprint
12	12	12	**WATER EFFICIENCY**
P	P	P	Indoor Water Use Reduction
12	12	12	Indoor Water Use Reduction
38	38	38	**ENERGY & ATMOSPHERE**
P	P	P	Fundamental Commissioning and Verification
P	P	P	Minimum Energy Performance
P	P	P	Fundamental Refrigerant Management
5	5	5	Enhanced Commissioning
24	24	24	Optimize Energy Performance
2	2	2	Advanced Energy Metering
6	6	6	Renewable Energy
1	1	1	Enhanced Refrigerant Management
13	14	13	**MATERIALS AND RESOURCES**
P	P	P	Storage and Collection of Recyclables
P	P	P	Construction and Demolition Waste Management Planning
1	1	1	Long-Term Commitment
4	5	4	Interiors Life-Cycle Impact Reduction
2	2	2	Building Product Disclosure and Optimization _ EPD
2	2	2	Building Product Disclosure and Optimization _ Sourcing of Raw Materials
2	2	2	Building Product Disclosure and Optimization _ Material Ingredients
2	2	2	Construction and Demolition Waste Management
17	16	17	**INDOOR ENVIRONMENTAL QUALITY**
P	P	P	Minimum Indoor Air Quality Performance
P	P	P	Environmental Tobacco Smoke Control
2	3	2	Enhanced Indoor Air Quality Strategies
3	3	3	Low-Emitting Materials
1	1	1	Construction Indoor Air Quality Management Plan
2	2	2	Indoor Air Quality Assessment
1	1	1	Thermal Comfort
2	2	2	Interior Lighting
3	3	3	Daylight
1	1	1	Quality Views
2		2	Acoustic Performance
6	6	6	**INNOVATION**
5	5	5	Innovation
1	1	1	LEED Accredited Professional
4	4	4	**REGIONAL PRIORITY**
NEW BUILD	RETAIL	HOSPITALITY	**TOTAL: 110 Possible points**

Table.01 LEED v.4.1 ID+C Scoreboard for interior design and construction adapted from LEED, 2021, p. 6-7.

Evaluating multiple attributes provides a more holistic understanding of sustainability than a single attribute system, which many eco-labels are based on . Yet, as argued by Bergman (2012), the problem with multiple attribute systems is that they can produce wildly different results depending on how each attribute - such as energy efficiency, toxicity, water consumption etc. - contributes to the final score. This is in part due to the weighted attribute system, but also because the original context for which the certification programme has been developed can vary geographically, culturally and in terms of the project typologies it focuses on. Although some programmes have developed nation-specific guidelines and criteria, limitations for universal applicability still exist (Hernandéz, 2020). It follows that one system cannot be applied as a realistic tool for evaluating the totality of interior architecture projects.

Since the sustainability rating a project receives can diverge based on the importance a certifying organisation places on one sustainability consideration over another, the choice of green building certification can also influence the design of a building and its interior (Hernandéz, 2020. Furthermore, the rigidity that comes with a weighted point system can lead to situations where the building's design is mandated more by the categories in which the greatest amount of points can be received, than the sustainability characteristics it has the potential to achieve. Professionals who engage in the act of ''point chasing'' (Hernandéz, 2020, p.90) place economic gains above genuine sustainability improvements, an action which borders on the lines of greenwashing. Rather than optimising the sustainability features of the building, which may qualify for a lower rating, the focus shifts to targeting attributes that are enough to qualify for the desired rating (Hernandéz, 2020, p.90).

2.3.2 ECO-LABELS AND CERTIFICATION

As environmental consciousness has been growing, so has the incentive for companies to produce 'more sustainable' product alternatives (Jones, 2008). Evidence of this can be found in the sheer volume of different upholstery textiles and carpet tiles that claim to be 'certified' or 'environmentally friendly' thanks to this or that technology, ingredient, innovation, process or other feature. Some of the labels circulating within the market are not certified, and can be used without limitation (Hernandéz, 2020). Uncertified product labeling of this type can misinform consumers and professionals by making unverified claims. In order to ensure that a product is not purely a form of greenwashing, the reliability and justification of the claim needs to be assessed in a transparent manner, preferably by an unbiased third-party whose assessment criteria is based on scientific evidence (Bergman, 2012).

The first organisation to assess labels in order to create a more reliable certification system was the German government when they introduced the voluntary Blue Angel (Der Blaue Engel) product & service eco-label in 1978. In Finland and the rest of the Nordic countries, a similar label known as the Nordic Swan (n.d) was adopted in 1989, and in 1994 the label became one of the founding members of the Global Ecolabelling Network (GEN).

At the time of writing, the ecolabel index counts 455 ecolabels spanning over 25 industry sectors (Ecolabelindex, 2021). Navigating through this amount of ecolabels brings with it similar challenges as come with identifying products that ''walk the talk''. Knowing which labels or sustainability certifications are credible and trustworthy requires knowledge about their rating process and the parties responsible for examining compliance and validity (Bergman, 2012). In essence, understanding how the label, or certification, is certified.

Along with certifications and labels that are based on multiple attributes, there are many eco-labels that measure the performance of a single attribute, such as energy or water efficiency. According to Hernandéz (2020), the credibility of single attribute labels developed or influenced by industry associations can be questioned due to potential conflicts of interest (Bergman, 2012; Hernandéz, 2020). However, industry involvement is also seen as contributing towards the creation of ''more pragmatic rating systems'' (Hernandéz, 2020, p.68) as they are able to tap into the knowledge existing in the field.

In addition to the rating process, the credibility of a label depends on whether it is managed by a first-, second- or third-party. The first is a non-validated label that manufacturers can use freely, such as the recycling label (Bergman, 2012; Hernandéz, 2020). The second, an industry or trade organisation operated standard in which manufacturers are subject to providing proof or their compliance with set standards. While second-party certifications are a level more trustworthy than a first-party certification, especially if standards are based on insights from an external consulting agency

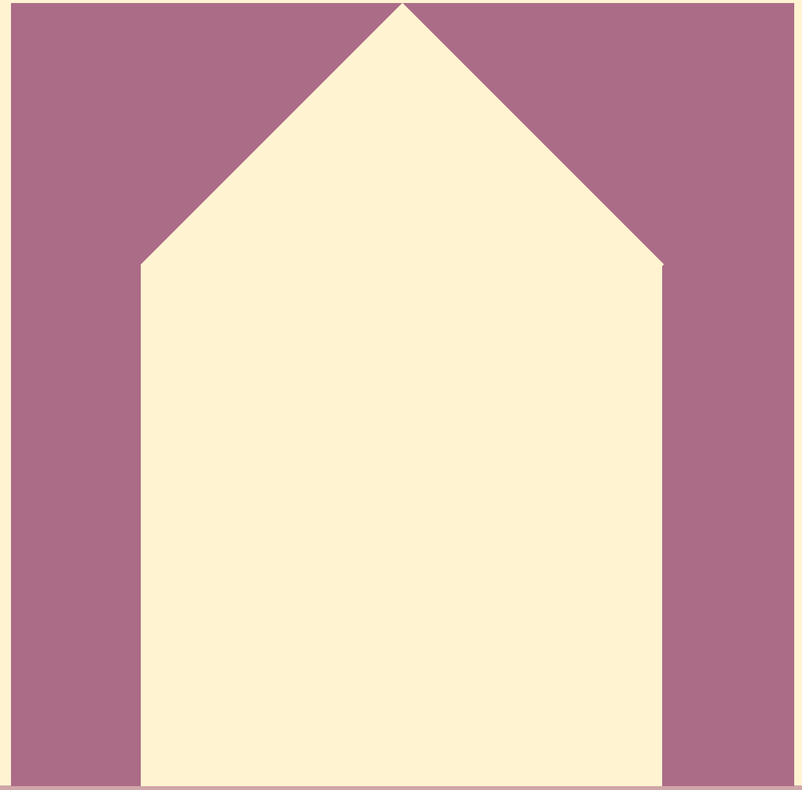
(Bergman, 2012; Hernandéz, 2020), their reliability can be compromised by conflict of interest arising from the financial incentives and potential partisanship involved in an industry self-regulating.

The last option, third party certification, is often the most reliable, as such certifications tend to follow a comprehensive process of examination assessed by an impartial and independent organisation (Bergman, 2012). For professionals involved in creating more sustainable built environments, verified third-party certifications and labels can provide consumers and professionals some reliability and support within the saturated label ecosystem. However, to avoid falling into a false sense of security, professionals should continue to critically examine the claims and justification behind product certification and alleged sustainability improvements (Stieg, 2006).

2.4 GENERAL LIMITATIONS AND CONSIDERATIONS

Previous chapters have discussed existing strategies for integrating sustainability into interiors. However, there are various systemic and contextual factors, or barriers, that can influence the success of their application (See e.g. Berardi, 2013, p.33).

In the following section I explore some of the general considerations that can impact the depth of sustainability integration in the designed interior. The purpose of this section is to highlight the typological, regulatory and contextual features that influence the possibilities for applying SDS as well as further considerations, such as participatory design activities and service life, which can be seen to play a part in defining the success of sustainability integration.



2.4.1 TYPOLOGICAL CONSIDERATIONS

Simply characterised, the practice of interior architecture deals mainly with designing interiors for new and existing buildings. Depending on the context, exterior elements may also be influenced by the interior architect. In existing buildings, designs may alter or restore the original architecture.

The scope of project assignments encompasses a variety of building classifications or project typologies (Sorrento, 2012). These include property and urban development projects, public buildings, offices and employment complexes, private homes, commercial and hospitality environments such as retail stores, restaurants and hotels, as well as centres for wellbeing. Project briefs may also include temporary designs and environments such as exhibitions, event pavilions, installations and fair stands.

The project typology can influence both the framing and scope of the interior architect's design contribution through the functions it serves to deliver. For instance, most retail environments are geared towards facilitating the sale of items. The practitioner's task in this context may be to design a functional environment for displaying the products and inviting customers. Depending on the product, nurturing their consumption may not be desirable from an environmental perspective, although it can contribute to social and economic wellbeing by creating employment.

These typological limitations can be considered behavioural and organisational barriers (Berardi, 2013). They hinder the adoption of sustainability improvements by enforcing mechanisms, traditions and lifestyles that conflict with the sustainability agenda (Berardi, 2013).

2.4.2 CONTEXTUAL CONSIDERATIONS

The stage at which interior architects get introduced to projects influences the scope at which they can contribute. Typically, a wide set of variables such as the project typology, size, schedule and client affect the time at which interior architects enter a project (Hernandéz, 2020). In the case of new-builds and significant renovations, it is likely that interior architects enter at the onset of the project as this can allow for a more holistic merger and integration of design elements (Winchip, 2011). In some cases practitioners enter an ongoing project and are perhaps expected to deliver only a specific feature or improvement.

As many projects involve working with an existing interior, the starting point for creating a new design or renovation differs wildly. According to Brooker & Stone (2008), before architects can make sustainable design choices, they need to evaluate site specific issues and assess their relationship to the surrounding environment as well as their ''more ephemeral connections with things further away'' (Brooker & Stone, 2008, p.12).

While Brooker & Stone focus on existing sites, evaluating the exterior context is an important first step especially for new builds because it provides parameters for the appropriate shape, layout and interior that could optimise sustainability (Brooker & Stone, 2008; Winchip, 2011). These contextual factors, as described by Brooker & Stone (2008) and Winchip (2011) include the orientation, topography, and aspect of the building and site, the urban density of the area, the design of the road and street network, and the relationship of the site with significant landmarks or neighbouring buildings (Brooker & Stone, 2008; Winchip, 2011). Added to the prior are the local climatic conditions, the history and previous function of the building, surrounding views, typology of the surrounding urban fabric and, if relevant, the positioning of the building in relation to significant transportation networks and residential areas (Bergman, 2012; Winchip, 2011).

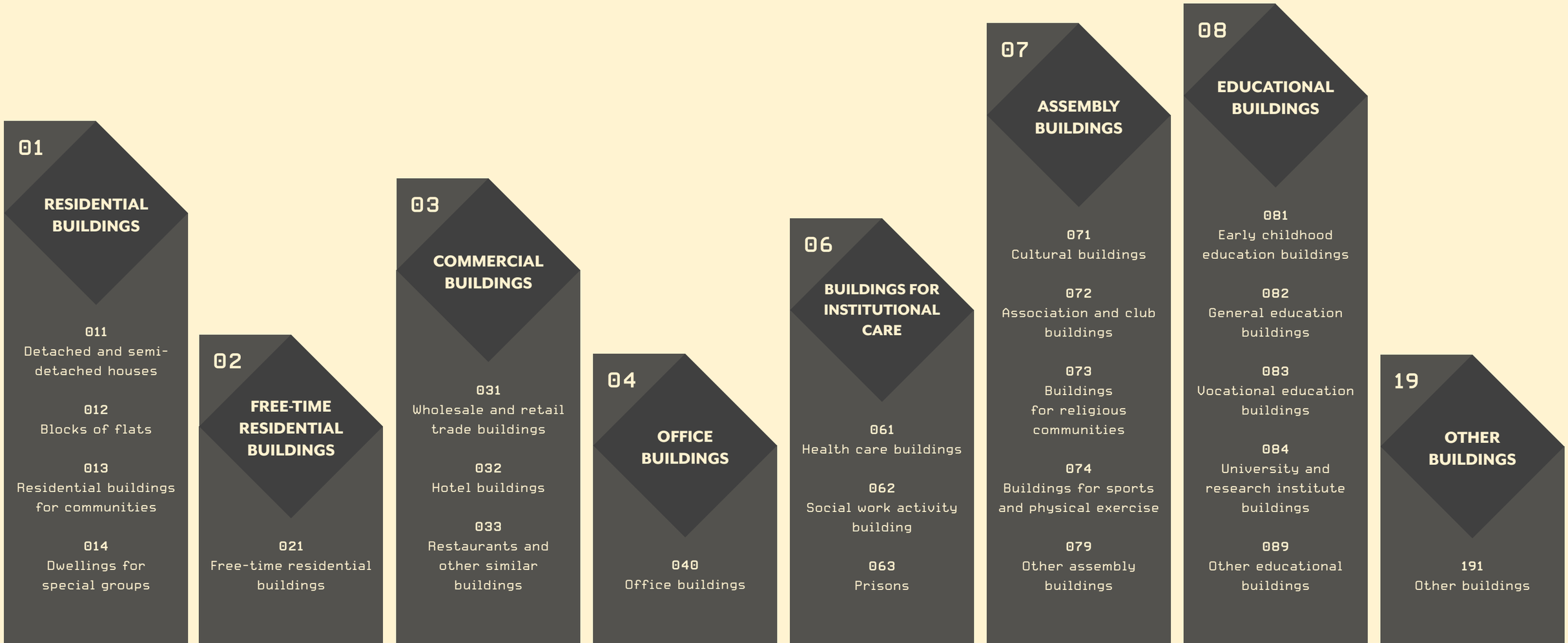
When sustainability is a principle for the design, steps towards its integration should ideally be made in a pre-design stage in order to lay the foundations for a low-impact implementation process, occupancy and end-of-life (Winchip, 2011). Professionals can gain knowledge of contextual needs, such as building codes, locally available resources, relevant cultural and climatic considerations, and recycling practices, by involving local communities and architects early on in the design process (Brenner, 2005).

2.4.3 REGULATORY CONSIDERATIONS

In addition to client expectations and contextual considerations, different project typologies are usually accompanied by regulations and requirements that place their own demands on the designed contribution. In this context, the project typology, or more concisely, the building classification can help in choosing the appropriate solutions for each application by giving an idea of who the interior should serve, what type of use the interior should be able to withstand, and what the overall safety requirements are.

An example of a building classification is the International Building Code (IBC) put forth by the International Code Council (ICC). These classifications divide the buildings according to their purpose (See Table.02 for examples of Finnish building classifications from Statistics Finland, 2018).

Table.02 Finnish building classifications based on classification by Statistics Finland (2018). The chart does not include details on the following classifications, as they do not appear in the sample:
05) Transport and communication buildings,
09) Industrial and mining and quarry buildings,
10) Energy supply buildings,
11) Public utility buildings,
12) Warehouses,
13) Rescue service buildings
14) Agricultural buildings and livestock shelters.



In many countries, building codes vary depending on the building classification. Different codes follow both according to the type of the building, or more exactly, its use and occupancy classification (f.i. Health care, Commercial, Residential) and the space (f.i. Bathroom, kitchen, garage). Among other areas, the IBC addresses interior finishes, accessibility, energy efficiency, structural design and general building heights and areas (Geren, 2016). They also delineate regulation for various material applications.

Material ratings enable practitioners to choose the appropriate products for each application. Examples of material ratings delineated by regulation include fire-resistance rating, sound absorption class, durability rating, slip rating, anti-bacterial or antistatic properties and the accepted level of material emissions. These types of regulation emphasise the health and safety features of the building. They influence the indoor air quality (IAQ) and indoor environmental quality (IEQ) of the interior, as well as ensure that the building can safely be used by its occupants for its intended use (Moxon, 2012; Winchip, 2011).

2.4.4 ECONOMIC CONSIDERATIONS

Like typological and contextual considerations, the cost of sustainability integration can influence what and how designers can apply different SDS. In discussing the ‘’greening’’ of the building industry, Berardi (2013, p.32) points out that the ‘’most common recorded barriers to sustainable innovations are economic ones’’. Economic considerations and the need to adhere to specific guidelines can sometimes become a limitation for implementing holistic sustainability-oriented design strategies and solutions, although, from a life cycle perspective, the higher cost related to sustainable solutions is often compensated for through reduced operational costs (Berardi, 2013; Bergman, 2012). Life cycle costing (LCC) methods assist in defining the financial benefits of sustainable building by evaluating the costs over the building’s life cycle (Hernandéz, 2020).

As legislation shifts towards mandating certain sustainability considerations, companies with a ‘’green lead’’ (Geels, 2010, p.498) can gain a competitive advantage over other businesses by pursuing sustainability integration early on, when legislation is still looser (Geels, 2010). Concepts like the environmental handprint - an impact evaluation method that utilises principles of life cycle assessment and carbon footprint measurement to quantify a product’s positive environmental impacts (Vatanen, 2019) - capitalises on this lead by helping businesses establish their positive impacts as a competitive advantage in the market (Vatanen, 2019).

2.4.5 CONSIDERING SERVICE LIFE

> *‘‘The idea of developing sustainable buildings stands in striking contrast to typical standard construction practices.’’ (Roosa, 2010, p.2014).*

The expected life-span that buildings and interiors are designed to serve is often tied to market forces. This relationship has been known to contribute to their sometimes premature deterioration and demolition. According to Roosa, buildings are typically designed to serve for roughly 40-50 years (Roosa, 2010) - with interiors likely to aim for far less - but with regular care and maintenance, a well designed building has the potential to serve for centuries.

In a case study conducted by Rauf & Crawford (2014) the embodied life cycle emissions of a building dropped by 29% when its service life was extended from 50 to 150 years (Rauf & Crawford, 2014). In fact, the additional input of energy and resources required for regular maintenance rarely reaches the levels required for new construction.

The ecological sustainability of a building is therefore closely tied to its service life. Similarly, strategies that focus on updating or repurposing existing structures, reusing materials or utilising recycled materials, can help lower the embodied energy of a building over its life cycle (Roosa, 2010). Interior architects alone are not responsible for organising and providing services that make

material cascading or the harvesting of on-site resources more accessible and applicable. Adopting wide-scale resource-conservation strategies calls for a re-organisation of construction practices and material sourcing infrastructure across the building sector (Roosa, 2010). Still, by utilising existing materials and structures in their designs or by specifying repurposed or recycled materials, interior architects can contribute to the adoption of these practices and lower the embodied emission of the interior over its service life.

While different product ratings can help guide the selection of appropriate, long-lasting applications in accordance to building classification, sustainability-minded designers need to also consider the life-expectancy of the interior they are designing (Moxon, 2012). Life cycle assessment tools can help determine solutions with the lowest overall impact, allowing designers to make more informed and sustainable choices but are often time consuming, which limits their utilisation (Hernandéz, 2020).

Due to the energy inputs involved in material production and cascading, it is also important to consider that a long-lasting product in a short-lived project may not be the most sustainable solution if the material production process has a high impact, which is why easily recyclable and reusable solutions are often encouraged in temporary project typologies such as fair stands and exhibitions (Moxon, 2012). In other words, when seeking sustainable solutions, the material options should be assessed in relation to the expected service-life of the interior (Moxon, 2012).

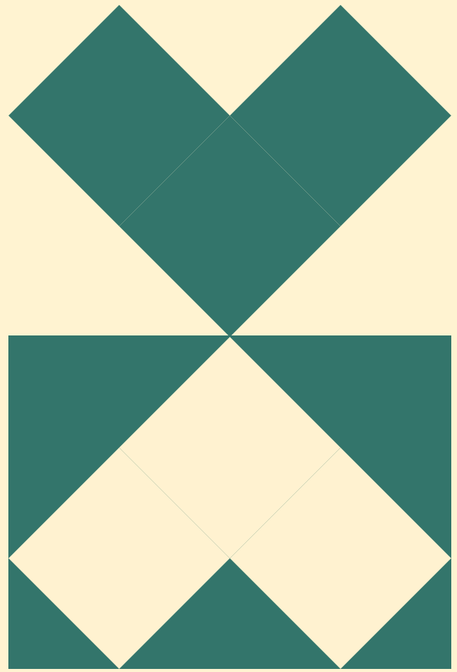
2.4.6 CONSIDERING GREENWASHING

A vast amount of tools, ratings systems, ecolabels and products circulate within the building industry. Professionals navigating these options may struggle to find time to evaluate the validity and credibility of the various options, which leads many to base their assessment on the reputation of the product provider (Stieg, 2006). Short on time and lacking the resources to examine and scrutinise each sustainability claim attached to a design component, it is easy for practitioners to unwillingly fall into the trap of greenwashing (Hernandéz, 2020).

Greenwashing can occur in various forms, such as through making vague and unverified claims about supposedly sustainable product attributes, associating the product with symbols or labels that imply environmental benefits, or by disguising hidden trade-offs by only highlighting the improved sustainability attributes of the product (Associates III, Stelmack, Foster, & Hindman, 2014; Hernandéz, 2020).

Interior practitioners may come across each of these forms in their work. For instance, when searching for materials they may find various unverified certificates implying that products are ‘all natural’ or ‘non-toxic’ (Hernandéz, 2020, p.41). They may also come across businesses implying local production, yet the resources required in the production of these goods can come from various countries. Searching for credible certificates and staying vigilant towards all forms of greenwashing can help practitioners steer clear of these traps.

Just as all marketable goods, interiors too can include elements of greenwashing. As sustainability itself is not a constant, integrating sustainability into interiors is a process. Hence the ‘sustainability’ of an interior is only either better or worse than the standard it is compared to. Therefore, when making claims about sustainable interiors, there is a risk that it will come off as sounding like greenwashing. For this reason, it may be a better option to focus on highlighting sustainability as an objective, or as a design driver, rather than an inherent quality of a solution or the interior itself.

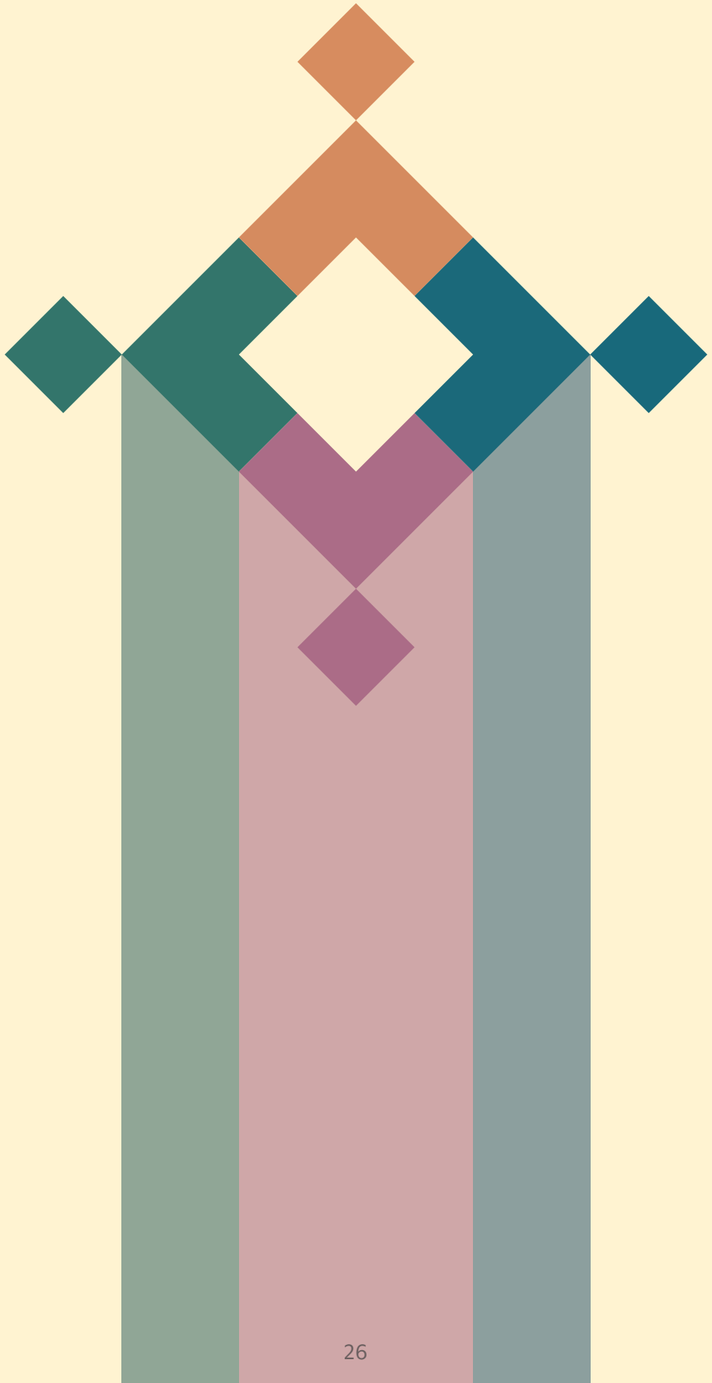


2.4.7 STAKEHOLDER PARTICIPATION

To account for the diverse nature of assignments, interior architects tend to lean on external expertise and work together with other stakeholders and companies when formulating and constructing designs (Stieg, 2006). Typical stakeholders that interior architects may collaborate with are the client, other architects, HVAC designers, construction and property managers, commissioning agents, graphic designers, furniture builders, lighting and multimedia designers, acoustic engineers, electrical engineers and plumbers, to name a few. In addition to the project-specific stakeholders and collaborators, interior architects may negotiate with providers of lighting fixtures, furnishing and surface materials (Hernandéz, 2020).

Operating as touchpoints in a wider service ecosystem, most interior projects tend to involve some level of participatory activities that inform the final designs from a user-need perspective. Participatory activities, such as workshops or design charades, can engage a range of different focus groups depending on whose input and expertise is relevant for the project (Winchip, 2011). Important groups include end-users, clients, community representatives, specialists and other experts (Winchip, 2011).

Naturally, participatory activities with stakeholders are an important part of integrated design processes, which are structured to nurture the creation of more sustainable interiors (Winchip, 2011). Engaging in participatory activities and seeking expertise from external advisors extends the capabilities of the design team, which is especially important when navigating more complex and systemic levels of innovation (Tschakert et al.2016).



Lastly, the importance of engaging with project collaborators should not be underestimated (Sorrento, 2012). Interiors tend to incorporate components, such as HVAC systems or weight bearing structural elements, that fall outside the interior architect's area of expertise. These components can have a significant impact on the longevity and energy-efficiency of the building and interior, so having a preliminary understanding of these building features is important for the holistic integration of sustainability (Winchip, 2011). From a social perspective, a functioning HVAC system and rigid structural design are foundations for a safe and healthy working environment. Therefore, it is important for interior architects to collaborate and engage with architects, structural designers and HVAC engineers from the onset of a project (Sorrento, 2012).

In the next chapter I take a closer look at the integrated design process (based on Winchip, 2011) as a means to explore how and when different stakeholder considerations factor into the design process and to delineate the roles and responsibilities of the interior architect in this process.

2.5 THE INTEGRATED DESIGN PROCESS

The practical implementation of a design process can vary between designers and design studios. Yet, a common notion of how a design process is structured is one in which it progresses from problem structuring to problem solving (Lawson, 2004). In this process the analysis of the problem structure forms the basis for the preliminary design ideas which are then refined further and used as a bouncing board for executing a more detailed design (Lawson, 2004). The phases of such a process can also be translated into the British Design Council's (2019) iterative 'Double diamond design framework' consisting of 'four D's': Discover, Define, Develop, Deliver (See. Fig.05).

Interior architects assimilating sustainability considerations into their designs might take part in a process structured like the integrated design processes (IDP) delineated by Winchip (2011) or Hernandéz (2020). Winchip (2011) describes the integrated design process (IDP) as one in which interdisciplinary teamwork and collaboration with various stakeholders becomes necessary for formulating interventions that can support the health and well-being of people as well as the environment (Winchip, 2011). The process itself follows a similar structure as the Double diamond, but pays special attention to stakeholder involvement and has more distinct phases for design execution and post-delivery evaluation. I have summarised the phases of IDP and recommended actions as described by Winchip (2011) in Fig. 06.

Knowing how sustainability integrated design processes are structured highlights how the creation of more sustainable interiors is not just a question of selecting appropriate materials, but of transforming the behaviour of the practice itself into one that can take on a more holistic perspective when crafting solutions. Encouraging this transformation requires continued education of established professionals who, without an update to their sustainability knowledge and design procedures, might find themselves ill-equipped to complete sustainability-oriented assignments successfully and with confidence. As Hernandéz (2020, p.13) points out, to foster a culture of confident professionals in sustainable design practices, sustainability should become an intrinsic part of interior architect education; a foundation block rather than an additional consideration integrated into the mix

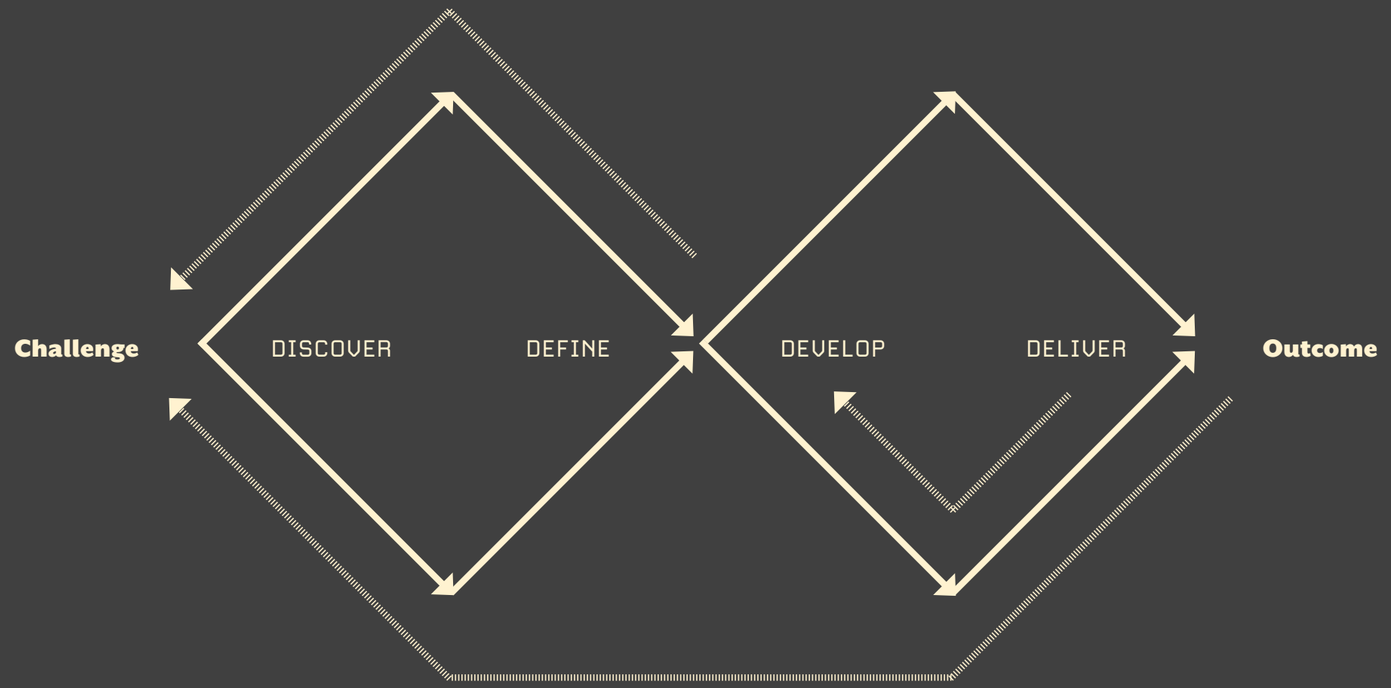
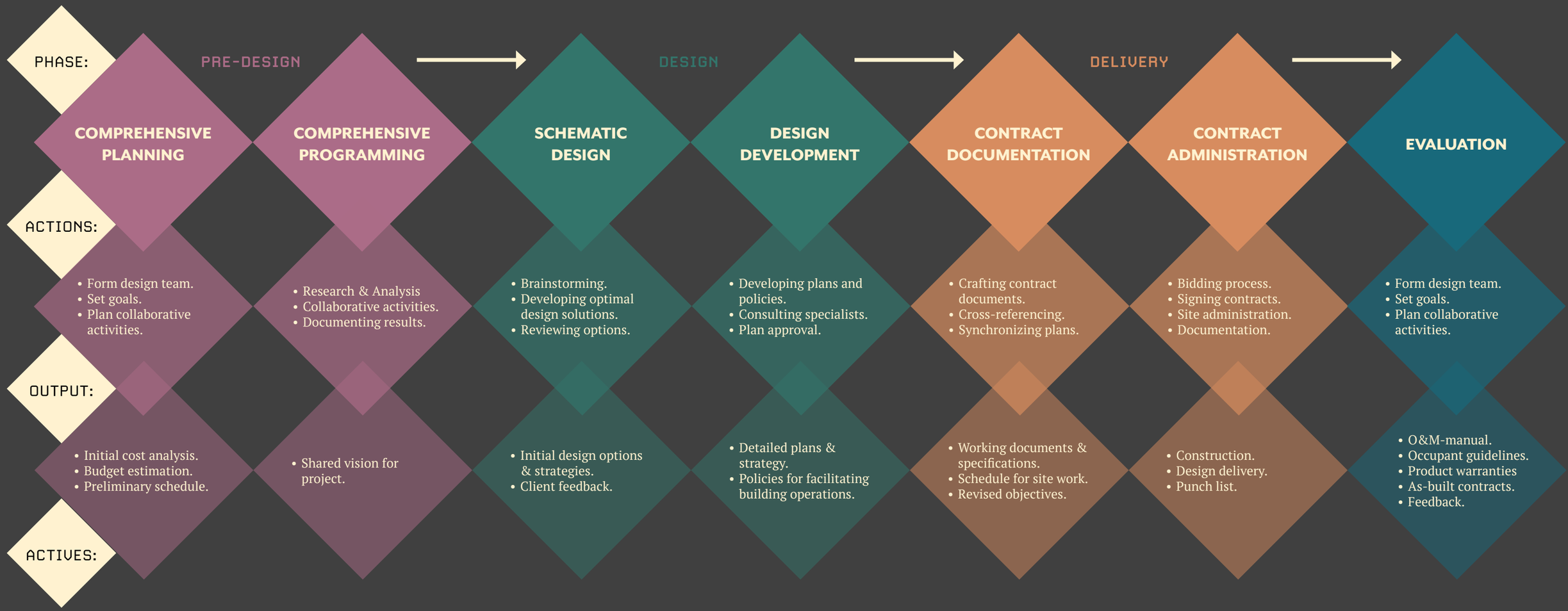


Fig. 05 The Double Diamond Design Framework by the British Design Council is a visual description of actions within a design process. (Figure adapted from British Design Council, 2019)

Fig. 06 The Integrated design process.
Based on Winchip, 2011, p. 246-279.



2.5.1 FROM PRE-DESIGN TO DEFINING FOCUS

In the integrated design process, the discovery phase tends to be where the participatory activities kick off as a means to define the ‘’design problem’’ and potential solutions (Winchip, 2011). According to Winchip (2011, p.4), the integrated design process includes practices such as evidence-based research, design charrettes, strategic planning, systems analyses, life cycle assessment (LCA) and continuous design iteration. Activities involve stakeholders such as end-users, representatives of the local community, or other relevant stakeholders, who can provide crucial insights.

Comprehensive research and analysis at the project’s onset will allow the project team to identify actual needs and tap into a transdisciplinary knowledge base when figuring out how to approach these needs without compromising on sustainability (Winchip, 2011; Brooker & Stone, 2008). Furthermore, it allows stakeholders more agency in the creation of solutions that affect them whilst also allowing them first hand experience of the complexity that is involved in crafting appropriate solutions.

Initial ideas resulting from research are presented by the team to the client, but may also be developed and explored collaboratively, for instance via special design charrettes arranged on site (Hernandéz, 2020; Winchip, 2011). In this way the following stage becomes more focused on defining a shared vision rather than accepting ideas formulated exclusively by the design team.

2.5.2 DEVELOPING THE DESIGN

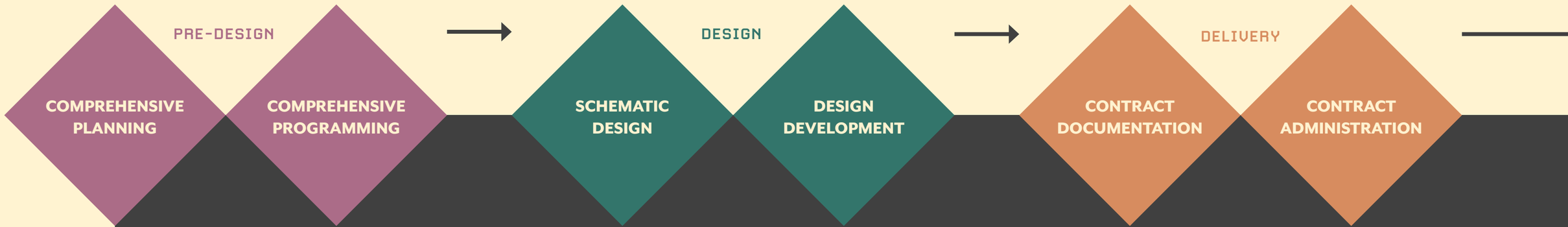
In the development phase the strongest idea or ideas are usually developed further into a guiding design concept that incorporates insights from preliminary feedback. It is in this stage that the shared vision is translated into an array of potential design strategies, the most suitable of which gets developed further in collaboration with various experts.

Activities in the early stages of the development phase can include reviewing and verifying the life cycle assessments of products, analysing the site’s existing conditions carefully, sketching potential scenarios in order to test the compatibility of design options, and formulating policies and documents that foster more sustainable practices in different stages of the building’s life cycle, such as construction and occupancy. The end result of the development phase is a set of detailed plans and strategies that will allow the design team to progress towards actualising the design.

2.5.3 DELIVERY THROUGH EXECUTION

If the conventional interior design process were divided crudely according to the BDC’s characterisation of ‘the four D’s’ (see: Ball, n.d), the delivery phase would perhaps only include concept reporting and preparation of necessary contract documents. However, if design execution is included, the phase would also involve the production of contract documents and instructions that site work should follow, as well as monitoring the construction process in order to respond to surprises that require design iterations or problem solving.

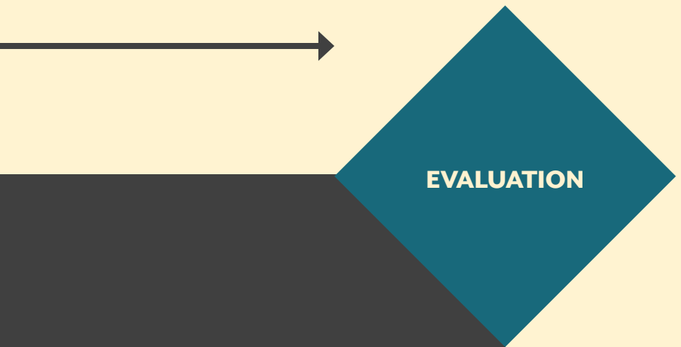
Because IDP emphasises sustainability as a driver of design choices, the overarching aim of projects is to minimise the life cycle impact of the end result. To achieve this goal, IDP pays careful attention to the impact of the process itself, especially when it comes to planning and sequencing construction activities so that they can be executed efficiently and in compliance with overarching sustainability principles (Winchip, 2011).



2.5.4 EVALUATION AND POST-OCCUPANCY

Once construction is completed, the design is evaluated, possible issues are documented, and relevant shortcomings are solved before the space is handed over to occupants. The design studio and client can also arrange a follow-up to ensure that everything functions as planned and to solve any additional needs that may arise. A thoroughly executed IDP takes this phase a step further by developing strategies for encouraging sustainable behaviour during occupancy and considers potential post-occupancy scenarios (Winchip, 2011).

When aiming for enhanced sustainability, the evaluation phase should involve providing clients and occupants with all the necessary documents required for maintaining a sustainable environment (Winchip, 2011). Later on, a post-occupancy evaluation (POE) can be conducted to determine the success of the design while gathering data and evidence to inform future projects and help educate professionals as well as the community. Doing so allows practitioners to critically reflect on the success of the overall design and identify points of improvement. The hope is that these learnings contribute to the pool of knowledge that goes on to inform best practice.



2.5.5 CERTIFICATION PROCESS AND COSTS

For projects applying for sustainability certification, the design process can involve a number of tasks and activities that are a prerequisite for obtaining certification, such as building commissioning or thorough documentation. These tasks vary depending on the certificate being applied for or level of certification aimed for and require careful planning in the pre-design stage if they are to be executed smoothly (Winchip, 2011).

As a result, applying for certification can add to the workload of the design team and to the cost of projects, which, as Hernandéz (2020, p.43) notes, has perhaps led some to consider certification as ‘’less cost-effective for small-scale projects’’. Such a notion, if true, could influence the percentage of interior architecture projects applying for certification, especially since smaller assignments taking place in existing environments, such as individual stores and restaurants, are common in the field.

As applying for sustainability certification is in most cases still voluntary and comes with an application fee, not all projects that integrate sustainability considerations into their designs pursue certification. Therefore, a low percentage of certified projects does not automatically indicate a wider disregard towards sustainability in the field.

In terms of cost, a thoroughly executed integrated design process may be relatively cheaper than one applying for certification, yet is likely to prove more costly than a non-sustainability-oriented design process due to the additional managerial responsibilities, design considerations, and limitations involved (Winchip, 2011). Nevertheless, designers attempting to convince clients to pay the extra dime can do well by advocating for the lower life cycle costs affiliated with more sustainable designs (Hernandéz, 2020; Winchip, 2011; Brooker & Stone, 2008).

2.6 ENGAGEMENT WITH SUSTAINABLE DESIGN STRATEGIES

The purpose of the previous chapters was to provide a broad idea of the different sustainable design strategies that interior architects come across and could utilise. At the same time, it brought up some of the various limitations that impact the ability of practitioners to apply and engage with these tools and methodologies. What the chapter paid less attention to are the boundaries placed by limited time, lack of know-how (Hernandéz, 2020; Jones, 2008; Stieg, 2006) and diverging sustainability perceptions (Sorrento, 2012), the last of which can result in conflicting agendas among the various actors participating in a project.

According to Stieg (2006) and Jones (2008) there is a gap between available knowledge on sustainability principles and the know-how needed for their application within the interior architecture practice. Amidst the busy schedule of a typical work week, nurturing continued learning and self-educating oneself is often compromised (Stieg, 2006). The result is a practice where knowledge exists, but may not be sufficiently disseminated (Stieg, 2006). Time-constrained practitioners keen to apply sustainability considerations may well do so to the best of their abilities, but the scope and framing of their interventions may fall short of what would be possible if they had the right tools available and the capability to apply them. These factors compromise the effectiveness of the design process and the resulting solutions (Stieg, 2006).

To address the issue, Stieg (2006, p.xix) calls for better coordination and communication across the discipline, cohesive education at all levels, and notes that, since most interior architects hold a bachelor's degree, creating opportunities for continued education is crucial. Suggested areas for education include, but are not limited to, focusing on collaborative team building skills, the contextual relationship of the building with its surroundings, the relationship of building infrastructure with the interior environment, resource efficient spatial design, daylighting and energy-efficient lighting design. More attention should also be given to material properties, specifications and their appropriateness in terms of design requirements and building codes as well as their impacts on the environment and indoor air quality.

To improve the capabilities of the practice, Stieg (2006) advocates for increased awareness of available design tools and resources and the ability to critically examine their validity and underlying motivations. Importance should also be given to developing a transparent evaluation or analysis of existing tools, certifications and standards, as well as ensuring that practitioners hold a basic understanding of sustainability science that is fundamental for being able to evaluate options when reliable data is lacking. Furthermore, Stieg calls for industry collaboration in advancing the integration of sustainability into the practice while addressing the gap between theory and practice (Stieg, 2006, p.vii).

To take a more active role in transitioning the industry, interior architects should adopt integrative design processes, become more engaged in educating clients, and advocate for sustainability improvements - to clients and among industry actors - that consider how the interior influences occupant behaviour and wellbeing, as it is not the building, but the people who consume energy (Sorrento, 2012, p.xix).

As sustainability transformation calls for action in all sectors of society in order to drive systemic change, each actor contributing to the building industry, including interior architects, has a part to play in its reorganisation. To take part in this change, practitioners would not only need the skills to apply various SDS in practice, but also the skills to advocate for their sustainability agenda and take an active role in disseminating knowledge across transdisciplinary boundaries.

In sum, there are various sustainable design strategies that interior architects can apply in order to create more sustainable interiors. These strategies approach environmental, social and economic considerations in different ways and with different motivations, yet do so in the name of improving sustainability. The SDS visited above focus mainly on environmental aspects of sustainability, although social and economic dimensions also play a part in more holistic forms of sustainability integration.

Despite having access to a variety of information and resources, literature suggests (Jones, 2008; Berardi, 2013; Hernandéz, 2020; Stieg, 2006) that there is a gap between knowledge and practice due to the simultaneous abundance and limited transparency of available data as well as the lack of know-how for applying sustainable design strategies in practice. It remains uncertain as to what degree practitioners apply different SDS, which limits the ability to assess the current level and nature of sustainability know-how in the practice. The next chapter introduces the application of media content analysis to design competition entries as a means to build a preliminary understanding of the level of engagement with different SDS.

3. CONTENT ANALYSIS: THE WINDOW

This section discusses the structure and application of media content analysis, which was used to gather insights for Sub-questions 2 (How are SDS implemented in the competition entries?) and 3 (How are SDS communicated about in the competition entries?), and, ultimately, the main research question (What perceptions of sustainable interior design are prevalent in prominent interior design competition entries?).

In this section, I also introduce the Design for Sustainability Multi-level frameworks, which provides a theoretical background for interpreting the results of the analysis.

3.1 INTRODUCTION OF MEDIA CONTENT ANALYSIS

In this work, I use the method of qualitative media content analysis to create a window into the current practice of interior architecture. I have adapted the method by formulating a coding matrix that would allow me to harvest and translate information and meanings from the competition entries into useful data.

To answer Sub-question 2, the analysis transforms qualitative data, such as correlation with qualities that characterise different SDS, into numerical format. To answer Sub-question 3, the data extracted from the content includes recurring themes present in the project descriptions.

In many cases, content analysis is used either in an inductive or deductive way (Elo & Kyngäs, 2008). The inductive approach derives categories from the data which it analyses and is typically used when available information of the phenomena is lacking. Deductive approaches are generally based on existing theories and involve developing a structured analysis matrix - also known as a coding matrix - that allows data to be coded in accordance to the categories in the matrix (Elo & Kyngäs, 2008).

In this research, a combination of the inductive and deductive approaches is used, as the research aims to decipher both the form and occurrence of known SDS as well as the practitioner's interpretation of them. Gathering data on both is relevant for evaluating whether the practice is truly engaged in SDS or whether areas exist where SDS are misinterpreted, miscommunicated or misused.

I use the deductive approach first to organise relevant theories gathered via the literature review into a master framework (See. Appendix II) that builds an image of the various sustainable design strategies (SDS) and how they might manifest in different contexts of application. The framework also visualises overlapping qualities between different SDS. The purpose of building a master framework is to simplify a diverse array of theory into a set of recognisable sustainable design characteristics, or methods, that can be identified in the media content.

While the predefined matrix is used to inform subjective analysis and to draw categories for the coding matrix, its fixed categories may limit the ability to gather data relating to trends or conflicts between theory, practice and communication. For this reason, I use the inductive approach to draw new categories based on the analysed content in situations where data does not fall neatly within the predefined matrix. The main coding categories that reflect sustainable design strategies highlighted in literature are summarised in Fig. 15 (p.62).

In order to measure the prevalence - or occurence - of different SDS, the matrix has been organised so that it translates content within the competition entries into numerical (quantitative) data. The quantitative data allows specific focus points and hierarchies to surface through the analysis.

When studying how practitioner's interpret SDS, I use a subjective lense. The subjective judgements are drawn from contextual clues present in images and text, with background literature, my personal experience from the field, and general knowledge providing a basis for interpreting their meaning.

The images analysed can be considered as having been ''created by a section of society'' (Banks, 2014), in this case captured for the purpose of documenting an publishing end result of interior design. The content of the images will be analysed in a manner that lends from 'compositional interpretation' (Rose, 2012), which studies the elements depicted in the image and can be seen as a subset of semiotic analysis (Banks, 2014). That said, the image analysis is more concerned identifying repeating trends, which are discernible in depicted visual cues, such as materials. Acknowledging the limitations of image analysis in creating robust results (See. e.g. Banks, 2014), the medium is only used to provide added insights into the implemented design choices rather than functioning as a primary source of data.

To provide transparency regarding the limitations of the sample, the analysis will be backed up by geographical data regarding project locations and the design offices in charge of implementation. To establish relationships between the results of the analysis and the wider discipline, further research is advised.

3.1.1 SAMPLE

The data samples for the analysis are a selection of competition entries to the interior design category of Dezeen Awards (DA), adding up to 155 entries in total. Dezeen is an extremely popular design website with a strong online presence. In 2016, web data firm Alexa ranked the website ahead of other contemporary design websites (Fairs, 2016). At the time of writing, Alexa places it as the 5,167th most popular website on the globe (Alexa, 2021). It was originally established in 2006 by British journalist Marcus Fairs (Dezeen, n.da). The outlet claims that the Dezeen awards are ''the benchmark for international design excellence and the ultimate accolade for architects and designers everywhere'' (Dezeen, n.db).

The analysis is limited to available online content, which includes the overall array of competition entry categories as well as a deeper analysis of text and image content contributed to the winners and shortlist nominations in categories related to interior architecture. Information on curating procedures or criteria for judging/choices is also presented in cases where such information is available.

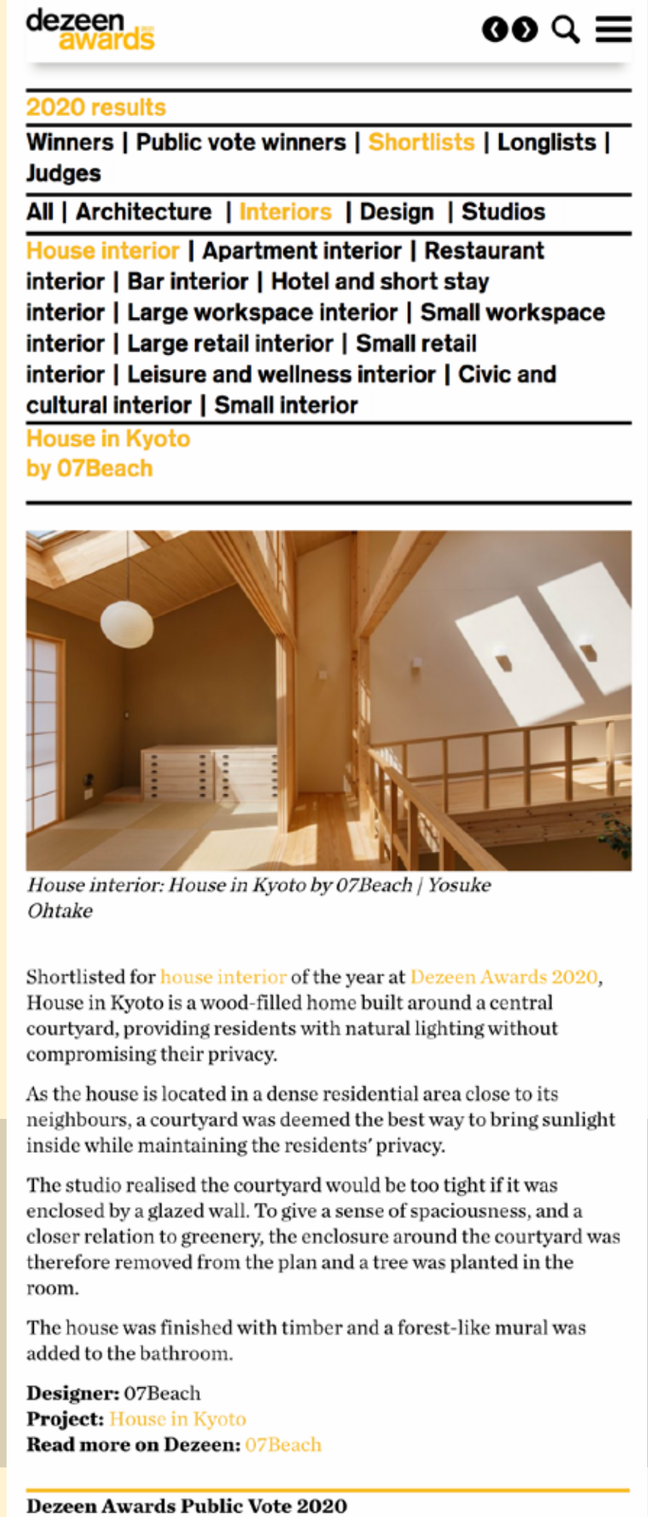
The sample includes shortlisted entries from a period of three years, which is the timespan for which material is available on Dezeen's website. The number of shortlisted entries varies between each year in accordance with the varying amount of competition categories available in interior architecture. The variation in the amount of entries and categories between each year creates incosistencies that could influence the credibility and comparability of the results (Elo & Kyngäs, 2008), which is why I report such incosistencies as they occur.

In 2020, the shortlists included 61 projects in 12 categories (discluding interior project of the year), in 2019, there were 53 shortlist nominations in 10 categories (again discluding interior project of the year), and in 2018, with only 8 categories (discluding the category for interior designer of the year) the number of shortlist nominations stood at 41. In other words, the competition has been growing steadily each year, with the latest round (2021) introducing a new category for Sustainable interiors.

Each entry consists of a short project description text accompanied by an image of the project. An additional image of most projects would have been available on an overview page, but in most cases I left these images out of the analysis as a means to limit workload and reduce exceptions in the sample. In retrospect, analysing the additional images could have contributed to a more holistic idea of the project's size and resource use. It is therefore advisable that if this research is to be continued or built on, these images would be included in the evaluation.

Image.01 Example of a shortlist entry displayed on Dezeens website. It includes the project title, the name of the designer, a short description and an image of the design.

Photograph by Yosuke Ohtake
Screencapture retrieved from
https://www.dezeen.com/awards/2020/shortlists/house-in-kyoto-07-beach/ [Visited 19th September, 2021]


dezeen awards

2020 results

Winners | Public vote winners | Shortlists | Longlists | Judges

All | Architecture | Interiors | Design | Studios

House interior | Apartment interior | Restaurant interior | Bar interior | Hotel and short stay interior | Large workspace interior | Small workspace interior | Large retail interior | Small retail interior | Leisure and wellness interior | Civic and cultural interior | Small interior

House in Kyoto
by 07Beach

House interior: House in Kyoto by 07Beach | Yosuke Ohtake

Shortlisted for house interior of the year at Dezeen Awards 2020, House in Kyoto is a wood-filled home built around a central courtyard, providing residents with natural lighting without compromising their privacy.

As the house is located in a dense residential area close to its neighbours, a courtyard was deemed the best way to bring sunlight inside while maintaining the residents' privacy.

The studio realised the courtyard would be too tight if it was enclosed by a glazed wall. To give a sense of spaciousness, and a closer relation to greenery, the enclosure around the courtyard was therefore removed from the plan and a tree was planted in the room.

The house was finished with timber and a forest-like mural was added to the bathroom.

Designer: 07Beach
Project: House in Kyoto
Read more on Dezeen: 07Beach

Dezeen Awards Public Vote 2020
Vote for this project! www.dezeen.com/awards/vote
Voting closes on 12 October.

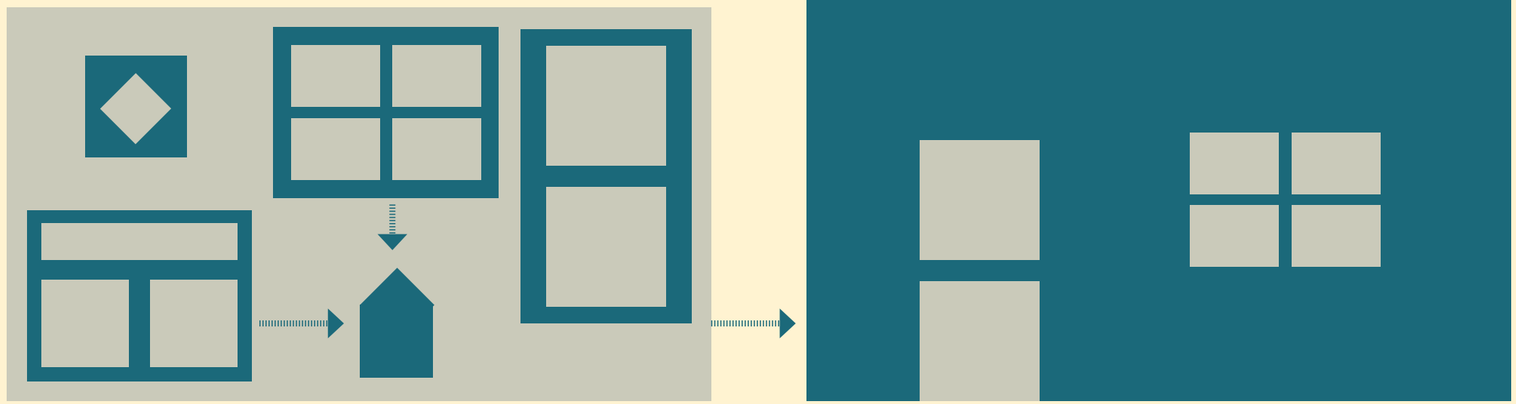
3.1.2 CHOICE OF CONTENT

The international design magazine, Dezeen, was chosen as the outlet for the sample due to its significant follower & reader base (2.8m followers on Instagram as of November 2nd, 2020), which signals its prominence in reporting design activity. Popularity of the outlet is important for yielding relevant results from the analysis because a magazine with a large follower base has the opportunity to attract more attention, both from readers and designers, as it is more efficient in showcasing, reinforcing and circulating trends. Therefore, using content from a popular outlet can give a better idea of what design ideals are receiving more attention.

Although the analysed media content is from an international design media outlet, the findings do not reflect the entire practice nor all practitioners of interior architecture, as not all practitioners follow the content, decide to enter, or are able to enter these awards. Instead, the findings should be assessed in relation to further research in order to gain a more nuanced image of the practice.

The choice of content was influenced by its role in the interior design process and the meaning competitions have for practitioners. In my experience, finding inspiration in previous work and compiling visual mood boards that include these works is a commonly used method in the practice of interior architecture for organising ideas and communicating them to clients and peers. In these situations, images circulating in popular media outlets become potential content to be placed on mood boards. The mood board then goes on to influence the designs which, if successfully documented and shared, join the stream of content circulating between media and practice. This process of circulation becomes a type of echo chamber through which the evolution of design trends can be viewed. Thus, it may also provide a fruitful window into the interior architecture practice and its current trending ideas of sustainable design.

In many cases, when a design magazine or other organiser hosts a design competition, the images and texts that describe the entry are submitted by the studio that created the original design entry. As there tends to be a limit on the number of images and words that the studio can enter, it is up to the design studio to choose which aspects of the design, when highlighted, can maximise chances of victory. Examining what kind of design implementations are depicted in competition entries could provide insights into how practitioners appreciate and apply different sustainable design strategies, while analysing design ideals highlighted by practitioners could help in identifying the position of sustainability ideals within the practice. These insights, in turn, could be useful for nurturing critical reflection within the practice.



3.2 INTRODUCTION OF AWARDS MEDIUM

Making informed judgements regarding the content of the competition entries calls for an understanding of the terms and conditions of the design competition. Terms and conditions influence what content practitioners can enter to the competition, how this must be entered and by whom. As the conditions introduce some of the judging criteria, they can also impact the practitioner's idea of which projects could have a chance if entered and what the submitted materials should highlight. The competition also involves entrance fees that may influence who can afford to enter or how many entrances one agency can afford to make. It is important to understand all of these constraints in order to make informed judgements regarding the sample and how it portrays the interior architecture practice. The following sections regarding the Dezeen Awards are based on information I found on their website (See e.g. Dezeen, 2020).

3.2.1 ELIGIBILITY

Firstly, in order to be eligible, each entry must be a completed project submitted by, or on behalf of, the designer(s) who are chiefly responsible for the design. If the responsibility is shared between more than one agency, the agencies involved are allowed to submit a joint entry. The same project should not be entered more than once into the competition, whether it be the same agency or another. However, the same agency may enter as many different projects into the competition as they wish.

All project descriptions must be submitted in English via the dezeen website before midnight (UK time) of the deadline date. The entry should contain at least one genuine image of the project, with minor retouching allowed. The applicants are responsible for ensuring that the use and publication of the images does not infringe or misappropriate any third party rights. Computer-rendered images can only be submitted as supporting material and must come with a caption that states them being computer-generated. Such images will be given secondary importance in judging.

3.2.2 ENTRANCE FEES

At the time of writing, information on entrance fees was only available for the year 2021. The entrance fees vary depending on the size of the design studio and the date of entry. Small companies with ten employees or fewer (≤10) pay half of what is paid by larger companies with more than ten employees (>10) per category entry. The later the entry, the more it costs. Early entrance fees start at £80 for small companies and £160 for large companies, standard entry is £100 and £200 respectively and later entries cost £175 or £350 depending on the company size. Dezeen claims that, by structuring the fees in a graduated manner, they hope to enable all types of companies around the world to have the chance to enter (Dezeen, n.dc).

3.2.3 ENTRANCE CATEGORIES

The competition awards both studios and projects in separate awards categories. To standardise the sample and limit the workload my focus in this thesis will be on the project categories dedicated to interior architecture as a means. However, further research could benefit from an analysis of the studio categories, as it could reveal further insights into the methods, processes and design values that practitioners hold in high regard and appreciate in peers.

The total array of categories for each year is summarised in Table 03. The table also presents how categories have divided and merged into new categories. Fig. 07 (p.43) shows how these categories have been divided when comparing typological differences in trends. Categories from the 2021 round have been added as a means to show how the structure has evolved since. Entries to the 2021 awards have not been included in the analysis as, at the time of writing, the competition is yet to be concluded.

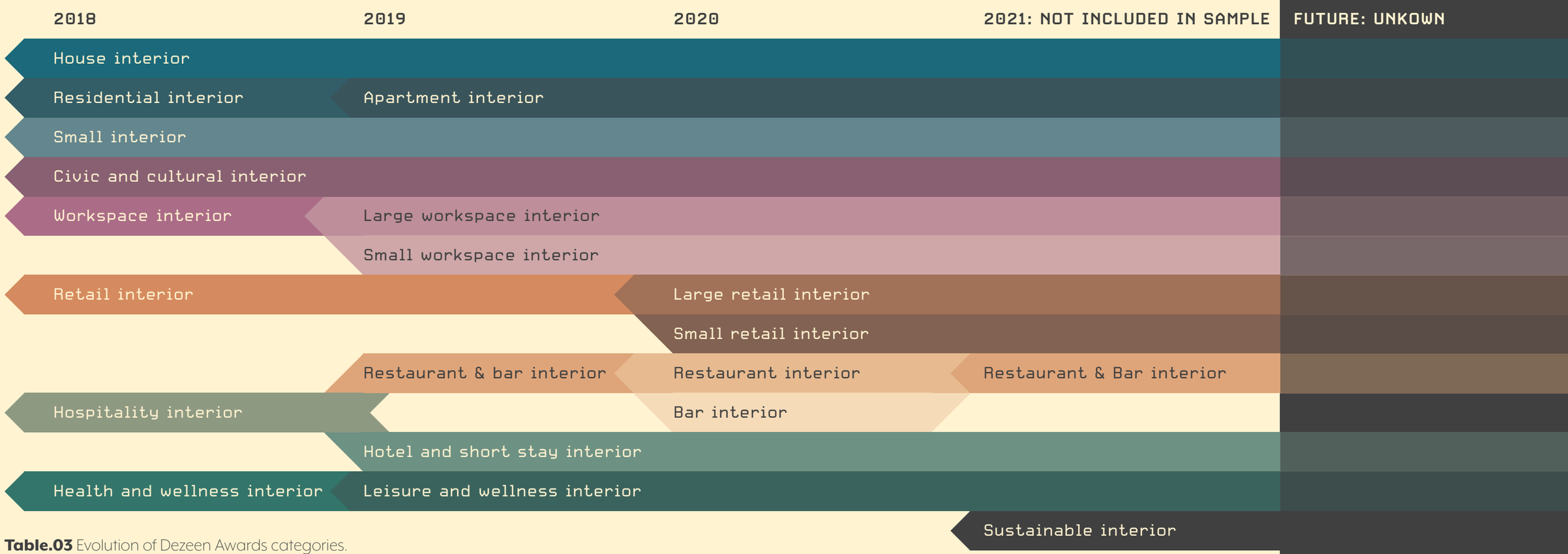


Table.03 Evolution of Dezeen Awards categories.

3.2.4 JUDGES

To judge the entries, an international jury of leading figures from domains of design, architecture and interiors has been appointed by Dezeen. From a total of 75 judges, 15 are selected to form a master jury for the final judging stages. The jury members are made public on the Dezeen awards website. To avoid bias, judges facing potential conflicts of interest are moved to a different category.

3.2.5 JUDGING PROCESS

According to Dezeen (2020), the judging process is divided into three stages:

STAGE 1: Dezeen's editorial team who are assisted by experts in the field create longlists for each project category by selecting 25 entries from the total pool of category entries.

STAGE 2: The longlist is ''shortlisted'' by the international jury, who select between four to eight entries to each category. To do so, each judge evaluates between 50-100 projects across two project categories using an online scoring system that gives scores according to judging criteria. According to Dezeen, through this process, the scoring system identifies suggested award winners.

STAGE 3: The master jury convenes to ratify the project category winners suggested by the scoring system results. During this time, they also pick overall winners for the three main project categories of architecture, interiors and design.

3.2.6 JUDGING CRITERIA

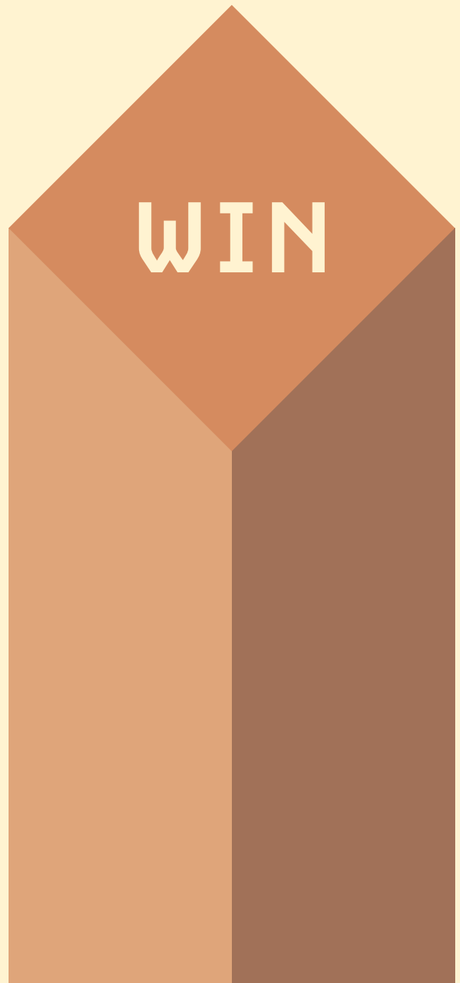
To give applicants an idea of the judging criteria, Dezeen's (n.db, visited 15th August, 2021) website states three characteristics that the judges focus on:

> BEAUTIFUL: does it look amazing? We know that beauty is subjective but our judges will be looking out for aesthetic rigour, good detailing and good use of materials.
>
> INNOVATIVE: does it incorporate original thinking or address a problem in a new way? We don't mean that every entry has to reinvent the wheel but we will be looking for evidence of fresh approaches and new ideas.
>
> BENEFICIAL: is it useful and considerate to both people and planet? Your project doesn't have to set out to save the world but it should show respect and consideration for users and the environment.

In other words, applicants who hope to fare well in the competition should pay special focus on bringing out these aspects in their design in the best light possible. It is also worth noting that the final criteria includes an element of sustainability consideration, which means that entries should hypothetically attempt to highlight their sustainability considerations to some degree.

3.2.7 PRIZES

The winners receive a trophy, a certificate and marketing materials with which they can promote their success. In addition to having their projects published on the Dezeen awards website, winners will also get mentioned on Dezeen's main site and promoted across Dezeen's extensive social media network and through their mailing list. In other words, the primary incentive for entering the awards is the increased visibility it can bring to the design and design studio.



3.2.8 LIMITATIONS IN BACKGROUND INFORMATION

While Dezeen publishes a summary of their judging criteria, the exact structure of the scoring system is unclear. Further details regarding the structure of the system would benefit discussion on results by nurturing a deeper perspective into the design values that are emphasised within the practice and shape its output.

Information on the structure of the submittal procedure is also restricted due to limited access to the applicants entry portal. Evaluation of the portal could help determine whether there are structural features in the entry form that could influence the content of the submitted entries.

While it is known that practitioners are in charge of entering their own project images and descriptions, it has not been determined whether the submitted information is subject to editing by Dezeen's staff prior to being published on the website. Also undetermined is whether limits exist for the length of the project description or the amount of images that practitioners can submit with their entry. Details on these matters would help establish the degree of control held by the practitioner in the process of forming and selecting materials for the competition. The level of control held by practitioners influences the validity of any results drawn from the analysis insofar as they are used to draw conclusions regarding what practitioners themselves value and choose to highlight.

3.3 METHOD OF APPLICATION

Following the literature review, I have gathered key SDS and their manifestations into a master framework. From this master framework, I transferred corresponding categories into the coding matrix along with further categories derived based on Sq2 and Sq3 that enable the identification of SDS manifesting within image content as well as analysis of how practitioners communicate about the SDS.

Starting from the most recent entries from 2020, I have assessed the text and image content of each competition entry individually for correspondence with categories in the coding matrix. If a relevant quality or insight has come across in an entry that the pre-established categories have failed to capture, a new category has been added to the matrix to incorporate these insights. All priorly assessed entries have then been re-assessed for correspondence with the newly established category.

The categories in the coding matrix differ from each other in the type of data they extract and/or produce. Roughly put, there are three types of data being collected:

1. OCCURENCE

When searching for occurrences, an entry is assessed for its correspondence with the quality named in the coding category title. If this correspondence exists, it is marked by entering a value of ‘1’ under the corresponding category. For example, if a project description mentions ‘’high-quality craftsmanship’’, the value 1 is entered under the SDS subcategories corresponding with ‘’Quality’’ and ‘’Craftsmanship’’.

Similarly, if an image depicts an interior with a concrete floor as well as wooden planks, the value of 1 is entered underneath subcategories of ‘’Wood’’ and ‘’Concrete’’ in the flooring materials category. It is worth noting that when occurence is entered in this manner, the derived data does not take into account the number of references to a quality within the same project. This means that a reference is entered with a value of ‘1’ regardless of whether one or three references to the same quality is made.

Once each entry has been assessed, the values in each category can be summed up to create a sample total as well as project-specific totals. By manipulating which entries are calculated in the sum, for instance by categorising the results based on the competition year or project typology, it is possible to search for similarities or variations in trends and potentially establish relationships between these trends.

2. SUM TOTAL

When the intent is to establish an idea of the quantity of an analysed quality, such as the amount of interior plants, or a certain material, a numerical value is entered into the matrix that marks a sum of these instances (1,2,3...). The summed values can be used similarly as values relating to occurrence. They help establish averages and trends by hinting at the popularity of different qualities. They are also more suitable than occurrence-values in establishing how many different varieties of a material exist in a single project.

3. TEXT

In an effort to provide answers to Sq3, some categories of the coding matrix seek for written answers that help establish a deeper understanding of how practitioners speak about their designs. This part of the coding matrix gathers descriptive words and actions that bring out details regarding the design

When an entry does not provide sufficient information for establishing an answer (i.e. it is not possible to decipher whether the quality exists or does not exist), the field will be marked as having no answer (N/A). When a project does not possess a quality, the field will be left empty or is marked with a line (-).

3.4 STRUCTURE OF THE CODING MATRIX

This section introduces the categories of the coding matrix, section by section. Potential exceptions and divergences in the sample and data extraction methods are mentioned, followed by examples of what these divergences mean for analysing extracted data.

Image.02 When turned 90 degrees, the coding matrix complete with entered data almost resembles a woven rug.

3.4.1 PROJECT DETAILS

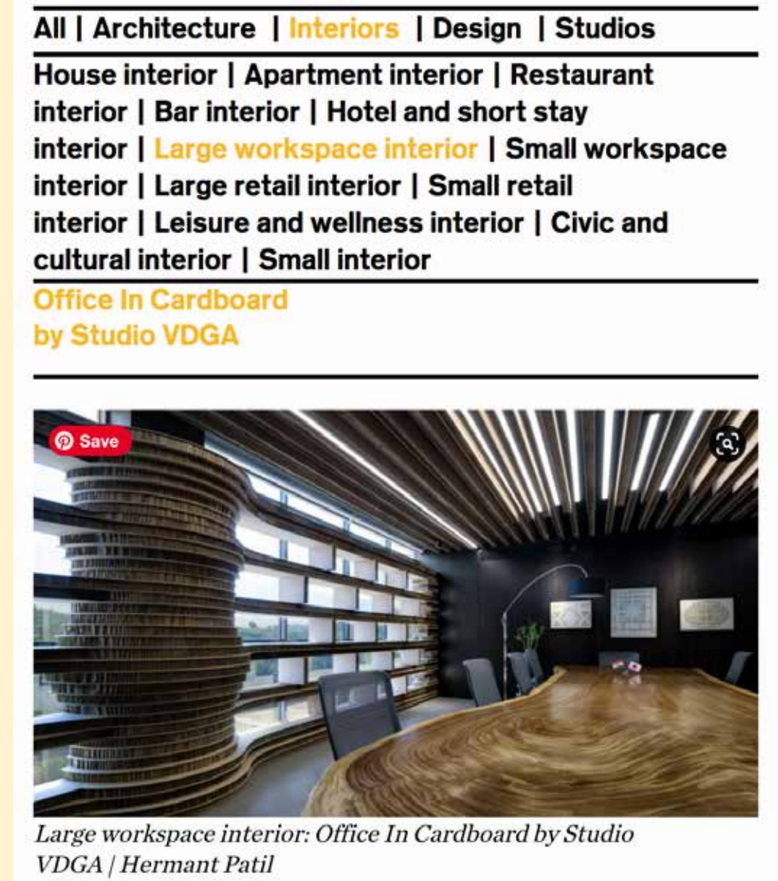
Functioning as the identifying data, project details provide transparency regarding the sample and provide an idea of 'what' (part of the interior practice) the sample represents. Identifying data includes the *name of the project*, the *competition year*, the *competition category* in which it is competing, the *project typology* plus *specifying details* regarding the project typology. Also included in this data are the *project location country*, *project location details* (urban, rural etc.), the *designer(s) or design studio(s)* who entered the design and their *country of operations*.

Identifying data further includes a link to each project entry, which displays the image and text used in the analysis, as well as the date when the specific content was analysed. Exceptions to this protocol are marked in the exceptions field.

To assess the success of the entry within the competition, I marked the projects that won the jury selection with a '1', while the rest are referred to as 'shortlisted'.

The amount of competition categories varies between each year as categories have been added, merged and divided into new categories. For example, in 2018, categories for private dwellings were limited to a single category titled 'Residential interior'. From 2019 onwards, this category has been divided into Apartment interiors and House interiors. In addition to these, the category of 'Small interiors' also contains a number of private dwellings. When there is a need to simplify and produce a more standardised set of data, I refer to the projects collectively according to their overarching typology regardless of their original entrance category.

For instance, all entries that are considered private dwellings are assessed as such when the purpose is to extract data and identify trends regarding private dwellings. Conversely, if I intended to compare and identify variations between different types of private dwellings, I would assess each project in accordance to the type of dwelling it represents.



Large workspace interior: Office In Cardboard by Studio VDGA | Hermant Patil

Image.03 Example of an entry that does not mention project location. The location of the design studio was determined through the design studio website. Identifying details coloured red.

Photograph by Hermant Patil
Screencapture retrieved from https://www.dezeen.com/awards/2020/shortlists/office-in-cardboard-studo-vdga/ [Visited 19th September, 2021]

The list of typologies that the entries have been divided into is presented in Fig. 07. If an entry is a combination of multiple typologies, it is entered into each of the corresponding categories and also marked separately as adhering to multiple categories.

The typology of the projects will function as one of the primary ways in which trends in the data can be compared. With this in mind, additional specifying details regarding the project typology will be collected just in case, as they may potentially lead to further insights regarding these trends.

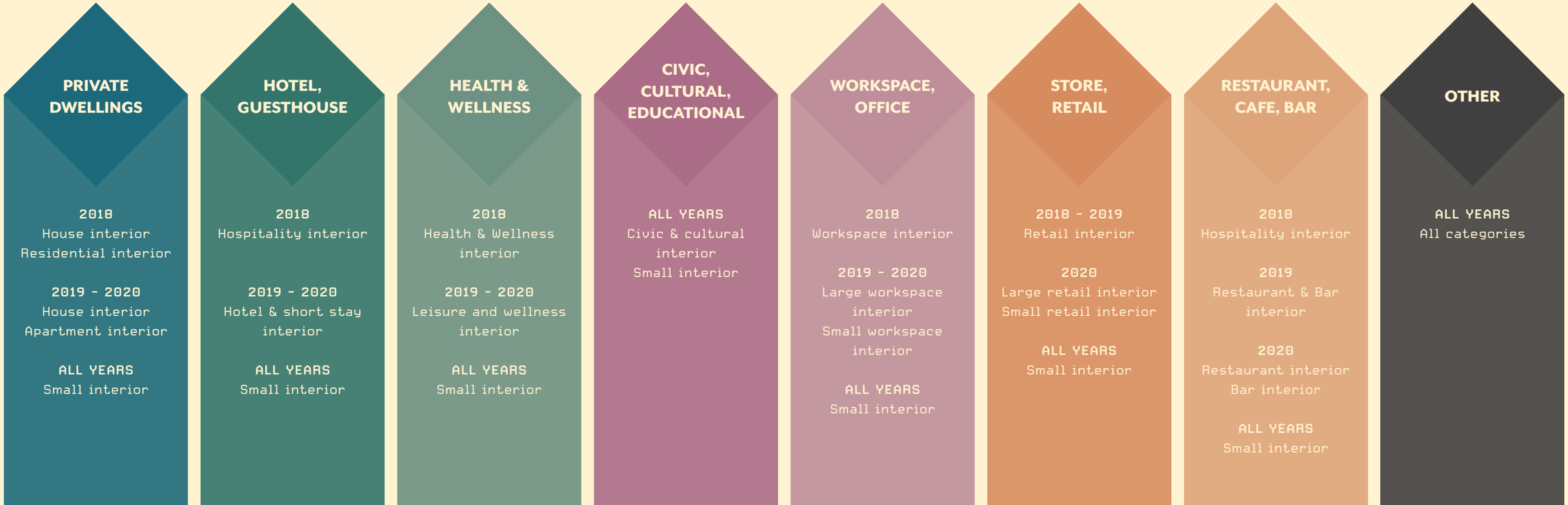


Fig. 07 Competition categories divided typologically.

3.4.2 COMMUNICATION

This section of the coding matrix focuses on gathering data relevant for responding to Sq3, but can also provide insights into Sq2. The section is divided into categories that vary in the approach they take to assessing the project descriptions of each competition entry.

STYLE DESCRIPTION:

When possible, I have extracted details regarding the style description (i.e. architectural style) of the design from the entry description text. An architectural style describes the identifying features of an architectural construction that separate it from other styles. Identifying features can be anything from shapes to materials to construction methods and beyond.

Subcategories in this section are derived from the style descriptions that surface during the analysis. Styles that are referenced fewer than three times are marked as ‘’other’’ along with a short title describing the style. To identify projects that combine different styles and/or aim to preserve existing features in addition to the new design interventions I calculated for each project a sum of the styles by which it has been described.

EXECUTION:

I gathered available information about the project’s execution to complement data project typology and architectural style. Knowledge on whether the interior is a new build, a renovation, an extension, or perhaps a temporary installment can be used to evaluate the SDS available to the practitioner’s at the onset of the project. This information can also provide insights into some of the SDS being applied, especially in regard to resource conservation and the preservation of cultural heritage. The data was collected by assessing correspondence with pre-established categories. When combined, the data was used to create an image of the most and least common project typologies in regards to execution.

DESCRIPTION STRUCTURE:

The text and image entries have been submitted to the competition by practitioners themselves, which means that it was the practitioners responsibility to choose which aspects of their design are highlighted. As a result, the level of insight and detail provided to the reader fluctuates from one project to another. If the description texts are regarded as a vehicle for disseminating knowledge, considering how the description is structured - so that the logic and justification behind design choices is easily understood - is relevant for nurturing the spread of knowledge within and beyond the practice.

For instance, one might expect that a competition entry describes the designed contribution, or solution, to the underlying design challenge or brief. Backing this information with insights into the background or starting point of a project can help the reader build an idea of the potential limitations or workload involved. Mentioning the design objective or aim on the other hand, can inform readers about the project’s priorities which influence the logic behind design choices. Finally, in the context of interiors, providing examples regarding the layout, spatial features, or material choices, can provide more details on the scope of the assignment and the chosen approach.

For this reason, the coding matrix is used to analyse the general structure of the description texts as a means to understand what kind of information is being transferred to the reader. This is done by assessing whether the text includes mention of the aforementioned features.

Results from the examination contribute towards responding to Sq3 by accentuating how practitioners communicate about their designs whether or not it involves mention of SDS.

MATERIAL DESCRIPTION:

In addition to searching for references to different SDS as well as analysing images for applied materials, the coding matrix takes into account materials mentioned in the project descriptions if such information is available. The data can be used to identify popular materials and/or changes in trends regarding the use of materials. These insights can also contribute to an understanding of how practitioners perceive sustainable design and what aspects they value or consider when choosing materials for sustainability-oriented applications.

CHOICE OF WORDS:

To interpret how practitioners communicate about their designs and to understand what aspects of design practitioners decide to highlight, the coding matrix gathers descriptive words that characterise the design or its components (f.i. Unconventional, open, oak), words describing actions that the design process has involved (f.i. Create, focus, select) or what the design pursues (f.i. Evoke, make reference, foster).

3.4.3 SDS REFERENCES IN DESCRIPTION

The final SDS categories and subcategories of the coding matrix have been derived from the SDS categories in the master framework. They stand for characteristics or considerations that, based on reviewed literature, are connected to creating more sustainable buildings and interiors. To limit the workload, mainly those categories and subcategories that have surfaced in analysis have been added to the coding matrix, with a couple of exceptions. Albeit covering main focus points, they are an incomplete representation of all the SDS out there.

As different SDS tend to share qualities and methods, the coding matrix includes subcategories that could relate to various SDS, but for practical reasons, have been categorised under a specific SDS in the coding matrix. In doing so, my aim has been to match general attributes with closely related SDS. That said, it is important to remember that the categories are essentially structured in a qualitative manner by the author, despite being informed by the literature review.

The way in which the categories of the matrix have been organised has an impact on the resulting hierarchies. SDS categories that have more qualities assigned to them are likely to harvest more hits from the content. Similarly, qualities that apply to a wide range of descriptive terms (such as aesthetic quality) are more efficient in collecting hits. To counterbalance this factor, a detailed breakdown of results is provided in Appendix I. The breakdown can be used by peers to extract data and reorganise it in any given way, such as to remove SDS qualities that are considered to skew the results in one direction or another.

The key function of the coding matrix at this point is to identify mentions of qualities that correspond with qualities of different SDS in the project description. It should be noted that the description does not have to match the exact wording used in the title, such as 'Energy-efficiency' for it to be considered to correlate with an SDS. Instead, the identification of corresponding qualities is based on a loose interpretation of themes and meanings in the text. As an example, any design that highlights an aesthetic feature of the design, such as a 'minimalistic' approach or a 'beautiful' detail, is considered as making a reference to 'Aesthetic style'. Similarly, a project that mentions wooden floors and a specific spatial function, such as ''leisure'' or 'co-working', is understood as making a reference to 'Natural resource use' as well as 'Usability and Functionality'.

The only design quality that requires a specific mention in order to have a value entered, is 'Explicit sustainability aim'. Here, the description must clearly state a sustainability aim or consideration in the design, or mention an aim that can generally be considered as a sustainability aim, such as pursuing a reduced environmental impact. As such, it functions as a subcategory that tries to establish the intent of sustainability consideration in the design. In so doing, it lends more weight to the rest of the design choices made within the project. Projects that do not state a clear sustainability aim can incorporate elements that correspond with SDS, but without a stated sustainability aim, it is hard to evaluate whether these correlations are intentional and considered, or purely coincidental.

When identifying different SDS in the textual content, there is a danger of reading too much into what SDS are actually being applied. As visualised in the master framework (See Appendix II), many SDS have similar qualities and are connected to each other. Related SDS may manifest in very similar ways and sometimes this overlap makes it difficult to draw a line between the SDS that are intentionally being applied and those that are unintentional or purely hypothetical.

For example, an attempt to improve energy efficiency can come across as improved daylighting, material applications with thermal heat storage qualities, or as low energy lighting technology and responsive controls. Any of these qualities could fall under the sub-category of improving energy efficiency, but for the purposes of producing more consistent results, it is important to refrain from over-analysing, and afford points only to those sub-categories that are most clearly referred to in the text. Therefore, if a text mentions ''maximizing daylight'', a point will fall under the sub-category of 'Daylighting' and not under 'Energy efficiency'.

Paying special attention to environmental sustainability, the designer used materials with low carbon emissions, such as wood and carbon neutral, fast growing fibers.

Image.04 Example of a stated sustainability aim in a project description.

Emma Olbers Design, 2019, Old Library at the National Museum Screencapture retrieved from https://www.dezeen.com/awards/2019/shortlists/the-old-library-at-the-national-museum/ [Visited 19th September, 2021]

To improve transparency regarding the evaluation process, summarised meanings or characteristics from the description, which have been used as evidence for coding a correlation, are entered in text format under ‘SDS mentions’. These snippets of text may not always be exact quotes from the description, but key themes, characteristics and details that relate to the SDS correlation in condensed format. I have collected this evidence to compensate for the low coder-reliability that follows from having a single coder (Lacy & Riffe, 1993). By presenting the details that have informed decision making, my thesis invites open scrutiny in the hopes that it can spurr improvements to the design of the matrix and method of analysis for future applications.

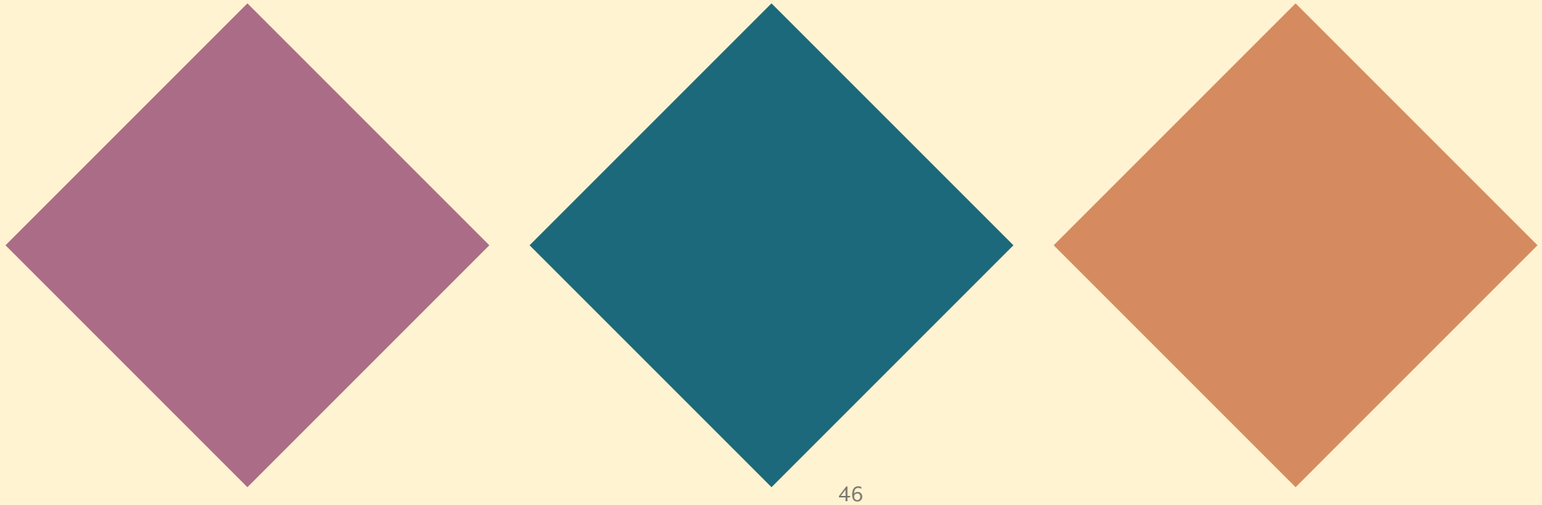
I will use the results from this section to evoke an idea of potential hierarchies in the use of different SDS, which, together with results drawn from other sections, is used to map the focus of the practice in applying different DfS approaches, and ultimately, form a response to the main research question.

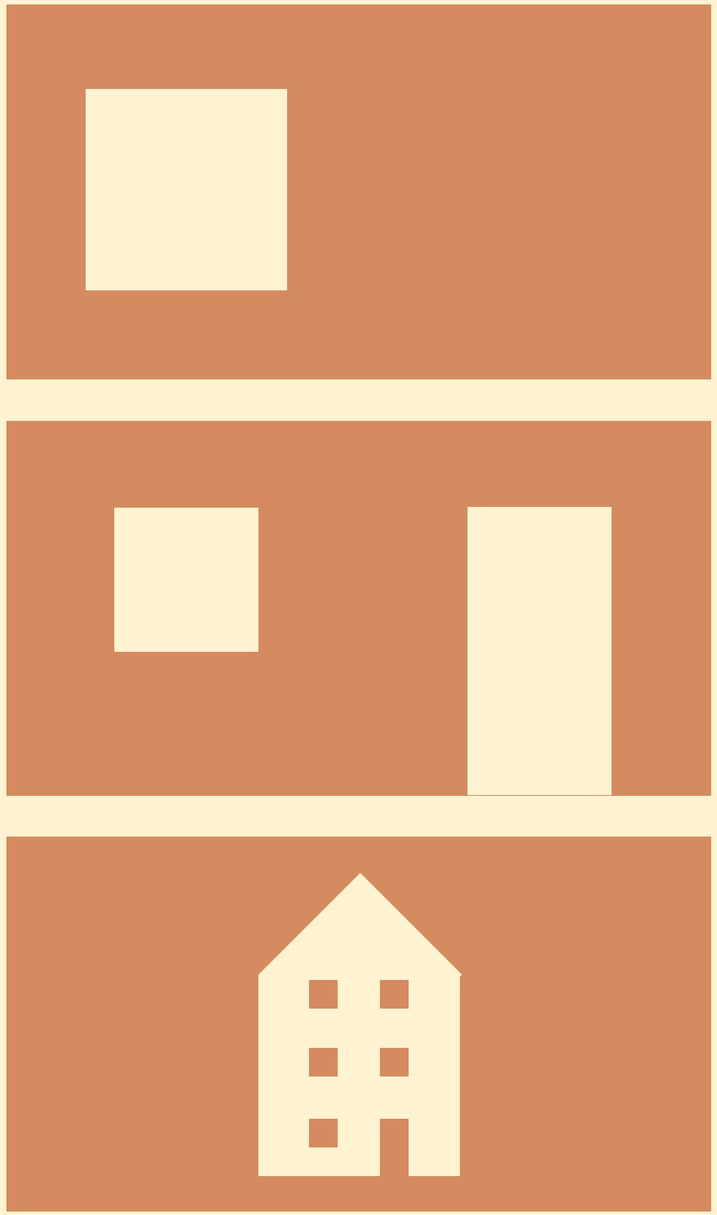
Illustration of transparency

3.4.4 JURY COMMENTS

This section of the matrix collects the comments of judges to winning entries. I used them as a reflection point for understanding how sustainability considerations function in evaluating the entries. In more direct terms, I use them to see whether the judges highlight sustainability in their considerations and if not, what qualities of the design they highlight when justifying the choices.

In light of the competition’s evaluation criteria, the justifications behind judges’ choices can provide an idea of what is valued within the practice, whether or not sustainability is truly a valued design characteristic, and what kind of sustainability considerations are enough to be afforded the status of winner.





3.4.5 IMAGE ANALYSIS

The image analysis section of the coding matrix focuses on the image content of the competition entries. The aim is to provide insights mainly for Sq2 by analysing the manifestations of SDS in image content. Most of the categories in this section of the matrix focus on analysing the occurrence of qualities listed in predetermined categories, with values entered as the sum of different instances identified in the image. This means that if a project incorporates five painted wall tones, a value of '5' will be entered within the context of walls under 'painted'. Furthermore, the most visible material tones will be collected as a means to assess the prevalence of SDS relating to improved daylighting and accessibility.

As a default, the analysis has been limited to one image per entry (with some exceptions). Since it is rather impossible to contain the totality of an interior project in one image, the validity, quality and quantity of the data that can be extracted from the images depends on a set of multiple variables. The level of detail depicted and the reliability of the coder (author) strongly influence what can be extracted from the images.

Lacking access to the entrance form, it is uncertain whether practitioners have decided which image is featured with their project descriptions. It is possible that the featured images have been selected by the design awards organisers from an array of images provided by the practitioners. Therefore, the featured image may not be what the practitioners regard as the best representation of the design and are not used to determine which aspects of the design practitioners choose to highlight.

Similarly, although the images are used to collect data on material applications, the data regarding these applications is biased by what parts of the design are portrayed in the image as well as the analyst's ability to correctly identify materials from the images. The resolution of the image can also limit the accurate identification of an object or material, especially in cases where the characteristic being identified is very far away or only partly visible.

These limitations are important to keep in mind when deriving conclusions out of the image-based data. As the data is highly dependent on coder-reliability, as well as the level of detail depicted in the image, any conclusions drawn from the data are hypothetical and based on qualitative interpretation. The data will be used as a means to identify the prevalence of different SDS in practice so far as the SDS can manifest in the use of materials, lighting or furnishing. Data from the images will not be used to directly determine whether a project has applied a certain SDS, as the image cannot convey such intent with sufficient reliability. Instead, sum totals from the predetermined categories will first be used to identify trends in prevalence. These trends can then be juxtaposed with known SDS to assess which aspects of the different SDS are potentially being applied.

I will use the rest of this section to shortly introduce and describe additional considerations related to each image-analysis category within the coding matrix.

CEILING HEIGHT BASED ON IMAGE:

Interpreted based on a best-guess estimate basis, as information regarding actual heights is unavailable. Categories have been derived from industry averages, with 2.5-2.7 meters marking average height. Images depicting multiple heights are entered into each corresponding category. Slanted ceilings or arched ceilings are entered also under ‘’other’’ along with a one-word description of the unique characteristic (f.i. Slanted, Arched). Projects with openings spanning multiple stories are marked under ‘’Multistorey’’. Height information contributes to assessments regarding spatial efficiency, daylighting, indoor environmental quality and overall resource use.

WINDOWS AND DAYLIGHTING:

This category counts the amount of different window pane sizes depicted in the image. The four size categories have been derived by the author and are based on a percentage of ceiling height that the window occupies. The information is mainly used to assess the prevalence of SDS relating to daylighting conditions and indoor environmental quality, but can also be used when reflecting on resource use, thermal comfort and energy-efficiency.

In addition to the window count, the matrix collects data regarding the number of walls on which windows have been placed, whether the interior contains skylights, or whether the interior incorporates glass walls, doors, railings or windowless openings to the outdoors. This information can be useful for deciphering further trends in daylighting and the use of passive heating.

Lastly, details about window placement are complemented by details on whether the image depicts daylight and/or window shading options. The prior details are used to determine typological differences in how spaces are depicted. In doing so it informs answers to Sq3. The occurrence of shading options on the other hand is used to complement information regarding daylighting, personal controls and usability.

VIEW TO NATURE OR GREENERY?:

Studies (f.i. Tennessen & Cimprich, 1995; Leather, Pyrgas, Beale, Kweon,& Tyler, 1998; Kaplan, 2001) have found that viewing scenes of nature can provide mental and physical health by buffering stress, increasing patience and reducing feelings of frustration (Pretty, 2004). For this reason, data is collected regarding the amount of interiors that have windows with views of nature or greenery. This information is used to assess factors relating to indoor environmental quality and maximizing views.

MATERIALS:

This section of the coding matrix explores the material applications portrayed in the images. The section is divided into categories by the context of application: It looks for materials applied to 1) Floors, 2) Walls, 3) Ceiling, and 4) Other fixed elements, such as doors, pillars and window frames.

Listed under each context are subcategories referring to a set of general materials that interior architects typically work with. The categories have been adapted from general classifications by Ashby (See e.g. Ashby, 2016b). As each application context has slightly varying needs in regards to functionality, safety and maintenance requirements, there are minor context-specific variations in which materials are included in the sub categorisation. For instance, wallpaper and cardboard are only included in the context of walls, whereas acoustic board is mainly used in walls and ceilings.

The purpose of the examination is to collect information on the variety of materials applied on average, as well as the prevalence of different material applications within and across projects. This means that if there are multiple varieties of the same material, such as wood, the sum of these varieties will be entered beneath the subcategory of 'wood'. The data is used to create an idea of which materials practitioners value and consider sustainable. The results of the evaluation can be useful in determining the prevalence of a wide range of SDS, such as improvements to indoor air quality, indoor environmental quality, accessibility & usability, length of the interior life cycle, resource use, pollution and so on.

FURNITURE:

In addition to interior surfaces and structures, portrayals of general materials used in furnishing are also collected to provide a more detailed image and further depth to the evaluation.

Details are gathered also by evaluating the array of furniture depicted, although it is unlikely to represent the full array of furniture used in the project. Instead, details on the amount of furnishing can be useful in connection with information on the furniture material choices when identifying typological variation and discussing differences in resource-intensity between typologies.

The final focus of the image analysis is on details relating to furnishing depicted in the images. As mentioned (p.60-61), these depictions fail to convey a holistic image of the design and hence conclusions made based on the depictions are purely hypothetical. Despite this, the matrix includes categories that search for the occurrence of area rugs, interior plants, HVAC and electric equipment as these elements can manifest SDS relating to indoor environmental quality, air quality, energy efficiency and functionality.

When identifying interior plants, the focus is both on identifying the presence and number of plants. The accuracy of the calculations depends on how well individual plants have been recognised in the image by the author.

3.5 DFS AS A THEORETICAL FRAMEWORK FOR REFLECTION

The data drawn through the media content analysis can reveal hierarchies in the application of different SDS. To contemplate what these hierarchies say about prevalent perceptions of interior architecture within the practice, and their ability to evoke transformational change, they are assessed for correlation with different approaches to sustainable design using the DfS Multi-level framework as a theoretical backdrop.

This section shortly describes the Design for Sustainability (DfS) Multi-Level framework by Ceschin & Gaziulusoy (2020). An overview characterising DfS approaches by Ceschin & Gaziulusoy (2020, Table 12.1, pp.142-143) is used as a backbone when reflecting on insights from the content analysis. In doing so, the framework becomes a conceptual backbone for positioning the SDS that are identified through analysis.

3.5.1 LEVELS OF INNOVATION

The framework consists of five levels of innovation (Ceschin & Gaziulusoy, 2020, pp. 144-146) that grow from insular to systemic, and from technocentric to more human-centric, according to the scope of the design intervention and the framing of the design problem (Ceschin & Gaziulusoy, 2020).

The most insular and technocentric level is the material/component level. Approaches inhabiting this level are mainly concerned with improvements to material characteristics. The next level is the product level, where the design targets user-product interactions. From there it grows into the product-service system level, where the problem framing takes an interest in consumption habits and behaviours. On the spatio-social level, the scope grows to encompass entire communities on a local level, with the problem framing targeting community practices. Finally, on the socio-technical system level, where the framing envelops socio-technical system dynamics, the design intervention targets leverage points with potential for greater sustainability impacts. (Ceschin & Gaziulusoy, 2020)

The purpose of discussing findings against the framework is to identify which levels of innovation are currently inhabited by the interior architecture practice and at which levels practitioners may need to increase their involvement when pursuing greater, more holistic sustainability integration. I do this by assessing which characteristics of different DfS approaches delineated by Ceschin & Gaziulusoy (2020) surface in the analysed content and see how these characteristics are positioned in the framework. For example, if the content analysis suggests that many interior projects focus on selecting durable or recyclable materials, this trend will be considered to inhabit similar levels of innovation as ecodesign, which contains corresponding principles.

3.5.2 CONVERGENCE AND DIVERGENCE

As depicted in the DfS framework, the different DfS approaches that inhabit the framework are somewhat interrelated. They share innovation levels as well as design strategies and objectives (from here on referred to as characteristics). Often the shared characteristics move forward on a temporal scale, meaning that later approaches build on those that have come before, perhaps becoming more focused on a certain strategy (f.i. Emotionally durable design, Cradle-to-Cradle design or Design for sustainable behaviour), targeting a different level for innovation (f.i. Design for the base of the pyramid, Systemic design or Design for sustainability transitions) or adopting distinct sources for design inspiration (f.i. Biomimicry or Biodesign [Collet, 2016]). In doing so they adopt characteristics that differentiate them from the other approaches for instance by becoming more focused on a certain theme, method or target group.

As a sub-discipline of design, sustainable design strategies applied in interior architecture tend to correlate with and manifest approaches of Design for Sustainability (DfS). Just as different DfS approaches overlap and complement each other in terms of their scope and framing, interior architecture projects can incorporate different DfS approaches simultaneously on various innovation levels.

Determining whether or not an interior design implements principles of a specific approach, or various approaches, is not straightforward. For instance, it is questionable whether an interior that is inspired by nature can be considered to utilise Biomimicry unless it actually incorporates elements inspired by natural processes.

And even in this situation, would the entire interior be deemed an example of Biomimicry or does the characterisation apply only to the specific intervention designed according to the design principles of Biomimicry?

Similar difficulties in drawing the line exist throughout the discipline. On the component/material level, an interior can utilise the output of an approach such as green design or ecodesign as a means to lower the total impact of the interior environment itself. The interior may also incorporate products belonging to a product-service-system (PSS), such as elevators, lighting fixtures, carpets or greenery. Yet the overarching aim of the interior may be to create an environment that nurtures more sustainable behaviour in its occupants.

Projects of this type can be seen to apply both ecodesign and Design for Sustainable behaviour (DfS), but since the designers of the project did not actively participate in the design of the PSS that is being utilised, it is perhaps more accurate to consider the PSS application as part of the ecodesign-strategy. Similarly, a project in which all the furniture is from manufacturers utilising Cradle-to-Cradle design (CTC), may not necessarily be a CTC design unless the interior itself - or the entire building - is designed according to Cradle to Cradle principles.

3.5.3 EXPANDING TO THE SOCIAL SPHERE

The playground for applying different DfS approaches becomes even wider when social and economic factors are included. Here, the innovation levels begin to span over the project context, from the building's components, to the building as a touchpoint in a wider service environment or built environment. Assessing who the interior is intended to serve, and how this intention manifests in the design choices that have been made, can give hints of the social or economic drivers involved.

In some cases, for instance, the interior may be intentionally built to serve a disenfranchised group or minority. This may be showcased in thoughtful details that create a more equitable or even favourable environment for the focus group, such as a floor plan designed specifically with wheelchair access in mind, or bespoke furniture designed for children.

In other cases, the interior may have been designed to challenge behavioural norms or thinking. It may do so, for instance, by showcasing new innovation or by setting an example. The underlying aim may be hard to decipher for someone visiting or experiencing the space, as it is hidden in the experience that the design facilitates, rather than the materials and forms visible to the eye.

3.5.4 ASSESSING DFS WITHIN INTERIORS

It follows that interior architects can engage with various DfS simultaneously, and as a result, their work can span across levels of innovation. However, it is uncertain how deeply practitioners engage with the different approach, and indeed whether one approach is being disguised by another.

To gain a better understanding about commonly applied approaches within current practices, it is necessary to first evaluate a range of interior projects and seek for hints regarding their aim and the scope of their design intervention. Doing so can reveal correlations with existing DfS approaches and help build a clearer image of the scales of innovation that the practice is able to reach. These, in turn, can provide an idea of which approaches are most characteristic to the practice, and which ones are engaged with to a lesser degree.

4. FINDINGS: THE VIEW

This section introduces the results from the content analysis. It presents data gathered from each category of the coding matrix and summarises findings regarding the occurrence and prevalence of different themes, qualities and SDS. The results are presented as a series of tables and figures accompanied by further explanation, details and additional considerations.

The section is thematically structured. It starts by presenting some of the general characteristics of the sample that characterise what it represents. Next, results related to communication are revealed. They include statistics regarding the structuring of texts, recurring themes and a comprehensive look into the occurrence of different SDS in description. Lastly, results from the image analysis summarised in a set of figures that depict trends in material application and spatial features.

Deeper analysis and discussion of the results will follow in Chapter 5, which includes reflecting on the results against the DfS framework and looks at how sustainability is addressed in the jury evaluations.

4.1 GENERAL CHARACTERISTICS OF THE SAMPLE

Accompanied by a series of figures, this section synthesises identifying data related to project details in order to characterise who and what the sample represents.

4.1.1 GEOGRAPHIC REPRESENTATION

In the coding matrix, identifying data regarding project details were gathered in order to establish which parts of the interior architecture practice are represented by the sample. Fig. 09 divides the samples geographically according to the project locations represented in the sample. The figure indicates that the bulk of projects come from four out of 32 recognised countries; Entries from England, USA, China and Japan make up roughly 40% of the sample.

In total, the sample represents roughly 16% of recognised countries in the world today (calculated from 195 countries). The mapping also visualises the emphasis on post-industrialised countries located in the global north, with the exception of China and Taiwan. Conversely, the sample includes no entries from entire continents (South-America and Africa) and, apart from China and Mexico, has rather limited representation across Asia, the Middle east, and Central America.

Evaluation of the design studios' countries of operation draws an almost identical picture with 81% of the geographically situated entries being designed by a domestic practitioner or studio. From all studios, 10 were such that a country of operations could not be identified. Based on the studios, the few additions made to represented countries would be those of Ghana, Vietnam and Brazil, with the rest of the foreign studios being located in previously mapped countries.

Details gathered regarding project location (See. Fig. 08) show that 61% of the projects are located in urban surroundings, with rural and residential areas following with 7.5% representation in each. Other contexts, such as coastal locations or campuses, which do not indicate details regarding urban-rural situatedness, make up just 2% of the sample. The rest of the sample does not include information on their local context.

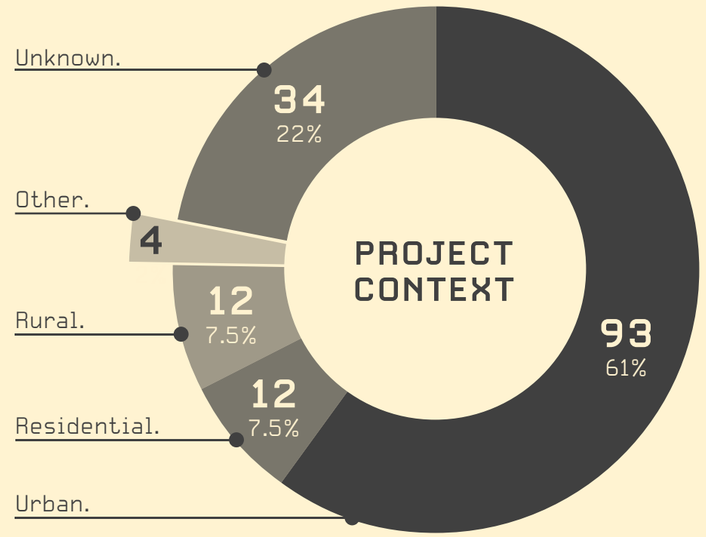
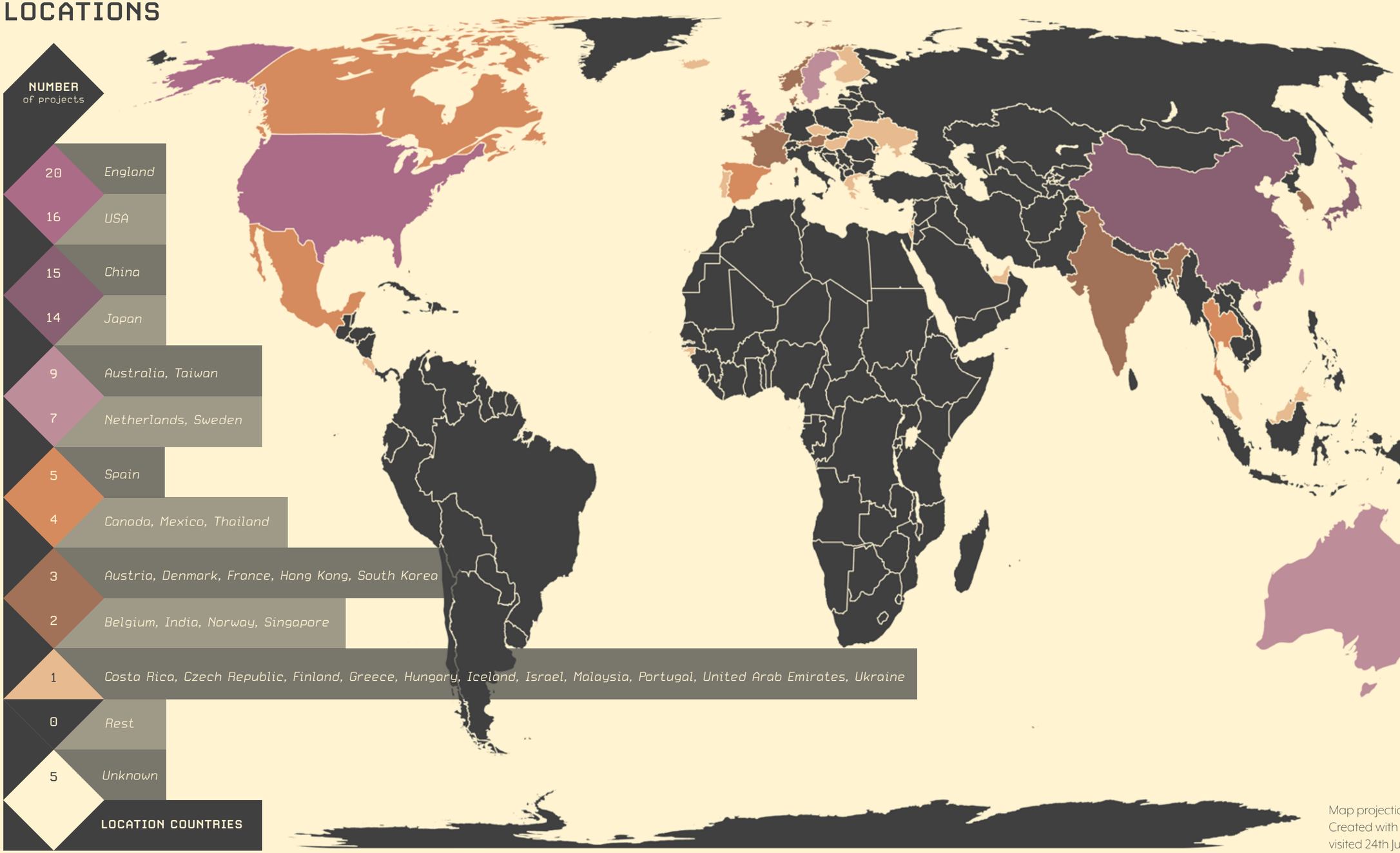


Fig. 08 Division of competition entries according to project context. Pecentages calculated from a total of 155 projects.

Fig. 09

PROJECT LOCATIONS



Map projection: Eckert IV
Created with mapcharts.net
visited 24th July, 2021

4.1.2 TYPOLOGICAL RESULTS

Dividing the sample according to typology reveals a relatively gradual arrangement (See Fig. 10), with ten projects being characterised by more than one typology.

In the results, private homes stand out as the most frequent typology. This is mainly due to the higher number of categories that accept this typology. Each year, Dezeen has hosted two categories for private dwellings. In 2019 these were Apartment and House interior, and in 2018 Residential and House interior. In addition to these, private dwellings were accepted in the category of small interiors. Similarly, the emphasis in Dezeens competition categories is what drives the overall weighting in the sample's typological build. It follows that small variations in typological emphasis are mainly created by entries to categories such as 'Small interiors' or 'Civic and cultural interior' that do not automatically propose a certain typological grouping present in this work.

Four projects presented special characteristics that made them difficult to place into one clear category, and hence were marked as 'Other' in addition to the closest typological matches. The projects marked in this manner include a community kitchen, an installation, a prototype and a student residence. While the student residence could have been considered to represent a private dwelling, special characteristics in its design - a combination of large shared spaces and private student dormitories - caused it to conflict within a category that mainly consists of private homes and apartments.

Viewing the results as they stand, it is possible to see that the bulk of the projects are of commercial nature. Typologies more commonly connected to the provision of public services, such as those with a Civic, Cultural, Educational or Health & Wellness focus, make up roughly 22% of the identified typologies, as opposed to the 38% made up commercial typologies such hospitality environments (Restaurants, cafes, bars, clubs, hotels etc.) and retail stores.

The commercial emphasis of the sample is further accentuated by two factors. Firstly, when offices are calculated as commercial, the percentage of commercial typologies reaches roughly 54%. Secondly, certain entries situated within Health & Wellness are in fact private clinics and businesses, such as yoga studios, that do not take part in the provision of public services and are commercial by nature.

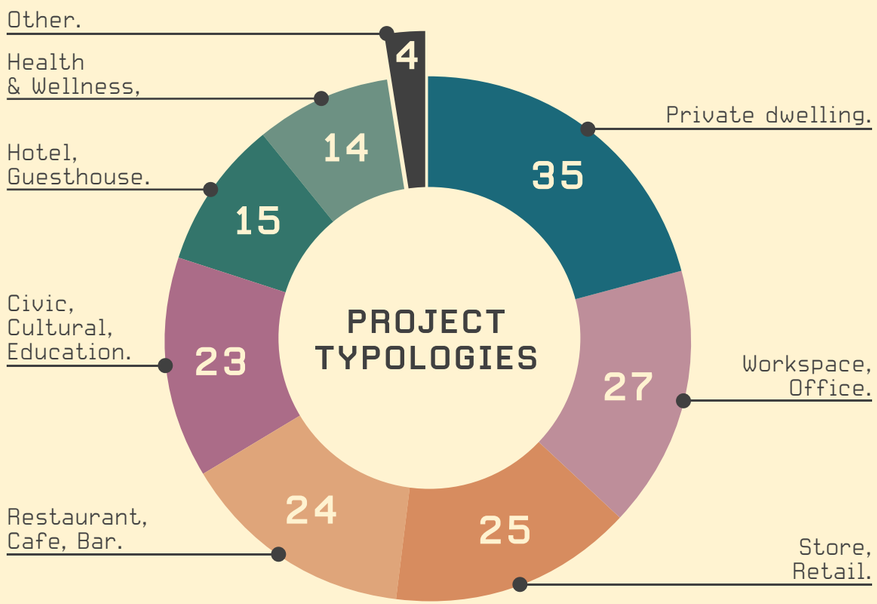


Fig. 10 Division of sample according to typology. The total number of project typologies within 155 entries was 167, with 10 entries characterised by more than one typology.

4.2 COMMUNICATION

In this subchapter I explore what the analysis reveals about how practitioners communicate about designs, and how sustainability considerations manifest in these communications. The results will go on to inform discussion regarding which perceptions of sustainable interior design are prevalent in the sample.

4.2.1 STYLE DESCRIPTION

Very few practitioners describe their designs using terms related to generally known architectural or artistic styles. Instead, style descriptions focus more on characterising a subjective quality that the space emulates (f.i. harmonious, continuous, smart, innovative), referencing a feeling that the space is considered to radiate (f.i. warm, cosy, relaxed, playful), or revealing sources of inspiration (f.i. Brand-informed, nature-inspired). The last was used solely in the context of retail interiors, although the sample contained some offices that seemed to reflect similar sources of inspiration.

I used the inductive approach to add categories in accordance with surfacing and repeating descriptions. Furthermore, descriptions that were considered to relate to each other, such as heritage, historical and old, were combined under one title. A summary of the results is depicted in Fig. 11.

From the total sample, roughly 46% of entries made no discernible effort to synthesise the aesthetic style of the design itself, although aesthetic qualities were brought up in context of different design characteristics. In total, an overall 140 style descriptions were identified, some of which were prescribed to the same project, which brought

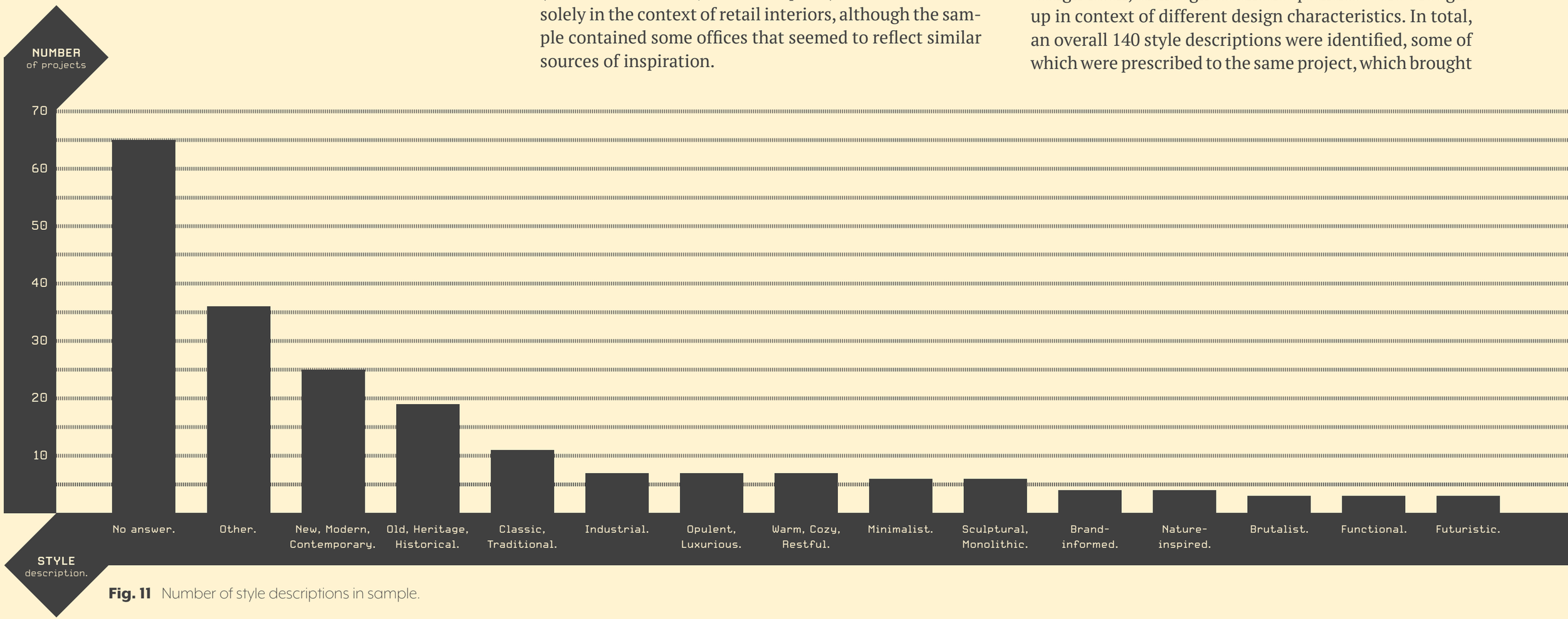


Fig. 11 Number of style descriptions in sample.

the average amount of assigned style descriptions to just under 1.6 per project (discluding projects with no style description).

The most common descriptions made reference to contemporary or modern (25 entries), historical (19), and/or traditional style(s) (10). In the case of the latter two, what the descriptions meant style-wise was dependent on the geographical and cultural project context.

Industrial (7), luxurious (7), minimalist (6) and sculptural (6) aesthetic qualities gained another significant bulk of mentions along with various forms of ‘Cozy’ (7). The first was mainly used in the context of renovations where original features of an industrial space were retained in the transformed interior. As such it is more accurate in describing the historical setting of the interior rather than the style of its transformation and was sometimes coupled with other stylistic descriptions, such as ‘’contemporary insertion’’.

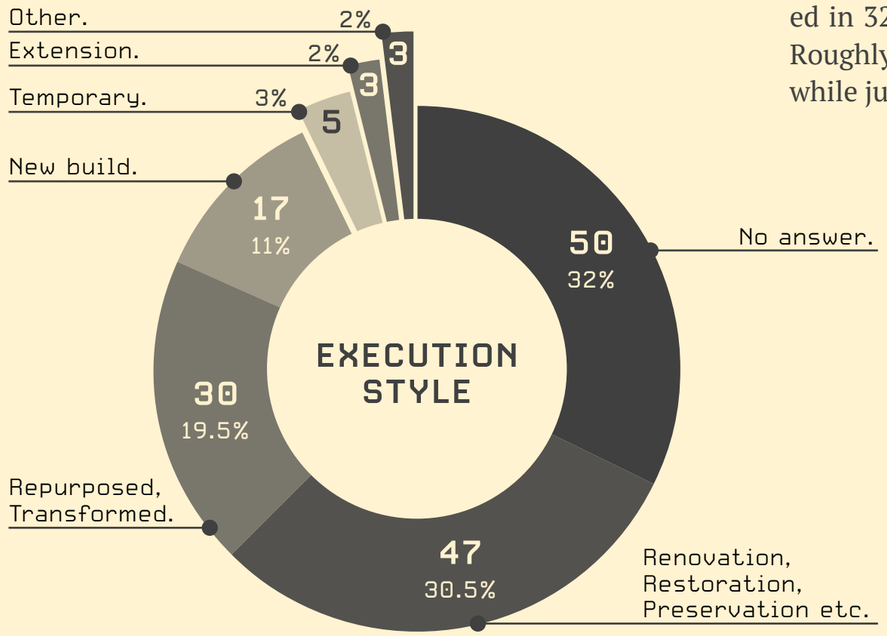
Luxury, *opulence* and *extravagance* on the other hand, were typically related not only to the stylistic features of the interior, but a subjective quality or feeling it was designed to radiate. The projects to which they referred existed in typological contexts that are typically connected with rest and relaxation; three of the projects were private dwellings, three more were retreats or hotels and one was a wellness interior.

All in all, at least 36 stylistic descriptions were made that weren’t granted their own category. Most of them are qualitative descriptions that do not translate into a specific architectural style, references to a nation or culture, or established architectural styles, such as *Modernist* or *Victorian*.

4.2.2 EXECUTION

Results from analysing project executions are presented in Fig. 12. Once again, a large number of entries (32% of sample) did not provide details regarding their execution. From the projects that did provide this information, a clear majority (a combined 76%) were set in an existing context, with new builds and extensions accounting for just under 20%.

Fig. 12 Percentage of different execution styles in sample.
The percentages are calculated from a total of 171 execution styles mentioned in the 155 entries and include the 51 entries that gave no answer.



4.2.3 DESCRIPTION STRUCTURE

In describing their projects, a majority of the practitioners mentioned a combination of informative details. The greatest emphasis was placed on explaining the design solution - mentioned in 89% of samples - with descriptions of the objective and aim following at 78% of the sample. The project starting point or details on background were provided in 65% of descriptions. Meanwhile, 58% of descriptions mentioned a spatial feature or details on the layout, and 49% mentioned a specific material choice.

Details regarding how many of these aspects were typically included in a project description are as follows: The largest number of entries - constituting 34% of the sample - mention a combination of three of the aforementioned details, a combination of four details were included in 32% of the sample, while 14% mentioned all five. Roughly 10% of the sample included only two details, while just 8% mentioned just one or none.

On a broad level, some of the recurring themes in the descriptions are as follows:

- Referencing the history of the building, interior or location, or describing design aspects relating to cultural heritage or local culture.
- In renovation, preservation and transformation projects: Mentioning the previous condition or purpose of the interior and the original features that were retained or restored.
- Expressing the quality of the design or its feature using subjective nouns and adjectives.
- Using descriptive metaphors to describe the style of a solution.
- Describing a feeling evoked by the interior, the shape, size or mass of a solution, or the role of the design in delivering a service, experience or function.
- Mentioning traditional or cultural qualities incorporated in the stylistic considerations of the interior, or the design's role in nurturing a community.
- Highlighting the locality, sustainability or unique quality of an applied material or method, or the handcrafted or bespoke features incorporated in the design.

In addition to the broad themes, when describing sustainability features, the practitioners typically brought up the following aspects, some of which partly overlap with the prior:

- The sustainability-influencing qualities of a material, such as its age, locality, recyclability, biodegradability, natural origin, organic production, certification or recycled content.
- The lower impact, 'efficiency', environmental-friendliness or high quality of a solution or design feature.
- The use of wood or bamboo and their method of application.
- Use of local craftsmanship or traditional handicrafts and the quality of their product.
- The traditional, cultural or historic qualities of a solution or the interior.

In rare cases:

- An underlying sustainability-related issue to which the design responds.
- The structural (socio-technical) change that the interior hopes to nurture.

4.3 SUSTAINABLE DESIGN STRATEGIES IN PROJECT DESCRIPTIONS

Project descriptions were also analysed for recurring qualities and manifestations of SDS to provide answers to Sq2 (PRACTICE) and the main research question.

Organised into a series of Tables (Table.04-15) presented in Appendix I, the data derived from the examination can be arranged in various ways in order to discover potential trends. The presented figures contrast each year against each other and the total sample. The data is presented in various forms, as so-called 'hits' that refer to a single occurrence of correlation, as well as in percentages that enable the comparison of trends within an uneven sample.

4.3.1 GENERAL FINDINGS

Fig. 13 depicts some general data regarding SDS hits in the sample. The data is divided according to yearly review periods in addition to the total sample scores. With a total of 867 SDS hits throughout the sample, the figure reveals that there is only slight variation in the average SDS hits per entry between the different review periods.

Across the board, winning entries have a lower average of SDS hits than their corresponding totals. Similarly, there is very little variation in the achieved top scores, lowest scores and most frequent scores, apart from 2018, when the most frequent score was somewhat higher.

Together, the total sample managed to insinuate at least 53 qualities correlating with SDS, with yearly scores for all entries just above 44. Winning entries managed to cower 33 different qualities, with yearly averages just above or somewhat under 20 qualities.

The next subchapter will explore how the qualities fall into place in terms of their frequency in the sample.

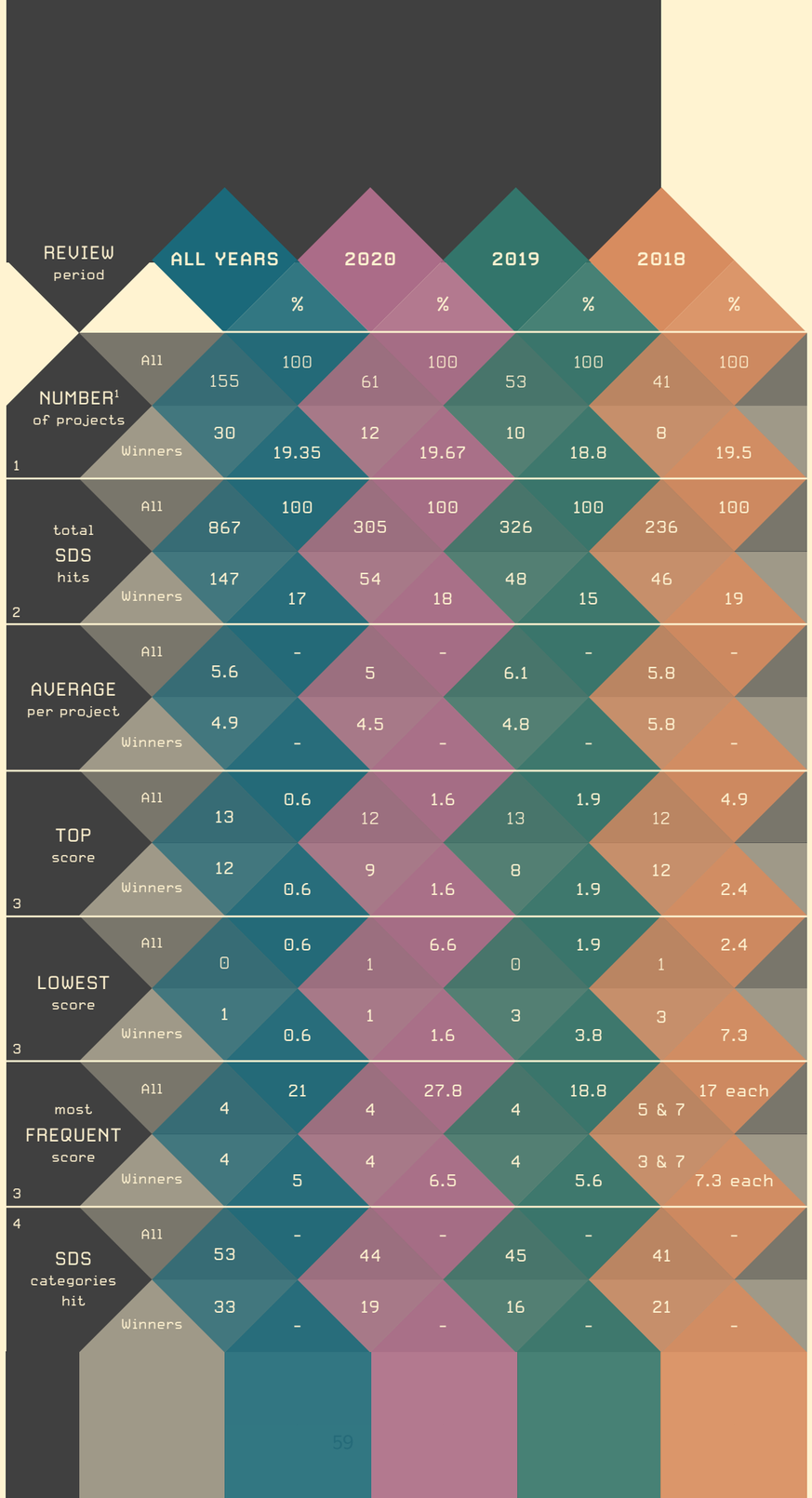


Fig. 13 General data on SDS hits in project descriptions.

% calculated as:
1: Percentage of projects from all projects within *review period* (f.i. All years, 2020, 2019 or 2028).
2: Percentage of SDS references [hits] from total SDS hits within review period.
3: Percentage of projects with presented score from projects within review period.

4: Number of referenced SDS from total SDS included in coding matrix [57].

4.3.2 PREVALENCE OF SDS

The prevalence of different SDS that surfaced through the analysis are arranged in Fig. 14 according to review period. The figure summarises data presented in Appendix I and Fig. 15, in which the hits to each SDS subcategory - also referred to as qualities - are gathered. Fig. 15 also introduces the key SDS and their subcategories that functioned as the coding categories in the matrix. It contains both the predetermined categories and later additions that were created in response to the analysed content. The categories follow an order from most prevalent to least prevalent.

In the figure, the different SDS categories have been organised in a hierarchical manner from most prevalent to least prevalent according to the sum total hits belonging to each SDS category (i.e. The summed value of all subcategory hits assigned to the SDS category). The resulting image depicts the focus points in potential SDS application according to each year. The featured percentages mark the proportion of hits that the category holds from the sum total of the review period in question (i.e. All years, 2020, 2019 or 2018). The showcase differences in trends despite variation in the number of contributing entries.

The first noticeable trend that surfaces from the arrangement is that the top four SDS stay the same regardless of the viewing period. This is likely the result of a few key qualities in the matrix that managed to gather a significant majority of hits or influenced by the number and arrangement of subcategories in each SDS category. The following sections will explore the data arranged in these figures in more detail.

INDOOR ENVIRONMENTAL QUALITY

Contributing to indoor environmental quality (See Appendix I, Table.04), 'Aesthetic style' gained the most hits across the board (roughly 67% of all entries). Drawing from heritage or culture is another major contributor to the category. With 56 hits it was the 5th most prevalent SDS subcategory. Daylighting (i.e. maximising daylight) gained 22 hits, while maximising views to the outdoors or nature gained 13 hits. Controlled acoustics were only referenced in two entries.

IMPROVING ACCESSIBILITY & USABILITY

The key qualities contributing to the popularity of 'Accessibility and Usability' (See Appendix I, Table.05) were usability & functionality (≈46% of total entries) accompanied by multifunction or multipurpose designs (≈21% of total entries). In most cases, these qualities were not stated clearly.

Qualities related to serving marginalised groups were less common within the sample. In the few cases they appeared, it was uncertain whether the correlation was intentional or pure coincidence. Clear intention was limited to a small set of examples where the design was created to serve a special group (in most cases children).

Accessible or barrier free designs were discernible in 6 entries, albeit it was unclear whether they were planned with wheelchair access in mind. Six entries could be seen to reference adaptiveness, customizability or flexibility, while four mentioned interactive, personal or responsive controls.

LENGTHENING THE INTERIOR LIFE CYCLE

The most prevalent quality related to longer interior life cycles (See Appendix I, Table.06) was the use of craftsmanship to create bespoke design features. Another prevalent approach to life cycle extension was utilising restoration or preservation practices as part of the interior implementation. From the total sample 23.2% of entries applied some form of restoration or preservation in the design. The method was most common in entries from 2019, followed by entries from 2018 and 2020 in that order. Comparison between years shows a slight decline in the quality from 2018, while its presence in winning projects was at its highest in 2019.

Around 12% of entries made a reference to the quality or durability of the design, or the consideration put into the design choices. Context driven design was mentioned by 9% of entries, while integration into surroundings was present in less than five. Meaningful, timeless or long lasting design were both mentioned by approximately three percent of entries.

Fig. 14 SDS Categories in order of percentage from total hits to all categories. Corresponding tables in Appendix I are marked below each category under 'All years'.

Percentages represent the sum total of SDS hits in the presented category as a percentage of total SDS hits within the review period. For instance: In 2020, the summed total of all hits to subcategories under 'Other' was 30. The total for all subcategory hits in all categories for 2020 was 305. The equasion is therefore: 30 / 305 = 0.0983... ≈ 9.8%.

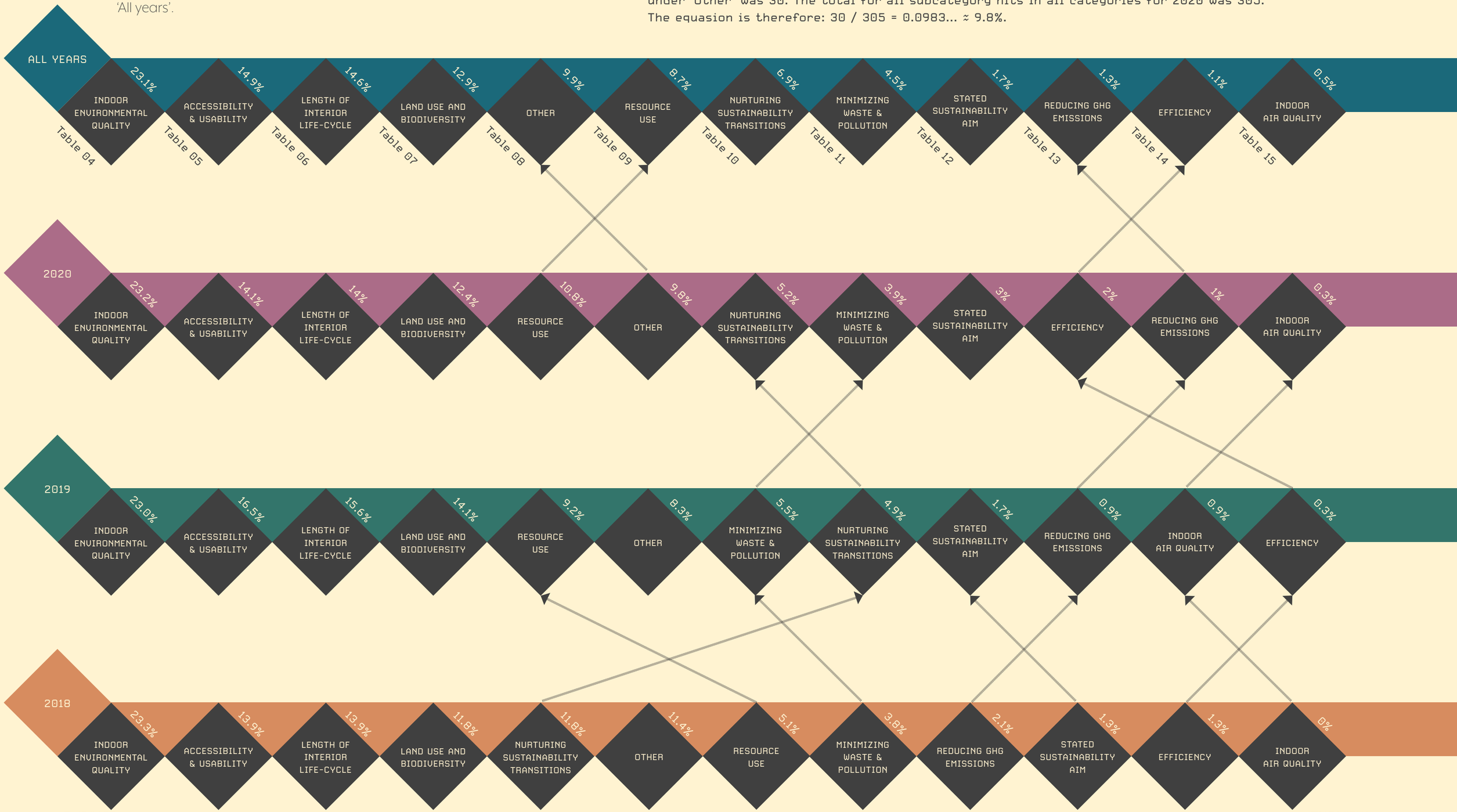


Fig. 15 Breakdown of SDS categories and subcategories in coding matrix according to category hits.
The order of the categories is based on the order of prevalence in sample, running from most 'hits' (left) to least 'hits' (right).
Order of subcategories (qualities) follows the same logic, running from most 'hits' (top) to least 'hits' (bottom).

LAND USE AND BIODIVERSITY

In land use and biodiversity (See Appendix I, Table.07), the most prevalent category was, refurbished, renovated or repurposed projects, which was a characteristic of approximately 49.6% of the total sample. Compact layouts and efficient space use was discernible in around 15% of projects. However, entries into competition categories 'small' were coded as using a limited footprint or applying efficient use of space, which makes it hard to determine whether these projects were in fact applying the aforementioned strategy.

The rest of the subcategories - Extension to existing building, limited damage to site or reduced site work, protecting or nurturing biodiversity - collected less than 10% of hits combined.

OTHER

During the analysis, the predetermined framework was not able to capture all the recurring trends that were relevant for the research. Two such trends make up the category of 'Other' (See Appendix I, Table.08).

Among the top hits of the total sample, a focus on the service or experience aspects of the design was insinuated in roughly 45% of all entries, which explains the positioning of this category in the top-mid range of the figure. The use of nature as inspiration for the interior style was referenced by 9% of entries. An important distinction to be made here, is that the entries mentioning this quality did not elucidate whether the inspiration manifested purely as a stylistic feature or whether forms of biomimicry were involved.

RESOURCE USE

Taking a closer look at strategies under resource use (See Appendix I, Table.09), the use of natural or organic resources is most clearly represented, with 25.1% of the total sample applying some form of this strategy. A lesser degree of attention is placed on the rest of the subcategories, such as local or regional material use (6,4%), local crafts of labour (5.1%), efficient resource use (3,9%) or the use of a very limited or minimal palette of resources (5,8%), although each of these subcategories gathers more mentions than the expressed use of responsible or abundant (natural) resources (1.9%).

NURTURING SUSTAINABILITY TRANSITIONS

In total, the prevalence of nurturing sustainability transitions (See Appendix I, Table.10) as a SDS category contributes to just under 7% of total hits. Occurrence of the related qualities was more common in 2018 than in consecutive years, apart from 'Nurturing the adoption of sustainable solutions' (NSS) which topped in 2020. The most prevalent qualities in this group relate to educational, experimental or exemplary aspects in the interior (12.2% of entries) or its ability to function as a hub for a certain culture or community (8.3%). Co-creation and participatory design approaches were discernible in only three projects out of the total sample (1.9%).

By delimiting the results it was possible to find that entries correlating with the nurture of sustainable practices and solutions (SSS) hold a significantly higher average of SDS hits than the sample average; 5.6 hits per entry in the total sample as opposed to 8.5 with SSS.

MINIMISING WASTE AND POLLUTION

When moving towards the lower end, more shifting in the hierarchy starts to take place. Taking part in these movements are design qualities related to minimising waste and pollution (See Appendix I, Table.11).

Contributing to a percentage of 4.5 from total hits, its most prevalent quality is the use of existing, salvaged or recycled resources. The quality could well be located in the category of resource use, but situated in this context, it highlights the role of this SDS in reducing demolition waste and nurturing circularity whilst reducing the need for additional resource input.

The use of raw or unprocessed resources was present in less than four percent of entries, while recyclability, pollution reduction and biodegradability were each mentioned by less than three percent of entries. Waste reduction was not mentioned by any entry, making it one of the three subcategories that didn't gather a single hit.

STATED SUSTAINABILITY AIM

Third last in the hierarchy, clear sustainability aims were only stated by 15 entries (See Appendix I, Table.12), including one winning entry from 2018. Mention of such aims was three times higher in 2020 than in the two prior years, suggesting a potentially growing trend..

Viewed from a typological standpoint, a small majority of entries fall within the hospitality industry, with bars, restaurants and hotels forming the bulk of the entries demonstrating the quality. Interestingly, the average number of SDS hits for this selection of entries stands at 9.1, which is significantly higher than the average for the total sample (5.6 hits per entry).

REDUCING GHG EMISSIONS AND IMPROVING OVERALL EFFICIENCY

Somewhat related in their low hit-score, categories of GHG reduction (See Appendix I, Table.13) and efficiency improvement (See Appendix I, Table.14) lack subcategories with a higher number of hits.

In the examination, the SDS category for efficiency stood for all types of efficiency other than that focused on material use. Within this category, qualities of energy efficiency or energy saving hold (2.5% of entries) a minor lead above economic efficiency (1.9%), with the rest of the qualities following at less than one percent each.

Correlation with strategies to reduce GHG emissions was also rare in the sample. Five entries hinted at the use of lower impact building techniques, with one entry especially keen to emphasise this factor. Low embodied emissions and accessibility by public transport were both referenced by less than 2% of entries. The use of renewable energy did not gain any mentions.

GOOD INDOOR AIR QUALITY

To limit the number of subcategories under Indoor environmental quality, the nurture and maintenance of good indoor air quality (IAQ) were separated into a distinct category (See Appendix I, Table.15). As purported by the results, the category lands at the very bottom of the hierarchy, with its combined subcategories (Ventilation/air filtration, low maintenance/easy to clean, non-toxic materials) contributing to less than a percentage of all hits.

4.3.3 TYPOLOGICAL COMPARISON INSIGHTS

By arranging the data on SDS occurrence according to project typology, I calculated averages to establish whether there are differences in the SDS prevalence between different project typologies. Average SDS hits per entry according to typology - in the order from the highest to lowest average - are as follows:

1. Other: 7.8 (Only 4 entries)
2. Hotel, Guesthouse: 6.9
3. Civic, Cultural, Educational: 6.1
4. Restaurant, Cafe, Bar: 5.8
5. Private dwellings: 5.7
6. Health & Wellness: 5.3
7. Workspace, Office: 5.1
8. Retail, Store: 5.0

Multipurpose: 6.3 (Only 10 entries)

Keeping in mind that the average score for ‘Other’ is likely a result of its small sample, variation between typologies is gradual.

Based on the examination, retail entries and offices correlate the least with the different SDS qualities, while hotels and guesthouses land above their peers. Although scattered in focus, a closer look at hotels and guesthouses suggests that, in comparison to the average sample, they correlate especially with the efficient use of space, the use of local or natural resources and the use of craftmanship or bespoke solutions.

In second place, civic, cultural and educational interiors seem to do especially well at drawing from heritage or culture and being either exemplary or educational, meaning that the context takes part in either educating or functioning as a positive example. The typology also holds the majority of projects designed with a marginalised group in mind and includes two of the three entries in which co-creation or participatory approaches were mentioned.

4.4 IMAGE ANALYSIS RESULTS

The following results reflect data drawn from the images accompanying the project text. By providing clues about material and furniture use, they form insights to sub-question 2 (Practice). The manner in which they portray projects can to some extent also provide insights for sub-question 3 (Communication).

4.4.1 PREVALENCE IN MATERIAL USE

In Fig. 16 the materials identified in the entries are arranged according to their context of application and the material class in question. The figure shows some discernible trends in the popularity of different materials.

WOOD: Wood or what looked like wood - was one of the most popular materials used in all application contexts. The use of bamboo was much lower than that of wooden floors and surfaces, which were especially prevalent in private dwellings.

CONCRETE: As the second most popular material applied to floors, concrete takes up the second spot in discernible materials used, a trend that seems to cut across all typologies. When viewing the results for combined surfaces apart from fixed elements, the use of concrete trumps wood and bamboo with a slight margin.

BRICK AND STONE: The use of brick and stone was most prevalent in old walls or stone flooring. Repurposed private dwellings in particular seemed to showcase 'rough and rugged' stone or brick walls that spoke of the past.

CERAMIC TILES: Used different forms, such as in large slabs or as intricate, patterned layings, ceramic tiles were most commonly present in flooring. They were used regardless of typology, with some applications seeking to restore the historic features of the interior.

METALS: The third most common material to be depicted in images. They appeared mainly in the form of steel, iron or aluminium and were used in fixed elements such as pillars, beams, trusses, staircases and window frames. Most entries being situated in existing buildings, the presence of these features was not so much a choice of the interior architect, but a feature of the existing design. Outside these applications, metals appeared mainly in visual applications such as perforated space dividers, railings, additional ceiling beams and fixed furniture.

GLASS: Used mainly in wall partitions, glass doors, and translucent railings. It is worth noting that windows or glass walls have not been included in the calculations under glass unless they have been used inside the interior.

POLYMERS: In addition to the rare carpet applications, polymers seemed to be most prevalent in special flooring applications in which hygiene was of importance. Due to the variety and ambiguity of flooring types containing polymers, they were particularly difficult to identify in the content. At times, what looked like a painted concrete floor, may have been an epoxy coating and vice versa. In theory, most paints used on concrete are also likely to contain polymers, but nevertheless, the attempt was made to try to mark down whether the flooring was in fact a polymer flooring, such as vinyl, or a painted one. Furthermore, some resilient flooring products, such as linoleum, may resemble types of vinyl at first glance. Differentiating between them is tricky through the medium of one image. It is then possible that the result contains a number of linoleum floors or the other way round. It is also possible that a majority of the plastic flooring applications have ended up in the unknown.

OTHER: NATURAL OR ORGANIC

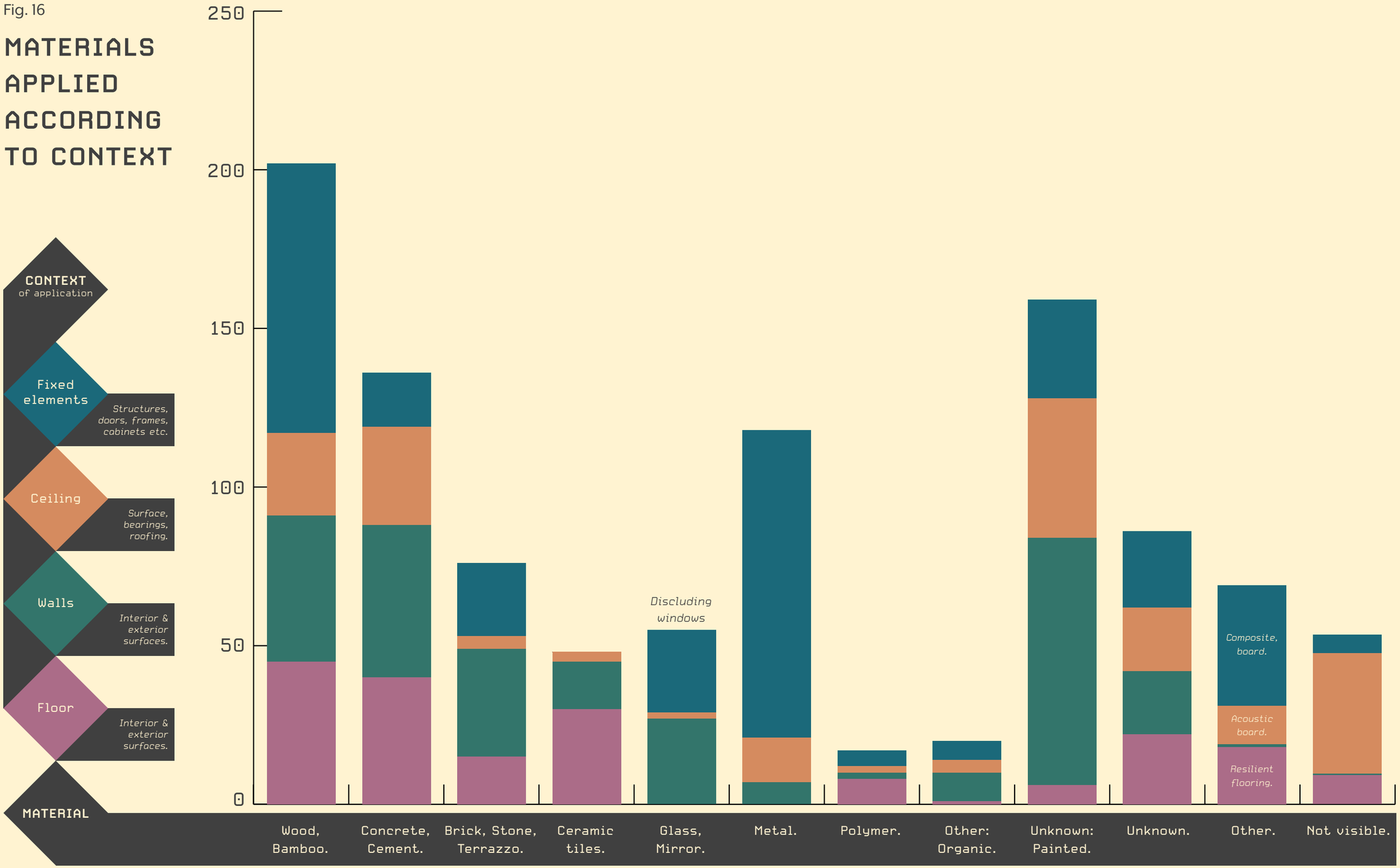
Other natural or organic materials such as cork or paper made only occasional appearances mainly as wallcoverings or in the form of cardboard. Entries using a high amount of cardboard would use it in various furnishing applications. The applications were often accompanied by descriptions detailing the versatility, recyclability, biodegradability or other 'sustainable' quality of the material.

UNKNOWN: PAINTED: Most unknown surfaces were painted surfaces from which it was not possible to make a reliable judgement on the underlying material. Typical paint tones applied to walls and ceilings were light or white tones, but stronger tones were also present in the sample on various occasions. Dark tones were used in a handful of interiors, mainly in workplaces and hospitality environments.

OTHER: Finally, in the 'other' section, which consists of various materials, the use of composite board materials in fixed furniture stands out. Acoustic board applications in ceilings and especially on walls appear to a lesser degree, whereas resilient flooring options, such as linoleum and earthen floors seem to trump occurrence of polymer floorings.

Fig. 16

MATERIALS APPLIED ACCORDING TO CONTEXT



4.4.2 LOOSE FURNITURE

Due to the restricting medium used to decipher details on furnishing, no averages were produced for the specific category, as they would have proved misleading. Despite this, the matrix gathered data on the number of furnishings discernible in the images, as they can still point in the right direction and provide an idea of the stylistic ideals practitioners may want to portray.

The results show that most entry images - 41 of them to be exact - depicted only a very minimal amount of furniture (1-4). Typically the entry was a private home or interior, which may indicate that the result is as much a matter of tight framing as an absence of furniture.

More than 15 pieces of furniture were depicted in 29 entries (See Fig. 17), most of which were workspaces (8), stores (4) or restaurants and bars (6). Thirty-five entries depicted no loose furniture, the pack consisting almost entirely of civic and cultural interiors, retail environments or health and wellness interior.

Fig. 17 Number of furniture depicted in entry images.

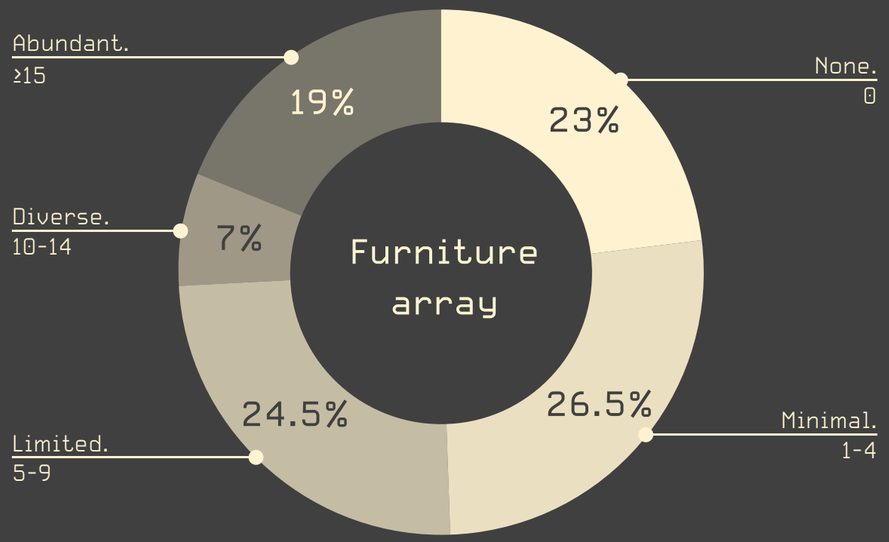


Fig. 18

LOOSE FURNITURE MATERIALS

Looking at furniture materials, Fig. 18 shows the variation in the amount of different materials discernible in loose furnishing. The versatile metal is the most prevalent, with the natural trio of wood, rattan and bamboo coming in second. Both groups were prevalent in seating and tables, with metal especially common in furniture legs and lamps.

Plastic furnishing made its presence available almost entirely in workspace interiors, mostly due to the existence of office chairs with polymer shells. However, the ‘unknown’ category may contain points that would have belonged to polymers.

Curtains and upholstery were popular throughout typologies and serve as a separate group that stands for all upholstered furnishing and textile applications apart from area rugs. Area rugs were present in 11% of projects, although the real number is likely to be higher.

4.4.3 AVERAGE MATERIAL USE

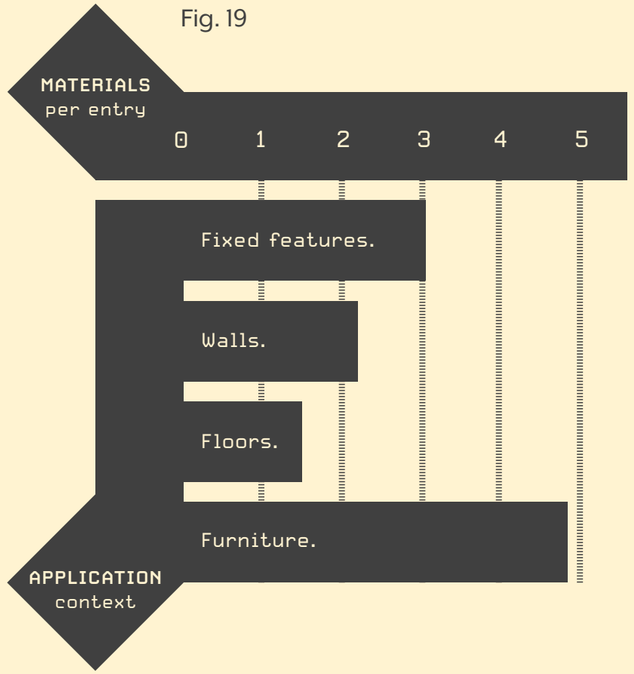
Based on data on depicted material use, the average variety of applied materials depends somewhat on the context of their application (See Fig. 19). Fixed features received an average score of 3 materials per entry, with pillars, beams, railings, staircases, doors, window frames, fixed furniture and so on adding up to a larger variety of different materials.

Walls followed at 2.2 materials per entry. The most typical wall application being paint, it was difficult to decipher what the underlying materials were. Most likely, they are a selection of different wall board materials, such as medium-density fiberboards (MDF), gypsum boards or plywood panels that have been smoothed over and finished off with paint to create a clean and even surface.

Floors typically showed 1.5 materials, with concrete, wood and tiling forming the majority of the application. In ceilings, the average amount of materials was 1.3, with the most frequent depictions being even paint surfaces or exposed concrete.

In furnishing, the average selection of materials reached 4.8. The most common material applied by far was wood, with an average of 2.2 types of wood - referring to finishes, species or forms - per entry applying it in this context.

Fig. 19

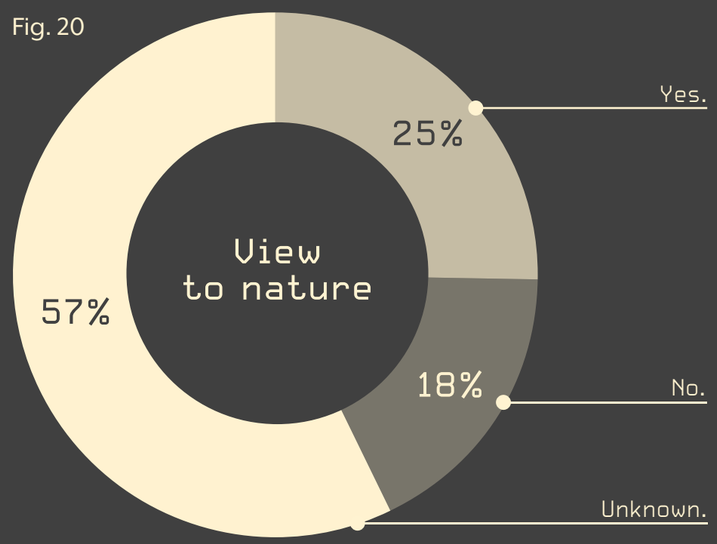


4.4.4 INDOOR ENVIRONMENTAL QUALITY & DAYLIGHTING

Improving indoor environmental quality and the health of occupants, at least 25% of the entries had windows with a view to nature or greenery (See Fig. 20), and 12% of the entries - containing a considerable chunk of private dwellings and workspaces - displayed plants in the interior.

Factors influencing daylighting appeared in the image content in various ways. Firstly, 75% of entries were depicted in daylight, with 10% portraying skylights to allow a flood of daylight into the interior. Out of total entries, 26% showed some sort of shading options that allowed occupants a level of control over daylight conditions.

Fig. 20



From analysed images...

12%
display interior plants or greenery

75%
are depicted in daylight

10%
include skylights

26%
display interior shading

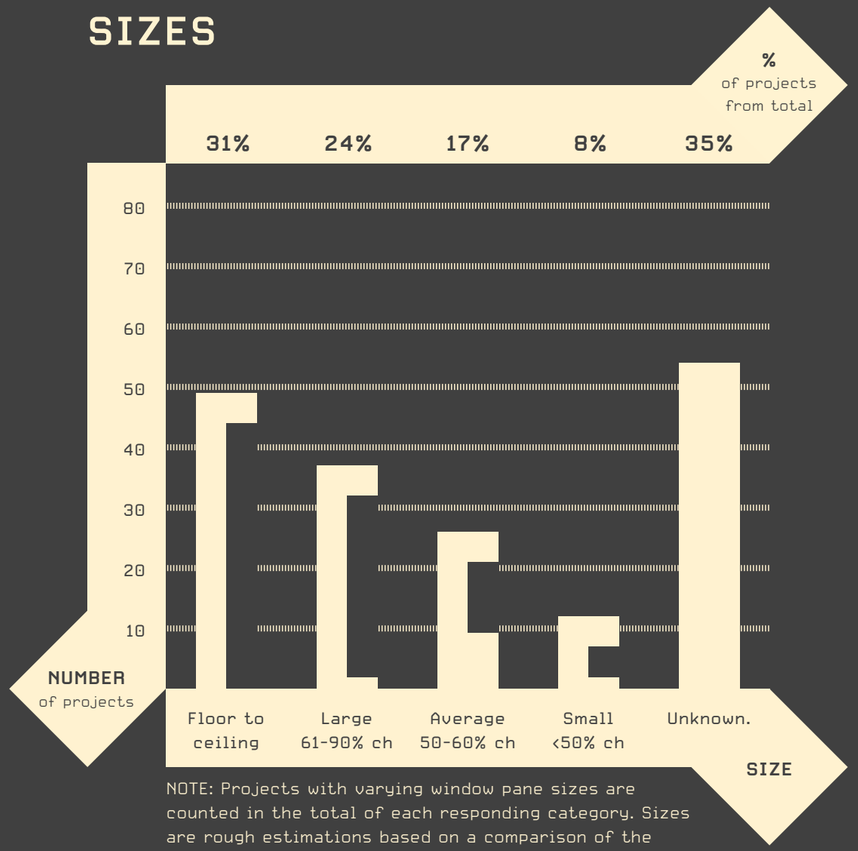
23%
include interior glass walls or doors

Entries showcased windows in many arrangements and sizes. Based on the images, the average amount of directions that windows were seen to face was approximately 1.5. Fig. 21 displays the amount of different size windows identified in the images. They have been arranged into categories based on the percentage of wall height occupied. The figure shows the popularity of floor to ceiling windows, with small windows appearing in the fewest entries.

The bulk (48%) of discernible ceiling heights (See. Fig. 22) looked average and were used regardless of typology. Following at 22% of entries, high ceilings were present especially in retail interiors, restaurants, bars and private dwellings. Ceiling height spanning multiple storeys was visible in 20% of entries, many of which were civic, cultural or educational interiors. Low ceilings accounted for 17% of the entries, and were present in a range of typologies, with private dwellings having highest representation in the group.

Fig. 21

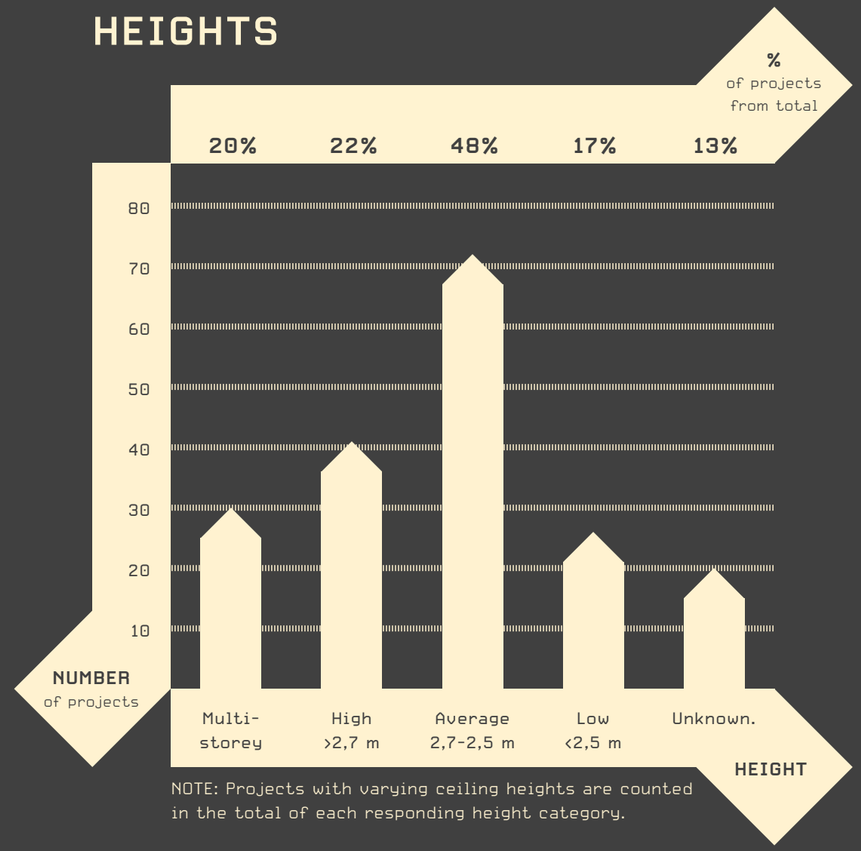
WINDOW SIZES



NOTE: Projects with varying window pane sizes are counted in the total of each responding category. Sizes are rough estimations based on a comparison of the depicted window size to the depicted ceiling height (ch).

Fig. 22

CEILING HEIGHTS



NOTE: Projects with varying ceiling heights are counted in the total of each responding height category.

4.5 WINNERS

One of the reasons behind choosing the awards as a medium, is that they are supposed to represent some of the best work in the field. If viewing the projects from this perspective, they can give hints about the design ideals that are appreciated by practitioners, hence also providing an idea of how sustainability factors into those ideals.

As a reminder, the shortlist entries have already been selected from a much larger pool of prospective contestants, and so they too are a representation of the ‘’crème de la crème’’. Despite this, some data focused on the winners has been gathered in order to investigate whether they share common denominators or special features that set them apart from the rest and give an idea of what the practice values. From this investigation on the 30 winners, the following notes have been drawn.

4.5.1 CONTEXT & EXECUTION

Geographically, the USA tops the chart with five winners in its pool, with China and Australia following with 3 each. England, Netherlands, Japan and Sweden hold two victors each, while Austria, Belgium, France, Greece, Hong Kong, Mexico, Spain, Taiwan and Thailand each represent one winning entry. The geography of two entries is unconfirmed. The result mirrors the overall sample, with countries that submitted more entries having more of a representation also in the winning picks.

Urban locations dominate, with only three out of thirty set in a rural or residential context, and seven giving no answer.

In terms of execution, the amount of renovated or repurposed projects dropped to 45% (as opposed to 79% in total sample), while new builds and extensions grew their share slightly to 22.5% (from 20% in total sample). Temporary projects and one prototype combined into 10% of the lot, while the rest (22,5%) did not contain hints as to how they were executed.

Once again, a significant amount of winning entries (43%) did not make a discernible effort to describe the style of the design. Based on those that did, the stylistic emphasis seemed to be on a mix of contemporary and herited styles, with sculptural or monolithic (3), minimalist (2), and nature-inspired (2) depictions following. ‘Otherness’ was present in seven entries, while tradition, homeliness and luxury each gained one mention.

4.5.2 INDOOR ENVIRONMENTAL QUALITY AND DAYLIGHTING

Views of greenery or nature were present in 20% of entries, while no view of such (when a view was depicted) rose to 30%. The presence of plants remained at similar levels as the total sample, with an average of 6.3 plants per interior, an increase from the total sample average of 4.3. The increase is a result of the winning entries containing two projects that depicted at least 20 interior plants each.

Large and very large windows were most prevalent once again, with small and medium sizes sharing second place. The number of directions windows were seen to face was slightly higher in comparison to the total sample, while the percentage of depicted skylights dropped to 3% of entries. Daylight was present in 63% of entries while a slight typological emphasis of retail environments, bars and restaurants were depicted in the gloom of artificial lighting.

Ceiling heights followed the same hierarchical trend as the total sample, although high ceiling and multiple-storey ceilings increased their share of the total while other heights decreased theirs.

4.5.3 THEMES IN DESCRIPTION

Structurally, 83% of descriptions mentioned something regarding the background of the projects, 66% mentioned an objective or aim, and 96% mentioned a solution. Spatial features or the layout were described in 70% of the entries, while 50% mention a material application. In comparison to the total sample, winning entries mentioned more details for the most part, although there was a noticeable decrease in description of objectives and aims. The greatest increase was in describing the background or starting point of the project.

Aligning with the previous results, winners included a larger number of the different details in the text, shifting the emphasis from three described details to four (40% of entries). All five were included in 20%, which is also an improvement in comparison to the total sample. Three details were discernible in 27% of entries and 13% of entries mentioned just two.

The aforementioned results are reflected also in the amount of descriptive words that the winners accumulated in the matrix. On a general level, the themes that arose from the text reflect the total sample, however, winning entries seemed to place slightly more attention on describing the functional features of the design.

4.5.4 SDS OCCURRENCE

Evaluating the occurence of different SDS qualities (See Appendix I) in the sample lends strength to the previous notion; Functionality, usability and multifunction or multipurpose characteristics were more frequently referred to in the winning designs.

Looking closer at the prevalence of different SDS qualities, the top hits seem to mirror the total sample, with aesthetic quality holding the lead above functionality. As mentioned (Chapter 4, p. 57 & p. 63), the majority of entries were refurbishments, renovations or transformations of purpose, although the increased share of new builds reduced their overall occurrence.

Whether new or existing, drawing from heritage or culture was a popular quality throughout the execution styles. Compared to the total sample, winning entries contained a slight increase in references made to bespoke, craftsmanship or unique features, the use of local or regional materials, and the use of natural or organic resources. Nature-inspired designs were also situated in this mix. A more drastic increase was present in references made to the use of local crafts or labour as well as attention paid to daylighting.

4.5.5 MATERIALS, FURNITURE & SPATIAL FEATURES

In materials, the same hierarchies repeat as in the total sample; wood and concrete were the most common applications on floors. On walls and ceilings, painted surfaces take the lead. In comparison to the overall sample, brick and stone increased their presence in the winning entries.

Repeating the trend in the total sample, metal was most prevalent in fixed structures and second most prevalent in furnishing after wood, rattan and bamboo. Curtains and upholstery were almost as common as the aforementioned three, bringing their frequency down in comparison to the total sample.

Average material usage as depicted in the images followed the same pattern as the total sample, with only a very small increase in wall applications and a slight decrease in floor applications. An increase was present also in the number of different materials identified in furnishing despite the most common image depicting no loose furnishing.

The majority of entries were situated at the low end of depicted furnishing, with diverse arrangements visible in only three projects, and abundant arrangements depicted in five. Again, abundance was a quality of mainly workspace interiors, while two out of three winning civic and cultural interiors as well as leisure and wellness interiors were depicted with no loose furniture.

4.5.6 COMMENTS FROM THE JURY

Going over the jury comments, qualities that they seemed to appreciate in designs included:

- The high quality, detail and sensitivity of the execution.
- The cleverness, inventiveness, simplicity and coherence of the design concept, its details, or execution.
- The use, conversion or improvement of existing interiors as a means to highlight the capabilities of the practice in lengthening the life cycle of existing buildings.
- The use of local, natural, sustainable, recyclable or rough materials in a clever way.
- The relationship of the interior with its exterior context.
- The relevance of the interior: The societal, environmental or functional issue that the interior tackles or is exemplary in tackling.
- The functionality of the interior and its ability to serve users in a relevant manner.
- The feeling the design evoked, such as warmth and comfort, luxury, surprise or sublimeness.
- The narrative of the design concept.
- Intriguing spatial features and their relationship with interior lighting.
- The aesthetic pleasure and beauty of the design.
- Collaborative effort used in creating the design.

In terms of understanding what perceptions of sustainable design were communicated, the jury seemed to appreciate designs in which value was added to existing buildings by repurposing them and highlighting their potential. They also seemed to appreciate projects where new and old components were merged in a respectful manner. As listed above, the use of resources and techniques considered more sustainable was also a valued quality in winning designs.

From a social point of view, judges seemed to appreciate designs born out of collaboration, or the attention paid to serving users in a meaningful way (i.e. Human-centered design). They also brought out how the winning design took part in solving an issue with a societal reach.

5. DISCUSSION: THE PERSPECTIVE

In this section I interpret the results of the analysis. I start by reflecting on how practitioners communicate about sustainable interior design. Next, I take a deeper look at the findings to assess areas where the practice is succeeding and lacking when it comes to pursuing higher levels of innovation and nurturing a transformation of the practice. This is done by reflecting on the approaches to sustainable interior architecture that surfaced through analysis, and situating them in the context of different levels of innovation. Before closing, I discuss the significance of the findings for the interior architecture practice and its education.

5.1 SUSTAINABLE INTERIOR ARCHITECTURE IN COMMUNICATION

In this chapter I discuss trends that surfaced in relation to how practitioners communicate about SDS. As such, this chapter and its subchapters discuss findings to sub-question 3 (Communication).

The first sub-chapter discusses sustainability in communication on a more general level, while in the second chapter, I discuss trends in description structure and its content. In the third subchapter, trends in communicating about further SDS are discussed.

5.1.1 SUSTAINABILITY AS A DESIGN DRIVER AND IDEAL

Guided by Rq3, I used content analysis to find answers to how practitioners communicate about the sustainability considerations in their designs. With less than ten percent of the entries stating a clear sustainability aim or intent, most of the efforts to integrate sustainability were left up to interpretation.

The scarcity of stated sustainability aims may be interpreted in many ways. On the one hand it could be that practitioners do not feel the need to state such intent, as the design output and the choices within it should speak for themselves. As a result, they may feel it is enough to describe some of the more sustainable choices made, such as the manner of execution, the use of natural resources and local craftsmanship, or another quality that links the design to known sustainability principles. On the other hand, practitioners may want to leave out explicit mentions if they feel that the sustainability considerations are insufficient or contradictory, as doing otherwise could be interpreted as a form of greenwashing.

It is also possible that there is a divergence between how some practitioners view sustainability and how I approach sustainability in this work, which could result in a situation where the highlighted sustainability qualities do not get noticed as they do not fit in with the conflicting sustainability narrative.

Then again, it may well be that practitioners prefer to highlight qualities of the design which are more appropriate for describing the designed solution. For instance, a project with a strong service focus may be better described through the solutions that support the service functions. Similarly, a brand-inspired entry may focus on describing features that capture the brand in order to explain the result.

Lastly, the scarcity of stated sustainability aims may also reflect just that; a scarcity of sustainability aims. As this last option paints a concerning picture, it is reassuring to think that the truth is likely a mixture of all five options and then some.

Be the truth what it may, the results indicate that practitioners take very different approaches to communicating about their sustainability considerations. At the very least, they show that sustainability considerations are not such that they should be stated in unambiguous terms.

When it comes to communicating about sustainable design, the ambiguity of the descriptions places more responsibility on the reader to decipher whether the design does or does not integrate sustainability considerations. Similarly, whatever the status of the claim, it is eventually up to the reader to interpret how holistic the potential sustainability considerations are.

According to Kim & Choi (2007), when the established media performs the role of an expert, it can play an influential role in communicating what is acceptable, which can contribute to shaping the conventions of the practice. Viewing this role in the context of sustainability transformation, Stebbing & Tischner, (2015) explain how art and design can influence behavioural change though the A2D2C model. As the first action Stebbing & Tischner (See. e.g. 2015, p.321) list is better communication, which means being ‘’more engaging and entertaining about severe sustainability issues’’. The next step is about creating motivation by providing role models that ‘’visualise the benefits of the new behaviour’’ and enhance ‘’the desire to change’’ (Stebbing & Tischner, 2015, p.321). They mention that by making it more enjoyable to integrate sustainability, the dread of unknown consequences and change will have less of a crippling effect.

In other words, the way in which practitioners communicate about their design and how they implement sustainability considerations in these designs influences how the practice is portrayed and the example that portrayal sets. Following this logic, by highlighting exemplary forms of sustainable interior design, the awards media functioning as the expert has an opportunity to nurture a positively-reinforcing relationship with the interior architecture practice, one that could help drive its value transformation.

5.1.2 THEMES IN COMMUNICATION

When evaluating the structure of the descriptions, most descriptions seem to focus on design objectives and solutions, whereas the material and spatial qualities of those solutions are less emphasised. Compared to the attention given to describing solutions and aims, background details seem to be less valued although they could potentially provide a window into how the design solutions have been justified.

The trend of omission repeats in various contexts. Firstly, almost half of the entries did not describe the style of the interior, which may be due to a variety of reasons, one being that the interiors are products of their era and are perhaps not considered to transcribe to a specific style. Secondly, viewing the results on how projects were executed, more than 20% of entries did not mention an execution style, which limits the ability to assess the starting point of the design, the array of available SDS or the depth of the ensuing sustainability integration.

Finally, a seeming lack of design validation was present also in temporary executions. Mainly small interiors such as exhibitions and pop-up stores, none of the entries explicitly described how their temporary nature had influenced the design and construction. Subtle suggestions were made between the lines as well as in the images, but clear manifestations of SDS linked to life-cycle thinking were lacking.

Continuing with the sins of omission, insights on prevalent perceptions of sustainability or the SDS manifesting in practice were scarce within project descriptions. However, the broad themes that did surface could be seen to provide an idea of some of the behaviours in the practice that also relate to SDS. For instance, the care taken to describe which original features of an existing interior had been merged with new insertions could lend a deeper perspective into how the practice deals with existing interiors. It showcases what types of old structures are appreciated and how they can be reutilised.

Descriptive themes could also be seen to suggest certain focus points within the practice in regards to SDS application. For instance, there was a discernible emphasis on various forms of resource conservation within the practice. On the one hand, this could be due to an increasing availability of ‘green’ product alternatives entering the market, but on the other hand, it may signal a level of capability in applying material or product level interventions.

In the context of this topic, it is important to note that even though applying lower impact alternatives is a valid strategy for reducing the life cycle emissions of an interior, when seeking to create a meaningful impact, significant attention should be paid to ensuring absolute reductions to overall resource use within the industry (Jackson, 2017). Hence, solutions in which an existing interior is first overhauled and then replaced with ‘’more sustainable material alternatives’’ can be called into question, as these alternatives are still essentially new products that require sourcing, manufacturing and distribution before they end up within the interior. The approach overlooks the sustainability potential in existing features and hence bears resemblance to forms of greenwashing in which, as explained by Associates III, et al. (2014) and Hernandéz (2020), hidden trade-offs are masked behind supposed sustainability ‘improvements’ (Associates III, et al., 2014; Hernandéz, 2020).

Another repeating theme in the descriptions was preserving or showcasing cultural heritage and tradition, which could be seen to insinuate that cultural features are regarded as value-adding characteristics while supporting social sustainability. The perception aligns with theories presented in literature that discuss the importance of preserving heritage and cultural value in creating more meaningful built environments (Brenner, 2005; Smith, et al., 2014; Winchip, 2011).

A less common but nonetheless intriguing theme was formed by the rare occasions when care was taken to describe the underlying sustainability issue and/or the aim of the project from a more systemic viewpoint. Although rare, their presence in the competition content

is a promising sign of interior architecture contributing to more systemic levels of innovation. What is more, the success of one such project (1st place in Hospitality interior, 2018) seems to suggest that the industry has an appreciation for this type of intervention, as noted by the judges: "This project embodies not just an aesthetic, but an ideal, which is particularly relevant in an age where resources and sustainability are key content both within and outside of the design industry" (Dezeen, n.dd).

Looking at how the jury justified their choices, a level of positive reinforcement seems to exist, yet the results of the analysis contradict this result to some degree; Although the jury seemed to appreciate sustainability considerations - a factor hinted towards in the judging criteria - only one of the winning entries clearly claimed to apply such.

Meanwhile, the jury comments varied in the level of sustainability justification as well as in how sustainability was approached; Some seemed to focus on highlighting life cycle thinking and resource conservation, others went as far as considering the potential role the IA practice could play in solving societal issues and nurturing societal change. On the one hand, expressly validating the winning choice by its sustainability considerations send a message that sustainability is a valued design characteristic, but on the other hand, these justifications were absent from a significant number of judge's comments, which could indicate that sustainability considerations are yet to establish themselves as a fundamental design ideal.

Furthermore, the introduction of a new, separate category for 'sustainable interiors' in 2021 sends a conflicting message. This division could be interpreted, or misinterpreted, as suggesting that sustainability is merely an add-on feature rather than a design ideal that takes part in determining the success of a design. On the other hand, a separate category gives the audience and judges a chance to view and evaluate work that aims to be sustainable in no uncertain terms. From this perspective, a separate category for sustainable interiors could function as a meter for evaluating the success of the practice in reaching broader scopes of intervention.

As there was no defined category for sustainable interiors in the sample, determining whether sustainability functioned a significant design driver had to be deciphered from between the lines. In the next chapter I discuss the discerned levels of engagement with SDS and based on the findings, evaluate how the practice succeeds in terms of reaching over levels of innovation.

Image.05 Jury comments for a winning entry that was the only one to include a clearly stated sustainability aim.

Photograph Nicklas Ingemann
SPACE10, Spacon & X, 2018, Lokal.
Screencapture retrieved from
https://www.dezeen.com/awards/2018/winners/lokal/
[Visited 19th September, 2021]

2018 results
Winners | Shortlists | Judges
All | Architecture | Interiors | Design | Studios
Interior designer of the year | House interior | Residential interior | Hospitality interior | Workspace interior | Civic and cultural interior | Retail interior | Health and wellness interior | Small interior
Lokal
by SPACE10 and Spacon & X

Lokal, London, UK, by SPACE10 and Spacon & X. Photo by Rory Gardiner and Nicklas Ingemann

Winner: Hospitality Interior of the Year 2018. Lokal was a pop-up farm during London Design Festival 2017, where microgreens were grown to make 2,000 salads.

IKEA's innovation lab Space10 worked with interior design studio Spacon & X to create the space during London Design Festival. It showcased Lokal, a new food project that aims to provide a space-saving and sustainable way for people to grow their own food.

It shows a way to develop a new, local supply chain—one that enables us to grow more food within our cities. Lokal showcases an alternative to our conventional supply chain by using biology, engineering and design principles to reduce food miles and our pressure on the environment.

The farm was on show at Protein Studios in Shoreditch, east London, and comprised a wooden structure of approximately two square metres, accommodating three levels of trays filled with hydroponic crops. A salad bar was set up in front of the farm, so that the nutritional food could be served up straight away.

"The beautiful part about microgreens is that the sprout actually contains the same amount of nutrients as the full-grown thing, so that means you get full value of the produce," said Simon Caspersen of Space10.

Judges comments: "This project embodies not just an aesthetic, but an ideal, which is particularly relevant in an age where resources and sustainability are key content both within and outside of the design industry."

Designer: SPACE10 and Spacon & X
Project: Lokal
Winner of: Hospitality interior of the year
Read more: SPACE10 and Spacon & X

5.2 ENGAGEMENT WITH LEVELS OF INNOVATION

The media content analysis contained various approaches for producing insights to Sub-question 2 (Practice). Some of the key insights drawn from the results are concerned with the way in which most entries seem to integrate sustainability into their designs. In order to understand which innovation levels they target, I have reflected on how they correlate with approaches in the DfS framework.

5.2.1 MATERIAL SUBSTITUTION ON THE INSULAR LEVEL

In terms of succeeding, interventions targeting insular and technocentric levels of innovation were discernible in various examples of resource use, where practitioners highlighted the choice of a recyclable, local, biodegradable, or otherwise 'more sustainable' product application. This could be seen as an approach to reduce the interior's overall impact or embodied emissions by improving on individual characteristics of the design, a strategy familiar to approaches of green design or ecodesign.

Engagement with ecodesign strategies could be seen as a positive first step marking a willingness to pursue DfS, although the popularity of the approach may also reflect the availability of ''more sustainable'' product alternatives in the market. In this regard, it is a low-threshold approach that can easily be used as a guise, as substitution alone does not guarantee a reduction of overall resource use.

In characterising a common perception of sustainable interior architecture, Byggmästar (2014) claims that practitioners applying a material substitution approach are essentially functioning as material salesmen. Despite the 'improved' material qualities, most of the materials are still new (Byggmästar, 2014). It is claimed that an estimated 75% of the embodied energy of a product is a result of its production, the rest resulting from the method of its application (Stahel, 2001). Therefore, in addition to material substitution, practitioners could do well by considering what they can do with existing materials to minimise the input of additional resources. Furthermore, by adopting cradle-to-cradle approaches, such as Design for Disassembly (See e.g. Crowther, 2005), practitioners can influence the later stages of the interior and support material cascading practices.

The problem with material substitution is that it does not necessarily curb consumption, which could allow for more resources to be conserved or distributed in an equitable manner. For instance, the findings regarding material applications suggested that practitioners consider natural resources such as wood or bamboo to be sustainable choices. Indeed, as a material, bamboo is linked to significant social, economic and environmental sustainability benefits due to its rapid growth in low-income regions coupled with high-end material qualities Ashby (2016a). Yet, as Daly (1990) points out, when it comes to applying renewable resources in a sustainable manner ''the rate of the use of renewable resources must be no greater than the rate of regeneration'' (Daly, 1990, as cited in Ashby, 2016a, p.218). In other words, it is not only the natural quality of the application but the quantity of it that matters when pursuing lower embodied emissions and material efficiency.

To some extent, small interiors can be seen as a strategy to apply resource efficiency in the interior context, effectively substituting the 'harmful' excess of space with less space. In the matrix, all entries that claimed to be ''small interiors'' were coded under efficient use of space. Yet determining whether or not this warrants true efficiency improvements is not straightforward.

Firstly, while the footprint of an interior may be smaller than another, it may not automatically indicate that the execution would be any more efficient in terms of embodied energy per square meter. If the smaller interior reduces demand on space elsewhere, for instance by effectively serving or housing as many people as a larger dwelling, then it may provide efficiency improvements if the life cycle embodied energy is lower than what the larger dwelling would require.

Secondly, whatever efficiency gains were made through the smaller footprint, the scale of their impact is tied to what ''small'' stands for. For instance, in the United

States, where the average number of rooms per household member in 2019 was above three rooms per person in private holdings (OECD, 2021), the definition of small could be anything below that, whereas in Mexico, where an average household member had less than 1.5 rooms at their use (OECD, 2021), ‘small’ could be perceived in a very different light. Thus, what the competition defines as a small interior depends on the socio-economic perspective from which the categorisation has been drawn. Therefore, the efficiency improvements reached in the ‘small’ entries may pale in comparison to improvements achieved by small interiors existing beyond the reach of the competition.

Material substitution, life cycle extension, and the preservation of resources, each a characteristic repeating through the sample. When combined, these were the most typical approaches, albeit also more prevalent as qualities in the matrix. They potentially point towards material and product level improvements to sustainability, which, when used as a singular approach, have been criticized as having too narrow a scope and framing to ‘’obtain the radical improvements required to achieve sustainability’’ (Ceschin & Gaziulusoy, 2020, p.73). Even so, they are considered a fundamental starting point, which may in part explain their popularity throughout the sample.

While material/component level and product level improvements were evidenced in the sample, efficiency improvements outside the material or strategies to reduce greenhouse gas emissions were scarce. On the one hand, it could mean that practitioners do not find it necessary to point out things such as low-energy equipment and appliances, passive thermal comfort techniques or water saving features. For instance, the use of renewable energy wasn’t mentioned once throughout the sample, although the word ‘’efficiency’’ and ‘’self-sufficiency’’ did make an appearance without further elaboration. On the other hand, practitioners may feel that these improvements are out of their control, mandated by the existing features of the building and the choices of other professionals within the building industry, and for this reason the focus of material/component and product level interventions is placed on material improvements or on interactions between the users and the space.

5.2.2 PRODUCT LEVEL INTERACTION

The most prevalent approaches focused on improving indoor environmental quality by means of aesthetic pleasure, cultural preservation and improved daylighting. If the interior is considered a product, the prevalence of qualities influencing the spatial experience could be seen to point to an interest in improving product-user interactions on the product level.

However, even if the target is improved interaction, the potential sustainability benefits of IEQ improvement are questionable if the main strategies are focused purely on aesthetic pleasure and increasing daylight. While the occupant may feel more attached to an environment that is pleasing and comfortable, the attachment to the aesthetic elements of that environment may dwindle with time, as tastes and trends change. Furthermore, if the space doesn't facilitate more sustainable behaviour in the occupant, it is questionable whether improvements to product-user interaction are justified from a sustainability perspective.

Indeed, the social sustainability benefits of good indoor environmental quality are not simply gained through stylistic features, but require consideration of the health and safety features of the interior as well as its functions. When successfully implemented, good indoor environments can help maintain good occupant health and lower stress levels, resulting in increased levels of productiveness and lower percentage of sick leaves (EPA, 2017; Winchip, 2011; Danielsson, Chungkham, Wulff, & Westerlund, 2014; Hernandéz, 2020).

Although playing a crucial part in ensuring a healthy indoor environment, strategies for improving indoor air quality gained very few mentions. On the one hand, it may be that interior architects do not find it necessary to highlight characteristics that influence IAQ, such as easy-to-clean, low maintenance designs, the use of non-toxic, VoC-free materials, or sufficient ventilation and air filtration, if they are considered self-evident or too immaterial.

Still, choosing to highlight aesthetic qualities above health features could also reflect the hierarchy of design ideals, gesturing that the practice is more concerned with beauty than practicality. Reviewing entries from the 2021 competition round, which include projects completed in 2020 and 2021, could provide insights into whether or not solutions targeting indoor air quality have gained more emphasis following the Covid-19 pandemic.

Whether or not a focus on IEQ can yield sustainability benefits, it is clear that without good IAQ, the interior may fail to provide a functioning environment for its occupants potentially endangering the health of inhabitants. Therefore, when seeking improved interactions between occupants and the indoor environment, strategies that provide healthy indoor air, serve diverse user groups in an equitable manner and nurture sustainable behaviour are essential for seeking sustainability benefits in a holistic manner.

5.2.3 PRODUCT-SERVICE-SYSTEM

Based on the sample, it is difficult to establish the number of examples targeting the product-service-system (PSS) level from a sustainability angle. Tukker & Tischner (2006, p.350) define product services as ‘‘a value proposition that consists of a mix of tangible products and intangible services designed and combined so that they jointly are capable of fulfilling final customer needs’’.

Certainly many of the (tangible) interiors took part in delivering (intangible) services, but did not necessarily encourage more sustainable consumption habits connected with sustainability-concerned PSSs, which can be defined as ‘‘causing minimum negative environmental and social impact while maximising social well-being and (…) economic added value’’ (Tukker & Tischner, 2006, p.24).

For instance, an entry that contained high-end furnished apartment rentals could perhaps be seen as a PSS to the extent that the interiors are maintained by the service provider, i.e. the company owning the building. Yet it is questionable whether this constitutes an intervention on the PSS-level, or whether it is simply a series of rental apartments designed to serve what on global metrics could be seen as a rather lavish lifestyle. Indeed, defining what a PSSs interior could be, would be an interesting undertaking.

So when evaluating the level of engagement the practice has with the product-service-system level, perhaps a more telling finding is that less than five per cent of the sample contained qualities that could be seen to nurture more sustainable behaviour and lifestyles, suggesting that if more interventions were targeting the PSS-level, their impact was potentially falling short.

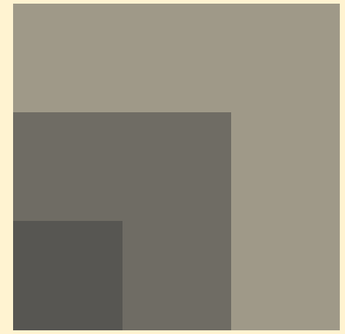
5.2.4 SPATIO-SOCIAL INEQUITY

To a smaller degree, the sample contained examples of projects where the scope of intervention encompassed spatio-social levels and socio-technical system level. These were mainly projects focused on educating, setting an example or providing services to marginalised groups. Furthermore, while the sample contained a number of entries functioning as community hubs, these entries did not necessarily focus on environmental aspects of sustainability, nor did they necessarily influence community practices in a manner that would support the adoption of more sustainable lifestyles. Hence it is uncertain whether the entries were truly taking part in sustainability transformation.

Recognising the importance of functioning spaces for serving occupant needs, many entries had a user focus, highlighting functionality, usability, or the delivered services, which, depending on the framing, could suggest a pursuit to nurture social equity and wellbeing.

However, explicit mentions of accessibility considerations with disabled groups in mind were almost entirely absent from the sample, it is once again questionable whether accessibility is a valued design driver, a tool for pursuing social equity, or whether it is merely a necessary consideration, one that adds little value if mentioned. Spaces in which functionality is hampered for disadvantaged groups can only be considered functional or usable by those whom it caters for.

Continuing with potential spatio-social level interventions, the few interiors that took part in delivering services to marginalised groups or facilitated social innovation, came the closest to influencing social dynamics in communities. Typologies that were most commonly



involved serving a special or marginalised group, were either civic, cultural, educational, or health-services, which could lend to a notion that environments run by the public sector or non-profit organisations are more concerned with providing equitable access to services. The likelihood that these typologies are subject to stricter legislative requirements while being more sensitive towards nurturing social equity among the demographic, could explain this trend in the sample.

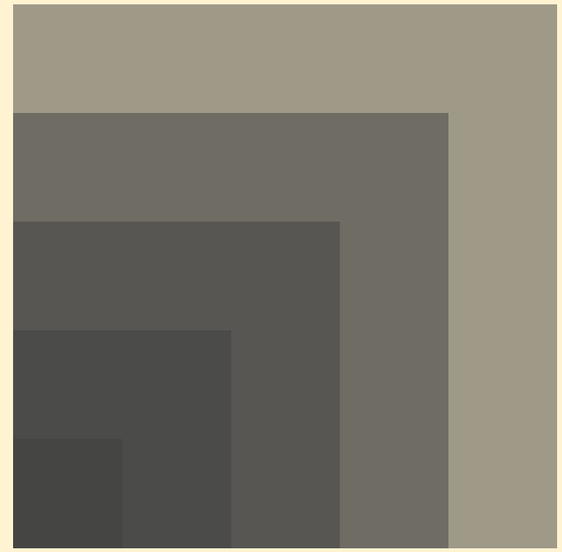
Although design for marginalised groups was scarce, many entries seemed to highlight service aspects of the interior. That said, how successful the service features are at nurturing more sustainable environments depends largely on the nature of the service and its scope of intervention. For instance, if the service empowers disenfranchised communities on a spatio-social level for instance by empowering a marginalised group, it likely produces grander benefits than one dispensing free buckets to every passer-by.

The same could be said for interiors particularly focused on the 'experience' provision. If that experience substitutes an untapped shopping-spree or other consumption-focused activity, then certainly the design of experiences could be considered to nurture more sustainable lifestyles. However, most experiences still rely on a very material setting for their facilitation. It is the construction of this setting as well as the psychological rebound effects of the experience being evoked, that determine whether it can be considered a SDS.

All in all, very few entries could be considered to truly pursue change on the spatio-social level. Perhaps due to being located mainly in high-income nations, most of the interventions only continued to cater for an already privileged demographic. Therefore, the interior practice and its competitions could do more to highlight participatory design processes, stakeholder needs, designs for the bottom of the pyramid, or design by the bottom of the pyramid for that matter.

In summary, it seems that the focus of sustainability approaches is on material/component level and product level improvements, with only a few entries intervening at PSS-level, spatio-social or socio-technical levels for that matter.

In the next two subchapters I delve further into the trend of renovating or repurposing existing interiors in the urban context, which was a prevalent trend throughout the sample. In doing so, I aim to bring out specific focus points of where the interior practice may be succeeding or lacking and what could be done to address the situation.



5.2.5 LIFE CYCLE EXTENSION IN THE URBAN CONTEXT

Based on the analysis, the majority of projects were located in an urban context especially when residential areas are considered as part of urban environments. In the urban context, a significant number of entries repurposed old buildings such as warehouses or industrial complexes into new uses. Their prevalence in part explains the amount of entries that drew from heritage, applied methods of preservation and restoration, and used existing or salvaged resources.

As hubs of activity, cities are said to account for about 60-80% of the world's energy consumption and generate 75% of carbon emissions (United Nations, 2016; Edenhofer, et al., 2014). Construction and building operations, mobility, population density, and the type of economic activities that take place in the urban environment contribute to these figures (Creutzig, Baiocchi, Bierkandt, Pichler, & Seto, 2015).

On the one hand, the prevalence of repurposed interiors may therefore be a sign of increased resource awareness within the practice; an effort to make use of derelict buildings, improve their efficiency and extend their life cycle. On the other hand, it may mirror current lifestyle trends, a desire for urban inhabitation amids brick surfaces and steel beams; an appreciation for the personality lent to an interior by its heritage. Yet, one of the most typical reasons tends to be that the building or interior has changed owners, with the new owners hoping to transform the interior to meet their needs and taste.

To some extent, the last two notions are supported by the results of the analysis. Although existing contexts were popular throughout the sample, a clear majority of private dwellings were transcribed to this category, suggesting a yearning for a certain type of milieu. In fact, when searching for typological trends, a noteworthy absence of private dwellings was present in the context of new builds, apart from two exceptions: a holiday home and a rural writer's studio. This insight is made only more noteworthy when considering the amount of private dwellings present in the sample. It potentially speaks of lifestyle-related trends in habitation and the qualities that home owners seek from dwellings.

The techniques applied in interior transformations seemed to blend clean bespoke insertions with existing, raw features or other characteristics that brought out the heritage of the interior. The result being a unique combination of old and new, its uniqueness can hold special meaning to the occupants while extending the life cycle of the building. In this regard the approach could be considered to adopt principles of emotionally durable design (See e.g. Ceschin & Gaziulusoy, 2020, p. 26-38).

It is for this attachment to the unique and personalised, that bespoke features were also included under the SDS category of lengthening the interior life cycle. Insofar as they improve functionality and provide a personal touch to the space, bespoke features can potentially improve emotional attachment to the design by delaying psychological obsolescence (Ceschin & Gaziulusoy, 2020). Their popularity in the sample could speak of an appreciation for the one-of-a-kind within the practice.

However, it is questionable whether bespoke items can help the occupant form an attachment with the interior. Typically the strategies applied in emotionally durable design aim to stimulate attachment through creating pleasure to the user, reminding of memories, being a form of the user's self-expression, or indeed expressing the user's affiliation to a group (Mugge, 2007). In this regard, main tactics applied include the participation or 'personal touch' of the end user(s) in the products design, customisation or reparation, a feature that changes with time, or perhaps a unique characteristic that differentiates the solution from others (Ceschin & Gaziulusoy, 2020). If a bespoke feature is purely created by the designer and fails to tap into any of the aforementioned determinants, it is questionable whether it can successfully delay psychological obsolescence.

Whether or not a personal bond between occupant and item is forged, context-driven solutions can enhance functionality by working around existing design quirks, thus turning a 'waste of space' into a practical part of the interior. Similarly, their downside is that they're very uniqueness may make them difficult to reposition in a new context, which limits the life cycle benefits to be achieved. In designing such features, it is worthwhile to realistically consider the expected service life of the interior and design bespoke features in a manner that allows their recontextualisation.

In addition to potentially nurturing attachment, repurposing or renovating existing interiors provides various opportunities for resource conservation. It adds value and extends the life cycle of the building, potentially preventing its demolition. By avoiding excavation and drastic site works, renovated interiors reduce the strain placed on the local environment (Winchip, 2011). Furthermore, renovating the existing building stock can reduce the need for new construction and help slow down urban expansion, this, in turn, can help preserve natural habitats and reduce pollution.

5.2.6 SOCIAL CONSIDERATIONS IN URBAN EXPANSION

As most of the entries focus on high-income economies, it is unknown how SDS are applied in the context of urban expansion in developing economies. In 2018, the United Nations (UN) estimated that the percentage of urban dwellers could be expected to rise to 68% of the global population by 2050 (United Nations, 2018) with the developing world being where 95% of urban expansion would take place in the coming decades (United Nations, 2019).

Strategies that focus on renovating the existing building stock, while reducing the environmental impact of cities, do not automatically translate to developing the urban environment in a manner that is respectful to local communities and supportive of more sustainable lifestyles. Instead, urban development, even when pursuing sustainability transformation, can have unwanted rebound effects from the perspective of social equity (See e.g. Grandit et al. 2019). For instance, as renovation efforts expand to the outskirts of urban areas, the increased value of the building stock can force low income households, who can no longer afford to purchase or rent property in the area, to relocate to areas with fewer services and less infrastructure to support more sustainable lifestyles. By renovating industrial complexes into expensive loft apartments or retail stores, interior architects - albeit unwillingly - can partake in feeding gentrification and limit equitable access to public infrastructure.

The problem is systemic, the solution out of reach for the sole practitioner. However, by co-creating designs that benefit local communities, practitioners have the potential to nurture change on higher levels of innovation. In addition to participatory design activities, empowering local communities can involve employing local craftspeople and utilising local resources insofar as they support local employment and communities. These approaches are seen to support the preservation of local heritage, which can contribute to longer life cycles by improving the meaning that the environment holds for the surrounding culture (Winchip, 2011).

Design processes involving community engagement can also support social equity by ensuring that the built environment preserves elements that allow disenfranchised communities to continue their culture for future generations (Smith, et al., 2014). In this way, interior architects can enable communities to retain access to resources and practices that allow them to facilitate their needs and maintain their identity in a dignified and equitable manner (Smith, et al., 2014, p.5).

The analysis suggests that civic, cultural and educational entries were the most successful in adopting these approaches. In many cases run by public organisations, they may provide a vehicle for solutions that target a wider scope and framing, as they are less restricted by commercial agendas.

When adopting an agenda of cultural preservation, it may be worth considering whether the values put forth by that culture endanger sustainable development, for instance, by obstructing the ability of other communities and cultures to meet their needs. It has been questioned whether cultural heritage should be considered a basic human right as the values and practices that come attached may conflict with more commonly accepted or ontologically grounded human rights, such as Article 5 of the Universal Declaration of human rights; the right to be free from inflicted physical suffering (Barthel-Bouchier, 2016; UN, 1948). Similarly, it has been questioned who gets to decide what is a basic human right and what is worth preserving (Barthel-Bouchier, 2016).

Broadening the scope of consideration to other than human beings, we might conclude that, in human cultures, there is a clear hegemony of disrespect towards the ability of these groups to meet their needs. As non-humans may be a hard stakeholder group to engage with, consideration for this group is often limited to design choices that protect and support biodiversity while refraining from activities that disrupt natural habitats, which brings us back to how urban infill projects tend to be justified from an environmental perspective.

To conclude, extending life cycles of existing buildings can have various social and environmental benefits, but balancing the rights of all the stakeholder groups involved (communities, occupants and non-humans) can be a difficult undertaking where some rights are better represented than others. Since buildings are products of culture, life-cycle extension also takes part in extending lifestyle and values. Therefore, to foster meaningful yet equitable built environments, it is not only important to engage with local communities and key stakeholders, but to consider which groups are left out of the conversation and whether or not their rights are being threatened by the agenda that is being served.

5.3 BARRIERS IN INTEGRATING SUSTAINABILITY CONSIDERATIONS

In this chapter I take a closer look at some trends in the analysis that could potentially limit the ability of the practice to engage with wider levels of innovation.

5.3.1 AESTHETICS FIRST

The results of the analysis made clear indication towards the high appreciation for beauty as a design ideal in the interior practice. Presented first in the judging criteria and landing first in the SDS hierarchy (See Chapter 4, p.62, Fig. 15), it is safe to say that interior architects have this one covered. However, while aesthetics play a part in enhancing indoor environmental quality, they do little to benefit environmental sustainability if the spatial experience is created using high impact methods.

Whilst many entries seemed to consider this aspect in their design, the sample also contained examples of 'monolithic' interiors in which high quantities of concrete was used to create the final result. With judges praising the 'sublime environment' evoked by the sculptural interior, one such example emerged victorious in the competition, yet only correlated with two SDS qualities (Aesthetics and bespoke solutions) in the description analysis. This opens up questions regarding the hierarchy of design ideals and their ability to support transformational change.

Literally set in concrete, the layouts of all-concrete interiors, provide little room for low-impact adaptation during the interior life cycle. On the one hand, as most of the monolithic entries were either new builds or unknown, it may be that the objective was to create a piece of so-called wow-architecture that could potentially receive protection status or at least a keen interest in its maintenance.

Housing public offices, museums and various other cultural hubs and destinations, impressive architectural designs can be seen to symbolise ideals and/or status and facilitate experiences. Yet, when embarking on missions to erect sculptural interiors with the intention to impress, practitioners in high-income nations could do well by taking into account the message sent by intense resource use on a globe where ''on a per-capita basis, high-income countries rely on 9.8 metric tons of primary materials extracted elsewhere in the world'' (UNstats, n.d). Meanwhile, Michael Lettenmeier (2018) suggests that the material footprint of a (Finnish) person should cap at eight metric tonnes in order to support a one-planet lifestyle. In other words, it is likely that high-income countries with a material footprint of 27 metric tons per person (UNstats, n.d), such as Australia, England, the United States and Japan, partake in the inequitable distribution of resources through excessive consumption of imported goods.

Thus, the aesthetics-first ideology purported by the analysis is concerning to the degree that it may trump sustainability principles when drafting the design. Although aesthetic pleasure can be important for nurturing emotional attachments with the interior, these attachments can be fickle; subject to change according to evolving trends and ideals. What is promising perhaps, is that by putting forth examples of beautiful, yet more sustainable designs, practitioners have the ability to shape aesthetic standards and in that manner, influence the behaviours of the practice.

In shaping aesthetics, it is worth questioning approaches of wow-architecture that lean on an impressive amount of resources, renewable or not. With a limited image medium and without a point of comparison, it is hard to draw conclusions regarding the scale of material use in the entries. What is perhaps telling is that while plenty of entries described approaches of material substitution, only nine mentioned the use of a limited material palette, six made some form of reference to the efficient use of resources, and only three used abundant or responsible sources.

In this regard, the preference of local resources may signal an aim to reduce strain on foreign supply chains, but without a reduction to absolute resource consumption, the benefits of this exercise are lost and unable to nurture change on a systemic level. For the aesthetics-first policy to work from a sustainability perspective, the aesthetic ideal should be one that appreciates subtle insertions, efficient use of space and visible layers of age. It is comforting then, that the sample includes some examples of just that, suggesting perhaps that these ideals are already evolving.

5.3.2 NURTURING THE ADOPTION OF CONSUMER CULTURE

As purported by the analysis, only a small percentage of projects showed an inclination towards nurturing sustainability transformation by targeting systemic behaviours and structures. To some extent, this scarcity may be a result of any number of limitations to the integration of sustainability, such as the contextual, budgetary or typological considerations visited in Chapter 2 (See pp. 21-26).

However, as the sample did include a small range of more transformative and educational examples, their scarcity could also point towards a shortage of such briefs. Playing by a different set of rules, the agility and investment capacity of the commercial sector trump that of the public sector and most NGOs, which may explain in part why projects funded by the latter are harder to come by. Then again, it could also be that practitioners do not know how to sell or apply more transformative solutions to typical project contexts where sustainability transformation is not at the top of the client's agenda.

To complicate things further, the growth of the construction sector relies on increased material resource inputs (OECD, 2019). This relationship enforces business-as-usual within the industry itself (Geels, 2010) and challenges resource conservation on an absolute level. Overcoming this barrier calls for interventions that can support a shift in the capitalist growth paradigm, as the roots of the issue reach deep into how the production of wealth is organised and the role design has adopted in this organisation.

As part of the wider design discipline, interior architecture tends to share its struggles with the wider domain when it comes to integrating sustainability, and while various temporal, territorial and typological variations of design exist, each utilising a plethora of approaches to meet diverse ends, in crude terms, the most typical function design plays out is the creation of need within contemporary consumer culture (Julier, 2017). It does so for instance by endowing perceived exchange value in the products it produces (Shove, Watson, & Ingram, 2005). This fundamental function is often thought to conflict with efforts to reduce absolute resource consumption, an action necessary for avoiding ecological catastrophe (Jackson, 2017).

As described by Julier (2017) design takes part in creation of marketable products and services, feeding the machine of neoliberal market dynamics, but can also be used as a vehicle for materialising possibilities and ''making change appear reasonable'' (Julier, 2017, p.3). While the second, more symbolic role can play out in design that facilitates sustainability transformation, these grand ideas may become undermined by capitalist market logic that aims to maximise returns by cutting back on costs. This logic can fuel the adoption of unethical, unequitable and/or unsafe labour practices in the cultivation and extraction of resources, which go on to undermine social sustainability (Byggmästar, 2014).

When viewing the typological construction of the sample, the role of interior design in facilitating commercial gains is revealed. The urban fabric is ripe with businesses and people engaging in economic activity, and interior architects take part in building the environments within which this engagement takes place. Functioning in this role, and also by being a product in itself, interior architecture takes part in needs creation through value-adding solutions. Furthermore, many of these solutions are created using the products offered through the market (Byggmästar, 2014).

Expanding theories regarding object and action interdependency by Schatzki (2002) into the interior domain; if interior architects are considered as creators of material artefacts - in this case spaces - they can also be seen to appropriate the space into a facilitator of particular practices and behaviours (Shove et al. 2005). This also means that practitioners involved in shaping social practice could also influence their transformation (Shove et al. 2005). By creating environments that enable more sustainable behaviour, including that of reduced consumption of goods, practitioners can potentially support a shift in the consumption paradigm.

While it may take time to reorganise the economic system to one that supports more sustainable consumption, practitioners could perhaps improve their behaviour, and that of others, by dedicating more resources to project typologies that may not produce the best economic returns, but involve briefs that can yield social and environmental returns. In this, practitioners can look towards place-based approaches that question capitalist ends and instead seek to reflect the values of regional cultures (Escobar, 2018). Furthermore, by preferring products from responsible (ethical) sources and transparent supply chains, practitioners can also support businesses that may be compromising on their returns in order to provide better, more sustainable solutions.

5.3.3 GEOGRAPHICAL EMPHASIS AND REPRESENTATION

When we consider the sample in the context of its source, and what that source claims to represent, the results can also be seen to contribute to a wider discussion on design colonialism. As such, they can be used in the context of nurturing a more reflexive practice, one that is aware of its sensitivity to the power dynamics that influence the design ideals, image and output of the global practice.

The emphasis on the global north is unsurprising for various reasons. Firstly, the awards are hosted in English by a magazine that was originally established in England, and is likely to hold its greatest audience in English-speaking countries. This hypothesis is strengthened by data from the web statistics company Alexa, according to which 22.13% of the website's visitors are from the US, 19.71% from the UK and 5.11 from Australia (Alexa.com, 15th August, 2021).

Secondly, as a relatively new discipline, the design practice shares much of its developmental journey with the neoliberalisation of the global north that gained momentum circa the 1980s (Julier, 2017) and has since expanded its reach across the globe. According to Julier (2017), resulting cultural shifts in the UK contributed significantly to how the creative industries, within which the design discipline is situated, have come to be defined (Garnham, 1990; Julier, 2017). Spearheading the campaign on ''what is design'', it does not come as a surprise that London boasts the largest concentration of creative industry specialists and designers on the globe (Freeman, 2011; Julier, 2017), nor that these specialists constitute a significant presence in the sample. In fact, the creative industry accounted for 5.2 per cent of the UK economy in 2014 (DCMS, 2014, as cited in Julier, 2017 p.41).

While London's status as a creative hub partly explains its dominance in the results, it is likely that the overall over-representation of the global north with the addition of China speaks, in part, of how 'successfully' these economies have managed to latch onto design as a ticket to the spoils of neoliberalism and infuse their portfolio of design exports with ideals that are generally cherished within western hegemonies of design culture.

Investigating the applicability of the above hypothesis could benefit from an evaluation of the totality of project entries submitted to the competition. Contrasting the geographical focus of the sample against emphasis in global trends supports the idea that representation is a privilege of higher-income nations.

Considering the economic growth China has experienced following its economic liberalisation, and the fact that as the unofficial factory of the world, the nation of roughly 1,4 billion people has become the world's largest exporter of creative goods (31.91% in 2012) (UN, 2015, p.4) it is quite safe to presume that the country could hold an even larger presence in the sample if language restrictions or cultural hegemonies in design were absent from the awards context.

Similarly, countries that do not rank as high in exporting creative goods lack representation in the sample. While the value of creative exports from Western Asia, Africa, Latin America and the Caribbean has increased from 2003 to 2012, they are still ranked low on the global scale. The image portrayed by the rankings mirrors neocolonialist power structures that characterise global politics and underline the inequitable distribution of wealth and resources across the globe. It is likely that the very same dynamics influence which countries have the capability and resources to produce designs and submit them under the examination of colonial design rule. Afterall, is it really that the interior architects in the global north are better at design, or is it merely that they are better equipped?

Without considering global power dynamics and their impact on the designed results and the principles applied in the process, it is difficult to unravel the inequities that continue to repeat and inhibit the ability of more people to achieve a sustainable living standard. Conversely, by placing attention on the habits of the so-called international practice, the journey calls into question the ideals exported by this domain of interior architecture. Turning the focus onto the standard of living represented in the entries, this opens up questions regarding how ready the practice is to nurture an equitable sharing of resources as well as their preservation for future generations.

6. CONCLUSIONS: A WINDOW INTO PRACTICE

This thesis started by asking what perceptions of sustainable interior design are prevalent in prominent interior design competition entries. Informed by literature, and guided by three subquestions, an approach of media content analysis was applied to generate a response to this question.

The answer to Sub-question 1 (What guidelines, principles, and strategies of sustainable design [SDS] are known to the interior architecture practice?) was laid through the literature review in Chapter 2 (See pp. 8-31) and gathered into the master framework (See Appendix II). The SDS known to the interior architecture practice are a range of strategies pursuing sustainable development by balancing economic and social considerations with environmental wellbeing. They combine technical approaches, such as strategies for efficiency improvement and impact reduction from a life cycle perspective, with collaborative approaches that target system dynamics by promoting a change in practices.

Through analysis, the thesis pursued responses to Sub-questions 2 (How are SDS implemented in the competition entries?) and 3 (How are SDS communicated about in the competition entries?). In terms of practice, entries seemed to implement SDS through a variety of material substitution strategies and life-cycle extension, but also by creating aesthetically pleasing environments inspired by cultural heritage and values. In addition to these, a strong service focus came through stressing the user-centeredness, functionality and usability of the interior. The approach could potentially signal that practitioners find these aspects fundamental in creating meaningful and thus long-lasting interiors.

When communicating about their sustainability considerations, only a small minority did so in unambiguous terms. In most cases, communication about the intentional application of SDS was open to interpretation. Practitioners would highlight qualities of the design that could be considered as more sustainable or as nurturing aspects of economic, social or environmental sustainability, but did not necessarily mention sustainability as a design driver. Effectively, the sustainability narrative within the practice seems to still be finding its confidence and coherence, with sustainability as a design driver still struggling to establish itself at the top of the hierarchy in its most ambitious forms.

So, to answer the main research question, this thesis concludes that the perceptions of sustainable interior design most prevalent in the competition entries are ones that focus especially on material/component and product level improvements to individual aspects of the interior. Also existing, but perhaps falling short of their sustainability potential due to a narrow problem framing, are notions of sustainable interior design as nurturing the wellbeing of communities.

Less prevalent, though existing, were perceptions of sustainable interior architecture as a vehicle for intervening on the spatio-social level or in socio-technical system dynamics. These perceptions seemed to hold onto a more holistic idea of sustainable interior architecture, one where the scale of vision spanned from product systems to social systems, or from the material/component level all the way to the socio-technical systems level.

It follows, that in applying different SDS, the area(s) in which the practice succeeds are as follows:

- Creating good quality indoor environments through aesthetic pleasure, cultural preservation, and improved daylighting.
- Improving the performance of the space for users by focusing on functionality and usability, facilitating the delivery of services or experiences, or combining various functions or services within the same space.
- Extending the life cycle of existing buildings, or lowering the embodied energy of the interior through strategies of preservation and resource conservation.
- Applying local, natural, salvaged or recycled materials as a value adding feature of the interior.

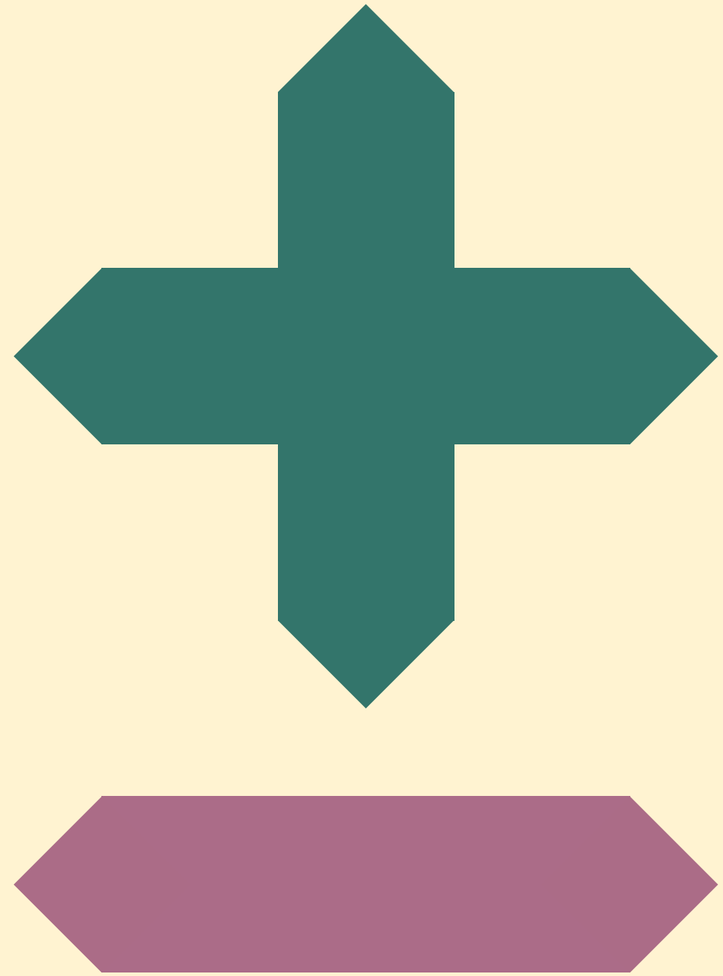
According to the analysis, areas that the practice could improve were:

- Nurturing sustainability transitions through approaches that facilitate sustainable behaviour or promote the adoption of sustainable practices.
- Utilising collaborative approaches to influence spatio-social dynamics and/or to foster social, economic and environmental equity.
- Reducing GHG emissions, improving overall resource efficiency, and minimising waste and pollution by pursuing absolute reductions to all forms of resource use and utilising cradle-to-cradle design where necessary.
- Ensuring good indoor air quality through low-maintenance solutions and non-toxic interior components.
- Dissemination of knowledge regarding SDS through transparent accounts and design justifications.

As a result I propose that all levels of education in interior architecture and design take part in promoting a more coherent sustainability narrative. In this context, the results of the analysis contribute to a wider understanding of the available measures, trends, directions and limitations that could benefit from intervention or support.

Since the context from which the sample is extracted presents the entries as ‘’the best of the best’’ in the practice, it is worthwhile contemplating the type of image they portray. If considered ‘exemplary’, as in ‘something to aspire to’, the entries can go on to influence the design ideals adopted by peers and replicated in later designs. By paying more attention to describing their processes and justifications behind their design aim and solution, practitioners may be able to increase the transparency of the practice and nurture its critical self-examination. In this way, the values and design drivers that shape the design are no longer hidden between the lines of subjective expressions. Thus, it is relevant to design competitions that they demand clear accounts of SDS application and justification, so as to promote the importance of sustainability as a design driver and support the practice of ambitious forms of sustainable interior architecture.

With only a handful of interiors seemingly integrating more holistic forms of sustainability, the image outlined by the results seems to suggest that there is still some way to go. In fact, the steps taken today, as important as they are, will likely need to be followed by further steps until there is no path to tread on. After all, sustainability is not a destination, it is a continuous journey that ends only once our time is up.



6.1 SIGNIFICANCE OF FINDINGS

Taken as they are, the findings can support further research regarding areas in which the practice is succeeding and lacking in terms of applying different SDS. In early stages of my thesis topic development, I could not find equivalent earlier research focused on analysing interior design competitions. In this sense, this research could open a new road into interpreting the practice. Whether this is the case or not, it offers starting points, questions, a methodological example and a point of reference for further research endeavours focused on design thinking within the practice.

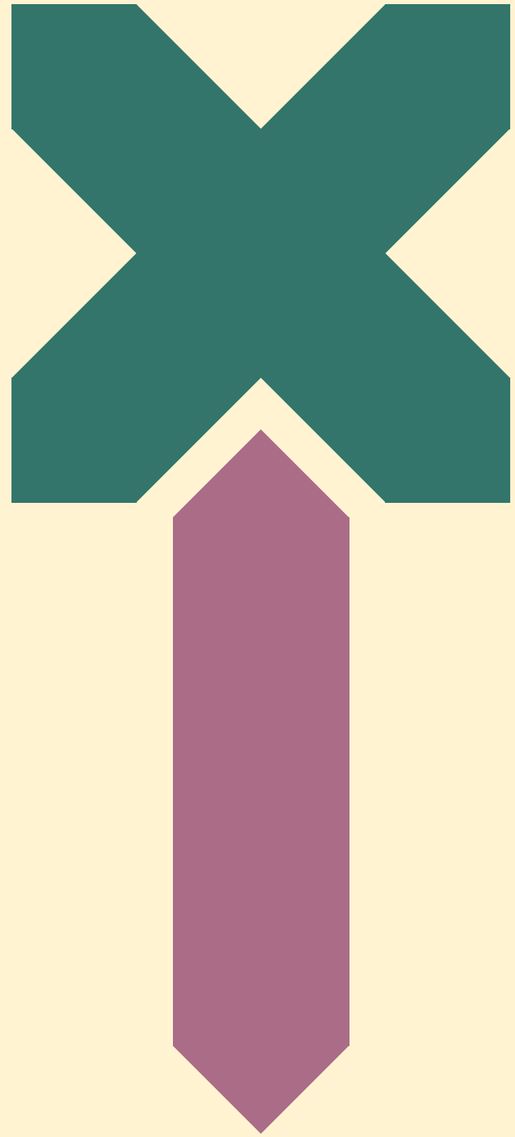
Although my findings represent a limited number of interior architecture practitioners, they nevertheless give important clues about where the practice at large might stand in relation to applying SDS in response to sustainability concerns. In the case that the findings reflect the present situation within the practice on a more general level, some measures would indeed be necessary to incorporate a more holistic sustainability narrative coupled with more ambitious forms of SDS into the interior design thinking.

To this end the research findings can give guidance to planning all levels of education in the field so that it includes a comprehensive understanding of SDS and their varying potential in nurturing sustainable development.

As to the various design competitions – which can function as important trendsetters when popular – the findings could help in designing competitions that would require more comprehensive attention to the SDS from the competitors in their descriptions, justifications and accounts. Through what accounts and justifications they demand from the competitors, and what they reward, competitions themselves could be among the forerunners in promoting SDS.

By pointing out barriers in sustainability integration or dilemmas arising from efforts to integrate SDS, the research findings can be useful in avoiding certain stumbling blocks in a field inherently tied to business agendas.

Finally, and perhaps most importantly, this research contributes to raising awareness of how interior architects can be involved in affecting present day wicked problems. Insofar as it succeeds in this, this research also contributes to the efforts of fighting the ecological crisis.



6.2 LIMITATIONS OF THE RESEARCH

The limitations of this research relate to the theoretical framework, the chosen methods, their construction and the chosen samples.

Theoretical limitations include a stronger focus on explaining environmental dimensions of sustainability, with less attention placed on explaining how social and economic dimensions of sustainability can be considered in the interior practice. This may have limited the depth of discussion and the ability of this work to catch trends in the content that relate to applying socially or economically-oriented SDS. This limitation may have influenced the conclusions regarding where the practice is succeeding or lacking.

Limitations of the media content analysis method and its sample include sample size and its origin, the availability of content, the structure of the content, and finally, the method of application.

Firstly, the small sample size extracted from just one content provider creates representational limitations which restrict the applicability of the results in drawing conclusions about the general practice. Secondly, at the time of writing, available competition entries spanned only over three years, which limited my ability to establish clear directions in the application of SDS through yearly comparison of trends. Further research can address these limitations by expanding the sample size for instance by expanding the examination period, including a wider range of sample providers (other competitions), or by also including longlist nominations in the sample (unavailable for years 2018 and 2019).

Concerning the content itself, evaluating the size of the interiors, as well as the quantity and variety of different material or furniture applications, was limited due to only one image being analysed per entry. Furthermore, as description length was typically less than 200 words, information regarding the design solution was scarce and its quality was highly varied.

Clearly, the medium of competition entries is only one limited approach to interpreting the practice. However, further research can address its limitations by evaluating longer project descriptions if these are available on the design agencies' website or provided by the design magazine hosting the competition. Typically these entries also include a larger number of images, which can improve the reliability of the medium in interpreting manifestations of SDS in practice and provide a more comprehensive understanding of each entry.

Finally, as the content analysis in this thesis has been conducted by a single person, the inter-coder reliability of it is wanting, as there is no way to compare or identify different interpretations made by separate analysts. Further research can improve inter-coder reliability by having more than one coder to conduct the analysis, utilising computerised software to conduct the analysis, and/or experimenting with different ways of structuring the coding matrix.

These limitations influence the applicability of the insights. While I found definite undercurrents that connect and correlate with trends and ideals shared in the wider practice, it is important to remember that they are only a snippet of what is out there. They allow us to observe the global practice through a narrow window: The captured view is bounded by the framing, the location, the direction the window faces, as well as time of viewing. With these limitations in mind, the results should be applied with deliberation.

6.1.2 FROM DFS MAPPING TO REFLECTION AGAINST FRAMEWORK

During the process of this work, many aspects of it have had to change and adapt as I encountered limitations in the system of analysis and in the sample itself. For instance, the original intention was to produce a mapping of the discoveries from the content analysis by situating them onto the DfS frameworks. This way the correlations between practice and generally known sustainable design approaches could have been visualised and utilised in interpreting likely focus points within the interior architecture practice.

However, because the word count and available information in the entries was limited, and most entries did not clearly state an intent of integrating sustainability in the interior, extracting the type of information from the entries needed for the mapping - namely the scope of the design intervention and framing of the design problem - was rarely achievable. Furthermore, although the results themselves could to some extent be mapped onto the framework, the lack of visible intent for sustainability integration from the practitioners side would have made such a mapping a rather misleading depiction of the practice.

As a result the DfS framework by Ceschin & Gaziulusoy (2020) was used only as a point of reflection; Its synthesis of the different DfS approaches and characterisation of the different levels of innovation, scope and framing, enabling a deeper reflection on the results. In this manner it was still possible to identify correlations between theory and practice and provide a preliminary idea of where the practice is succeeding or lacking.

6.3 AREAS FOR FURTHER RESEARCH

To establish a more comprehensive image and improve the representation of the sample, further research could build on this work by lengthening the observation period or by including content from more design competitions. In addition to expanding the reliability and representation of the sample, a longer observation period could contribute to an understanding of the historical evolution of sustainability considerations applied in practice. By continuing this exercise and developing the method accordingly, the yearly results of these competitions could continue to provide windows into the design ideals circulating within the practice.

In this thesis I have proposed for educators and practitioners to take on a more active role in shaping the sustainability narrative of the practice through clear communication and by re-organising the hierarchy of design drivers. To help with this challenge, further research could delve into the relationships between the design media and interior architecture practitioners and seek out potential ways in which these actors influence each other. This could involve interviewing practitioners, students, educators and design journalists as well as representatives of interest organisations connected to interior architecture.

To address potential limitations in the scope of the theoretical framework, further research could seek to expand the research scope by placing greater attention on identifying how social and economic SDS manifest in practice.

Lastly, a new round of Dezeen Awards is taking place at the time of writing, with longlists published to the public. For the first time in its history, the competition contains a separate category for sustainable interiors. This could provide an interesting case for further research because it allows for comparing the prevalence of SDS between the ‘regular’ and ‘sustainable’ project categories. With a clear intent to produce sustainable interiors, analysing the entries in this category could provide a more reliable window into what perceptions of sustainable interior design are prevalent within the practice.

REFERENCES

Ashby, M. F. (2016a). *Materials and sustainable development*. Elsevier.

Ashby, M. F. (2016b) *Material property data for engineering materials* (4th ed.). Cambridge University, Granta design.

Associates III, Stelmack, A., Foster, K., & Hindman, D. (2014). Sustainable Residential Interiors. United States, Somerset: John Wiley & Sons, Incorporated.

Banks, M. (2014). Chapter 27: Analysing images. In U. Flick (Ed.) *The SAGE Handbook of Qualitative Data Analysis* (pp. 394-407).

Barthel-Bouchier, D. L. (2016). *Cultural heritage and the challenge of sustainability*. Routledge. DOI: https://doi.org/10.4324/9781315431055

Berardi, U. (Eds. Michałowicz, M., Kerber, A.). (2013). *Moving to sustainable buildings : paths to adopt green innovations in developed countries*. London: Versita, Versita Limited. DOI: https://doi.org/10.2478/9788376560113

Bergman, D., (2012). *Sustainable Design: A critical guide for architects and interior, lighting, and environmental designers*. New York, NY: Princeton Architectural Press.

Block, M., & Bokalders, V. (2009). *The whole building handbook: How to design healthy, efficient and sustainable buildings*. Retrieved from ProQuest Ebook Central https://ebookcentral.proquest.com

Braungart, M., & McDonough, W. (2002). *Cradle to Cradle: Remaking the Way We Make Things*. New York, NY: North Point Press.

Brenner, S. (2005). Teaching cultural sensitivity at architectural schools for more sustainable buildings. In S. Skjerven, J. Reitan (Eds.) *Design for a Sustainable Culture: Perspectives, Practices and Education* (pp.197-213). Taylor & Francis Group.

Brooker, G., & Stone, S. (2008). *Context + environment*. AVA Publishing.

Burall, P. (1991). *Green Design*. London, UK: Design Council.

Byggmästar, B. (2014). *Uncovering treasures– Approaching sustainability through renovation in interior design*. Master's thesis, Aalto University, School of Arts, Design and Architecture.

Carson, R. (1962) *Silent Spring*. Penguin books.

Coleman, C. (2000). Interior design: Assessing the future of green design. *Interior Design Magazine, 71*(1): 66.

Collet, C. (2016) *Framework for biodesign*. Design & Living systems lab.

Ceschin, F., & Gaziulusoy, İ. (2020). *Design for sustainability: A multi-level framework from products to socio-technical systems*. Routledge Focus. DOI: https://doi.org/10.1201/b19041-14

Crowther, P. (2005). Design for Disassembly: Themes and principles. *RAIA/BDP Environment Design Guide*.

Creutzig, F., Baiocchi, G., Bierkandt, R., Pichler, P-P. & Seto, K. C. (2015). Global typology of urban energy use and potentials for an urbanization mitigation wedge. PNAS. *Sustainability Science, 112*(20): 6283-6288. DOI: 10.1073/pnas.1315545112

Danielsson, B. C., Chungkham, H. S., Wulff, C. & Westerlund, H. (2014). Office design's impact on sick leave rates. *Ergonomics, 57*(2) 139-147. DOI: https://doi.org/10.1080/00140139.2013.871064

Department for Culture, Media and Sport (DCMS) (2014, January) *Creative industries economic estimates,* Statistical release, Report. London: DCMS.

El Khouli, S., John, V., & Zeumer, M., (2015). *Sustainable Construction Techniques: From Structural Design to Interior Fit-Out: Assessing and Improving the Environmental Impact of Buildings*. München, Germany: Detail Business Information GmbH.

Elo, S., & Kyngäs, H. (2008). The qualitative content analysis. *Journal of Advanced Nursing, 62*(1), 107-115. DOI: 10.1111/j.1365-2648.2007.04569.x

Elo, S., Kääriäinen, M., Kanste, O., Pölkki, T., Utriainen, K., & Kyngäs, H. (2014). Qualitative content analysis: A focus on trustworthiness. *SAGE Open, 4*(1), 1-10. DOI: 10.1177/2158244014522633

U.S. Environmental Protection Agency, Office of research and development [EPA]. (2010). *Healthy Benefits of Green Infrastructure in Communities*. Science in Action, EPA.

Escobar, A. (2018). *Designs for the Pluriverse: Radical Interdependence, Autonomy, and the Making of Worlds*. New Ecologies for the Twenty-First Century.

Fuller, R. B. (1969). *Operating manual for spaceship earth.* Carbondale, IL: Southern Illinois University Press.

Freeman, A. (2011). *Current issues note 33: London's creative industries 2011 update, Report.* London: GLA Economics.

Garnham, N. (1990) *Capitalism and communication – Global culture and the economics of information*. London: Sage.

Gaziulusoy, İ & E. Öztekin, E. (2018). Design as a Catalyst for Sustainability Transitions. *Design Research Society International Conference: Catalyst.* DRS International Conference Series. 1041-1051. ISSN 2398-3132. ISBN 978-1-912294-18-3. DOI: 10.21606/dma.2018.292.

Geels, W. F. (2010). Ontologies, socio-technical transitions (to sustainability), and a multi-level perspective. *Research Policy, 39*(2010), 495-510.

Geren, R. L. (2016). *Applying the building code: step-by-step guidance for design and building professionals*. Wiley.

Grandin, J., Haarstad, H., Kjaerås, & K., Bouzarovski, S. (2018). The politics of rapid urban transformation. *Current Opinion in Environmental Sustainability, 31*, 16-22.

Grumman, D.L. (ed.) (2003). *ASHRAE green guide*. Atlanta: ASHRAE.

Hernandéz, A. (2020). *Integration of sustainable interior design practices: Adding value to interior design services provided by Suunnittelutoimisto Amerikka.* Master's thesis, Aalto University, School of Arts, Design and Architecture.

Hopwood, B., Mellor, M., O'Brien, G. (2005). Sustainable development: Mapping different approaches. *Sustainable Development, 13*(1), 38-52.

IPCC. (2021). Summary for policymakers. In V. Masson-Delmotte, P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.) *Climate Change 2021: The Physical science basis. Contribution of working group I to the sixth assessment report of the Intergovernmental Panel on Climate Change*. Cambridge University Press. In Press.

IPCC. (2018). Summary for Policymakers. In V. Masson-Delmotte et al. (Eds.), *Global warming of 1.5°C: An IPCC special report on the impacts of global warming of 1.5°C above pre- industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. Geneva, Switzerland: World Meteorological Organization.

Edenhofer, O., Pichs-Madruga, R., Sokona, Y., Farahani, E., Kadner, S., Seyboth, K., Adler, A., Baum, I., Brunner, S., Eickmeier, P., Kriemann, B., Savolainen, J., Schlömer, S., von Stechow, C., Zwickel, T., & Minx, J. C. (eds). (2014). *Climate change 2014: Mitigation of climate change. Contribution of working group III to the fifth assessment report of the intergovernmental panel on climate change*. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.

Jackson, T. (2017). *Prosperity without growth : economics for a finite planet*. Earthscan.

Jones, L. (2008). *Environmentally responsible design : green and sustainable design for interior designers*. Wiley.

Julier, G. (2017). *Economies of Design*. SAGE Publications Ltd.

Kaplan, R. (2001). The nature of the view from home: psychological benefits. *Environment and Behaviour 33*, 507-542

Kim, W., S. & Choi, C., J. (2007). Habits, self-control and social conventions: The role of global media and corporations. *Journal of Business Ethics. 76*, 147-154. DOI: 10-1007/s10551-006-9263-6

Krippendorff, K. (2018). *Content analysis : an introduction to its methodology* (4th Edition.). SAGE.

Krippendorff, K. (1989). Content analysis. In Barnouw, E., Gerbner, G., Schramm, W., Worth, T. L. & Gross, L. (Eds.), *International Encyclopedia of Communication, 1,* (pp. 403-407.). New York, NY: Oxford University Press. Retrieved from http://repository.upenn.edu/asc_papers/226 2nd November 2020.

Lacy, S., R., & Riffe, D. (1993). Sins of omission and commission in mass communication quantitative research. *Journalism & Mass Communication Quarterly, 70* (1): 126–132. DOI:10.1177/107769909307000114.

Lawson, B. (2004). *What Designers know*. Routledge.

Leather, P., Pyrgas, M., Beale. B., Kweon, B. & Tyler, E. (1998). Plants in the workplace: the effects of plant density on productivity, attitudes and perceptions. *Environment and Behaviour 30*, 261-282

Lehne, J., Preston, F. (2018). *Making concrete change: Innovation in low-carbon cement and concrete*. Chatham house report. The Royal Institute of International Affairs. Retrieved from https://www.chathamhouse.org/2018/06/making-concrete-change-innovation-low-carbon-cement-and-concrete-0/1-introduction

Lettenmeier, M. (2018). *A sustainable level of material footprint — benchmark for designing one- planet lifestyles*. Aalto, Finland: Aalto University.

Loorbach, D., Frantzeskaki, N. & Avelino, F. (2017). Sustainability transitions research: Transforming science and practice for societal change. *The Annual Review of Environment and Resources, 42*, 599-626.

May, B. (2012). Another side of green buildings: Interactions between sustainable practice and users. *Journal of Interior Design, 37*(2), v-viii. DOI:10.1111/j.1939-1668.2012.01074.x

McCoy, J. (2012). Sustainability: Environmenattly responsible interior design. *Journal of Interior Design, 37*(1), 5-6. DOI:10.1111/j.1939-1668.2011.01070.x

McPhearson, T., Iwaniec, D., M. & Bai, X. (2016). Positive visions for guiding urban transformations toward sustainable futures. *Current Opinion in Environmental Sustainability, 22*, 1-8.

Meadows, D. H., Meadows, D. L., Randers, J., & Behrens, W. W. (1972). *The Limits to growth: A report for the Club of Rome's project on the predicament of mankind*. New York: Universe Books.

Moxon, S. (2012). *Sustainability in interior design* (1st edition). Laurence King Publishing.

Mugge, R. (2007). *Product attachment*. Doctoral dissertation. The Netherlands: Delft University of Technology, Delft.

Vatanen, S. (2019). Environmental handprint tells of positive environmental actions. *Business Finland*. Retrieved from https://www.businessfinland.fi/en/whats-new/cases/2019/environmental-handprint-tells-of-positive-environmental-actions# [Visited: 30.05.2021]

Naderer, B., Schmuck, D., & Matthes, J (2017). Greenwashing: Disinformation through Green Advertising. In: S. Grubenmann, M. B. Rimscha, & G. Siegert (Ed.) *Commercial communication in the digital age : information or disinformation?* (pp. 105-120.). De Gruyter Saur. DOI: https://doi.org/10.1515/9783110416794

OECD. (2019, February, 12). *Global Material Resources Outlook to 2060 - Economic drivers and Environmental Consequences*.

OECD. (2021). *HC2.1 Living space, report*. OECD Affordable housing database. Retrieved from https://www.oecd.org/housing/data/affordable-housing-database/housing-conditions.htm [Visited: August 15th, 2021]

O'Brien, K., & Sygna, L. (2013). Responding to climate change: The three spheres of transformation. *Proceedings of the Conference Transformation in a Changing Climate,* 16-23.

Papanek, V. (1985). *Design for the real world: Human ecology and social change*. New York: Van Nostrand Reinhold.

Pretty, J. (2004) How nature contributes to mental and physical health. *Spirituality and Health international. 5*(2), 68-78.

Porritt, J. (2007). *Capitalism as if the world matters*. London: Earthscan.

Rauf, A., & Crawford, R. H. (2014). Building service life and its effect on the life cycle embodied energy of buildings. *Energy, 79*, 140-148. DOI: https://doi.org/10.1016/j.energy.2014.10.093

Raworth, K. (2017). *Doughnut economics : Seven ways to think like a 21st century economist*. Random House Business Books.

Reed, B. (2007). Shifting from 'sustainability' to regeneration. *Building Research and Information, 35*(6), 674-680.

Roosa, S. A. (2010). *Sustainable development handbook*. Retrieved from ProQuest Ebook Central https://ebookcentral.proquest.com

Rose, G. (2012) *Visual methodologies: An introduction to researching with visual materials*. (3rd edition). London: Sage.

Sangiorgi, D. (2011). Transformative services and transformation design. *International Journal of Design, 5*(2), 29-40.

Schatzki, T. (2002). *The Site of the Social*. Pennsylvania: Pennsylvania University Press.

Scupelli, P. (2015). Designed transitions and what kind of design is transition design? *Design Philosophy Papers, 13*(1), 75-84

Sharpe, B., Hodgson, A., Leicester, G., Lyon, A. & Fazey, I. (2016). Three horizons: a pathways practice for transformation. *Ecology and Society, 21*(2):47. DOI: http://dx.doi.org/10.5751/ES-08388-210247

Shedroff, N. (2009). *Design is the problem: The Future of design must be sustainable*. New York, Brooklyn: Rosenfeld Media.

Shove, E., Watson, M. & Ingram, J. (2005, September, 22-24). The value of design and the design of value. *Joining Forces,* University of Art and Design Helsinki.

Smith, D., Lommerse, M., & Metcalfe, P. (2014). *Perspectives on social sustainability and interior architecture: Life from the inside* (2nd edition). Springer Singapore. DOI: https://doi.org/10.1007/978-981-4585-39-2

Sorrento, L. (2012). A Natural balance: Interior design, humans, and sustainability. *Journal of Interior Design. 37*(2), ix-xxiv. DOI:10.1111/j.1939-1668.2012.01075.x

Stahel, W., R. (2001). Sustainability and Services. In C. Martin & U. Tischner, (Eds.) *Sustainable Solutions – developing products and services for the future* (pp. 151–164.). Greenleaf Publishing,

Stebbing, P., & Tischner, U. (Eds.) (2015). *Changing Paradigms: Designing for a Sustainable Future*. Cumulus Think Tank Publication No1. Aalto University School of Arts, Design and Architecture.

Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., ... Sörlin, S. (2015). Planetary boundaries: Guiding human development on a changing planet. *Science, 347*(6223), 1259855.

Stieg, C. (2006). The Sustainability Gap. *Journal of Interior Design, 32*(1), VII-XXI, DOI: 10.1111/j.1939-1668.2006.tb00252.x

Tennessen, C. M., & Cimprich, B. (1995). Views to nature: effects on attention. *Journal of Environmental Psychology, 15,* 77-85

Tschakert, P., Tuana, N., Westskog, H., Koelle, B., & Afrika, A. (2016). TChange: The role of values and visioning in transformation science. *Current Opinion in Environmental Sustainability, 20*, 21-25

United Nations. [UN] (2018). *The world's cities in 2018: Data booklet.* Department of economic and social affairs, population division.

United Nations. [UN] (2019). *World urbanization prospects: The 2018 revision*. Department of economic and social affairs, population division. New York: United Nations.

United Nations. [UN] (2016). *The World's Cities in 2016: Data Booklet.*

United Nations. [UN] (2015). *Creative economy outlook and country profiles: Trends in international trade in creative industries*. United Nations conference on trade and development [UNCTAD].

United Nations. [UN] (1948). *Universal declaration of human rights*. United Nations General Assembly.

UNEP. (2020, December 16th). Building sector emissions hit record high, but low-carbon pandemic recovery can help transform sector. *UN Report*, Press release, Resource efficiency.

Retrieved from https://www.unep.org/news-and-stories/press-release/building-sector-emissions-hit-record-high-low-carbon-pandemic [Visited: August, 20th, 2021]

UNEP. (2017). *Emissions gap report 2017: A UN environment synthesis report.* United Nations Environment Programme.

Voros. J. (2003). A generic foresight process framework. *Foresight, 5*(3), 10-21. DOI:10.1108/14636680310698379

World Commission on Environment and Development [WCED] (1987). *Our common future.* England: U Oxford.

Winchip, S. M. (2011). *Sustainable design for interior environments* (2nd ed.). Fairchild Books.

WEB-SOURCES

Alexa (2021, August, 15th) *Dezeen.com competitive analysis*. Retrieved from https://www.alexa.com/siteinfo/dezeen.com [Visited: 15th August, 2021]

Ball, J. (n.d). *The Double Diamond: A universally accepted depiction of the design process*. Retrieved from https://www.designcouncil.org.uk/news-opinion/double-diamond-universally-accepted-depiction-design-process [Visited: December 15th, 2020]

British Design Council [BDC] (2019). *What is the framework for innovation? Design Council's evolved Double Diamond*. Retrieved from https://www.designcouncil.org.uk/news-opinion/what-framework-innovation-design-councils-evolved-double-diamond [Visited: December 15th, 2020]

Dezeen, (2020). *Dezeen Awards: Terms and conditions*. Retrieved from https://www.dezeen.com/awards/terms-and-conditions/ [Visited: 15th August, 2021]

Dezeen (n.da) *Marcus Fairs*. Retrieved from https://www.dezeen.com/author/marcus-fairs/ [Visited: 15th August, 2021]

Dezeen (n.db). *About Dezeen Awards*. Retrieved from https://www.dezeen.com/awards/about/ [Visited: 15th August, 2021]

Dezeen (n.dc). *Dezeen Awards: Prices and dates*. Retrieved from https://www.dezeen.com/awards/prices-and-dates/ [Visited: 15th August, 2021]

Dezeen (n.dd) *Winner: Hospitality interior, 2018*. Retrieved from https://www.dezeen.com/awards/2018/winners/lokal/ [Visited: 15th August, 2021]

Ecolabelindex. (2021). Ecolabel index. Retrieved from http://www.ecolabelindex.com/ecolabels/?search=building&as_values_053= [Visited: 15th August, 2021]

EOD (n.d) Earth overshoot day. Retrieved from https://www.overshootday.org/ [Visited: August 13th, 2021]

European Commission (2019). Construction and demolition waste https://ec.europa.eu/environment/waste/construction_demolition.htm [Visited: December 9th, 2020]

European Parliament. (2019). What is carbon neutrality and how can it be achieved by 2050? News, European Parliament, Society. Retrieved from https://www.europarl.europa.eu/news/en/headlines/society/20190926STO62270/what-is-carbon-neutrality-and-how-can-it-be-achieved-by-2050 [Visited: 27th August, 2021]

Fairs, M. (2016). Dezeen is officially the world's most popular online design magazine. Dezeen. Retrieved from https://www.dezeen.com/2016/12/08/dezeen-officially-worlds-most-popular-design-magazine-alexa-rankings/ [Visited: 15th August, 2021]

GEN (2019). GEN celebrates 25 years. Retrieved from https://www.globalecolabelling.net/assets/Uploads/GEN-Ed35-FinalTimeline2.pdf [Visited: 15th August, 2021]

ISO (n.d) About us: The iso story. Retrieved from https://www.iso.org/the-iso-story.html [Visited: 15th August, 2021]

Nordic Swan (n.d) The Nordic Swan ecolabel. Retrieved from https://www.nordic-ecolabel.org/the-nordic-swan-ecolabel/ [Visited: 27th August, 2021]

Rakennustieto. (n.d) Historia. Retrieved from https://www.rakennustieto.fi/index/rakennustieto/histo ria.html [Visited: 27th August, 2021]

Statistics Finland (2018) Classification of Buildings 2018. Retrieved from https://www.stat.fi/en/luokitukset/rakennus/ [Visited: 21st August, 2021]

United Nations. [UN] (n.da). *Sustainable development goal 11: Sustainable cities and communities*. Retrieved from https://sdgs.un.org/goals/goal11, [Visited: February 3rd, 2021].

United Nations. [UN] (n.db). *Sustainable development goal 12: Responsible consumption and production*. Retrieved from www.un.org/ sustainabledevelopment/ sustainable- consumption- production/. [Visited: December 15th, 2020]

UNstats. (n.d) *Overview: Sustainable development goal 12: Responsible consumption and production*. Retrieved from https://unstats.un.org/sdgs/report/2019/goal-12/ [Visited: August, 20th, 2021]

IMAGE SOURCES

Image.01 - Dezeen Awards. (2020b). House Interior: 07Beach, House in Kyoto. Retrieved from https://www.dezeen.com/awards/2020/shortlists/house-in-kyoto-07-beach/ [Visited 19th September, 2021]

Image.03 - Dezeen Awards. (2020c). Large workspace interior: Studio VDGA, Office in Cardboard. Retrieved from https://www.dezeen.com/awards/2020/shortlists/office-in-cardboard-studo-vdga/ [Visited 19th September, 2021]

Image.04 - Dezeen Awards. (2019). Civic and cultural interior: Emma Olbers Design, The Old Library at the National Museum. Retrieved from https://www.dezeen.com/awards/2019/shortlists/the-old-library-at-the-national-museum/ [Visited 19th September, 2021]

Image.05 - Dezeen Awards. (2018). Hospitality interior: SPACE10, Spacon & X, 2018, Lokal. Retrieved from https://www.dezeen.com/awards/2018/winners/lokal/ [Visited 19th September, 2021]

Illustrations, figures and tables by the author.

APPENDICES

Appendix I: SDS hits by category. Figures 11-22.

Table.04

INDOOR ENVIRONMENTAL QUALITY	% of hits	ALL YEARS [201] 23.1 %	2020 [71] 23.2 %	2019 [75] 23.0 %	2018 [55] 23.3 %	SDS SUM from total 1
Aesthetic style	Total	108 69.6	35 57.3	40 75.4	33 80.4	
	Winners	20 66.6	7 58.3	7 70	6 75	
Draws from heritage or culture	Total	56 36.1	23 37.7	19 5.82	14 34.1	
	Winners	9 30	3 23	3 30	3 37.5	
Daylighting	Total	22 14.1	7 11.4	10 18.8	5 12.1	
	Winners	6 20	4 33	2 20	0 0	
Maximising views	Total	13 8.38	6 9.83	4 7.54	3 7.31	
	Winners	1 3	0 0	1 10	0 0	
Controlled acoustics	Total	2 1.29	0 0	2 3.77	0 0	
	Winners	0 0	0 0	0 0	0 0	

% Calculated as percentage of projects using SDS from all projects within review period and group (All or Winners).
1 Sum total of SDS hits in presented category as a percentage of total SDS hits within review period.

Table.05

ACCESSIBILITY & USABILITY	% of hits	ALL YEARS [130] 14.9% %	2020 [43] 14.1% %	2019 [54] 16.5% %	2018 [33] 14% %	SDS SUM from total[1] 1
Usability & Functionality	Total	72 46.4	27 44.2	31 58.4	14 34.1	
	Winners	17 56.5	6 50	8 80	3 37	
Multifunction, or multipurpose	Total	33 21.2	10 16.3	13 24.5	10 24.3	
	Winners	9 30	4 40	3 30	2 25	
Serves a marginalized group	Total	9 5.8	2 3.27	3 5.66	4 9.75	
	Winners	0 0	0 0	0 0	0 0	
Accessible, Barrier free	Total	6 3.87	1 1.63	4 7.54	1 2.43	
	Winners	1 3	0 0	1 10	0 0	
Adaptive, Customisable, Flexible	Total	6 3.87	2 3.27	3 5.66	1 2.43	
	Winners	0 0	0 0	0 0	0 0	
Interactive, Personal or responsive controls	Total	4 2.58	1 1.63	0 0	3 7.31	
	Winners	2 6.5	1 8	0 0	1 12.5	

% Calculated as percentage of projects using SDS from all projects within review period and group (All or Winners).
1 Sum total of SDS hits in presented category as a percentage of total SDS hits within review period.

Table.06

LENGTH OF INTERIOR LIFE-CYCLE		[127] 14.6% ALL YEARS % of hits	%	[43] 14% 2020	%	[51] 15.6% 2019	%	[33] 14% 2018	%	SDS SUM from total 1
Bespoke, Craftmanship, Unique	Total	42	27	15	24.5	18	33.9	9	21.9	
	Winners	10	33	4	33	3	30	3	37	
Restoration, Preservation	Total	36	23.2	12	19.6	14	26.4	10	24.3	
	Winners	5	16.5	1	8	2	20	2	25	
Quality, Durability, Consideration	Total	18	11.6	7	11.4	5	9.43	6	14.6	
	Winners	0	0	0	0	0	0	0	0	
Context driven	Total	14	9.0	3	4.91	6	11.3	5	12.1	
	Winners	3	10	0	0	1	10	2	25	
Integrated into surroundings	Total	7	4.51	2	3.27	5	9.43	0	0	
	Winners	0	0	0	0	0	0	0	0	
Meaningful	Total	5	3.22	0	0	2	3.77	3	7.31	
	Winners	0	0	0	0	0	0	0	0	
Timeless, Long lasting	Total	5	3.22	4	6.55	1	1.88	0	0	
	Winners	0	0	0	0	0	0	0	0	

% Calculated as percentage of projects using SDS from all projects within review period and group (All or Winners).
1 Sum total of SDS hits in presented category as a percentage of total SDS hits within review period.

Table.07

LAND USE AND BIODIVERSITY		[112] 12.9% ALL YEARS % of hits	%	[38] 12.4% 2020	%	[46] 14.1% 2019	%	[28] 11.8% 2018	%	SDS SUM from total 1
Refurbished, Renovated or Repurposed	Total	77	49.6	25	40.9	29	54.7	23	56	
	Winners	13	43	5	41.5	6	60	2	25	
Compact layout, Efficient use of space	Total	24	15.4	9	14.7	11	20.7	4	9.75	
	Winners	4	13	1	8	3	30	0	0	
Extension to existing building	Total	5	3.22	3	4.91	1	1.88	1	2.43	
	Winners	1	3	1	8	0	0	0	0	
Limited damage to site, Reduced site work	Total	5	3.22	1	1.63	4	7.54	0	0	
	Winners	0	0	0	0	0	0	0	0	
Proctect or nurture biodiversity	Total	1	0.64	0	0	1	1.88	0	0	
	Winners	0	0	0	0	0	0	0	0	

% Calculated as percentage of projects using SDS from all projects within review period and group (All or Winners).
1 Sum total of SDS hits in presented category as a percentage of total SDS hits within review period.

Table.08

OTHER		ALL YEARS [84] 9.8%		2020 [30] 9.8%		2019 [27] 8.3%		2018 [27] 11.4%		SDS SUM from total[1]
	% of hits		%		%		%		%	1
Focus on service or experience	Total	70	45.1	23	37.7	23	43.3	24	58.5	
	Winners	10	33	2	16.5	2	20	6	75	
Emulates nature, Nature-inspired	Total	14	9.03	7	11.4	4	7.54	3	7.31	
	Winners	3	10	2	16.5	0	0	1	12.5	

% Calculated as percentage of projects using SDS from all projects within review period and group (All or Winners).
1 Sum total of SDS hits in presented category as a percentage of total SDS hits within review period.

Table.09

RESOURCE USE		ALL YEARS [75] 8.7%		2020 [33] 10.8%		2019 [30] 9.2%		2018 [12] 5.1%		SDS SUM from total[1]
	% of hits		%		%		%		%	1
Use of natural or organic resources	Total	39	25.1	16	26.2	18	33.9	5	12.1	
	Winners	8	26.5	4	33	4	40	0	0	
Use of local or regional materials	Total	10	6.45	5	8.19	2	3.77	3	7.31	
	Winners	2	6.5	1	8	0	0	1	12.5	
Minimised or limited material palette	Total	9	5.8	3	4.91	5	9.43	1	2.43	
	Winners	1	3	0	0	1	10	0	0	
Use of local crafts or labour	Total	8	5.16	6	9.88	1	1.88	1	2.43	
	Winners	3	10	3	25	0	0	0	0	
Efficient resource use	Total	6	3.87	2	3.27	2	3.77	2	4.87	
	Winners	0	0	0	0	0	0	0	0	
Use of responsible or abundant resources	Total	3	1.93	1	1.63	2	3.77	0	0	
	Winners	0	0	0	0	0	0	0	0	

% Calculated as percentage of projects using SDS from all projects within review period and group (All or Winners).
1 Sum total of SDS hits in presented category as a percentage of total SDS hits within review period.

Table.10

NURTURING SUSTAINABILITY TRANSITIONS		ALL YEARS [60] 6.9% % of hits	ALL YEARS %	2020 [16] 5.2%	2020 %	2019 [16] 4.9%	2019 %	2018 [28] 11.8%	2018 %	SDS SUM from total[1]
Exemplary, Educational, Experimental	All	19	12.2	5	8.19	6	11.3	8	19.5	
	Winners	5	16.5	2	16.5	0	0	3	37.5	
Hub for culture or community	All	13	8.38	5	8.19	2	3.77	6	14.6	
	Winners	2	6.5	2	16.5	0	0	0	0	
Nurtures Social, Economic and/or Environmental equity	All	9	5.8	0	0	4	7.54	5	12.1	
	Winners	1	3	0	0	0	0	1	12.5	
Nurturing the adoption of sustainable solutions	Total	9	5.8	5	8.19	2	3.77	2	4.87	
	Winners	0	0	0	0	0	0	1	12.5	
Nurturing sustainable behaviour & lifestyles	All	7	4.51	0	0	2	3.77	5	12.1	
	Winners	0	0	0	0	0	0	2	25	
Co-created or Participatory design	All	3	1.93	1	1.63	0	0	2	4.87	
	Winners	0	0	0	0	0	0	0	0	

% Calculated as percentage of projects using SDS from all projects within review period and group (All or Winners).
1 Sum total of SDS hits in presented category as a percentage of total SDS hits within review period.

Table.11

MINIMIZING WASTE & POLLUTION		ALL YEARS [39] 4.5% % of hits	ALL YEARS %	2020 [12] 3.9%	2020 %	2019 [18] 5.5%	2019 %	2018 [9] 3.8%	2018 %	SDS SUM from total[1]
Use of existing, salvaged or recycled resources	Total	25	16.1	8	13.1	12	22.6	5	12.1	
	Winners	3	10	0	0	1	10	2	25	
Use of raw or unprocessed resources	Total	6	3.87	2	3.27	2	3.77	2	4.87	
	Winners	0	0	0	0	0	0	0	0	
Recyclability & Design for Disassembly	Total	4	2.58	1	1.63	3	5.66	0	0	
	Winners	0	0	0	0	0	0	0	0	
Focus on reducing pollution	Total	2	1.29	0	0	0	0	2	4.87	
	Winners	1	3	0	0	0	0	1	12.5	
Biodegradable	Total	2	1.29	1	1.63	1	1.88	0	0	
	Winners	0	0	0	0	0	0	0	0	
Reduced waste	Total	0	0	0	0	0	0	0	0	
	Winners	0	0	0	0	0	0	0	0	

% Calculated as percentage of projects using SDS from all projects within review period and group (All or Winners).
1 Sum total of SDS hits in presented category as a percentage of total SDS hits within review period.

Table.12

STATED SUSTAINABILITY AIM		[15] 1.7%	[9] 3%	[3] 1%	[3] 1.3%	SDS SUM from total[1]
		ALL YEARS	2020	2019	2018	1
	% of hits	%	%	%	%	
	Total	9.67	14.7	5.66	7.31	
		15	9	3	3	
	Winners	3	0	0	12.5	
		1	0	0	1	

% Calculated as percentage of projects using SDS from all projects within review period and group (All or Winners).
1 Sum total of SDS hits in presented category as a percentage of total SDS hits within review period.

Table.13

REDUCING GHG EMISSIONS		[11] 1.3%	[3] 1%	[3] 0.9%	[5] 2.1%	SDS SUM from total[1]
		ALL YEARS	2020	2019	2018	1
	% of hits	%	%	%	%	
Low impact building techniques	Total	3.22	1.63	3.77	4.87	
		5	1	2	2	
	Winners	0	0	0	0	
		0	0	0	0	
Low embodied emissions	Total	1.93	0	1.88	4.87	
		3	0	1	2	
	Winners	1	0	0	1	
		3	0	0	12.5	
Short transportation distances or Accessible by public transportation	Total	1.93	3.27	0	2.43	
		3	2	0	1	
	Winners	1	0	0	1	
		3	0	0	12.5	
Renewable energy use	Total	0	0	0	0	
		0	0	0	0	
	Winners	0	0	0	0	
		0	0	0	0	

% Calculated as percentage of projects using SDS from all projects within review period and group (All or Winners).
1 Sum total of SDS hits in presented category as a percentage of total SDS hits within review period.

Table.14

EFFICIENCY		[10] 1.2%		[6] 2%		[1] 0.3%		[3] 1.3%		SDS SUM from total[1]
		ALL YEARS		2020		2019		2018		
	% of hits	%		%		%		%		
Energy efficiency & Energy saving	Total	4	2.58	2	3.27	1	1.88	1	2.43	1
	Winners	0	0	0	0	0	0	0	0	
Economic efficiency	Total	3	1.93	2	3.27	0	0	1	2.43	
	Winners	0	0	0	0	0	0	0	0	
Passive temperature control & ventilation	Total	1	0.64	1	1.63	0	0	0	0	
	Winners	0	0	0	0	0	0	0	0	
Self-sufficiency	Total	1	0.64	1	1.63	0	0	0	0	
	Winners	0	0	0	0	0	0	0	0	
Water efficiency	Total	1	0.64	0	0	0	0	1	2.43	
	Winners	0	0	0	0	0	0	1	12.5	

% Calculated as percentage of projects using SDS from all projects within review period and group (All or Winners).
1 Sum total of SDS hits in presented category as a percentage of total SDS hits within review period.

Table.15

INDOOR AIR QUALITY		[4] 0.5%		[1] 0.3%		[3] 0.9%		[0] 0		SDS SUM from total[1]
		ALL YEARS		2020		2019		2018		
	% of hits	%		%		%		%		
Ventilation & Air-filtration	Total	3	1.93	1	1.63	2	3.77	0	0	1
	Winners	0	0	0	0	0	0	0	0	
Low maintenance, Easy to clean	Total	1	0.64	0	0	1	1.88	0	0	
	Winners	0	0	0	0	0	0	0	0	
Non-toxic materials	Total	0	0	0	0	0	0	0	0	
	Winners	0	0	0	0	0	0	0	0	

% Calculated as percentage of projects using SDS from all projects within review period and group (All or Winners).
1 Sum total of SDS hits in presented category as a percentage of total SDS hits within review period.

Appendix II: SDS master framework.
Details can be viewed by zooming in or by requesting for the full size image from the author.

Part 1.

		Sustainable design strategies	a	b	c	d	e	f	g	h	i	j	k	l	m
			Improve / Maximise					Recuce / Minimize					Nurture		
		Context / Application	Indoor environmental quality (IEQ)	Indoor air quality (IAQ)	Accessibility / Usability	Energy efficiency	Length of interior life-cycle	Resource use	Waste	GHG emissions	Pollution	Land use / Biodiversity loss	Sustainable behaviour / lifestyles	Adoption of sustainable practices / solutions	Social, Economic & Environmental equity
1	Design drivers	General desired qualities / Pursue	Views to nature/greenery. Controlled acoustics. Daylighting. Accessibility. Aesthetic style & Heritage.	Functioning air ventilation & filtration. Low maintenance / Easy to clean. Regular care and maintenance with low-energy & non-toxic methods. Hygienic & Non-allergen producing. Fire-resistant & Non-toxic.	Accessible and functional for diverse people. The design and its key functions support the independence and assistance of disabled users.	Use passive technologies where possible. (f.i. heating / cooling / ventilation / daylighting). Efficient use of electricity and energy sources. Unnecessary consumption is minimised. Responds to level of demand; Personal, passive and automatic controls available. Solutions/components support efficiency.	Context-fitting. Meaningful. Customisable / Modifiable / Allows for restoration. Easy to clean & maintain. Regular care. Thoughtful aesthetic style. Respects surroundings & heritage.	Local / Regional. Abundant & Rapidly renewable / Organic. Responsibly sourced & managed / Certified. Careful measurements.	Zero-waste design. Allows for restoration instead of replacement. Easy to maintain.	(SEE: Energy efficiency) Use of renewable energy sources & cleaner fuels. Short transportation & commuting distances. Location accessible with public transportation.	Organic / Regional species & sources. Responsibly sourced & managed / Certified. Non-toxic.	Abundant / Rapidly renewable / Invasive.	Facilitates the adoption of more sustainable choices/behaviour. Aims to delay relative and psychological obsolescence (Cooper, 2004) Forms, Improves, develops emotional attachments.	Solutions are carefully compared and selections are justified from a systems design perspective. Responsibly & ethically sourced and managed resources, including Labour. Inclusive, equitable and non-discriminatory working environment. Outcomes, Impacts and learnings are documented and shared openly with peers & relevant stakeholders.	
			Ilndoor temperature between 18-26°c Optimal relative humidity 30-50% (Winchip, 2011)					Re/Up-cyclable / Biodegradable. Reused / Salvaged / Cascaded / Recycled. Appropriate recycling procedures are available and followed. Efficient / Low-impact life-cycle.							
								Durable / Timeless / Gracefully ageing.					Encourage collaborators, stakeholders and users to adopt more sustainable policies and behaviours. Work closely with collaborators and stakeholders to craft and advocate for more sustainable solutions.		
2		General undesired qualities / Avoid	Noise-pollution / Loud or busy acoustics. Dark / Windowless spaces.	UV-transmittance from sunlight. Produces indoor air pollutants. Harbours dust and allergens. Facilitates spread of germs, viruses and harmful spores. Imposes fire safety risk.	Cramped spaces. Unaccessible / Obstructing installation heights and locations.	Excessive or insufficient humidity levels. Incompatible components. Uncontrolled heat gain or loss: Sub-optimal indoor temperature.	Single use / Short service life solutions. Low-quality alternatives.	Rare / Endangered. Slowly renewing / Non-renewable. Long transportation distances. Contributes to an unhealthy working environment. Contributes to environmental degradation.			Oil-based / Creates micro-plastics. Contains rare or heavy metals. Production uses toxic/harmful chemicals. Contributes to harmful runoff / residues / fumes.	Rare / Endangered. Slowly renewing / Non-renewable. Long transportation distances.	Compensating rather than change making. Solution has problematic rebound effects.	Complex, Uncertain, High risk or ethically questionable supply chain. Inflicts harm on the environment, communities or disenfranchised groups.	
			Glare or uncomfortable heat gain/loss from sunlight.		No personal or responsive controls.			End-of-life: landfill or dumping.			Contributes to environmental degradation.		Does not nurture systemic or long-lasting change: Targets/impacts only the practical sphere of transformation (O'Brien & Sygna, 2013). Feeds inequitable power balances.		
3	Materials	Across categories	Use materials with sound absorbing properties to improve interior acoustics.	Use water soluble or non-toxic adhesives, sealants, paints, finishes.	SEE: General desired & Undesired qualities.	Use materials with high thermal mass for passive solar applications; Place materials with high thermal mass in a sunny spot to absorb, store and radiate heat.	Material is correctly installed and all components are suitable for the intended application. Appropriate care and maintenance is followed. Meaningful: Material is locally handcrafted / custom made / historically important / traditional etc.	Take into account material standard sizes, minimum order quantity, accurate dimensions and material calculations, optimal laying pattern and direction. Mix products with different dimensions. Salvage/Reuse existing materials. Return, donate, sell or recycle excess product. Prefer low-impact & compact packaging. Follow appropriate recycling/cascading procedures.		Use local/regional products. Consider supply chain transportation distances.	Prefer low-impact & compact packaging.	SEE: General desired & undesired qualities.	Select materials that can be cleaned using nontoxic substances and low energy use. Provide clear care & maintenance instructions for all interior surfaces and materials.	Design for disassembly / circularity. Pursue minimal resource use. Prefer circular product solutions/options.	Prefer solutions that minimise harm on the environment, communities or disenfranchised groups.
								Clean and restore rather than replace: Cleaning with nontoxic substances and low energy use.						Check the legitimacy of certifications or label claims. Conduct LCA comparison of material options. Prefer providers who offer reclamation services and have short reclamation distances.	
4		Wall covering & finishes *Vinyl, textiles, paper, paint*	Select colours and patterns that maximise aesthetic quality and user benefits.	Avoid materials containing PVC, chlorine, asbestos or other indoor air pollutants. Avoid Vinyl in conditions where it might facilitate fungal growth. Avoid materials that flake into small particles.		Reduce heat loss by choosing solutions with insulating properties (f.i. Rugs, tapestry).	Favour durable coverings (washable, scrubbable, resistance to abrasion, stains, colorfastness etc.) Ensure suitable installation conditions. Check that the chosen wall-covering or paint product is suitable for the intended application. Prefer subtle patterns and colour combinations.	Short-term installation: Use re-usable modular options, fabrics and tacking.			Where feasible, consider: Products with zero or low dye content Biodegradable options, like natural fibers, pigments, dyes & adhesives.	Use renewable materials in thoughtful quantities; always pursue minimal resource use.	Restore/preserve/respect the traditional/original aesthetic instead of making frequent updates in response to trends.		
5		Acoustical boards & ceilings	Choose the product based on the application context and required acoustical characteristics.	Avoid UF content and shedding fibers. Do not install in conditions that support molding and mildew. Fiber panels: moisture control.	Establish or check context-specific or regulatory requirements for Sound transmission class (STC), Outside-indoor transmission class (OITC) & Noise-reduction coefficient (NRC).			Where feasible, consider: Products with zero or low dye content Biodegradable options, like natural fibers, pigments, dyes & adhesives.	Prefer products made with post-consumer or post-industrial waste. Should not contain poisonous residues!			Avoid unsustainably harvested peat products.	In short term applications: Consider removable covering that does not damage the wall. (f.i. stretch fabrics, peel-off removable wallpaper).		
6		Floors — Wood					Avoid constantly humid/wet locations. Avoid areas subject to heavy traffic or staining or cover with a protective matt. Leave room for material expansion and contraction.	Reclaimed/Remilled wood. More adundant: Lower grade wood.		Avoid options contributing to rainforest clearing/forest loss.	Use biodegradable and non-toxic treatments and finishes.	Rapidly renewing / fast growing wood types (f.i. Bamboo, pine)			
7		Floors — Concrete			Use unglazed or structured surfaces to provide slip resistance.	To maximise passive solar heat storage, use in sunny locations.	Vertically grained (quarter sawn) wood allows more frequent sanding than plain sawn. Use durable and salvageable solid wood in long-lasting applications (f.i. Oak & Maple). Avoid engineered wood in long-lasting applications (Thin face veneer, shorter life, harder to salvage).	Use in slab-on-grade construction on ground floor to eliminate additional flooring material and improve sustainability. Reduce embodied energy by using fly ash (Waste from local coal power plants).		Maximise passive solar heat storage by applying in sunny locations.		Outdoor application: Use in a tile form that leaves room for vegetation and rainflow.		
8		Floors — Tile		Prefer water-based installation components. Avoid substrates, adhesives, grout, mortars, sealants, or glazes containing either Lead, VoCs content, petroleum or solvents.			Select denser and harder tiles for higher use applications. Proper installation impacts durability, structural soundness and rigid substrate. Prefer low water absorbance.	Salvage tiles from demolition for cascading opportunities (f.i. terrazzo, mosaic etc.). Utilise 30-100% recycled content tiles.		Hardest glazes require the highest temperatures: High embodied energy.	Avoid glazes that use rare metals or toxic pigments, such as lead.				
								Reduce grouting by using larger tiles.							
9		Floors — Resilient floors	Cork an linoleum: Acoustic insulators, Suitable for thermal installations.	Prefer natural alternatives: Earthen, cork & linoleum. Avoid Vinyl & Rubber due to off-gassing properties. Select natural oil surface seals & UF-free binders. Use cork or linoleum in antistatic & antimicrobial applications.	Prefer natural alternatives in anti-slip flooring.		Proper subfloor preparation. Linoleum: No cleaning with solvents. Service life is 3x that of Vinyl (Winchip).	Refresh linoleum by sanding. Use natural jute backing and natural adhesives and sealants to ensure biodegradability.		Earthen floor has low embodied energy.					
10		Floors — Carpet	Can improve room acoustics. Natural fibres: Warm to touch.	Utilise products certified for IAQ standards. May harbour dust and allergens.	Avoid thick tufted carpets in high traffic areas, passages and other areas where they may obstruct accessibility.	Can improve thermal insulation by preventing heat loss & transfer.	Choose high quality Pile-yarn density, Tuft bind, Delamination strength, Abrasion resistance, Color fastness and stability. Prefer timeless colours and patterns that forgive stains and/or are easy to clean.	Prefer area rugs to wall-to-wall carpet systems. Synthetic fibres: Prefer products with recycled content of >10%.		Wool: Lower energy & water-use in manufacture.	Prefer undyed products or sustainably produced non-toxic dyes. Avoid: Synthetic fibers and dyes that can emit poisonous pollutants, VOCs and toxic dyes into waterways.	Animal based: Evaluate the treatment of animals and their impact on the environment.			
								Prefer fibres extracted from agricultural / industrial waste or invasive species.	Prefer recyclable carpets or leased carpets from providers with short reclamation distances. Consider sustainability of all parts in the carpet system. Prefer products with Low embodied energy.						
11	Legislation & Policy		Complying with laws, regulation, local building codes.			Long-term capital investments in sustainability improving innovations, including energy-efficient equipment, insulation or durable furnishing.	Appropriate implementation of operational and maintenance practices: extend life of equipment, finishes, furnishings.			Adopting, developing and complying with policies that support social and environmental equity.			Complying with laws, regulation, local building codes. Sufficient guidance and appropriate implementation of operational and maintenance practices. Adopting and complying with policies that support social and environmental equity. Conducting LCA comparisons and POE. Using certified solutions. Appropriate planning and monitoring of implementation. Gathering and reacting to feedback.		
12	Location / Site / Orientation		Harness site topography, surrounding views and direction of sunlight in maximising sustainability and user benefits.	Ensure correct site conditions when storing and installing materials to prevent moulding. Examine building site cleanup and follow up on arising needs for further procedures.	To improve accessibility, consider: Proximity of mobility services. Existing accessibility infrastructure. Terrain / Topography of access points.	Orient building according to the suns movement to optimise: Natural daylighting. Passive solar heating & cooling. Ability to harvest renewable energy.	Follow correct installation and building procedures. Appropriate site conditions for the correct storing, treatment and installation of interior components. Plan, schedule and monitor site works.			Utilise existing transportation networks. Retail/Markets: Prefer locations close to residential areas and public transportation. Prefer regional labour.	Minimise polluting site works. Plan and monitor on-site waste handling practices.	Minimise damage to existing environment. Design in accordance to site topography.	Plan & Monitor site work in a transparent manner while following the correct health & safety procedures. Examine potential collaborators & establish shared rules and standards for collaboration. Report and rectify divergences from sustainable site practices. Encourage sustainable behaviour in collaborators.		
										Prefer urban infill to expansion.					

11	**Legislation & Policy**	Complying with laws, regulation, local building codes.			Long-term capital investments in sustainability improving innovations, including energy-efficient equipment, insulation or durable furnishing.	Appropriate implementation of operational and maintenance practices: extend life of equipment, finishes, furnishings.			Adopting, developing and complying with policies that support social and environmental equity.			Complying with laws, regulation, local building codes. Sufficient guidance and appropriate implementation of operational and maintenance practices. Adopting and complying with policies that support social and environmental equity. Conducting LCA comparisons and POE. Using certified solutions. Appropriate planning and monitoring of implementation. Gathering and reacting to feedback.		
12	**Location / Site / Orientation**	Harness site topography, surrounding views and direction of sunlight in maximising sustainability and user benefits.	Ensure correct site conditions when storing and installing materials to prevent moulding. Examine building site cleanup and follow up on arising needs for further procedures.	To improve accessibility, consider: Proximity of mobility services. Existing accessibility infrastructure. Terrain / Topography of access points.	Orient building according to the suns movement to optimise: Natural daylighting. Passive solar heating & cooling. Ability to harvest renewable energy.	Follow correct installation and building procedures. Appropriate site conditions for the correct storing, treatment and installation of interior components. Plan, schedule and monitor site works.			Utilise existing transportation networks. Retail/Markets: Prefer locations close to residential areas and public transportation. Prefer regional labour.	Minimise polluting site works. Plan and monitor on-site waste handling practices.	Minimise damage to existing environment. Design in accordance to site topography.	Plan & Monitor site work in a transparent manner while following the correct health & safety procedures. Examine potential collaborators & establish shared rules and standards for collaboration. Report and rectify divergences from sustainable site practices. Encourage sustainable behaviour in collaborators.		
									Prefer urban infill to expansion.					
									Choose location based on building typology to reduce impacts from transportation.					
13	**Building envelope, Exterior & Layout**		Ensure sufficient ventilation. Utilise passive ventilation indoors and in structure.		Avoid cold bridges in structure to prevent heat loss. Utilise passive solar heating & cooling. Controlled infiltration of sunlight.		Design exterior structure and materials according to regional needs, resource availabilities and expertise.					Utilise choice architecture to award more sustainable behaviour/choices. Consider how layout could maximise benefits from passive solutions for users and overall efficiency (i.e. level of natural light, temperature, ventilation, rainwater harvesting etc.).		Prefer solutions that minimise harm on the environment, communities or disenfranchised social groups.
							Design structural components for disassembly. Plan structures according to standard material dimensions.							
								Avoid permanent fixing of biological and technical components.						
14	**Windows**	Optimise High Luminous efficacy constant (Ke), Visible transmittance (VT) and solar heat gain coefficient in relation to the desired effect (heat storage, cooling etc.) Place windows within interior to allow natural light to access remote or dark spaces. Select the placement, type and size of windows to optimise natural daylighting.				Select window characteristics and shading that prevent UV transmittance from sunlight.								
		Prevent glare and UV transmittance from sunlight. Place windows on more than one wall to improve daylight characteristics.			Use reflective, matte surfaces close to windows: Light toned walls, sloped ceiling, splayed reveals. Shifting climates: Double glazed windows.									
15	**Window treatment**	Select shading types based on the needs of the application environment and required characteristics: R-value, insulation properties, noise control, privacy, glare reduction, solar protection, fire retardancy, antimicrobial characteristics, resistance to UV degradation, LCA outcome.			Use shading to improve the performance of mechanical systems, insulation, HVAC & lighting. Use tight seals to reduce heat loss/gain.	Use drapery lining to protection of fabric from radiation & condensation / Replace lining instead of replacing whole curtain.								
		Provide users with interior shading controls.	Shading contributes to the efficiency of HVAC systems. Choose shade systems with a high R-value to reduce air filtration, convection & radiation.	Select blinds & curtains that allow users to modify the working environment according to need. Provide privacy and blackout options.	Use LCA to compare options. Prefer products that are easy to maintain with low energy cleaning techniques: Manual cleaning.	Conduct or compare the LCA of available options. Use shading to protect finishes & furnishing. Provide manuals for appropriate and regular care! Consider the sustainability of each component (textiles / materials: the weave, dyeing method, yarn material, thread count, treatment, finish etc...).								
16	**Furniture**	Select the type of furniture according to context-specific needs and requirements. Select ergonomic and functional furniture and combinations.	Avoid products with components that produce indoor air pollutants, release toxins, or cause allergic reactions. Regular dust removal from upholstery and surfaces. Protect furniture from decay and moulding: Do not store upholstered or natural furniture in damp environments.	Select furniture and place furniture in a way that serves diverse user needs: Disabled, elderly, children etc.		Repair upholstery and components rather than replacing entire item.								
						Consider: Longevity, Sound construction, Form & Function, Hardware, Structural stability and Durability, Ergonomy and User-specified needs.	Use leased furniture. Reuse existing furniture or prefer old/recycled/refurbished/refinished furniture.	Avoid mixed-materials. Prefer: Powder coated to metal plated furniture, uncoated metal furniture.						
17	**Appliances**	Locate loud appliances away from areas of rest or concentration. Select aesthetically pleasing and convenient integration and placement. Integration can help reduce noise.	Dehumidifiers: Locate in a clean and dust-free place where air circulates and adjacent windows and doors are closed.	Consider accessibility: installation height and user-friendlines, mechanisms. Timers, smart sensors & automation: Help/notify user.	Seek efficiency improvements through passive solutions. Refridgerators & Freezers: Place away from sunny windows, heat-generating appliances or heat-sources.	Provide manuals and place product information /codes and maintenance numbers in a visible location.	Prefer water conserving solutions. Consider alternative/passive systems. Utilise Product-Service-Systems.	Check length of product warranty. Place product manuals and maintenance numbers in a visible location.	Appliances play an important role in reducing energy consumption: Review product LCA!! and choose efficient appliances.			Place recycling bins in visible, accessible and convenient locations that encourage recycling. Use solutions that limit consumption (f.i. self-closing taps, signal tones, dispensers).	Seek to build closed loop/systemic designs. Example: Alternative toilet systems (dry, suction etc.) Reduce water use, turn waste to resource. Sync with anaerobic or biological digestion tanks. Produce biogas for heating, fertilizer etc.	
			Adhere to fire-safety requirements. Select appropriate installation environment: Check classification!			Conduct or compare the LCA of available options.								
					Choose the appropriate size: not too big or small.									
18	**Lighting**	Control sunlight and reduce glare using internal and external shading techniques.		Utilise automated systems that respond to daylight conditions, occupancy and user needs. Provide user controls.								Provide sufficient external and internal shading options and light controls to avoid light pollution to the outdoors.		
			Provide sufficient shading options to prevent overheating.	Reduce glare. Minimum illumination at 269 lux (lx) in 75% or 90% of spaces (LEED). Select appropriate light characteristics (warmth, luminosity, colour rendering) for intended application.	Ensure appropriate installation method, environment and component combatibility: Prevent overheating.				Important role in reducing energy consumption. Prefer: High quality / Low embodied-energy! Products from regional manufacturers. Check that certification meets with regulation. Prefer renewable energy sources and cleaner fuels.			Place personal controls in visible and accessible locations.		
					Use energy-efficient light sources (LED) & components. Select sufficient CRI: High CRI tends to show as higher energy consumption.	Use PSS options.								
						Select appropriate warmth, luminosity & colour rendering characteristics for intended application.	Prefer energy-efficient components. Choose relevant light output, efficacy and lamp life.							
19	**HVAC & Mechanical systems**	Approriate installation, regular maintenance and sufficient operation capacity are important for ensuring good Indoor Air Quality!					Utilise passive/solar water heating systems. Rainwater harvesting.							
					Utilise passive/solar water heating systems.		Select options that conserve valuable resources, such as fresh water. Utilise greywater in non-potable applications.							
20	**Plants**	Provide shading, control noise pollution and protect the exterior from weather by planting trees and bushes around the building. Select native species and determine their placement and number according to the sun's movements, climatic needs as well as in response to existing shading or protective features.			Depending on climatic conditions, plant either deciduous or evergreen trees in front of windows/facades exposed to excessive sunlight.		Minimize impact to the existing natural environment when planning site works, designing new builds or other exterior implementations.							
							Prefer plants that survive with lower amounts of supplementary watering and light.		Use green roofs or other green integrations in the building exterior to compensate for loss of greenery.	Use greenery to absorb air pollutants and runoff (water/rainfall).	Avoid excessive trimming or felling of grass and plants to protect wildlife habitats and biodiversity. Prefer biodiverse solutions as opposed to monoculture.			Use greenery to absorb air pollutants and runoff (water/rainfall).
		Use plants in interior applications for aesthetic enhancement and stress-reduction.	Select air-purifying and non-allergising plants.		Prefer plants that survive with lower amounts of supplementary watering and light.					Prefer natural, non-toxic, biological solutions when combatting unwanted pests or promoting species health and growth.		Provide employees the opportunity to select, care for, enjoy and maintain interior greenery.		

Appendix II: SDS master framework.
Details can be viewed by zooming in or by requesting for the full size image from the author.

Part 2.

Tessa Dean
798736

Aalto University
School of Arts, Design and Architecture
Department of Design
Master of Arts, Creative Sustainability

2021

Supervisor: dil Gaziulusoy
Advisor: Anahita Rashidfarokhi

Pages 92 + 23