

Visually dissecting sustainability

This theoretical study is divided into the following sections:

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1.0 Chapter Introduction

It has been said that:

Architecture is an act of conscious willpower.

To create architecture is to put in order.

Put what in order? Functions and objects (Le Corbusier, 1991, p.68).

What, one may ask, does this order produce? Well, it might be said that in the final act architecture produces nothing. Except what it asks from us. And what we produce in answer can be conceived to be the very essence of sustainability. The production of meaning is arguably first conceived in our minds; by mixing architecture with sustainability. However, in order to understand more about what the relationship is between sustainability and the built environment, the starting point for this study is located outside the domain of architecture. It lies in philosophy. “The idea of the mind as embodied” (Rosch, IN Varela, Thompson and Rosch, 2016, p.xlvii) can be said to sit well with the idea of what is asked of us by the functions and objects of the key protagonists of our built environment: architecture and urban design. We are asked to experience our built environment so that we can make sense of our surroundings; and then to sustain those conditions that we have made sense of. How do we sustain those conditions? We do so it is argued, by taking what the past has put in order *for us*; and passing this order, along with what has been ordered *by us*, on to the next generation. Or put another way: if meaning is the luggage, then sustainability is the leaving. The luggage is ‘hooking in’ with the surroundings (establishing meaning); while the leaving transports that collective meaning into the future; for someone else to hook into. Three distinct terms are contained in the title of this study, namely visual; sustainability; and the built environment. A broad-brush synopsis of how these respective entities may be connected is offered as follows.

Visual refers not only to what we see or experience through sight but is also important for its social relevance. This is because our social world enacts a form of perception (Varela, Thompson and Rosch, 2016); without which meaning is diminished. Our environment is socially-centric in that we use the environment (Clark, 2005; Wilkens, 2014) as well as artefacts (Steadman, 1979, p.81) to store information. Thus, in the context of using our surroundings as a library of sorts, we not only make artefacts but we also use these artefacts for their information; to provide the ongoing meaning that sustains us. If the environment is a repository of information then one could argue that the quality and durability of that stored information directly affects levels of sustainability in the built environment.

Sustainability can be linked to the concept of the visual through our social world because:

Society is indeed a contract... a partnership not only between those who are living, but between those who are living, those who are dead, and those who are to be born (Burke, 2001, p.123).

Sustainability as a term in this study is less concerned with what Barton et al. refer to as nature or uninhabited terrain (2020) and is more focused on human sustainability in, and of, inhabited space. Sustainability and the built environment together reflect how “the things we make make us” (Berleant, 1997, p.11). Sustainability can be said to reside in the idea of being conditioned by the things we make and these two together resonate not only with the theory of ecological perception (Gibson, 2015), but also with the theory of enaction (Varela, Thompson and Rosch, 2016). For ecological perception the idea of environmental conditioning relates to how an object is perceived through our own movement (action- based); while enaction describes how we produce meaning from the background (environment) through our action. In both cases what our action can be said to do for us is fourfold:

1. produce meaning
2. store meaning
3. reveal meaning, and
4. retrieve meaning.

Producing these four things sets up a system that can help us understand what visual sustainability might mean in the context of the reality of our built environment. Because conferred in the reality of the built environment is the realisation that “despite the many differences between them, living creatures and their inorganic counterparts share a crucial dependence on intense flows of energy and materials” (De Landa, 1997, p.104). If we overlay some of these ideas about how we are conditioned in our environment, with De Landa’s unique perspective of reality as an expression of “... *matter-energy* undergoing phase transitions...” (De Landa, 1997, p.21), then the argument can be made that:

- Matter equals object; and energy equals action.
- Energy can be divided into two parts: human and non-human.
 - Non-human energy exists in causality, through for example, one billiard ball striking another (The Perception of Causality (Part 1), 2013). We do not see the cause, just the effect.
 - On the other hand, human energy can be said to exist through social interaction. In this case the opposite appears to be true: the interaction can be seen; but not the effects. For example, we see two people talking to each other but we do not see enrichment or its opposite, the alienation of that interaction. So, if we try and superimpose this scenario onto the example of the two billiard balls; we do not see the effect: the approaching ball or the momentum of the struck ball. All we see is the cause: that instant when one ball strikes another. The cause is human interaction. The effect is unknown. It manifests in other ways but the effect at the point of origin is unknown. Another example is how we see the behaviour of a group of people in an urban setting. Again, we see the interaction but we cannot see which components of the urban (architecture, building, spaces etc.) are producing the sense of enrichment or alienation produced by this interaction. We can ask people about their feelings but even then, how does one describe a feeling in words without some level of ambiguity? It can also be true that the perceiver(s) themselves have no idea which elements are influential and which not, so trapped and obscure are the meanings in their assemblages.
- We bring forth a world (Varela, Thompson and Rosch, 2016); and sustain ourselves in that world by acting around objects.
- Matter can be seen as physical use; or the physical use of an object to us.
- Energy on the other hand can be equated with visual use because it can be argued in this analogy that physical use to us of objects stimulates a corresponding reciprocal visual use (similar to the concept of affordance). The tangible stimulates the intangible and vice-versa.

- In Gibson's theory of affordance the object offers certain uses depending on perceiver and context (Gibson, 2015).
- Visual use can be posited as an energy or an intangible force that can act as, what Varela describes, the bridge between lived experience and embodied cognition (2016).
- The channel (or in Varela's terminology, the circulation) for lived experience can be said to be activated by visual use.
- This study holds that the argument can be extended to the built environment and typologies typically found in the built environment such as the high street.
- Matter can be said to equal physical use and energy equals visual use. This is because matter is the invariance or object required by us to be there for us; so that we can perceive or bring forth the world. The world in this case would simply be: Meaning.
- Lastly, the phase transitions can be posited to be analogous to changes between states of sustainability in the specific context of a part of the built environment.

The rationale above provides the context needed to understand what this study means when it refers to the term visual sustainability. These points will form the basis of further discussion throughout this chapter.

Notwithstanding the ontological significance of the terms being used in this study, the following rationale will outline some of the more general ways sustainability can be understood for this study. Despite a broad history of scepticism, ambiguity, and equally ambiguous ways of measuring sustainability (Bell and Morse, 1999; Owen and Dovey, 2008; Six Things I Learned From World Urban Forum 9, 2018; Barton and Gutiérrez-Antinopai, 2020) it is a concept that has found a home at the United Nations through its UNESCO declared status. The concept has, as it were, been wrestled from a process of individuation and our collective unconscious as described by Jung et al. (1964), and transformed into a regulatory powerhouse informing corporations, governments, and social pedagogy (Agbedahin, 2019; Moallemi et al., 2019). And yet the origins of this proclaimed status appear to be not unlike a derivative of any other status function declaration that has been described by Searle (John Searle on Language & Social Ontology, 2011). Where just as a piece of paper with some ink on it was called money and spawned the complex science around economics, the birth of modern-day sustainability too has developed out of a similar simple abstract concept around equity and needs. Just like paper and ink defined the concept of exchange, Sustainable Development Goals (SDGs) and Sustainability Indicators (SIs) can be thought of as a new form of transaction. The concept, to paraphrase UNESCO, is broadly defined to mean that we take care not only of ourselves but also ensure we have done enough to allow future generations to take care of themselves (1987 Brundtland Report). If society is a contract then, at a metalevel, one of the transactions of that contract essentially bridges past, present and future in the manner of a partnership described by Burke between the dead, the living, and those to come (2001, p.123). It is a transaction between the current version of ourselves and the future version of ourselves. In effect then what the Brundtland Report seeks to achieve is similar, one could argue, to one of the maxims of this study, which is: 'Sustainability equals that which sustains us'. However, this maxim forms only part of any proposed strategy in trying to understand the concept of sustainability. This can be said to be because it is only as successful as "the way we *represent the world to ourselves*" (De Landa, 1997, p.273). If, as De Landa notes, we make ourselves more familiar with "questions of self-organized heterogeneity" (De Landa, 1997, p.273) we can look beyond thinking "about complexity in terms of homogeneous hierarchies" (Ibid.: 1997, p.273).

What is it then that sustains us? To answer this, we need to first understand that sustainability is not a concept that can be neatly packaged, disseminated and understood in an instant. It is the kind of concept that on the surface appears to be relatively simple but can become complicated the more one tries to understand how it is held together. This is partly because sustainability is so multifaceted and multi-disciplinary that it can be said to face multiple directions at the same time. It is no surprise

therefore that the term sustainability carries the weight of a diverse amount of meaning about 'that which sustains us'. If we add our visual world to the mix it would produce an even more diverse range of meaning. Because in the same way that Hockney reflects on memory (David Hockney - *The Art of Seeing*, 2018, p.00:42:18) one could say that for visual meaning each person's mind is a little different; and therefore each person cannot be visually sustained in quite the same way. If this is true then factors such as context, culture, and history make it impossible for us to be visually sustained in exactly the same way. Except, one could argue, if the focus is moved from the qualia associated with these factors, to studying the effects of these elements at a higher level; in an overarching theoretical framework. What if a framework existed where the only two things needed to understand levels of visual sustainability were physical use and visual use? That is a question that motivates this study.

We could equally argue that because sustainability means different things to different people in many different contexts (Evans and Jones, 2008; Rydin, 2011; Barton and Gutiérrez-Antinopai, 2020) this ambiguous characteristic could be used as a strength and not a weakness. For example, in a non-linear complex adaptive system the levels of perceived ambiguity from the amount of complexity contained by the system, enriches rather than dilutes our experience of a phenomenon. As De Landa puts it: "we are starting to think of heterogeneity as something valuable" (1997, p.274). Or take a tree with so many branches and leaves that it has instead become an ambiguous object made up of patterns. In such an object it is difficult to tell things apart and yet it provides, it can be argued, a greater sense of visual stability or wholeness. This is because, as is argued (Polanyi, 1966; De Landa, 2016), we are no longer distracted by the parts. We focus on the whole emergent phenomenon. The same argument can be applied to the diverse and complex entities that describe a condition of sustainability.

The actions we take 'to put in order' is itself, one could say, an act of sustainability. Because we are gathering meaning and putting meaning in order so that things and events can be understood; both in hindsight and for future understanding. UNESCO's modern-day concept of sustainability has been dedicated to putting things in order. This order is reflected in the materialisation of Sustainable Development Goals (SDGs). In fact, modern-day sustainability has become so ordered that it has morphed into an industrial-scale enterprise wielding considerable influence and supported by 'armies' of dedicated scientists and theorists. If we accept the premise that sustainability can be represented as an act by which we put things in order, then it can further be suggested that we order things, not only physically, but by using our minds. If the built environment can be asserted to reflect physical ordering then this study then will lay claim to the concept of sustainability through a process of visual ordering. Because we use our minds in the act of perception.

The argument made so far leads us to question how long the piece of string is that makes up the concept by which we are visually sustained in our built environment. In extrapolating the argument that we sustain ourselves visually not only in what we see but also through embodied perception (Varela, Thompson and Rosch, 2016) it does not take long to find ourselves holding the other end of the piece string. Because there appears to be a circularity by which visual use can be tracked back to physical use through the pathway offered by embodiment. It appears that using our mind and body requires that we take care of and preserve those visual aspects that sustain us. This is reinforced by the premise of how 'that which sustains us' reinforces our identity and sense of self in the world. This study then proceeds from a certain logic: that meeting present needs without compromising the ability of future generations to meet their own needs (Brundtland Report) can be said to be wrapped up in the overarching idea of 'that which sustains us'.

The idea that sustainability can still exist as a concept even if it means different things to different people can be captured in the metaphor of a tree. Sustainability is a tree with many branches and full of leaves. Each branch appears to be independent of, and partially isolated from, the other. For example, along one branch extends a realm concerned with social sustainability. The leaves along this

branch are entities which refer to generic phrases such as ‘reduce alienation’, ‘sense of community’, and ‘place attachment’ (terms taken from a conceptual framework proposed by Eizenberg et al.) (2017). However, many of these leaves are like the leaves that are proposed in this study; except that this study follows another branch; which we will call visual sustainability. And the leaves for visual sustainability, while similar, are not exactly the same as the leaves on the social sustainability branch. But they are all generic enough to point us all upwards in roughly the same direction of the tree trunk. It follows that in this ‘tree of sustainability’ our search for the meaning of sustainability is highly contextual and depends on which area of our lived world we wish to focus; and on how we wish to apply our lived experience to that search. The branches mean different things but they all belong to the same tree trunk. In this sense then, it is the contention of this study that if we think about the built environment, a certain set of conditions may present themselves in the guise of another form of sustainability, and yet be different. The conditions are different because they are seen through a different lens. The overall problem of differences in types of sustainability is compounded by the growing list, for example, social; ecological; technological; and economic, to name a few. In fact, almost every aspect of life and lived experience can be said to be connected in some way or other to the main tree trunk of sustainability; to the idea of being able to be sustained or of ‘that which sustains us’. Which is why the best way forward is not to fight the differences but to embrace them.

This study will focus its efforts on sustainability of the built environment. Notably, Eizenberg et al. refer to aspects of the built environment through the lens of social sustainability, reflecting on how:

The concept of Urban Forms represents the physical dimensions of *socially desired* urban and community physical forms. Eventually, a desired physical form should promote a sense of community, safety, health, and place attachment, among other environmental objectives (2017, p.1, emphasis added).

Inferred in Eizenberg’s statement is the idea that similar entities exist along different branches or in different frameworks. The phrase, ‘socially desired’ can be read to mean how the intangible expects to be mirrored in the tangible. How what we do *not* see should be present in what we do see. A similar distinction has been drawn in this study: between physical use and visual use. It refers to many of the intangible values inherent in our environment that support the physical use reflected in and afforded by the physical forms in the built environment. This theme of “connecting the visible and invisible world” (Burke, 2001, p.124) with visible and invisible needs (Lefebvre and Nicholson-Smith, 2011) is key to understanding the premise of this thesis, which is that sustainability is as much about visual use and attraction as it is about physical use and attraction.

The third distinct term is ‘built environment’. It is our “urban exoskeleton” (De Landa, 1997, p.27) and, in an ideal world, is represented by architecture and urban design. Architecture is generally used in this study to refer to the built environment and not to information technology. Inferred in the relationship between these two disciplines is the notion that they are closely aligned with sustainability. This subtlety of this relationship is conferred in how architecture itself as a form of storytelling. It is aligned with how sustainability and sustainable development have been described: as “contemporary metanarratives in that they are widely used to reflect particular world views” (Barton and Gutiérrez-Antinopai, 2020, p.1). The subtlety for architectural and urban storytelling lies in representations of the built environment. These representations are often highly coded and employ devices such as semiotics, metaphor, and thematic schemes to validate these professions.

Why is visual sustainability important?

The importance of being visually sustained is twofold. Firstly, it makes a connection that appears to be absent from the goals of modern-day sustainability; of the importance to humans of sustainable levels; not just physical satisfaction or use, but also visual satisfaction or use. Secondly, it will be argued that visual sustainability through the reciprocal interaction between these uses, can help neutralise

the effects of urban alienation. Urban alienation (Bhugra et al., 2019; Yuill, 2017; Sussman and Hollander, 2018; Hollander, Sussman and Carr, 2018; Sussman and Ward, 2017, 2016; Sussman and Chen, 2017; Lefebvre and Nicholson-Smith, 2011; Cullen, 1995; Alexander, Ishikawa and Silverstein, 1977) should be understood in terms of the definition provided in this document. However, it is not ever located far from the idea of a “homogenization of point of view” (De Landa, 1997, p.244), whether this be in delivery of information in any number of disciplines from journalism to architecture. Because buildings deliver information.

Does a concept of visual sustainability exist?

We have reached a point in this introduction where the question can be posed about whether a concept of visual sustainability exists. If it does *not* exist then it can be suggested that a branch needs to grow out from the tree trunk of modern-day sustainability. If it does, then we need to be able to see the branch and be able to discern for ourselves which leaves are important for the argument being made in this study. In the discernment of conditions that may describe a sustainable built environment, there are two important points to consider when thinking about how we consume visual elements.

The first point questions how it is that we know visual use and meaning is largely absent from modern-day sustainability. It appears to be true, one could argue, by pointing out the manner in which modern-day sustainability has been framed through UNESCO’s Sustainable Development Goals (SDGs). The majority of the goals provide no specific information or guidance about visual meaning. For example, SDG 11 refers to ‘resilient’, ‘sustainable’, and ‘protecting cultural heritage’. Target 11.4 can be said to relate most closely to this study’s concept of being *visually* sustained in life. But only in the narrow frame of being non-renewable resources; and only in the context of the perceived threat to World heritage sites (Ashrafi, Kloos and Neugebauer, 2020). The UNESCO guidelines are as follows:

- SDG 3 ‘Good health and well-being’ refers to one single target as follows:
 - Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination (UNEP UN Environment Programme, 2017).
- SDG 11 has the main aim to “Make cities and human settlements inclusive, safe, resilient and sustainable”. It cites the need for “urban resilience” (Ibid.: 2017) to counter threats of climate change and natural disasters. Targets include:
 - Target 11.3: By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.
 - Target 11.4: Strengthen efforts to protect and safeguard the world’s cultural and natural heritage. The “role of culture in sustainable development” (Ashrafi, Kloos and Neugebauer, 2020, p.2) is specifically relevant to world heritage sites, and structures. These are primarily considered in terms of the visual threat posed by “uncontrolled urbanisation” (Ibid.: 2020, p.8) surrounding development, because:

As mentioned by UNESCO, Heritage properties are “nonrenewable resources” of each community which extremely linked to the identity and sense of belonging. The World Heritage Convention 1972 recognised Outstanding Universal Values (OUV) as a central concept of World Cultural and Natural Heritage which deserves to be protected and transmitted to the next generation (Ibid.: 2020, p.2).
 - Target 11.7: By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities.
- By comparison, the SDG Resources for Educators (UNESCO, 2018) provides a pedagogical snapshot of what is arguably a more direct measure of each goal in turn, because they

represent what is being taught. But here too there is very little to add. For example, SDG 11 ‘Sustainable Cities and Communities’ seeks to allow

... its inhabitants to live in good conditions and in harmony with their surrounding nature... Quality education provides the appropriate tools to ensure the monitoring of waste management and air quality. It prepares communities to manage their resources properly and tackle climate change (UNESCO, 2018).

It appears then that visual meaning in the built environment is not only absent in the overriding policy but also in the supporting role education provides. It reaffirms the long-standing criticism levelled about how “Science remains the most powerful discourse in the quest for sustainability” (Owen and Dovey, 2008, pp.12–13) because “in our present world science is so dominant that we give it the authority to explain even when it denies what is most immediate and direct – our everyday, immediate experience” (Varela, Thompson and Rosch, 2016, p.12).

The arguments in this study, that modern-day sustainability lacks the foundation that visual sustainability can provide, is aligned with Varela et al.’s viewpoint that “Science alone - that is, science without any bridge to everyday human experience – is incapable of this task” (Varela, Thompson and Rosch, 2016, p.218). The absence, at this level of governance, of visual use and meaning (and by extension, social signification) is thus problematic and it signals that a correction is needed. Because “as important as they may be... physical settings/ characteristics are insufficient for addressing the problems that urban communities currently face and cannot independently generate the capacities that communities require to become sustainable” (Eizenberg and Jabareen, 2017, p.3). UNESCO should be encouraged to reframe the terms of reference for modern-day sustainability to incorporate a concept of visual sustainability because sustainability cannot exist as a concept in isolation from “... a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity” (WHO | Constitution of WHO: principles, 2018). The need to be inclusive, advocated by WHO, underpins the logic of this study; which will be to argue that visual sustainability provides an overarching framework containing the components that speak not only to visual aspects of social sustainability but to the theory of cities in general.

If it can be agreed that for people, a healthy mind is just as important as the health of the physical objects that surround them, then we appear to be confronted with a dilemma. The dilemma is that a gulf exists not only in sustainability, between how we understand and provide for physical use at the expense of visual use, but also in cognition. In cognition the “gulf [is] between the human mind as studied by science and the mind as personally experienced—now often spoken of as the disconnect between first person and third person knowledge” (Eleanor Rosch, IN Varela, Thompson and Rosch, 2016). Because while sustainability of the physical environment has been extensively detailed in every one of the seventeen SDGs, there is little acknowledgment of the role played by lived experience. This despite the observation made by Rosch: that it is the mind that contains both science and lived experience (Eleanor Rosch, IN Varela, Thompson and Rosch, 2016, p.xxxvii).

If it is true that, in the tradition of Merleau-Ponty, “we see our bodies both as physical structures and as lived, experiential structures – in short, as both “outer” and “inner,” biological and phenomenological” (Varela, Thompson and Rosch, 2016, p.lxi), then, for us as humans, sustainability, in the broadest sense of the word must meet and satisfy these requirements. Thus, can be said, that from the physical structure emanates *physical use*; and from the lived, experiential structure emanates *visual use*. These two *uses* are key concepts in this study. As uses or affordances, they are not different in many respects to associated urban phenomenon, for example, in “the physical and non-physical aspects of social sustainability” (Eizenberg and Jabareen, 2017, p.4) except in what they target. This study will through the entities of physical use and visual use target the following:

- a) Attempt to discover more about the relationship between
 - i. the process of visual sustainability and

- ii. the enactment or use that makes the process more discoverable (Kelley); and
- b) Narrow the focus to visual consumption, that is, how we consume visual elements in an environment in relation to levels of sustainability.
- c) Place the emphasis on “*understanding* instead of prediction” (Jabareen, 2009, p.49).

To help bridge the gap that appears to exist in modern-day sustainability; between objective science and subjective lived experience we need to understand the charge levelled in defence of science in sustainability. This appears to be framed along the following lines: that “there remains no direct, hands-on, pragmatic approach to experience with which to complement science” (Varela, Thompson and Rosch, 2016, p.lxiv). A possible solution can be proposed to circumvent this apparent contradiction by embracing the following two conditions:

- Firstly, that this methodology acknowledges the concept of human subjective agreement (John Searle on Language & Social Ontology, 2011). As a society, we can agree to do something about this gap in comprehension by adopting the reasoning advocated by Searle: to use collective intentionality and status function declarations to bridge the ambiguity.
- Secondly, that this methodology incorporates the logic employed in neurophenomenology by Varela et. al. which makes lived experience just as relevant as science in modern-day sustainability of the built environment. The purpose of this will be to act as a buffer to the threat of being overrun by “technological artifacts” (Varela, Thompson and Rosch, 2016, p.lxiii) populating both our physical and our visual world. Because these artefacts and images have multiplied to such an extent the question that can now be asked is whether we understand more about other people’s experience than our own.

The second important consideration is more a statement than a question. Because there is no question that evidence exists throughout history that implicitly a). recognises the concept of visual sustainability and b). ties it to our achievements and well-being. It is inferred in theories and by built environment theorists and practitioners.

It may be suggested that one obvious example of an urbanist being grounded by a sense of visual sustainability is Cullen (1995) whose devotion to extending urban meaning into the future is an inspiration to many urbanists. Another example is Christopher Alexander. While Alexander’s theory is quite explicit about enduring and sustainable space (Alexander, Ishikawa and Silverstein, 1977; Alexander, 1979, 2002a; b, 2004) his practice of visual sustainability through architecture can be said to be, at the very least, derived from a noble intention to produce visually sustaining artefacts. For Alexander “wholeness is not merely a gestalt of the thing, but the *system of* larger and smaller *centres* in their connections and overlaps” (2002a, p.90, emphasis added). Alexander understood the power of emergent properties through his patterns:

No pattern is an isolated entity. Each pattern can exist in the world, only to the extent that it is supported by other patterns: the larger patterns in which it is embedded, the patterns of the same size that surround it, and the smaller patterns which are embedded in it. This is a fundamental view of the world (Alexander et al., 1977, xiii, cited in Dawes and Ostwald, 2018, p.3).

A tree is an example of pattern making. But the analogy of a tree is different when describing our urban. As Alexander pointed out, we do not live as isolated entities. Our urban does not exist like the branches of a tree but as a fully integrated network (Alexander, 1965). We are all part of a larger pattern and there is no boundary at which these patterns can be said to have stopped. Even if modern-day sustainability is more like a tree, it should arguably be more like a network of meaning. In the same sense described in fractal theory, we can be said to all be part of ever-increasing patterns and layers of patterns. It is important to bear in mind that, at this stage, visual sustainability has not been defined. Yet we do have a definite sense for what this definition might be based on the theory of protagonists such as Cullen and Alexander. At the very least, we can reinforce the idea that there is

room to argue that because architecture is a pattern of storytelling, it can be seen to form part of the metanarrative of sustainability proposed by Barton et al. (2020).

Can we answer the question of whether a concept of visual sustainability exists? What these two important considerations discussed reveal is the paradox confronting the term visual sustainability. It is like experiencing a phantom limb. We cannot see it but we experience it (Consciousness, Qualia, and Self (V.S. Ramachandran), 2007). On the one hand visual sustainability does not exist; on the other hand, it does. It does not exist in modern-day sustainability where we most expect to find it; and yet it purports to exist through lived experience in urban storytelling. This uncertainty furthers the sense of curiosity about the unknown entities that would make this concept more discoverable. If it does exist but we cannot see it, perhaps it is a case where: "The aspects of things that are most important for us are hidden because of their simplicity and familiarity" (Wittgenstein, 1968, p.50). Or perhaps the uncertainty is derived from the fact that until now there has been no direct connection made between our visual world and modern-day sustainability. Or lastly, perhaps it is simply a case that science is not willing to share the concept of sustainability with the mind; through lived experience.

What this means for modern-day sustainability

The proposition in this study, that sustainability is 'that which sustains us', raises the question about why it is that the visual meaning that sustains us is not part of 'meeting our needs' as defined by the Brundtland Report. Any meaning that helps ground us to our world should be considered indivisible from the UN goals of "related thematic issues, including water, energy, climate, oceans, urbanization, transport, science and technology" (United Nations, 2020). This question is however far too broadly stated for the remit of this study. What is needed is a more holistic way of addressing the knowledge gap. To put that in order, the first thing to understand is how the absence of visual meaning poses an existential threat. It threatens our human spiritual existence because:

On the one hand, the realist naturally thinks that there is a distinction between our ideas or concepts and that which they represent, namely, the world... The idealist, on the other hand, quickly points out that we have no access to such an independent world except through our representations... We cannot stand outside of ourselves to behold the degree of fit... (Varela, Thompson and Rosch, 2016, p.137).

In other words, the science of modern-day sustainability is simply one representation of the world because "the very idea of a world independent of representation is itself only another of our representations" (Ibid.: 2016, p.137). If the technology that drives the way in which we are being asked to understand sustainability is just a representation, then we should at least spend an equal amount of attention on another important form of representation: the interpretive domain of knowledge.

One important caveat however to bear in mind for the upcoming methodology is that, while this research illuminates the gap in knowledge (that is, the ontological significance of the absence of a SDG that addresses visual meaning in modern-day sustainability), the focus of this research is not to address the gap per se at the level of UNESCO's SDGs. Instead, by highlighting the gap, this research aims to understand more about the components that make up visual sustainability; and how visual use in the built environment can survive the passage of time along with physical use. Because physical use is already clearly evident in each of the Sustainable Development Goals.

The importance of the gap in knowledge, however broadly stated, is presumed to lie in the components that this research hopes to discover more about. This in turn promises to help point us in the right direction to a condition called visual sustainability and is important so that we should:

1. be able to recognise it;

2. call it out by its name;
3. help promulgate and disseminate its virtues; and
4. insist that it forms part of UNESCO's sustainability manifesto and is reflected in the SDGs.

What this means for what sustainability means in this study then is that the term visual sustainability will be explored within a narrow frame of reference as follows:

- By thinking about how visual use is important in the built environment.
- By thinking about the opposite dimension of visual use, which is physical use.
- By considering the effects of alienation in the built environment under the following premise: that visual alienation is a concept situated directly opposite visual sustainability in this ontological framework. This is especially relevant in terms of two significant "trends... the objectification of science and the externalisation of our lives" (Eleanor Rosch, IN Varela, Thompson and Rosch, 2016, p.xxxvi); as well one can argue, increased levels of alienation through social distancing. These trends appear to contribute to an increase the perception of feeling alienated (Bhugra et al., 2019).
- By considering how, on the grounds of reconciling science with experience, enaction "as a *philosophical* paradigm" (Eleanor Rosch, IN Varela, Thompson and Rosch, 2016, p.xxxviii, emphasis added) can help steer the argument for visual sustainability with a greater sense of clarity and purpose.

Sustainability and self-actualisation

A condition of being visually sustained is also important in terms of the process of self-actualisation because the ultimate achievement of the tree of sustainability must be to contribute to uplifting the human spirit. It has been asserted, for example, that: "Significant architecture makes us experience ourselves as complete embodied and spiritual beings" (Pallasmaa, 2008, p.11). If we consider only the practice of architecture, it is debateable how many buildings have such a profound effect on ordinary members of the public. But if it is true that architecture is "our primary instrument in relating us with space and time" (Pallasmaa, 2008, p.17) and "is intended to live on into a distant future" (Rasmussen, 1964, p.12), then it is almost inconceivable to think that visual meaning is largely absent from modern-day sustainability. Or that a SDG called visual sustainability does not exist.

Even if the declarations about the influence and longevity of architecture is often one-sided, highly subjective, and grounded in personal experience, each declaration is essentially the culmination of a personal journey. These stories endure as first-person phenomenological accounts. And when they form part of a larger pattern of storytelling in society; storytelling in the context, not only of individual buildings, but of rich assemblages or architectural compositions, then at a metalevel they exist for their restorative powers. Both as sustenance and in sustaining people from different cultures. The example of individuation and power of ancient symbols (Jung, Franz and Freeman, 1964) attest to this phenomenon. While Rasmussen's story appeared two decades before the Brundtland Report enacted modern-day sustainability, and Pallasmaa two decades after, it does not preclude either from the fact that the concept of visual sustainability has arguably existed for as long as man has roamed this earth; in the form of tacit knowledge (Polanyi, 1966) accessed through the human mind. The realisation then is that sustainability is less about 'when' and more about 'what'. It appears to be something hardwired in our brain; as matter which ensures we survive. At this juncture then we can safely pivot away from the problem of its absence from modern-day sustainability; towards what visual sustainability might be and why. Because, while knowing little about it, we almost always think we recognise it. The question then is: what is it that we think we recognise?

Sustainability and urban theory

Polanyi et al. have been to the social sciences what Alexander et al. have been to architecture and urban design. Both ontologically deeply satisfying yet both arguably largely ignored and abandoned.

While in the social sciences Polanyi has paved the way for understanding the phenomenon of tacit knowing (Polanyi and Grene, 1969), as far as the journey of visual meaning goes in the story of architecture, Alexander, Lynch and others have been credited for moving the discussion beyond phenomenology to a more quantitatively based footing. Lynch is credited with being the first in social sciences to refer to “the *value in* the built environment as something in itself... [and] deals with the *quality of* the built environment” (Beinart, 2013, pt.00:06:40, emphasis added). *Quality of* and *value in*, are expressions that find considerable traction in this study, although both are quite generic and ambiguous terms often used in many different contexts. Lynch also describes meaning in the built environment by way of the relationship that exists between physical form and social relationships (structure and identity) (Lynch, 1984); physical structures and mental images (Lynch, 2005); and the inseparability between practical and aesthetic (Lynch, 1984, p.104). But Lynch failed to address meaning: “Kevin Lynch (1960) supplied us with a language for understanding and manipulating the urban environment... However, he explicitly avoided the question of meaning... Later studies found that social and functional meaning were as significant a factor in urban perception as imageability (e.g., Gulick 1963, Appleyard 1976)”. If we accept the importance of Lynch’s empirically based analysis (of what can be described in this study as the relationship between physical and visual use) it can be argued that, from an urbanist’s point of view, the SDGs also fail to adequately address meaning through this relationship. (Appleyard, 1979, p.150). Could the meaning lie in the concept of visual sustainability? And if so, then this study is less about urban mapping, symbols, and coding; and more about the relationship between physical and visual use.

Sustainability and alienation

Society as a whole has been feeling the effects of homogenization where social structures, for example newspapers, “were *not* in the business of selling information to people, but rather of selling *the attention of their readers* to commercial concerns” (De Landa, 1997, p.243). It would make sense that these social effects would be directly passed down to the built environment, and would be especially relevant because “technological developments were working against... heterogenizing forces” (Ibid.: 1997, p.242). Recently, as technology has improved, there has been an even more pronounced shift away from the interpretive domain, in favour of cognitive science and cognitive architecture. And this includes mental health and the negative effects of alienation in our cities. Beyond the long list of scientific-led assertions of a correlation existing between physical and mental health problems in relation to natural and urban settings (Bhugra et al., 2019; Citizen science research investigates neighborhoods’ effects on well-being - Scope, 2018; Human brain hard-wired for rural tranquillity, 2013; Jaffe, 2012; Berman et al., 2012; Ulrich, 1979) some progress has also been made on understanding, for example, how buildings themselves directly affect mental health (Sussman and Hollander, 2018; Hollander, Sussman and Carr, 2018; Sussman and Chen, 2017; Sussman and Ward, 2017, 2016). Yet for all these advances there has been little by way of understanding how lived experience and science can connect in a way that can challenge the overwhelming levels of science in modern-day sustainability. The adoption of a promising new research methodology called enaction however offers hope. Enaction has been described as “a new kind of cognitive science... that may help bridge the communication gap between experience and science” (Eleanor Rosch, IN Varela, Thompson and Rosch, 2016, pp.xxxv, lii). It helps us understand how the production of meaning (or relevancy in De Landa’s terms) can be managed. Enaction occurs through a process linking our actions with our environment. It describes how: “The living body is a self-producing and self-maintaining system that enacts or brings forth relevance” (Evan Thompson, IN Varela, Thompson and Rosch, 2016, p.xxv). This idea spawns several more, one being in the form of a statement that, in the same way, physical use in an environment enacts or brings forth visual use or relevance. Because an object cannot be relevant until our mind has dealt with it sufficiently enough; until we see the visual use. And this includes not only how our mind processes what we see but also how our mind uses our body to help understand the relevance of it all. Gibson’s concept of affordance (Gibson, 1983), that it is about the use that objects imply or hold, strongly supports this rationale. This view is supported in the embodied

cognition theory of Varela et al. in which they describe how affordance “consists in the *opportunities for interaction* that things in the environment possess...” (Varela, Thompson and Rosch, 2016, p.203, emphasis added). Physical and visual use are concepts that are found in urban theory, for example, alluded to in Rapoport’s description of fixed elements versus non-fixed elements (1990).

Sustainability and enaction

What this thesis seeks to establish is whether the idea of enaction through embodied cognition, meaning the relationship between the self-regulating functioning of our bodies and the visual use harnessed by our mind (Wilson and Foglia, 2017), can be transferred over into an argument about the interaction between the two concepts already touched on in this section; and that relate to our relationship with our built environment, namely, physical use and visual use. Because it is difficult to argue against the fact that there is an environmental process in which we are embedded; in which physical use (for us) and visual use (for us) both produce meaning (for us) individually or collectively, in a cultural sense. Both physical use and visual use can be said to be entirely dependent on some form of action for an effect to take place; that helps explain their relationship not only to each other, but to the environment as well. Thus, by using Kelley’s analysis (Figure 2) (The Perception of Causality (Part 1), 2013) we can hope to learn more about the relationship between a process (visual sustainability) and those entities that make that process discoverable; entities which this study holds, are physical use and visual use. To summarise the argument in the context of sustainability:

- IF the consequence of enaction is that we create our own future as it were; as described in “the process by which one enacts one’s world (in phenomenology speak, “brings forth a world”))” (Eleanor Rosch, IN Varela, Thompson and Rosch, 2016, p.xxxviii); and
- the observable entities themselves reveal more about the process itself (Kelley), of creating the future in real-time,
- THEN our actions in relation to a specific context in and around our built environment can be harnessed to positively contribute to each of the Sustainable Development Goals.

Sustainability and ambiguity

While over the last fifty years Lefebvre, Searle and Varela et al. have wrestled with and pushed back against the contradiction found in ambiguity and the Cartesian mind-body mindset (Lefebvre and Nicholson-Smith, 2011, p.420; John Searle on Perception & Philosophy of Mind, 2015; Varela, Thompson and Rosch, 2016), modern-day sustainability has, it can be argued, been less successful in closing this gap. It is simply the case that in modern-day sustainability (by which is meant post-1987 Brundtland Report), one domain of knowledge dominates: objectivist over interpretive; third person (outside-in) over first-person (inside-out). It should be remembered that the science of modern-day sustainability that drives UNESCOs SDGs, depends on our experience because:

Everything perceived, believed, theorized, researched, and known is done so by an observer... the brain is inside the mind rather than vice versa. And it is from that point of view that phenomenology throws down the gauntlet... (Eleanor Rosch, IN Varela, Thompson and Rosch, 2016, p.xxxvii).

The practice of modern-day sustainability appears therefore to have left the most important component hanging outside of its terms of reference: our lived experience.

Coincidentally, in much the same way Rasmussen and Pallasmaa stood on each side of the 1987 Brundtland Report’s declaration of modern-day sustainability, Varela’s work spanned across this period. It is important in this regard because Varela seeks to achieve what sustainability fails to: in uniting the science of UNESCOs Sustainable Development Goals with the lived and visual experience of humans interacting with the effects of this science. Because it is evident from these ‘goals’ that we understand the scientific side of sustainability (in the sense that scientists are underwriting the statements being made) and we accept these statements to be true because the scientists say so. But

there is little backing in sustainability for the phenomenological side of lived experience, and the closest we have come to uniting these domains of knowledge has arguably been through the neurophenomenological stance taken by Varela. Their work makes a conscious and timely effort to “now refer to [experience] as “first-person experience,” so much less biased and invalidating a term than its forerunner, “subjective experience” (Jon Kabat-Zinn, IN Varela, Thompson and Rosch, 2016, p.xiii).

The aim of this thesis is to follow the trail of arguments that seek to unite rather than obfuscate these old ideological and ontological foes; and to offer a definition based on a greater understanding about what the main variables may be for a concept of visual sustainability. The methodology will use Kelley’s analysis of causality (The Perception of Causality (Part 1), 2013) as a starting point, to look at which visible entities point us towards a better explanation of this invisible phenomenon we can call visual sustainability.

The use of the word visual with the word sustainability

At the start of this research visual sustainability was a term that had not been used in general urban discourse, or at least not in a specific sense. It was implied in the built environment through philosophy, theory, and history underpinning architectural and urban practice. A history that Tavernor, for example, highlights for us as follows:

In a UK context, the “most valued townscapes” are usually a creation of more than one approach to architecture and place making, and townscape quality and character is the outcome of generations, if not centuries of design and planning process (2007, p.3).

It can be argued that it is precisely this diverse array of approaches which has tended to get in the way of a more holistic way of thinking about what it is to be visually sustained by our built environment. These theoretical shifting sands produce a promising but elusive dance around the key idea being proposed by this thesis; about the existence of visual sustainability. In this context then, this thesis aims to lift ‘the visual’ as a concept above the crowded philosophical and theoretical discourse that exists today. Tavernor’s use of the phrase ‘visual and cultural sustainability’ is used in the context of the problem of visual blight of tall buildings in London. This, along with the “eco-aesthetic concept of *visual sustainability*” (Erem and Gür, 2008, p.54, emphasis added) adopted by Guy and Farmer (2001) represent one of the few discovered uses of the term in the context of our built environment. Guy and Farmer however do not use the term visual sustainability, instead referencing “crystalline forms and fractured planes” (2001, p.144) as evidence of their eco-aesthetic concept. Tavernor, on the other hand, references Sitte and Cullen in terms of the “... notion of a *visually sustainable* blend of ancient and modern architecture in UK towns and cities” (2007, p.6, emphasis added). He however does not offer a definition of visual sustainability, instead deferring to “visual boundaries of sustainable urban design” (Tavernor, 2007, p.11); and in the context of proposals that are ‘not sustainable’ when considered in relation to architectural heritage (ibid.: 2007, p.4).

The argument around how we make visual sense of the world has, as we have seen, been traced from a multitude of disciplines in the previous section. Visual methodologies (Rose, 2007) offer one perspective into an appropriate methodical approach in this study; one that allows us to “make the invisible within a city visible... “seeing” systems and making legible the city” (Altamirano-Allende and Selin, 2016, p.462). The techniques employed vary considerably. Innovative methods range from how architectural and urban atmospheres influence our perception in towns (Thomas, 2009), to understanding urban sustainability in the context of green spaces (Anzoise, 2017). There are ideas around enactment — by which is meant the process of creating the future through action (Varela, Thompson and Rosch, 2016) — and which will be considered and framed in relation to the methodology. All these ideas seem to coalesce around the central supporting argument about how

“ways of acting in the environment are also ways of perceiving it” (Ingold, 2002, p.9). This two-way process, between seeing and acting, is fundamental to developing an urban concept that speaks to the enduring relationship between two modes of urban consumption: physical satisfaction and visual satisfaction. (1990, pp.32–34). “By moving around we’re actually creating structure” (The ecological approach to perception & action, 2013, p.00:37:40; James Gibson - Ohio - 1974 - Part 1, 1974, p.00:11:40). There does not appear to be a contradiction between Gibson’s analysis of moving around objects to discover them, and the idea floated by Anzaise, “through which meanings immanent in an environment are not so much constructed as discovered” (Anzaise, 2017, p.203). Her view is inspired by the process advocated by Ingold whereby environmental perception is the result of growth, not inborn or through acquisition of skills (2002). This approach can be considered to support Piaget’s view that discovery is growth. Which in turn supports Gibson’s theory of affordance (acknowledged by Varela et al.) and Varela et al.’s own approach “that perception consists in perceptually guided action and that cognitive structures emerge from the recurrent sensorimotor patterns that enable action to be perceptually guided” (Varela, Thompson and Rosch, 2016, pp.200, 203). The construction of our visual world therefore points to how we act in our environment. How we act thus determines the nature of our physical use of objects in the environment, as well as our visual use, or what we consume with our minds. The notion of physical use and visual use must in some way be relevant to Varela’s theory of enactment and embodied cognition because it makes sense that we create our own future, as described by the theory of enactment, through a process that requires us to act.

These ideas so far are the seeds for a developing argument in this thesis: that acting can be said to be a physical function; a tangible event. The developing argument is thus: I look at something, which makes me perform an action using my mind, based on the physical use that object affords me. The actions are describable. When however, an object makes me *feel* something, when an action is *internalised*, then it is no longer the same describable action. Now it has become an action for which there is no language (Polanyi and Grene, 1969), where we have crossed over into visual use. Visual use is comprised of intangible processes that act as containers for social and cultural expressions. No action can describe these processes. No physical use can describe these expressions. Because, as Polanyi asserts, these are phenomenon for which there is no language. This developing concept of an environment comprised of two things: physical use and visual use, is similar to that made by Ingold where he describes how it dawned on him that the Cartesian mind-body problem can be solved by adopting Gibson’s theory of ecological perception (2015). He offers ecological perception as his answer to the question about whether a link can be established “between the biological life of the organism in its environment and the cultural life of the mind in society...” (Ingold, 2002, p.3). And, for this research into visual sustainability, it can be reframed into a question about whether the terms *physical use* and *visual use* can be substituted for the expressions: *biological life* and *mind in society*. The reciprocal nature of (what is perceived as an ambiguous duality) is, as we have seen, evident not only in Ingold’s work, but also in Varela’s work related to embodied cognition; as well as Searle’s work of the mind and language. The idea that people “are carried forward and transformed through their own actions” (Ingold, 2002, p.3) is a compelling one. It speaks to the concept of being visually sustained; where visual sustainability is a litmus test for how people consume and are sustained through both physical and visual use.

In the built environment there is one fundamental ordering device: the street. The street itself acts as a container for uses. Carmona reminds us of the importance of “establishing high streets as real ‘places’ as opposed to simple functional spaces” (2015, p.15). It is a place that produced “the weekly markets that have always existed at the heart of most cities and towns... periodically concentrating people and goods from near and faraway regions” (De Landa, 1997, p.28). Essentially then a high street can be said to be a small-town market because it is an extension of De Landa’s hybrid (De Landa, 1997); between centralising Matter but also acting as a network system; as a node with edges directing Energy in and out. This container (for uses) points to and potentially describes the key variables in this

study of visual use in relation to physical use. For sustainability, a high street exhibits sustainable characteristics, one study noting how a street is sustained physically by the characteristics of silhouette and street elevation (Leyzerova and Bagina, 2017). They however stop short in their analysis into what this means for a concept such as visual sustainability, by limiting their findings to the way in which “architectural and artistic sustainability” have endured within the bounds of the original parameters set when the street was formed. If we look further afield for different approaches to that which sustains us visually, we find one wrapped up in the philosophy of beauty (Why Beauty Matters? (Por que a beleza importa?) Roger Scruton, 2015). The concept of beauty adopted by Scruton has found traction amongst, what could be argued, the more elitist urban scribes in society and in 2020 a distinct movement emerged (Scruton, 2007; Sir Roger Scruton/Dr. Jordan B. Peterson: *Apprehending the Transcendent v2*, 2018; Ministry of Housing, Communities & Local Government, 2020a; Darley, 2020; Brussat, 2018). The idea of beauty as a driver for what sustains us has led to lively debate, much of it critical, in both the media and in general public discourse. The culmination of this initiative occurred with the unfortunate death of Scruton and the virtually simultaneous release in January 2020 of the ‘Building Better, Building Beautiful Commission’ report. This report is certainly a valuable tool to use to push forward sympathetic government policy, but for this thesis beauty is just one effect of visual sustainability; in the sense that an object may not be beautiful but still invaluable in sustaining us mentally. Regardless of semantics, the positive effect has been that the whole beauty movement spawned by Scruton, has solidified efforts in the UK around a concept of being sustained visually; and gratifyingly, albeit unexpectedly, relevant also in economic terms. One example of which has been a White paper by the UK government entitled ‘Planning for the Future’ (Ministry of Housing, Communities & Local Government, 2020b).

Mid-2020 saw another more direct reference to the concept of visual sustainability in the suitably titled paper ‘*Visually meaningful sustainability in national monuments*’ (Motevalian and Yeganeh, 2020, emphasis added). Here consideration has been given to morphology, aesthetics, and “visually meaningful sustainability indicators” (ibid.: 2020, p.1). The theoretical framework offered to understand “... Visual Lure...” (ibid.: 2020, p.2) is made feasible by a reasoned argument around two specific drivers: contextual indicators and perceptual indicators. These drivers or “visual indicators” (ibid.: 2020, p.5) defer to, and are reliant on, the prominent architectural theories of previously mentioned theorists, inter alia, Sitte, Lynch, Cullen, Appleyard, Carmona, and Alexander. These drivers are thus bound by the same highly subjective criteria underpinning most urban theory and philosophy. And the level of ambiguity remains unresolved because, it can be argued, the entire analysis is trapped exclusively in architectural thought processes. The notion that elements are “valued according to the views of thinkers and scholars” (ibid.: 2020, p.13) must be challenged because it can be argued (as evident in the conclusion) that the baseline used, of thinkers and scholars, ultimately (and ironically) does little to solve the unreasonably high levels of ambiguity contained in “visual pleasure” (ibid.: 2020, p.19).

For this study then, and bearing the protagonists just discussed in mind, it can be argued that the information that we do have about *visual sustainability*, or *sustaining the visual*, is steeped in Polanyi’s arguments around tacit knowledge (Polanyi, 1966; Polanyi and Grene, 1969). One premise of this thesis is that visual sustainability exists as a product of, and implied by, normative social values. These values describe how we seek out and need to be sustained by visual meaning; individually as well as collectively. It is relevant to how we ground ourselves in the present through meaning from the past. If past meaning is important to us, then planning for meaning in the future is equally important for future generations. Any preoccupation with past and future visual meaning therefore presupposes the validity of a concept of visual sustainability. It follows then that, in terms of human normative values, our visual world is indeed a sustainable commodity. Carmona’s observation of how the transformation of the canal system in London can help us understand the challenges facing high streets (Carmona, 2015, p.77) is a point well made. Where something so physical and appearing to be

so interwoven and interconnected, is not. This can be extended more philosophically to the obsession with ‘catchall’ phrases such as aesthetic value (which he too mentions). It is the contention of this research that we need to instead start referring to visual use. This research will try to highlight the importance of moving away from rationalising the urban along the lines of terms such as aesthetic value or beauty, and to develop our understanding in terms of transactions between physical use and visual use. This idea of transaction skirts back to the idea of non-linear environments, which can be argued to apply to “the operation of real markets” (De Landa, 1997, p.19). And which in this study can be analysed in terms of the high street environment. The high street can be said to function like a bicycle: one wheel propels the self-regulating function; the other is turned by a non-linear adaptive system. Both are required to move the bicycle forward. Gigerenzer refers to risk versus uncertainty. Uncertainty, in Gigerenzer’s theory, can be linked to or non-linear dynamics through bounded rationality because fast and frugal heuristics rely on uncertainty to work, not risk (2000). A last point is that the link between high streets and sustainability can be traced along one important deception. That we are fooled into thinking that functions in the high street have become disentangled, where “just like canals, most of this passes by with little connection or engagement with the other functions of these streets” (Carmona, 2015, p.77). This study holds that urban activities have not become disentangled or isolated from one another. It is rather a case that we no longer recognise the “hidden” (Wittgenstein, 1968, p.50) value in physical and visual transactions taking place; and the relationship between the two. As users in the urban, we are consequently missing out on opportunities presented by these invisible interactions, between the uses associated with the word visual and the word sustainability, taking place right in front of our eyes.

Introduction summary

For this thesis, the meaning itself, of objects in our visual world, is less important than the fact that meaning exists to sustain us. This is evident not only because we know it to be true, through our lived experience and the tacit knowledge with which we are imbued, but also in the diverse range of theories and philosophies from both sides of the ontological divide which support the idea of being sustained and enriched through meaning. We see this reflected in the interpretive theories of Polanyi, Searle, Maslow, Lefebvre et al., as well as in the positivist theories of Gibson, Varela, De Landa, and Sussman et al. In a normative sense the most obvious clue to how we know meaning passed over from one generation to the next is important to us, is by the evidence of the insatiable demand for past meaning; from tourists flocking to historic sites and buildings. A picture is not good enough. People have an innate desire to place themselves “in the middle of the picture itself” (Rasmussen, 1964, p.40). This then is the departure point for this thesis: that we should make an attempt to locate ‘the middle of sustainability’; where, as framed by Kelley (The Perception of Causality (Part 1), 2013) we are able to make the phenomenon itself more discoverable. The approach adopted in this study has been to consider visual sustainability not as a theory but as a “framework within which it is possible to have theories” (Searle, 1999, p.32).

Let us look briefly now at the main points that have been lifted from the preceding literature review chapter before we turn in greater detail to the strategy that will be used to make sense of the relationship between all these underlying theories.

2.0 Purpose Statement Review

Purpose Statement

The purpose of this qualitative grounded theory study is to find out whether a concept of visual sustainability exists through visual use and physical use in the built environment.

The working hypothesis is that sustainability is as much about visual use and attraction as it is about physical use and attraction.

3.0 Methodology

Preliminary methodological statement

- The urban transaction may be considered to be defined by the way in which we use ‘the visual’ to transact with ‘the physical’. This preliminary definition is based on the idea that a relationship exists between Energy and Matter (De Landa, 1997); and is interpreted for this study as follows:
 - we use Energy to *transact* with Matter.
- The visual describes ‘visual use’; the physical describes ‘physical use’. This study draws inspiration from De Landa’s term ‘Relevance’ to describe Meaning.
 - Relevance in this study is the *use to us* of elements in our lived world.
- The effect of this continuously looping action between Energy and Matter over time produces a “flow of norms through generations (and across communities)... [resulting] in both meshworks and hierarchies” (De Landa, 1997, p.186).
- The methodology, through observation and semi-structured interviews, intends to identify urban phenomenon according to the approach adopted by De Landa in his rationale of “evolutionary processes” (Ibid.: 1997, p.138) in city building (Ibid.: 1997, pp.32, 43, 75). This approach uses two key ideas which will be used in the high street:
 - Meshworks. These have properties consisting of inter-alia: lateral; neighbour-based; non-linear; node and edge phenomenon. These systems (Ibid.: 1997, p.39) may also be regarded valid in the context of Brenner’s theory of extended urbanisation (2014).
 - Hierarchies, which act through a pyramidal structure, as “hierarchies of uniform elements” (Ibid.: 1997, p.32). These possess vertical hierarchical structures; homogenised; linear; stratified properties.
 - These two key ideas are based De Landa’s qualifier that “only *mixtures* of meshworks and hierarchies are found in reality” (1997, p.187) and that “self-stimulating... urban dynamics cannot emerge when hierarchical components overwhelm meshwork components” (Ibid.: 1997, p.34).
 - What, it may be asked, does this have to do with visual sustainability? It is proposed in this methodology that Matter and Energy underpin any discussion about sustainability. However, the concept of *use* is, as has been discussed, indivisibly linked to human interaction with the environment.
 - What is the relevance to high streets? If we look at De Landa’s investigation into human languages we can infer from his question about authenticity of being: “At what point in time did the speakers of these diverging dialects begin to “feel” they were using different languages?” (De Landa, 1997, p.188). If we think of authenticity of place, high streets are in themselves a language. We understand each high street differently and eventually, it can be argued, a threshold is crossed where the differences are unique enough to inject new energy into the system; where values become shared and binds the system (Ibid.: 1997, p.192). These values, it is argued, ultimately reflect one of two dominant urban conditions:
 - Connectivity (meshwork)
 - Focus (hierarchy)
- These phenomenon will then be qualitatively analysed and a theory advanced at the end of the study about the validity of a concept of visual sustainability.
- While several statements have been (and will continue to be made in this study) these are all placeholders for the consolidating argument in the Discussion section. The

discussion section will either support or reject the concept of visual sustainability based on urban phenomenon that occur along a high street.

Rationale from the literature review

While keeping the preliminary methodological statement above in mind, we can now reconnect with some of the more salient features of this study thus far. The literature review commenced and was predicated on the fact that as a society we do not know what the term visual sustainability in the built environment means. The point has been made that there is sparse recognition for the phrase itself and nothing has been written about it in its own right, as a self-supporting concept. One might be tempted at this stage to make the following statement:

- IF Le Corbusier's architecture is like science, a (self-regulating) machine for living in,
- THEN lived experience *of that architecture* is different.
- Lived experience is not a machine run by the brain, where cybernetics would have the brain acting as a computer with input from external devices in an outside-in process; but can instead be thought of as the self-organising system of enaction (Eleanor Rosch, IN Varela, Thompson and Rosch, 2016, p.xxxviii). The importance for this study in explaining visual sustainability is to move the argument away from a rationale around urban symbols, references, coding/decoding, non-verbal communication, semiotics, semantics, and syntax (Rapoport, 1990; Lynch, 2005; Kitchin and Dodge, 2005; Hillier, 2015); to a higher level of analysis which embraces the ideas of assemblage and emergence (De Landa, 2016, 2006; Holland, 1998). The idea that architecture is a language which can be read or decoded is a seductive one because of its resemblance to fractal theory where (in language) "each vowel and consonant, each semantic label and syntactic pattern, will be thought of as a *replicator*, that is, as an entity that is transmitted from parents to offspring..." (De Landa, 1997, p.185). "The idea that the structure of language determines the structure of perception" (De Landa, 1997, p.231) is as valid as the idea that perception determines the structure of language. Both appear to be true and both most likely are, adding another layer of ambiguity to perception.
- Lefebvre (2011, p.7) and Rapoport (1990, p.82) have both wrestled with the concepts of semiotics and nonverbal communication; of inhabiting and reading messages in space. Lefebvre in terms of a socially interactive and practical relationship; Rapoport in terms of encoding and deployment of messages and schemata into the built environment; and of decoding and action. Coding and decoding is also present in human interaction in an environment, as described "in the book *Interaction Ritual...* [which] treats conversations as assemblages" (Goffman, 1982, cited in Manuel DeLanda. *Assemblage Theory, Society, and Deleuze*. 2011, 2012, p.00:59:50). However, "if the code is not shared or understood, the environment does not communicate" (Rapoport, 1990, p.57).
- Therefore, while it is true that an architectural element can be said to be a signifier in a physical sense for an intangible concept (the signified), this study asserts that our perception of the built environment is less through representation as a "homogenizing force" (De Landa, 1997, p.273) and "symbol manipulation" (Varela, Thompson and Rosch, 2016, p.85); and more a result of emergent conditions based on experience. Because "*both the world of objective referents and the world of labels and concepts have undergone processes of uniformation and standardization*" (De Landa, 1997, p.273). There is thus, it is proposed, "a way that things are, independent of our representations of how they are..." (Searle, 1999, p.32). Visual sustainability is in Searle's sense (Ibid.: 1999, p.32), a framework for theories related to symbolic and metaphorical perception. The use (or relevance) and the user (consumer of relevance) are central to both urban systems but it is the emergent condition that this study seeks to know more about and not representation through symbols. This is the rationale that Varela et al follow in embodied cognition theory, specifically in relation to how the self-organising ability of the brain produces emergence (2016, p.85). Their system elaborates on an inside-out process at work in the environment; in which the integrity of boundaries

between the known and unknown, while everchanging, are maintained (Eleanor Rosch, IN Varela, Thompson and Rosch, 2016, p.xxxviii).

In enaction the term 'self-organising' refers to the same sense of existence described by complexity theory and typically found in non-linear emergent conditions, in for example swarm-like behaviour. Could visual sustainability then be considered the emergent process found in Varela et al.'s description of enaction's second phase called groundlessness? Does it reside in that transitional state of "groundlessness of the enacted edifice in which humans live" (Eleanor Rosch, IN Varela, Thompson and Rosch, 2016, p.xli)? Can groundlessness be compared to emergence in the form of self-actualisation? Is it the by-product referred to by Frankl (*Man's Search for Meaning*, 2017)? These are questions that may be beyond the scope of this study but which can nevertheless help in the construction of a definition for visual sustainability.

It may be suggested that the non-linear capacity in the built environment (represented in this study through the proxy of the high street) points us towards how visual sustainability might manifest because:

First and foremost, nonlinear models show that without an energy flow of a certain intensity, no system, whether natural or cultural, can gain access to the self-organization resources constituted by endogenously generated stable states (attractors) and transitions between those states (bifurcations). Second, nonlinear models illustrate how the structures generated by matter-energy flows, once in place, react back on those flows either to inhibit them or further intensify them (De Landa, 1997, p.55).

The structures, in a physical sense, generated by matter-energy line both sides of the high street: the buildings. In a visual sense the structure in this thesis is premised to be visual sustainability. Yet, we cannot know for sure; we can only know by examining what the change in condition states (referred to as bifurcation by De Landa) mean in the context of a high street. Our lived experience of the 2020 COVID pandemic and lockdown presents one such opportunity to understand condition states. What we do know is that the experiential qualities and values of both physical elements and visual elements around us, underscore and underpin current discourse and theory about our built environment. The way we experience our built environment works both ways: either enriching our lives or alienating us; by either intensifying or inhibiting matter-energy flows. The process appears to be the same. For visual sustainability we are talking about "an intensified energy flow" (De Landa, 1997, p.55) between elements in the built environment.

We also know that architecture cannot be practised without a theory of architecture. Taking what we do know into account, it is therefore logical to make the connection between physical and visual experience in our built environment with how we consume visual elements. Clearly, if we consume something it must be because it has some use and value to us. What we call *use*, Gibson calls *affordance* (Gibson, 2015): where every object implies a certain use for a person; in a certain context or under certain circumstances. One could argue that affordance applies not only to how we use things physically (physical use), but also to how we use things visually (visual use). Put another way, the meaning generated from visual use is just as important as the meaning generated from physical use.

Because we know nothing about visual sustainability as a concept, the strategy adopted in this research has been to focus on the underlying theory that talks to the notion of three elements: *use*; our *visual world*; and *sustainability*. And because it is not known what to look for, a decision was made early on to make an initial statement about what visual sustainability might be; around which a theoretical framework could be developed. Without a scientific formula to guide this definition, a heuristic was chosen instead; as a shortcut to an answer, in the fast and frugal sense (as defined in

bounded rationality theory and advocated by Gigerenzer). Instead of not being sure exactly what it is we are doing, for example when riding an bicycle for the first time or catching a ball, in this case it is about the fact that we are not quite sure what it is we are *saying*. But saying it anyway was important because we know how well our intuition works (in the sense of tacit knowing championed by Polanyi) and as humans we have learnt to trust our intuition through lived experience. And our intuition aligns with sustainability, in what Carmona refers to as an “ongoing journey... and the long-term guardianship of space” (2014, p.88). From Carmona’s sense about protecting the physical use of space, we should also recognise that part of the ongoing journey lies in the long-term guardianship of *our experience of that space*; or what this study calls visual use. The cognitive processes that enable intuition in our environment via, for example heuristics, can be found in embodiment where

... it is relatively easy to generate a torrent of experiments and studies by showing that a particular movement of the body or interaction with the physical or social environment makes a measurable difference in cognition or vice versa, all of which count as confirmation of the basic proposition of embodiment... One example: holding a cup of warm versus cold liquid in one hand changes how experimental subjects evaluate other unrelated stimuli (Eleanor Roasch, IN Varela, Thompson and Rosch, 2016, p.xivii).

In this sense then, how we feel about something depends on how we see. Conversely, how we see depends on how we feel. The ‘condition state’ (using De Landa’s term) of our body is inescapably relevant to the process of sustainability. In the visual world at least, a sense of sustainability can be said to be directly related to the giving and receiving processes at work in our environment, between seeing and feeling. Because: “Whereas most embodiment research focuses on the interaction between body and mind, body and environment, or environment and mind, enaction sees the lived body as a single system that encompasses all three” (Eleanor Rosch, IN Varela, Thompson and Rosch, 2016, p.xlviii).

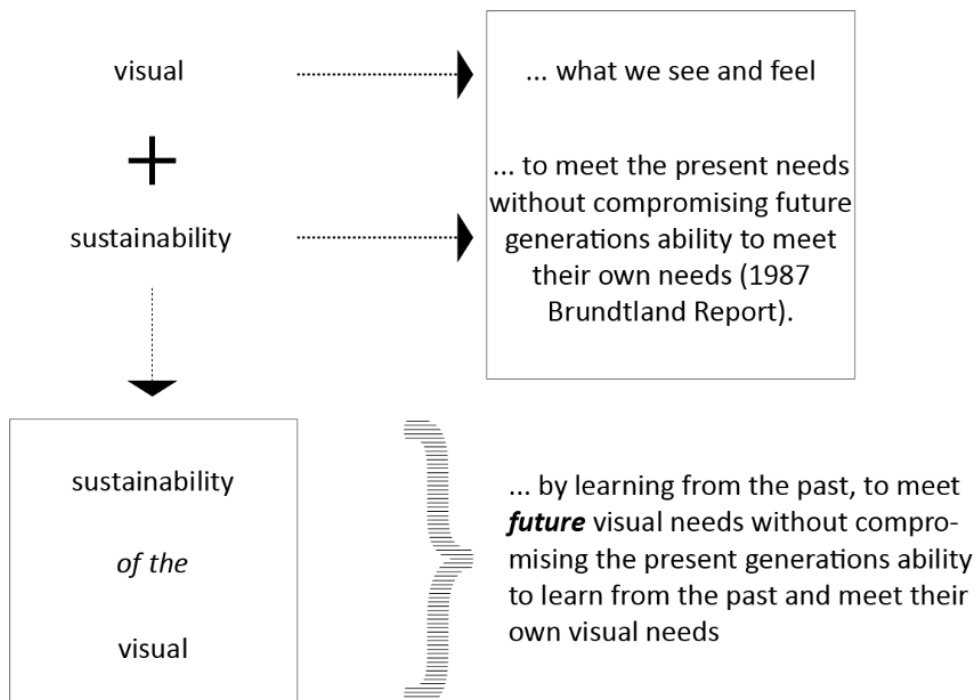


Figure 1: Rationale for a working definition of visual sustainability

A working definition of visual sustainability

This study will offer a preliminary working definition to be used as a placeholder until a more grounded definition can be proposed. This working definition is based on an underlying rationale (Figure 1) for both concepts: *visual* and *sustainability*.

The working definition reads as follows: *visual sustainability is the process by which we are sustained and enriched in daily life through the visual relationship we hold dear to our surroundings.*

Physical use and visual use

Candle and flame analogy

This working definition for visual sustainability has been ontologically framed as follows (Figure 2):

- The term *process* in this definition aligns with the argument by Kelley (2013) about the relationship between process and the physical entities that make the process more discoverable. In his example, Kelley explains: “It is the heat of the flame that causes the pain... not the colour or the shape. Look at the heat of the flame... temperature... that temperature is part of the identity of the flame” (The Perception of Causality (Part 1), 2013, p.00:35:00).
 - This thesis holds that *the process* in this research is *visual sustainability* and that the discoverable entity is the pain we feel from the temperature. The temperature represents the amount of physical and visual use present in *our surroundings*. The heat of the flame may be said to represent how *enriched* or alienated we feel.
 - This study holds that there is a link between an environmental process and the components of our built environment (that make up that process) and will argue that the components are physical use and visual use. And in terms of this metaphor, the amount of physical and visual use is both discoverable and is part of the identity of the urban assemblage it belongs to.
- The acceptance that the intangible burning sensation from the heat through its temperature exists as part of the identity of the flame, in the same as Searle’s rationalisation of epistemically objective analysis of ontologically subjective phenomenon. Searle’s example of a doctor trying to diagnose pain in a patient () is similar to the parallel that can be drawn with how we are trying to diagnose levels of visual sustainability. We know that something exists but we cannot put a finger on it.
 - The pain is the discoverable entity. It is a measure of amounts of physical and visual use present. It is how we know visual sustainability (the process) exists: by how enriched or alienated we feel (pain from the heat of the flame). The pain is the final reaction in the process.
 - Just as the doctor understands what the patient is feeling (because of his/her own experience of pain), so it is that we too know when a high street is unhealthy. We know, because we know intuitively what a well-functioning high street *feels* like. This thesis will thus attempt to make the same connection between the built environment and the intangible yet discoverable entities that produce conditions in which we are visually sustained.
- If we take the analogy further it is logical to say that the whole candle represents the emergent conditions of visual sustainability. It is comprised of two inseparable components: visual use and physical use. Together the candlestick and flame acts as an assemblage. The temperature is visual use to us in the sense that it is an intangible element even if it provides warmth which some may argue to be a physical use. The shape and colour of the candlestick is the physical use to us because it is a tangible element.
 - The whole candle represents the concept of an assemblage, or collective agency as it applies to social ontology. It is important to the concept of visual sustainability

specifically “the part to whole relationship” (Manuel DeLanda. *Assemblage Theory, Society, and Deleuze*. 2011, 2012, p.00:08:50): that an assemblage is more than just a collection of unrelated parts. For De Landa assemblage possesses new properties of its own through the concept of emergence: the meaning or whole is not reducible. It is made up of parts that cannot be reduced; if you remove any of the parts, the assemblage no longer exists, nor does the meaning (Manuel DeLanda. *Assemblage Theory, Society, and Deleuze*. 2011, 2012, p.00:05:00). Assemblage changes meaning through emergent properties of the new meaning. Just as hydrogen and oxygen serve as fuel for the flame; as an assemblage it can also extinguish the flame (Manuel DeLanda. *Assemblage Theory, Society, and Deleuze*. 2011, 2012, p.00:13:30). In the built environment a high street may be considered a large assemblage containing several components of smaller assemblages.

- Individually however the candlestick through its shape and colour provides physical use in, for example, how we understand our location in relation to the location of the candlestick, how much it stands out due to its colour, or how it provides a sense of scale when seen in relation to other objects. What we see then, is what we get with the shape and colour of the candlestick.
 - This can be likened to the physicality of our built environment where the physical requirements are met; of, for example, enclosure, scale, or in the case of wayfinding, where in a physical sense people need “linkage information” (Jeffery, 2017). Linkage exists through language as “a variant pattern shared by a group and used to communicate with other groups” (De Landa, 1997, p.193). And at one level the urban is a means of communication and of finding ones’ way. There is thus a lesson to be learnt from De Landa’s theory around language and linguistic history because the built environment is essentially a social construct; it exists because we do and it exists because of our interactions. Space syntax theory (Hillier and Hanson, 2005), for example, speaks to these interactions. These interactions exist through physical and visual use. The value of physical use lies in affordance; its tangible qualities that relate to what it may be used for under differing conditions or circumstances. But when we feel emotion from the shape or colour, it can be said that we cross a threshold when physical use becomes visual use; because the phenomenon has in our minds crossed over into the intangible domain; the mind being “a collection of constantly changing emergent processes” (Evan Thompson, IN Varela, Thompson and Rosch, 2016, p.xx). An obvious example of this would be when we move from linkage information (Jeffery, 2017) which underpins urban design practice, to using a process of mind mapping (Lynch, 2005) to orient ourselves.
- Individually, on the other hand, the flame can be recognised for its intangible experiential qualities, by for example affecting our mood and how we feel; or put another way that which *we hold dear*. But we are also able to experience physical use through its light, to help us see. Examples in the built environment include framed vistas or the silhouette of an object above the horizon.
 - In our built environment, physical use and visual use can be said to exist in the same object, depending on how our brain is activated to respond to either a physical want/desire; or a visual need. The argument around this idea of physical use and visual use (extrapolated from Kelley’s analogy of the candle) can thus be said to mutually specify each other in the sense described by Varela: “The opposition between inner and outer causal factors is replaced by a coimplicative relation, since organism and medium mutually specify each other” (2016, p.197). Inner and outer causal factors are in themselves highly charged concepts, especially relevant, it can be argued, to the related concept circulating in Polanyi’s theoretical forcefield; where inner (visual) and outer (physical) refers to concrete (physical invariants) versus abstract constructions

of the mind (conceptual invariants such as knowing or tacit knowledge). Varela especially highlights how these dualities lose their ambiguity in relation to the other at a metalevel, where they are viewed as complementary forces that sustain human perception. Varela et al's. theoretical framework of enaction, which includes both science and phenomenology (Vörös and Bitbol, 2017), is sympathetic to Gibson's view of ecological perception in the sense that we perceive affordance by moving around invariant objects. For Varela this is also true because "whatever [an observer] describes (sees, perceives, understands) is a reflection of his actions (perceptions, properties, organization)," and that the two "poles" are, in fact, "mutually revealing" (Varela, 1976). And it is in this action that we create the future; in the sense that cognition is not "...pre-given, usually as a problem-solving situation... [but] *enacted or brought forth* from a background" (Varela, 1992, p.250; Vörös and Bitbol, 2017, p.34). Our actions in the built environment can be said to be "not specified but triggered through interactions" (Imoto, 2004, p.20). It is similar in a sense to Piaget's theory about how children construct their world. The idea of a latent form of complementarity between physical use and visual use can be thought of in the same way as a "conversational pattern" (Varela, 1976, p.65) where visual use (the mind), which is normally seen as the opposite of physical use (the body), exists as a "conversational pattern" (Vörös and Bitbol, 2017, p.33). One thinks here of Alexander's pattern language as an easy way to describe complementary data sets, but the pattern Varela describes is a transparent one (Varela, Thompson and Rosch, 2016). This transparency is easy to conceive where one sits above the other, until the other is brought forward. All the while one can still be discerned from the other. This notion of transaction mentioned earlier thus becomes relevant again through this notion of transparency. Where our world is made up of transactions between physical use and visual use. Transaction is enabled through the transparency at work. So, one could conceive that the way in which people transact with the visual world is achieved through a continuous process of exchange through a process of cognitive transparency. For the methodology in this thesis this concept will be important when evaluating data from interview; as the conversation between reference to physical use and visual use.

- With Kelley's candle, the discoverable entity or the amount of physical and visual use present (temperature) are the discoverable entities and can be thought of as a measure of visual sustainability.
 - We cannot tell what the actual temperature is; we only experience temperature as a relative feeling along a spectrum of feeling ranging from very hot to very cold. Temperature is the intangible component that is able to produce sensations in people. Temperature reflects visual use because even though we may be able to feel the heat or cold, we cannot see either. And we cannot know what these values are without an instrument. But the numbers generated by a scientific instrument measuring temperature bear no relationship to the feeling we experience.
 - Visual sustainability is discoverable by the embodied mind ((Varela, Thompson and Rosch, 2016).
- The candlestick on its own without the flame is a completely different object from the burning candle.
 - In the built environment it can be said that we are attracted to both physical and visual use for different reasons. And without both present, the emergent condition of any assemblage is lost; in the same way described by De Landa in assemblage theory. In this sense then, we are *sustained and enriched* by the emergent conditions of an assemblage, not by its parts.

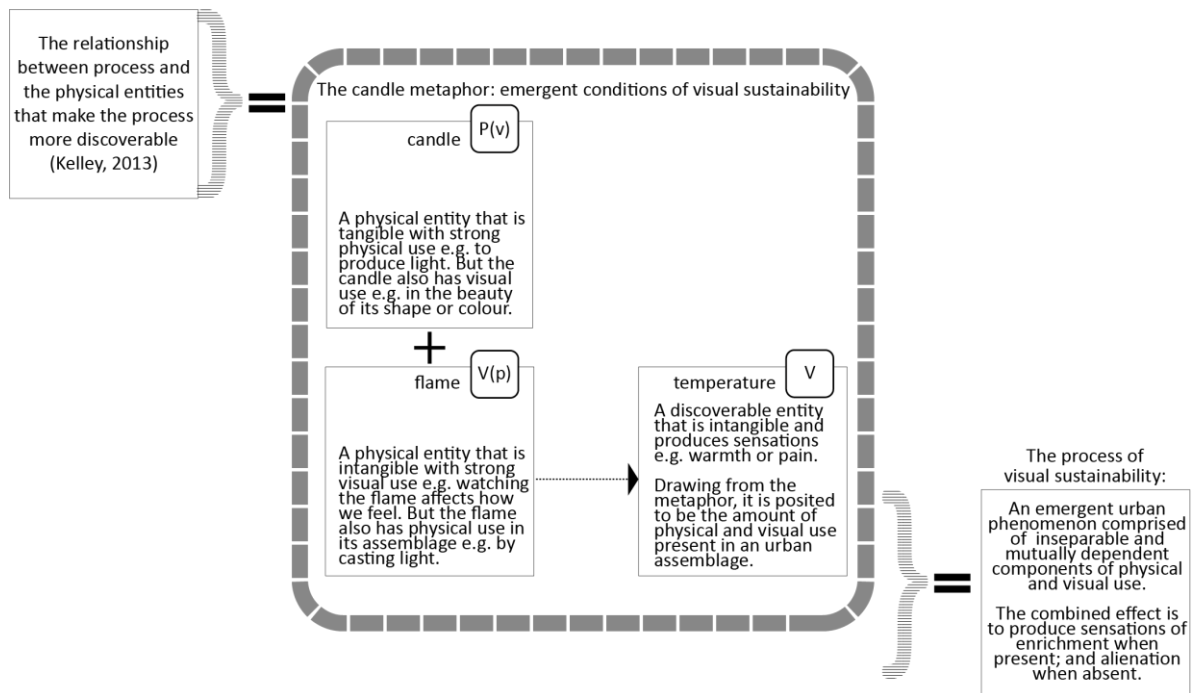


Figure 2: Visual sustainability is like a candle

- Kelley has provided clues about how to situate emergence in the methodology for this research. He contrasts our direct awareness of an object (a tangible, physical entity) with the conceptual identification of what is perceived (the intangible, visual entity). That thing or event that we do not see (the temperature) and the pain we feel from the flame is, as Kelley points out, indivisibly part of what we do see, which is, the object (The Perception of Causality (Part 1), 2013, p.00:34:30).
 - It is proposed in this study that for visual meaning, temperature represents the spectrum along which meaning can be measured; not the meaning itself but the presence of meaning. The durability of meaning over time is what, by all accounts (taken from architectural theory), sustains our visual world. As previously stated, the meaning is less important than the fact that it has a temperature. In other words, visual sustainability can be thought of as existing along a spectrum of meaning.
- The temperature state of a flame looks like an object because of its colour; yet exists as a process. It is not an object in the strict sense of the word. It is not invariant.
 - This phenomena of a process looking like an object and which describes a **visual relationship** is important for this thesis because it can be argued that we often mistake a process for an object and vice-versa. Often the visual relationship is too complex to make sense of in the space and time we often find ourselves in, in the built environment. There is no language (Polanyi) for the heuristics (Gigerenzer) involved of how we adapt in “milliseconds” (Ellard, 2015, p.41) to our environment in a world of uncertainty as opposed to risk (Gigerenzer). There is no language or scientific formula to describe this phenomena. It is the same with our visual relationship to our surroundings. These interactions can be thought of as transactions. The **visual**

relationship we hold dear (referred to in the proposed working definition) may thus, by extension of the argument, be thought of as a series of continuous transactions.

- Finally, this metaphor of visual sustainability as a candle can be translated more loosely from architectural theory of the built environment in several ways.
 - One way to contextualise architecture, is through the device of framing a view. A framed view forces us to focus on the elements that can be seen. But at the same time, it alludes to the things that we cannot see. Just as we cannot see temperature, we cannot see beyond the framed view but we can *feel* what lies beyond. This example helps describe physical and visual use in the built environment. The physical use can be generalised as what we can see, ignoring the fact for now that we also *feel* when we look at architecture. And the visual use is what we do not see but *feel*. Sitte and Cullen, for example, understood the power and mystery of visual use. As observers, our senses have learnt to cope with the hidden or unknown, by building information in our minds of what is to come; in a way similar to the constructive process of sense data (Gregory). However, that which is currently available to us in a direct sense is best described by Gibson in ecological perception theory (the counter argument to Gregory). Regardless of whether Gregory and Gibson's theories are scientific opposites or complementary in our lived world at a metalevel (Varela), the physical use of architecture can be argued to relate to use or signification of use; or even of what can be consumed in a physical sense. The visual use of architecture relates to what we *feel* and this is validated by urban theory that underpins the practice of architecture.

Matter-Energy/ Physical-Visual analogy

What matters is not agriculture per se, but the great increase in the flow of matter-energy through society, as well as the transformations in urban form that this intense flow makes possible.

From this point of view cities arise from the flow of matter-energy... (De Landa, 1997, p.28).

As De Landa observes there are "several possible ways of intensifying energy flow" (1997, p.28) and this concept can also be argued to be true for the high street. The high street is dependent on energy flows. Matter and Energy are *used (consumed)* by humans in one way or another. It can thus be argued that physical use and visual use exist because Matter and Energy exist. One does not exist in isolation of the other. Matter is physical use and Energy is visual use. Matter creates Energy and Energy creates Matter. Physical use creates visual use and visual use creates physical use.

Other examples of physical and visual use include Lynch's rationale for mind mapping; Lefebvre's representational space in his spatial triad; fractal theory describing emergent conditions and assemblage; and other emotional triggers such as historical value, cultural value, and sentimental value. The perceived duality that exists in urban theory also resides in physical use and visual use. This duality can be resolved by introducing the concept of exchange or transaction. Transaction, however, specifically focused on the way we think about the built environment. Transaction in the economy highlights how money has "no physical existence at all" (John Searle on Language & Social Ontology, 2011, p.00:18:20); yet it still exists as a scientifically valid piece of paper with some ink on it.

The link that this study asserts exists, of the transaction between sustainability and the high street, is money. And money is made possible through the variable of visual use because if visual use can be considered to be equal to energy in the matter-energy theory offered by De Landa,

then “The flow of energy makes possible the circulation of money” (Howard T. Odum and Elizabeth C. Odum. *Energy Basis for Man and Nature*, 1981, p. 41. IN De Landa, 1997, p.35). In other words, the ‘circulation’ (in Varela’s sense) of visual use in a non-linear state (in De Landa’s sense) enacts the circulation of money in a high street. And the opposite is also true, because “money flows regulate (inhibit or intensify) energy flows” (De Landa, 1997, p.35).

Cities “offer affordances that are not just physical, but also social and cultural affordances as well” (Shields, R. (2010) ‘Interview with Rob Shields’, in Farias and Bender, 2010, p.297). Each sense is not only physically grounded but also its use is culturally defined (Rodaway, 2011, p.22). Berleant, for example, refers to inseparability of theoretical and practical in the built environment (1997, p.36). Rapoport refers to the physical environment providing the cues” (1990, p.57) while the space around an object provides meaning (1990, pp.32–34). Lefebvre describes the confusion of the “abyss between the mental sphere on one side and the physical and social spheres on the other” (2011, pp.4–6). He refers to “first, the physical – nature, the Cosmos; secondly, the mental, including logical and formal abstractions; and thirdly, the social... the space of social practice, the space occupied by sensory phenomenon, including products of the imagination” (2011, pp.11–12). We see how space may be marked physically as well as “abstractly, by means of discourse, by means of signs” (Lefebvre and Nicholson-Smith, 2011, p.141). Both Lefebvre and Rapoport note how the relationship of information exists in a state of opposition (Rapoport, 1990, p.118; Lefebvre and Nicholson-Smith, 2011, p.158). Salingaros refers to space that becomes so uncomfortable visually that we are forced to leave (1999). Appleyard refers to how science suppresses meaning by not recognising “symbolic content of the environment” (Appleyard, 1979, p.143).

Defining visual sustainability at the outset provided enough momentum to further investigate the underlying theory and helped in gaining an understanding of the positivist and interpretive theories around visual perception as well as environmental behaviour (typically discussed by Lefebvre, Rapoport, Berleant, Ellard, Rodaway, Mcfarlane, Bhugra et al.). The strategy was thus to read widely, curiously, and without bias as far as practically possible in order to allow the literature to establish a pathway to illuminate more clearly how visual use and meaning helps sustain people, today and into the future. The literature review settled ultimately on three significant theoretical streams of thought related to the built environment, namely, tacit knowing (Polanyi), cognitive science (Sussman et al.), and the bridge between these two: the embodied mind (Varela).

With this in mind, and referring to the definitions section for ontological framing, we can now summarise the literature review in broad terms as follows:

- As a single key statement one of the main themes to emerge is that transactions take place between our Self and the world around us. This thesis will argue that just like money, our visual world is made up of transactions; and the currency we use is meaning. Meaning in this case is physical use and visual use.
- However, meaning is also present along a gradation. This study refers to a spectrum of meaning. One such spectrum in the urban is picked out by De Landa; between homogeneity (principles of regulation and imposed structure) and heterogeneity (self-organising principles) (De Landa, 1997, p.30).

The mineralization of humanity took forms that were the combined result of conscious manipulation of urban space by some central agency and of the activities of many individuals, without any central "decider" (De Landa, 1997, p.30).
- The main modes of investigation offered to us to advance the case for visual use, are Varela’s concept of a Lived World and Polanyi’s concept of tacit knowing. Both concepts draw on a

fundamental observation repeated throughout the underlying theory; that our understanding of visual meaning can be distilled into physical attraction and visual attraction (attraction of the mind). This is evidenced in the built environment, it is argued, through two distinct urban phenomena, namely, physical use and visual use.

- The overriding question that arises at the end of the literature review is whether it is appropriate to persist with the term visual sustainability to describe that which sustains us in our built environment. The answer to this lies in the way we think about the two main emerging modes of thought: the science we produce and our lived experience (the intangible quality of life produced through tacitly knowing (and thus doing)). We *know* through our lived experience, and we *live* because we are empowered by the tacit understanding that we possess, of the world and our place in it. This becomes evident in the things and events we produce, ranging from ethics and social structures to beautiful or important objects. It is derived from the physical use implied by an object as well as the tacit knowledge about our experience in the presence of or using that object or space. The answer then to the question is yes (Figure 3). Based on the findings about the visual component in our built environment and how it is that we sustain ourselves and future generations through the visual world we leave behind for them, we can indeed persist into the methodological section with the term visual sustainability intact.
- The obvious broadly based conclusion one can draw from the literature review is that visual sustainability is just as important as physical sustainability or, put another way, just as important as the physical world we produce, be it clean water and energy or green infrastructure and architecture. We can also conclude from the literature review that visual sustainability acts as an umbrella for the intangible qualities of our social world. Visual use is thus an embodiment of lived experience and goes beyond the simple act of seeing with our eyes.

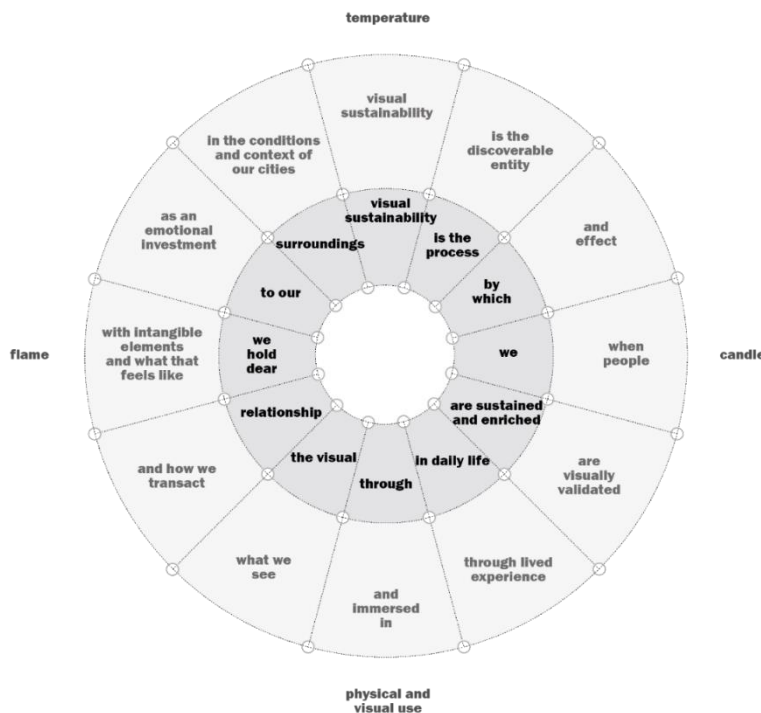


Figure 3: Advancing the working definition of visual sustainability

Before looking at the following methodological breakdown, it is important to understand that this thesis seeks to understand visual sustainability by declaring that sustainability is as much about visual use and attraction as it is about physical use and attraction.

4.0 Key Proxies Used

Our visual world: physical use and visual use

When reference is made in this study to perception of our visual world, it is important to emphasise one key distinction. The underlying premise in this thesis is that our visual world is comprised not only of physical use (the candlestick) but also of visual use (the flame). In addition to the working definition for visual sustainability offered previously, several more definitions have been posited at the end of (and having been justified by) the integrated literature review. The following two explanatory definitions are emphasised for their methodological significance.

- Physical Use (the candlestick)
 - In the context of the maxim Form vs Function; physical use represents Function.
 - Refers to the physical use to a person of something that exists in the environment.
 - Is a third person or empirical descriptor.
 - It is what we see that is physical, tangible, or invariant.
 - Is a transaction for a tangible or quantifiable good or service.
 - Refers to how useful a building or place is to a person e.g. going to a shop to buy a product or service.
 - Refers to resilience and adaptability to new uses of buildings; as described by the Building Better, Building Beautiful Commission (Ministry of Housing, Communities & Local Government, 2020a, p.28).
- Visual Use (the flame)
 - Is the opposite of physical use.
 - In the context of the maxim Form vs Function; visual use represents Form.
 - Is a first person or phenomenological descriptor.
 - It is what we see that is intangible.
 - Is a transaction for an intangible service or product.
 - Refers to lived experience (Varela), including the social world;
 - Is the tacit knowledge we have of our surroundings and the emotional use to us; e.g. a building is a physical object but how you think about that building is categorised as visual use.

One important point related to use, is how terms such as ‘good design’ and ‘liveable places’ are used by key stakeholders at every level and, especially in relation to aesthetics. The meaning of these terms is fraught with ambiguity and contradiction. This research contends that physical and visual use

transcends the use of catchall phrases like ‘good design’ by operating at a metalevel. These terms are less important than the fact that they should always have meaning in De Landa’s terms: of being *relevant* or *having capacity to make a difference*. Again, whatever that meaning is, is not as important as what produces that meaning. This study supports the idea that meaning is produced through the process described by Varela of enaction, of “sense-bestowing activity” (Vörös and Bitbol, 2017, p.37). As Ingold frames it through the lens of Gibson’s direct perception theory, meaning is “immanent in the relational contexts of people’s practical engagement with their lived-in environment” (Ingold, 2002, p.168). Here once again, we see a connection being made with Varela’s concept of the lived world and lived experience. It is thus suggested that *where* the meaning originates, is key to understanding the significance of visual sustainability, and is constituted as follows:

- Meaning is a product of:
 - enaction (Varela)
 - relevance (De Landa)
 - capacity to make a difference (De Landa)
 - embodied action (Varela), and
 - “sense-bestowing activity” (Vörös and Bitbol, 2017, p.37).
- Meaning exists in a landscape where:
 - we are “bringing forth meaning from a background of understanding” (Varela, Thompson and Rosch, 2016, p.149) and
 - which is based on acting or moving around invariants (Gibson); and
 - the meeting point of meaning is in the “circulation” (Varela, Thompson and Rosch, 2016, p.236); between and where science and human experience meet (Ibid.: 2016, p.xli).

The key proxies were chosen for their systems level characteristics, meaning their global-like behaviour: where parts are always seen in relation to the whole. We (author and reader) are primarily looking for relationships to help point to those entities that better describe the process of visual sustainability. There are three stages in understanding how this study is theoretically located. Firstly, this study agrees with Varela et al. that a world of mental representation is not ideal; where, just as with a computer, symbols represent and are interpreted for meaning or the way we navigate our world. There is more to perception than the idea of acting like a computer; where we respond to instructions from symbols for our meaning. Varela et. al. prefer a second stage of theoretical thinking which is the concept of emergence. This study finds emergence helpful in exploring the concept of visual sustainability because it is a concept discussed across several theoretical disciplines, from pedagogy to complex systems. De Landa’s explanation of assemblage (called structural coupling by Varela et al.) is probably the most compelling and easily understood when considered in the context of the built environment. Assemblage can be thought of as that condition state reached when the whole is more than just the sum of its parts. In a high street therefore, when something exists that we cannot put our finger on but which exceeds any description of its parts, it may be, as will be posited in this study, a manifestation of emergence through assemblage. Varela, for his part, describes this phenomenon of emergence in cognition theory as connectionism: “This name is derived from the idea that many cognitive tasks (such as vision and memory) seem to be handled best by systems made up of many simple components, which, when connected by the appropriate rules, give rise to [complex] global behaviour...” (Varela, Thompson and Rosch, 2016, p.8). This is very similar to the meaning as understood in both assemblage theory (De Landa, 2006) and in complexity theory (Lloyd, 2001). The third stage in the departure from the traditional understanding of cognitivism, as representation, extends the argument of emergence towards the theory of enaction. This theory holds that emergence exists through the self-organising capacity called enaction (Varela, Thompson and Rosch, 2016, pp.9, 88); a mutually enabling process that is systems based (Varela, Thompson and Rosch, 2016, p.xlviii). Enaction is considered relevant to the concept of visual sustainability because it speaks to the way in which we address objects in the built environment. Let us consider a high street. It is not

enough to lean on the idea of a pre-given world for our perception, but to consider the fact that through our actions in the urban we create new conditions. In Varela et al.'s terms, we create the future; a world that did not exist a moment ago. In this concept Varela also links up with assemblage theory because (in the case for example of a high street) it endows a "complex system to enact a world" (Varela, Thompson and Rosch, 2016, p.151). Assemblage theory as described by De Landa can be argued to be directly understood in architectural terms, for example, through the power of composition or fractal theory. Assemblage or structural coupling may also be translated into the built environment to describe, for example, how connected a person is to a high street, or a shop; or between actants such as a shop to a high street. Because, as Varela says of this concept, cognition (also perception) is "the enactment of a world and a mind on the basis of a history of the variety of actions that a being in the world performs" (Varela, Thompson and Rosch, 2016, p.9). So, if this is the case, we enact not just our world but our mind too. In terms of our built environment one could say that the repetitious nature of urban composition and scale when combined with repetition from the self-regulating functioning of a high street (the rhythm of the street) together produce the right conditions (for growth) in which we are able to enact our world. The premise then is that by enacting our world we sow the seeds for self-actualisation. Because if mind and world together perform the ritual of enaction, then meaning is produced that is visually rich and ultimately visually sustainable.

The case has been made throughout this chapter for mutual specificity of physical use and visual use; where each enables the other in a transparent sense, not an either/or sense. If this is a sound theoretical framework for cognitive theory then there should be no reason why it does not apply to perception in the built environment. If we then apply visual use to the urban social arena, the idea of "mutual participatory sense-making" (Eleanor Rosch, IN Varela, Thompson and Rosch, 2016, p.xlviii) brings a new perspective to the fore. Which is that systems theory energises the thinking away from more traditional methods of using "... the internal cognition of individuals (who must use verbal and physical cues to guess one another's states of mind) as the nexus of social dynamics" (Eleanor Rosch, IN Varela, Thompson and Rosch, 2016, p.lxviii). It moves the argument towards examining the entities that make the process of visual sustainability more discoverable, in a parts-to-whole systems approach (similar to that used in both tacit knowledge theory as well as in complexity theory). Rosch identifies the three parts of mutual participatory sense-making as follows:

1. It is "*mutual* and thus systems based";
2. It is "*participatory*; the participants [in this case, physical use and visual use] who are interacting are doing something, thereby creating a system that is changing"; and
3. It is "... *sense-making*, which is defined as the ongoing emergence of roles, values, dispositions to act, and meanings" (Eleanor Rosch, IN Varela, Thompson and Rosch, 2016, p.xlviii).

Finally, in understanding the selection of proxies to deliver results for this study, we are reminded that enaction is at its core "a philosophy that is shape shifting into science" (Eleanor Rosch, IN Varela, Thompson and Rosch, 2016, p.l). This is important because:

One of the signatures of enactive language, inherited from phenomenology, is its ability to evoke a sense of humanity and deep respect for life. But as it reaches the level of specificity where it is reframed into the impersonal world of dynamic systems analysis, brain mechanisms, and so on, it can easily lose the mind/experience aspect of the lived body and drift toward a body-based reductionist materialism (Eleanor Rosch, IN Varela, Thompson and Rosch, 2016, p.l).

This study has accordingly limited itself to qualitative grounded theory for its methodology and methods. This method has been widely adopted in similar research that aims, for example, to "generate, identify, and trace a phenomenon's major concepts, which together constitute its theoretical framework" (Jabareen, 2009, p.53). With this rationale in mind, the next layer of understanding, was to find a proxy for sustainability as it relates to the built environment. We will use the High Street for this. The reason for choosing a high street is that it combines both physical use (for

example; buildings; access) and visual use (for example; the effect of buildings; or social activity) at a level of detail that is easily understood. The first proxy, which we are all familiar with, is the high street.

The high street, the shopkeeper, and sustainability: a story of structural coupling

Sustainability may be thought of as a complex system in an infinite continuous spiral or loop, housing a myriad of separate interacting self-organising loops on varying trajectories; all sustaining people and things. Figure 4 suggests one such trajectory: a closed loop based on evidence from the case studies carried out by Vaughan et al. (Vaughan, 2015). For the first proxy, consider what the high street does along a stretch of road. The road is self-regulating. It requires no intervention. If the street, as a segment of the road, does nothing it remains a sub-component of the autopoiesis of the road. A high street however does something different. That something, it is proposed, is the same as Pallasmaa's description for buildings and towns: as enabling "us to structure, understand and remember the shapeless flow of reality and, ultimately, to recognise and remember who we are... and to place ourselves in the continuum of culture and time" (Pallasmaa, 2008, p.71). The second proxy is contained by the high street: the shops. If: "Above all, the idea of the high street is associated with the presence of a wide variety of small local shops" (Griffiths et al., 2008, p.1155), then it would be logical in any discussion around visual sustainability in high streets, to start with shops. Both these proxies speak to sustainability by the circular nature of their interaction; repeating over the passage of time and producing one recurring outcome: continuity. This research is interested in understanding more about the intangible qualities contained within this circular process that describes sustainability (Figure 4). But in order to understand more about visual use and how visual use is sustained and enriched over time, we need to take a step back first and understand what it is that we know. The quantifiable aspects of physical use in a high street provide this data by way of its existing conditions.

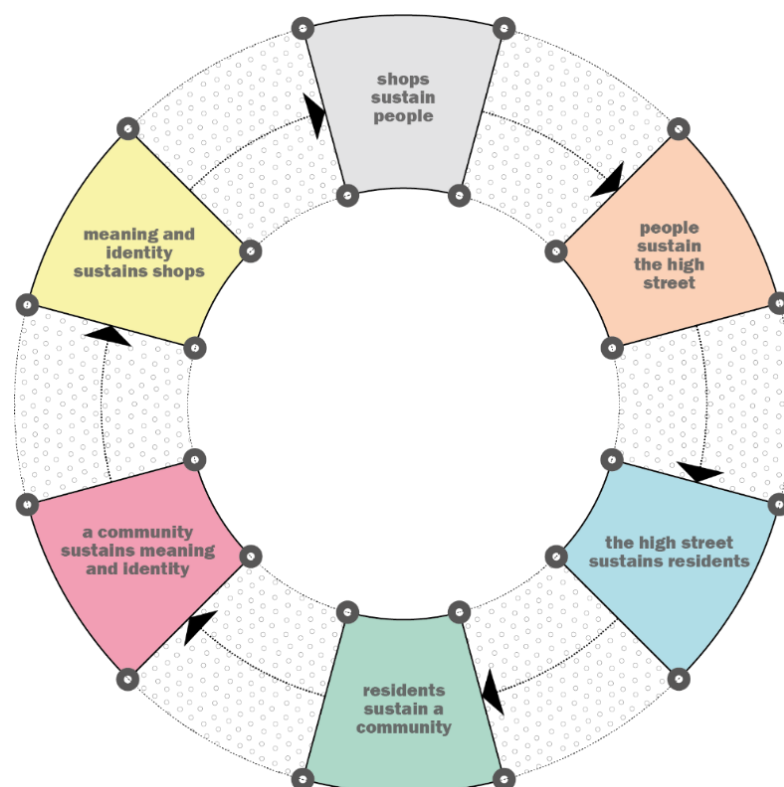


Figure 4: The proposed sustainability loop, based on use, of a traditional high street

The High Street is used in this thesis to understand and attempt to extract the components of visual sustainability. It is used to develop a theory about the existence of visual sustainability for the following reasons:

- High streets are referenced in the report of the Building Better, Building Beautiful Commission for the “values that matter to people – beauty, community, history, landscape” (2020a, p.v). If streets then are “the primary urban space” (2020a, p.13) a high street can be said to be the urban square. They represent a gathering place where a community congregates, if only to ‘feel close’ to other people.
- The high street presents itself as being able (when functioning properly) to fulfil the conditions of sustainable growth because, as Carmona best puts it: it exist as both “... ‘link’ and ‘place’” (2015, p.7). It therefore consolidates and it connects. And despite representing “some of the most important spaces in the city” high streets only take up “3.6% of the road network” in London (Carmona, 2015, p.74). The high street acts as that quintessential organism in the urban ecology, shaping itself and its surroundings continuously; its self-regulating rhythm advancing along the tiniest of increments. The ontological significance can be described by analogy. Just as farmers do not grow wheat, they provide the conditions for wheat to grow (Ralph Stacey quoted by Eli Sopow, *Applying Complexity Science for Organization Development*, 2012); a high street does not produce sustainability, it presents the conditions for sustainability to thrive. This is relevant to Walker’s definition (2018) that sustainability is comprised of *personal meaning*, *social meaning*, *practical meaning*, and *economic means*. The high street is also relevant in terms of developmental forces, acknowledged by Tavernor; where conservation is pitted against continuity (2007, p.3). This study holds that Walker’s components are themselves, at a higher level, all components or attributes of physical use and visual use. Personal and social meaning describe visual use; while practical and economic means describe physical use.
- High streets today face an existential crisis (Preskey, 2019; Simpson, 2019; Ministry of Housing, Communities & Local Government, 2020a, p.89). The aim of this thesis is not to solve the reported systemic problems facing high streets but it is logical to suggest that high streets are failing because they are not sustainable; or else they would not be failing. The high street can be said to have undergone a “process of intense homogenization” (De Landa, 1997, p.179) where like language the messages and “grammatical patterns” (De Landa, 1997, p.184) have become predictable and boring (Introduction to Complexity: Shannon Information Part 1, 2018; Ellard, 2015, p.113). Using the high street as a proxy for understanding visual sustainability is thus a logical progression of the analysis. There is arguably no better environment than to study a system on the brink of catastrophic failure.
- The high street in its traditional form is typically where shops are small-scale community-oriented businesses, managed and run directly by their owners (Griffiths et al., 2008). A distinction therefore is made in this study between a street with locally run shops of a particular size and scale, and a street dominated by franchises and large retail chains. Therefore, it is important that we observe conditions of visual sustainability in conditions that most closely resemble the traditional high street.
- High streets are walkable. many appear to be under 800m in length which is the equivalent of a 5-minute walk from the centre out in each direction.
- The high street, while an assemblage in itself, is proposed as part of a larger assemblage and circularity of uses that sustain people and communities (Figure 4).

- A high street provides a sense of identity (Ministry of Housing, Communities & Local Government, 2020a, p.42; Vaughan, 2015; Jones, Roberts and Morris, 2007).
- A decision has been taken to analyse one single component of the high street, the shops. This typology has been selected for the sample for the following reasons:
 - Advantages
 - Shops are a distinct, easily recognisable entity.
 - A high street is defined by its shops. Shops are arguably the most influential component of a high street.
 - In a shop both processes of role playing (Goffman, 1971) in the high street can be analysed: of serving or of being observant about the needs around you (shop owner); and being served or observing through wants and desires (customer, consumer). If we understand the former, we can arguably discover more about levels of attraction in the latter.
 - Shops occupy the street for longer periods of the day than anyone else. The traders are present all day long and often well into the night.
 - They are heavily invested for their livelihood in making the street work. If the high street is not sustainable then they will not be sustainable in the high street; whereas shoppers are arguably less invested in a high street because they have many other avenues of satisfaction, for example, through online shopping and house delivery services. Shops are therefore arguably more loyal to the street.
 - Shoppers and other pedestrians are more transient; in the sense that they generally arrive and leave more quickly relative to the traders.
 - By concentrating on one distinct group in a high street, as opposed to a stratified sample of every group, it can help limit the complexity and cross-over of meaning, in an urban element that is already recognised as a highly complex system (Fractals and Scaling: Summary of course, 2019).
 - They are in a fixed location which is good for research and follow-up interviews.
 - Disadvantages
 - Small sample size.
 - The perception that pedestrians and shoppers are more important than traders.

5.0 Understanding What to Look For

The aim of this research is to find out whether a concept of visual sustainability exists. If it is true that: “All places and spaces can be understood to have a condition of sustainability, which may range from very weak, where one dimension is emphasized to the detriment of others—to very strong...” (Barton and Gutiérrez-Antinopai, 2020, p.1); then some level of sustainability exists a priori at the point at which we intervene in (or analyse) a space. Similarly, if sustainability is about “what is” (Ibid.: 2020, p.1) and sustainable development is about “the production of what might be” (Ibid.: 2020, p.1); then the high street should be analysed by these same rules. The high street can be considered in terms firstly, of what exists (existing conditions); and secondly, of potential. Potential here may be described as that which empowers “actor driven transformation”(Ibid.: 2020, p.1). In Varela et al.’s terms the analysis this would amount to enaction theory (2016); which can also be understood as the transformation produced between human and non-human actants.

This research is looking for that “dynamic condition” (Ibid.: Barton and Gutiérrez-Antinopai, 2020, p.1) that exists much like, it can be argued, self-actualisation exists: as a by-product. The argument put forward here is that we cannot produce it; all we are able to produce are the right conditions for it to emerge from the background as Frankl observes (Man’s Search for Meaning, 2017). We cannot see

self-actualisation but we see the effects and we know it when we feel it. *Visual sustainability* in the built environment is thus not sustainability in the ‘green and blue’ sense offered by modern-day sustainability through UNESCOs SDGs. It is not looking for a clearer definition by association, between terms, for example, between sustainability and beauty. It is looking to describe the essential components of a single unambiguous holistic concept called visual sustainability. It is not looking directly at social sustainability nor is it looking at any of the all too typical descriptors in isolation of each other, for example: sustainable, high quality, well designed, and beautiful often found together in one sentence (Ministry of Housing, Communities & Local Government, 2020a; b). All too often when sustainability is conjoined with concepts such as attractiveness, aesthetics or beauty in the built environment, the sustainability portion of the sentence refers to nature. An example of this is as described in the BBBBC Living with Beauty Report (Ministry of Housing, Communities & Local Government, 2020a, p.105). This study is also not looking at sustainability primarily through building use and function, although use and function may be symptomatic of conditions of visual sustainability (Figure 7).

For visual sustainability then it is less about the relationship between entities themselves; but about how Kelley’s frames it, as the relationship between the process and the physical entities that make that process more discoverable. The literature review has established that we understand the world around us in two main ways: through physical use and through visual use. If then, a concept of visual sustainability exists, it is logical, in the first instance, to justify its existence through the underlying theory about both physical and visual use. Visual sustainability is a positive or negative urban phenomenon that can be understood through the relationship the process of that phenomenon has with the physical and visual entities (uses) that make that process more discoverable (Figure 5).

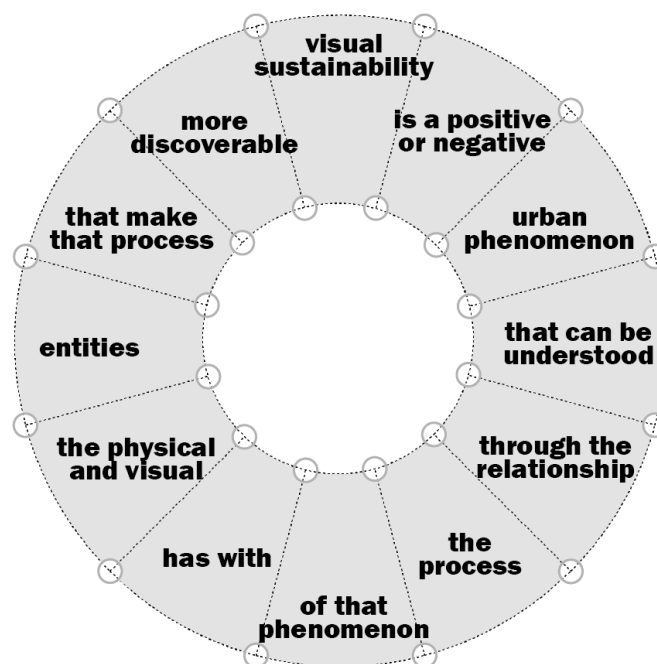


Figure 5: Working methodology for visual sustainability based on Kelley's Perception of Causality (2013)

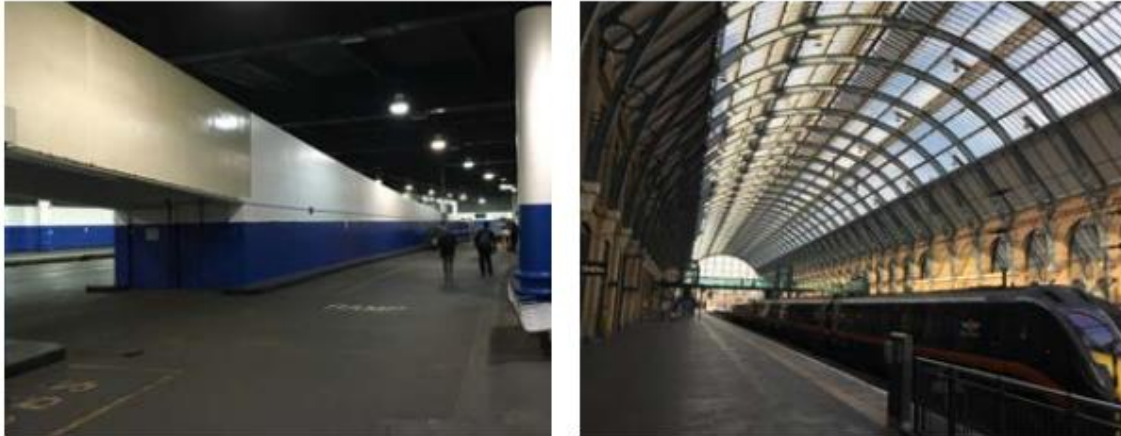
In order to know what to look for in a high street, an evaluation of existing conditions is required to provide base-level physical information. This will be followed by an interpretive process by which more information is gathered about the surrounding visual use. The objective is to understand what physical use and visual use *do*, so that we can understand more about what visual sustainability *is*.

The concepts of physical and visual use have been justified from the literature review summary and rationale, and in order to understand how these are related, if at all, it has required the pairing of several components. The methodology starts with an idea and works its way toward the theory. It will look for patterns to emerge, by constantly comparing existing conditions. The first and most important pairing are the concepts of physical use and visual use because, as discussed, these uses are often described in architectural, urban, and environmental theory.

The following methods will attempt to explain how physical use and visual use can be analysed in epistemically objective (Searle) terms and whether a link can then be established that connects to the process of visual sustainability, in the form of its working definition. Ultimately to a point where it will be possible to take the ‘temperature’ of the high street. It may be worth repeating that this concept of temperature has been framed in a metaphorical sense from Kelley’s argument (Figure 8). The temperature speaks to the process; the flame speaks to visual use; the shape and colour of the candlestick speaks, in the first instance, to physical use; and can at a certain threshold (emotion) be converted into visual use. This qualitative threshold in a process (De Landa) is important to recognise as it occurs when emotion is activated and converted into an intangible quality which can only be read through Polanyi’s concept of tacit knowing. Depending on the state of the brain we are able to look at the same object in a physical way as well as in a visual way. And this will be one of the main challenges for this study, which is to attempt to document the cross-over effect in respondents and in the spaces being analysed. Visual temperature can be gauged from two photographs in the Building Better, Building Beautiful Commission’s report (Ministry of Housing, Communities & Local Government, 2020a, p.28) shown below (Figure 6):



Figure 6: Example of what contrasting ‘visual temperature’ in a high street might look like (Images from Building Better, Building Beautiful Commission’s Report: Living with Beauty .p.28. Credit: Upper: Robert Kwolek; Lower: © Copyright Gordon Griffiths and licensed for reuse under Creative Commons Licence.).



Euston Station (left) and King's Cross Station (right). Both perform the same function – but which will last longer?

Figure 7: Proposed visual sustainability (not sustainability and/or beauty) as evidenced through building adaptability and use (Images from Building Better, Building Beautiful Commission's Report: Living with Beauty .p.94. Credit: Nicholas Boys Smith).

A total of three high streets will be studied and the existing conditions and values defined for each (Step 1). The street will be broken down into uses and any consistencies between them will be documented. Based on these findings, an analysis (Step 2) will be carried out using interviews and grounded theory techniques to look for components of visual use. Step 3 will look at how Steps 1 and 2 produce a concept of visual temperature in the street. The underlying theory (Figure 9) in Step 3 is related to the idea of structural coupling in a system, in that perception is reliant on “interdependence or mutual specification” between our structure (brain/body in the high street) and our experience (feelings/reaction in the high street) (Varela, Thompson and Rosch, 2016, p.10). Because the “fundamental insight of the enactive approach... is to be able to see our activities [how we consume through physical and visual use] as reflections of a structure [state of mind] without losing sight of the directness of our own experience” (Varela, Thompson and Rosch, 2016, p.12). This can be interpreted in this study as follows: on the one hand at any one moment in time, we have a ‘state of mind’ focused on either physical or visual use; on the other hand our behaviour in, and experience of, the built environment is not just an effect of that mindset in that instant, but it causes the structure to move forward in the world; on to the next process iteration. An iteration here can be imagined as the effect between a brain state and an experience where the reaction, it can be conjectured, is similar to the process occurring in cellular automaton theory. Cellular automaton is an analogy used by Varela et al which is useful in understanding how, for example, embodied cognition may manifest in the built environment; specifically, in the context of a phenomenon called visual sustainability. Experience creates the future in the brain state and the brain responds, producing another behaviour or experiential condition; which changes the brain, the cycle endlessly repeating. The challenge in this circular relationship is to not lose sight of our experience. In this argument our experience of the urban is what creates future urban. Because breaking the cycle produces the kind of result that has been argued to have occurred in modern-day sustainability; where every iteration is not only predictable but isolated or alienated from what the vessel which is holding it all together: our minds. We thus no longer see what is in front of us and what is actually happening. We lose sight, of what Varela refers to as the directness of the experience. While the argument is understood this study does not cross the final ontological bridge proposed by Varela et al.; of groundlessness because it does not need to. For this study, “Whether the world is mind-dependent or mind-independent makes little difference, if any, to our everyday experience” (Varela, Thompson and Rosch, 2016, p.218).

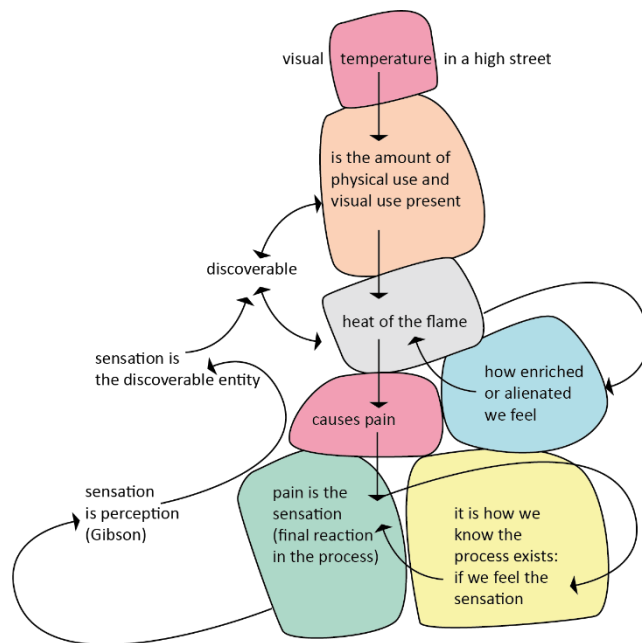


Figure 8: The discoverable entity



Figure 9: Interdependence or mutual specification of structure and behaviour/experience. Image: Varela et al., (Varela, Thompson and Rosch, 2016, p.10).

Perhaps what to look for is best summed up by what not to look for: in the first instance “not by starting with symbols and rules but by starting with simple components that would dynamically connect to each other in dense ways” (Varela, Thompson and Rosch, 2016, p.88). In the context of the built environment it is proposed that we can scrub through a particular context (for example, shop location) to look for uncomplicated data which may, when connected up with ‘neighbouring’ data (the cellular automaton analogy presents itself again), reveal conditions of emergence at work.

The three steps taken are as follows:

STEP 1:

Understanding existing physical conditions

People sustain shops but equally important to understand is that shops sustain people. One cannot function in a high street without the other. What we do know is that we can establish the physical value of shops in a high street through the value of their lease or rentals. We cannot begin to understand what we do not know without first establishing what it is that we do know. The methodology is therefore about establishing the things we are certain of and only then turning to the things we do not know. So that we can understand where the value lies in the high street, it is necessary to establish the following:

Tangibles: what we can quantify

- Existing conditions
 - Where the physical value lies (£/sqm.)
 - Footfall
 - The tangible elements; existing morphology, texture and scale (candlestick shape and colour)

If we understand where the physical value lies, we know where to look for the hidden visual use; which is latent in the transactions that have taken place to secure these spaces. By value here is meant the commercial value of the physical transaction; meaning how much a trader is prepared to pay to secure a space. The evidence about existing values will form the basis for further qualitative analysis in step 2, addressing why certain areas are physically more valued than others and whether there is a component of visual use mixed and undetected in that physical value.

STEP 2:

Identifying visual use

It is argued that part of a decision to buy or rent a shop space in a certain location is based on visual use. This is the part that is not recognised by modern-day sustainability. If there is visual use hidden in the physical value, then the components need to be understood and a value ascribed to reflect this attraction. This value then in effect captures all the dimensions related to visual, social, perceptual and morphological conditions. The attraction includes, but is more than, the architecture or urban design features. It shapes meaning from how spaces are used, from lived experience; for which there is no language.

Intangibles: what we do not know

- The components of visual use depend on:
 - Whether there is a flame. What is meant here is that, as previously stated, the heat of the flame represents how we are *enriched* (hot) or alienated (cold) we feel. Or put another way, whether there is visual use; and whether there are positive or negative intangible elements activated and working away in the background.
 - The temperature state of the flame (the sense of being sustained by visual elements in the street).
 - The importance of the following elements in determining the temperature state. This includes aspects of Policy Proposition 25 of the Building Better, Building Beautiful Commission (BBBBC) (Ministry of Housing, Communities & Local Government, 2020a, p.100):
 - Open space
 - Views
 - Bulk (or 'boxland' BBBBC)
 - Proportion
 - Composition
 - Facades (BBBBC)
 - Light
 - Scale (including shop size, BBBBC)
 - Street length (BBBBC)
 - Design code vs zoning (BBBBC)
 - Gentle density (BBBBC)
 - Use classes (BBBBC)
 - Adaptability (BBBBC)
 - Heritage buildings (BBBBC)
 - Trees
 - Community owned High Street Data Trusts (BBBBC)

- Other

STEP 3:

Identifying the ‘temperature’ of the high street

This step involves targeting the shop owners for answers about the ‘temperature’ of the high street. If we extend Kelley’s analogy of the flame into the domain of self-regulating phenomenon, visual temperature can be said to move our perception “from local rules to global coherence” (Varela, Thompson and Rosch, 2016, p.88). This autopoietic functioning in a global sense, and at a global scale in our urban, it can be said to be aligned with current theoretical discourse around “emergent or global properties, network dynamics, nonlinear networks, complex systems, or even synergetics” (Ibid.: 2016, p.88). It is in this light that shops provide the necessary context; with which to frame conditions along the entire street; as they do both visually and physically,

Shop owners are considered the best user group to establish physical and visual meaning because they offer the most unbiased way to get answers about the ‘temperature’ (or health, or sustainability) of the high street. Instead of trying to link visual sustainability to shoppers, the approach taken has been inverted. The strategy adopted is to look for ways to logically link the shop owners up with sustainability. Thus, the angle of investigation is not how does the high street justify the shops, but how do the shops justify the high street? This can be summarised as follows (see also Figure 4):

- Shops sustain people, and
- People sustain a high street.
- The high street in turn sustains the local residents.
- The local residents find common ground as a community surrounding the high street, and
- because of this, meaning and identity becomes self-sustaining and slowly enriched.
- The meaning and identity support the location of the shops, increasing property values and customer expectation.
- This meaning allows a greater diversity of shops to continue sustaining people.
- People continue sustaining the high street.
- Which in turn sustains and enriches the local community.
- The cycle continues and becomes self-sustaining. Future generations enjoy the street because it endures over time. It has a history as well as sentimental value.

This circularity speaks to the concept of sustainability declared by the 1987 Brundtland Report and more specifically aligns with Walker’s definition of *personal meaning, social meaning, practical meaning, and economic means* (Walker, 2018). This study therefore asserts that the high street is a microcosm of what occurs in visual sustainability and which has been described previously in the working definition as *the process by which we are sustained and enriched in daily life through the visual relationship we hold dear to our surroundings*. If we were to find visual sustainability in our high street then it would exist as a friendship where: “Like the pleasure of friendship, the pleasure in beauty is curious: it aims to understand its object, and to value what it finds” (Sir Roger Scruton FBA FRSL, In: Ministry of Housing, Communities & Local Government, 2020a, p.ii). In Scruton’s analogy, the pleasure of visual sustainability lies in the way in which we are sustained by this friendship between beauty and value. In this study it is framed along the two main entities we wish to discover more about: visual use and physical use.

If the science of our brain declares the world perceived by our brain is contained in our mind (Eleanor Rosch, IN Varela, Thompson and Rosch, 2016, p.xxxvii), then it follows that whatever the condition is that represents visual sustainability, it is the product of this same mind. This fundamental consideration therefore must inform the methods that will be adopted to ground the theory of visual sustainability. The methods applied in this study will look to establish a sense of meaning from the

“connectionist approach” (Ibid.: 2016, p.99); or, in the context of this study, from emergence in urban assemblage. It will not look for meaning in symbols or codes but for the meaning that “resides in complex patterns of activity that emerge from the interactions” (Ibid.: 2016, p.100) of simple parts.

6.0 Methods

In terms of connectionism (emergence theory for the built environment) the “law of reciprocity” (Varela, Thompson and Rosch, 2016, p.94) holds the following interpretation for the built environment: if physical use connects to visual use, then visual use connects reciprocally back to physical use. This analogy moves sideways as well, poaching ground held by complexity theory and behaviour in complex adaptive systems as follows. We can think of each shop as “an “attractor” in dynamical systems theory” (Varela, Thompson and Rosch, 2016, p.89); as an urban, configurable unit “that receives input from two immediate neighbors and communicates its internal state to the same immediate neighbors” (Ibid.: 2016, p.89). This helps with understanding the relevance of emergence in our built environment because “emergence of global patterns or configurations in systems of interacting elements is neither an oddity of isolated cases *nor unique to neural systems*” (Ibid.: 2016, p.90, emphasis added). For this study, the idea offered by cellular automaton allows us to develop a qualitative method around the notion of attraction. Where, normally, qualitative concepts are used as placeholders for quantitative methods, in this study we will use quantitative concepts and data as a placeholder to produce a qualitative analysis. In this sense then, attraction is proposed to exist primarily because of the mutual specification between physical use and visual use in the environment. Because physical and visual use are concepts extensively used (implied as well as explicitly used) in built environment theory, can we say that these two uses exist in the process we know as sustainability? Are these the entities that make the process of sustainability more discoverable? This thesis has adopted the following qualitative methods in two distinct phases to answer these questions.

STAGE 1: EXPLORATION

Since the rationale from the literature review section, we have slowly but surely moved away in this study from representation and manipulation of symbols found in the built environment theory. This study holds that visual sustainability is less about a world defined by representations through symbols and code; and more about assemblage, emergence, and enactment. In terms of Louis Sullivan’s maxim that form follows function, form does not follow or equal function in this case. Instead form *resides* with function. Visual use resides with physical use. One is wedded to the other in a marriage that is self-sustaining, complementary, and reciprocal.

The work by Rapoport; Lynch et al. can be argued to be symptomatic of the fact that “we do not really have knowledge of the world; we have knowledge only of our representations of the world” (Varela, Thompson and Rosch, 2016, p.142). For both Lynch and Rapoport architecture and urban design are grounded in a process of representation as a means of communication and for providing meaning. It is de facto storytelling through symbolism and metaphorical coherence as described by Ortman where “use of the image-schematic structure of a concrete domain to conceptualise and reason about an abstract target domain” (Reading Ancient Minds: Metaphor, Culture, and Complexity, 2012, p.00:13:30). Perception however appears to be less about the need to find representations of the external world and more about understanding the process of “continuous self-modifications” (Ibid.: 2016, p.139). If we follow the argument of Varela et al. (Varela, Thompson and Rosch, 2016) relational networks offer more than metaphorical constructions because the latter looks almost exclusively inwards to the mind; while the former looks both ways, potentially acts as a bridge between mind and body through the everchanging complex web of interconnectivity. Continuous self-modification forms the basis of emergence thinking. And where self-regulating phenomenon occur, they exist as closed loops (Ibid.: 2016, p.139). There is thus this sense of repeating circularity or behaviour about them. “Instead of *representing* an independent world, they enact a world...” (Ibid.: 2016, p.139). The

question then arises: is sustainability not ideally about a closed loop, a continuous circularity that conditions our world? If it is then the process of being visually sustained is inseparable from a sense of physical fulfilment.

To uncover those entities that reveal more about the process of visual sustainability, this study has settled on a methodology that subscribes to a systems-level analysis, where “the meaningful items are not symbols; they are complex patterns of activity among the numerous [simple] units that make up the network” (Varela, Thompson and Rosch, 2016, p.99). In this sense then the proxy of a high street can be said to be one such system, made up, as it is, of a complex web of simple interacting parts.

If meaning in the built environment is less about symbols and more about emergent themes and patterns then the initial stage of this qualitative method is to try to understand more about the phenomenon of visual sustainability that we feel. We see it too but based on lived experience we feel visual sustainability first; and that is why we are able to recognise and therefore ‘see’ it. This then is the exploratory statement with which to advance the methods section. Because it can be argued that we know it when we feel it; and then we see it. The rationale behind the working definitions in this study is to help us understand more from the underlying theory, about which ontological objects fit into the conceptual framework and which do not. With this in mind we would do well to think of the urban as a single giant network enacted by human perception. Then take a path for the built environment similar to what Varela et al. suggest in understanding the mind through the brain; where “instead of looking for grand, unified models for all network behaviors, one should study networks whose abilities are restricted to specific cognitive activities and then look for ways to connect the networks” (2016, p.105). The methods will therefore in the first instance look for networks through urban assemblages that increase a sense of visual richness or do the opposite; that increase the sense of alienation.

STAGE 2: THEORISATION

The second stage proposed in this research has been to move from a process of exploration of the underlying theory to examining and theorising. The important consideration in this methodology and the methods chosen is similar to Varela et al.’s statement of perception; which is “is seen as an active process of hypothesis formation, not as a simple mirroring of a pregiven environment” (2016, p.136). The hypothesis formation has been derived from various literature and underscore the difference between attraction, symbols, and perception in the built environment as follows:

- Attraction is a product of emergence (connectionism) in the built environment. Attraction is posited as a process that avoids the ambiguity found in representational thinking, which holds that there must be some form of symbolic or intermediate meaning or explanation for the attraction levels in an urban forcefield. By linking attraction to relational thinking, described by the kind of activity found in networks, we are able to bypass many of the problems around ambiguity and subjectivity. We are thus less concerned about terms such as beauty, aesthetics, quality and more focused on levels of attraction. Architects and urban designers may be considered specialists in their field but they circulate at a level of irrelevance mainly due, it is argued, to the overwhelming levels of subjectivity and ambiguity of the representational state they inhabit. Even among architects there is often little consensus about what is aesthetically pleasing or beautiful; with the result that words are used to convince their peers and members of the public.
- Symbols and coding are discoverable in urban assemblages (structural coupling) and can be interpreted through various levels of representation of our world; where the world is always represented in a certain way (Varela, Thompson and Rosch, 2016, p.134). But we are not subjects of Le Corbusier’s machine. Humans do not interact with their environment where, analogous of a computer, we exist as snippets of code and respond to an environment of

inputs and outputs. Instead we live in a world as Varela et al. propose: “enacted by our history of structural coupling” (2016, p.217). In the built environment the analogy can be extended to assemblage theory where the most rewarding environments appear to be comprised of layers rich in assemblage and emergence.

- We can build on the chicken-and-egg analogy proposed by Varela et al. (2016, p.172) as follows. The chicken is direct/ecological perception (epitomised by Gibson et al.) and the egg is indirect perception (epitomised by Gregory et al.). While theoretical opposites, both are forms of representation in the sense that representation means “anything that can be interpreted as being about something” (Varela, Thompson and Rosch, 2016, p.134). This study does not hold itself epistemologically loyal to one or the other because it need not. It subscribes to a view that embraces both; contained in “the idea of a world or environment with extrinsic, pregiven features that are recovered through a process of representation” (Ibid.: 2016, p.138). In addition, the theories of both Gibson and Gregory (chicken and egg) are satisfied because “world and perceiver, specify each other” (Ibid.: 2016, p.172). There is a pregiven world but we also rely on sense-data for information. We thus create our world by acting in it. As such this study suggests that it may be possible for the outer world or realism (Gibson et al.; Searle, Gigerenzer et al.) to be reconciled with the inner world or idealism (Gregory et al; Polanyi et al.) because “These two extremes both take representation as their central notion: in the first case representation is used to recover what is outer; in the second case it is used to project what is inner” (Ibid.: 2016, p.172). Imoto points out the kind of misunderstandings that occur between these protagonists in his example between Searle (Searle, 1995) and Maturana and Varela (Maturana and Varela, 1980). In this case the existence of an external world is not in dispute by either party, only the order in which they are perceived.
- In the methods used, the emphasis will be less about what is being represented (directly or indirectly) and more about what the relationships are between those things and events. Thus although everyone agrees that representation is a complex process, it is nonetheless conceived to be one of recovering or reconstructing extrinsic, independent environmental features. Thus in vision research, for example, one speaks of “recovering shape from shading” or “color from brightness.” Here the latter features are considered to be extrinsic properties of the environment that provide the information needed to recover “higher order” properties of the visual scene, such as shape and color. The basic idea of a world with pregiven features remains (Varela, Thompson and Rosch, 2016, p.136).

With the above in mind, the strategy was to set aside the working definitions which have helped frame the study to date, and to ground the theory in data collected from:

- Observations and establishing data that describe existing conditions.
- Interviews and grounded theory analysis.

In this stage we set the table with the following questions:

- Does visual sustainability exist as a process?
- What is the relationship between sustainability in our built environment and what is the evidence, from the literature review, of physical and visual use?
- If visual sustainability does exist in theory, then can we say that the primary entities that make the process of visual sustainability discoverable, visual use and physical use?
- Can it be said at the end of this study, that visual sustainability exists and that sustainability in the built environment is as much about visual use and attraction as it is about physical use and attraction?
- How can we ascertain conditions where “an intensified energy flow” (De Landa, 1997, p.55) exists between elements in the built environment?

If visual sustainability is a process of the mind through the brain, we are reminded that it is process of *a process that changes itself* (Minsky, *The Society of Mind*, p.287, IN Varela, Thompson and Rosch, 2016, p.139) and this realisation is key to understanding the role played by emergence in the built environment. Just like brain states, the urban is a mass of condition states, continuously changing and shifting. For the methods chosen then the emphasis will be less on factual data and more focused on an experience around being sustained visually that more or less remains consistent over a period of time. A sense that visual sustainability exists will not come from producing a catalogue of signs and symbols but from an analysis of behavioural cues. We refer back to the concept of affordance when considering both physical and visual attraction or use; how a network exists in complex adaptive systems that promote “the *opportunities for interaction* that things in the environment possess...” (Varela, Thompson and Rosch, 2016, p.203, emphasis added).

STAGE 2 STEPS

2.1 Produce a 3D model of the street as a). part of the process of observation; b). to be used in observation; and c). used in reflective analysis in follow-up interviews.

2.2 Establish existing conditions in the high street.

- Shop locations
- Shop typology and use
- Footfall
- Value
- Look for areas where there is a sense of visual richness
- Look for areas where there is a sense of alienation
- Map which shops are located in each of these areas
- Identify “different structure-generating processes that result in meshworks and hierarchies” (De Landa, 1997, p.185). Establish which of these hierarchical structures and network functions (De Landa, 1997, pp.38–39) are important to observers. In other words, where the hierarchical assemblages are and where the nodes lie along the street network. This will help understand where the forces or the energy that monetises Matter are.
- Understanding the non-linear nature of a high street in relation to its self-regulating functioning will help us understand the cyclical nature of “successive periods of growth and decay” (De Landa, 1997, p.42). This is a little like understanding the conditions for growth as opposed to the top-down idea that ‘farmers grow wheat’ when in fact ‘farmers create the conditions for wheat to grow’, even in a drought. In other words, shops do not ‘grow’ high streets; but shops create the conditions for high streets to grow or thrive, even in tough economic times when there is poor cashflow (energy).
- Identify elements that exist in a network versus in a hierarchy as framed by De Landa (1997, p.49). Identify the high streets that make up a network system vs the high streets that make up a hierarchical system. Identify the characteristics typical of these two types of high street. How does the energy flow and matter differ? Because:
 - any structure that matters as far as human history is concerned may be defined by its degree of stratification, and changes in composition between command and market components may be defined as movements of destratification and restratification (De Landa, 1997, p.261).

2.3 Establish sample.

Contact the local business association of the high street and ask for the names of traders who own or run their own business. Exclude franchises and retail chains. Invite each shop/ business owner to take part in the research. Complete ethical requirements. Proceed with interviews of all willing participants.

2.4 Interviews (semi-structured format).

The aim is to understand what a localised network of lived experience looks like through the role of heuristics (Gigerenzer) and context dependent know-how (Varela). Because it can be said that the fast and frugal heuristics of Gigerenzer are embedded in the process of common sense advocated by Varela. In the time it takes to catch a ball (Gigerenzer's example), common sense must prevail for the duration the ball is in the air. It is the same for our interactions in the built environment. One similar example might be when crossing a street. In the time it takes to judge which gap between cars is best to cross, no architectural assemblage however beautiful, serves to sustain you. But before and after the crossing, any number of focal points may have been meaningful. This view of "cognition as enaction", or embodied action, speaks to the idea that "... knowledge does not preexist in any one place or form but is enacted in particular situations" (Varela, Thompson and Rosch, 2016, p.178). So, while symbols and urban coding can be beneficial as lower-order devices, the process of enactive agents (people) residing in non-linear dynamics of emergent conditions (environment) can be argued to be a far more powerful urban cocktail for this concept of visual sustainability. The point is that the methods adopted in this study will not try to establish the entire system as an autonomous emergent system but that we as humans interact with the state of emergence around us; often in ways that is visually sustainable for us. In the same way we are in awe at the flock of birds flying in unison without a leader, so too in the urban, in conditions that are indescribable yet fulfilling. Although this study does not fully subscribe to the view that cognition is enaction to the point that it is at the expense of Gibson's theory of direct perception, if cognition *is* enaction (Varela, Thompson and Rosch, 2016) then perception too is enaction. If perception is action 'by doing', then the built environment only works when people 'do the space' by 'producing the space'; not in the sense of being produced by a designer, but through both affordance and what Varela et al. call "a viable history of structural coupling" (Ibid.: 2016, p.205) or what can be described as the historic mutation in evolutionary terms between an organism and its environment. This enactive approach has settled on meaning "not only that cognition is embodied action, and so inextricably tied to histories that are lived, but also that these lived histories are the result of evolution as natural drift" (Ibid.: 2016, p.213). Which is possibly one reason why alienation has become so prevalent on society. Because space these days for many hours of the day has become little more than a computer screen. The interviews conducted must therefore be focused on understanding the meaning of 'doing'. What is a person doing firstly, in a physical sense (physical use) and secondly, in a visual sense (visual use).

The interviews conducted must be understood in terms of the modern interpretation of hermeneutics; extended from interpreting ancient texts "to denote the entire phenomenon of interpretation, understood as the *enactment* or *bringing forth* of meaning from a background of understanding" (Varela, Thompson and Rosch, 2016, p.149). The interviews are an exercise in interpretation. This study is oriented towards interpreting the meaning of the patterns formed by a melee of the objects and events surrounding shops in the high street. The patterns formed represent our embodiment: we are wed to this world by the knowledge we gain from embodiment (Ibid.: 2016, p.149). This embodiment can be said to be derived from the surrounding visual and social cues. We are embodied through our visual structures and social structures not because of the intervention by an architect or urban designer but as a "result of the organisation and history of the system itself" (Ibid.: 2016, p.157) through autonomy (emergence through self-organisation) and coupling (assemblage) (Ibid.: 2016, pp.151, 156). In the approximately 10% of our urban which is directly authored by a built environment professional (Cuthbert, 2003), even if meaning is assigned by an architect it is rarely if ever interpreted in the same way by an onlooker. The interview thus needs to look beyond to patterns formed by the history of the system itself. And the history of the system, it can be argued using the theory of enaction, is based not on "the visual extraction of features but rather by the visual guidance of action" (Varela, Thompson and Rosch, 2016, p.175). Architects and urbanists should therefore, on this basis, not look to communicate through visual features per se, but how those features prompt us to act in

the world or guide our behaviour. This includes the ethical value of all manner of things such as ornament, detailing, form, shape, integrity of purpose etc. Going back to Le Corbusier's quote at the beginning of this chapter, architecture produces nothing except what it asks from us. Le Corbusier may have claimed the house as a machine for living in, but does the perceiver ever interact with a house in this way? What he claimed (and by extension of the argument, what architects and urbanists claim) is often irrelevant to what the object affords us. If it then asks nothing of us, or if what it asks is unrecognisable, then is it architecture or is it just a blob in the landscape? In terms of the working definitions for physical use and visual use, just like function and form, physical use and visual use can be seen as being "aspects of the same process" (Varela, Thompson and Rosch, 2016, p.177). This leads the discussion to a point where it may be asked: Is this the same as the modernist maxim, where form equals function? To which the answer must be: No, they cannot be the same thing. They only equal each other in a circular, self-sustaining manner; where each informs the process to which they are attached in a complementary, reciprocal way. The maxim for this study should read: Form resides with Function; or Visual Use resides with Physical Use. It is a marriage.

- Constant comparative analysis
 - 1. Initial interview
 - Discuss shop location and look for correlation with areas identified for visual richness and alienation.
 - Transcribe
 - Code and categorise ideas
 - Observe, then analyse field notes made from observation; and compare with transcription.
 - 2. Follow-up interview (3D model intervention)
 - Transcribe
 - Code and categorise ideas
 - Generate themes
 - 3. Reflective interview.
 - Observe, then analyse field notes made from observation; compare with the transcriptions.
- Repeat interviews, including with other sample types if required by the results of categorisation and theme generation (e.g. Shoppers).
- Repeat until a saturation point is reached of no new information.

7.0 Conclusion

If we accept that shops act as a thermometer for the health of a high street, then a high street acts as a thermometer for the level of social (visual) sustainability. The metaphor of a thermometer in the sense argued by De Landa describes where "... the causal relation does not form a straight arrow but folds back on itself, forming a closed loop" (De Landa, 1997, p.67). The conditions being measured are potentially composed of "... combinatorial possibilities [where] – the number of possible hybrids of meshworks and hierarchies – are immense" (Ibid.: 1997, p.69).

This study holds that when a shop owner decides to buy or lease a space, visual use is considered in their deliberations and negotiation; whether they realise it or not. Their final decision to trade in a specific location is based on whether there is a 'flame' and how hot that flame is: is there feeling and are there underlying levels of attraction (similar to desire lines) evident that enhance the location for the trader? Does a closed loop exist producing a regulated set of favourable conditions?

It is the aim of the methodology to find out what those 'visual things' are that are absent from the physical equation (where space is equated to a cost in £/sq.m.); but which were considered (consciously or unconsciously) when the owner decided to trade from that space. By finding out more

about this latent part of the equation we can start to understand more about the value of visual use. A shop owner may be prepared to pay £30/sqm for a space but if certain visual elements that attracted him/her to the space are removed, how much less would they be willing to pay before looking elsewhere? What is the value of this difference? And conversely if certain visual uses were added, how much more would they be willing to pay? These questions are fundamental to understanding not only physical use but visual use; and the relationship between the two. These components can then be presented as 'solid evidence' of their role in modern-day sustainability. If we can find out a little more about visual sustainability it will help validate and reinforce the standing of architects and urban designers; and the role they have to play in modern-day sustainability.

8.0 References

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