SDG18 Visual Sustainability: dream or reality?

May 2020

Abstract. Visual meaning plays such an important role in our daily lives that as an epistemological concept, visual sustainability is curiously absent from pedagogical and modern-day sustainability. Methods: A theoretical framework firstly unpacks how and why we 'latch on' to visual elements. Secondly, the construct of a high street is used to help understand more about visual meaning as urban phenomenon in the context of modern-day sustainability. Results: Simulation techniques, used in conjunction with other methods, can be a useful tool in experimenting with the complex relationship between visual affordance and physical use. Conclusion: Visual sustainability is closely aligned with the Sustainable Development Goals (SDGs), especially SDGs 3 and 11. But it does more. It orients us at both ends of life's spectrum: in basic physiological needs, as well as in self-actualisation.

Keywords: visual, architecture, sustainability, urban, ambiguity, crossroads

1. Introduction

How often do we find ourselves at crossroads where we intersect with uncertainty or ambiguity? One such uncertainty is visual sustainability, which may be described as the process by which people are enriched and sustained in daily life through the visual relationship held dear to their surroundings. Yet visual meaning plays such an important role in our daily lives that as an epistemological concept, visual sustainability is curiously absent from pedagogical and modern-day sustainability. A theoretical framework firstly unpacks how and why we 'latch on' to visual elements, what we 'latch on' to, and for how long; exploring several unsettled conceptual relationships around structures of meaning (Frankl); invisible needs (Lefebvre); tacit thinking (Polanyi); perception-thought (Wittgenstein); networks and complexity theory (Holland); assemblage (De Landa); heuristics (Gigerenzer); and conditions of satisfaction (Searle). Secondly, the construct of a high street is used, together with simulation techniques, to help draw together divergent ideas about recurring urban phenomena.

Visual sustainability "represents the technology before the technology" (1) and may be described as *the process by which we are enriched and sustained in daily life through the visual relationship we hold dear to our surroundings* (2). This paper looks firstly at a theoretical framework centred on Gibson's theory of direct perception (3); the fallacy that science is objective and incompatible with subjective domains of knowledge (4–7); and ecological rationality (8,9). The framework (10) (Figure 1) is set in the context of two contrasting urban outcomes: visual sustainability vs alienation. It is concerned with the perceiver of information (people), the environment (the information), and how that information is used to create sustainable (or alienating) places. These three conditions underpin the success or failure of all sustainable development efforts because, as Frankl observes of the need for meaning, "if there is no meaning… in [our] visual field then [a person can be driven to] take his life" (11); when a point of no return has been reached and our sense of alienation is complete. (12)

We will also look at two determinants around the concept of affordance posited by Gibson et al. (3,13,14); firstly in the use that objects imply, or hold, and secondly, in how these can change as we map out our futures. These inform the construct of a high street: firstly, through physical use or affordance and secondly, through visual use or affordance. The former describes how useful buildings and places are; and the latter, the intensity of their visual attraction. These two concepts can be argued to lie in parallel with Frankl's notion of self-actualisation or emergence as a by-product (15); of value creation through creative values and experiential values (15); as well as "Lefebvre's concept of "the physical... the mental... and, thirdly, the social"; specifically "the space occupied by sensory phenomena, including products of the imagination such as projects and projections, symbols and utopias" (16).

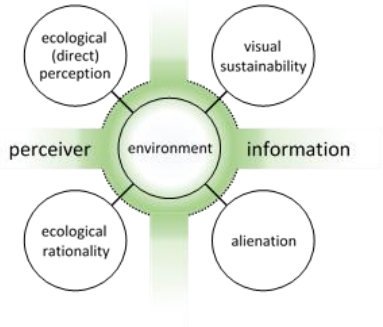

Figure 1. A theoretical framework

In the second part of this study we turn our attention to survey and simulation techniques that can be employed on the construct of a high street; to explore the relevance of the concept of visual sustainability in modern-day sustainability. The aim is to increase awareness of how the ontological

subjectivity of visual meaning over time (visual sustainability) may be reconciled with the epistemically objective conditions of SDGs 1 to 17.

Why a SDG called visual sustainability?

Visual sustainability is not a theory. It acts as a short-cut or heuristic to explain theory. It exists or it does not; and cannot be commanded into existence: it is emergent, or in Frankl's terms it "falls into your lap automatically" (15) if the conditions are right. It is the product of a multitude of processes, only one of which is theory. It reaches for meaning beyond aesthetic preferences. And because theory should be seen in the context of something we need, to "direct us to significant relationships and networks" (17), we are directed to the significance of visual sustainability by urban theory and urban philosophy. We are directed in modern-day sustainability to what is not there: to the absence of a SDG that embraces the importance of ontologically subjective meaning in our environment.

Visual sustainability is to modern-day sustainability as (described by Searle) pain is to a doctor or a piece of paper is to the stock exchange or our livelihood. The pain is as real as the piece of paper we call money, and equally as real as the visual meaning that sustains us over time and influences our sustainable behaviour. So why not develop a goal around the currency of visual meaning? (Figure 2). This study submits that Frankl's creative and experiential values exist as proxies for sustainable behaviour. Our visual world affects every other sphere of life because we are grounded by our visual world. It orients us and it separates order from chaos (18). Visual sustainability binds us to one another in a profound way. It conditions our behaviour towards our environment as well as towards each other; so that "the desire to choose and build according to a perception of what is 'right', should lead towards the recognition of expressive meaning" (19). Visual sustainability can be described as "focusing on relationships between entities rather than the entities themselves" (20). We point to visual sustainability in the same way as we point to the sky. We understand the sky and can describe how atmospheric conditions states exist in a multitude of ways, scientifically as well as theoretically and emotionally; but none produce the sky. They only try to make sense of it. Lefebvre, for example, talks about crowds of invisible needs (16). Polanyi about tacit knowledge and intuition (21). Wittgenstein refers to how thought contains perception and perception contains thought (Ludwig Wittgenstein, cited in Davey, N. 'The Hermeneutics of Seeing'. In: ,22). Holland refers to recombining life's building blocks (23). De Landa et al. of emergence and assemblages (24). Searle identifies collective intentionality through status function declarations (4). Scruton adores beauty and sense of detail (25) while Alexander subscribes to a lexicon of patterns (26). Space Syntax deals in centralities and connectivity (27), Peterson in tools and options (28). Cullen in townscape visual linkages (29), Lynch in mental mapping (30). The list is endless and made denser by all manner of movements, for example, the arts and crafts movement, the modern movement, and more recently in biophilic urban theory (31) and the New Urbanism movement (32,33). Each iteration as convinced of their vision as the other. New possibilities spring up all the time, for example, Gibson's ecological perception (3,34) when combined with Gigerenzer's approach to ecological or bounded rationality and fast and frugal heuristics (8,9) produces an interesting perspective on visual sustainability (35). Visual meaning is also subject to cultural differences, most famously mapped out by Jung (36) and more recently by psychologists and philosophers from all persuasions, such as Peterson. These hierarchies can be consolidated and compressed or pulled apart and flattened out by tensile forces such as the post-modern ideologies. A SDG should thus be more

than theory. There is growing consensus about cities in terms of complexity, complex adaptive systems, and information theory (23), for example, in Jankovic's work on emergence-based approach to designing (37).

How does visual sustainability fit in?

It makes sense to recognise the power of our intuition and our interaction with invisible forces. While it is possible to see with our ears and hear with our eyes, (12) see through our experience, (38) or experience our visual world through words, there are many things in life for which we cannot find a language. "All we [arguably] need to do is understand the capacity of measurement. We measure things by analysing our visual world. We measure with visual meaning" (39) (Figures 2 and 3). There is this sense that tacit knowledge can be measured in the visual world because of how "we are surrounded by invisible needs (Lefebvre); the dialogue between perception and thought (Wittgenstein); [and] how De Landa has shown how intangibles can be measured." (40) How then do we quantify these invisible forces? This study will propose a simple method of quantification using the high street; one that can become as sophisticated and data rich as necessary.

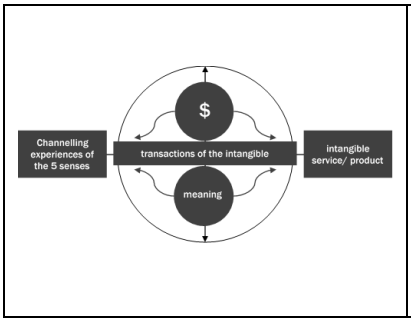

Figure 2. Our visual world is comprised of transactions; and the currency used is meaning. *(40)*

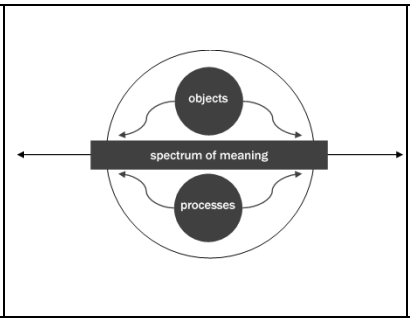

Figure 3. Objects and processes along a spectrum of meaning. *(40)*

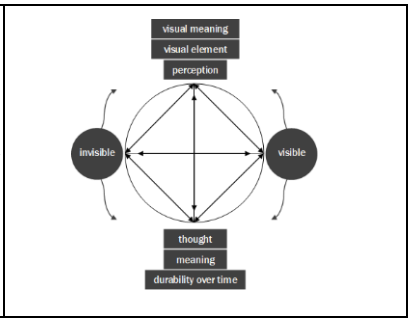

Figure 4. Perception-thought analysis. *(40)*

What are some of the key drivers?

It follows that while this paper contends that visual sustainability is not a theory, theory helps us to understand and manage our expectations around the things that we cannot see. In Figure 4 we can follow "the logic of De Landa in understanding how it may be possible for condition states to exist; that when analyzed by a concept of dials can produce qualitatively different phases. (41) Using this technique we seek to extract unseen 'things' and 'events' by way of gradations of evidence and causation, for example, between perception and thought; or between visual elements and meaning; or in the durability of visual meaning over time." (40)

In a similar way, the first key driver lies is in how we intuitively understand how mind and environment provide the conditions, the connective tissue, for our urban. Which, it can be argued, can be found in "the relationship *between* the organism and the environment." (8) Gigerenzer has developed several heuristics and one, for example, the Recognition heuristic, involves processes of searching and stopping rules which could be adapted to how we navigate the urban. Which may explain how tacit knowledge helps us avoid "being trapped by the parts, and which holds the greatest promise for understanding how we are sustained in life by the visual relationship we

hold dear." (39) Because, "After all, architecture is simply emergence along a spectrum of sustainable meaning." (42)

Secondly, because we are oriented to the things we want; that we look at what we want (28) it is no coincidence that the act of looking directs us physically as well as spiritually towards every need or goal. (43) We gravitate towards "the logical place to be." (44) The logical place to be in our urban is in our high streets. High streets or main streets are visual markers in our environment (both physically and mentally) and are thus excellent constructs with which to measure the presence of visual sustainability in our urban (43). They essentially contain all the elements, from economic viability, diversity of uses, morphological scale, tacit knowledge, and invisible interactions. High streets are constructs that we are all familiar with; that we all understand to some degree; and which it will be argued, contain all the elements that define three important elements of our urban, namely visual meaning, visual richness, and durability over time. These three elements, it is argued, make up the meta-assemblage that holds the high street together; meeting the conditions for measuring visual sustainability.

Thirdly and perhaps most importantly, meaning which can then be recorded, tracked and incentivised to produce self-census data and documented networks of meaning; responsive then to the individuals in the community; which in turn can raise the profile of depressed areas (1).

Lastly, the concept of affordance (3) is inseparable from our urban, as is tacit knowledge, by the way "we are first and foremost oriented through the affordances contained in our visual world." (43) Tacitly, a good urban environment tells us to pay attention; while many argue how bad urban environments stop us from paying attention. (45,46) "We navigate heuristically in and out of networks of meaning" (43) and through tacit knowing we recognise an urban that produces conditions of both meaningful (sustainable) and meaningless environments. (1) High streets display both these conditions; often evident in the same street. The reason high streets are failing is no mystery. It can be argued that successful high streets rely for their success on the presence of a triad of conditions described by Frankl, namely, creative or useful work; experience or experiential qualities; and attitude or attitudinal qualities. (15) This paper argues that these elements form the foundation of visual sustainability.

Methodological considerations

The methods that follow are based on the broad notion that while we forage for value in a high street, there is a constant tension between visual affordance and physical affordance; except where they are co-located. We contend that emergent conditions that point to visual sustainability (as defined in the opening paragraph) exist in areas where these forces coexist in high concentrations. The theory behind this is that we think to make and make to think. This notion of thinking and doing/ doing and thinking, helps locate and embed these two concepts of visual affordance and physical affordance in this study. We draw *on* tacit knowledge to empirically craft an object; after which we draw *from* the extended meaning for an explanation of its constituent empirical parts. This conversation, between animate and inanimate objects, and the data produced continues unabated. On a metaphorical level the high street is similar to our immune system. At an optimal level, high streets are self-regulating devices; their success lies in maintaining that homeostasis. On the other hand, *our* success lies in tacit knowledge; in the underlying tension in how we interact with this environment and ultimately with one another. The emergence can be discovered at the level of our success. This study has therefore looked at evaluating conditions at a systems level. Tacit knowing can be defined as "an act of integration… in the visual perception of

objects." (21) This act of integration between physical use and visual use the is the principle tenet of this study. The relevance to our urban lies in how tacit knowing describes the process of shifting our gaze from localised meaning to emergent meaning. And analysing emergent meaning forms the basis of the following methods.

2. Methods

The methods section is philosophically driven and can broadly be divided into two parts: a survey and agent-based modelling (ABM). This study is interested in a read-out of the interaction or tension at play between unseen elements, namely 1. visual (hard to quantify but something we intuitively understand) attraction/affordance; and 2. physical desire for a need to be satisfied (physical affordance); for example, desire for food or other service/product. The hypothesis being that where both visual and physical affordance exist simultaneously in high concentrations in one location, a condition of high visual sustainability exists in the environment. The methods while appearing to be reductive are in fact focused on a systems approach, specifically about discovering more about conditions of emergence. In the ABM, the key was to observe more about the whole (the street); produced by interacting parts of blue (visual) and green (physical) agents.

In the first part, a survey (Figure 5) was carried out to initiate the study and map the nodes considered relevant to experiential attraction and the results were graphed together (Figures 9 and 10) with the results from an ABM approach (Figures 6 to 8). The survey form was distributed electronically to all the members (n=25) of a WhatsApp group that had been formed by a resident of Colomb Street London; all actively participating in the exchange of information as well as providing a running commentary on social and local business activity along Trafalgar Road. Colomb Street is ideally situated off Trafalgar Road and survey responses (n=2) has been a valuable resource for this study. It is important to note that the two responses received are considered adequate for the purposes of this study for three main reasons: Firstly, because this study is primarily concerned with understanding emergent conditions that showcase the relevance of modern-day sustainability. Secondly, due to their location next to the high street, both respondents are fully integrated into the high street and therefore actants in what may be described as a living laboratory in the study of modern-day sustainable development. Lastly, due to the negative impact of COVID-19 there has had a negative impact in responses as residents are focused on more pressing needs.

In the second part, ABM was employed, a technique that has been used over the last decade to successfully produce experiments of simulations of social settings in spatial terms. In particular, ABM simulations can be helpful in observations where we would like to consider the richness and complexity of spatial systems (e.g. cities, neighbourhoods or high streets) as they evolve (47). ABM approaches allow us to work with complex urban systems, where a generic population is represented by individual agents whose behaviour is predetermined by a set of initial rules (for example, an initial motion vector that represents a clear intention to go from A to B). Most of the time, such rules are dependent on the characteristics of the physical environment, represented by a digital model. For example, agents are programmed to react to the presence of walls, surfaces, or street sections and are subject to a number of forces that represent the real atmospheric conditions (gravity, inertia or pressure). On a higher level, agents respond to a number of pre-set inputs, to which they are able to react as they progress through each iteration of the simulation. These inputs are programmed to simulate a setting that fits the social and physical environment being observed. With

this experiment this study wanted to evaluate the difference between visual and physical behaviour in the physical setting of the high street.

The agents in the simulation are set up to replicate people's response to several buildings in our case study: Trafalgar Road in Greenwich. To each building a value of attractiveness has been assigned on a scale 1-10. The simulation is run in Boid (48) a swarm behaviour library developed by Ján Pernecký at *rese arch* (49) which work on Rhinoceros/Grasshopper. This simulation engine is primarily based on iterations, where the behaviour of each agent is computed at each step of a loop based on local rules. These include a motion vector (acting to the point representing the agent) and the position and behaviour of other agents. The simulation occurs within an Anemone loop (50) where a number of vectors representing forces acting on the agents are aggregated. By computing each agent individually, the engine returns complex flocking behaviour with the final objective of observing emergent behaviour.

In order to test our simulation, a CAD model of Trafalgar Road was developed where 48 points of attraction have been included (the points of interests resulted from the survey), 25 for visual attraction and 23 for attraction because of their physical use and affordance value. Each of these points represent a building, more precisely a particular store or local activity). To each building, a value of attraction was assigned, represented by the magnitude of an attraction vector (adhesion) with an area of influence on the agent equal to the length of the pavement in front of the building at that particular section. The final vector applied to each agent is the combination of the initial motion vector (which trigger the initial movement of individual points) running along the high street, an attraction vector towards the building, and a repulsion vector that simulates the continuation of the walk after the agent remained in the proximity of the building. 100 agents were deployed for 1,200 iterations along the high street, each with individual behaviour based on their initial location, the mutual position of the other agents and the local forces applied. The observation was that 1,200 iterations provided an optimised system in equilibrium where, after this threshold, agents start to have similar behaviours (agents follow the same path and are attracted to the same point of interest). To observe the behaviour of each agent, the study allowed them to trace a trail of their movement in the high street, using different colours to highlight the differences between the behaviour due to visual (blue) and physical (green) attractions.

Finally, the blue and green agents' trails were compared to observe communalities and differences. In particular, the focus was on: i) distance from attractor (point or block of interest), ii) individual paths traced by individual agents and iii) spatial relationship between the agents and the built environment expressed in distance and configuration of trails and the physical and visual boundaries of high street (pavement, crossing points, facades, alleys and main viewpoints).

3. Results

The results of the survey highlight three main points and at certain nodes point to emergent conditions that influence users of a high street. By, for example, looking at conditions produced by the survey (Conditions A to D, Figure 9), we can get a sense of the importance of this method for evaluating conditions of visual sustainability. We also get a sense of the importance of evaluating three-dimensional streetscapes in the animation produced to replicate a person (agent) at a fast walking pace https://vimeo.com/411083921. That Trafalgar Road reflects values looking North, of 6.38 for visual attraction and 4.83 for physical affordance or use; while looking South, values of 4.73 and 5.0 respectively, is a positive step in understanding the dynamics at play of active invisible forces.

The first and possibly most important output is that the results demonstrate how it may be possible to produce documented networks of meaning for communities that describe more empirically how people are enriched and sustained through the visual relationship they hold dear to their surroundings. Secondly, they also show that a street has value not only through its nodes but also in the emergent conditions that produce assemblages. An interpretation of the assemblages in Trafalgar Road can be posited as follows: Condition A: high physical and visual use (high visual sustainability); Condition B: low physical/high visual (imbalance, visual sustainability not present); Condition C: High physical/low visual (imbalance, visual sustainability not present); Condition D: similar (but not high) levels of physical and visual (synchronized but low visual sustainability). A third observation is that it can be argued that the levels of synchronicity between physical affordance and visual affordance produces emergence in our urban. This emergence underpins our efforts at producing sustainable development, because we aim at what we want (28); both in a visual sense as well as a physical sense.

Turning towards the ABM scenario, the results also focus on three main aspects: i) adherence to the main pathway, ii) sequential movement and iii) different behaviour between green and blue agents. Looking at the adherence to main pathway (i), observations were made of the extent to which each agent stayed close to an invisible curve connecting the initial and the final points at the end of the high street. This line goes approximately along the midline of the pavement. In this, it was noticed that the green agents (physical attraction) tend to remain in a more compact configuration than the blue ones (visual attraction). Conversely, the blue agents seem on average to diverge more significantly from the attraction points (Figure 6). This shows the agents trails, where motion vectors applied to agents at each iteration, pulls the agent toward them and then releases them to re-join the main path. The trails are not trimmed to fit the pavement boundary in this figure, in order to visualise the full extent of the impact of vectors on the agents. Secondly, observations were carried out of the sequential movement (ii) of agents whereby the focus was on the attractors as a system. Observations were made of the impact of the previous attractor on the current position of the agent. It was recorded that low values of attraction ($x<4$) have a significant deviation effect on the main pathway. In those cases where a low value is followed by a higher value ($x>5$), the trail seems to average to a linear (straight) configuration of the trail; perhaps then a sense of focus. This supports that the diversion on the main path does not grow exponentially as the attraction value increases. There is an initial push from the attractor outwards with low values which then normalises the trail (Figure 7). Thirdly, observations were carried out of the overall spatial behaviour (iii) of agents comparing the influence of physical and visual attraction (Figure 8). With a similar initial position and the same number of agents, it became apparent that the physical attraction generally tends to result in a more consistent configuration of trails (represented by the linearity of the green lines in Figure 8). Conversely, visual attraction results in a more varied configuration, characterised by clearly identifiable point of divergence, where the combined influence of the different points pushes the agents into diverging directions (circled in Figure 8). In this particular case, based on the ABM scenario, there were mixed results. The three points of conspicuous divergence were 1. (lower left/Ad1) an ordinary configuration of line shops 119-121 Trafalgar Road; the same divergence taking place for both physical and visual use; 2. (upper right/Ad2), the divergence takes place after an empty block and for physical use, starts with the Tesco shop; while visual use is delayed and diverges half-way further down the same block. The third point of divergence (Ad3) is centred on the

'Forum At Greenwich' (ex-Church) and 'The Crown' (south-side). It shows that the agents, on their trajectory from one end to the other of the high street, are highly conditioned by their position. In Ad3 it is evident how those agents of which distance from a point of interest is larger than 5m continue in their path following a straight line, as their behaviour is not influenced by the attraction/repulsion generated by the Point of Interest (PoI). Conversely, those agents of which position is included within a circular area of approximately 5m around the PoI are significantly attracted to the point and then repelled away from it. The stronger the attraction/repulsion values are for each point, the more is the distance with which the agent travel from the point before returning into its straight trajectory.

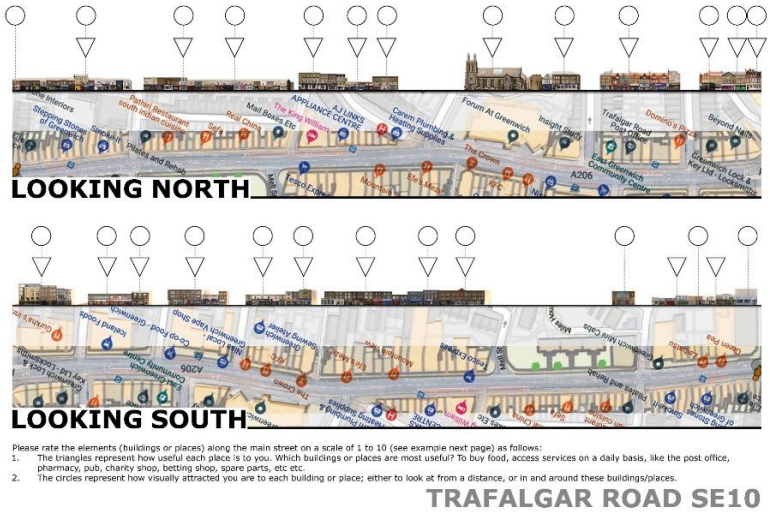

Figure 5: Questionnaire (Experiential)

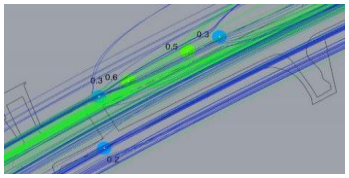

Figure 6: Simulation results, typical response

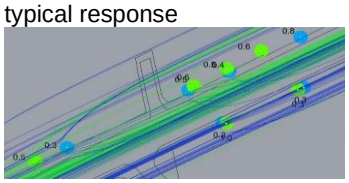

Figure 7: Simulation results, sequential movement (typical)

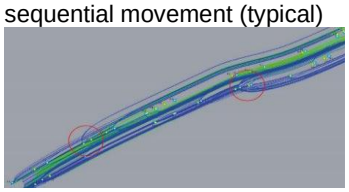

Figure 8: Simulation results, visual convergence (typical)

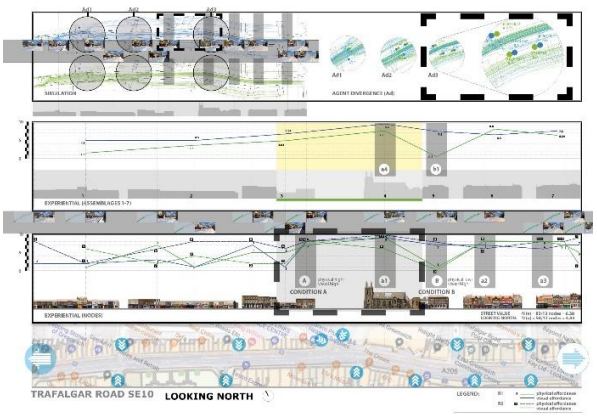

Figure 9: Typical street analysis

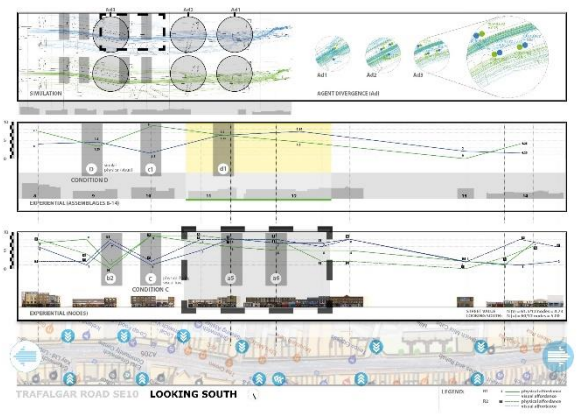

Figure 10: Typical street analysis

4. Discussion

The results of the ABM show that the behaviour of agents is heavily affected by the encounters that agents have previously made. In fact, if we focus on the directions of the trails, it becomes evident that the position of the agents approaching the points of divergence is determined not so much by the point itself, but, more significantly, by the combination of attraction and repulsions resulting from the previous points of interests in the agents' journey through the high street.

Five themes have emerged from this study. An immediate thought is that we know that the agents in the model (people) cannot interpret the three-dimensional environment except through the values ascertained from the respondents of the survey. But the bigger idea is in how agents produce information amongst themselves, independently of the PoI's. A second theme is based on how low values of attraction ($x<4$) have a significant deviation effect on the main pathway, is that this lack of information stimulates a process of searching for stronger attraction or meaning. The third theme is focused on how the tension between their own interaction creates future divergence of agents (further tension), which is produced retrospectively; from a point in the past. Fourthly, there is the tension between the notion of a high street as a homeostatic entity, which can be contrasted with our role in the street, in which we do *not* act in "a tensionless state". (51) For, as Frankl points out, we are a product of tension through the meaning we seek and the "potential meaning waiting to be fulfilled" (51), which in this case, is present in the high street: waiting to be activated through "existential dynamics in a polar field of tension, where one pole is represented by a meaning that is to be fulfilled, and the other pole, by the man that has to fulfil it". (51) And the fifth theme focuses on the agents' behaviour in certain conditions. Within a circular area of 5m, their exaggerated behaviour can be interpreted as people needing to get close to a point in order to have more information about it (for example, in looking at the shop window and the items in it) and, once they have seen the point at a close distance, they tend to take the opposite direction from which they came, in a radial way until the 5m attraction area of the next PoI (retrospectively in the case of this model) intersects their path.

At this point in the discussion it may be helpful to take a step backwards and reflect on the goals of the study. To put it another way, this study is interested in the resulting phenomenon, in the by-product of tension. Just as self-actualisation is a by-product for Frankl, this study submits that visual sustainability acts in the same way. What is promising is how it may be possible to track divergence between visual and physical using more sophisticated research methods and models. Thus we arrive at the first claim of this study: that, in the context of visual sustainability, this novel approach re-analyses and attempts to restack or re-order the building blocks of urban sustainability, by focusing on the relationship between two variables in modern-day sustainability: visual use or affordance (which has been long ignored), and physical use (which has been seen in isolation for far too long).

This study then forms part of an ongoing exploration into visual sustainability and, while inconclusive, the findings are conditional on more complete experiential survey results as they become available. While there is no clear explanation for the conditions at Ad1 and Ad2 (for example, in interpretation or chosen modelling method), there are signs at Ad3 that point to an environmental condition in which the by-product may be visual sustainability; as defined in the introduction. Can we say that visual sustainability exists at Ad3? Is this represented by the simultaneous high levels of visual and physical use people experience while engaged with or in this area? This study would like to suggest that visual sustainability does exist at Ad3 and that the invisible interaction or

tension between visual and physical needs are the primary drivers. It follows then that, if it does exist, then we should further unpack this concept and its parts and decompress the latent data (42) produced by these emergent conditions. So that we can see more of the invisible needs around us by understanding more about the invisible interactions that enable us, and that produce sustainable development.

5. Conclusion

Visual sustainability is as much about visual use as it is about physical use and should therefore be acknowledged in both the opening and closing chapters in the book of modern-day sustainability. Future research must focus on understanding the importance of our visual world to help reconcile bottom-up and top-down processes and make them more relevant to disadvantaged communities. This will help practitioners foster a new zeitgeist centred on a concept of adaptive visual relevance. This study is hopefully the first of many to attempt to reconcile and link three-dimensional attributes up with two-dimensional analysis and in some small way advance current theoretical and empirical efforts.

This study has used visual affordance together with physical affordance as a pathway to explore the concept of visual sustainability. It has also used the high street as a construct to generate two methods of measuring the existence of levels of visual sustainability. Firstly, experientially, and secondly, using ABM. The results point to a correlation particularly in the strong convergence of visual attraction and physical attraction in the nodes described above. This study is also hopefully the first of many to attempt to reconcile and link three-dimensional attributes up with two-dimensional analysis and in some small way advance current theoretical and empirical efforts, for example, by way of adding to the conversation around the increasing awareness of perceived limitations of space syntax theory, as discussed by Pafka et al. (52) Future research will look in more depth at emergent conditions in high streets, including re-running the model, experimenting with different modelling techniques, and accounting for greater diversity in resident's feedback. The second claim of this study is that the two uses, visual and physical, are inseparable and therefore for the SDGs this paper offers the following observation: that it is not about where we go, but also about *where we go*. How "our senses travel" (43). One thing is certain: we consume and are driven through simultaneous and inseparable forces of visual and physical use. And the measure of our understanding of sustainability can be found in the final act of self-actualization; particularly in the sense described by Frankl (15): to have "fulfilled a concrete meaning… [that we] actualise [ourselves] as a by-product" of a number of interacting processes and invisible needs. We do so on a personal level as well as collectively; in that state of heightened awareness which more completely describes the trajectory of our journey — emanating from visual sustainability in physiological, safety and orienting processes, to fulfilling the meaning we all reach out for.

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