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What is a sustainable construction project?

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Abstract

To contribute to sustainability, or even to merely “be” sustainable, the built environment needs to deliver change and change the way that it delivers. The making of the built environment is dominated by the paradigm of construction project management. These projects change ‘stuff’ but also control and constrain change. This is a working paper in which we seek to develop a theoretical approach to understanding construction projects, change and sustainability. We adopt an interpretative methodology to create a bricolage built from our reflections on three collaborative episodes of making sense of sustainability in the built environment. Starting with the question “what is a sustainable construction project?” we interpret our experiences using research on system change to widen our analysis beyond the planning and control of asset delivery. Among other levers, that will be the subject of future research, we identify the need for a shift from the language of sustainable ‘construction projects’ to ‘sustainable construction’ projects. Our reflections are a set of steps towards locating such projects within a socio-technical transition system of sufficient reach and scope to address the sustainability challenges we face.

INTRODUCTION

If the built environment is to contribute to sustainability, or even to merely “be” sustainable, then change is essential. Change to the physical built environment; change in the way it is delivered and managed; and change in the mindset of the system. The fundamental theoretical and practical connections between project management and sustainability remain in their infancy. The core reason is that project management is entrenched in a particular paradigm; positivist, objective and typically quantifiable while sustainability remains a slippery and elusive construct, sometimes at odds with the dominant paradigm.

This is a working paper in which we are starting to develop a conceptual approach to understanding construction projects, change and sustainability. We ask the question “what is a sustainable construction project?” as a probe and as a means of approaching the interrelationships between sustainability and projects.

Our paper is structured as follows: a discussion of project management, sustainability, and change; a methodological positioning statement for our distinct qualitative approach that situates the authors within the text and analysis; our provisional “results” in the form of a description of three recent episodes in which we grappled with these issues and our reflection and sensemaking; and a discussion that represents a snapshot of our position as we move forwards in order to shift to a more problem structuring approach and thus driving change within project management and sustainability.

PROJECT MANAGEMENT, CHANGE, AND SUSTAINABILITY

Construction projects are fundamentally about changing ‘stuff’. That change can be conceptualised as physically changing materials from one state to another, often in a unique configuration and under constraints. Change also occurs in the bringing together of components and materials to create a ‘built’ entity, along with the changes to the teams and organisations involved. Then of course change also occurs in terms of how a finished project impacts a location, stakeholders or the community.

We take change as a jumping off point because of its uneasy and contradictory relationship with projects, both conceptually and empirically. Change management as a construction project management practice has the goal of limiting, reducing and mitigating the effect of changes (particularly where they have contractual implications). Change is viewed as interference with or disturbance of the project. (e.g. Love et al, 2002; Sun et al, 2006). The other view, drawing on the design literature, sees change as essential to the process of the building and project - emerging from the process of design development (Knotten et al., 2015). However, the “necessity” for design change is easily captured by the dominant change management paradigm. Pointers to a truly alternative paradigm comes from applying a knowledge management perspective to project change that emphasises the value of learning through change (Senaratne & Sexton, 2008).

Project management thinking, practices and tools, did not develop in a world where sustainability was part of the common discourse. In fact, rather the opposite, whereby the Association of Project Management typically quote the Manhattan project as the formalisation of modern project management, a project in which achieving the goal overrode any other consideration. In fact, any human endeavour of significance, such as the Great Wall of China or the Great Pyramid of Giza must have required a version of what we understand to be doing project management (Sankaran et al, 2021). Yet without the awareness of sustainability that we have today, nor the same desire to tackle it, project management is shaping how well sustainability is enacted. And while the two domains develop in parallel, sustainability is also shaping how well project management is enacted. Sustainability is an active variable, with agency, and we need to recognise that and act upon it.

The traditional project management paradigm is that projects should mimic a closed system: stable, defined, structured, predictable, bounded, and with a fixed end date. In essence, the

past 75 years of modern project management thinking has been dominated by seeking to manage out 'change' and search for ever more certainty in project delivery, whilst generating greater efficiencies with the dominant rhetoric being time, cost and quality (Martens & Carvalho, 2016). That tradition is aligned with what has been termed the 'problem solving' paradigm of project management, borne out of years of positivist perspectives that steered much of social and management science (Mateo et al, 2017).

Change is required to get sustainability into project management practices. If change can't happen to project management practices, then sustainability cannot become part of it, cannot become part of the very fabric of project management (and will remain some sort of ill-fitting bolt-on, and that will result in a poor take up of real impactful sustainability action).

There are other alternatives to the problem solving paradigm of project management that may help in tackling the challenge above. Once such approach not driven by problem solving is perhaps rather unexpectedly a 'problem structuring' paradigm of project management, a sort of neo-project management if you will. This fresh, 'problem structuring', paradigm conceptualises the 'social construct' of a project differently and therefore what stakeholders could be focussing upon (Franco et al, 2004; Mingers & Rosenhead, 2004). With the built environment sector, and society on the whole, facing huge challenges in terms of 'all things sustainability', and based in part upon the arguments developed (above) it seems timely to ask if our current project management thinking can actually cope, respond or absorb fresh sustainability thinking?

It is time to think about what the field of project management might look like given the global challenges of today, fresh perspectives that can potentially cope better with change associated with sustainability are worth considering/investigating to see what can be learnt. If the built environment sector, is going to address its shortcomings in terms of its operation and production regarding sustainability, then the project management approaches must surely be revisited as part of this complex, this wicked problem of sustainability. Society needs to have sustainable projects delivering sustainable buildings.

METHODOLOGICAL JUSTIFICATION

This is a working paper in which we are seeking to develop a theoretical approach to understanding construction projects, change and sustainability. The authors are both built environment academics, with industry experience, trying to make sense of sustainability in the built environment as a scholarly endeavour and on behalf of our students and partners. We share a professional background in construction contracting and project management which is reflected in the focus of this current paper. In terms of academic community we would both associate with the construction innovation literature and draw primarily on social science disciplines and interpretivist and critical research approaches. Davies is a Senior Lecturer who returned to academia from an industry change role in 2024. He has applied these ideas to sustainability only recently having previously focussed on digital and process

innovation (e.g. Davies & Harty, 2013). Larsen is an Associate Dean of Sustainability in the built environment and has researched and published on the subject (e.g. Larsen 2025). The purpose of sharing this work with SEEDS is to develop and socialise our findings and grow them in conversation with diverse disciplines and perspectives.

Methodologically, this paper can be thought of as bricolage. Bricolage is a methodological term used to refer to a research approach and family of methods that are characterised by flexibility, pragmatism, and a tendency to go beyond traditional disciplinary boundaries (Denzin & Lincoln, 2018). All of this allows researchers to combine resources in novel ways leading to new insights. In this research we draw on our experiences of trying to make sense of sustainability in the built environment in the context of three episodes that unfolded in 2024. The three episodes are:

1. Davies studying a training module in carbon reduction in the built environment produced by our institution;
2. both authors designing and delivering a presentation to an industry-focussed conference on net zero building;
3. both authors working with others to design and deliver a pilot leadership training event in partnership with an environmental charity.

Starting with episodes and the struggle to make sense of them means that we will discover literature as we go, rather than building on an assumed static “state of the science”. A process that continued as we produced this representation for the purpose of SEEDS 2025, and will develop further as we share it with the community and respond to challenges and feedback.

Fundamentally, our research aligns with the processual school (cf. Pettigrew 1997 and Whittington 2007) and is thus embedded within a becoming ontology (cf. Chia, 1995). This helps set the boundaries by which the constructs being considered are conceptualised and the language used. Reality is perceived not as static or fixed, but rather in a state of flux, temporal, known as a state of constantly becoming. Based upon that ontological position, projects, strategies or sustainability as themes of interest are conceptualised as processes that are enacted and reenacted, again constantly changing and evolving. No novelty is claimed here, with notions of becoming traced back to the existentialists school (giants of philosophical thinking like Jean-Paul Sartre and Friedrich Nietzsche). Even the built environment literature has begun to recognise this nuanced but important distinction and how it might inform our thinking (Kao et al., 2009).

EPISODE DESCRIPTIONS AND REFLECTION

Episode 1: Learning and thinking about carbon in buildings.

When Davies joined University of the Built Environment they completed a training module in carbon reduction in the built environment. The course was a 22 hour online mixed media CPD

course covering: introduction to carbon in buildings; passive design; active design; sequestration and offsetting; and energy and carbon assessments.

Reflecting on that learning experience in the context of this research, the notable feature of the module was that it talked about buildings, and touched on the operation of buildings, but did not talk about projects at all. The process of delivering and adapting buildings was only considered obliquely via the concept of embodied carbon. An assertion that sticks with me was a rule-of-thumb that the operational carbon benefits of triple-glazing are not worth the increased embodied carbon compared to double-glazing: something that points to decision-making and the resolution of trade-offs that would be the domain of project management. Without the design, commercial, procurement and risk management processes the project embodies, operationalising that “technical” knowledge to achieve better sustainability would not be possible.

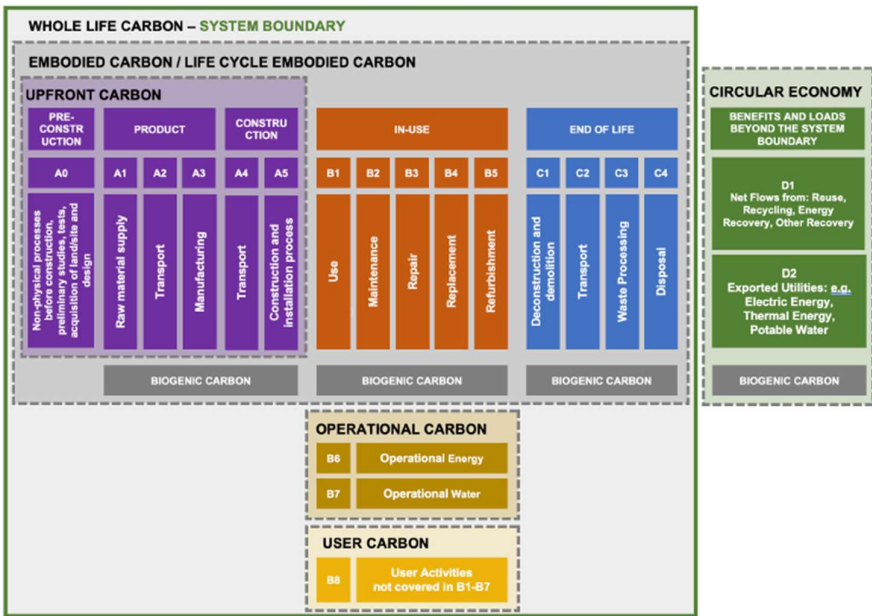


Figure 1. Carbon ‘modules’ for construction project lifecycle (WLCN, 2023).

Figure 1 is from a reference used in the training module (Whole Life Carbon Network, 2023) it shows elements of carbon use for various stages of an asset lifecycle and, as such, necessarily encompasses a construction project. Would the measurement specified here tell us if a project is sustainable? Looking at this diagram, it’s notable how little of it is given over to the activities that are the traditional concern of construction project management; namely A5 and A0 (although this standard allows the assumption of zero carbon for A0 for building projects) along with an implicit set of complex accounting rules to attribute quantities of carbon in A1-4 to “the project”. This diagram, simple as it is, challenges the idea that a project can even be satisfactorily defined such that its sustainability can be assessed. It shows the other “managements” in action around and through the “project management”. It points to the project being embedded in a network of systems, and to a multitude of potential system

boundaries on which to base an assessment. And this is only carbon, not the “triple bottom line” of sustainability (Goh et al., 2020) with the social benefits only partially captured by “B8” and the financial and economic dimensions absent entirely.

Episode 2: Talking about innovation in sustainable materials

Episode 2 focusses upon both authors designing and delivering a presentation to an industry-focussed conference and exhibition on net zero building. The event was arranged by the marketing team of University to promote a Master’s programme and was allocated to a “Sustainable Materials” track in the conference. This required the authors to imagine the interests and concerns of an unknown audience and to reflect on the usefulness and salience of programme materials. The eventual theme of the session was to “think differently” and consisted of: describing and advocating for an eco-centric, strong sustainability mindset in materials management; and an exercise in which attendees were supported to think about their position within a socio-technical network for sustainable transition. The latter was based on Multi-level perspective (MLP) (see below) and had the twin goals of encouraging a different perspective and seeing oneself as part of a whole, and to provide a useful, theoretically informed, framework to make complex things visible and guide action.

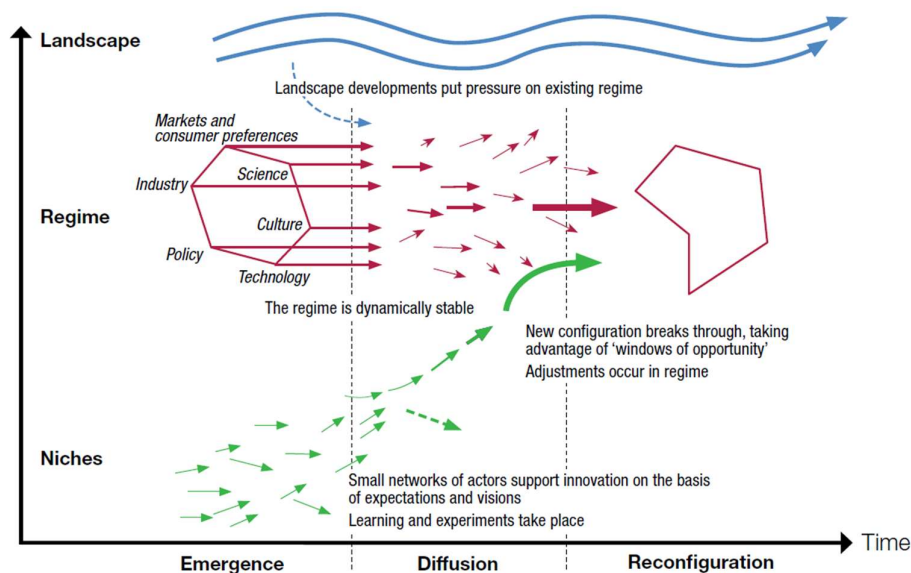


Figure 2. The Multi-Level Perspective (MLP). (T2S Programme, 2019)

MLP is a theory of technology-driven socio-technical-system (STS) transitions (Geels, 2002) that is central to the research on sustainable transition (Geels, 2019). The basic mechanisms of MLP are shown in Figure 2. An example we used in the session was to consider how the relatively ‘niche’ technology of video conferencing was taken up at scale by the office and knowledge work ‘regime’ under the ‘landscape’ pressure of the COVID pandemic; and how that lead to permanent changes in the regime (in terms of organisation, technology, practices and places).

In this paper so far we have “challenged” the idea that projects are closed systems and instead are open systems in a world of open systems. Reflecting on this complexity using MLP gives us a map (Figure 2) to further consider “where” is a sustainable construction project?

Reflecting on the ‘regime’ level, projects can be thought of as part of the system via which the built environment is made; not the entirety of the system but a major part and the dominant production model. In MLP terms, projects are therefore part of a “dynamically stable” system – unlikely to change spontaneously and constrained by their relationship to other components and other projects. And likely to respond to landscape pressure or technological change in ways that maintain or reinforce the dominant paradigm. Considering ‘landscape’ one is put in mind of the discipline of “project management” as represented by codes, communities of practice, education etc. MLP would predict that without major changes to “project management”, “projects” won’t change. Finally, what would it mean to think of projects as ‘niches’? This is an attractive idea that is given theoretical weight by the construction innovation literature that emphasises project-created innovation (e.g. Slaughter, 2000). However, other models of construction innovation place the agency for innovation within the firm, positioning projects as the recipients of change (Gann & Salter, 2000). Reflection on this episode has highlighted the important open question of where to locate projects (or, perhaps, a specific project) within the socio-technical transition model of MLP. If projects are going to change to be more sustainable, or be part of a sustainable transition, then we need to understand how they fit into this model.

Episode 3: Helping and changing future leaders

Episode 3 focusses upon both authors working with others to design and deliver a pilot leadership training event in partnership with an environmental charity. The objective was to equip and empower built environment leaders to advance sustainability in the sector. Our session built on the experience of Episode 2 but, for this audience we introduced a key theoretical feature of MLP drawn from evolutionary economics (Geels, 2002). In evolutionary terms, the purpose of niches is to generate “variety” from which the regime “selects” innovations as a way of adapting to changes in the environment (landscape). (Note that this is closer to the model of construction innovation proposed by Slaughter (2000) than that described by Gann & Salter (2000)). The purpose of this in the session was to imbue participants with a sense of agency and to lead into a discussion of management actions that could be taken to support these mechanisms. In doing so we found ourselves discussing portfolio management – an attempt to take control of the “forces” used in the evolutionary metaphor. The emergence of project portfolios from this activity raises another challenge to the question of the best project boundary for evaluating sustainable projects (Anjamrooz et al., 2024). Should we in fact be holistically evaluating portfolios of projects?

Thinking about the function of niches and regimes (variety/selection) rather than their “location” on the MLP map challenges the notion of layers in the model. Alternative system models envision a network of interconnected systems, subsystems and environments that are

not arranged hierarchically with a fixed direction of effect. This raises the possibility that our question should not be what is a sustainable construction project, or where – but rather why or how? Not what a sustainable construction project is – but what it does.

DISCUSSION

In this phase of our research we are seeking to develop a theoretical approach to understanding construction projects, change and sustainability. We are doing so in the belief that there is nothing quite so practical as a good theory (Van de Ven, 1989). Basing our analysis on episodes of trying to make helpful sense to industry actors helps to ground our work in the perspective and imperatives of builders, developers, designers, manufacturers. The challenge is to endow that descriptive worldview with usefulness for practice and action to support the sustainable transition that is our ultimate goal. Throughout our work on episodes 2 & 3 we struggled to find the balance between simplifying complex theoretical ideas to make them digestible, and challenging our participants to adopt new and difficult ways of thinking. While the former promotes acceptance we agree with Meadows (2008) that mindset change is among the most effective levers for system transformation.

What is a sustainable construction project? From episode 1, the distinction and interconnections between asset sustainability and project sustainability is clearly important for our question (see Sankaran, 2021). Where the asset contributes to sustainability and is delivered sustainability, any evaluative schema would be expected to classify that as a “sustainable construction project” (provided assumptions about operations and the social value of the asset in use are met) and vice versa. What is missing is a clear way of answering the question when one component is sustainable and the other is not, thus scale or level of abstraction enters the discussion/debate. There is a line to find between reducing everything to embedded carbon (a form of techno-rationalist panacea) and “surrendering” to a strong discursive position.

This relationship is also reflected in the preoccupation by the traditional project management paradigm within the built environment of built assets as projects. At first that might sound ‘odd’ and perhaps obvious, but that preoccupation has consequences. The consequences manifest themselves into perspectives of project sustainability - as distinct (but related) to – asset sustainability. A view of assets as fixed entities, and thus embedded in a being ontology naturally leading to project management practices to serve that. This paradigm has shaped the very discourse mobilised in much of project management. The traditional simplistic dichotomy of change being cast either good or bad is unhelpful when seeking to understand what a sustainable construction project might look like. Doing so oversimplifies the stakeholders involved, the temporal considerations (time in shaping and changing views or interests) and the competing agendas. It is to address these issues that the becoming ontology adopts a problem structuring rather than solving orientation seeking to build commitments to improvements in situations with multiple actors & perspectives, conflicting interests, intangibles & uncertainties (Mingers & Rosenhead, 2004).

At numerous points in our analysis we have also reflected on the challenge and opportunity of determining appropriate system boundaries for sustainable construction projects. Systems thinking reminds us that a system of interest does not necessarily exist in the world. But to affect change in socio-technical systems, the choice of analytical system boundary is not entirely devoid of context and requires some grounding in reality. It is possible to view a construction project as an open system, connected to other systems. But it is not essential. Consider the perspective of a façade manufacturer – the project in their system is merely a customer, a set of parameters with respect to quantities and timing and a series of logistics enablers and constraints. A sustainable construction project as a system to assemble components into a building is different to a project to create and transfer new knowledge, or to facilitate the collaboration of materials suppliers in reconfiguring their products, or to balance risk and reward in a portfolio of projects. Systems (and projects) are defined by their purpose (Meadows, 2008).

We have found the attempt to apply MLP to the question of what is a sustainable construction project to be fruitful and illuminating analytically and feedback from episode participants encourage us that it has the potential to help unlock the new thinking that transformation requires. The fact that it is not immediately obvious where construction projects are represented in the model opens up numerous avenues for analysis and empirical research. One promising line of inquiry is suggested by recent research on digital innovation in construction and the role of major projects (Papachristos et al 2024). Those researchers apply an MLP lens to an historical analysis and find that projects, rather than ‘being’ part of the niche or regime, are the vehicle that create links between niches and regimes through mechanisms like; network development, actor alignment, learning, and knowledge transfer. Discursively, this focus can be represented by shifting the terminology we use from sustainable ‘construction projects’ to ‘sustainable construction’ projects (not constrained by the link to asset delivery). This is a step towards recasting projects in a way that supports transformation.

Attempting to operationalise MLP in the episodes has highlighted apparent problems of the model for this purpose. Our further research will explore and reconcile these issues through iterative engagement with the literature. One challenge is that MLP is a “mid-range theory” (Geels, 2002) and seeks to retrospectively explain large scale transitions over decades. Applying it to our scenario has face validity, and MLP is popular with institutions and networks what seek to support sustainable transition, but we are not aware of research that validates the model at the short-range level of analysis. For use in strategy and planning we also need the model to help people make prospective predictions and to plan actions. The shorter timescales also mean that the eventual systemic impact of the selection of innovations can’t be the driver of incremental change – that will require judgement on behalf of project actors pointing again to the problem structuring approach of the becoming ontology.

REFLECTIONS AND WHAT’S NEXT

Throughout the research we have argued that change is not only *not bad*, but that change is required within and across projects in the broadest sense if we are to engage with sustainability challenges. The three episodes enacted only begin to touch upon the complexities in unpacking *what a sustainable construction project is* or looks like. In essence, the episodes have metaphorically opened the project management ‘black box’ and questioned what’s inside and the assumptions made. The questions have been informed by sustainability and change and what these mean for project management, project managers and projects.

The research raises several important themes. A theme that is more noticeable by its absence is finance and the apparent cost sustainability brings to a project (and in turn a built asset). Our engagement with clients and developers (not described here) has left us in no doubt of the importance of this theme. With an undercurrent of *we can’t afford to be sustainable* the tide could be instantly changed through instead thinking *we can’t afford not to be sustainable*. Whilst short term, investor driven, perspectives are embedded in weak sustainability, true entrepreneurs will foresee how perhaps speeding slightly more now (more due to a lack of path dependency and the current institutional norms) yields a more sustainable society and helps bring systemic change (providing a better environment for more investment and so on). Furthermore, future change agents will seek to create innovative new financial products that enable sustainability without it necessarily costing more, creating “competitive advantage” by challenging current thinking to bring systemic change. This supports the notion of change from niche toward regime within the MLP.

Project management, as a discipline, needs actors that acknowledge change more broadly set against today’s challenges. In doing so, those enacting and shaping the discipline of project management must acknowledge their agency in the delivery of sustainability across the built environment. Whilst improvement might be made incrementally, through seeking out isolated efficiencies, it is how project management enacts this paradigm shift to embrace change which potentially offers society and the built environment the biggest wins.

Moving forwards, further research could build upon where the numerous outdated assumptions discussed are simply now no longer reflecting our reality, and unpack them in greater detail. Further research could seriously consider looking to build a better understanding the symbiotic relationship between project management, change and sustainability. In doing so, research could focus upon developing and socialising the findings, enabling the consideration of project management, change and sustainability to become a different style of conversation with diverse perspectives to meet the demands of the built environment. Mindful of the scope and complexity of the sustainability challenges faced, it’s possible to envisage a future competitive advantage for stakeholders that possess an ability to shape these conversations, and in essence re-shape project management for *today’s* and *tomorrow’s* built environment.

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