Engineering Project Organization Journal 2022

Projecting for Sustainability Transitions: Advancing the Contribution of Peter Morris

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Abstract

Projects are both shaped by processes of socio-economic change and shape those processes of socio-economic change – an insight that guided much in Peter Morris' career and contribution. In this paper, we address a growing concern of both Peter and the projects research community more generally with the grand challenges we all face, particularly achieving net zero. We therefore place project organizing research in the context of the four industrial revolutions and the Anthropocene over the last 250 years or so. In particular, we focus on the role of projects in sustainability transitions – that is the transition from one socio-technical regime to another such as from fossil fuels to renewables for electricity generation. On this basis, we suggest that the major projects of the third industrial revolution that Peter so comprehensively analysed may not be the most appropriate models for addressing the challenges of the fourth when projecting for sustainability transitions. We close by suggesting one potential additional approach.

Keywords
4th industrial revolution; Anthropocene; sustainability transitions; major projects; electrification

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INTRODUCTION

Peter's contribution to research and practice in project organizing – particularly complex project organizing – over the past 5 decades is immense as the other contributions to this special issue testify. In this essay, I want to focus on his most recently published work on projects for sustainability (Morris 2017) and their implications for sustainability transitions (Geels 2004; Morris 2013). We need to locate these considerations into the broader context of the historical evolution of the management of projects (Morris 1994), of which Peter was so aware by placing them in relation to the four industrial revolutions (Schwab 2018) and the Anthropocene (Steffen et al, 2012). On this basis, we suggest that the major projects of the third industrial revolution that Peter so comprehensively analysed (Morris 1994; Morris and Hough 1987) may not be the most appropriate models for addressing the challenges of the fourth when projecting for sustainability transitions. We close by suggesting one potential additional approach.

PROJECTING FOR SUSTAINABILITY TRANSITIONS

The penultimate chapter of Morris (2013) is entitled "Only Connect: The Age of Relevance". It argues that it is not enough for researchers and practitioners in the management of projects to focus on *how* they should be shaped and delivered, but they also need to focus on *why* they should be so shaped and delivered. The answer to why, Morris argues, is because of the enormous developmental grand challenges that the world faces. Morris (2017) picks up what is perhaps the most important of these grand challenges – the net zero challenge – which, on one estimate, requires an additional 60% of global capital investment each year over today's levels across sectors such as power, mobility, and buildings (McKinsey 2022). We can identify four main ways that this particular challenge affects the management of projects.

First, there is the addition of sustainability criteria to "business as usual" projects that would be happening anyway, and the role of project professionals in ensuring projects are as sustainable as possible. This work principally involves the supplier domain (Winch 2014) as the solution providers for owner's investment projects, although owners have a role in motivating innovation and enabling appropriate design of the commercial and governance interfaces on the project (Winch et al 2022). For instance, one innovation is the replacement of massively carbon-positive concrete structures with new materials such as concretene that uses graphene to improve significantly the mechanical performance of concrete thereby allowing for reductions in the amount of material used and removal of the need for steel reinforcement: www.nationwideengineering.co.uk/concretene/. This can reduce CO_2 emissions by up to 30% and drive down overall costs by achieving the equivalent of 28-day strength[2] in just 12 hours while retaining the use of existing pouring techniques. Broadly, this is the line of research on "sustainability of the project" (Huemann and Silvius 2017), influenced by triple bottom line concepts (Martens and Carvalho 2017) where non-carbon strategic

[2] The mechanical strength that a standard concrete pour achieves after 28 days

outcomes are achieved with a lower carbon intensity.

Second, there is the set of mitigation projects that are required to improve resilience against the climate change that is already happening. Projects here include flood relief; developing defences against rising sea levels; and ensuring buildings and infrastructure can withstand higher wind speeds. Here, governments are the principal actors. For instance, the Boston Barrier Scheme provides flood protection from high tides for over 14000 homes around the town of Boston, UK that has been flooded nine times over the last 200 years: www.waterprojectsonline.com/custom_case_study/boston-barrier-2021/. The project team used the United Nations Sustainable Development Goals (SDGs) as a basis for monitoring and evaluating success, which provided a holistic approach to project delivery and maximised the project's benefits. This and the following two types of project are about "sustainability by the project" (Huemann and Silvius 2017) where specific strategic outcomes include movement towards net-zero and associated resilience.

Third, there are the projects that will actually transform our economy and society towards the net zero target. Many of these, are, of course, energy projects but they also include the electrification of transportation, the upgrading of millions of homes so that heating them is affordable, and the transformation of food supply chains. Here, collaborative action between the public and private sectors is key. For instance, the widespread investment in wind power by private electricity generators in the context of well-designed regulatory environments has been one of the great successes of energy transformation, at least in Europe, yet little has been published on how these achievements can be applied more widely. The story of nuclear power is less happy (Lovering et al, 2016), although the advent of small modular reactors gives hope. The hot fjord project is a good example of this kind of project (Aarseth et al. 2017), which uses the relative warmth of sea-water to heat much of a small community using heat pump principles.

Finally, there are the advanced research and development projects that promise completely new ways of achieving net zero. Morris (2017) mentions nuclear fusion and carbon capture and storage, but these are technologies that have been "promising" for decades now and significant challenges remain with nuclear fusion, although they appear now to be diminishing (Financial Times 24/11/21). Hydrogen is closer to viability, with large-scale trials such as HyNet that combine hydrogen generation and its blending into the natural gas supply network with carbon capture and storage from blue hydrogen production: www.hynet.co.uk/. Battery storage remains challenging, particularly using low-carbon processing and manufacturing technologies and sourcing materials that are not from conflict zones. Most excitingly, we can expect solutions that will be perfectly viable in 10 years' time, which we do not yet know about.

In order to underpin intellectually his discussion of projecting how we will achieve net zero, Morris (2013) draws on the established body of work on sustainability transitions. The most influential perspective here is the multi-level perspective (MLP). This identifies three levels of analysis (Geels 2002; Geels 2004; Geels 2010). The central level is the predominant *socio-technical regime* in an economic sector as the institutionalized set of actors, technologies and interactions between them that stabilize and maintain socio-economic activity. For instance (Geels 2002), the sailing ship regime for water transportation consisted of a remarkable array of operatives (sailing ship owners and mariners), suppliers (ship-builders), infrastructure (ports), users (traders), and associated cultures (the London coffee-house culture) within a regulatory framework (maritime law). Within this regime, technologies evolved incrementally over centuries to reach their apogee in the clipper ships of the mid nineteenth century.

Below this central level are various *niches* which allow new technologies to emerge which start to challenge the socio-technical regime. These niches are often protected from market forces in some way – either by deliberate government policy, wealthy enthusiasts, or by military requirements. For instance (Geels 2002), steam power emerged first in shipping where its advantages were overwhelming (e.g. tug-boats[3]) or very high prices could be charged (such as for mail packets which could carry wealthy passengers on voyages with predictable departure and arrival times). A series of radical innovations over the course of the 19th century such as the marine screw, iron shipbuilding techniques, and compound steam engines enabled steam ships to compete with sailing ships in more and more niches until they became dominant at the socio-technical regime level by around 1900. Infrastructure requirements supporting this transition included larger port installations, larger shipyards, ship canals, and a global network of coaling stations.

Above the central level is the *landscape* level of overall socio-economic developments that both shape, and are shaped, by the various socio-technical regimes. Elements here include war (clipper technology evolved rapidly to evade British blockades of the American ports in the war of 1812); the first industrial revolution based on steam power; imperialism and the growth of global trade; and mass migrations that generated a demand for cheap passenger ocean transportation. Thus the steam ship both enabled the first globalization supported by the Suez and Panama canals, and was also shaped by that globalization which created a world-wide demand for fast transportation for both passengers and valuable cargoes.

These transitions are replete with major projects from shipbuilding to port and canal construction, and all the innovations embedded therein. However, a recent authoritative review of sustainability transitions research by the Sustainability Transitions Research Network (Köhler et al. 2019) makes mention of projects only in passing, and does not include *how* transitions are delivered through projects and programmes in its proposed research agenda. Yet, as Peter persuasively argued (Morris and Teerikangas 2015), projecting is central to achieving the regime transitions that are essential for achieving net zero and other sustainable development goals, but the projects community is not addressing these issues proactively. We appear caught in an unfortunate situation where project researchers are not addressing systematically how projecting can contribute to achieving sustainability transitions, and as a result, researchers on sustainability transitions do not see the

[3] Turner captured this niche transition brilliantly in his evocative 1838 painting, The Fighting Temeraire.

relevance of research on projecting for achieving sustainable development goals.

This last sentence may be controversial, given the interest in the last 10 years or so in sustainable project management (Aarseth et al, 2017; Martens and Calvalho, 2017; Sabini et al, 2019; Silvius and Schipper 2014). However, it is clear from these comprehensive literature reviews that the main line of enquiry is on ensuring that projects that would be authorized for other reasons meet triple bottom line criteria – our type 1 projects above – rather than on the new ways of projecting associated with the other three types of projects defined above. The research, therefore, remains conceptually trapped in a PMI view of the world that Peter (2013) would reject. The challenge, rather, is to generate research on how we deliver the new kinds of projects that sustainability transitions require - both exploration projects (March 1991) within niches or exploitation projects reinforcing new socio-technical regimes.

PROJECTING FOR INDUSTRIAL REVOLUTIONS

Part of the problem here is that our conceptual toolkit for projecting – particularly on complex projects – is very much a child of the third industrial revolution, and not fully adapted to the challenges of the fourth industrial revolution. The concept of multiple industrial revolutions is a useful one for ordering our ideas around socio-economic development over the last 300 years or so, the period which is also known within the palaeontology literature as the Anthropocene (Steffen et al. 2011). We believe it is appropriate to combine these two epoch definitions in an essay on sustainability transitions. There are various attempts to characterize the successive industrial revolutions[4] within the Anthropocene, but one promoted by the World Economic Forum (Schwab 2018) is finding broad favour (Fleming 2021) as illustrated in figure 1.

This consists of four successive industrial revolutions starting from around 1770 with the English industrial revolution through to the globally widespread fourth industrial revolution starting around 2005. An important point to note with these revolutions is that they are cumulative; that is to say, the transformations of the earlier industrial revolutions sustain into the subsequent revolutions and only decline slowly. For example, many communities still rely on pre-industrial agricultural socio-technical regimes (i.e. subsistence agriculture) and the iconic technology of the first industrial revolution – steam from coal – is still in widespread use for generating electricity in economies such as India and China. Indeed, according to the International Energy Agency, 2021 saw the highest use of coal in the world economy *ever* (Financial Times, 12/12/21). The third industrial revolution starting around 1950 is also associated with the "great acceleration" in the implications of the Anthropocene for environmental sustainability (Steffen et al, 2011). The fourth industrial revolution starting around

[4] Others include Perez (2010). She divides the first industrial revolution into two phases – one based on waterpower and a second based on coal. However, waterpower was used throughout the pre-industrial era, and so is not a distinctive energy source and does not contribute to global warming. The importance of coal in the industrial revolution is indicated by the fact that the other leading capitalist economy of the 18th century – The Netherlands – relied on peat as a fossil fuel energy and did not participate significantly in the first industrial revolution (Pomeranz 2000).

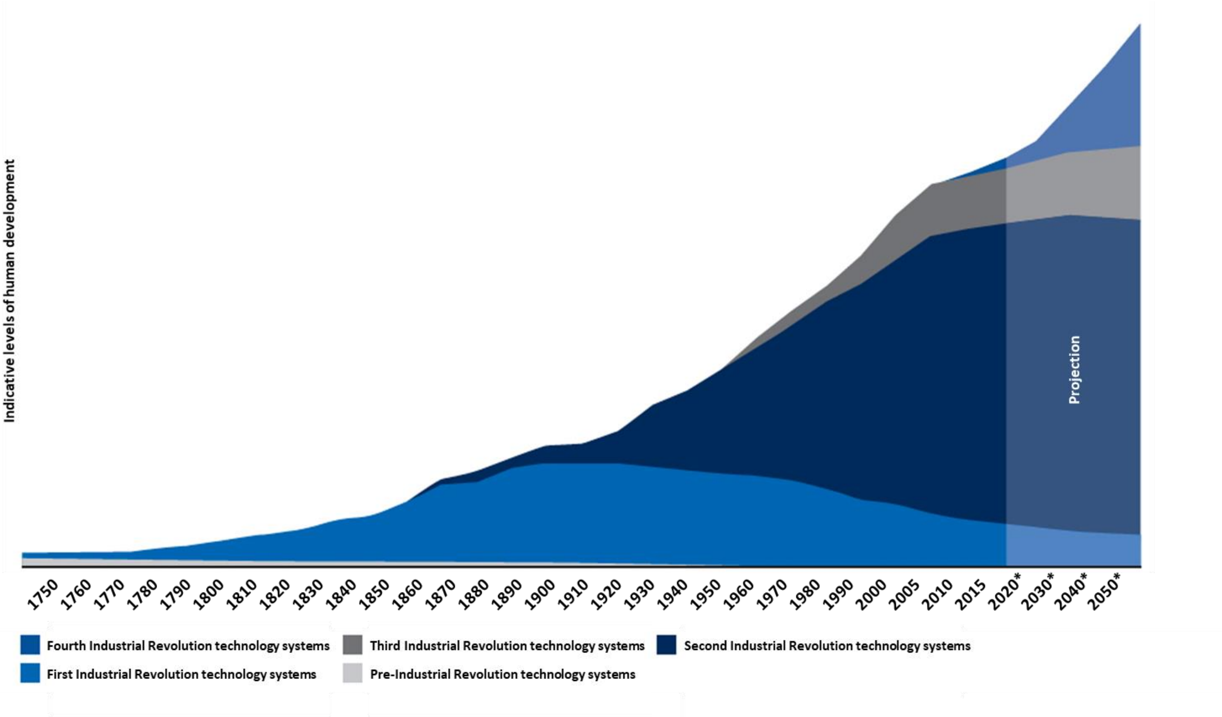

Figure 1: The Four Industrial Revolutions of the Anthropocene.
Source: Schwab, 2018 Fig 2. Used by kind permission of the World Economic Forum

2005 is notable because it is the first which is witnessing a concerted attempt to reverse the negative implications of the three previous revolutions for sustainable development (Winch et al. 2022).

A limitation of mapping socio-technical regimes from the MLP onto industrial revolutions is that they are sectorally specific, while industrial epochs require the identifications of general-purpose technologies that have very wide socio-economic implications (Perez, 2010). One way to do this is to focus on sources of energy, because it is transformations in energy sources and uses that characterize the transition to the Anthropocene (Steffen et al, 2011). They are, therefore, at the heart of the challenge of achieving net zero. Table 1 lays this out, complemented by the principal infrastructure technologies and key developments in operations (manufacturing) and project organizing, and a doubtless flawed attempt to identify the "iconic" major project from each epoch.

Although the early factories around Manchester were water powered, the dominant technology of the first industrial revolution was steam power generated from burning coal. Combined with access to food and fibres from the Americas, coal released Europe from its fundamental ecological constraints in a way that Asia could not emulate (Pomeranz 2000).Coal allowed the development of the railway and the early steamship, and burning coal directly fed town gas networks and iron smelting. Infrastructure investments from Defoe's age of projectors (Defoe 1697; Keller 1966) such as London's New River and the turnpikes laid the foundations for urbanization and the broader "industrious revolution" (de Vries, 1994; 2008), while lighthouses and canals further supported the transportation revolution. The same period saw important developments in project organizing around emergence of the contractor supplying projectors (entrepreneurial infrastructure investors) with their infrastructure and building needs. We select as our iconic project the Liverpool Manchester railway that unleashed a profound and far-reaching revolution in transportation as the first steam-powered passenger railway in the world.

The second industrial revolution took these advances and added electricity (generated by steam from coal) and the internal combustion engine (powered by refined oil) as sources of energy. Manufacturing was transformed by the American system of manufactures that enabled Ford's development of the assembly line (Hounshell, 1984). These enabled the production of steel and the development of modern road and air transportation with associated infrastructure as well as the transformation of motive power for shipping. Making burgeoning cities liveable led to major public sector interventions led by projectors such as Bazelgette and Haussmann and the development of urban transit systems. In terms of project organizing, the period saw the emergence of the professions such as civil engineering (Perkins 1989) and the decline of the great projectors such as Brunel. Our iconic projects are the Suez Canal which did much to integrate European colonies economically and socially with Europe itself, and the electrification of the Soviet Union which transformed the military and industrial capabilities of that country. Coopersmith (1992) tells the early part of this socio-technical regime change in Russia.

Revolution	Distinctive energy source	Distinctive infrastructure	Manufacturing transformation	Project organizing developments	Iconic major project[5]
1st ~ 1770 on	Steam from coal	Canals and lighthouses, then railways	The factory: water then steam powered	The contractor	London and Liverpool Railway
2nd ~ 1860 on	Electricity from coal; oil	Electricity and oil supply; roads	The American system of manufactures; then the assembly line	The professional engineer	Suez Canal; electrification of the Soviet Union
3rd ~ 1950 on	Electricity from nuclear; gas	Industrial-military complex; airports	Automation	Professionaliz-ation of project management	Apollo programme
4th ~2005 on	Electricity from renewables	Digital networks	Cyber-physical systems	Projecting the Future?	Operation Warp Speed

Table 1: The Four Industrial Revolutions of the Anthropocene

[5] The principal criterion used here for "iconic" is whether an opera was written for it (Verdi, *Aida*, 1871; Osborne, *Electrification of the Soviet Union*, 1987; Dove, *Man on the Moon*, 2006). However, to my knowledge, this criterion does not work for the 1st and 4th industrial revolutions, so I have used my own judgement.

The outcomes of the Second World War significantly shaped the third industrial revolution in terms of both technologies and geo-politics. The new energy technology was electricity from nuclear power, while the information revolution has its origins in the military work on radar and code-breaking leading to the mainframe computer and corporate information systems. Geo-political tensions led to the development of what President Eisenhower (1961) called the military-industrial complex with major projects to develop weapons systems and to put a man on the moon. The use of coal for electricity and oil for motive power accelerated exponentially. In manufacturing the principles of automation spread initially relying on mechanical systems, but rapidly switching to computer-based control systems (Bright, 1958; Noble, 1986). In terms of project organizing, the notable development was the professionalization of project management supported by various codified bodies of knowledge. Our choice of iconic project is the Apollo programme that drew on the achievements of the Atlas and Polaris missile programmes (Morris 1994). Those with a geopolitical awareness will note how these advances would have been unlikely if it were not for the electrification of the Soviet Union towards the end of the second industrial revolution that gave the Soviet Union the capability to challenge the US industrially and militarily.

As we move into the early years of the fourth industrial revolution, new energy sources from renewables are underpinning developments. As the UK Prime Minister, Boris Johnson, put it

> *Lenin once said that the Communist Revolution was Soviet power plus the electrification of the whole country. Well, I hesitate to quote Lenin before the Confederation of British Industry, but the coming industrial revolution is green power plus the electrification of the whole country* (*Financial Times*, 22/11/21)

Moreover, for the first time there is a concerted effort to suppress the negative effects of the first two industrial revolutions and their reliance on fossil fuels – coal and oil - with natural gas being positioned as a cleaner transitional source of energy (Helm 2015). Advocacy of nuclear power remains strong, although actually delivering new power stations faces considerable challenges while the promise of small modular reactors is yet to be realized. More generally, the digital revolution in its myriad forms is transforming economy and society. In terms of project organizing, agile methodologies have evolved to deliver the software supporting this digital revolution, while the profession is entering an age of reflection as evinced by the Association for Project Management's Projecting the Future initiative: www.apm.org.uk/projecting-the-future/. Manufacturing is entering the age of Manufacturing 4.0 and the cyber-physical system (Lee et al, 2015; Tao et al, 2019) while our iconic project – more strictly portfolio - is Operation Warp Speed, the US vaccine development initiative (Winch et al 2021).

PROJECTING IN THE THIRD INDUSTRIAL REVOLUTION

While the practices of project organizing evolved steadily during the first and second industrial revolutions (Pinney 2001), we now turn to the project practices of the third industrial revolution which Peter analysed so comprehensively (Morris 1994). His argument is that the practices developed within the US military-industrial complex were transformative for project organizing. While Programme Evaluation Review Technique (PERT) was described as “the first management tool of the nuclear and computer age” (cited Morris, 2013: 34), Peter’s argument was that it was the organizational innovations associated with the coordination and integration of the Polaris and Atlas nuclear missile programmes that were the most important and the source of the most lasting influences. The Special Projects Office of the Polaris programme was a prototypical project management office that aggregated progress information and thereby centralized reporting to government stakeholders. On the Atlas programme, an external consultant – The Ramo Woolridge Corporation - was appointed to provide the essential coordination services. This built upon the established project offices associated with each weapons acquisition programme (Morris 1994).

This heady combination (Johnson 1997) of operations research (for the integrity of the tools); systems engineering (for the holistic approach to the whole development programme) and project management (for coordinating effort) then diffused rapidly. In particular, they were developed on, and made internationally famous by, the success of the Apollo programme. Cleland and King (1968) then systematized this approach. Thus project management is an inherently organizational innovation, which Peter dubbed the “management of projects” to distinguish it from the tools and techniques derived from operations research that were emphasized by the nascent project management professional associations. However, as early as the nineteen seventies these practices were perceived as not delivering as expected, and this observation forms the basis for Peter’s critique of project management practices and, eventually, his reconstructing of project management (2013). His recommendations for improvement include “making the project organisation the unit of analysis, where context, the front end, technology, people and the commercial basis of the project’s development and delivery are included, as well as the traditional control topics” (Morris, 2013: 281).

What is missing from this perspective, however, is attention to “owner project capability” (Winch and Leiringer 2016). This omission is surprising given the attention in Morris and Hough (1987) to the strong owner; the experience of the US weapons acquisition programmes where all Peter’s analytic attention is to the owner organizations (US Navy, US Air Force, NASA); and the project performance evidence already available (Merrow 2011). A larger question, though, is whether this reconstructing of third industrial revolution project practices is still appropriate for the fourth?

One enthusiastic proponent (Mazzucato 2021) argues that it is entirely appropriate. Mazzucato argues that in order to address the grand challenges of the fourth industrial revolution, we need to learn from the remarkable project achievements of the third and orientate economy and society towards a mission-oriented capitalism, led by an entrepreneurial state (Mazzucato 2015). In particular, the Apollo programme provides a model for both the state support for radical innovation and the way to deliver those innovations into beneficial use successfully. However, as many, including Peter, have pointed out, the Apollo programme was unique in terms of the socio-political context in which it was launched, and, perhaps, most importantly, was without significant stakeholder debate about how to achieve the mission or whether the mission was an appropriate one in the first place. As a result, its lessons proved difficult to transfer more generally (Horwitch 1987). There are grounds to suggest that the project organizing triumphs of the third industrial revolution are not so well adapted for the challenges of the fourth.

PROJECTING IN THE FOURTH INDUSTRIAL REVOLUTION

The manifest failings of the UK's Crossrail project despite being managed by an A-team of talent deploying best available practices has sent something of a shock wave through the British major projects community which displayed high confidence after the successes of the 2012 London Olympics, and Heathrow's Terminal 5 and Queen's Terminal. As a result of this traumatic failure, the UK Institution of Civil Engineers (ICE 2020) published a thoughtful review and lessons learned analysis of how things more generally should be improved. As part of their wider argument, ICE observe that the addition of SDG criteria to the project mission to achieve sustainability of the project entails another level of complexity for project organizing, and that the built environment is a system of systems in which any single infrastructure project – no matter how large – forms only a part. This is in strong distinction from the Apollo programme which was an inherently standalone system. ICE propose the application of a Systems Approach to Infrastructure Delivery (SAID), drawing on systems engineering and systems integration concepts to complement traditional civil engineering ones, and more collaborative working (ICG 2017). More broadly, one can argue that Crossrail made the same error as the Channel Fixed Link in that the project DNA – its "delivery identity narrative" (Sergeeva and Winch 2021) – was focused on the project output of tunnelling rather than on the project outcome of running trains to provide infrastructure services. It is notable that the Thames Tideway project has deliberately not used the word "tunnel" in its delivery identity narrative (Winch et al, 2022).

The ICE's SAID approach – which complements its work on collaborative delivery with Project 13 (ICG 2017) – is effectively a doubling down on some of the key ideas from the early stages of the third industrial revolution (Weaver 1948; Wiener 1948) as well as the practices (Sapolsky 2003) of the US weapons acquisition programmes analysed by Peter. This is to be welcomed, but there is also evidence from the response to COVID that it is not enough to address the challenges we face. There has long been a debate (Pich et al. 2002) between the advocates of "instructionism" in project organizing as the singularly mission-focused management of projects advocated by Peter, and "selectionism" as the promotion of competing projects within portfolios and measuring success at the portfolio rather than the project or programme level. This is the essence of the advocacy of the Manhattan project as an alternative model (Lenfle 2011; Lenfle and Loch 2010) which Peter rejects as not being project management "because the language hadn't yet been invented" (2013: 23). The reasons for this would appear to be a rather nominalist approach in which something is not "project management" unless so called, but more a concern that one of the achievements of the post-war US military programmes was to get to grips with "concurrency" - defined as parallel working on programme elements – through configuration management.

More recent experience, however, challenges Peter's insistence that little can be learned from the Manhattan project. One of the major triumphs of the project response to COVID was the vaccine development programme (Winch et al. 2021) which operated on a fundamentally selectionist basis. The US, UK and other governments took a portfolio approach to vaccine development – in the UK, the portfolio was led by an experienced venture capitalist, and in the US by an experienced vaccine development executive. Within those portfolios, vaccine suppliers competed to develop and trial their vaccine candidates, a race that was won by Pfizer/BioNtech with the result that it is now predominant in the global COVID vaccine market (Financial Times, 30/11/21). Selectionism triumphed! There is also a selectionist challenge to the most distinctively new project management methodology of the early fourth industrial revolution – agile. Research on teams competing in hackathons found that those that tried to adopt a structured agile approach performed poorly compared to those that took a more unstructured approach (Lifshitz-Assaf et al. 2021).

THE IMPLICATIONS FOR OUR RESEARCH AGENDA

What are the implications of our, admittedly sweeping, analysis? First, we suggest that addressing the challenges of fourth industrial revolution project organizing needs both instructionist systems thinking and selectionist portfolio management. A crucial research question for the advance of the discipline, therefore, is when to use each. A starting point for this enquiry might be that selectionism is more appropriate for exploration projects in niches to identity the most effective ways of achieving zero-carbon sustainable transitions, while instructionism is more important for exploitation projects implementing new low-carbon socio-technical regimes once technologies have been proven.

A second observation is that research within sustainable project management has been vitiated by confusion in which "coexisting streams increasingly pose different questions, employ different methodologies and adopt different levels of analysis as well as understandings of sustainability" (Sabini et al. 2019: 821). One level of analysis is what project managers ought to do (Silvius and Schipper 2014), the stresses they face in so doing (Sabini and Alderman 2021) and the ways in which they form their identities as sustainability professionals (Sergeeva 2022). However, in line with Peter's insistence (2001) on the project organization as the unit of analysis rather than the project manager, we suggest that a more appropriate level of analysis is the project delivery organization itself in relation to the other two domains of project organizing (Winch, 2014) rather than what project managers do. Crucial here is the role of project owners as investors and operators – "hosts" in Aarseth et al (2017) terminology – and the room for manoeuvre they allow suppliers to bring innovative zero-carbon technologies to their investment projects (Winch et al. 2022).

In order to address the issue of exactly what "sustainability" means, we suggest that the focus of research could be upon projects, programmes, and portfolios, for achieving *sustainability transitions* across sectors such as transportation, energy, housing, and digital. In other words, our focus should be on types 3 and 4 of our typology of sustainability projects above if we in the project studies community are to engage with, and contribute to, the wider debates on sustainability transitions. The concerns of SPM research around type 1 projects are rapidly becoming the norm, driven in countries such as the UK by government policy and regulatory change. Type 2 projects do not appear to pose new challenges for project organizing, although clarity of the project mission achieved through project shaping and intensive stakeholder engagement are essential. We suggest that it is the type 3 and 4 projects, with new types of collaborative, and hence complex, owners (c.f. HyNet) and unproven technologies (c.f. nuclear fusion) require new levels of partnership between the public and private sectors, that can most benefit from our research attention.

A final observation is the importance of project narratives in both shaping the project mission and motivating project delivery. Recent research (Sergeeva and Winch, 2021; Winch and Sergeeva, 2022) shows how important these are for "inventing the future perfect" (Morris et al, 2011: 6) and, indeed, avoiding the future imperfect. The research on project narratives has not yet turned to how they are influenced by the sustainability and net zero narratives that pervade contemporary debate, particularly around successive COPS summits. These sustainability narratives might be expected to shape both the external image of the project captured in its project mission and the internal identity of the project in its delivery DNA as in the Thames Tideway project (Winch et al, 2022).

CONCLUDING THOUGHTS

Peter Morris made an enormous contribution to the development of research on project organizing – particularly complex project organizing – as the contributions to this special issue have demonstrated. We have argued in this contribution that Peter was also one of the pioneers of thinking about how the discipline of the management of projects with an organizational emphasis could contribute to the achievement of the SDGs and, in particular, net zero ambitions. However, we have also argued that the model of project organizing that evolved to meet the challenges of the third industrial revolution is not up to the task of addressing the challenges of the fourth. Peter would surely accept most of principles underpinning the SAID approach, but he was less happy with the advocacy of selectionism. We suggest that this parallel working approach in the context of strong portfolio management also needs to be brought within the scope of the management of projects as a complement to the Apollo model for the mission-orientated approach. Or, to put that argument another way, we need to understand mission orientation at both the (major) project and portfolio levels if we are to successfully address the global challenges we all face together.

ACKNOWLEDGEMENTS

I am very grateful to Giorgio Locatelli, Jeff Pinto, Luca Sabini, Natalya Sergeeva and Eunice Maytorena-Sanchez for their comments on earlier drafts of this paper. I am also grateful to Kirsi Aaltonen for making the Morris and Teerikangas (2015) reference available to me.

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