

ISSN 2633 1640

**Volume 44(2) Winter 2023
Supplement**

**Abstracts of Presentations from the United Kingdom Systems
Society International Conference 2023**

**University of Portsmouth
14-15 September 2023**

**Systems: Transition to a sustainable
World**

SYSTEMIST

**Publication of
The UK Systems Society**

Published by the UK Systems Society

Registered office: Sidelands, Nutgrove Lane, Chew Magna, BRISTOL, BS40 8PU

Registered Charity, No: 1078782

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Our Keynote Speakers

Ray Ison

Ray was appointed Professor of Systems at the Open University in 1994. His research and scholarship have spanned the biophysical and social and are primarily interdisciplinary and collaborative. From 2008-15 he also had a role as Professor of Systems for Sustainability at the Monash Sustainability Institute (MSI), Monash University, Australia. He is the author or co-author of a number of books, including *'The Hidden Power of Systems Thinking. Governance in a Climate Emergency'* co-authored with Ed Straw as published in 2020. Ray has also authored numerous scholarly articles, Keynote addresses and conference presentations. He is a past President of the International Federation for Systems Research (IFSR), and has a number of other governance roles within the international systems and cybernetics community, as well as a number of awards recognizing his outstanding contributions to research and practice in systems and cybernetic sciences. Nowadays, he continues to pursue a portfolio of research, scholarship and consulting activities mainly in Australia, South Africa, China and Germany.

Rodney Irwin

Rodney is a Senior Management Team member at the World Business Council for Sustainable Development (<https://www.wbcsd.org/Overview/About-us/Our-team/SMT/Rodney-Irwin>). This is a CEO-led organisation of >200 leading businesses working to accelerate transition to a sustainable world. Rodney's role is to drive global, pan-industry change to accounting, audit and risk practices for ESG reporting measurement and valuation, working closely with international industry bodies, universities and WBCSD's members. Rodney also holds a number of academic and advisory positions in a variety of academic and learned organizations around the world.

Abstracts

Keynote Speakers:

Rodney Irwin

[World Business Council for Sustainable Development](#)

Systems thinking: A key foundation for business transformation

The capitalist economic system, whilst creating wealth and value for some stakeholders, is also destroying value for society. It is reliant on extracting from the planet, and the current legal system that regulates the system perpetuates the "business as usual" mantra. However, many progressive businesses, countries, and legislators believe that business as usual is economically risky, environmentally dangerous, socially unacceptable, and legally challenged.

Sustainability is the end result of a business strategy that understands and addresses the negative impacts that the business has on nature and society. Sustainability is inherently a system-thinking discipline; however, the enablers needed to ensure system transformation are challenged by barriers. This presentation will delve into WBCSD's Vision 2050: Time to Transform, published in March 2021. This work, which builds on the 2010 publication of Vision 2050 and involved 42 businesses across geographies, sectors, and legal personalities, puts systems transformation and associated thinking at the centre of the Vision.

Ray Ison

[Open University and IFSA](#)

Acts of Deframing: Transitioning to Sustainable Co-Evolution in Our World

Initial starting conditions create pathway dependencies, and thus trajectories, from which it is difficult to escape. Contemporary lived experience makes it glaringly obvious that the current trajectory of structural coupling between humans and the biosphere we inhabit is characterised by breakdown in relationship through declining quality and questionable long-term viability. In this talk I will draw on my 40+ years of systems scholarship to make the case for future systems thinking

practitioners to add acts of deframing (and reframing) to their professional repertoire. Reaching back to Checkland's coining of the term 'holon' and then 'soft system' I will argue that the systems community itself has yet to develop the requisite reflexivity, and thus capacity, for deframing/reframing praxis, praxis that effectively employs systems concepts, methods and practices capable of fostering the emergence of trajectory-altering manners of living within an ever-changing, human-created, Anthropocene biosphere.

Participants:

Marianne Bellotti

Bellotti.Tech

Fault: A Modelling Language (Work in Progress)

Proposing a new model language, Fault, specifically for reasoning and exploring the behavior of dynamic systems. Previous model languages for dynamic systems have focused on simulation style models in which outputs are generated by computer for a single scenario based on specific inputs. Fault compiles down to first order logic and presents the system as a satisfiability problem, which considers all possible states of the model in order to determine the inputs that produce a specific output. This allows system thinkers to assert that particular system states are not possible and ask a computer to provide a scenario in which those assertions are false.

Akinola Kila

[Defence School of Geospatial Intelligence \(DSGI-RSMS\)](#)

Hard, not Soft; A critical review of the philosophical underpinnings of Viable System Model (VSM)

Literature review suggests that the Viable System Model (VSM) as a whole is open to different interpretations. While many adopt a structuralist view (Jackson, 1992; Schwaninger 2018; Scott & Davis, 2007), others argue in favour of an interpretative view or both (Harwood, 2019; Espejo, 2011). From the conceptual

phase, some authors ignore the information that VSM (Beer, 1981, 1983, 1989) was conceived based on the functions of the human nervous system, and also the importance of Ashby's (1958) concept of 'Requisite Variety' in the development of VSM. Emphasis was not being made on the claim made by Beer (1985) that the whole model (VSM) is system 1. While the VSM is designed as a recursive system, each system can exist on its own, and that is the criteria of viability (Beer, 1985; Scott & Davies, 2007, p.545).

Attempts have been made which suggest that VSM is applicable as a soft action research, such as in the case of VIPLAN methodology (Espejo, 1988) which shares some similarities with Soft System Methodology (SSM) regarding the tools used.

The aim of this paper is to discuss the author's critical review of Viable System Method (VSM) and to highlight some of its useful applications and ideas in organization inquiry, its perceived drawbacks, and why it is less congruent with interpretivism and Soft action research. The author argues that VSM is fundamentally tied to a rational structuralist view of an organization.

Keywords: Viable System Model (VSM); Organization; Soft action research; Soft systems

Harry Kogetsidis

University of Nicosia

The contribution of participatory modelling approaches to problem-solving

When the analytical field of operational research (OR) was born in the late 1930's, its aim was to provide an inter-disciplinary scientific approach to problems of increased complexity. The need to recognise the systemic nature of problems and to take a holistic approach in addressing them was implicit in the philosophy and actions of the pioneers of the new discipline. However, operational research was soon to become a predominately mathematical area and to be seen as 'quantitative common sense' in problem-solving. Despite its huge record of success in areas such as optimisation, forecasting, inventory planning, logistics etc, operational research found it much harder to deal with complex problems involving multiple stakeholder groups and the existence of conflict.

In response to this inability of the traditional OR approach to deal with ill-structured and often messy situations, a large number of non-mathematical modelling approaches have been developed over the years. Focusing primarily on how to enable the different actors to work together, these participatory modelling approaches have played an important role in addressing complex problematic situations in organisations and society.

The aim of this presentation is to identify and discuss the key aspects of the contribution that participatory modelling approaches have made to problem-solving and how they can help managers and leaders deal with the unprecedented levels of complexity that organisations and societies face in today's turbulent and highly uncertain global environment.

Keywords: Participatory modelling; Stakeholders; Systems; Complexity

Andy Lane and Kevin Collins

[Open University](#)

Using systems diagrams to support multi actor collaboration in agriculture

European agricultural policies increasingly acknowledge the tension between the economics of food production and the common good, a collaborative imperative for agriculture to be sustainable, and adaptation to the exigencies of climate change and biodiversity loss. To address this tension, significant emphasis has been put on understanding and describing the Agricultural Knowledge and Innovation Systems (AKIS) that operate at different levels within different countries and doing so through graphical representations of these systems. Strong support also exists for multi-actor approaches to foster dialogue between organisations and groups within these AKIS. However, a key problem is that abstract macro-AKIS diagrams can contain assumptions and emphasise particular forms of knowledge and practices that do not readily support dialogue between different actors within a micro-AKIS attempting to determine innovations for more sustainable agriculture. This paper reports on several diagramming techniques often used in systems practice that can enable multiple actors to co-create mutual representations of the complex situations and choices they face as they attempt to work together more effectively and efficiently. Our findings from six Living Labs convened for the H2020 funded AgriLink project showed diagrams could be an essential tool for collaboration and collective understanding and action within a micro-AKIS. We conclude with implications for policy-making at the meso and macro AKIS levels.

Keywords: Systems diagrams; collaboration; multi actor; Agricultural Knowledge and Innovation Systems.

Neil McBride

De Montfort University

A Systems Approach to Responsible AI Ecosystems

AI promises both enabling and inhibiting influence on the achievement of SDGs. It may be a core instrument in achieving sustainability. A strong interaction between AI and SDGs is seen as an important ethical use of AI. However, the use of AI raises complex ethical issues and AI ethics has become a focus of attention for academics, regulators, governments and technology companies. The AI ethics landscape is complex and dynamic. In such an environment, the progress of AI ethics and the influence of multiple worldviews makes the representation of AI ethics in straightforward policies problematic.

Recent studies have characterised AI as a social-technical ecosystem where complex interactions take place. This representation is further refined as a responsible AI ecosystem by considering who is answerable for the uses or consequences of the action of the system. Soft systems methodology may offer the inspiration for understanding stakeholders, relationships, concerns and conflicts. It also offers the possibility of defining the conceptual model in terms of CATWOE and a root definition. Most importantly, SSM offers concepts of the worldview of the system and the transformation which it achieves.

However, AI is a global ecosystem and overlaying an ecosystem of ethics identifies further complexity. As such it exposes some of the limitations of SSM. Firstly, its boundaries are diffuse and hard to characterise. There may be multiple boundaries across which information passes. SSM requires a distinct system boundary which may be hard to identify in systems where the connections are multiple, dynamic and diffuse. The distinction between in the system and out of the system required for SSM becomes untenable in the face of complex interactions. The AI ethics ecosystem is a complexity of patterns and entangled boundaries. SSM requires a boundary is selected, and the process of selecting a boundary eliminates other options for boundaries may exclude significant elements.

Secondly, the development of a conceptual model requires the selection of a worldview. SSM assumes that a system has one worldview which can be stated and underpin the CATWOE model. Any system, at whatever level harbours multiple worldviews, distinguished by assumptions, ideologies, moral frameworks and learnt experience. Defining one worldview may not work when considering the AI ethics ecosystem. The worldview is a fundamental concept in SSM because it determines the direction of the system, the understanding of the problematical situation, and the identification of the core conceptual model. In an AI Ethics ecosystem multiple worldviews interact.

Thirdly, in an AI ethics ecosystem, there are multiple transformations, even within a particular worldview. Therefore, in attempting to understand the AI Ethics ecosystem, SSM is limited. While being a systems approach, it is effectively reductionist, aiming to strip away the complexity of a human social system to a representation of the conceptual model, expressed as a root definition and a CATWOE model. A key assumption of SSM is that the heart of the system is a straightforward what, how and why model which, if the dross of social interactions and irrelevancies is washed away, can be defined and optimised for maximum efficiency, effectiveness and efficacy. In doing so the very qualitative essence of SSM is dissolved. The complex shifting social dynamics which both hold the system together and create the complexity. Hence in investigating any complex social-organisational systems SSM will be of limited value since in seeking a pure conceptual model it erodes the social cement which hold the human system together.

SSM offers ideas which may be carried forward. The rich picture, which is the familiar representation of a social systems in SSM, is a starting point not an endpoint. The value of the rich picture is the freedom it offers in exploring a system. While often used as a significant output and a vehicle for discussion within an organisation or a situation being investigated, it is actually something to be discarded in the search for the pure essence of the system, the reduction to a conceptual model. The rich picture offers the identification of stakeholders, relations between stakeholders, and the cooperation and conflicts which characterise these relationships. But the idea of stakeholders provides a weak representation of the phenomenon. I would suggest that DeLeuze's concept of the assemblage provides a richer tool for characterising social systems. Rich pictures also identified the importance of information flows and communication between stakeholders.

Key to SSM is the concept of worldview, which remains relevant in understanding an AI Ethics ecosystem, but this ecosystem will contain multiple worldviews. These will be dynamic, influenced by changes in the system, but also anchored in

ideologies and social environments. Transformation has ethical consequences, but cannot be pinned down to a single transformation. The concepts of customer and actor are both problematic in that they may be multiple, diffuse and difficult to define. Again, it appears that SSM requires a reduction of a system to a single CATWOE.

In order to investigate the AI ethics ecosystem, I will adopt a variation on Deleuze and Guattari's concept of an assemblage. The assemblage is an abstract representation of, in our case an organisation involved in AI, its governance and ethics. We may identify assemblages which act in relationship to adopt a particular responsibility for the actions or outcomes of the AI ecosystem. Assemblages are networks, and themselves are parts of networks of assemblages. Furthermore, responsibility is relational: an assemblage is responsible to another assemblage for the outcome of the AI ecosystem. Socially, assemblages are power structures. Emanating out of them are particular worldviews which in terms of social assemblages, members or participants adhere to. The assemblage is held together by general adherence to a worldview and acceptance of power structures. Furthermore, assemblages are linking with events. Events change assemblages, push assemblages forward.

I take organisational assemblages to be emergent abstract organisations to which individuals and societies subscribe to as being a source of emergent behaviour and activities. Assemblages are sustained by perceptions of purpose, function and outcome driven by the worldview(s) of those connected with them. Assemblages themselves may be unstable, and form unstable relationships. Although an assemblage is highly abstract, its representation may be crystallised through organisational forms, administrative processes, marketing strategies, and regulations, for example. Assemblages have content and expression; patterns of practice and elements. Therefore, we need to attend to the language of the system as it develops from and expresses the worldview.

An assemblage has a linguistic expression, connections within an ethical ecosystem are by alignments and misalignment of those expressions, by connecting of meanings. Hence part of our investigation of the AI ethical ecosystem involves assessment of collective expressed understanding and meaning. This collectiveness appears as a phenomenon through strategy statements, codes of ethics, regulations and acceptable rules. Assemblages group into large scale networks of constellations, enabling the emergence of cultures; local acts can be abstracted to the global.

The system is not a static structure with a fixed what, why and how and a simple transformation as SSM would suggest but rather a dynamic structure, generating an effect by acts, events, evolving and interacting, which through language can be

described as an abstract machine. The concept of assemblage offers a way of mapping organisations and institutions which are always in process; with changing boundaries, transforming and being transformed.

In concert with the concept of assemblage is that of territoriality, which applies the metaphor of territory to analysis how the assemblages occupy social space. Assemblages occupy and remove themselves from territories. These territories may be assemblages of enunciation, language structures which express ideas in flux. The territory tends to be more stable, with clearer boundaries. They are more passive structure, although territorialized, de-territorialized and re-territorialized by evolving assemblages.

Using these concepts from DeLeuze and Guattari's *A Thousand Plateaus*, and identifying multiple worldviews and transformations I will tentatively investigate the AI ethics ecosystem within which ChatGPT has resided. I will start with the identification of events, explore the territory, and identify assemblages, interactions and worldviews. The objective will be to illustrate a possible approach to identifying potential interventions in the AI Ethics ecosystem.

Keywords: AI Ethics; Rhizomic Systems; Social assemblages

Petter Ogland

University of Oslo

Critical Systems Thinking and Sociological Paradigms

Critical Systems Thinking (CST) is an attempt to integrate systems thinking with the politically radical philosophy known as the critical paradigm in social science, emphasising ideas like critical awareness, emancipation and methodological pluralism. However, the way CST consultants typically work with top managers and representatives of the organisational elite, for example when using it for implementing Total Quality Management (TQM), it can be difficult to stay within the paradigm. TQM implementation may end up being planned and implemented through interpretivist and functionalist philosophies, ignoring the politics and perhaps even making the organisation more oppressive than it used to be. In this paper it is argued that CST-based implementation of TQM is more likely to become successful when being run by internal CST consultants who identify with the oppressed, view critical awareness and emancipation within the context of their own political struggles, and use the PDCA process of TQM for managing methodological pluralism.

Keywords: Critical Systems Thinking; Sociological paradigms; Total Quality Management; Action research.

Igor Perko, et al

University of Maribor and WOSC

Sustainable supply chains – empowering the low-tier supply chain members using intelligent technology

The supply chain (SC) members differ significantly in their capacity to address the complexity of their environment, which is needed for sustainable behaviour. Currently, the focus is achieving sustainable behaviour of the principal SC members, while the low-tier SC members' behaviour is largely left to be governed by principal members. Often, the low-tier SC members can be found among agricultural producers, especially in the food and pharmacy industry.

In this research, we focus on the low-tier SC agricultural members using the viable systems model to elaborate on the capacities required for enabling sustainable behaviour. Additionally, we propose a combination of internal and external resources, which could empower and direct the low-tier SC members to plan, act, and measure the results of sustainable behaviour. We examine the potentials of intelligent technology as a catalyst of the process.

We conclude that raising the capacity for sustainable behaviour of the low-tier SC members is requisite for the development the low-tier SC members sustainable governance style, the intelligent technology can act as a catalyst in all phases of the process. It requires cooperation, support, and control not only by the SC principals, but above all, by the regulators, the local community and the nature representatives. It should result in a learning and capacity development process leading to responsible behaviour in an inclusive environment co-designed by the low tier SC members.

With this research, we lay the conceptual fundamentals for an explanatory research of sustainable behaviour of the agricultural low-tier SC members and interactions with their environment.

Keywords: Supply chain; sustainability; systems thinking; low-tier supply chain members; supportive environment; intelligent technology.

Lawrence Reavill

Birkbeck College, London University

Viability of the Performing Arts – Delivery of the Performance

My current research is on the funding, general management, and performance scope and quality of major UK touring dance companies. This is a specific example of the broader area of the delivery of performance art to customers, generally an audience in a theatre. The generation of a live performance, be it drama, opera, ballet or contemporary dance follows the standard format of: idea (concept) -> development -> design -> production -> delivery -> customer (audience), not fundamentally different to that used by the manufacturers of motor cars (e.g. Ford) or the providers of groceries (e.g. Tesco).

The major problems in this operation are that it is labour intensive, seriously expensive, requires specialist creative people, and at the higher artistic level needs subsidy. Drama, opera and dance are delivered to the public by commercial companies (e.g. West End Theatre) and by “non-profit” organizations (e.g. National Theatre, Royal Opera House). The artistic elements of the creative process are of concern to Arts Culture academics but my interest is the finance, product quality and repertory scope, and the delivery process. At an earlier UKSS conference I discussed the funding. My in-progress research is now focused on repertory scope and performance quality. This paper considers the delivery.

A theatre is the most frequently used method of delivery of a performance to an audience; product to customers. It is a batch process, like the van that delivers groceries to Tesco shops and the transporter which delivers new cars to Ford distributors. The size of the vehicle and the frequency of its use determines the number of customers supplied. The seating capacity of the theatre and the frequency of performances determines the number of customers, (audience members) entertained. However, this is not the only limitation. The ability of the customer to pay for the product (car, groceries or performance) will vary generally depending on the cost of the product, (ticket price), and their disposable income.

There is also a need to consider other factors such as the catchment area of the theatre: (small town or metropolis); the proportion of the public interested in the product, (drama/opera/dance fans); the frequency of attendance (regular or occasional); the popularity of the product (general or highbrow); marketing (TV or local newspaper advertisements), potential competition from other entertainments (musicals, football matches, nightclubs) etc. Theatre managements cannot easily change the size of their theatres, (though multiplex cinemas can swap films around), but can adjust to some extent the number of performances. Recent and potential future innovative means of extending the catchment area are a component of current investigation.

Established theories of cultural economics such as Baumol and Bowen's "Economic Dilemma"; arts management techniques such as "Balanced Scorecard"; and general management methods such as Stakeholder Analysis and Resource Dependency Theory are currently deployed in this research. However, the subject of study appears to be a complex interactive system, and could be worth employing systems analysis. A start with a rich picture perhaps?

Tammi Sinha¹ and Christine Welch²

¹University of Southampton, ²Portsmouth Business School

Organizational Sustainability through Engagement with Lean and Sociotechnical Thinking

An organization can be viewed as an open system in which many human and non-human elements interact with some common purpose in view. At every level, people will be trying to make sense of their situations. They will be interacting with one another, using tools, technologies and materials within their different roles. Individuals' understandings of organization and roles will differ, so that varied norms and objectives will emerge in different areas and levels of an organization, as well as formal objectives set out in policies.

Sustainability

There is a global agenda for change "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland Report, 1987) <http://www.un-documents.net/our-common-future.pdf>. As a society, we need to create a circular economy, in which we rethink production, reduce our consumption of scarce resources, repair products when they breakdown, reuse artifacts and resources to create new ones, repurpose things when they are no longer needed, and recycle waste to recover usable materials. Sustainability must therefore be considered at organizational, as well as individual level.

When considering organizational sustainability, it has become customary to speak of the 'triple bottom line' – economic, social and environmental. Attention is often focused first on environmental issues, which can attract public attention. For example, green accounting is needed to report upon the impact that organizations have on local communities and on nature as a result of their business activities. However, even with modern accounting methods, many external impacts remain invisible – for instance, a stressed workforce makes greater calls upon the resources of healthcare systems. It is important that attention is paid to human and social sustainability as well as environmental factors. Where there is conflict or stress, people may not be able to focus on producing their best work, and teamworking in particular will suffer, leading to wasted effort. The power dimension in social relations can lead to some voices being privileged while others are inhibited. Approaches to leadership are needed that enable different viewpoints to emerge. Of course, an organization's primary task going forward is to remain in business,

i.e. to consider its economic sustainability. As Vickers pointed out, an organization must maintain its relationships within many external forces. He likened this to a ship at sea – the captain may intend to pursue a course to a certain destination, but her first duty is to see that the water stays on the outside and the crew and cargo on the inside.

Lean

Lean principles for continuous improvement in operational systems include a number of elements, including respect for people, and identification and elimination of waste. Respect, in this context, means more than just trusting employees and considering their welfare. Within the tradition of the Toyota system from which Lean principles derive, respect means engaging in a dialogue with staff about their contextual understandings of a problem. Leaders thus acknowledge that they are not the people with all the answers – that problem solving must be a partnership and must draw upon contextual knowledge of people close to the operations concerned. Employees may not know what they know, or how to solve the problem quickly, but through dialogue, their understandings are helped to emerge so that a solution can be found.

There can be many types of waste within operational systems, which Lean practitioners usually classify as: *Muda*, meaning wastefulness, uselessness and futility, contradicting value-adding; *Mura*, meaning unevenness, non-uniformity, and irregularity; and *Muri*, meaning overburden, going beyond one's power, excessiveness, impossibility or unreasonableness. Seeking for continuous improvement will involve identifying and taking action to eliminate wastes. In a Lean system, people will be empowered to notice problems close to the point of operation, and take corrective action before opportunities to add value are lost, thus creating processes that are self-healing in operation. It is clear from the above that promoting Lean and sustainable systems, solving problems and maintaining sustainability in its widest sense must involve everyone within the organization. However, if every individual simply acted to optimise their own part of operations, the result might be sub-optimality – the whole system amounts to more than simply the sum of its parts. A sociotechnical approach is needed within which contextual knowledge can be surfaced and applied at all levels – individual, team and organization, in order to address inherent complexity.

How can Lean and sustainable systems be co-created within organizations? How can respect for people be demonstrated so that all voices are heard, and staff are motivated to join in continuous improvement of operations? How can they be

enabled to surface and contribute their contextual knowledge? Tools and techniques will be needed to stimulate engagement.

Tools and techniques to promote Lean and Sociotechnical Systems Thinking

How can we encourage 'flow' – enjoyment of complete engagement ?

Storytelling:

Rich pictures:

Lego Serious Play:

ADKAR

Communities of Practice.

Keywords: Triple bottom Line; Organizational sustainability; Lean; Sociotechnical Systems Thinking; Engagement.

Alison Stowell¹, et al

¹Lancaster University

Valuing the afterlife of plastic packaging

Plastics are the epitome of a 'wicked problem' that has no straightforward path to its resolution; a grand challenge that requires robust actions. The UK Research and Innovation Natural Environment Research Council funded research project Plastic Packaging in People's Lives: Rethinking the consumer attitude behaviour gap aims to develop solutions to this problem. Taking the food sector as an exemplar, our project is gathering behavioural insights to enable policymakers and industry to rethink and bridge the gap between consumer attitudes to plastic packaging reduction and consumer behaviour. This is being achieved by taking a holistic approach and examining the whole packaging supply chain, from production through consumption through waste disposal to tackle the key pinch points inhibiting the drive towards cleaner, greener growth. Waste disposal and the afterlife of materials plays a key role in rethinking the consumer attitude behaviour

gap. For example, how these materials are disposed, reused and reborn in the same form, or transformed and reincarnated exposes latent values (e.g., household recycling bins or returned to supermarkets, back into new plastic bottles or made into combs, plant pots, furniture etc).

In this short talk we will explore some of these values including plastic packaging as community; employment; food security; climate change and health. By understanding different values assists to move beyond critique and the demonisation of plastic packaging and opens up dialogues for new solutions and helps foster shared responsibilities.

Nigel Williams

University of Portsmouth Faculty of Business & Law

Why isn't the climate changing our research?

Unlike many other domains of Management, Project Management places uncertainty at its core. The need to address uncertainty is embedded in PM in ambiguities where outcomes are unknown and variability where the extent is unknown. In the context of climate impacts, the risk is used to address the ambiguity and variability of negative impacts of climate hazards on individuals, economies, community quality of life, ecosystems and infrastructure. In defining climate impacts, exposure (the presence of entities in locations that may be adversely affected) and vulnerability (the susceptibility to harm and lack of resilience). Despite the scale, recency and frequency of climate impacts, it is curious that the academic literature on Project Management has paid scant attention.

Since projects may employ extended networks of organisations in multiple locations, it may be challenging to incorporate carbon-reducing innovations to meet windows of opportunity for change created by shifts in public priorities since they may not be applicable in every location. While exogenous shocks such as climate-induced natural disasters can also trigger rapid shifts in public opinion, these may be country-specific rather than a regional or global priority.

Adoption of a systems perspective can enable the project management discipline to articulate how researchers and professionals can engage with these larger societal risks to create research that is not only rigorous but relevant

Claudius van Wyk

www.holos-earth.org

Transitioning to a Sustainable World - Clues to Barriers in the Interstitial Spaces between Systems thinking, Edge of chaos, and Holistic Perspective

This explorative foray considers a South African test case as a potential illustration of transforming conventional systems thinking to more encompassing holistic systems practice. In charting the course towards a sustainable world, a hidden obstacle is examined—the inclination towards prediction and control that often accompanies the mechanistic application of linear systems mapping. This recognition serves as a pivotal turning point. By embracing the concept of 'emergence' as a product of the synthetic tendencies inherent in living systems, holistic systems practice redirects its focus toward steering the regenerative forces of life at the local level.

A transformative epistemological framework embracing 'edge of chaos' is presented. In the delicate balance between the extremes of equilibrium and chaos, 'edge of chaos' is the fertile ground for engaging with emergence. With this process-oriented perspective, holistic systems practitioners can develop enhanced ability for adaptive problem-solving. Attention shifts from isolated components to the intricate dance of processes, reframing interventions from the pursuit of fixed 'solutions' to the nurturing of regenerative cultures.

Further potential illumination emerges from the interstitial spaces that lie in a Venn diagram at the intersection of systems thinking, 'edge of chaos,' and the holistic perspective. These insights might empower individuals with further agility and agency for adaptation. By embracing collaborative engagement with emergence, autopoiesis, as the self-sustaining nature of living systems, is catalysed. As practitioners acknowledge their integral role within the systems they influence, they might pivot from theoretical problem-solving to immersive participation. Entering more deeply into the state of 'interbeing', heightened sensitivity can unlock the inherent intelligence and purposefulness of localised systems. Consequently, efforts evolve towards a harmonious collaboration with these systems, propelling their continued growth and evolution.

Keywords: Edge of Chaos, Holistic Systems Practice, Interstitial Spaces, Epistemology, Ontology, Autopoiesis, Regenerative Cultures, Interbeing

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