# Large Systems Change

## An Emerging Field of Transformation and Transitions*

Steve Waddell
*NetworkingAction, USA*

Sandra Waddock
*Boston College, USA*

Sarah Cornell
*Stockholm University, Sweden*

Domenico Dentoni
*Wageningen University, The Netherlands*

Milla McLachlan
*Stellenbosch University, South Africa*

Greta Meszoely
*Center for Business Complexity and Global Leadership, USA*

In this paper we put forward a theory of large systems change (LSC), where large systems are defined as having breadth (i.e. engaging large numbers of people, institutions, and geographies) and depth (i.e. changing the complex relationships among elements of power and structural relationships simultaneously). We focus primarily on transformational LSC, recognising that such systems are complex adaptive systems in which change is continuous and emergent, but directions can be supported. A typology of change actions with two core dimensions—'confrontation' and 'collaboration' on the horizontal axis and 'generative' and 'ungenerative' change on the vertical—suggests that change strategies can be classified into four broad archetypes: forcing change, supporting change, paternalistic change, or co-creating change. LSC theory development focuses on three core questions: what is the foundation of LSC concepts and methods, what needs to change, and how does LSC occur? We conclude by reviewing how papers in the Special Issue fit into these questions.

---

## The need for large systems change

OURS IS AN HISTORICALLY UNPRECEDENTED era of human, technological and natural systems transformational change. Their increasing intensely interconnected and interdependent qualities are creating both tremendous challenges and opportunities. Traditional tools and methodologies are inadequate for understanding and addressing today's pressing complex issues, advances in science, technology, and computing power and capacity. New understanding, tools and methodologies demonstrate the potential for greatly enhancing action to steward emergence of a flourishing future.

This 'new' is coming from several directions. The study of complex adaptive systems (CAS) is not new, but the foundational principles of complexity science now are being broadly used to reveal new ways of processing empirical data at increasing rates and scale. Poverty, economic crises, conflict, corruption, natural disasters, food insecurity, and epidemics are not new, but our limited success at addressing them is provoking significant innovations. Our recent world financial crisis, terrorism, natural disasters, climate change, health epidemics, and other pressing challenges suggest now is a good time to take stock with the aim of developing an integrating new framework for understanding and acting.

The scale of these 'wicked' problems is unprecedented (Churchman, 1967; Rittel & Webber, 1973). They require action across social, political, technical, economic and environmental domains. While some might believe that business-as-usual will resolve or at least contain some of these problems, others—and we are among them— believe that rather massive systemic change we refer to as large systems change (LSC) is central to addressing them and creating a thriving future. We take the position that although LSC may be experienced as positive or negative, purposive LSC is both desirable and possible: while recognising many controversies about what desirable futures look like, we believe that the widespread public identification of challenges such as those mentioned above suggests a broad sense of desired direction. Though some might associate this direction with 'sustainability', we prefer the term 'flourishing futures' (Ehrenfeld, 2005). However the desired future is characterised, we believe that new paradigms for action are required to effect LSC.

We believe that advancing our purposive action capacity can be greatly enhanced by thinking of LSC as a field. To support the emergence and identity of LSC as a field, we build on the knowledge and experience of the editors and authors of this Special Issue to propose a holistic framework for conceptualising large systems, how they are changed, and who can influence these changes.

## The need for a theory of large systems change

We all know how hard change can be. Just think of how hard it is to make changes at the individual level, altering yourself or your habits in any significant way. For example, losing weight, changing eating habits, or breaking a bad habit like biting your

nails can be challenging. It takes time, energy, commitment, resolve, and a willingness to do things differently. Perhaps most of all, it takes a belief that the ability to envision and realise change is both needed and possible.

Imagine the scaling of that individual level change to a whole organisation, and you arrive at a vast organisational development literature. This literature consistently demonstrates how intractable established patterns of behaviour are and how difficult it is to make change when the multiple interacting systems of an individual organisation are involved (e.g. Buchanan, 2011; Weick & Quinn, 1999; Beer & Walton, 1987). Systems change of the sort needed to deal with issues as big as poverty, climate change, sustainability, or inequity is obviously even more complex as it involves numerous different types of organisations, numerous policies and norms, numerous sets of beliefs and practices, and a complexity of other interacting elements including numerous change initiatives.

The term 'theory of change' has been popularised as a way to guide action and develop strategies to address change challenges (e.g. Klein, 2014). An operationally oriented definition of the term characterises a theory of change as a coherent set of ideas about how change processes develop, can be managed, and evolve throughout the change process. Making the assumptions about relationships between actions and outcomes explicit is central to a 'theory of change' approach. Used in a broader sense, theories of change are associated with geological eras (ICS, 2013), paradigm shifts (Kuhn, 1962), tipping points (Gladwell, 2002), revolution (Malia, 2008),

evolution (Darwin & Bynum, 2009; Gersick, 1991; Malia, 2008) and social movements (Della Porta *et al.*, 2009; McAdam *et al.*, 1996; Tilly, 2005). We see value in developing a theory of LSC that builds on this diverse foundation, while recognising that others might offer complementary theories.

## Definitions

By large systems change (LSC), we mean change with two characteristics. One we refer to as breadth: change that engages a very large number of individuals, organisations and geographies across a wide range of systems. Indeed, given the interconnectedness of humanity, we see the need to think about global systems change engaging local-to-global (glocal) dimensions. The second characteristic we refer to as depth: LSC is not simply adding more of what exists or making rearrangements within existing power structures and relationships, but rather changes the complex relationships among these elements at multiple levels simultaneously. LSC means fundamental revisioning of what is possible and ways of sensemaking that lead to previously unimaginable outcomes.

There are three main types of change: incremental, reform, and transformation.

▶ **Incremental change** focuses on reinforcing or reducing systems, while allowing it to gradually shift in a more or less continuous way, such as when a retail company expands by opening stores in new locations, and when wind turbine technology is replicated as an emerging innovation

► **Reform** happens when there is a shift of power or dominance among linked system components, again within a given system, such as when laws move regulation from government to business (self-regulation)

► **Transformational change** occurs when there is fundamental systemic change resulting from new ways of understanding what is possible and acting on them, such as South Africa's movement from pre- to post-apartheid, or the reconfiguration of physical and ecological processes in the natural environment resulting from human-driven climate change (Waddell, 2011)

Although incremental change (more of the same) and reform (changing rules) may lead to LSC and are part of its dissemination, transformation provides our over-arching change framework.

The 'systems', we refer to in LSC are complex adaptive systems (CAS), which describes both human systems and natural ecosystems. These are dynamic systems, with multiple interacting and interrelated parts. Change is continuous and emergent at all levels of the system and its paths are unpredictable. In these complex systems, there is really no such thing as stasis (or what in economics is called equilibrium) because of the dynamic and interactive nature of the system. However, there are periods of greater and lesser turbulence; the former is associated with 'revolution' and the latter with stability. The tenets of complexity theory (e.g. Prigogine & Stengers, 1984; Nicolis & Prigogine, 1989; Stacey, 1997; Kauffman, 1995) help us to consider some of the characteristics of LSC with which any change agent—or, better, change systems agent(s)—must contend. Complex

challenges are without obvious beginning or end points, interdependent, and lack agreed solutions.

In LSC the change agents themselves are embedded within the system that is to be changed; that is, they are part of, rather than separate from, the relevant complex problem (Waddell *et al.*, forthcoming). Hence bringing in an outside consultant (or group) to foster the change is not feasible; LSC happens from within the relevant system, even when change is deliberate and intended.

## A typology of change actions

Can we propose a framework that provides a basis for comprehensively mapping the enormous range of change actions? This will greatly facilitate development of strategies that draw from understanding about the range of choices, implications behind strategic choices, when one choice might be better than another, and sequencing of choices. It will help deepen conversations between advocates of different strategies to hopeful evolve more effective action.

Figure 1 is one possible such framing typology. It draws from several sources, most notably from a common call to more explicitly include power issues in change processes, Scharmer's Theory U (Scharmer, 2009), Isaac's work on dialogue (Isaacs, 1999), and Kahane's book *Power and Love* (Kahane, 2010). Kahane explains his book as reflection on Martin Luther King, Jr's statement that 'power without love is reckless and abusive and love without power is sentimental and anemic'. Love is action based in connection and relationship with others, and power is the

driver of people and entities to realise and grow their own interests.

Both power and love can be either generative or degenerative. The former is a creative force and the latter is experienced by many as destructive, although Kahane conceives it as "decay". 'Generative' relates to 'generative dialogue' (Isaacs, 1999; Scharmer, 2009), which is associated with empathy and concern for the whole to produce action and transformation with a drive towards highest aspirations. 'Degenerative' is seen as its opposite: action and transformation produced by narrow concerns and shutting down, with a focus on personal power and rewards. The degenerative side of 'love' approaches is that they can smother and oppress individuals and groups. Power, Kahane describes, is experienced at the extreme as:

> An individual or group that exercises power to achieve its desires and ambitions, but pays no attention to the desires or ambitions of others, will end up steamrolling the others. This degenerative power shows up disturbingly as greed or arrogance and catastrophically as rapaciousness or violence (Kahane, 2013).

*Figure 1* A typology of change actions
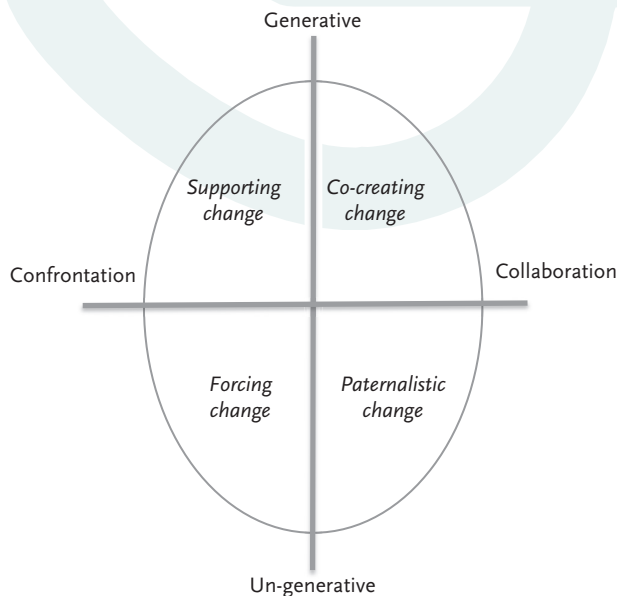


These ideas led us to develop Figure 1, with a vertical axis of generative to un-generative. The horizontal axis is confrontation to collaboration, to get at the underlying dynamics of extremes of how power and love can be experienced. 'Positive' or 'negative' evaluations will be different for different actors depending on their goals and power concerns. They are described archetypally as follows:

▶ **Supporting change** occurs when power-holders use their resources to realise change, convinced it is for the broader good. However,

they use unilateral action as is associated with 'lifting up' and *noblesse oblige*. Doing this can be the objective of government legislation, philanthropy, and community organising, although these actions can figure in other types of change as well. In the US, this strategy fits with the 'what's good for business is good for America' (or vice versa) mindset

▶ **Forcing change** occurs when a stakeholder group(s) acts to grow power in relation to others, often through confrontational tactics and strategies, perceiving that resistance to change in their desired direction (or moves to change the status quo) make this necessary. As a strategy, forcing change is often associated with such things as capital and labour strikes, government legal sanctions, armed insurrections, and occupations

▶ **Paternalistic change** actions are associated with power being used in ways that maintain the status quo. Consultation by power holders with the marginalised is a common activity in this when the power holders do so without opening up and responding to questions about power dynamics. They take actions in the name of others and with identifiable benefit, but with the paired objective of maintaining or reinforcing the status quo. Much lobbying of government fits in this strategy, as well as top-down government consultative approaches to regulation and being 'in control' of responses to challenges

▶ **Co-creating change** represents collaborative strategies to develop LSC such as with multi-stakeholder mass movements; processes to develop statements of principles for business and activities to implement them; public–private partnerships; and education and outreach programmes. A common underlying strategy is to bring together diverse stakeholders with early adopter insiders as a way to transform issues of joint concern

This typology aims to get at underlying dynamics of change that are behind a popular name for a strategy that can confuse these dynamics. For example, 'codes' can be a strategy applied in any of these four types of change strategies (see Table 1) depending on the intent and composition of the strategies' participants. This is a demonstration of the value of such a typology.

Much of the most impactful change effort arises from a drive for power and self-serving goals. However, most people working on complex change issues focus on generative collaboration strategies we would place in the co-creating change quadrant. Such change strategies are reflected in approaches like Theory U (Scharmer, 2009), appreciative inquiry (Cooperrider & Whitney, 2005), most social innovation labs (Hassan, 2014; Westley *et al.*, 2012) and work in the transformation management tradition. The assumption is that by getting people together to create shared visions of the future, collaborative efforts at change will emerge. People will open their hearts, minds, policies, and institutions to realise a larger emerging collective need and potential. They will change, relate better to each other, learn to collaborate around

issues important to all, and thus begin the change process each in their own ways, moving the change initiatives so that change effort participants' 'power' in the traditional sense is simply another 'resource' and factor available for the change effort rather than one that determines outcomes. This is the highest integration of power and love.

The suggestion we make here is that the co-creating change strategy should be placed in the context of other types of change actions to both understand and develop powerful change approaches. The forcing and supporting change actions are almost always important for transformational change advocates as well; paternalistic change strategies can actually hinder transformation. They must be approached skilfully. The interplay between these strategies can be seen in big historic shifts. For example, referring to Martin Luther King, Jr again

and the 1960s struggle of American blacks for their voting rights: King and his contemporary Malcolm X were coming from a minority position which each organised into a power block. Co-production was not proving a successful strategy. With a generative base, King emphasised a nonviolent supporting change response, and he was supported by some with power such as white religious groups in his efforts. Malcolm X took a more violent and revolutionary position with a forcing change strategy. They were always facing dangers of being 'bought off' with incremental change when they were working for transformational change. The latter finally began with empowering government legislation which then led to many co-creating change activities to 'give life' to the legislation. Table 1 lists a few examples illustrating the use of all four archetypal strategies in several major efforts to accomplish LSC.

*Table 1* Examples of strategic-tactical change actions

| Name | Supporting change | Forcing change | Co-creating change | Paternalistic change |
|---|---|---|---|---|
| **Components** | Generative confrontation | Un-generative confrontation | Generative collaboration | Un-generative collaboration |
| **Dynamic** | Empowering Raising up | Confronting Violence (physical, verbal, etc.) | Collaborating Co-evolving | Suppressing Maintaining status quo |
| | Willingness to share power | Willingness to ignore harm | Willingness of everyone to change | Willingness of disempowered for marginal improvement |
| **Popular terms** | *Noblesse oblige* Upliftment | Forcing | Co-production | Paternalism Obstructionism |

*Continued*

| Name | Supporting change | Forcing change | Co-creating change | Paternalistic change |
|---|---|---|---|---|
| **Archetypal strategies** | Community organizing Philanthropy Human rights legislation Opening up legal cases Education | State force Strikes (capital, labor) Demonstrations | Multi-stakeholder fora Public engagement Social labs | Reinforcing legal cases Financial pay-offs Consultation |
| **Example 1: Black American voting rights** | King and non-violent action | Police violence | Inter-racial faith coalitions | Eliminating poll taxes (while maintaining other barriers to voting) |
| **Example 2: Codes of conduct** | Rainforest Alliance (NGO controlled) | Opposing gvt standards | Forest Stewardship Council (multi-stakeholder) | Sustainable Forestry Initiative (industry controlled) |

### Key questions for LSC

We approach development of large systems theory of change through three questions. In this section we investigate them with the goal of suggesting some boundaries for the field of LSC in terms of knowledge and action. In the following section the questions are used to review the contributions of the papers in this Special Issue.

### Question 1: What is the foundation of LSC concepts and methods?

The field of LSC has evolved from a strong foundation of a vast body of research and action from disparate disciplines, genres, and sectors. Each of these approaches provides an important lens with which to view social, political, economic, technological, and physical systems and their corresponding issues. While each has made significant contributions, many of today's problems intersect numerous fields and disciplines requiring an approach that reflects this reality. LSC emerged out of an appreciation of the depth and scale of the complex issues we face and need for multidisciplinary action and insights. It builds on these trans-disciplinary change strategies to effect unimagined possibilities.

Figure 2 aims to provide an initial, illustrative sketch of the relevant knowledge domains that support and remain critical to the development of theoretical and practical knowledge about LSC. Rather than proposing a comprehensive depiction, this descriptive figure is simply illustrative of the wide range of approaches that contribute to and support our understanding of complex adaptive systems and LSC. This figure was developed in consultation with numerous experts working on LSC challenges and issues.

The figure depicts a range of traditions that emerged to address complex change challenges, i.e. those problems for which LSC is needed.

The figure proposes a range of traditions and workstreams that have been deployed by the authors or others in LSC. The figure illustrates several[1] major streams of work or traditions in which LSC is being addressed in some ways, albeit not considered as LSC in quite the holistic way we conceive of it. The streams are represented by the 'arms' coming out of the centre of the figure: governance, learning and evaluation, cultural change, business in society, environment, complexity science, spiritual/psychological, peace and conflict resolution, and socio-economic development. The next level depicts various streams of work that derive from the major traditions. There are, of course, many ways the traditions could be represented and parsed; the main point of the figure is to emphasise that there is a rich, but fragmented, LSC knowledge base that provides the foundation for active multi-, inter-, and trans-disciplinary action to effect sustainable and structural change resulting in unimagined possibilities.

*Figure 2* Mapping of large systems change approaches currently in use
Source: Waddell (2014)



---
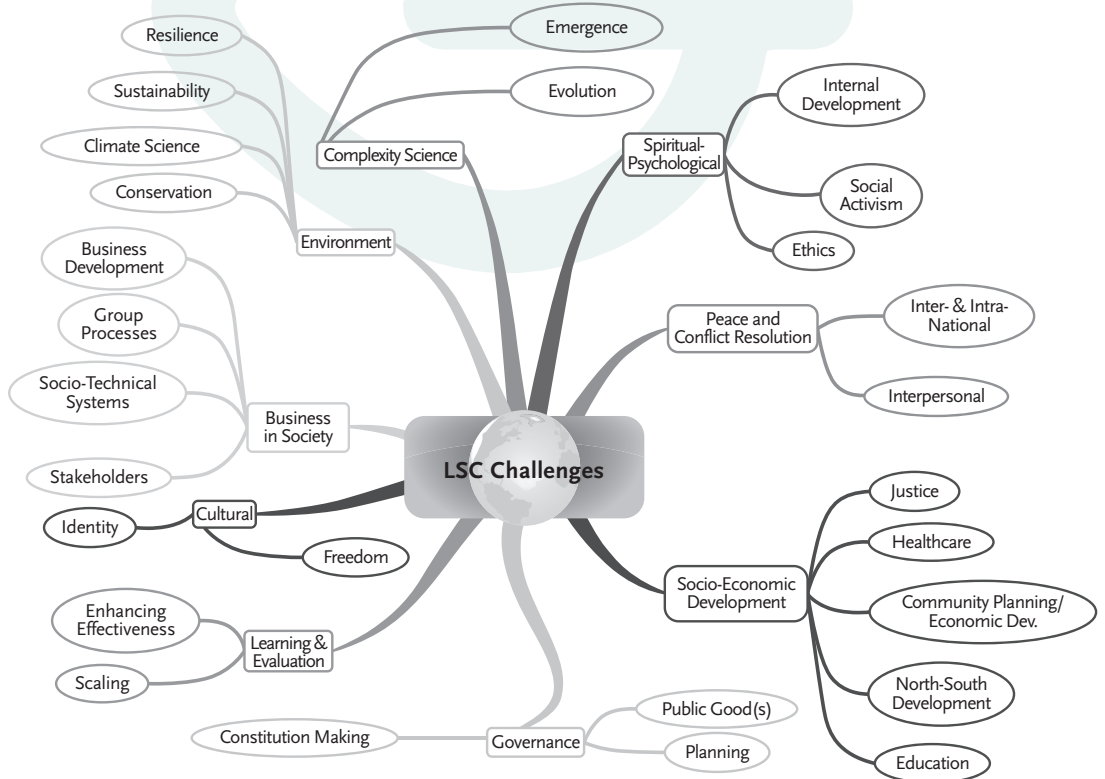
1 Of course there are many ways to divide up these traditions, and Gersick (1991) identified six. This figure is simply illustrative.

**Complexity science** provides for understanding the structure and dynamics of interconnected and co-evolving systems and the context to

develop strategies for change at multiple levels within the complex network. A false causality is not assumed—instead one works with the system's dispositions (Snowden, this issue). By expanding the framework of reference for action in each field to incorporate their understanding of CAS, practitioners are likely more inclined to appreciate the broader impact of their actions on actions of others. This will likely result in more effective and comprehensive strategy to effect sustainable change.

As Figure 2 suggests, the **business in society** (BiS) and **socio-economic development** (SED) traditions have developed particularly rich sets of approaches ranging from normative ideas about what is the right way to operate businesses, to corporate (social) responsibility approaches to stakeholder relationships, and numerous approaches to social and economic development with a wide range of methodologies (see Tandon this issue) that could stimulate systems change. Historically, the BiS tradition is focused on questions about the responsibilities of the corporation as the core stakeholder, with emphases in the literature on socio-technical systems, stakeholders, group processes, and business development. The SED tradition focuses on broader societal stakeholder concerns, including justice, healthcare, education, economic and community development, and North–South development as major substreams of work. Many of the SED literature and approaches, however, are technocratic, linear, and not systemic.

Over time these BiS and stakeholder perspectives have increasingly intersected as the perspective

of corporations has broadened and the SED traditions have recognised the importance of the contribution of corporations to addressing their concerns. Both traditions have historically shared what might be described as an institutional-structural focus in their efforts to conceive change. Individuals' roles have often been framed, particularly in the BiS tradition, around the concept of 'leadership', typically in a hierarchical heroic model. Group processes, as 'teams' in BiS and 'communities' in SED, have spurred a rich tradition that has grown into the shared concept of 'multi-stakeholder convenings', and the socio-technical systems tradition has major roots in the vast literature on planned change and organisational development.

Approaches that start with reflexivity, learning and enhancing individual and group awareness have developed within what is here termed the **spiritual-psychological** (SP) tradition. Individuals' inner states of awareness and insight (as opposed to heroic leadership) are emphasised as being central strategies to bringing change about (see Scharmer & Yukelson and Betit, this issue). These approaches are focused on raising awareness in groups of individuals so they can work together collaboratively on change. Historically, SP approaches have produced different types of intentional communities or communities of practice around ways of living or particular practices.

Both institutional and individual interactions are foci of the **peace and conflict resolution** traditions, which have received perhaps the most significant and concentrated attention as 'complex change challenges' because of their obvious life-and-death issues (see

Fitzduff, this issue). Again dialogue surfaces as a key method (e.g. Lederach, 2005; Saunders, 2003; Susskind *et al.*, 1999). Conflicts such as those with the Apartheid regime in South Africa, the persistent Israel–Arab crisis, Northern Ireland's troubles, internecine guerrilla activity in Colombia, and violence in Central America, as examples, have produced an impressive array of methods relevant to complex change from interpersonal strategies to post-conflict reconciliation commissions. The potential for multi-disciplinary and cross-sector knowledge transfer to effect change in this and so many other areas is likely to have significant impact on the interacting systems and influence the CAS.

As the **governance** traditions suggest, the need for effective government/governance has produced in the political science field and beyond notable processes for national conversations around constitutional arrangements and strategies to advance agendas such as regional planning. Thinking of top-down government being 'in control' is giving way to concepts of collaborative and deliberative governance involving all organisational sectors, especially some initiatives at the global level (e.g. Biermann et al., 2012; Glasbergen and Schouten, this issue). Collaborative governance (Zadek & Radovich, 2006) approaches contrast with standard hierarchical government and the coercive power implied by mandate; 'experimentalist governance' (Sabel & Zeitlin, 2012) integrates flexible, recursive processes more democratically than traditional top-down approaches. At an even broader cultural level, other methodologies have developed to support shifts in popular insights

and values such as the wide range of media and specific methods, such as Theatre of the Oppressed. Political, cultural, and socio-economic complex change strategies have produced a range of methods associated with community organising, collaboration and purposeful conflict generation such as with strikes (Victoria & Albert Museum, 2014).

The most impressive growth in the traditions over the first decades of the 21st century is associated with the **environmental** tradition, with the concepts of 'resilience' (e.g. the Resilience Alliance) and 'transitions' (e.g. the Sustainability Transitions Research Network). Concerns about degradation of the natural environment originally brought biologists and natural scientists into the transformation fray, with a gradual realisation that addressing their concerns must categorically address socio-economic and political concerns not purely ecological ones. This tradition has led to holistic stakeholder strategies around natural resource issues ranging from fisheries to, increasingly, climate change.

## Question 2: What needs to change?

A key question that change agents, who themselves are part of the system undergoing change, must ask is: What needs to change? Wicked problems are embedded in the complex system with different stakeholder perspectives on what the problem is, why it exists, and what should be done about it. Individuals, including 'experts', focus on particular aspects of the problem, reflecting the proverbial problem of blind people touching different parts of the elephant and imagining different animals. Can a comprehensive framework be developed?

Figure 3 provides one way of conceiving what needs to change in LSC as a series of related spheres or circles that are integrally linked to each other but represent different important facets of the change process. Each circle, called an LSC sphere, can be viewed as a set of systems that change over time. At the broadest level is the natural environment, which underpins and influences everything in the system. The next sphere consists of memes (Dawkins, 2006); that is, shared beliefs, values, and other cultural artefacts providing an idea- and information-based framework that aligns and creates identities within different subsystems. The socio-political structures are familiar informal (e.g. family) and formal (e.g. corporations, governments, NGOs) organisations and institutions that constitute societies, in which individuals, with their own beliefs and values, act on social and natural systems.

In fact, most theories of change focus on one of these perspectives, leaving the other layers weakly articulated, if at all. Following Wilber's developmental notions, the broader systems encompass and constrain in some ways the narrow systems in nested fashion (Wilber, 2000). LSC must deal with all of them holistically and appreciate their dynamic impact within a CAS to realise change. Collectively these perspectives represent the system of interest to us: a 'large system' in the sense of having multiple components of very different kinds, with many interactions playing out at various scales of time and space. The figure is loosely organised as a cascade of spheres, where changes in the outer systems play an interactive role in emerging the options for change in the inner systems (shown by the curved arrows). As you move towards the inner systems, change tends to be more specific and definable and takes place in shorter timeframes. In the outer systems, change is more likely to be more diffuse, broad ranging, and slower. Importantly, these interactions are dynamic and create feedback, thus the mindset and actions of an individual may affect technology or memes which influence the individual to potentially create or adopt a disruptive technology.

Figure 3 should not be interpreted as being a rigid hierarchy of systems, or even of approaches to understanding systems. Rather it is a dynamic and co-evolutionary model of a complex reality. There are many ways to define or theorise systems, in terms of deciding on their boundaries and the kinds of relationships between components that are deemed to matter. There are also other ways to theorise this framework for large systems change that go beyond our practice-oriented pragmatic approach.

*Figure 3* What changes in large systems change?
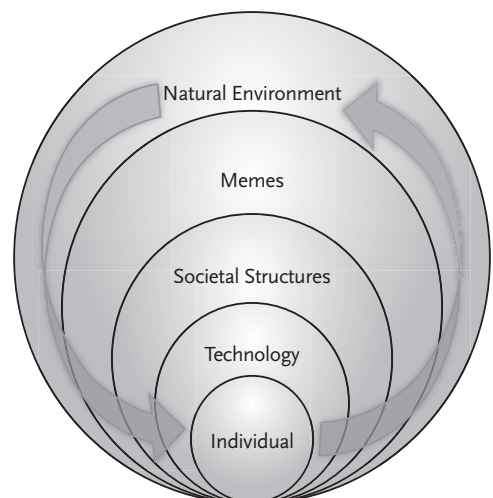
## Natural environment

At the broadest level, change happens within the context of nature including human beings' relationship to and treatment of nature. Earth's weather, natural resources, flora and fauna are limiting and enabling factors in large systems change. At transformation's grandest scale, change is counted in 'geological ages'. Transitions from one age to another are defined by the International Commission on Stratigraphy based on geological evidence of global events, such as changes in Earth's orbit around the sun, planetary impact events, massive volcanic eruptions, and mass extinctions (ICS, 2013). The field of **Earth system science** seeks to understand these events, which are associated with shifts in the physical composition of land, oceans and the atmosphere, and the responses to these changes by living organisms. This large systems change concept has come into more common parlance with the proposition that we are now in the Anthropocene—an era arguably beginning with the Industrial Revolution, when human activity began to have a dramatically increasing level of influence on natural systems (Crutzen, 2006; Steffen *et al.*, 2007). As the predictive power of the field of Earth systems science reaches its limits in the light of human-caused changes, new ways of conceptualising linked social-ecological systems are being explored. The idea of **panarchy** (Holling *et al.*, 2002) and other forms of global governance, is important in this context, as it addresses evolving hierarchical systems that link biological, ecological, and various human elements across temporal and spatial scales.

## Memes: shared values, beliefs, and cultural artefacts

The rise of the Anthropocene can be seen as the product of change in the other systems shown in Figure 3 and an example of the second circle: changes in memes, or values, beliefs, and cultural artefacts. Memes, following Dawkins (2006), are ideas with 'spreading power'. Memes, broadly defined to encompass the intangible ideas that shape how people in different settings view the world, are the core underpinnings of societies: for example, shaping ideologies of various sorts and the perspectives, such as about change itself, that come from those ideologies (see Waddock, 2015). The meme circle of large systems change is where work on scientific paradigm shifts (Kuhn, 1962), for example, is placed, as a way to describe such important changes in the perspectives of large swaths of people, such as pre- and post-Copernican, and pre- and post-Cartesian ways of understanding the world. Shifts in scientific paradigms involve change in definitions of *what* an analysis should observe, the kinds of questions that should be asked, how the questioning should be developed, and how the results should be interpreted.

This layer is also evident with belief systems of various labels, including a number of 'ies', such as monarchies, democracies, and theocracies; and political 'isms', such as imperialism, socialism, communism and capitalism; and religious ones such as polytheism, monotheism, atheism, and more particular denominations within them. Within each of these broad categories is a memeplex (complex set of memes) (Blackmore, 2000)

or a range of ways of understanding the world, where the core dimensions to be understood are the functioning of the physical environment, the relationships among different cultures or groups of people, and the relationship between humanity and its environment. Memes are the cultural artefacts that constitute the belief sets on which societies are based, much as genes make up the DNA that determines the constitution of every living being and have an effect on the world beyond themselves.

Of course, such labels are given to the dominant organising imperative or dominant meme: any particular example contains various degrees of many of these memes, and conflicting memes can exist within a given culture such as a conservative versus a progressive perspective (see Lakoff, 2014). But moving from one social-political belief system to another is another form of large systems change, which can be associated with revolutions (e.g. the French and American revolutions in the 18th century, pre- to post-Apartheid South Africa, and the 'coloured' revolutions[2] at the turn of this millennium), as it can involve a basic realignment of power structures and ways of life.

### Societal structures

The third circle is the formal and informal social, political and economic institutions and organizations in societies, including global structures. Here we find governance

---

2 e.g. the 'Rose Revolution' in Georgia in 2012, the 'Orange Revolution' in Ukraine in 2004, and the 'Tulip Revolution' that took place in Kyrgyzstan in 2005.

mechanisms of various sorts, ranging from the family to organisational to national to global level. It includes the many networks that are part of our daily lives, and the ways that they are increasingly influenced by virtual communications. Many change initiatives focus explicitly on institutions within this circle, recognising that how our institutions are shaped, function, and perform, and the policies and practices that they generate, shape how people experience life within a given system. Many of the socio-economic development, governance, cultural, complexity, and business-in-society traditions noted in Figure 2 focus on this circle.

### Technology

Large systems change is also associated with changes in physical technologies. Eras, for example, are named for core technologies, such as the bronze and iron prehistoric ages, and more recently the industrial era and the information age. Dominant (and sometimes emerging) technologies can have significant influences on the social-political and economic systems. For example, in some developing parts of the world, today's widespread access to cell phones in developing countries has shifted power in agricultural production to farmers, who now have ready access to market information, and away from middle-men whose power previously depended on their privileged access to that information. In the electricity industry power is shifting from utilities to 'prosumers': those who both consume and produce energy. Innovation theories address this layer of large system change, and learning and

evaluation and complexity traditions of change often work with this circle.

## Individual

Many current change traditions approach LSC as a challenge of individual awareness and capacities. Collaborative strategies in the spiritual-psychological, cultural, socio-economic development, and governance traditions often start with individual awareness and attempt to create collaborative strategies. They are, at one level, working with the memes or 'large systems' set of assumptions and beliefs held by individuals and attempting to change them through interaction, awareness-raising, and cooperation. In one important strand of theory, this layer of individual agency is interpreted in the traditional frame of leadership. In another strand, there is recognition that LSC is connected to an individual's sense-making about relationships between people and the natural environment, often associated with a sort of spiritual awareness (Weick *et al.*, 2005; Werkman, 2010).

## Question 3: How does LSC occur?

From observing LSC, are there any general propositions to make about how it occurs? Certainly work to date suggests some. We would like to build on this to advance the understanding for taking purposive action. If we assume that LSC must occur in the context of a CAS, questions abound: for example, what are sets of interventions that can support movement in a desired direction? What types of processes and engagement of various stakeholders are needed to bring about LSC? Where does effective LSC begin and how?

How are others brought into an initial change effort so that they feel part of the change process? Here we provide some observations to contribute to propositions about the LSC process.

## Observation 1: LSC seeds can be in any LSC sphere

There is a strong tendency of those working on LSC issues to assert a key beginning point. For example, Scharmer clearly advocates the beginning is with individual awareness. However, as noted in the discussion of the LSC spheres, we observe that different analysts and activists focus on different spheres with success; complexity or wicked problems thinking would indicate that it is next to impossible to determine an actual beginning point for any change.

## Observation 2: LSC potential is constant with facilitating factors

Such factors include:

▶ **Opening up**. New insights and getting in touch with unrecognised limiting assumptions can lead to new ways of acting, new rules and new beliefs

▶ **Closing down**. Restricting actions, reducing knowledge and limiting resources can dramatically change the inertia in a system

▶ **Addressing contradictions**. Both Marx and Kuhn emphasised tensions between espoused practice, structures and beliefs, and those observed and arising

▶ **Hitting boundaries**. Existing systems contain enormous inertial pressures to adapt to change,

rather than accept transformation. However, incremental adaptation changes can force LSC, as Malthus (2013), Diamond (2005) and analysts of the fall of the Roman Empire have theorised

### Observation 3: LSC involves change throughout all of the LSC spheres

While recognising that the temporal horizons are of great variation, LSC appears to work across the spheres of Figure 3. LSC in one sphere produces changes in another. Without accommodation in other spheres, the change will remain a marginalised idiosyncrasy rather than a LSC.

### Observation 4: LSC is evolutionary and revolutionary

Reviewing six knowledge domains, Gersick investigated theories of revolutionary change and found a commonality that warrants repeating: 'Systems evolve through the alternation of periods of equilibrium, in which persistent underlying structures permit only incremental change, and periods of revolution, in which these underlying structures are fundamentally altered' (Gersick, 1991: 13).

A core question for those interested in realising peaceful purposive change is how the period experienced as equilibrium can work with factors within the various spheres and develop important experimental-transformational responses in the desired direction.

### Observation 5: LSC development occurs in stages

Development stages move from inducement to prototyping to dissemination where true LSC is experienced.

LSC can be rapid or slow; however, it must go through a period of testing to develop new DNA in the LSC spheres with protected spaces (skunk works) for transformation.

### Observation 6: Transformation moments are always emerging, but unpredictable

These observations reflect the constant presence of inducing factors and an axiom of complexity science. The real question for LSC is: What do purposive change efforts look like, since emergence is a constant?' Chaos theory suggests that specific predictions cannot be made—but general patterns of change can be sensed. For purposive change efforts, the first may be debilitating, the second inspiring. The development stages will not lead to transformation at pre-determined points. This observation is reflected in both the lack of prediction of the Arab Spring, and its collapse. Tipping points are an attractive idea, but not only are they hard (impossible?) to define, but there are many examples of false positive declarations of transformation. The message for purposive change makers is that efforts must be persistent and include a healthy dose of reflection and humility!

### Observation 7: Change initiatives can be undertaken from wherever a change agent sits within the system

Deliberate or purposive LSC requires acts of leadership or what Raelin (Raelin, 2003) calls 'leaderfulness' from anywhere in the system. But the outcomes of any given act of leaderfulness cannot be fully determined in advance given the complexity of the systems.

*Observation 8: The role of memes is central in shaping behaviours, beliefs, practices, norms, and systems*

Memes are the core ideas on which ideologies, ideas, and belief systems of all sorts are built, but far too little is understood about how they influence behaviours or the change process positively or negatively.

*Observation 9: LSC itself has stakeholders who must work collaboratively for purposive transformation*

Individuals who perceive a need for LSC usually strive to identify their role, or roles, in these processes of change. How is each of us contributing to LSC? In particular, using the language of organisation studies in LSC (Lawrence and Lorsch, 1967), how do roles in LSC differ from each other in achieving LSC? How do we integrate and catalyse our efforts towards complementary rather than conflicting outcomes? This question on how roles are defined and integrated is crucial: individuals, organisations and institutions seeking solutions to problems at large scale risk exacerbating problems when they collide rather than coordinate with the roles of others targeting the same end point.

We can think of differentiating and integrating roles for LSC along at least two different dimensions. The first dimension may lead to differentiation of our roles based on the initial resources that each individual brings to play: including financial, physical, intellectual and social resources. These resources could be thought of as an initial endowment that each of us receives. This may lead individuals to work in one specific sphere of change, or across different spheres

(Figure 3). Moreover, within or across different spheres, individuals may take one or more of these different roles that were identified through a World Bank-funded exploration (Waddell, 2014):

► **Complex issue owners** are those who are taking leadership to respond to complex change challenges. They are usually organisations, classically governments and inter-governmental organisations and their agencies and foundations; NGOs; occasionally businesses; and, in more mature issue fields, multi-stakeholder entities

► **Funders** provide financial support to address complex challenges. They include high net-worth individuals, foundations, research funders, and government agencies

► **Practitioners** are those who are supporting action through organising and application of methodologies to a particular complex challenge. Classically these are consultants or employees of a problem owner

► **Trainers and educators** are those who are building capacity of practitioners, complex issue owners and issue stakeholders to address their challenge

► **Action and conventional researchers** are those who engage in analysis of data of an issue to produce knowledge and methods to inform action. Action researchers, particularly important in LSC given the collaborative emergent learning imperative, work with stakeholders in an issue to support real-time co-production of knowledge and action. Conventional social

scientists work in an issue expert mode with particular emphasis on controlled, quantitative and historic experiences

► **Change issue stakeholders** are those who are influenced by the topic of change

## Papers in this Special Issue

As editors of this Special Issue, we are pleased to share four invited Turning Point pieces from leading academic practitioners and seven full article contributions that highlight the challenges and complexity of LSC. In this section, we briefly review those contributions.

The papers represent a great diversity in LSC forums: individual competencies, peace-making, government services, a private company, national issue arenas, global networks, glocal arenas, and fields of research and practice. They bring in a global complexity of actors, their roles and change approaches. They embrace the forms of complexity Kunkel notes as: dynamic, generative, social and institutional, and value. Of course, within the space constraints of a Special Issue, the variety of perspectives cannot be comprehensive. We note, for example, that a Western/Northern tradition is clearly dominant.

The contributions are notable for their action-based qualities. This is certainly not a simple coincidence. Loorbach *et al.* explain the purposive nature of transition management (TM) in ways most, if not all, contributors would agree as a basis of their own work: '…to better understand the failure of policy and markets in delivering a fundamental reorientation of the development pathway of modern societies and an opportunity to explore new ways to achieve breakthroughs'. The contributors to this Special Issue share a commitment to active engagement in the betterment of the world through LSC, and eschew traditional positions about neutral objectiveness.

This is not to say that they do not value traditions of rigour and discipline, however. They are committed to reflective, analytic action, and practice using and advancing development of research tools in a most serious of ways applied to the world's most serious of issues. There is, however, a clear value basis for the future that they are supporting that goes beyond sustainability to realising participatory, flourishing futures. This is a hallmark foundation of what we mean when we refer to the field of large systems change.

### Contribution to typology of change

In terms of the typology of change presented earlier, these papers are less diverse. They tend to focus on the co-creating generative-love quadrant with multi-stakeholder processes, while verging into the consultative, status-quo led quadrant of leading change with generative power. Holton, in her review of social movements, enters more categorically into forcing change degenerative power approaches: 'leaders', she says referring to Heifetz, 'can "ripen" issues through conflict'. Nevertheless a lesson she presents is that 'Leading from a social movements perspective requires courage

to leave behind familiar power-vested responses…'.

Glasbergen and Schouten explore the interaction between the typology quadrants with three governance forms for large systems change: market-driven, state-driven, and public–private institutions. Market-driven and state-driven transformations would represent approaches for generative power leading change; yet the risk is that, without pressure from stakeholders in the system, these could turn into forms of degenerative forcing and paternalistic change. Public–private institutions have the potential to become forms for co-creating change, although the risk is that, without a continuous attempt to find coherence with other institutions towards large systems change, they could turn into forms of forcing change (yet masking by co-producing change). Thus, Glasbergen and Schouten conclude by mentioning that, most likely, only a coherent combination of these three typologies of governance would lead to co-producing change.

When Moore looks at issues of scaling, she emphasises a complex change dictum reflected in the Glasbergen and Schouten conclusion: develop multiple paths and experiment. Loorbach *et al.* describe this within the TM tradition as innovation, co-evolution and empowering front-runners, with an acceptance of a high likelihood that success will not follow immediately or directly or at all.

## Contribution to defining the range of LSC knowledge and methods

The contributions to this Special Issue reflect the assertion that LSC as an emerging field of study draws from many sources. Some contributions themselves cite this quality, perhaps most notably Loorbach *et al.*'s categorical reference to complexity science, governance, sustainability science and social innovation as foundations for TM. Others are associated in particular with peacebuilding, business in society, social movements, systems analysis, and leadership.

Within this range one knowledge tradition stands out. Complexity science and complex adaptive systems references are perhaps most commonly referenced. Its most formal articulation is evidenced in the analysis by Moallemi *et al.* of Iran's fuel cell development, drawing heavily from systems analysis. Also, Snowden's Turning Point contribution highlights a complexity science approach.

With Holton's paper, we become immersed in social movements theory lessons for LSC. Loorbach *et al.* specifically look at TM from a governance perspective; Glasbergen and Schouten integrate this with a business-in-society tradition. Leadership is highlighted by Kuenkel. The Carris companies' transition to a fully employee-owned company (see Betit, this issue), has origins within a combination of the business-in-society, governance, and socio-technical systems approaches to change.

Three particular points arise from the contributions in terms of methodologies. One is that the LSC field is not simply about action within one tradition; it is very much inter- and transdisciplinary. The second point is that it is both quantitative and qualitative, but the former tradition such as reflected in the Moallemi paper appears poorly integrated, based on

the editors' experience and the admittedly narrow representation of the papers. There are enormous potential contributions to LSC from, for example, emerging big data approaches. Snowden's SenseMaker methodology, not a feature in this issue, is a good example of this direction as well as work by MIT's Center for Collective Intelligence. This quantitative weakness is also reflected in the lack of clear ways impact measurement is addressed (recognising all the difficulties of time spans, counterfactuals, attribution, and problems in defining goals).

Of course there are traditions that have important roles in LSC that are at best weakly represented here. For example: the TM paper makes reference to social learning, and Holton approaches social movements not in a traditional rational-analytic problem-solving mode, but rather as an exercise in emergent creative thinking and flexible adaptation. However, there is also a gap with 'learning' as a tradition contributing to LSC. Emergent learning is stressed as key to LSC, but we lack contributions that reflect this.

## Contribution to understanding what needs to change

One theme in the papers is the importance of thinking and acting in terms of the 'whole' rather than focusing simply on a part. This wholeness comes in many forms. At its most basic it involves broadening of awareness: Scharmer and Yukelson state 'that behaviours within systems cannot be transformed unless we also transform (deepen) the quality of *awareness* that people in these systems apply to their actions, both

individually and collectively'. This means understanding relationships between organisations, goals, and issues; from individual to societal; and in Glasbergen-Schouten's and Fitzduff's cases understanding the glocal, and Betit's in understanding change at the company level.

This awareness and how to develop it is, of course, a focus on the individual change sphere as the point of departure that is also reflected in Kuenkel's work. The papers actually present a nice array of approaches in terms of the earlier model of the spheres of change. TM focuses on technology; Betit with the Carris example focuses on an organisation while emphasising employee awareness; Tandon with mining in India looks at government as an institution; with social movements Holton looks at memes in the context of specific institutions—a combination also apparent in the Glasbergen-Schouten look at global networks, Moallemi with Iran's fuel cells and Moore's analysis of scaling processes. Fitzduff with peacebuilding provides the greatest focus on memes as a basis for LSC action.

The importance of interacting activity among the spheres of change is reflected in the contributions, although of course not with that language:

▶ TM is explicit about the levels of change (niche to landscape) and acknowledges diverse co-evolving processes (economy, technology, ecology) through cycles of destabilisation and reconfiguration

▶ Fitzduff writes that 'a systemic, integrated, and holistic approach to developing sustainably peaceful societies is more effective than

the more usual one dimensional approach'

▶ Glasbergen and Schouten discuss the role of societal structures as starting point for change. Through institutions (e.g. global standards), multiple actors interact to develop shared beliefs and shape the natural environment. At the same time, institutions have the power of facilitating the development and outreach of technology with effects on all individuals involved in LSC

▶ Betit explores the 20-year transition of the Carris Companies from a traditional firm to a wholly employee-owned and managed ESOP (employee stock ownership plan) company, focusing explicitly on the role of leadership, on changing employee and management awareness, and on the numerous small changes that resulted in the overall system change of the company, as well as the ripple effects that the Carris transition had beyond the firm itself

▶ To realise scaling, Moore points to the importance of multi-level action

## Contribution to explaining how purposive LSC occurs

There is a common rejection of traditional management practice as incompatible with, and even counter-productive to, LSC. The predefined outcome focus of management drives out the innovation that is at the heart of LSC: if the transformation can be so clearly articulated, it must have already been experienced and therefore not a transformation at all. Moreover, the solutions 'roll out' approach of traditional management is at fundamental odds with the sustainability emphasis on the need for contextual (environmental, social, political, cultural, economic) sensitivity. Snowden points to three core assumptions behind traditional decision making that are simply wrong for LSC challenges: order, rational choice and intentional capability.

This does not mean the papers are without operationalisable LSC pathways guidance as the very term 'transition management' suggests. Almost all the contributors propose some sort of stage development process. So it is not surprising that the contributors are strong advocates of an incremental evolutionary perspective. At first blush, this may seem at odds with the authors' desire to greatly speed up LSC in response to pressing issues such as climate change. However, deeper in the contributors' message is that they say 'evolution', but aim for an intensity that many would experience as 'revolution'.

In this LSC process the role of visioning the future remains a contentious issue. The most strident proponents of defining futures and then building them are associated with the Sante Fe Institute modelling tradition. This is reflected in the Moallemi *et al.* article on Iranian fuel cells. Rather than defining futures, Snowden emphasises the importance for LSC efforts of thinking in terms of propensities and dispositions. In one of her lessons in this issue, Holton cites Snowden (this issue): 'Sustainability and resilience are more likely to be achieved if we enable change rather than trying to determine what that change would be in advance'.

However, creating visions of the future—exploring potential future realities—is emphasised among many in this issue as a key ingredient in developing forward energy. Kuenkel refers to taking responsibility to consciously shape reality towards a sustainable future; Scharmer and Yukelson refer to activating the power of intention; Betit holds the vision of the Carris company owner as instrumental in realising transformation.

There might be agreement that the real issue is about how visioning and modelling are used: in a deterministic, goal setting way or in a way to generate conversations and action in a certain direction. Certainly the Moallemi *et al.* article offers an opportunity to greatly deepen understanding of dynamics and roles within a system that seems valuable input for action.

There is an emphasis on change through prototyping and experiments as core to the development process. This is where the 'incremental' change comes in. 'Successes' collectively lead to a new dominant meme, to mix TM and our thinking. However, the world is replete with prototypes and experiments, and a core question is how to move beyond them. How to scale transformation is a core question for TM. Betit uses the image of enlarging ripples from a pebble tossed into a pool as the impact of transformation of the company. Happily, scaling is the focus of Moore's paper as she distinguishes between three strategies: scaling up and out focuses on the legal environment; scaling out on numbers impacted; scaling deep is a hearts and minds (and memes) experience. In her description of development of the field of peacebuilding, Fitzduff very much reflects this scaling activity.

The geographic scales of Glasbergen and Schouten range from local to global. Although institutions play a prominent role in LSC, they recognise that institutions alone cannot achieve their transformative potential without a different source of change linking them. To find coherence across institutions, a broader sphere of change is needed and, at the same time, individuals within the system have the power to influence the transformative power of institutions.

The question of what are the key roles in LSC produces diverse answers from the contributions, as reflected in their diverse spheres of change foci. Individual leadership is particularly important in the view of several. Moore explores the roles necessary to realise LSC and identifies shielding, nurturing, and empowering. Similar to shielding, TM emphasises the importance of protecting front runners. The common concern is both for protecting emerging transformations from the incumbent memes and actors and for growing clarity about what possible alternatives are most powerful.

## Conclusion

LSC is a field of study and action that is characterised by its focus on transformational pathways towards a participative, flourishing future through inter- and trans-disciplinary approaches that value engagement with practitioners and those aspiring for such futures. Its emergence holds great promise for addressing critical issues. Advancing its development requires aggressiveness to cross the

many disciplinary, institutional and other boundaries and build the necessary scale of effort; however, humbleness is also required to recognise that although we have substantial knowledge and methodologies for approaching LSC, we are still at early stages of their development.

To apply the question of how to scale to the field of LSC, the contributors and editors reflect it happening at the three levels identified by Moore (this issue): broadening by increasing the numbers of people and organisations identified with it; going up and out with a more receptive environment arising with failures of traditional management approaches; and deepening of knowledge and methods for supporting LSC. We hope that you, the reader, will find this Special Issue makes a valuable contribution in this direction.

## References

Beer, M., & Walton, A. E. (1987). Organization change and development. *Annual review of psychology, 38*(1), 339-367.

Biermann, F., Abbott, K., Andresen, S., Bäckstrand, K., Bernstein, S., Betsill, M. M., … Zondervan, R. (2012). Navigating the anthropocene: Improving earth system governance. *Science, 335*(6074), 1306-1307. doi: 10.1126/science.1217255.

Blackmore, S. (2000). *The meme machine.* Oxford, UK: Oxford University Press

Buchanan, D. A. (2011). Reflections: good practice, not rocket science–understanding failures to change after extreme events. *Journal of Change Management, 11*(3), 273-288.

Burnes, B. (2009). Reflections: Ethics and organizational change–Time for a return to Lewinian values. *Journal of Change Management, 9*(4), 359-381.

By, R. T., Burnes, B., & Oswick, C. (2012). Change management: Leadership, values and ethics. *Journal of Change Management, 12,* 1–5.

Churchman, C. West. (1967). Guest editorial: Wicked problems. *Management Science, 14*(4), B141-B142.

Cooperrider, David L., & Whitney, Diana. (2005). *Appreciative inquiry: A positive revolution in change.* San Francisco, CA, USA: Berrett-Koehler.

Cornell S. and Parker J. Critical realist interdisciplinarity: a research agenda to support action on global warming. In: Bhaskar R. et al. (eds) *Interdisciplinarity and Climate Change.* Routledge. pp. 25-34.

Crutzen, Paul J. (2006). The 'anthropocene' *Earth system science in the anthropocene* (pp. 13-18): Springer.

Darwin, Charles, & Bynum, William F. (2009). *The origin of species by means of natural selection: Or, the preservation of favored races in the struggle for life*: AL Burt.

Dawkins R. (1976, 3rd edition 2006) *The Selfish Gene,* Oxford University Press.

Della Porta, Donatella, Kriesi, Hanspeter, & Rucht, Dieter. (2009). *Social movements in a globalizing world (second expanded edition)*: Palgrave Macmillan.

Diamond, J. (2005). *Collapse: How societies choose to fail or succeed*, Penguin.

Ehrenfeld, John R. (2005). The roots of sustainability. *MIT Sloan Management Review, 46*(2), 23-25.

Gersick, Connie. (1991). Revolutionary change theories: A multilevel exploration of the punctuated equilibrium paradigm. *Academy of Management Review,* 16, 10-36.

Gladwell, Malcolm. (2002). *The tipping point: How little things can make a big difference.* Boston, MA, USA: Little, Brown and Company.

Gunderson L. and Holling C.S. (2001) *Panarchy: Understanding Transformations in Systems of Humans and Nature,* Island Press.

Hassan, Zaid. (2014). *The social labs revolution: A new approach to solving our most complex challenges.* San Francisco, CA, USA: Berrett-Koehler.

Holling, C. S., Gunderson, L., & Ludwig, D. (2002). In quest of a theory of adaptive change. In L. H. Gunderson & C. S. Holling (Eds.), *Panarchy: Understanding transformations in human and natural systems*. Washington, DC: Island Press.

ICS. (2013). Http://www.Stratigraphy.Org/ Retrieved Oct. 28, 2013, from http:// www.stratigraphy.org

Isaacs, William. (1999). *Dialogue and the art of thinking together*. New York, NY: Currency Doubleday.

Kahane, Adam. (2010). *Power and Love: A theory and practice of social change*. San Francisco, CA, USA: Berrett-Koehler.

Kahane, Adam. (2013). Love and power: When are they generative, instead of destructive? *Yes! magazine, Summer*, http://www .yesmagazine.org/issues/love-and-the-apocalypse/a-critical-balance.

Kauffman, S. (1995). *At Home in the Universe: The Search for the Laws of Self-Organization and Complexity*. NY: Oxford University Press.

Klein, Naomi (2014). *This changes everything: Capitalism vs. the climate*. San Francisco: Berrett-Koehler.

Kuhn, Thomas. (1962). *The structure of scientific revolutions*. Chicago, IL: The University of Chicago Press.

Lawrence, P.R., and Lorsch, J.W. (1969). *Developing organizations: Diagnosis and action*. Reading, MA: Addison-Wesley.

Lederach, John Paul. (2005). *The moral imagination: The art and soul of building peace*. New York, NY, USA: Oxford University Press.

Malia, Martin. (2008). *History's locomotives: Revolutions and the making of the modern world*. New Haven, CT, USA: Yale University Press.

Malthus, T. R. (2013). *An essay on the principle of population*, Cosimo, Inc.

Nicolis, Grégoire, and Ilya Prigogine (1989). *Exploring Complexity: An Introduction*. New York: W.H. Freeman.

Prigogine, I. and Stengers, I. (1984). *Order Out of Chaos: Man's New Dialogue with Nature*. Boulder, CO: New Science Library.

Raelin, Joseph. (2003). *Creating leaderful organizations: How to bring out leadership in everyone*. San Francisco, CA, USA: Berrett-Koehler.

Rittel, Horst W. J., & Webber, Melvin M. (1973). Dilemmas in a general theory of planning. *Policy sciences*, 4(2), 155-169.

Sabel, Charles F, & Zeitlin, Jonathan. (2012). Experimentalist governance.

Saunders, Harold H. (2003). Sustained dialogue in managing intractable conflict. *Negotiation Journal*, 19(1), 85-95.

Scharmer, C Otto. (2009). *Theory u: Learning from the future as it emerges*: Berrett-Koehler Publishers.

Stacey, R.D. (1991). *The Chaos Frontier: Creative Strategic Control for Business*. Oxford: Butterworth-Heinemann.

Steffen, Will, Crutzen, Paul J., & McNeill, John R. (2007). The anthropocene: Are humans now overwhelming the great forces of nature. *Ambio: A Journal of the Human Environment, 36*(8), 614-621.

Susskind, Lawrence E., McKearnen, Sarah, & Thomas-Lamar, Jennifer. (1999). *The consensus building handbook: A comprehensive guide to reaching agreement*: Sage.

Tilly, Charles. (2005). *Social movements, 1768 - 2004*: Paradigm Publishers.

Victoria & Albert Museum. (2014). *Disobedient objects*. London: V&A Publishing.

Waddell, S. (2011). *Global action networks: Creating our future together*. Bocconi University of Management. Hampshire, UK: Palgrave-Macmillan.

Waddell, Steve. (2014). Addressing the world's critical issues as complex change challenges: The state-of-the-field. http:// goldenforsustainability.com/what-golden-does/eco-system-industry-lab/: World Bank and GOLDEN Ecosystems Labs.

Waddell, Steve, McLachlan, Milla, Meszoely, Greta, & Waddock, Sandra. (Forthcoming). Large scale change action research. In H. Bradbury (Ed.), *Action research handbook*: Sage.

Waddock, S. (2015). Reflections: Intellectual Shamans, Sensemaking, and Memes in Large System Change. *Journal of Change Management*, http://www.tandfonline. com/doi/full/10.1080/14697017.2015.1 031954#.VWiD-kbwDfc.

Weick, K. E., & Quinn, R. E. (1999). Organizational change and development. *Annual review of psychology*, 50(1), 361-386.

Weick, Karl E, Sutcliffe, Kathleen M, & Obstfeld, David. (2005). Organizing and the process of sensemaking. *Organization science, 16*(4), 409-421.

Werkman, Renate. (2010). Reinventing organization development: How a sensemaking perspective can enrich OD theories and interventions. *Journal of Change Management, 10*(4), 421-438.

Westley, Frances, Goebey, Sean, & Robinson, Kirsten. (2012). *Change lab/design lab for social innovation* (Vol. January). Waterloo Ontario, Canada: Waterloo Institute of Social Innovation and Resilience.

Wilber, Ken. (2000). *A theory of everything: An integral vision for business, politics, science and spirituality.* Boston, MA, USA: Shambhala Publications.

Zadek, Simon, & Radovich, Sasha. (2006). Governing collaborative governance: Enhancing development outcomes by improving partnership governance and accountability. Cambridge, MA, USA: Corporate Social Responsibility Initiative - Harvard University.

**Steve Waddell** is Principal of NetworkingAction. Responding to the 21st century's enormous global challenges and realising its unsurpassed opportunities require new ways of acting and organising. For 30 years Steve has been supporting this with organisational, network, and societal change and development. He does this through NetworkingAction with collaborative consultations, education, research, and personal leadership. For the last 10 years he's focused largely on multi-stakeholder global change networks (Global Action Networks) as a large systems change strategy. Currently he is deeply engaged with development of the Potsdam Initiative as a network of LSC stakeholders.

✉ 14 Upton St., Boston, MA 02118, USA

🖥 swaddell@networkingaction.net

**Sandra Waddock** is the Galligan Chair of Strategy, Carroll School Scholar of Corporate Responsibility, and Professor of Management at Boston College's Carroll School of Management. Author of more than 100 papers, she has published 11 books, the latest of which is *Intellectual Shamans* (Cambridge, 2015). Her current research interests are large system change, intellectual shamans, wisdom, and memes.

✉ Carroll School of Management, Boston College, Chestnut Hill, MA 02467

🖥 waddock@bc.edu

**Sarah Cornell** is an environmental scientist at the Stockholm Resilience Centre, Stockholm University. Her research is on global environmental change, and the place of people in driving change, and understanding and responding to it. In this transdisciplinary area, she works with climate modellers, resource economists, policy analysts, ecologists—and with regular people in businesses and her local community, helping to build the knowledge, dialogues and action that are needed for sustainability.

✉ Stockholm University, 10691 Stockholm

🖥 sarah.cornell@su.se

Dr. **Domenico Dentoni** is Assistant Professor in Agribusiness Management and Strategy at Wageningen University (Netherlands), and Principal Investigator at the Global Center for Food Systems Innovation, funded by US Agency for International Development. With support from the Governments of Ecuador, Malaysia, Poland, Australia and US, he leads research projects on designing, managing, bridging and evaluating multi-stakeholder partnerships that stimulate systems innovation in agribusiness. He was awarded with Best PhD thesis award in Agricultural Economics in 2009 at Michigan State University. His publications are available on his blog: <http://domenicodentoni.blogspot.nl/p/publications_3.html> and at Google Scholar: <https://scholar.google.it/citations?user=QLjjVw8AAAAJ&hl=en>.

domenico.dentoni@wur.nl

**Milla McLachlan** is an independent consultant on food systems change, and part-time Professor in Human Nutrition at Stellenbosch University. Milla is the Co-founder of the Southern Africa Food Lab, a multi-stakeholder initiative to facilitate transformation towards social and environmental sustainability in the regional food system. Previously, she served as Nutrition Advisor at the World Bank in Washington, DC, and as senior policy analyst at the Development Bank of Southern Africa. She holds a PhD and MA from Michigan State University, has published several peer-reviewed journal articles, book chapters and review papers, and co-edited *Combating Malnutrition: Time to Act*, a World Bank publication on the need for innovation in nutrition change strategies.

5411 SE 66th Ave, Portland, OR, 97206 USA

millam@sun.ac.za

**Greta Meszoely**, Ph.D. is Founder and Executive Director of the Center for Business Complexity and Global Leadership. Working in business and academia, Greta leverages her expertise in complex systems and governance to enable sustainable large system change, innovation, and develop fundamental management competencies to support effective governance. For two decades she has leveraged her research to support economic development, integrated resources management, and human rights in the US, Africa and the Middle East. Greta continues to advise corporations in the US and Europe to achieve sustainable change. Dr Meszoely holds a PhD in Law and Public Policy, an MA in International Relations and Comparative Politics, and a BS in International Business from Northeastern University.

80 Chandler St, Boston MA 02116

greta@businesscomplexity.com