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From policy coherence to 21st century convergence: a whole-of-society paradigm of human and economic development

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The 20th century saw accelerated human and economic development, with increased convergence in income, wealth, and living standards around the world. For a large part, owing to the well-entrenched Western-centric linear and siloed industrialization pattern, this positive transformation has also been associated with complex societal challenges at the nexus of agricultural, industrial, and health sectors. Efforts at cross-sectoral policy coherence have been deployed with limited success. To go beyond what has been possible thus far, the whole-of-society (WoS) paradigm for human and economic development proposes a 21st century convergence where, instead of the rest (of the world) converging with the West, sectoral and cross-sectoral efforts converge in their single and collective policy and action on a common target of human and economic development. In this paper, we first review and discuss contributions and limitations of policy coherence approaches. We then elaborate the institutional foundation of the WoS paradigm, taking as an anchor the well-established model of polycentric governance that views individuals, and state, market, and community, forming society as part of the same complex adaptive system. Actors within such systems self-organize into nested hierarchies that operate at multiple scales and move toward 21st century convergence of human and economic development.

Keywords: whole-of-society; human development; economic development; markets

Introduction

The 20th century saw accelerated human and economic development around the world, with globalization spreading the well-entrenched Western-centric linear and siloed industrialization pattern.^{1,2} As a result, income, wealth, and living standards of the rest of the world have converged with the West.^{3,4} Maternal and childhood malnutrition and mortality decreased importantly,⁵ while life expectancy and well-being increased.⁶ Global poverty decreased by 50% since 1990, while efforts deployed for the most vulnerable populations have been somewhat less successful.⁷ However, Western-centric industrialization has also given rise to cumulative, adverse, delayed consequences for human development, in-

cluding epidemics of diet- and lifestyle-related diseases and burgeoning healthcare costs.^{8–10} These now threaten the financial viability of individuals, businesses, and states.^{6,11,12}

In an effort to continue reaping the many benefits of industrialization without its present toll on diet and health, efforts at cross-sectoral policy coherence have been deployed at state, country, international, and global levels with some success.^{13–17} To go beyond what has been possible thus far, we have advanced a solution-oriented whole-of-society (WoS) paradigm to human and economic development to go beyond policy coherence and give a different meaning to convergence for the 21st century.¹ That is, instead of the rest of the world converging with the West,⁴ sectoral and cross-sectoral efforts

around the world in the coming decades are to converge in their single and collective policies and actions on a common target of human and economic development.

In this paper, we first discuss what motivates the need for 21st century convergence. We then review and discuss contributions and limitations of policy coherence approaches. While falling short of achieving the targeted multilevel and cross-sectoral impact, policy coherence efforts have moved the yardstick for the amount of effort invested by economic actors and sectors in addressing poverty, nutrition, health, and other human development challenges. We then elaborate the institutional foundation of the WoS paradigm, taking as an anchor the well-established model of polycentric governance¹⁸ that views individuals, as well as state, market, and community, forming society as part of the same complex adaptive systems, with policy and action to be undertaken at multiple scales in moving toward 21st century convergence of human and economic development. Polycentric systems are self-organizing into loosely coupled nested hierarchies, where single and collective efforts to maintain or transform the status quo determine single and system-level outcomes.

Context: why do we need 21st century convergence?

The context of low-middle income countries and emerging economies appears the most immediately relevant to addressing the relevance of 21st century convergence. Consider countries like Mexico, China, and India, where increases in diseases of affluence follow economic growth at accelerated pace.^{8,13} At the same time, in the same countries a glass ceiling is soon reached in the capacities to alleviate poverty, to improve health, and to ensure access to health care in the most vulnerable populations.^{5,19} In India, for instance, while many of its 600 million smallholder farmers are successfully integrating modern market and society,^{20,21} many others, in particular women, are stuck in traditional ways, barely sustaining themselves through subsistence agriculture.²² This happens at the same time as the country is experiencing significant economic growth and has become the “diabetes capital of the world,”²³ with high prevalence of the disease even in urban slums around the country.^{24,25}

These complex societal problems have been linked to an artificial divide between pathways of

poverty alleviation and wealth creation that progressively emerged from linear and siloed features of Western-centric development.^{9,17} This divide manifests itself in a disconnect between, on the one hand, a still predominantly human development approach to support small holder rural farming and livelihood through social welfare and community mobilization to reach subsistence and traditional societies,^{26,27} and, on the other hand, a primarily economic focus driving farming and nonfarming activities in value chains and markets as industrialized urban societies develop.^{21,28}

As a linear structural transformation occurs with economic development,²⁹ low-income agrarian structures and rural economies give way to more developed industry-based economies as soon as conditions permit. As the share of agriculture in economic output falls, there is a rise in the share of urban population compared to rural population, and a rise in diversity and specialization of economic activity in industry, be it manufacturing, service, or knowledge.^{21,30,31} Modes of agricultural production and labor force are being restructured accordingly, raising the appeal of nonfarm work and urban migration.^{32–34} Through this development process, agriculture is viewed as providing a supporting role to industrialization; the latter considered the most essential aspect of growth and development.²⁹ This soon translates into excessive rural migration, village devitalization, and growth of urban slums.^{21,35}

Meanwhile, over the same time course and in parallel to agriculture and industrialization, a two-pronged strategy is typically deployed in health system design, capacity building, and delivery.^{14,36,37} The first strategy focuses on community and primary care for providing basic healthcare necessities, reducing infectious diseases and early mortality, with an emphasis on the most vulnerable segments of the population. The second strategy is being deployed in tertiary and higher level care that caters to domestic and international demand for cutting-edge technologies for adding impact, speed, and convenience to bio- and pharmacomedical diagnostic or treatment of modern pathologies.³⁸ Between these two poles of capacity building there is an almost complete void of effort by health systems to serve as catalyst and steward for multisectoral engagement in patterns of agricultural, industrial, and economic development that would leapfrog diseases of affluence, in the first place, while scaling

up the ability to address ailments of scarcity and enabling populations to reap the many benefits of such development.¹

A comprehensive redress of these complex societal problems that goes beyond what has been possible thus far may require bridging or leapfrogging the divides above, transforming the well-entrenched linear and siloed approach to human and economic development. In this approach, fragmentation and lack of long-term foresight for unanticipated consequences still characterize many policies, programs, and investments, both within and across human and economic development and in both rural and urban settings.^{3,6} Policy coherence efforts reviewed below, while falling short of achieving the scale of cross-sectoral policy and action needed, have increased the efforts of economic actors and sectors in addressing poverty, nutrition, health, and other human development challenges. Moving toward a full integrative and inclusive approach that bridges human and economic development in novel ways is more imperative than ever, as the time scale for traditional societies of small holder farmers to become interdependent with state, national, and transnational agricultural, industrial, and health systems has been reduced from century to decades.⁸

The 21st century convergence proposed in this article through the WoS paradigm departs from present efforts at policy coherence where each side operates alone, with an after the fact check that economic policy and decision are “doing no harm,” or contribute limited resources to nutrition, health and other facets of human development.^{15,39,40} The WoS paradigm is the outcome of more than a decade of collaborative work in industrialized countries and emerging economies by an international network of scientists and action partners and introduced to mainstream academia in a special feature of the *Proceedings of the National Academy of Sciences*.^a The WoS paradigm views individual, community, market, and state organizations as part of the same complex dynamic adaptive system, targeting convergent outcomes (human and economic) in both individual and collective decision making in order to better balance tradition with modernity, farm with non-farm activity, natural with industrial value creation, as well as rural and urban development.

Moving toward a pattern of development for 21st century convergence necessitates revisiting many of the behaviors, practices, and institutional arrangements that have prevailed from the beginning of the industrial revolution. To be successful, such behavioral changes and ecosystem transformation require the continued creation of a common ground that enables distinct and independent actors (e.g., individuals, community, business, and government), from diverse backgrounds and expertise, to come together and develop a shared understanding of the strategic value to be created for themselves and throughout society by targeting convergent outcomes, instead of, or in addition to, siloed outcomes.^{41,42} From an institutional theory lens,^{43–45} such pluralism calls for governance mechanisms that *loosely couple* multiple stakeholders with goals, values, and patterns of action that are different,⁴⁶ sometimes competing with each other⁴⁷ yet remain responsive to each other in some fashion. Challenges arise as to finding appropriate configuration of incentives and control and coordination mechanisms for these actors to singly and collectively create convergence of human and economic development.

Policy coherence

As an institutional innovation, policy coherence has gained popularity in the common parlance of government around the world,^{48–51} and in advocacy for scaling up solutions for health, nutrition, and economic development.^{52–54} In theory, policy coherence entails consistency, comprehensiveness, and harmonious-compatible outcomes across domains and sectors, in a manner that does not compromise the integrity of policymakers’ goals.^{55,56} Shades and labels of policy coherence are diverse; they include coherent policy making, policy coordination, policy integration, holistic government, and whole-of-government (WoG) policymaking.^{55,56} Coherence between various components of a policy system occurs at different levels.^{51,56,57} *Horizontal* coherence ensures that sectoral policies build on each other and minimize inconsistencies in the case of conflicting goals, be they perceived or real conflicts;^{58,59} *vertical* coherence ensures the same approach across spatial and jurisdictional levels of governments;^{60,61} *temporal* coherence ensures that current policies continue to be effective even in their future deployment.⁵⁴ Additionally, *organizational* coherence calls for coordination between

^a<http://www.pnas.org/content/109/31/12294.full>

organizations involved in policy deployment; *institutional* coherence, on the other hand, demands synergy and the minimization of conflicts among the various formal and informal rules adopted by the various organizations. However, as we will see from two well-known ongoing efforts at policy coherence (reviewed below), much of these different operational forms of policy coherence are (largely) metaphorical, with their full potential yet to be harnessed.

Health in all policies

Health in all policies (HIAP) efforts at policy coherence aim to make nonhealth sectors, be they with a social (education, social support) or economic (agriculture, transportation, and trade) mission, aware of the health impact that their policymaking and strategy have on health outcomes, capacities to stay healthy and for health system organization, regulation, and financing.³⁹ HIAP is the latest in a series of calls, beginning in 1977, made by World Health Organization (WHO) for intersectoral action as part of its primary health care approach through its Health for All strategy in the Alma Ata declaration.⁶² Intersectoral action was reiterated later in the Ottawa Charter for Health Promotion,⁶³ and, more recently, in the political declaration of the UN high-level meeting on the prevention and control of noncommunicable diseases. All policy approaches, including healthy public policy, HIAP, and trade and health coherence, stressed the importance that policies, actions, and interventions outside the direct purview of the health sector have on health and health care.^{15,64} On the economic side, a pioneering success was achieved in the 1980s in Finland's North Karelia project, with broader community health and disease prevention programs and measures.⁴⁰ In this initiative, national policy in areas such as agriculture and commerce were used to prevent and control adverse health care consequences. For example, agricultural subsidies for products with a high-fat content, such as milk, were decreased, while subsidies were increased for domestic berry and vegetable products. However, instances of true policy coherence with agrifood and other diet and lifestyle related sectors, such as those deployed in the North Karelia project, have failed to become mainstream. HIAP remains primarily anchored in a "do no harm" philosophy, with its main tools being health impact assessments,

policy briefings, policy committees, health reports, policy dialogues, and case studies.⁶⁵

WoG policy and programs

Going one step deeper in policy coherence is the WoG approach to human development (also referred to as *joined-up* or *horizontal government*). Fighting against traditional departmentalism and vertical silos, the intent is to explore concrete ways to reduce fragmentation and increase integration, coordination and capacity to work pragmatically and smartly across boundaries—organizational, sectoral, and jurisdictional.⁵⁸ Many WoG policies are articulated around a human issue, be it mother and child health, food security, or NCD prevention. Overall governmental plans and strategy are specified in terms of sectoral and intersectoral goals, ways to achieve the goals through policy instruments, and organizations involved in achieving the desired integration. WoG policy coherence further specifies different strategies in working together,^{66,67} ranging from *networking* (informal relationships where information is exchanged for mutual benefit), to *cooperation* (informal relationship without a common mission where information is shared on an as needed basis; authority remains with each organization, there is little risk, and resources and rewards are kept separate), *coordination* (more formal relationship and compatible missions that require some common planning and more formal communication channels, with risk entering the equation), and *collaboration* (pooling and jointly acquiring resources, sharing rewards; but also increased risk, promoting mutual benefits, and common purpose). Policy coherence processes in WoG include national action plans with overarching and sectoral targets, indicators and timetables; cabinet and ministerial processes; interdepartmental taskforces; integrated service delivery; and lead agency approaches. In spite of the significant development in WoG targeting diverse domains of human development, challenges remain, as the transaction costs of cutting against the grain for coherence across sectors are significant,⁶⁸ with relatively few incentives in place for competing with more status quo, siloed priorities, aiming instead for shared results and accountability.^{15,64,69}

Discussion

In summary, policy coherence is an institutional innovation that has begun engaging economic actors

in scaling up solutions to complex human problems. Yet, approaches applied for policy coherence have remained primarily top-down and state-centric, without fully harnessing resources and capabilities throughout society.⁷⁰ In addition, their deployment remains primarily characterized by a search for silver bullet solutions and panaceas,^{71–73} while the complex and dynamic nature of the targeted challenges calls for policies and institutions attuned to the diverse and changing requirements of the activities and sectors they are supposed to influence.¹⁸

Specific limitations of policy coherence are four-fold. First, the quest for coherence is unidirectional: actors involved in health and other facets of human development ask economic actors to place health on their agenda, ensuring that no-harm is done and contributing their share to the collective human goals.⁶⁵ Queries for mutual benefits may, however, be necessary scaling up conditions. These could translate either into either asking for economic feasibility and sustainability to be front and center in the design and delivery of health care and other social supports or asking actors in human development to help place these issues as a driver of innovation and core operational strategies of economic actors. For instance, as health care costs are taking up more than 17% of the GDP in industrialized countries such as the United States,⁷⁴ HIAP, and to a large extent WoG approaches as well, still pay little attention to evidence, suggesting that one-third or more of medical care expenses are not buying improved health in many industrialized countries.⁷⁵ In addition, actors on both sides of the human and economic divide can partner in co-creating economically successful innovations that are sensitive to nutrition, health, and human development in general, while being accessible, affordable, and appealing for all, as pointed out by Dubé *et al.*⁷⁶ This is a core part of what 21st century convergence is about.

Second, a key bottleneck preventing policy coherence in reaching fuller impact is the deeply entrenched belief, by many human development professionals and organizations, that there is an intrinsic conflict of interests between human development and the primarily economic *raison d'être* of the economic sectors of agriculture, food, transportation, and trade.⁷⁷ Empirical cases of public-private or broader multistakeholder partnerships show that this does not have to be the case.^{77–79} Conflict of interest arises only when a secondary

vested interest prevents the achievement of the primary objective of a focal enterprise.⁸⁰

Third, beyond their limited ability for engaging market actors, policy coherence efforts have not fully harnessed the power of local communities, seeing them primarily as targets for intervention, not as key driver of impactful, agile, and sustainable solutions for convergent human and economic development. This is the case for both traditional communities opening to market and state, as well as local communities in industrialized societies around the world.^{56,81,82} Finally, much in line with general practice in public policy, policy coherence has not adequately addressed the role of individuals—including policymakers themselves—as core human agents in the system in need of transformation, beyond normative consideration of rationality underlying most public policies.^{31,83} Not only is change of individual and family behavior a step that cannot be avoided between intervention and impact in most domains of human and economic development,⁸⁴ but also individuals are themselves critical powerful actors in defining the level of coherence or convergence they manifest among their diverse roles in society, be it as workers, consumers, or citizens—or as recipients of economic aid or policymakers.⁸⁵

The WoS paradigm

Paradigms reflect shared social agreement about the nature of reality, and determine goals, structures, mindsets, general behaviors, practices, and institutional arrangements of the systems that shape this reality.⁸⁶ Paradigm shifts have two essential characteristics, “their achievement is sufficiently unprecedented to attract an enduring group of adherents away from status quo Simultaneously, it is sufficiently open ended to leave all sorts of problems for the redefined groups of practitioners to resolve.”^{86,87} As the first decade of the 21st Century has seen recurrent food, fuel, finance, and economic crises shrink resources that society can devote to both humanitarian and economic development, a tipping point may have been reached where the status quo is no longer acceptable and bold actions have started to be taken throughout society that reflect a significant shift away from the silos and structural divides between human and economic processes and outcomes that supported the 20th century convergence.^{1,6} Instead, the WoS paradigm goes beyond policy coherence to fully embrace a

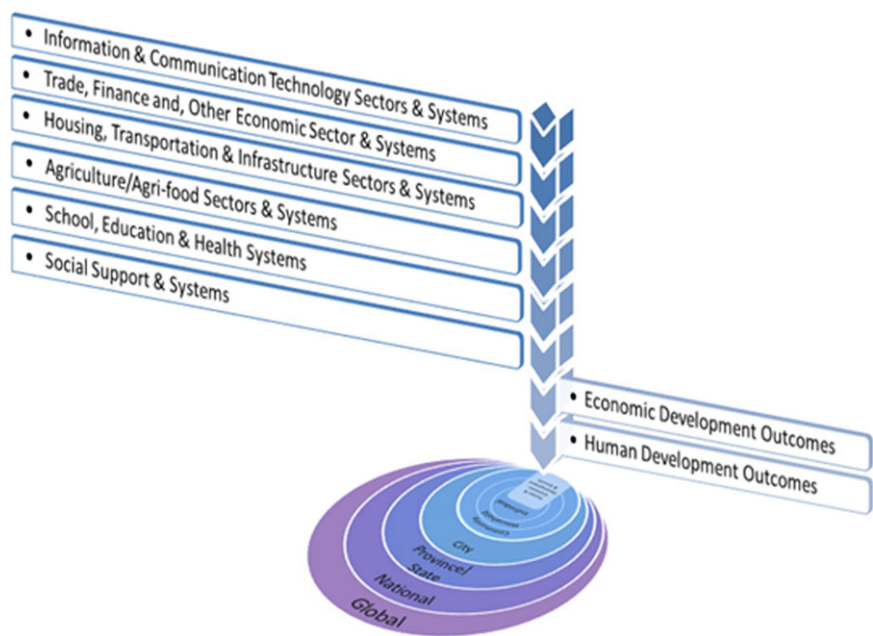


Figure 1. Whole-of-society paradigm for convergence of human and economic development.

multistakeholder and multilevel governance that places convergence of human and economic development at the core of goals, structures, and mind-sets, as well as general behavior, practices, and institutional arrangements within and across silos throughout society. The WoS paradigm views individuals and the plural organizations and institutions in different sectors that form state, market, and community as part of the same system in transformation through policy and action deployed on multiple scales (see Fig. 1).¹ If there remain problems to be resolved through this paradigm, and operational strategies to that end are yet to be specified, there are already many instances of policy and action that are better explained by the WoS paradigm than by its predecessor.

A core anchor of the WoS paradigm is the concept of polycentricity,^{18,88} which views the governance of policymaking as being organized in a form where part of what is the whole system at one level is a part of another system on a different scale, thereby forming nested hierarchies linked by externalities.^{89–91} The final system’s dynamic behavior at any scale is the product of the events taking place on all scales, and it reflects the ability to self-organize around nested hierarchies to adapt under complexity and unpredictability, that is, to learn, diversify,

and evolve, thus fostering experimentation and producing heterogeneity aims at sustainably governing the resources upon which all depends.⁹² In nested hierarchies, positive and/or negative actions are being taken on different scales, that is, different temporal, geographical, and political scales.⁹³ This creates tremendous institutional diversity, departing importantly from the present search for panaceas in addressing complex societal problems.^{71,72,93}

In the words of its originator, Vincent Ostrom,⁹⁴ a “polycentric system” is defined as one in which “many elements are capable of making mutual adjustments for ordering their relationships with one another within a general system of rules where each element acts with independence from other elements.” Whether they actually function independently, or instead constitute an interdependent system of relations, is an empirical question in particular cases. To the extent that they take each other into account in competitive relationships, enter into various contractual and cooperative undertakings, or have recourse to central mechanisms to resolve conflicts, the various political jurisdictions in a metropolitan area may function in a coherent manner with consistent and predictable patterns of interacting behavior. To the extent that this is so, they may be said to function as a *system*.⁹⁵

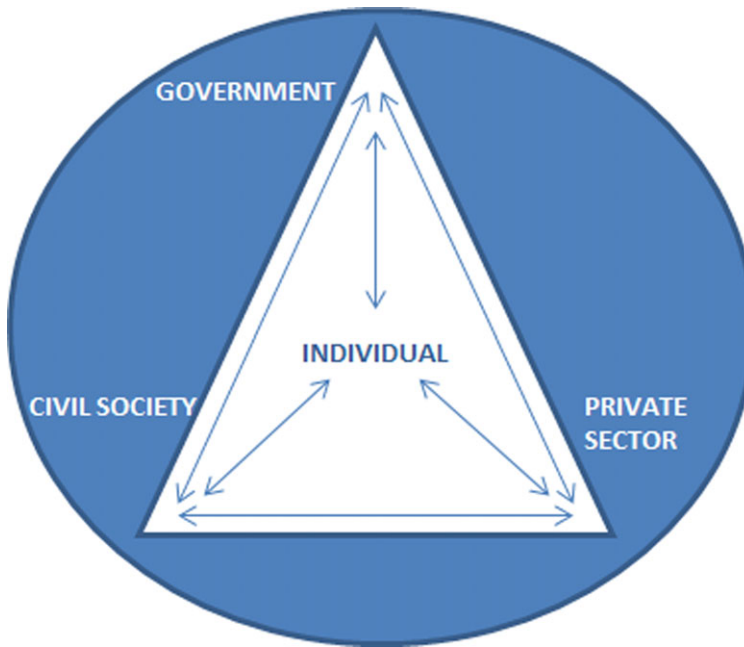


Figure 2. Whole-of-society paradigm core components.

In the next section, we sketch the basics of a framework for the conceptual development of the WoS paradigm.

Individual and society as part of the system: rethinking rationality

While the bulk of institutional literature focuses on the macro level structure of society, with organizations being the smallest level of institutional actors,⁸⁵ it is also well-recognized that institutions take their roots in microlevel human decision making and action, often times through internalized rules that are chronically reproduced by individuals through everyday action.⁹⁶ Research in the domains of environment and ecological resources protection that are anchored in a polycentric framework further suggests that the individual level is core among the multiple scales at which change occurs,⁹⁰ nested within families, firms, industries, nations, global agencies, and many other units—themselves part of still larger structures. The WoS paradigm views individual and society as part of a same polycentric system, shaping and being shaped by each other (see Fig. 2).

Departing from 20th century models of neo-classical rationality,⁹⁷ two aspects of human decision making and behavior are relevant to specify

individual–society linkages in the WoS paradigm, one that relates to *bounded rationality*, the other to *bounded selfishness*. Work initiated by Simon^{98,99} and Kahneman^{100,101} have found decision making of boundedly rational individuals as being based on biases, heuristics, biological drives, and emotions, with competing beliefs, motives, and goals that favor easy, simple, and appealing options if conflict arises, be these easy options or not in one's self-interests. Public services and marketing efforts deployed to promote green products and practices have started to successfully integrate some of this complexity and to carefully tailor interventions to diverse individual and contextual characteristics.^{102–104} Behavioral economics is also increasingly used to integrate bounded rationality into a rich diversity of nudge policies and choice architecture designs, with the aim of making the normative choice the simplest and most appealing, guiding individuals to act in their own, and in society's, best interest, while preserving freedom of choice.^{31,83,105,106}

Individual bounded selfishness,⁸⁸ in turn, points to human agents as being able to feel and show empathy,¹⁰⁷ and to craft and learn from norms and rules in collaboration with others.^{88,108} These challenge the notion of self-interest, competition, and free riding associated with neoclassic models of

rationality.⁹⁷ In fact, extensive research in natural socioecological systems by Ostrom and collaborators have shown that policies and other institutional arrangements are relatively more successful when based on the assumptions that individuals can learn how to devise well-tailored rules and cooperate conditionally when they design institutions affecting them.^{93,108,109} In these conditions, reciprocity, reputation, and trust can help to overcome the strong temptations of short-run self-interest.^{110–112} More recently, research on individual contribution to virtual communities has further spelled out how social practice and supporting institutions mediate the relationship between individual motivation and system outcome.¹¹³

Polycentric governance: from top–down to nested hierarchies

Society is presently organized around a bipolar structure of state and market institutions, which prevails in spite of significant rise in pluralism.^{43–45} In contrast, polycentric systems are structured around a tripod of state, market, and community.^{93,114} While many facets of human and economic development are designed, deployed, or delivered in and by local communities around the world, their full integration on the same footing as market and state into society's multilevel governance framework is yet to come.^{115–117}

Decades of work in environmental sustainability of socioecological systems by Ostrom^{18,93,118} and other leaders in the field^{119,120} have demonstrated the added value of formally linking local communities to market and states as core structuring institutions in society. Locals have accurate understandings of how the systems to be impacted operate and appropriate norms of behaviors. Local communities are also the point of convergence for various programs targeting individuals and families, increasing the probability of stakeholders involved in action being trustworthy. In addition, community level knowledge enables more specific tailoring to local needs and allows for a diversity of applications in different contexts, thus facilitating experimentation and adaptive learning.¹²¹ Finally, local communities often play front and center roles in helping the poorest segments of the population access basic necessities and work, acting as key intermediaries with higher level state and market actors. In both research and action in socioecological systems, local

community is taken as a central entry point, with emerging processes and outcomes being linked, on the one hand, down to household and individual level and, on the other, up to higher order actors in the ecosystem.^{116,122}

How does coordination occur within and between state, market, and community in polycentric governance? In the present bipolar institutional model, coordination mechanisms for state institutions lie in top–down hierarchical authority, while economic signals that align supply and demand (e.g., commodity prices and interest rates) play a similar coordinating role for market dynamics. Research at the level of local,^{26,123} professional,^{114,124} and virtual^{125,126} communities have found that, owing to the repeated and reciprocal nature of exchanges, pragmatic trust and reciprocity are the key coordinating mechanisms at play. How do these come together in polycentric governance? How do they combine where action occurs on different scales, and when all in the systems singly and jointly contribute to convergent outcomes? From a lifetime study of a large number of socioecological systems, Ostrom and collaborators^{18,71,73,88,118} observed that in highly functional polycentric systems, hierarchy must balance the welfare, freedoms, and responsibilities of the subsystems and total systems. There must be enough central control to achieve coordination toward the large systems goal, and enough autonomy to keep all subsystems flourishing, functioning, and self-organizing.

There is, however, an important difference between the typical state top–down hierarchical authority and nested hierarchical authority. Hierarchies in polycentric systems evolve from the lowest level up, as the systems learn and adapt, and the purpose of a nested hierarchies is always to help its originating lower level subsystems do their job better.⁹⁰ Thus the State plays a central role in creating a stable and enabling environment that supports actions throughout society. Developing empirical evidence about polycentric governance in health, Addy and collaborators¹²⁷ report the Quebec experience where provincial state partnered with the largest private family foundation in Canada to create common financial pool for promotion of healthy lifestyle and environment, with 75% of the funds being deployed through geographically dispersed local community organizations that articulate strategic plans according to local needs and possibilities. This form of

governance is embedded in normal, everyday forms of community activities.¹²⁸

Beyond its role as enabler, the State is also the institution that has the coercive capacity to impose order, prevent theft and fraud, and enforce contracts between private parties.⁹² For instance, for businesses of any size to achieve their primary economic goals while fully partaking in capacity building and human development throughout society, they need a level playing field—that is, a space where the right linkages can be made, a simple regulatory framework, and an effective public infrastructure that both makes it easy to start, operate, and close a business and to set the appropriate incentives and mechanisms for mainstreaming convergent outcomes in strategic decisions and investments.²¹

Beyond top-down state level authority, polycentric governance gives equal importance to rules and other institutional arrangements that shape, mediate, and channel individual and collective choice made at any scale at which state, market, and community actors choose to organize themselves.⁹³ Actors grouped in an action unit may create rules for determining who is a member of the unit, in order to, for example, allocate resources, resolve conflicts, or monitor and sanction rule breakers. Each nested system exercises considerable independence to make and enforce rules within a circumscribed domain of authority for a specified geographical area or specific goal. These smaller scale action units, once nested within several levels of general-purpose governments, make the system as a whole function. Challenges in collaboration across scale arise from differential abilities between scales—in organizational and managerial ability, coordination, and communication.¹²⁹ Over time, however, participants in successful polycentric systems can draw upon locally evolved norms of reciprocity and trustworthiness, as well as the likely presence of leaders at local levels who are also connected with leaders and organizations at higher levels.¹³⁰

How do market level actors relate to community and state organizations and institutions in polycentric governance? Hybrid forms of governance, regulation, and/or partnerships have emerged across the divides of markets, states, and communities, ranging from market-based incentives and monetary valuation of human outcomes, to diverse forms of cogovernance and partnership between two, or all, parties involved.¹²⁸ It is important, however,

to recognize the many demand-side factors driving and/or constraining such ecosystem transformation. For instance, the high transaction costs of participating in commercial value chains in emerging economies may restrain small-scale operators from successful integration, to the benefit of large-scale commercial operators. Insights in this regard come from recent work by agricultural economist Thomas Reardon,^{21,28} who reports on more balance between farm and nonfarm activities in rural and urban development; an emerging “quiet revolution” with the development of rural–urban food value chain and systems, and the progressive rise in rural areas of medium-scale enterprises in trucking, wholesale, warehousing, cold storage, first and second stage processing, restaurants, and food retail.

Other instances bear on social and commercial entrepreneurship,^{131,132} Base-of-pyramid ventures,^{133,134} and corporate shared-value creation programs,¹³⁵ which foster development in diverse sectors of economic activities to support communities, villages, and emerging small and mid-size towns to support local and regional activities. This more dynamic view of farm and nonfarm activities and rural–urban development reflects possibilities for novel forms of de-centralized urbanization. It addresses key human development problems while spreading the wealth to surrounding rural areas with smaller cities and towns that are more accessible markets than large cities, including more spin-off effects to surrounding rural areas for rural nonfarm employment generation, growing markets for local traditional food, and the possibility of industrialized value addition that remain closer to the farm.²⁸ In this context, convergence of human and economic development comes from both individual and collective action of a rich diversity of actors throughout society.

General discussion and conclusion

In this article we have set the foundations of the WoS paradigm for the convergence of human and economic development, building upon existing institutional innovations that have begun to permeate the existing silos and divides that have structured industrial society for centuries. We argue for a paradigm shift that engages actors throughout society to singly and jointly target human and economic development instead of looking at

individual outcomes alone, with only some afterthought for the other—as in the status quo. Among other things, this means making behavioral and structural changes in both the models of human and economic development for both individual and society. How to kick-start—or rather *accelerate*, as much is already underway—a multilayered transformation in 21st century institutions that engage and enable actors throughout society in a dynamic, adaptive, and effective process that makes convergence the mainstream *modus operandi*?

We propose polycentric governance as a way forward for revisiting 20th century institutions and institutional arrangements and to bridge efforts deployed throughout society in bringing convergence to the 21st century, be they reflected in the individual choices of diverse stakeholders or in their collective action. It will be important in furthering the development of the WoS paradigm to specify further the many types of individual choice and collective action that could lead to convergent outcomes, their underlying mechanisms, and the contexts in which they may or may not apply. For instance, collective action can take many shapes:¹²⁰ single-actor models that treat group behavior as given; models of the interdependent aggregation of individual choices into collective action; models of the collective decisions of individuals with different interests; and models of the dynamic interactions among collective actors and their opponents. The latter two entail multistakeholder partnerships, and the abundant literature on this topic could provide significant insights.^{77,78,136,137}

It is important, however, to consider the transactions costs associated with the bottom-up approach underlying the WoS paradigm, as well as the trade-offs involved in reducing the sectoral focus.¹²¹ We need to recognize the human capital and organizational skills required at the community level in order to be effective partners in the change process. The transaction costs involved in dealing with government and donor groups that are trying to implement projects can be very high and can create disincentives for the community to participate. In addition, complex societal problems that require a convergent approach, such as those tied to poverty alleviation, malnutrition, and chronic diseases, often require bridging cutting-edge techniques and disciplinary strength of a sectoral approach, with local diversity and contextualization. However, this may not be systematically the case; and thus it would

be important to differentiate between the conditions under which a convergence approach is appropriate versus those in which it is not.

The literature on institutional pluralism promises further insights in this regard.^{43–45} For instance, Evan *et al.* recently examined plural stakeholder involvement and institutional arrangements in explaining how pragmatic and successful initiatives in essential drugs, tuberculosis treatment, and urban health have maximized human outcomes given Bangladesh's limited economic resources.¹³⁸ These authors emphasize the critical importance of local engagement and inclusion of all stakeholders in action, regulation, and accountability framework, including formal and informal sectors. Questions arise, though, when giant NGOs orchestrate such pluralistic achievement by nonstate actors. Are they simply filling in the voids left by dysfunctional governments? Is that sustainable as government capacity increases? Is it desirable, given the nonaccountability of such NGOs and their dependency on high levels of donor support? Polycentric governance is not about the strong community substituting for weak market or states, or vice versa. It is about acknowledging the points of vulnerability and levers for changes in the system, as well as the different scales at which the creation of convergent outcomes are possible, and enabling the best configuration of individual and collective action to create sustainable and resilient outcomes.

The WoS paradigm may also scale up and accelerate the human and economic outcomes of goal frameworks such as the Millennium Development Goals, the Scaling Up Nutrition Movement, and others. In these, considerable autonomy is given to involved stakeholders to redefine objectives in light of learning, performance reports, and participation in peer reviews, in which results are compared with those pursuing other means to the same general ends.¹³⁹ However, these bottom-up and *ad hoc* characteristics are tied to multiple and persistent social, political, and economic challenges and constraints that limit their ability to promote systemic change.⁵⁶ Embedding these frameworks within a WoS paradigm for convergent outcomes may help improve system level transformation by better linkages with government, market, and community actors. It may also help scaling up the significance of private sector involvement in this undertaking, moving beyond their present corporate social responsibility mindset to actual

mainstream nutrition, health, and other aspects of human development as a core driver of innovation and business strategy.

Much remains to be operationally specified, however, on *how* such fundamental changes proposed in the WoS paradigm could be achieved, drawing upon empirical evidence. Particular reflection is needed on how conventional governance would be able to change/adapt, and how governments can change the way they work and how markets function. Similarly, to be considered are how opposition to change would be overcome, how representational democracy systems of government would need to adapt to accommodate such changes, and how market forces would actually be harnessed in ways that supply public versus private goods. Given the multiple levels where action is required for polycentricity, recent work on practices of cross-functional teams who integrate their knowledge to create a solution may be relevant for avoiding the felt inertia from the overwhelming nature of the task.¹⁴⁰ This works suggests that when confronted with seemingly irreconcilable differences, strategies that move away from examining and discussing these differences helped the team develop a collective orientation to the problem-solving effort.^{141,142} Such solution-oriented approaches are very much at the core of the WoS paradigm.

We hope that this paper will help foster viewing the convergence of health and economics not as wishful thinking but as a realistic, viable option.

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Conflicts of interest

The authors declare no conflicts of interest.

References

- Dubé, L., P. Pingali & P. Webb. 2012. Paths of convergence for agriculture, health, and wealth. *Proc. Natl. Acad. Sci.* **109**: 12294–12301.
- Bussolo, M., R.E. De Hoyos & D. Medvedev. 2008. *Is The Developing World Catching Up?* Global Convergence and National Rising Dispersion. Washington, DC.: World Bank.
- Acemoglu, D. & J. Robinson. 2012. *Why Nations Fail: the Origins of Power, Prosperity, and Poverty*. New York, NY: Crown Business.
- Ferguson, N. 2011. *Civilization: the West and the Rest*. London: Allen Lane-Penguin Books.
- Black, R.E. *et al.* 2013. Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet* **382**: 427–451.
- Deaton, A. 2013. *The Great Escape: Health, Wealth, and the Origins of Inequality*. NJ: Princeton University Press Princeton.
- World Bank. 2012. Food prices, nutrition, and the millennium goals. Global monitoring report. Washington DC: World Bank.
- Swinburn, B.A. *et al.* 2011. The global obesity pandemic: shaped by global drivers and local environments. *Lancet* **378**: 804–814.
- Moodie, R. *et al.* 2013. Profits and pandemics: prevention of harmful effects of tobacco, alcohol, and ultra-processed food and drink industries. *Lancet* **381**: 670–679.
- Thomas, B. & L.O. Gostin. 2013. Tackling the global NCD crisis: innovations in law and governance. *J. Law Med. Ethics* **41**: 16–27.
- Cutler, D., K. Davis & K. Stremekis. 2010. The impact of health reform on health system spending. Issue Brief (Commonwealth Fund) **88**: 1–14.
- Cutler, D.M., A.B. Rosen & S. Vijan. 2006. The value of medical spending in the United States, 1960–2000. *N. Engl. J. Med.* **355**: 920–927.
- Beaglehole, R. *et al.* 2011. Priority actions for the non-communicable disease crisis. *Lancet* **377**: 1438–1447.
- Bloom, G., H. Standing & R. Lloyd. 2008. Markets, information asymmetry and health care: towards new social contracts. *Soc. Sci. Med.* **66**: 2076–2087.
- Blouin, C. 2007. Trade policy and health: Getting from conflicting interests to policy coherence. *WHO Bulletin* **85**: 169–173.
- de Haen, H., K. Stamoulis, P. Shetty & P. Pingali 2003. The world food economy in the 21st century: challenges for international co-operation. *Dev. Policy Rev.* **21**: 683–696.
- Gillespie, S. *et al.* 2013. The politics of reducing malnutrition: building commitment and accelerating progress. *Lancet* **382**: 552–569.
- Ostrom, E. 2010. Beyond markets and states: polycentric governance of complex economic systems. *Am. Econ. Rev.* **641**–672.
- Ruel, M. T. & H. Alderman. 2013. Nutrition-sensitive interventions and programmes: how can they help to accelerate progress in improving maternal and child nutrition? *Lancet* **382**: 536–551.
- Gomez, M.I. & K.D. Ricketts. 2013. Food value chain transformations in developing countries: selected hypotheses on nutritional implications. *Food Policy*. **42**: 139–150.
- Reardon, T., C.P. Timmer & B. Minten. 2012. Supermarket revolution in Asia and emerging development strategies to include small farmers. *Proc. Natl. Acad. Sci.* **109**: 12332–12337.
- Kadiyala, S., J. Harris, D. Headey, *et al.* 2014. Agriculture and nutrition in India: mapping evidence to pathways. *Ann. N.Y. Acad. Sci.* **1331**: 43–56.

23. Mohan, V. *et al.* 2012. Epidemiology of type 2 diabetes: Indian scenario. *Indian J. Med. Res.* **136**: 217–230.
24. Singh, R. *et al.* 2012. Study of risk factors of coronary heart disease in urban slums of Patna. *Nepal J. Epidemiol.* **2**: 205–212.
25. Ramachandran, A. *et al.* 2008. High prevalence of diabetes and cardiovascular risk factors associated with urbanization in India. *Diabetes Care.* **31**: 893–898.
26. Devaux, A. *et al.* 2009. Collective action for market chain innovation in the Andes. *Food Policy.* **34**: 31–38.
27. Sarada, D. & N. Rajani. 2012. Horticultural nutrition intervention through women's participation: an action research. *J. Hum. Ecol.* **38**: 71–80.
28. Reardon, T., K.Z. Chen, B. Minten, *et al.* 2014. The quiet revolution in Asia's rice value chains. *Ann. N.Y. Acad. Sci.* **1331**: 106–118.
29. Williamson, O. 1985. *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*. New York: Free Press.
30. Lock, K. *et al.* 2010. Health, agricultural, and economic effects of adoption of healthy diet recommendations. *Lancet* **376**: 1699–1709.
31. Dubé, L. 2010. *Introduction: on the Brain-to-Society Model of Motivated Choice and the Whole-of-Society Approach to Obesity Prevention*. Laurette Dubé, *et al.*, Eds.: xxiii–xxix. San Diego: Academic Press.
32. Dekle, R. & G. Vandenbroucke. 2012. A quantitative analysis of China's structural transformation. *J. Econ. Dyn. Control* **36**: 119–135.
33. Young, A. 2003. Gold into base metals: productivity growth in the People's Republic of China during the reform period. *J. Pol. Econ.* **111**: 1220–1261.
34. Zhang, L., J. Huang & S. Rozelle. 2002. Employment, emerging labor markets, and the role of education in rural China. *China Econ. Rev.* **13**: 313–328.
35. Ranis, G. & F. Stewart. 1993. Rural nonagricultural activities in development: theory and application. *J. Dev. Econ.* **40**: 75–101.
36. Bloom, G., H. Standing, H. Lucas, *et al.* 2011. Making health markets work better for poor people: the case of informal providers. *Health Policy Plan.* **26**: 145–152.
37. Theobald, S., M. Taegtmeier, S.B. Squire, *et al.* 2009. Towards building equitable health systems in Sub-Saharan Africa: lessons from case studies on operational research. *Health Res. Policy Syst.* **7**: 1–8.
38. Creswell, J. & V. Plano Clark. 2011. *Designing and Conducting Mixed Methods Research*. 2nd ed. Thousand Oaks, CA: Sage.
39. Kickbusch, I. & Gleicher, D. 2012. *Governance for Health in the 21st Century: a Study Conducted for the WHO Regional Office for Europe*. Copenhagen: WHO Regional Office for Europe.
40. Puska, P. & T. Stahl. 2010. Health in all policies—the Finnish initiative: background, principles, and current issues. *Ann. Rev. Public Health* **31**: 315–328.
41. Tushman, M.L. & C.A. O'Reilly III. 1997. *Winning Through Innovation: a Practical Guide to Leading Organization Change and Renewal*. Cambridge, Mass: Harvard Business School Press.
42. Barki, H. & A. Pinsonneault. 2005. A model of organizational integration, implementation effort, and performance. *Organ. Sci.* **16**: 165–179.
43. Robey, D. & M.-C. Boudreau. 1999. Accounting for the contradictory organizational consequences of information technology: theoretical directions and methodological implications. *Infor. Syst. Res.* **10**: 167–185.
44. Kraatz, M. S. & E.S. Block. 2008. *Organizational Implications of Institutional Pluralism*. Sahlin-Andersson, K., *et al.*, Eds.: 243–275. Mondon: Sage Publications.
45. Dunn, M. B. & C. Jones. 2010. Institutional logics and institutional pluralism: the contestation of care and science logics in medical education 1967–2005. *Adm. Sci. Q.* **55**: 114–149.
46. Orton, J. D. & K.E. Weick. 1990. Loosely coupled systems: a reconceptualization. *Acad. Manage. Rev.* **15**: 203–223.
47. Boxenbaum, E. & S. Jonsson. 2008. *Isomorphism, Diffusion and Decoupling*. Greenwood, R., *et al.*, Eds.: 78–98. London: Sage Publications.
48. Blackman, D. *et al.* 2010. Australian experiences with whole of government: constraints and paradoxes in practice. Presented at *IRSPM conference, University of Berne*, 7–9 April 2010.
49. Downe, J. & S. Martin. 2006. Joined up policy in practice? The coherence and impacts of the local government modernisation agenda. *Local Gov. Stud.* **32**: 465–488.
50. Jones, T. 2002. Policy coherence, global environmental governance, and poverty reduction. *Int. Environ. Agreements.* **2**: 389–401.
51. Organisation for Economic Co-operation and Development. 2006. Whole of government approaches to fragile states. Organisation for Economic Co-operation and Development. Paris.
52. European Union Commission. 2011. EU 2011 report on policy coherence for development. In Commission Staff Working Paper. SEC (2011) 1627. European Commission. Brussels.
53. Organisation for Economic Co-operation and Development. 2003. Policy Coherence: Vital for Global Development. In Policy Brief. Organisation for Economic Co-operation and Development. Paris.
54. Organisation for Economic Co-operation and Development. 2005. Governance of Innovation Systems, Volume 1: Synthesis Report. Organisation for Economic Co-operation and Development. Paris.
55. Challis, L., S. Fuller & M. Henwood. 1988. *Joint Approaches to Social Policy Rationality and Practice*. Cambridge: Cambridge University Press.
56. Stead, D. & H. Geerlings. 2004. Integrating transport, land use planning and environmental policy in Denmark, Germany and England: theory and practice. In *NECTAR Cluster 2 Meeting*. Geerlings, H., E. Verhoef & D. Stead, Eds.: 1–16. Athens: NECTAR.
57. Duraipapp, A.K. & A. Bhardwaj. 2007. Measuring policy coherence among the MEAs and MDGs. International Institute for Sustainable Development. www.iisd.org/sites/default/files/pdf/2007/measuring_policy.pdf.
58. Christensen, T. & P.L. Ågreid. 2007. The Whole-of-Government approach to public sector reform. *Public Admin. Rev.* **67**: 1059–1066.

59. Bakvis, H. & L. Juillet. 2004. *The Horizontal Challenge: Line Departments*. Central Agencies and Leadership, Ottawa: Canada School of Public Services.
60. Lafferty, W. & E. Hovden. 2003. Environmental policy integration: towards an analytical framework. *Environ. Pol.* **12**: 1–22.
61. Lafferty, W.M., A. Ruud & O. Larsen. 2005. *Environmental Policy Integration: How Will We See it When We Recognise It? The Case of Green Innovation Policy in Norway*. Paris: OECD.
62. WHO. 1978. Declaration of Alma-Ata: International Conference on Primary Health Care, Alma-Ata, USSR, 6–12 September 1978. Geneva: World Health Organization.
63. WHO. 1986. *The Ottawa Charter for Health Promotion: First International Conference on Health Promotion*. Ottawa: WHO.
64. Blouin, C., J. Heymann & N. Drager. 2007. *Trade and Health: Seeking Common Ground*. QC: McGill/Queens University Press.
65. Lindstrom, B. & M. Eriksson. 2009. The salutogenic approach to the making of HiAP/healthy public policy: illustrated by a case study. *Glob. Health Promotion*. **16**: 17–28.
66. Mattessich, P., M. Murray-Close & B. Monsey. 2001. *Collaboration: What Makes It Work*. 2nd ed. St. Paul, MN: Amherst H. Wilder Foundation.
67. Himmelman, A. 2001. *Collaboration for a Change: Definitions, Decision-Making Models, Roles, and Collaboration Process Guide*. Minneapolis, MN: Himmelman Consulting.
68. Halligan, J., F. Buick & J. O'Flynn. 2010. *Experiments with Joined-Up, Horizontal and Whole-of-Government in Anglo-phone Countries*. Massey, A., Ed.: Cheltenham, UK: Edward Elgar.
69. Jordan, G. & D. Halpin. 2006. The political costs of policy coherence: constructing a rural policy for Scotland. *J. Public Policy* **26**: 21–41.
70. Stubbs, P. 2003. International non-state actors and social development policy. *Glob. Soc. Policy* **3**: 319–348.
71. Ostrom, E. 2007. A diagnostic approach for going beyond panaceas. *Proc. Natl. Acad. Sci. U. S. A.* **104**: 15181–15187.
72. Ostrom, E. 2009. *Understanding Institutional Diversity*. Princeton: Princeton University Press.
73. Ostrom, E. 2009. A general framework for analyzing sustainability of social-ecological systems. *Science* **325**: 419–422.
74. WHO. 2011. *World Health Statistics 2011*. Geneva: World Health Organization.
75. Cutler, D.M. & M. McClellan. 2001. Is technological change in medicine worth it? *Health Affairs* **20**: 11–29.
76. Dubé, L. et al. 2014. Convergent innovation for sustainable economic growth and affordable universal healthcare: innovating the way we innovate. *Ann. N.Y. Acad. Sci.* **1331**: 119–141.
77. Dubé, L. 2014. Scaling up multistakeholder partnerships for non-communicable disease prevention and control: threading the needle between conflict and convergence of interest. Unpublished report to the Pan American Health Organization.
78. Buse, K. & S. Tanaka. 2011. Global public-private health partnerships: lessons learned from ten years of experience and evaluation. *Int. Dent. J.* **61**: 2–10.
79. Buse, K. & A. Waxman. 2001. Public's private health partnerships: a strategy for WHO. *Bull. World Health Organ.* **79**: 748–754.
80. Bekelman, J.E., Li, Y. & Gross, C.P. 2003. Scope and impact of financial conflict of interests in biomedical research: a systemic Review. *J. Am. Med. Assoc.* **289**: 454–465.
81. Haddad, L., A. Mejia Costa & J. Fanzo. 2012. *Accelerating Reductions in Undernutrition: What Can Nutrition Governance Tell Us?* Brighton, UK: IDS.
82. Mejia Costa, A. & J. Fanzo. 2012. Fighting Maternal and Child Malnutrition: analysing the political and institutional determinants of delivering a national multisectoral response in six countries. Brighton: Institute of Development Studies.
83. Thaler, R. 2012. Watching Behavior Before Writing the Rules. *In the New York Times*. New York.
84. Prochaska, J.O. & W.F. Velicer. 1997. The transtheoretical model of health behavior change. *Am. J. Health Promot.* **12**: 38–48.
85. Powell, W. & P. DiMaggio. 1991. *The New Institutionalism in Organizational Analysis*. Chicago, IL: University of Chicago Press.
86. Kuhn, T.S. 1996. *The Structure of Scientific Revolutions*. Chicago, IL: University Of Chicago Press.
87. Stobbs, N. 2011. The nature of juristic paradigms: exploring the theoretical and conceptual relationship between adversarialism and therapeutic jurisprudence. *Washington University Jurisprudence Review*. **4**: 97–149.
88. Ostrom, E. 1998. A behavioral approach to the rational choice theory of collective action: presidential address, American Political Science Association, 1997. *Am. Pol. Sci. Rev.* 1–22.
89. McPeak, J.G., D.R. Lee & C.B. Barrett. 2006. Introduction: the dynamics of coupled human and natural systems. *Environ. Dev. Econ.* **11**: 9–13.
90. Ostrom, E. 2012. Nested externalities and polycentric institutions: must we wait for global solutions to climate change before taking actions at other scales? *Econ. Theory* **49**: 353–369.
91. Serman, J.D. 2000. *Business dynamics: Systems thinking and modeling for a complex world*. Boston: McGraw-Hill/Irwin.
92. Agrawal, A. 2001. State formation in community spaces: the forest councils of Kumaon. *J. Asian Stud.* **60**: 1–32.
93. Ostrom, E. 2005. *Understanding Institutional Diversity*. Princeton, NJ: Princeton University Press.
94. Ostrom, V. 1999. *Polycentricity's Part 1*. Ann Arbor: University of Michigan Press.
95. Ostrom, V., C.M. Tiebout & R. Warren. 1961. The organization of government in metropolitan areas: a theoretical inquiry. *Am. Pol. Sci. Rev.* **55**: 831–842.
96. Bourdieu, P. 1977. *Outline of a Theory Practice*. New York, NY: Cambridge University Press.
97. Harsanyi, J.C. & R. Selten. 1988. *A General Theory of Equilibrium Selection in Games*. Cambridge, MA: MIT Press Books.
98. Simon, H.A. 1957. *Models of man; social and rational*. Oxford, England: Wiley.
99. Simon, H.A. 1991. Bounded rationality and organizational learning. *Organ. Sci.* **2**: 125–134.

100. Kahneman, D. 2003. Maps of bounded rationality: psychology for behavioral economics. *Am. Econ. Rev.* **93**: 1449–1475.
101. Kahneman, D. 2011. *Thinking, fast and slow*. New York: Macmillan.
102. Luchs, M.G. *et al.* 2010. The sustainability liability: potential negative effects of ethicality on product preference. *J. Market.* **74**: 18–31.
103. Lin, Y.-C. & C.-c.A. Chang. 2012. Double standard: the role of environmental consciousness in green product usage. *J. Market.* **76**: 125–134.
104. Griskevicius, V., J.M. Tybur & D.B. Van. 2010. Going green to be seen: status, reputation, and conspicuous conservation. *J. Pers. Soc. Psychol.* **98**: 392–404.
105. Benartzi, S. & R.H. Thaler. 2013. Behavioral economics and the retirement savings crisis. *Science* **339**: 1152–1153.
106. Carroll, G.D. *et al.* 2009. Optimal defaults and active decisions. *Q. J. Econ.* **124**: 1639–1674.
107. Blair, R.J.R. 2005. Responding to the emotions of others: dissociating forms of empathy through the study of typical and psychiatric populations. *Conscious. Cogn.* **14**: 698–718.
108. Ostrom, E. 2012. *The Future of the Commons: Beyond Market Failure and Government Regulation*. Westminster, London: The Institute of Economic Affairs.
109. Cox, J.C. *et al.* 2009. Trust in private and common property experiments. *South. Econ. J.* **75**: 957–975.
110. Cox, M., G. Arnold & T.S. Villamayor. 2009. *Design Principles are Not Blueprints, But Are They Robust? A Meta-Analysis of 112 Studies*. Working Paper. Cambridge, MA: Lincoln Institute of Land Policy.
111. Janssen, M.A. & E. Ostrom. 2008. TURFS in the lab: institutional innovation in real-time dynamic spatial commons. *Ration. Soc.* **20**: 371–397.
112. Ostrom, E. 2000. Collective action and the evolution of social norms. *J. Econ. Perspect.* **14**: 137–158.
113. von Krogh, G. *et al.* 2012. Carrots and RAINBOWS: motivation and social practice in open source software development. *MIS Q.* **36**: 649–676.
114. Adler, P.S., S.-W. Kwon & C. Heckscher. 2007. Perspective's professional work: the emergence of collaborative community. *Organ. Sci.* **19**: 359–376.
115. Ostrom, E. & H. Nagendra. 2006. Insights on linking forests, trees, and people from the air, on the ground, and in the laboratory. *Proc. Natl. Acad. Sci. U. S. A.* **103**: 19224–19231.
116. Rout, S. 2010. Collective action for sustainable forestry: institutional dynamics in community management of forest in Orissa. *Soc. Change* **40**: 479–502.
117. Trawick, P. 2001. Successfully governing the commons: principles of social organization in an Andean irrigation system. *Hum. Ecol.* **29**: 1–25.
118. Ostrom, E. 1990. *Governing the Commons: the Evolution of Institutions for Collective Action*. New York: Cambridge University Press.
119. Heckathorn, D.D. 1996. The dynamics and dilemmas of collective action. *Am. Sociol. Rev.* **61**: 250–277.
120. Oliver, P.E. 1993. Formal models of collective action. *Ann. Rev. Sociol.* **19**: 271–300.
121. Chhatre, A. & A. Agrawal. 2009. Trade-offs and synergies between carbon storage and livelihood benefits from forest commons. *Proc. Natl. Acad. Sci. U. S. A.* **106**: 17667–17670.
122. Futtema, C. *et al.* 2002. The emergence and outcomes of collective action: an institutional and ecosystem approach. *Ambiente Sociedade.* **10**: 107–127.
123. Stroink, M.L. & C.H. Nelson. 2013. Complexity and food hubs: five case studies from Northern Ontario. *Local Environment: Int. J. Justice & Sustainability* **18**: 620–635.
124. Adler, N. & K. Matthews. 1994. Health psychology: why do some people get sick and some stay well? *Ann. Rev. Psychol.* **45**: 229–259.
125. Kudaravalli, S. & S. Faraj. 2008. The structure of collaboration in electronic networks. *J. Assoc. Inform. Syst.* **9**: 706–726.
126. Wasko, M.M., R. Teigland & S. Faraj. 2009. The provision of online public goods: examining social structure in an electronic network of practice. *Decision Supp. Syst.* **47**: 254–265.
127. Addy, N.A. *et al.* 2014. Whole-of-society approach for public health policymaking: a case study of polycentric governance from Quebec, Canada. *Ann. N.Y. Acad. Sci.* **1331**: 216–229.
128. Lemos, M. & Agrawal, A. 2007. A greener revolution in making? Environmental governance in the 21st century. *Environ. Dev. Econ.* **49**: 36–45.
129. Nolte, C., A. Agrawal, K.M. Silvius & B.S. Soares-Filho. 2010. Governance regime and location influence avoided deforestation success of protected areas in the Brazilian Amazon. *Proc. Natl. Acad. Sci.* **110**: 4956–4961.
130. Ferraro, P.J.H., M.M. 2014. Quantifying causal mechanism to determine how protected areas affect poverty through change in ecosystem services and infrastructure. *Proc. Natl. Acad. Sci.* **111**: 4332–4337.
131. Dacin, M.T., P.A. Dacin & P. Tracey. 2011. Social entrepreneurship: a critique and future directions. *Organ. Sci.* **22**: 1203–1213.
132. Yunus, M., M. Bertrand & L. Lehmann-Ortega. 2010. Building social business models: lessons from the Grameen experience. *Long Range Plan.* **43**: 308–325.
133. Prahalad, C.K. & A. Hammond. 2002. Serving the world's poor, profitably. *Harv. Bus. Rev.* **80**: 48–57.
134. London, T., R. Anupindi & S. Sheth. 2010. Creating mutual value: lessons learned from ventures serving base of the pyramid producers. *J. Bus. Res.* **63**: 582–594.
135. Porter, M.E. & M.R. Kramer. 2011. Creating shared value. *Harv. Bus. Rev.* **89**: 62–77.
136. Buse, K. & A.M. Harmer. 2007. Seven habits of highly effective global public-private health partnerships: practice and potential. *Soc. Sci. Med.* **64**: 259–271.
137. Buse, K. & G. Walt. 2000. Global public-private partnerships: part I-a new development in health? *Bull. World Health Organ.* **78**: 549–561.
138. Evans, T.G. *et al.* 2013. Preventive vaccines for tuberculosis. *Vaccine* **31**(Suppl. 2): B223–B226.
139. Vanhercke, B. & S. Greer. 2010. The hard politics of soft law: the case of health. In *Health Systems Governance in Europe: the role of EU Law and Policy*. Mossialos, E., *et al.*, Eds.: 186–230. Cambridge: Cambridge University Press.

140. Faraj, S. & A. Yan. 2009. Boundary work in knowledge teams. *J. Appl. Psychol.* **94**: 604.
141. Tsoukas, H. 2009. A dialogical approach to the creation of new knowledge in organizations. *Organ. Sci.* **20**: 941–957.
142. Vegt, G.S.V.D. & J.S. Bunderson. 2005. Learning and performance in multidisciplinary teams: the importance of collective team identification. *Acad. Manag. J.* **48**: 532–547.