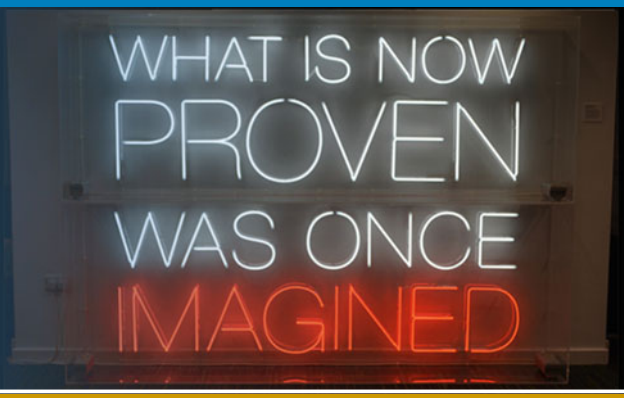
The Anthropocene: Politik–Economics–Society–Science



Maja Göpel

The Great Mindshift

How a New Economic Paradigm and Sustainability Transformations go Hand in Hand

With Forewords by Simon Dalby and Uwe Schneidewind

Wuppertal Institut

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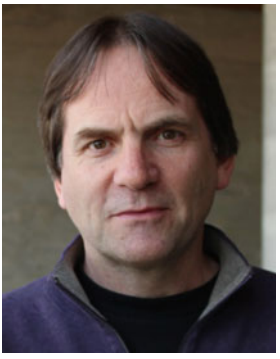
To Frankie Moore-Lappé,
beloved heroine and friend.
The more I understand,
the closer I move to your thinking

Foreword by Prof. Dr. Simon Dalby



In December 2015, the world watched as delegates to the Paris climate conference crafted an agreement to attempt, finally, a comprehensive effort to tackle the rapidly growing dangers of climate change. The agreement marked at least some tentative innovations in global governance. Its approach worked with what states offered in terms of their intended contributions, rather than trying to accomplish the traditional process of drafting a "top-down one-size-fits-all" treaty. In numerous side events to the main conference, corporate actors, environmental campaigners and policymakers compared notes on their programs and exchanged ideas about how to construct a more sustainable world. Clearly after two decades of fairly ineffectual efforts in climate policy, world leaders are starting to think about how to proceed and doing so in ways that suggest, very tentatively, that traditional modes of thinking are giving way to new ways of thinking about governance.

The Paris meetings emphasized the great difficulty that many contemporary modes of thinking and policy analysis have in grappling with the climate question. Conventional ideas of climate as a pollution problem, a matter for regulation and environmental legislation, are now no longer enough to grapple with either climate or many other sustainability issues. Discussions of earth system boundaries and a safe operating space for humanity are now juxtaposed with the dawning realization that at least some low-lying member states of the United Nations may be completely inundated in coming decades by rising seas. The conventional economic development thinking of the twentieth century seems increasingly inappropriate in the face of global change. Market-based measures may be part of the short-term policy attempts to reduce carbon emissions and accelerate the uptake of renewable energy systems, but clearly more is needed, much more than conventional economics has to offer.

In part, this is because of the simple but profound insight that forms one of the bases for this book that climate change and the combustion of fossil fuels that are the primary causes of the problem are not a matter of scarcity or inadequate economic development. Quite the contrary! The problem of climate change is a matter of too much fossil fuel that is easy to extract from the ground and burn to power all manner of human technologies. Applying economic reasoning premised on scarcity, shortage and the need to massively increase human energy use and hence produce necessities for human flourishing, to the problem of climate change, is a major conceptual and political error. Hence, the need for a fundamental transformation of policy discourses and of their intellectual underpinnings in modern assumptions and modes of thinking. A "mindshift" is very obviously needed.

This is obviously in part about economics, and crucially about the idea that growth is the answer even if it is not clear what the question actually is. Maja Göpel's "great mindshift" is also about a recognition that humanity has, albeit mostly inadvertently, changed its place in the planetary system by the scale and persistence of its activities. The introduction of the controlled use of fire, agriculture, the selective breeding of domesticated species, complex tools, city building, industrialization, and now the construction of a global production and trading system based on fossil fuels have transformed both humanity and our habitat in fundamental ways. We have already postponed at least one, possibly two ice ages, and hence, the rich and powerful parts of humanity have effectively taken the future geological conditions of the only habitat we all have into their hands. All of which has led to the increasingly wide adoption of the term Anthropocene to specify present circumstances.

These new recognitions, of both the problem of too much fossil fuel and the sheer scale of humanity's actions, now require that we rethink many things. Just as modernity required a dramatic shift in thinking as part of what Karl Polanyi termed the great transformation to a commercial society based on the notions of interests, economic growth and relatively unregulated markets, the new conditions of living in the Anthropocene require new formulations and also new modes of human conduct. If the planetary habitat for future generations is to be kept even close to the conditions that humanity has known for its recorded history, we will have to "shift our minds" in a new transformation that incorporates the insights of earth systems science and numerous new research endeavours to build sustainable societies on new principles.

Given that economic reasoning has become the way in which so much of human activity is described, interpreted and increasingly governed, a fundamental re-evaluation of its basic premises, of the scarcity assumption, the efficacy of current modes of "growth" and the quest for narrowly defined efficiencies in markets, is long overdue. Hence, this volume, which tackles these key themes directly, is to be very much welcomed as a most useful and timely contribution to both the critical re-evaluation of the hegemonic thought processes and policy practices of contemporary economism as well as to new political, economic and, crucially, ecological thinking that breaks away from the increasingly counterproductive formulations in contemporary policy. As the World Social Forum slogan

has it: “other worlds are possible”. But to successfully achieve the necessary transformations to make them we will, as this volume so clearly indicates, need a “great mindshift” to facilitate building new institutions and modes of life for the billions of humans who are now crowding our rapidly changing planetary habitat.

January 2016

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Foreword by Prof. Dr. Uwe Schneidewind

The twenty-first century is an age of radical change. It presents us with challenges of a new dimension, scale and scope. The transformation challenge of the twentieth century was seen as one of primarily socio-economic dynamics with nation states being the central actors. We are now facing a situation where we are aware of planetary ecological boundaries and the global nature of the transformation ahead.

Recognizing the urgency and magnitude of this challenge, the German Advisory Council on Global Change (WBGU) argues in its 2011 flagship report that we need a "Great Transformation". Referring to Karl Polanyi's work, it creates a realistic vision for the twenty-first century of a good life for 9 billion people within planetary boundaries, that is, if we manage to accomplish a great transformation.

What we need, if we want to make this vision a real option for the future, are concepts that capture the complex nature of intertwined ecological, social, economic and technological transformation processes for sustainable development. The concepts need to offer guidance and orientation to the people that are actually engaged in the transformation process. Over the past 15 years, scientists have developed approaches for "transition management" to meet these challenges. Many of these approaches, originating from a diverse set of scientific communities—as portrayed in this book—focus on greening the economy, fostering (technological) innovation, searching for new modes of governance and understanding the dynamic relationship between established "regimes" and pioneers working towards new system architectures.

However, most of the scientific frameworks for sustainability transitions and transformation research remain limited in one key aspect: not reflecting on how deeply embedded the capitalist economic logic has become in organizing societies. For a more adequate conceptualization of the "Great Transformation", we need a

better understanding of the relationship between modern capitalist societies and the global ecological crisis. Naomi Klein, among others, has emphasized in "Climate versus Capitalism" that the sustainability debate urgently needs to include a critical focus on economic systems.

This is where Maja Göpel's book comes in: (1) She demonstrates how a critical analysis of the economic dimension facilitates a better understanding of the transformation challenge, and (2) she clearly shows that adopting an economic mindset is not "neutral", simply offering objective scientific concepts, but has an impact on how societal developments and individual aspirations are shaped, and whether they are unsustainable. With reference to Karl Polanyi's political economy analysis of the "Great Transformation" of the eighteenth and nineteenth centuries, Maja Göpel argues for a "Great Mindshift" that can help us to steer the next "Great Transformation" in more sustainable directions.

This book is not only a key contribution to the current transformation debate, it is also a milestone for the Wuppertal Institute. Maja Göpel has developed a key element of a more profound theory of transformation, which is essential for the sustainability debate of our times.

February 2016

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Acknowledgement

Writing a book while having babies and switching your job into a new sector is, as I know now, a pretty unwise idea. So these acknowledgements are also something of an apology. My amazing family was often confronted with a person I had aspired not to be: absent-minded, frustrated and irritable when lack of proper sleep or the next kiddie sickness once again destroyed all routines and told my mental capacities that there indeed are limits to exploitation. My partner Christian and my mother Ulla deserve admiration for continued loving and granny-support, and my little daughters Jospehina and Juna huge hugs for being so wonderful that despite all the stress, I felt like the luckiest mother around.

So where did this unwise idea come from in the first place? In itself, it was actually a fantastic offer and my big thank you goes to Armando Garcia Schmidt of the Bertelsmann Foundation. As part of the jury for the Reinhard Mohn Prize on Sustainable Development Strategies (2013) I challenged him to put more definition behind what the foundation means when speaking of the need for a paradigm shift. So I got a grant to write down what it could amount to and delved into transformation research while keeping my critical political economy hat on. I found great potential for complementary insights.

My boss, Uwe Schneidewind, lent his support to developing this into a full-on book with a scientific publisher. He enabled official working time for it, some staff assistance and also the Open Access publication. Theresa König was fantastic in her research and editing skills and Nikola Berger much more than a graphic designer.

I am indebted to Kate Raworth, Wolfgang Sachs, Katherine Trebeck, Paul Raskin, Ernst Ulrich von Weizsäcker, Mark Drewell, Karoline Augenstein and Alexandra Palzkill for their willingness to read comment and provide

endorsements. The same holds for the three anonymous reviewers who were extremely generous with the quality of feedback they provided.

It is to this spirit of joint inquiry for knowledge and strategies in support of sustainable futures that I hope this book contributes.

Berlin Maja Göpel
March 2016

Contents

Abbreviations and Acronyms

CGBS	Common Good Balance Sheet
CSA	Community Supported Agriculture
DMC	Domestic Material Consumption
EU	European Union
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GNH	Gross National Happiness
GNI	Gross National Income
GPI	Genuine Progress Indicator
HDI	UN Human Development Index
IDDRI	Institute for Sustainable Development and International Relations
IEA	International Energy Agency
IISD	International Institute of Sustainable Development
ILO	International Labour Organization
IMF	International Monetary Fund
INET	Institute for New Economic Thinking
IPCC	Intergovernmental Panel on Climate Change
IRP	International Resource Panel
ISEW	Index of Sustainable Economic Welfare
ISSC	International Social Science Council
MEA	Multilateral Environmental Agreements
MF	Material Footprint
MLP	Multilevel Perspective
NWI	National Welfare Index
OECD	Organisation for Economic Cooperation and Development
PE	Political Economy
PNAS	Proceedings of the National Academy of Sciences of the United States of America
QDI	Quality of Development Index
RMC	Raw Material Consumption

SDGs	Sustainable Development Goals
SES	Socio-Ecological systems
SETS	Socio-Ecological-Technical Systems
SME	Small- and medium-sized enterprises
STRN	Sustainability Transition Research Network
STS	Socio-Technical Systems
TEEB	The Economics of Ecosystems and Biodiversity
TJN	Tax Justice Network
TMC	Total Material Consumption
TMR	Total Material Requirement
TTIP	Transatlantic Trade and Investment Partnership
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WBGU	German Advisory Council on Global Change
WCED	World Commission on Environment and Development
WEF	World Economic Forum
WHO	World Health Organization
WSSR	World Social Science Report
WTO	World Trade Organization

List of Figures

List of Tables

List of Boxes

Chapter 1
Introduction

> In the middle of the twentieth century, we saw our planet from space for the first time. Historians may eventually find that this vision had a greater impact on thought than did the Copernican revolution of the sixteenth century, which upset the human self-image by revealing that the Earth is not the centre of the universe. From space, we see a small and fragile ball dominated not by human activity and edifice but by a pattern of clouds, oceans, greenery, and soils. Humanity's inability to fit its activities into that pattern is changing planetary systems, fundamentally. Many such changes are accompanied by life-threatening hazards. This new reality, from which there is no escape, must be recognized—and managed.
> World Commission on Environment and Development, *Our Common Future* (1987: 11).

> Throughout the ages, people have said that the world is in the midst of big change. But the level and degree of global change that we face today is far more profound than at any other period in my adult lifetime. I call this period the Great Transition.
> Ban Ki-moon, UN Secretary-General, speech, Stanford University (2013).

We still aspire to fit humanity's activities into Earth's patterns. Most of the reports on our progress in achieving sustainable development are devastating. In preparation for the 2012 Rio+20 summit, the *Department of Economic and Social Affairs of the United Nations* (UNDESA) concluded that

> The political deal that emerged from the Earth Summit in 1992 has, for various reasons, never been fulfilled. Neither the expected outcomes—elimination of poverty, reduction in disparities in standards of living, patterns of consumption and production that are compatible with the carrying capacity of ecosystems, sustainable management of renewable resources—nor the agreed means to achieve them, have materialized (UNDESA 2012: iii).

After nearly three decades of aspiration it is not surprising that the language that describes what it would take to turn the wheel and reach this deal has become more radical. The terms 'Great Transition' or 'Transformation' have become common in recent years. In September 2015, the heads of UN states adopted *The 2030 Agenda for Sustainable Development: Transforming our World* (UN 2015: 2). It contains 17 newly agreed *Sustainable Development Goals* (SDGs) that map where this transformation is supposed to lead. These cover the topics of the earlier Millennium Development Goals like ending poverty and hunger, improving education and

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health, but also encompass goals and targets for improved work situations, income distribution, more sustainable growth patterns and city developments as well as resource efficiency, clean energy and the protection of marine and land ecosystems. Two of the goals also provide targets for governance improvements and the quality of institutions and partnerships, which should help the implementation process (UN 2015).

Some critics may lament that these goals are pipe dreams, too ambitious and sometimes contradictory, given that the socioeconomic pledges can only be realized if the targets for environmental protection are missed. I think that this will certainly be the case if the spirit of transformation and radical change that UN Secretary General Ban Ki-moon expressed in his 2014 preparatory report on reaching the SDGs is lost. Ki-moon wrote, "Transformation is our watchword. At this moment in time, we are called to lead and act with courage. We are called to embrace change. Change in our societies. Change in the management of our economies. Change in our relationship with our one and only planet" (UN 2014: 3).

It is this spirit of transformation that I want to support with this book. To me it holds a renewed window of opportunity for the radical changes that in essence the sustainable development agenda always held. And I want to show that radicalness in purpose should not be conflated with a call for instant revolution, tearing down the system or hostility to dissenting ideas. Radicalness in purpose is equivalent to holding a vision or belief in what could be possible if X, Y or Z was to change, an imaginary that stirs up energy, commitment—and persistence in taking the many incremental steps required to get there.

Sociologists use the term 'imaginary' to capture more than ideas: it includes a set of values, institutions, laws and symbols with which people imagine their social whole. Without this combination of radical imaginary and persistent progress toward it, not much transformation will happen, at least not in the direction of sustainable development. The path dependencies that shape humanity's activities and development dynamics today are pushing and pulling in a decidedly non-sustainable direction.

This is why I also want to make the case that we should not simply stick the label 'transformation' on any amendment to the status quo, or call each technological efficiency gain an 'innovation.' If the benchmark for the changes to which we aspire is not radically different to the one that has guided development solutions so far, humanity will not escape those strong path dependencies. At the same time, dismissing the role that incremental steps play in getting there means ignoring the insights that complex system research offers about patterns of change. So juxtaposing the two approaches as entirely separate strategies—a practice often used to discredit someone else's proposals—does not help. What helps is to keep each other challenged with respect to both the radicalness of the imagined outcomes (what do we deem possible) and the amount of change in this direction that the next, often little, steps could bring (what do we do to make it happen).

This book speaks to this combination under the tagline of radical incremental transformation strategies. The purpose that these strategies should serve here is long-term sustainable development as defined in the Rio Declaration of 1992 and

now the SDGs. For an analytical approach it is important to make this explicit and not conflate process-design with desired outcome. One is descriptive and the other one normative: transformation is a *qualitative degree of change* that might happen in a system, and research seeks to describe typical patterns of such change processes so that they can be understood or at best guided. Sustainable development, on the other hand, is one possible *quality of the outcome* of a transformation process, and research supporting this normative goal seeks to identify and describe typical design principles that characterize sustainable systems.

Today's analysis reveals that the world is undergoing massive transformations and that we need to change their qualities to achieve sustainable development. It also shows that very skillfully managed transformation processes can lead to very unsustainable outcomes and very well-designed sustainability solutions can cause resistance or even turmoil in a system that is not ready for this change.

Since this is the thorny challenge that confronts every change agent for sustainable development, the overarching goal of this book is to contribute to both Transformation Science (understanding how transformation processes happen) and Transformative Science (developing approaches for a furthering of transformation processes) alike (WBGU 2011a: 342). These related and yet somewhat divergent contributions shape the structure of the chapters: Chapters 2 and 3 provide the backbone to a reflexive political economy understanding of transformations toward sustainable development, Chap. 4 presents case studies of pioneering practices that fit the remit of the suggested Great Mindshift, and Chap. 5 offers a summarizing framework for individual 'transformative literacy' for those seeking to support it as well.

1.1 It's the Economy, Stupid!

As one can hardly hope to capture or work on all aspects of sustainability transformations at once, I have zoomed in on what could be a key leverage point in different projects and change initiatives surrounding this purpose. The idea was to follow the dictum of Richard Rumelt, one of *The Economist*'s "management gurus" and an expert on "Good Strategy/Bad Strategy" (2011). He says that a good diagnosis, "simplifies the often overwhelming complexity of reality by identifying certain aspects of the situation as critical" (Rumelt 2011, quoted from his blog). My diagnosis is that the most critical aspect for turning the wheel toward fulfilling the SDGs is changing the economic paradigm. Hence the title of the book.

But why economic thought above all? Because it informed the creation of the practices, norms, laws, rules, business and market structures, and technologies that delivered unsustainable development in the first place. Because governments, ministries, international organizations, corporations and banks that move big money around and design the rules of our markets use economic models and expertise in their decision-making and justification of it. Economic calculations of, for example, productivity or competitiveness have also become the most important frames when

disputing the trade-offs behind political decisions or when justifying business strategies. The economic paradigm is thus massively influential in what is deemed possible and legitimate for hypothetical future development paths. Eric Beinhocker, director of the *Institute for New Economic Thinking*'s (INET) research program in Oxford, explains: "Just as abstract scientific theories are made real in our lives through the airplanes we fly in, the medicines we take, and the computers we use, economic ideas are made real in our lives through the organizations that employ us, the goods and services we consume, and the policies of our governments" (Beinhocker 2006: xi–xii).

Paul A. Samuelson, Nobel laureate and one of the most influential economists of the twentieth century, went as far as to say: "I don't care who writes a nation's laws—or crafts its advanced treatises—if I can write its economics textbooks" (Weinstein 2009 citing Samuelson). His textbook *Economics* was a bestseller for nearly 30 years and translated into 20 languages.

Similarly, popular economist John Maynard Keynes shared Samuelson's opinion: "the ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed the world is ruled by little else" (Keynes 2007: 383–384). He continued to reflect on the effects that this power of ideas has on societies and commented on his own overturning of firm beliefs: "The difficulty lies, not in the new ideas, but in escaping from the old ones, which ramify, for those brought up as most of us have been, into every corner of our minds" (ibid: preface).

It is this stickiness that most of the book seeks to highlight and understand. Because after all, some of the most powerful current economic ideas—like 'gain' being the prime human motivation, 'utility' a good measure for well-being and 'capital' a useful container term for everything that might be needed in production processes—were once radically new and far from common sense. They were integral components of the massive paradigm shift that has been called the Enlightenment movement. Dirk Messner, leading German transformation researcher and president of the *German Development Institute* (DIE) has described its effect as a change in the social, cultural and cognitive 'software' of the agrarian societies: it changed the reservoir of ideas, norms, values and principles which actors drew on when creating technologies, institutions, laws, business models and individual identities (Messner 2015: 263).

Today, 250 years later, these powerful ideas and economic concepts have become the basis of a new normal, of a civilization and development model that is unsustainable in a world with nine times as many people as there were when these concepts were invented. Applying them means that leaders claim progress even when the patterns of the clouds, the oceans, the forests and the very soil are destroyed to a degree that threatens to tip our fragile planet out of balance. In addition, while this development model has created much material wealth, it has not generated the maximum happiness for the maximum number of people as its progenitors and promoters believed it would. Meanwhile, the market system that hosts this type of civilization has become one of global reach and highly complex

feedback loops that are very difficult to change without risking collapses in wide parts of the global economy.

Thus, a transformational 2030 sustainable development agenda needs new 'software' that opens up the imaginary and thus political space for radically different development solutions and systems. And I feel we might be at a turning point: the first 40 years of sustainable development agenda left the economic paradigm widely unchallenged. Instead of integrating economic, environmental and social dimensions of development—as mandated by the *Brundtland Report* defining sustainable development—social and environmental concerns have been inserted into an economic way of seeing and therefore governing the world. As a result, quantification and marketization in the service of endless 'growth' has become the dominant mode of organizing ever more areas of life. Diversified governance solutions have been homogenized to fit in with this paradigm.

But since the consequences of accelerating natural exploitation and social inequality have become more tangible in rich countries, an awareness of the pitfalls of this shift is coming to the fore. Moreover, since the 2007 financial crisis hit the 'developed world' hard, even the deeply 'economic' institutions like the *Organisation for Economic Cooperation and Development* (OECD), *International Monetary Fund* (IMF) and World Bank have begun to question some of Samuelson's ideas and their own established models. The *World Economic Forum* (WEF) has launched a sustainability-adjusted competitiveness index and lists global inequality as well as job-loss in rich countries through digitalized industrialization 4.0 as top topics of conversation. Former Wall Street heroes linked to George Soros put $200 million into the Institute for New Economic Thinking and the OECD hosted a Commission on the Measurement of Economic Performance and Social Progress chaired by Nobel laureate economists Joseph Stiglitz and Amartya Sen, which has just started its second round of work.

Of course this does not mean that the people in powerful positions now know better than the thinkers who have been challenging the mainstream economic paradigm for decades or centuries. Nor does it imply they do better than the practitioners who have worked incredibly hard to achieve sustainable niche solutions within a system that's pushing in the opposite direction. It does mean, however, that the hegemony of the mainstream economic paradigm is broken. The credibility of the trickle-down and green growth narratives that it informed is lost.

In the decades to come, the old and alternative paradigms will be struggling to fit the shape taken by what could become the Second Enlightenment. Our task is to fill the reservoir of social and cultural inventions with ideas, norms, principles and values that support a de-commodified view of human needs, nature and money, based on twenty-first century natural and social sciences that include many non-quantifiable variables. They provide alternative meaning, legitimacy and practice options for everyone engaging in the highly political struggles over transformations for sustainable development. This is what *The Great Mindshift* stands for.

1.2 Structure of the Book

To support and explore the claims made in this introduction the book goes back and forth between transformation research and the discussion of changing economic paradigms in theory and practice. It introduces four analytical concepts and two heuristics in order to provide some answers to the following overarching questions:

1. If the changes envisioned by the 2030 Sustainable Development Agenda are supposed to be transformational in quality, how do we work toward this quality?
2. If the transformations envisioned are supposed to support sustainable development, what are the key leverage points to unlock unsustainable path dependencies?

The second chapter, on transformation research in the context of sustainable development, provides the conceptual background to my call for radical incremental transformation strategies. Based on an overview of major strands of system transformation research, I develop three analytical concepts to make the case:

Materialization of ideas: Transformation research literature describes the transformational quality as manifesting itself in "co-evolutionary changes in technologies, markets, institutional frameworks, cultural meanings and everyday life practices" (Geels et al. 2015: 2) and often uses the concept 'system innovation' to capture it. The 2015 OECD *System Innovation* report defines these as "radical—insofar as they alter existing system dynamics—innovations in socio-technical systems that fulfill societal functions, entailing changes in both the components and the architecture of the systems" (OECD 2015: 6).

While these definitions provide a helpful description by which to distinguish transformational change from normal, adaptive change, they do not say much about how the reconfiguration of these system elements is taking place. In the literature one finds catchy terms like "innovation cascades," "knock-on effects," "diffusion of new technologies" or "(re)alignments between multiple elements and interactions between multiple actors," all of which "changes cultural discourse and behaviour" (Geels et al. 2015: 6). But who are the agents behind all these descriptive nouns? In this book system innovations are understood to be driven by humans: purposefully acting individuals who see what could be possible beyond the status quo and make it happen.

Bringing individuals and their mind-sets into systems is an important step toward understanding where change originates and who promotes it with what effects. I introduce the concept 'materialization of ideas' to discuss this structurational interplay between ideas, human behavior, collective action and institutional design. It highlights both how the resulting systems shape reality and freedom of agents in the future and also how the agents' freedom to think, feel, reason and act differently fuels the transformational phenomena that characterize system innovations.

Repurposing systems: Most of the literature (Geels et al. 2015; Messner 2015; WBGU 2011a: 342) states that transformation cannot be planned nor will it unfold

according to plan. It can primarily be diagnosed when looking back from the future. Yet, if the sustainable development community understands that the degree of change necessary to reach its goals cannot fall short of being transformational, science should help the community to get a grip on which change strategies and initiatives seem promising. If transformational change is defined as radical because a system's dynamics, components and architecture have been changed, two questions arise: how can a radical degree of reconfiguration be intentionally pursued? And how can the system dynamics be altered to this degree without causing collapse or rejection?

In order to answer these questions it is crucial to once again link back to purposefully acting individuals who engage with one another and nature to produce the goods and services they deem necessary or beneficial to their well-being. Such engagement involves the creation of facilitating institutions and technologies that amount to what transition research calls socio-technical systems (STS's). Hence, each of the systems is designed to fulfill a particular purpose, so understanding this purpose will shed light on where to find core drivers of its current dynamics. This also means that when the goals and ends of the system are in question, innovation strategies should first focus on defining a new purpose, and then coordinating updates of technologies and institutions with that purpose (Leadbeater and Mulgan 2013: 46).

The sustainable development agenda called the outcomes of the old economic growth path into question, but most of its strategies have fallen short of defining a new guiding purpose: they kept economic growth and tried to quickly provide yet more of it—just with less environmental damage. Current statistics show that simply driving the system to do more is not enough if a real change is needed, as the following quote from UNDESA's 2012 *Back to Our Common Future* report highlights: "Even if we succeeded in pushing our technological capabilities to the utmost, without doing something else, in a few decades we are likely to end up in a world that would offer reduced opportunities for our children and grandchildren to flourish" (UNDESA 2012: iii).

In the "doing something else" we find the benchmark for a transformational agenda. It has to start with what is captured by the heuristic 'repurposing a system'—e.g., properly replacing the pole star of economic growth with that of sustainable development. To do so one should, I argue here, check if the prevailing mind-sets or paradigms and the models and measures they inform can guide repurposing strategies—or also need to be shifted.

Radical incremental transformation: However, declaring a radically different purpose and even clearly seeing which flawed assumptions and unhelpful path dependencies stand in its way will of course not magically transform them. This requires intense work of an often highly political character and the acceptance that it takes time. Seeking to change a system too swiftly or too drastically is likely to create self-defensive or destabilizing reactions. The art of system innovation therefore entails finding the right steps and measures at the right time, and also being prepared to deal with unexpected results.

This is why I reject the juxtaposition of radical versus incremental change and propose the conceptual framework of 'radical incremental transformation.' The radically new purpose informs which multiple and diversified incremental interventions are necessary to unlock the path dependencies that keep the system in the old dynamic. Often it is easier to focus energy on discontinuing a few strong drivers or root causes and observing how this creates new dynamics that allow parts of the system to start reorganizing. Yet, some agreement about the direction of purposeful reorganization has to prevail for collective strategic action to take place.

The third chapter, which deals with the mainstream economic paradigm, therefore launches straight into discussing both the root causes and the direction of purposeful action for sustainable development. It highlights why it is important to check for the worldviews and paradigms on which key actors and coalitions base the narratives surrounding their collective action. While the former capture how a person or a scientific discipline views the world, the latter captures the rationale or stories that actors share to argue their choices and activities. The crux of the matter is that one and the same narrative for collective action, e.g., 'we want to achieve sustainable development,' can host very different ideas about how it could best be done. These differences may emerge from interests and power games but even those are embedded in and influenced by differences in worldviews and paradigms. These soft factors are the source of how sense-making people believe the world works, how it could or should therefore be governed and which role they should play in it.

From this perspective, Chap. 3 puts the second question center stage and explains why the mainstream economic paradigm might well be the most important lever for unlocking unsustainable path dependencies. Its main argument runs as follows: The world started engaging with environmental problems in the 1960s. The first big report to make global waves was the 1972 *Limits to Growth* issued by the Club of Rome think-tank. The international community reacted and in 1987 the UN-appointed *World Commission on Environment and Development* (WCED) published its ground-breaking *Our Common Future.* The commission and the report also carry the name of Gro Harlem Brundtland, the former prime minister of Norway who led the work.

The report exposed many of the degrading effects that the twentieth century's economic development path had inflicted on the environment, while failing to eradicate poverty. It therefore called for the replacement of this path with "sustainable development," which was defined as development which meets "the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987: 16). To that end emerged what became the infamous "integrated perspective," namely that "the common theme throughout this strategy for sustainable development is the need to integrate economic and ecological considerations in decision making. They are, after all, integrated in the workings of the real world. This will require a change in attitudes and objectives and in institutional arrangements at every level" (WCED 1987: 55). Any negative social consequences of the twentieth century development ideal were not really acknowledged. The problem was put down to insufficient economic output to lift everyone above poverty lines.

So what happened? Instead of a proper interdisciplinary endeavor to define a new paradigm that captures the purpose of sustainable development holistically, the already dominant economic paradigm became paramount. Social and ecological dimensions were inserted into its monetary quantification frameworks. This could not change attitudes, objectives and institutional arrangement toward sustainable development simply because the basic ideas of that paradigm do not say much about either human needs or the environment's ability to replenish resources. The chapter zooms in on a few key concepts underlying this, for example, the pursuit of endless economic 'growth' to achieve development, maximizing 'utility' to meet human needs and substituting 'natural capital' so that everything can continue to grow in the future.

Some of the detrimental effects these concepts have on understanding how to reach the goals of sustainable development are discussed by bringing in insights from twenty-first century social and natural sciences as well as alternative economic thought. Earth system sciences, ecological economics, sociology, well-being studies, psychology and neurosciences have much to say about human needs, nature's laws and the impact on both of these of economic growth-driven societies. Adding these findings to the picture shows that the paradigm and ideas that informed the creation of unsustainable system dynamics cannot guide their removal.

So which paradigm can achieve this? This is the key question that spans Chap. 4 and the case studies on pioneers working with different imaginaries of what the purpose of sustainable development could mean in practice. With the intention of investigating which key ideas or concepts a new and transformational development paradigm could build on, I took a closer look at the following initiatives: the *Economy for the Common Good* (a prominent business initiative in Germany and Austria), *Transition Towns* (an urban community initiative born in the United Kingdom), the *Commoning Movement* (civil society initiative spanning the Atlantic between the United States and Europe) as well as the Bhutanese *Gross National Happiness* (GNH) Framework (government initiatives that want to supplement GDP with other performance indicators).

Although I would not venture to state that one can define a clear-cut new paradigm or streamlining development purpose like, for example, 'economic growth,' I was surprised by the common ground between theory and practice as well as across practice examples. The worldviews of how to understand human needs and nature's laws and the narratives about what development should therefore aim to achieve are very similar. All of these movements adopt the view that ecological systems host sociocultural systems and that economic systems are subordinate means in successfully structuring nature–human relations. This is radically different to the view of the mainstream paradigm that pursues the ongoing integration of social and environmental concerns into economic governance logics by pricing them. So I would go as far as to set one common heuristic that expresses the radical purpose and another to capture the strategic directions that the incremental steps of these pioneers are taking.

The radical repurposing agenda could be summarized as *recoupling* economic processes with human well-being and nature's laws by making the economic dimension the one that needs changing. Given the structural reality of today's path dependencies, the foremost strategy for successive change in this direction—the incremental strategies that can achieve it—is *double-decoupling:*

1. Decouple the production of goods and services from unsustainable, wasteful or uncaring treatment of humans, nature and animals (do better).
2. Decouple the satisfaction of human needs from the imperative to deliver ever more economic output (do well).

The latter has been given much less attention because the worldview informed by the mainstream economic paradigm cannot even countenance it.

This last argument lies at the core of the fifth and final Chap. 5, which explores how a shift in a paradigm and the mind-sets it informs can be the mediating element between the radical imaginary and the incremental steps toward repurposing systems. It uses the findings of the transformation research discussions to present a framework that helps individuals hack the system they work in, identify and argue for change strategies that work both aspects of decoupling. This framework is thus an updating contribution to *transformative literacy*: "the ability to read and utilize information about societal transformation processes, to accordingly interpret and get actively involved in these processes" (Schneidewind 2013: 83).

Impactful repurposing strategies need to reflect on the paradigm that informed the system's goals and purpose. There always exist several paradigms in parallel, but one becomes dominant. It frames the issues at stake and thus the selection of relevant information, the legitimacy of arguments, the normative judgments of proposed solutions, the acceptance of rules and institutions and the beliefs that something is worth pursuing. Paradigms are the sources of systems. They function as a reference framework for individuals wanting to do something and so shape the mindsets of the people involved in the system.

Of course, structural path dependencies are not overcome merely by changing the way the world is viewed. For structural path dependencies to be overcome requires a lot of engagement, effort, persistence and struggle. It also requires mindfulness and challenging one's own belief systems, habits and convictions in the search for different solutions. The SDGs capture a transformational agenda for the entire world precisely because there is no sustainable role model to copy. The search is on and the more freely ideas behind unsustainable solutions are reassessed, the more creative and transformational the agenda can be. Declaring that the current situation has no alternative or that we are simply at the end of history would be bad news.

Chapter 2
What Political Economy Adds to Transformation Research

> The continuous striving for improvements in material welfare is threatening to surpass the limits of the natural resource base unless there is a radical shift towards more sustainable patterns of consumption and production and resource use. Persistent inequalities and struggles over scarce resources are among key determinants of situations of conflict, hunger, insecurity and violence, which in turn are key factors that hold back human development and efforts to achieve sustainable development. Business as usual thus cannot be an option and transformative change is needed. As the challenges are highly interdependent, a new, more holistic approach is needed to address them.
> UN System Task Team on the Post-2015 UN Development Agenda, *Realizing the Future we Want for All* (2013: 1).

> Particular narratives are produced by particular actors and so co-construct particular pathways of response. Some are dominant; shaped by powerful institutions and substantial financial backing—these are the 'motorways' that channel current mainstream environment and development efforts. But these can often obscure and overrun alternatives; the smaller by-ways and bush paths that define and respond to different goals, values and forms of knowledge.
> Leach, Scoones, und Stirling, *Dynamic Sustainabilities: Technology, Environment, Social Justice* (2010: 5).

So, if the changes envisioned by the 2030 Sustainable Development Agenda are supposed to be transformational in quality, how do we work toward this quality? This chapter provides the analytical perspective of a system-thinking, environmentally aware political economist with a sober appreciation of technological innovation. It defines two concepts and one heuristic that lie at the core of this view: engaging with the *materiality of ideas* and *radical incremental transformation* strategies enables a *repurposing* of our current development systems. This analytical framework emerged from my transdisciplinary quest to find out why humans collectively create societies that individually they would like to change. This quest has always been connected with sustainable development: no one I know is not in favor of peace, of letting nature thrive and enabling every person and animal to live a life of dignity. So why is this not possible?

My search for answers led me to combine academia and research with political engagement and activism. For a long time it seemed that this made me something of

M. Göpel, *The Great Mindshift*, The Anthropocene:
Politik—Economics—Society—Science 2, DOI 10.1007/978-3-319-43766-8_2

an outsider: too keen on systematic and nuanced argumentation to fit into a media-driven world of punchy slogans and easy scapegoats, but also too interested in changing the real world to become an expert who dug deep into one scientific discipline. Given the rapidly growing popularity of transformation research over the last five to ten years, in particular in the field of sustainable development, my notion of being an outsider has fundamentally changed: transdisciplinary approaches have become the new thing for tackling the persistent problems that sustainable development strategies face. This means that scholars not only connect different scientific disciplines, but also integrate the insights of practitioners on the ground. The goal is to create robust knowledge that not only refines existing theoretical hypotheses about how humans and the world work, but also has relevance for the people enacting change on the ground.

The term 'transdisciplinary research' was first introduced in 1970 by Erich Jantsch, a Club of Rome member, to encapsulate the notion that inherited scientific knowledge needs frequent confrontations with the 'real world' in order to test, amend and form new assumptions. Only with such an approach would science support the ability of a society to continually self-regenerate. This approach has not been very popular in the Enlightenment-influenced sciences, however. Here, the dominant ideal is of the positivist paradigm whose goal and premise it is that universally true 'laws' governing human behavior and natural evolution can be identified and fit into quantitative models and experiments with which future developments can be predicted and managed. This still does, of course, require researchers to make decisions about what they observe, how they quantify aspects that cannot simply be tallied, and how they interpret their observations. This is why, in scientific terms, paradigms are divided into assumptions that are epistemological (what can we know), ontological (what can be said to exist and how we group those things), and methodological (what guiding framework is suitable in solving a problem). Some scientists also add axiological aspects, encompassing the choice of relevant values. Depending on how these various aspects are defined, a single event can be interpreted very differently. Likewise, proposed solutions for the problem will vary significantly.

The transdisciplinary paradigm differs considerably from positivist ones in its epistemology. For example, it does not involve the ambition of finding universal laws that could be true forever. In its ontology it is constructivist or reflexive and thus does not see 'reality' as something objective that can be observed by researchers at a distance but instead as something intersubjectively created by sense-making actors and thus subject to change. Meanwhile the current state of reality will also impact the way humans—including researchers—make sense of how the world objectively 'is.' As a result, no researcher or truth claim can declare itself separated from reality. Our world, as quantum physics affirms, is constantly evolving. German has a great word for 'reality' to capture this information-based interplay: *Wirklichkeit*. *Wirken* means to 'seem' and 'appear' but also 'have an

effect' or 'operate.' The word 'reality' on the other hand has its Latin roots in the term 'res,' which means 'thing,' 'matter.'

A reflexive research approach therefore views humans as both the object and the subject of making history: today's interactions do not happen in a vacuum but under the circumstances created by us and the generations before us. As a consequence, humans experience individual freedom within frameworks for action laden with beliefs, norms, social roles, typical procedures, rules and distribution patterns that are not necessarily of their choosing but still shape their sense-making and behavior. Thus, my personal opinions and behavior are influenced by my surroundings but also influence those of others with whom I am interacting, my counterparts and observers. And humans are arguably the only species on the planet that can apply reflexivity in order to discover, assess and creatively work with or against the frameworks for action that we encounter.

This point was foregrounded in parts of the 2013 *World Social Science Report* (WSSR) with the introduction of the concept of 'futures literacy':

> The complexity of these processes of transformation raises a number of questions, most notably about people's capacity to imagine futures that are not based on hidden, unexamined and sometimes flawed assumptions about present and past systems. 'Futures literacy' offers an approach that systematically exposes such blind spots, allowing us to experiment with novel frames for imagining the unknowable future, and on that basis, enabling us to critically reassess actions designed in the present (ISSC and UNESCO 2013: 8).

Not everyone within the transformation research community works with a transdisciplinary approach and reflexive paradigm. The community combines a wide array of scientific disciplines and is still sorting out where exactly paradigmatic agreements lie. So within this book I pulled together the work of leading scholars who do at least reject the positivist epistemology and ontology that one finds in the mainstream economic paradigm and its methodological individualism. In this paradigm, humans do not reflect on more than the costs and benefits of the choice set with which they are confronted. So each person in their economic system behaves similarly (representative actors), regardless of where they happen to live. This is very convenient because individual behavior assumptions are aggregated into extrapolations of how the system will work as a whole and what knock-on effects it will have—e.g., the prediction that markets will balance themselves.

However, even within allegedly objective, positivist/standard economics, it has been recognized that such additive approaches risk a fallacy of aggregation, ending in incorrect predictions. For example, American economist Alfred E. Kahn warned of *The Tyranny of Small Decisions* as early as 1966. He stressed that market equilibrium theory must remain cautious about the reliability of its methodological individualism: small decisions by rationally calculating actors may well lead to misallocation effects on the macro scale that produce outcomes which the same individuals would not choose (Kahn 1966: 23). One prime example of this tyrannical effect in natural sciences is the way that climate change results from the cumulative effect of what seem to be negligibly small entities of additional CO_2 emissions made on the individual scale.

The tyranny of small decisions makes perfect sense to those who conduct the complex system research used both to examine the Earth's ecosystems and in social sciences. Here the main thrust of the research lies in understanding relations between single elements and the dynamics of the whole in order to understand why single elements behave the way they do and how this might change. As a result, the emphasis when searching for sustainable development solutions is less on improving single technological products or economic incentives, and more on understanding the dynamics of wider socio-technical or socio-ecological systems (STS or SES) before thinking about which interventions could improve sustainability.

Most reflexive transdisciplinary methodologies work with what has been called a problem-driven approach. The research is designed around a specific problem or challenge that scholars seek to address or produce answers for. Collecting information about its emergence, including talking to people, allows mapping which actors, but also which institutional, technological, economic, environmental, and socio-cultural conditions are relevant factors of its persistence. From this information one can draw a system that is relevant to dealing with the challenge. Often this system will cut across official demarcations of organizations, sectors, disciplines or even nations.

The 2015 OECD *System Innovation* report explicitly defines 'system innovation' as a way of analyzing and innovating that will transgress the boundaries of established containers: "The appeal of system innovation today is closely linked to the pressing issue of meeting the 'grand' or global challenges of today. These global challenges require policy actions across technological, economic and social structures and boundaries, as well as national borders" (OECD 2015: 8).

> Returning to the *Brundtland Report*, we realize that this is not really a new insight: The integrated and interdependent nature of the new challenges and issues contrasts sharply with the nature of the institutions that exist today. These institutions tend to be independent, fragmented, and working to relatively narrow mandates with closed decision processes… The real world of interlocked economic and ecological systems will not change, the policies and institutions concerned must (WCED 1987: 17).

It seems that such structural change implications were among those demands considered too radical at the time and that they thus need persistent reiteration. The transformation and system innovation discourse brings the need for encompassing structural change to the forefront and to the titles of flagship reports, while slowly delegitimizing the narrow emphasis on adaptive market magic, money printing and technological breakthroughs.

To me, this is part of the window of renewed opportunity for sustainable development. The rapidly growing transdisciplinary transformation research community could become instrumental in helping to use this window strategically. It promises the most telling insights into how the infamous integration of ecological, social and economic dimensions of development can be achieved in practice.

2.1 Digging into Societal Transformation and System Innovation Research

I begin with a few definitions from influential sources that illustrate what transformation research leaders say about the challenge of turning development toward sustainability. The Intergovernmental Panel on Climate Change (IPCC), for example, foresees "the altering of fundamental attributes of a system (including value systems; regulatory, legislative, or bureaucratic regimes; financial institutions; and technological or biological systems" (IPCC 2012: 5).

The primarily European Sustainability Transition Research Network (STRN), founded in 2005, says in its mission statement that "incremental change in prevailing systems will not suffice. There is a need for transformative change at the systems level, including major changes in production, consumption that were conceptualized as 'sustainability transitions'" (STRN 2010).

The German government's *Advisory Council on Global Change* (WBGU) published the report *A World in Transition: A Social Contract for Sustainability* in 2011 and defined its viewpoint as follows: "This major transformation will require technological advances, new concepts of welfare, diverse social innovations, and an unprecedented level of international cooperation" (WBGU 2011b, 1).

My contributions to the field focus on concepts that foreground mind-sets because these will inform the purpose that the technological advances, new concepts and innovations of all kinds will serve. And I argue for a Great Mindshift because I feel that willingness to reassess old assumptions and convictions for their validity seldom involves the degree of radicalness required. The definition of transformation proposed by the Stockholm Resilience Centre comes closest: "Transformation or transformability in social-ecological systems is defined as the capacity to create untried beginnings from which to evolve a fundamentally new way of living when existing ecological, economic, and social conditions make the current system untenable" (Stockholm Resilience Centre 2012). To create untried beginnings we need new social imaginaries, sets of ideas including values, institutions, laws and symbols through which people imagine their social whole and envisage how alternative systems would differ from the current situation—and the courage to let go of that to which we have grown accustomed.

In order to develop my foundational analytical concepts of how to achieve the large system change to which the 2030 Sustainable Development Agenda aspires, I will first present a selection of popular transition research concepts from three thick, multi-scholar reports that are also seeking answers to this question. They are all part of the rapidly growing community adopting systemic and transdisciplinary approaches. At the same time, they differ with regard to certain basic ideas and departures for research design and can be systematized as examples of 'the three camps' within transformation research, distinguished by the disciplinary homes from which the new agenda is approached: *innovation management*, *natural sciences*, and *political economy*.

The three camps are certainly not the only possible systematization of the field; they are simply one way of approaching issues discussed within the community itself. Transition scholars should not be upset to come across categories that they reject but are instead invited to read what follows in the spirit of cultivating awareness about framing effects that emerge when we (including myself) choose the lenses and terms with which we decipher the world.

The first camp of transition research tends to contain social scientists with an evolutionary economics or innovation management background. They are primarily interested in understanding how technological advances change the way communities and societies organize themselves and which potentials for sustainable development emerge from that. Their main unit of observation is the STS. The second camp is deeply rooted in natural and earth systems sciences and argues that new knowledge of Planetary Boundaries and ecosystem services needs to be the reference frame for the identification of solutions to sustainable development. Their main unit of observation is the SES. Political economists who engage with the systems frameworks highlight the need to understand unsustainable structural drivers embedded in current economic processes and the effects of increasing marketization and commodification on systemic governance proposals. They would apply these to both the socio-technical and socio-ecological relations and thus I grouped them into *socio-ecological-technical systems* (SETS).

In line with these different views, the descriptions of transition processes also vary. Scholars with an evolutionary economics, innovation and management background tend to speak of repeated learning cycles in which the results of pilot projects and niche innovations are monitored for their effect and the most convincing ones, i.e., the most resource-efficient, become part of a transformed system. More recently, aspects of interest and power have been taken into consideration, but agency remains a less important variable, as the following characterization of "main features of system innovations" shows: "(1) disrupting or complementary types of knowledge and technical capabilities; (2) fundamental changes in consumer practices and markets; and (3) novel types of infrastructures, institutional rules and skill sets" (OECD 2015: 6).

Scholars with a natural science background will tend to search for dynamics, feedback loops and tipping points in the reproduction circuits of ecosystems and develop extraction or pollution targets and principles to help societies stay within safe operating spaces. Often less attention is paid to the question of how the governing frameworks and economic processes needed to stay within the boundaries can be implemented. One important contribution toward this has been the concept of 'pathways' to show that there are multiple possible solutions to governing a safe operating space and that each one implies different distribution and participation patterns. Here the power relations and interests behind the emergence or maintenance of one pathway in particular receive explicit attention (Leach et al. 2010).

Finally, political economy approaches are making their way into the transformation research community. Traditionally they do not have a strong track record in ecological literacy or the relational innovations that technology breakthroughs might engender. The sub-camps that engage with transition research mostly consist

of ecological economists and behavioral economists. They place their chief emphasis on understanding the emergence and perpetuation of capitalist economic path dependencies that keep on pushing SETSs out of sustainable development paths (Göpel 2016). Political economists tend to reject win–win narratives and argue that both transformational changes and the status quo involve winners and losers, and that these should be exposed.

Thus, while all researchers foresee that transition or transformation will involve discontinuities in the current systemic setups and dynamics, their notions of where transformational changes originate differ. The typical terms for explanations thus also differ: 'diffusing technologies' or 'disruptive innovations' tend to be socio-technical terms, 'feedback loops' or 'tipping points' stem from a socio-ecological view, and political economists speak about 'struggles' and 'structural crises.'

Some scholars explicitly prefer the term 'transformation' to the evolutionary term 'transition' because it makes the conflicting aspects of change more clear. But when it comes to defining what constitutes a transition versus what constitutes a transformation, the quotes above demonstrate that there is not much difference. Here, I use the terms interchangeably and wish to map the commonalities rather than the differences between the camps. Each of the three larger studies reviewed here can be roughly grouped into one of the camps. My own bias in what I select will be that of an environmentally aware political economist who appreciates the potential of technological breakthroughs.

Given its conceptual leadership in the field, I start by reviewing the 2010 book *Transitions to Sustainable Development: New Directions in the Study of Long Term Transformative Change* edited by John Grin, Jan Rotmans and Johan Schot. It was the first conceptual milestone of the STRN network mentioned above. This network and its annual International Sustainability Transitions conferences have been the epistemic community development locus for the STS camp.

Its work has influenced my second example: the SES-driven WBGU and its 2011 flagship report to the German chancellor, the transition viewpoint of which is cited above. Here the starting point is less an understanding of transitions as such and more the avoidance of disastrous climate change (one important Planetary Boundary), which is deemed only possible with a great transition. To this end the report has a set of recommendations for policy and science at its core. The Stockholm Resilience Centre cited above is a strong convening player of this camp; the biannual Transformations and Resilience conferences are key exchange platforms.

The third study I will examine was published in 2002 as the outcome of longer discussions of the Global Scenario Group convened by the Stockholm Environment Institute and the Tellus Institute in the 1990s. The report, *Great Transition: The Promise and Lure of the Times Ahead* defines transitions as "complex junctures, in which the entire cultural matrix and the relationship of humanity to nature are transformed" (Raskin et.al. 2002: 3). It states that the world is in transition to a planetary phase and sketches six possible development pathways for the future that combine narratives with quantitative data. The scenarios differ according to the degree of change in human values, paradigmatic thinking and therefore policies

adopted; economic thinking plays a central role. Discussions of *The Great Transition* continue online at http://www.greattransition.org.

Please bear in mind that naturally I can only present selective reviews that are mere snapshots of hundreds of pages. They will not do justice to the entire work but instead provide an insight into the core concepts and basic assumptions underlying these hallmark publications and their respective camps, at best triggering an appetite for more.

2.1.1 Socio-technical Systems and Their Innovations

The goals of STS thinking as developed in the STRN community could be summarized as follows: how can we understand innovations systemically—and apply this knowledge for sustainability purposes. It fits firmly into what I call the reflexive ontology. The status quo of our world is viewed as a constant reproductive process in which "internal dynamics, external influences and the resulting feedback loops keep on rearranging the ordering" (Grin et al. 2010: 6). Technologies are therefore not viewed in isolation but in conjunction with the social practices, norms, and institutions that enable or hamper their use and influence choices between the options on offer. Meanwhile, adopting certain technological solutions rather than others will also influence which institution, infrastructures or business models seem promising and sensible to make good use of.

The diversity of energy systems highlights these co-evolutionary properties. The availability of resources on a particular territory and in geopolitical relations with potential delivery partners will make some fuels and raw materials for harvesting technologies more desirable then others. The availability of investments depends on the desirability of proposed solutions, while existing market and ownership structures will play an additional role in these judgments. Meanwhile, knowledge about the negative pollution effects and risks of some fuels compared to others will impact citizen opinions, while consumer acceptance of technological solutions depends on consumer budgets and habits. Policymakers navigate this set of information and preferences in order to shape governing solutions that find support from lobbyists and voters—which will in turn impact geopolitical relations and investment expectations. Breaking out of a particular system of energy supply therefore depends on changes in all of these dimensions rather than only in the availability of alternative technologies.

The highly political battles over the ongoing renewable energy transition in Germany and the fierce opposition of powerful incumbents of the fossil energy system are good examples of this. Transitions are therefore always "intrinsically social, full of uncertainties, ups and downs, twists and turns" and should best be viewed as a dynamic, multidimensional, multi-actor and multilevel challenge that cannot be planned and predicted in a linear manner (Grin et al. 2010: 6). In order to get a grip on how to meet this challenge, the 2010 book provides some key conceptual frameworks of the STRN community and I picked out the two most popular ones to make my case. They seek to explain and improve understanding of

processes of transformation and thus can be applied for many outcome goals of transformations, like moving toward a safe operating space or institutionalizing a Second Enlightenment with a new economic paradigm.

The STS transition research community was born in the Netherlands when professors Jan Rotman, Johan Schot and John Grin combined their respective research backgrounds for a programmatic approach toward understanding larger system changes. These scholars primarily study medium-sized systems, often on a sectoral basis like energy. The duration of transformational changes in these systems is estimated to take about 40–50 years (Grin et al. 2010: 3–7). One of the key iconographic outcomes of this endeavor is the Multilevel Perspective (MLP) presented in Fig. 2.1. It was developed by Jan Rotman and his student Frank Geels and highlights the interplay between different societal subsystems across space and time. It differentiates qualitative levels of resistance to intentional and spontaneous change in order to identify multiple upward and downward causalities of influence behind large system change processes. It is important to note that these are functional scale levels and do not represent spatial or geographical hierarchies.

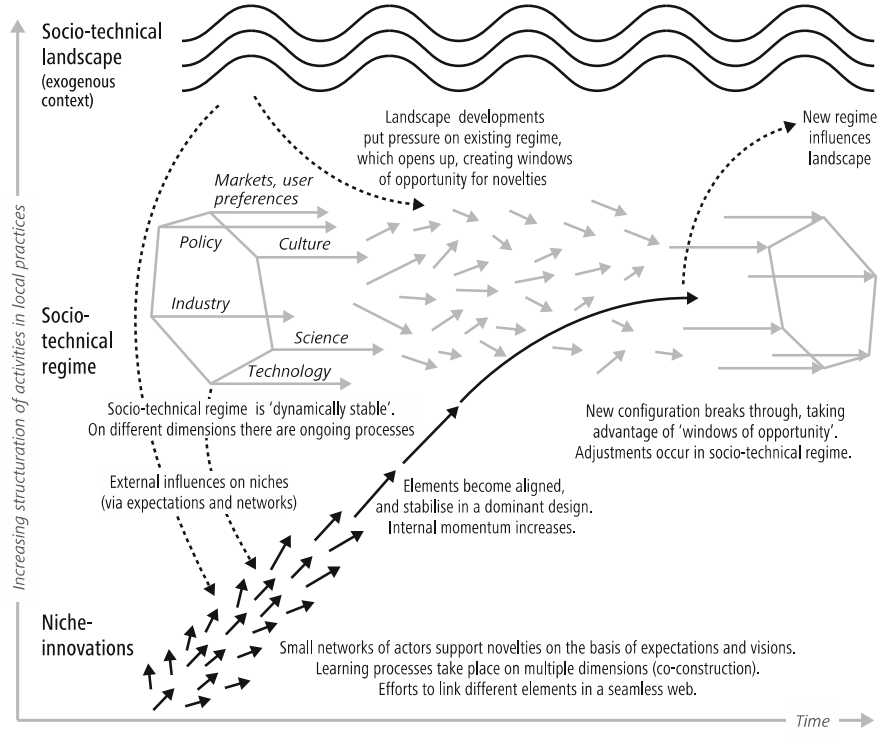

Fig. 2.1 The multilevel perspective on system transformation. *Source* Geels and Schot (2010: 25)

Figure 2.1 shows that the most innovation-friendly level is the *niche* or *micro-level* where small units or 'situated groups' experiment easily with alternative solutions, as long as the degree of interdependencies with overarching or neighboring systems is not too strong. Examples here range from single technology innovations like mobile phones to empowering local food production (e.g., Community Supported Agriculture or CSA). Their initial development often takes place under conditions shielded from the overarching regime logic. These can be laboratories for research and development in science, experimental pilots introduced by businesses, direct or indirect government subsidies for desired solutions, or the emancipatory initiatives of citizens.

Higher levels of structuration characterize the *regime* or *meso-level* because it hosts structures in the form of well-established institutional setups in governments and markets, scientific standards and technologies or infrastructure. They change much more slowly and define a framework for action that tends to stabilize the status quo because it limits the scaling and multiplying of alternative solutions.

Yet, the MLP is not intended to present a hierarchical ordering but rather embedded systems. It could and often is read as a bottom-up theory of change, in particular because the arrows that represent change-inducing pioneering activity in the graph emerge from the niche level. But it is important to point out that change can emerge on all levels. Pioneering initiatives can be little hubs of deviation and innovation within entities that fall into the *regime* grouping—for example, research and development units in big corporations or inter-ministerial units in government. An activity is pioneering if the solutions it promotes differ radically from the status quo. And typically, niche actors depend on support from pioneering actors within the regime institutions in order for their solutions to become part of an adapted or transformed system configuration.

For this to happen, an important role is given to the *landscape* or *meta-level*. It harbors all those aspects that intentional action will likely not be able to change in the short- or medium-term. These are natural developments like climate change but also deeply anchored human-made institutions like the market system or hegemonic paradigms, social values and cultural beliefs. This level forms the backdrop, or deeper structuration, of lower-level developments. Sudden expressions of ongoing changes here, like natural disasters, a massive financial crisis or an outbreak of right-wing violence against refugees, have the quality of shocks for the subsystems and their self-stabilizing processes. These shocks tend to be windows of opportunity for change, a point I will return to below.

Depending on the author, one finds slightly diverging descriptions of the level at which single aspects like market patterns or policy orientation rest, i.e., regime or landscape level. This choice often depends on the actual case researched and the individual view of the researcher as to what should and can be changed intentionally. The joint message is that the higher the level, the slower the change processes and the more difficult for individual actors to imbue transformational missions. But it also means the higher the level the higher the transformational

impact: changes in overarching systems always reshape the framework of action for smaller units, whereas only a critical number of changes on lower levels are likely to impact higher levels.

The other joint message is that despite the good intentions of many actors involved, unsustainable trends persist, a phenomenon that can best be understood through a systemic view that recognizes not only economic and technological dimensions of innovation but also institutional and sociocultural aspects. The latter affect not only which solutions take off but also whether their adoption will transform or perpetuate system dynamics. One great demonstration of the added value of such a holistic systemic approach is the search for answers for the widely observed 'rebound effect,' namely, while resource efficiency goals and standards reduce the relative resource use per product or service, overall resource use is not coming down.

This observation was originally made by William Stanley Jevons in 1865 regarding coal extraction. The steam engine alleviated the need for coal in one sector but the fall in prices then made it economically viable to use coal in many other contexts, which increased overall extraction again. This example is now known as the Jevons Paradox and he generalized it into the statement that a more economic use of a resource must not be confused with its sparing use (Jevons 1866). More recent examples include the technological advances in transport technologies for cars and planes, which have made each kilometer of distance traveled more efficient and therefore economically cheaper. The consequence was a spurt in kilometers traveled and rising emissions from the transport sector.

Thus, without checking holistically for the driving factors behind resource extraction, we cannot change the overexploiting trajectory. If we begin with the most obvious drivers, we must consider the number of people: population levels (landscape) are still growing and at the same time a significant percentage of people live with fewer material goods than they need for a decent life. But this can hardly explain the persistence of rising resource consumption in countries with saturated material needs and stable population levels. Here, when we examine the regime level, we find, for example, business models based on constantly increasing outputs embedded in market patterns geared at constant competitive growth of national output. As a consequence, billions are spent on marketing measures to ensure that a consumer culture (landscape level) guarantees demand for, or at least acceptance of, what could count as oversupply. This culture then runs counter to solutions that involve raising prices for resources that would in turn make products expensive: people have become used to rapidly changing fashion or technology trends and the short product-lives in throw-away use patterns and business models (regime). As a consequence, absolute resource use increases despite impressive technological efficiency advances in pioneering products or firms (niches).

Transition research therefore starts with one particular persistent problem or undesirable trend and seeks to find and understand the key reasons, drivers and stabilizers of the system to which it is host. The overarching term used for multifarious different stabilizers of certain system dynamics or development in

institutionalism theory is 'path dependencies.' All transformation researchers use it, albeit giving different degrees of attention to the technological, economic, institutional, sociocultural and ecological dimensions that path dependencies combine. So depending on the camp and also the individual researcher, such path dependencies include more directly visible political laws and regulations, infrastructural or technological limitations, market patterns and scientific knowledge, but also consumer behavior, power plays, firm strategies and economic transaction cost considerations (WBGU 2011a: 418–419). Moreover, socio-psychological aspects like norms, role expectations, lifestyles and self-images or shared beliefs play important yet less tangible roles (Welzer 2011). Complex system theory would say that path dependencies harbor important 'feedback loops' in that particular system. All of these usages of path dependencies capture processes within a system that hamper a change of course. So at least some of them need to be 'unlocked' if the problem or undesirable trend should discontinue.

Path dependencies also form the link between the MLP and the second concept for explaining transformational change, the *s-curve or multiphase concept*: path dependencies behind one particular problem do not necessarily adhere to one of the levels but might cut across them. The set of path dependencies behind the rebound effect was one example of this. And each context shows a different, historically grown setup of path dependencies, which means that one niche proposal or initiative may work in one region but not in another. And here we depart from any notions of and demands for blueprinting. Even if a solution is doing magic in one place, this does not mean that replicating it in another will lead to success.

Hence, the starting point of strategic transformative research designs is always one particular wicked problem in one defined context. After the challenge has been defined, the system that is relevant for understanding its existence and persistence is mapped, including aspects or elements from any MLP level if suitable. The results portray unique system boundaries: constellations with different scope, dynamics, impulses, agents, and room for maneuver. The next step then lies in developing ideas on how to intervene in these system constellations so that desired outcomes—like avoiding the rebound effect—become likely. This is where the multiphase concept as another key iconography of the transition community comes in. It is basically a very coarse model of a theory of change for complex systems and shows at which stages which intentional change initiatives seem promising.

The multiphase concept illustrated in Fig. 2.2 shows that transformational changes in complex systems do not unfold in an obvious and linear manner where the dosage of change-input equals that of change-output. Unless they are triggered by some drastic shocks from neighboring or overarching systems, system transformations require a build-up in which not much is visibly happening before tipping points are reached, after which a lot of change happens in a short period of time. After this chaotic and contested phase either a restabilization of the system or its collapse can follow. When this change pattern is captured in an illustration it resembles an 's', which is why the multiphase concept is also called the 's-curve.' Sequencing is typically divided into four stages:

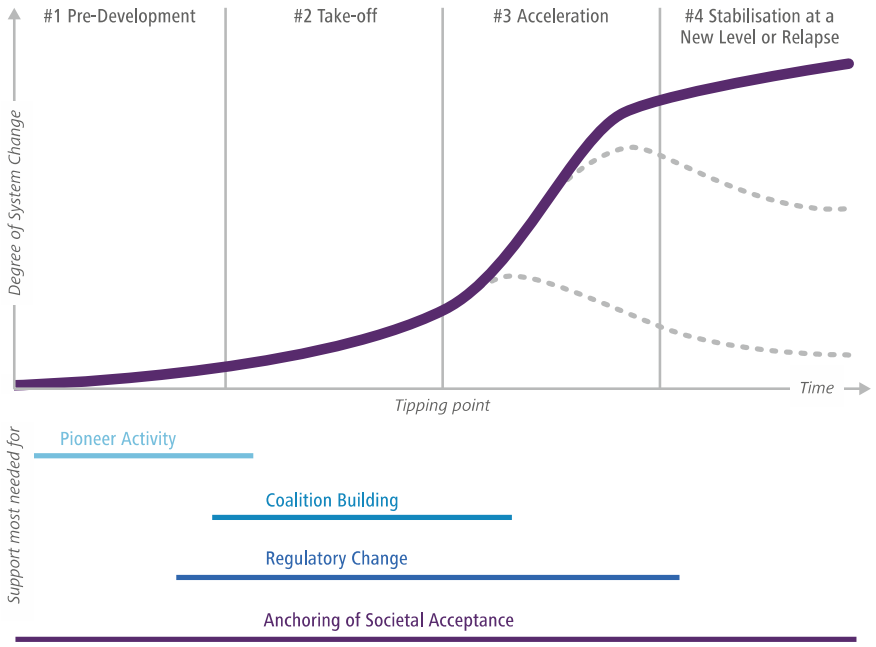

Fig. 2.2 The four-phase pattern of transformation processes. *Source* Based on Mersmann et al. (2014: 34)

1. *Pre-development*, in which a system is in a dynamic state of equilibrium and changes slowly but unobtrusively.
2. *Take-off* or point of ignition during which more coordinated niche activity and regime reactions gain momentum. These may lead to the tipping points followed by an…
3. *Acceleration* or *navigation* phase in which structural changes become possible and visible but hard to control. Eventually, at the stage of…
4. *Stabilization*, a new dynamic system setting emerges. This can be a transformed system in which the overall development trajectory is different, because it is informed by many niche elements and ideas. However, this can also be an adapted version of the old dynamic in which most of the challenges have been absorbed or subjugated by the old regime structures, so that some aspects are amended but the general development trajectory stays the same. In a third alternative, the system can collapse when it falls out of the order imposed by the former dynamic, should restabilizing feedbacks and activities be insufficient (Grin et al. 2010: 3–7).

The phase pattern was originally observed in natural systems but proves very insightful for social changes as well. It is part of all the reports reviewed in this chapter. Figure 2.2 provides an example illustration drawn up for a climate change financing project by myself and my colleagues at the Wuppertal Institute

(Mersmann et al. 2014). It has been labeled with ideas about which type of activities seem promising in each phase if a donor would like to support intentional transformational changes. In our particular case these have been climate mitigation and adaptation strategies with transformational impacts.

The basic message behind this phase concept is that stable systems, i.e., those whose path dependencies work in smooth dynamic alignment, will be immune to any attempts at trans*form*ational change. Their form is well supported by ongoing, often slightly adaptive activities that maintain stability. Only through increasing irritations do the alignments become brittle enough to provide space for more radical changes: those that challenge this form.

Such irritations can be new challenging knowledge (e.g., on climatic change), growing niche activities (e.g., around new renewable energy technologies), or emerging landscape changes (e.g., increasing droughts and floods). If these prevail despite adaptive calibrations, the alignments eventually stop running smoothly—hence the term tipping points. These tipping points are highly political because they mean that the feasibility, support and legitimacy of the old form has ceased, so struggles about what should replace it are intense. This replacement outcome could be a transformed one that embeds a new system goal or purpose—but could also be re-formed to accommodate some of the irritations but stay on a similar development trajectory. The multi-phase graph encapsulates this view: only with significant changes of path dependencies on the regime level will there be lasting transformations of the system's dynamics.

The thick purple line should not give the impression that the phases are unfolding in a linear fashion. Transformations are a rocky and highly contested ride. This graph is a gross simplified model of what would, in reality, zigzag considerably if viewed in more detail. The energy transition in Germany is a good example of how this simplified sequencing can help understand and inform the intentional transformation of large systems. The following provides a rough tour through important developments over the last few decades and groups them according to the phases. It also shows that all dimensions of path dependencies from cultural to technological are playing a role.

The important landmarks indicating the rising awareness in Germany that energy systems would need to be transformed were the 1970s oil crises and the reports about limits to the exploitation of natural resources. These first regime crises were reined in but the sociocultural anchoring of the awareness that a fossil energy development path was contested and risky prevailed. This fed into an already ongoing anti-nuclear movement that led to the creation of The Greens as a political party. The Greens got enough votes to enter the German parliament, the *Bundestag*, in 1983 and the 1986 Chernobyl nuclear power plant disaster worked like an accelerating shock from the landscape level for its political agenda. Environmental concerns became much more mainstream.

Meanwhile, from the early 1980s onward, technological developments slowly but surely made the idea of significant renewable energy production seem feasible. Niche players acted in a pre-development phase under favorable civil society and public discourse conditions. Some regime pioneers in the political and investment

community understood the potential and started to support these developments through targeted research initiatives into technological opportunities and transition pathways. In the political discourse these became solutions to what was established as a societal challenge and the first small feed-in tariff regulation in 1991 encouraged credit for technology pioneers.

Following Germany's 1998 elections, a new coalition government incorporating the Green Party started to develop renewable energy support schemes and the anti-nuclear agenda became a fully-fledged Renewable Energy Act. By 2000 this included not only an agreement on phasing out nuclear power plants over the following 25 years, but also differentiated support schemes for different renewable energy technologies. These were available to all end users of electricity who wanted to become producers by installing small-scale solar, wind or biomass power plants. The 'feed-in tariff' scheme provided guaranteed prices per kilowatt-hour of renewable energy fed into the national energy grid over 20 years. It obliged electricity utilities to purchase this energy but allowed for them to push the cost onto the final consumer bills.

This mechanism effectively created a return on investment security that attracted conventional banks and risk-averse investors into lending small enterprises, farmers and citizens money to install renewable energy technology. For the first time there was a technology market in a sector previously dominated by a few big companies whose long-subsidized centralized coal and nuclear energy infrastructure seemed more like oligopolies. Since these older business models had rendered the transaction costs of switching to renewable energy solutions prohibitively pricey in the past, no pioneering movement had been possible. The Renewable Energy Law hedged the risks of a plethora of new, decentralized energy producers and unleashed the competitive activity of many small- and medium-sized enterprises (SMEs) active in technology development.

By the mid-2000s the tipping point into the acceleration or navigation phase had been reached, and pioneering activities had become mainstream considerations. Fossil energy suppliers now felt threatened and tried to fight the regulation at all levels, e.g., attempting to make the EU declare feed-in tariffs incompatible with energy market integrations. But the renewable energy sector grew very quickly, created many jobs in rural areas with high unemployment and turned Germany into an international technology leader that inspired other countries. Thus, an environmental issue had found technology solutions and became solidly economic when it served the export interests of the German economy and found wide, bottom-up citizen support.

The share of renewable energy in the electricity mix increased steadily, debunking the strongly spun narrative that renewable energy systems were technologically unfeasible—although concerns about black-outs remain. However, a new narrative was established in which a transformation of the energy sector was both possible and in progress, drawing in many new participants.

However, unexpected side effects—like rapidly dropping prices for solar technologies; changes in international production relations (solar panels imported from China were much cheaper and their German purchasers were also entitled to the

feed-in-tariff support scheme); problems with the functioning of the electricity market (renewable energy has no fuel costs and therefore does not fit a spot market sales scheme); and some resistance to the alternative electricity grid infrastructure from civil society—led to a new and critical phase that required legislative changes.

Actors with vested interests in the fossil energy system inevitably used this strategically. When the government changed to a conservative party coalition with a very industry-friendly liberal party in 2009, a window of opportunity to open the Renewable Energy Act and terminate the agreements to phase out nuclear power plants emerged. This in turn boosted the revenues and stock values of the incumbent energy players. These had entered the renewables production and lobbied for electricity market regulation that would favor big suppliers over small ones and compensate conventional energy plant owners for being fall-back providers in periods when renewables could not deliver.

Although the flipflop on the long-standing nuclear exit encountered much public and political resistance in 2010, it was the Japanese nuclear catastrophe in Fukushima in March 2011 (a shock from the landscape level) that caused the conservative Chancellor Merkel not just to return to the nuclear-exit strategy but also to go even further by fostering a cross-party consensus on an energy transition roadmap. This consensus foresees tackling issues in electricity markets, compensation injustices and electricity provision infrastructure that are all in line with the goal of a renewable energy system. Yet, at the same time, the former plan for rapid transformation was also watered down when the priority to get as much renewable energy as possible was replaced by a target of 45 % by 2020.

Its proponents argue that this is due to safety of supply and better cost management, but it is clearly also less disruptive to the incumbent business models, whose champions get public money to dismantle the previously lucrative nuclear power stations. Nevertheless, these providers have been hard-hit by a plunge in stock market value and revenues. So the German example clearly shows that each transformation involves changes in who is winning and who is losing—and that incumbents will not easily give up on status quo solutions.

So it is no surprise that Germany is still grappling with putting the energy transition commitment into practice and will be for decades to come. It seems that the radical vision of a renewable energy system will not be reversed: its purpose has been changed from ‘as much energy as possible at lowest costs’ to ‘climate-friendly and long-term secure energy.’ The cost effects are often used and misused in arguments against the transition but its sociocultural anchoring is still firm and broadly based. But the regime restabilization actually required to achieve this goal is far from complete: intense struggles are taking place in the social, economic, cultural, technological and political dimensions of the energy system. Who is paying how much for which type of electricity? Which business models receive which type of financial support? Where can wind turbines and solar panels be located so that they fit the landscape? Which storage capacities will be available to smoothly provide irregularly harvested renewable energy? Which party coalition is supporting which business sector and how do Germany’s European neighbors react to a transition that also impacts their energy grids?

Large-scale system transitions take time and are full of political battles and small steps. The actors that steer or influence a transition are, at the same time, part of it. Their freedom is a structured one, framed by the existing path dependencies. Here we find the basis for the concept 'radical incremental transformations': no deep and wide changes will happen without pre-development and build-up leading to frictions and crises that provide the space for them.

2.1.2 Socio-ecological Systems and Their Safe Operating Spaces

From an ecosystem perspective, the main question for the SES camp could be summarized thus: how can we best understand sustainable human societies and apply system innovations to achieve them? Important institutional research in this field is carried out at the Stockholm Resilience Centre in Stockholm, Sweden, and also the STEPS Centre in Brighton, United Kingdom.

One report that made significant waves in Germany was the WBGU's 2011 *World in Transition: A Social Contract for Sustainability*. The WBGU was founded just before the 1992 UN World Summit on Sustainable Development with the mandate of providing independent scientific advice. A key idea promoted by the WBGU in an earlier report was that of "planetary guard rails" similar to the "Planetary Boundaries" introduced by Rockström et al. (2009). While acknowledging other environmental domains and their overuse, the main emphasis of both the WBGU guard rails and the 2011 transition or transformation report (the German title uses 'Transformation' but the English translation is 'transition') lies on climate change (WBGU 2011a).

Overall, the single most important issue and overarching goal of the different measures and strategies discussed, is the avoidance of catastrophic climate change with all its implications for "the world's ecosystems and their ability to sustain human life." Given the wide-reaching consequences of the carbon cycle for life on earth, a transformation toward "climate compliance" is declared an "ethical imperative" similar to that of the abolition of slavery and child labor (WBGU 2011c: 1).

Climate change is introduced as the most important environmental global challenge and the report discusses other global megatrends in order to understand interlinkages: economic development; democratization; global energy supply and demand; urbanization; and patterns of increasing competition for land use between food, bio-energy and forests. It also seeks to identify how these and ecological earth system trends interrelate. As a result, the three areas with the highest transformative impact are identified. These are the sustainable design of future energy systems, urbanization trends, and land use patterns. The programmatic gist of these required transformations is to turn current carbon-based economies into ones based on renewable, or at least recyclable resources. The magnitude of this remodeling is

equated with "the two great revolutions which have crucially shaped world history: the Neolithic Revolution (the diffusion of arable farming and animal husbandry) and the Industrial Revolution (the transition from an agrarian to an industrial society)" (WBGU 2011b).

In line with the focus on the fossil fuel foundations of our current development model, one part of the *World in Transition* report provides detailed information about how these megatrends impact energy use. It also discusses the technological and economic feasibility of decarbonizing our economies and concludes that decarbonization is possible if a supportive "social contract" between state, civil society, business, science, and research is agreed. In essence this contract involves the agreement that new rules are necessary for the economic system, and also conclusions on how development could subsequently proceed.

While many of the contract's rules will impact on very structural technological, economic, political and ecological path dependencies, the prime root for its conclusion lies in the sociocultural domain: the ethical basis that can bind such diverse interests could lie in our responsibility toward future generations, combined with ecological responsibility and a culture of democratic participation. If the contract were based on such a visionary agreement (read: a better purpose for development), it would provide the legitimizing backdrop from which a 'proactive state' engaged to change the rules and incentives so that sustainability transformations could proceed. As a potent manifestation of the contract the country could embed sustainable development or climate protection into the constitution.

Wide discussion of such a new social contract is intended to generate the political will and public support necessary to break some of the current barriers to policy change, namely powerful interests vested in the fossil-fuel-based infrastructures and consumption patterns of our economies today. The antidote to powerful lobbyists is public opinion, which the authors claim has undergone a significant shift in the direction of environmental awareness and post-materialist value sets. The Gallup Institute's *World Values Survey* is cited as one important base of evidence for this, as are the ongoing initiatives on new measures of progress, wealth and well-being. Thus, the new social contract would find its expression not primarily on paper but rather in people's consciousness: it changes what they judge to be appropriate and desirable policy and product options (WBGU 2011c: 2).

Adopting the STRN concepts, the report foresees that extended participation of enlightened citizens would not only legitimize but also improve policy implementation, which creates new room for pioneering sustainable business and citizen practices that test prototype practices for a sustainable society. These may turn into niche solutions, like an eco-village, a car-sharing business or a renewable energy cooperative but also possibly set a new trend. Such pioneers of sustainability practices operate in all parts of society, business, non-governmental organizations, culture and even in political decision-making.

These emerging solutions put visions into practice and provide proof to policymakers that alternatives to fossil-based energy dependence are not only thinkable

but actually possible. Through strategic niche management the state could therefore create more spaces in which social and technological experiments are protected from immediate market exposure. Meanwhile, the niche players can also increasingly press for policy changes in the regulatory regime so that their solutions are able to expand instead of being held back by the current path dependencies on the regime level, like vested interests and structures of production and consumption.

Following citizen pressure, supportive regime-level changes are also proposed. Institutionalized foresight and long-term orientation expresses the spirit of the contract because it counters the dominance of short-term orientations in democracies with frequent voting cycles: the immediate costs to one's core voters are very unpopular, even if they help prevent much higher costs in the future. In addition, improved democratic participation in the formulation of policy changes is supposed to up their acceptance and legitimacy. Some possible accountability mechanisms to these ends include a future chamber of parliament that frequently reports on the long-term effects of policies and programs, and also ombudspersons whom citizens can address in cases of perceived maladministration or with whom civil society organizations can work before bringing cases of environmental damage to the courts.

Thus, transformation occurs when regime structures are changed to a meaningful degree, accelerating the spread of existing pioneer solutions and incentivizing even more radical ones. Taken together, the "requisite transformation encompasses profound changes to infrastructures, production processes, regulation systems and lifestyles, and extends to a new kind of interaction between politics, society, science and the economy" (WBGU 2011c: 1).

In summary, the emergence of the Great Transition is described as a rather evolutionary learning process, in which more knowledge and sustainability values will make things better and bring down powerful vested interests. Key interlinked processes mentioned here can be summarized as:

- Learning about technical performance, market demand, infrastructure requirements, policy instruments and symbolic meaning.
- The articulation and adjustment of expectations or visions that guide innovation activities and help attract attention and funding from additional actors.
- The building of social networks that expand resources and capabilities (WBGU 2011c: 1).

In this way the authors of the 2011 WBGU report put strong emphasis on the overarching role of joint ideas and visions in encompassing change processes, and add these sociocultural aspects to the STRN perspective. They also discuss at length what the role of science itself should be in these processes. As the WBGU is firmly in the SES camp, this includes understanding the carrying capacities of our ecosystems. The WBGU also draws attention, however, to the role that transformative science plays in this context, and promotes a notion that science should become part of bringing sustainability solutions to life. The theory of change is summarized as follows:

> In co-operation with policymakers, business and society at large, the scientific community is tasked with developing visions for a low-carbon society, exploring various development pathways, and supporting sustainable technological and social innovations. Education should help to create problem awareness and promote systemic thinking, thus empowering people to participate in and shape the transformation process (WBGU 2012: 1).

When considering the redesign of energy systems, urbanization trends and land use patterns, a study of the wider setting of correlations and side effects will enable people to not only think about more efficient cars but also to explore how mobility can be delivered in the most sustainable way (WBGU 2011a: 342–343).

Here of course we find a strong link with the emphasis on mind-sets in this book, and my call to integrate political economy stems from what I find to be a slightly naïve conception of the origin and roles that ideas and paradigms play in political processes and their relation with power. While hardly anyone would explicitly argue against values like the protection of future generations or our environment, the devil lies instead in the detail—in this case the worldviews held. The same value set might lead to very different proposed solutions, given differing worldviews and their focuses. Mainstream economic mind-sets tend not to support the regulation of markets precisely because this would hamper individual freedom, happiness, creativity and meritocracy—values to which most people would subscribe.

In one paragraph, the report mentions that Karl Polanyi's interpretation of the industrial revolution, *The Great Transformation* (1944), describes how "attitudes and considerations inspired by personal benefit maximisation have established themselves" and that with mass production, "the 'good life' has increasingly become synonymous with material wealth" (WBGU 2011a: 67). The proposals for change in the report, however, leave this deep cultural wiring and its mental path dependencies unchallenged. Hence, it does not say how the observed value shifts can be implemented if there is no discussion of the paradigm behind the evidence and narratives used to argue which policies are suitable to embed the shift.

2.1.3 Socio-ecological-Technical Systems and Their Repurposing

The discussion of paradigms and mind-sets is an important aspect of the 2002 report *Great Transition: The Promise and Lure of the Times Ahead*, which primarily explores the question: how do we best understand human choices and apply this understanding in times of transformation? It is the result of seven years of collaborative efforts between the Stockholm Environment Institute and the Tellus Institute in the United States. The goal was to describe and model scenarios for potential future development paths, including one that would be a Great Transition toward sustainable development.

Making reference to two former "sweeping macro-transformations" from the Stone Age to early civilization about ten thousand years ago and from there to the modern era in the last one thousand years, such transitions, says the report, were

marked by a change in the "entire cultural matrix and the relationship of humanity to nature" (Raskin et al. 2002: 3). With this definition the report combines an *ecologically embedded socio-technical view* (SETS) with an economic lens on relationships. The authors describe social organization, the character of the economic system, and capacity for communication as the three core dimensions that have been transformed.

The modern era is seen as beginning with the advent of nation states as the social and political forms of organization that interacted with the establishment of capitalist-industrialist forms of production and consumption. In parallel, communication also expanded its geographical scope and became more widely accessible through printing. The ongoing twenty-first century transformation toward what the report calls the "planetary phase" is marked by the globalization of all three dimensions: governance beyond nation states, multinational economic relationships and information technology communication connecting almost all parts of the world. Another pattern observed is increasing social complexity, an accelerating pace of change and spatial connectedness, so that few places are immune to what takes place elsewhere. From this the authors conclude that the next transition should not last ten thousand or a thousand years, but around a hundred.

The 2002 report locates the origins of the modern era transition in the characteristics of the modern capitalist industrialist system that overthrew the authority of a society based on birthright, economic traditionalism and rigid class divisions. Instead, law-governed institutions, market economies and a society based on scientific ingenuity and mass production emerged. The authors also observe that these institutions were designed to primarily harness some aspects of human potential, those for accumulation, acquisition and innovation: "A permanent revolution in technology, culture and desire spawned an explosion of population, production and economic complexity. Ever hungry for new markets, resources and investment opportunities, the self-expanding and colonizing industrial system began its long march toward a world system" (Raskin et al. 2002: 7).

The planetary phase was a necessary outcome of this explosion because the fate and relationships of peoples in different parts of the world are now too connected for anyone to think that developments in one part of the world can happen without impacting others. In addition, the fate of and relationships between people and nature are too intertwined for anyone to believe that the destruction of ecosystems can leave humanity unscathed.

So the report focuses not on *whether* there will be a transformation but instead on the fact that one is already underway. It is up to purposefully acting people to influence which path this transformation will take. In terms of what drives conscious human action, the authors distinguish several different mind-sets. Each of them embodies beliefs about the potentials and qualities of technological, human and natural changes. They amount to paradigmatic differences regarding the assumptions of what we can know about the world, what we say the world is like and how we presume it ought to be. This broad categorization distinguishes three typical lenses through which to anticipate the future:

- *Evolutionists* foresee conventional worlds because they are convinced that the dominant patterns of the modern era can be adjusted to deliver prosperity, stability and ecological health.
- *Catastrophists* foresee a future of barbarization because they predict that environmental, social and economic crises will lead to a perfect storm.
- *Transformationists* share these concerns but still believe that a Great Transition toward sustainable solutions is possible.

The authors describe two development scenarios for each of the three worldviews in the event that each type of thinking—evolutionist, catastrophist, transformationist—guides people's actions and decisions in consumption, production and policymaking. Examples include whether or not societies will elaborate policies aiming to decouple resource use from economic growth or if they might, at the same time, aim to reduce overall resource use. Other paradigmatic crossroads look at what might happen if we continue to pursue more GDP per capita as a means for better living or, by contrast, if the consumption-based welfare idea is challenged. Still others examine whether the financial markets are perceived as efficient drivers of economic development or not, and so on.

In a massive modeling endeavor, the study substantiates the narratives with quantified estimates on resource use and availability, economic output numbers and some social criteria in each scenario. This is done by estimating how selected indicator developments—e.g., emission or resource extraction patterns—would be impacted by the combined consumption, production and policy choices described as likely for each of the different worldviews. The table in Fig. 2.3 summarizes the scenarios and the predicted quantitative trends.

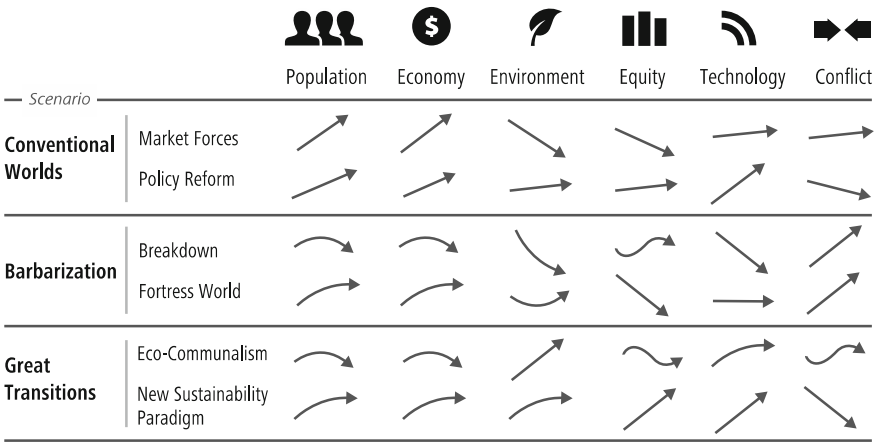

Fig. 2.3 Great transition scenario structure with illustrative patterns of development. *Source* Based on Raskin et al. (2002: 16)

In a 2010 paper, some of the report's leading authors updated the framework by reducing the number of scenarios to four—market forces, policy reform, fortress world and a Great Transition—and fitting them with data from 2005 (Raskin et al. 2010). They also developed a Quality of Development Index (QDI) with updated data from 2005. This combines sub-indices on human well-being, community cohesion, and environmental protection to "consider the quality of development—the degree of well-being in human lives, the strength of communities, and the resilience of the biosphere—rather than gross domestic product, the misleading conventional measure of 'development'" (Raskin et al. 2010: 2631). The website *greattransition.org* also has an animated short film highlighting the key messages.

In both report and paper, only the Great Transition or new paradigm scenario leads to long-term prosperity within Planetary Boundaries. This scenario involves "profound historical transformations in the fundamental values and organizing principles of society. New values and development paradigms ascend that emphasize the quality of life and material sufficiency, human solidarity and global equity, and affinity with nature and environmental sustainability" (Raskin et al. 2002: 15). Here we find a strong overlap with the WBGU report, including the urge for a conscious repurposing of what development is about (like the social contract on climate compliance). Yet, this report does not start the reflexive change process with the spread of knowledge about planetary guardrails, but by asking what purpose economies should have in the first place. This question precedes the assessment of how this can be done sustainably and in this scope comes close to a Second Enlightenment discourse.

In order to highlight the influence of basic paradigmatic questions concerning 'being in the world' on the more specific mind-sets that guide policy choices, the Global Scenario Group combined each development scenario with one 'archetypical worldview' by referring to one well-known philosopher and his core ideas about the world. Many of these 'patrons' are economists. The list of the key attributes in their thinking of course emphasizes the fundamental differences, so the nuances of each view get lost:

- Adam Smith and John Maynard Keynes are the main protagonists for the evolutionist worldview but differ hugely on the question of how best to run economies smoothly: The invisible hand of the market is the best allocation tool for Smith (scenario *market forces*) whereas Keynes emphasizes the role of government interventions to secure demand when capitalist relations lead to crises (scenario *policy reform*).
- Among the catastrophists we find Thomas Robert Malthus and Thomas Hobbes, neither of whom were very optimistic about the human capacity to become more civilized. Malthus is connected with a *breakdown* scenario because of his claim that limited resources will necessarily mean that people die if the population becomes too big. Hobbes stands for an armed defense or *fortress world* scenario because he depicted the natural state of the world as one of warfare between humans resembling beasts.

- For the transformationists, the authors refer to William Morris, E. F. Schumacher and Mahatma Gandhi as well as John Stuart Mill. All of these thinkers question whether humans really need to be selfish, endlessly accumulating competitors. The first three formulate ideas about a decentralized variety of small and beautiful communities in self-determination (the *eco-communalism* scenario), while Mill sticks with larger units but envisions a post-industrialist and post-scarcity development model (a *Great Transition* or *paradigm shift* scenario). All three aim for human development rather than material acquisition once subsistence needs are met (Raskin et al. 2002: 17).

The main message of the Great Transition report thus lies in assessing the combination of worldviews and values in order to understand differences in ideas, imaginaries and convictions about the best way forward. The Global Scenario Group labeled these 'soft' aspects of values and needs, knowledge and understanding, power structures and culture as the "ultimate drivers" of transitions. The more readily observable trends in politics, economics, technology and governance are by contrast mere "proximate drivers" (Raskin et al. 2002: 50).

Most of the time, as the concept of futures literacy cited in the introduction indicates, humans operate without much awareness of their ultimate drivers. It is at the moment of conscious reflexivity that unstated ideas and assumptions about the world—possibly flawed—are revealed and contested. Here we find another reason why transformation researchers herald the moments of crisis or increasing irritation as moments of potential. They are not dismissive of the terrible consequences that potential runaway effects might have when feedback loops turn trends into uncontrollable developments, but, as the Global Scenario Group points out and the s-curve in Fig. 2.2 illustrates, they are instead 'branch points' where conscious human action can have very meaningful influences on the future of the planetary system.

While many transformation researchers discuss the role of crises in structural changes, few make such an explicit link to the ideas to which humans will revert when searching for strategies to deal with them. One rather unexpected ally is Nobel laureate Milton Friedman, one of the leading thinkers of the mainstream economic paradigm. His theory of monetarism was instrumental in transforming the governance structures of many countries and he is clear about the role it played as a political tool: "Only a crisis—actual or perceived—produces real change. When that crisis occurs, the actions that are taken depend on the ideas that are lying around. That, I believe, is our basic function: to develop alternatives to existing policies, to keep them alive and available until the politically impossible becomes the politically inevitable" (Friedman 2002: xiv).

Karl Polanyi was another thinker who was very clear about this interplay. Since I believe that Friedman's ideas are more of a problem for sustainable development than a solution, this last subchapter is a quick excursion into the thinking of Polanyi, who could also be called the father of the idea of a Great Transformation: his 1944 book carried this title and he is often referred to in contemporary transition

and transformation writings. But reference is seldom made to the fact that his work already contains much of today's critique of the way in which mainstream economics deals with issues of sustainability. It does, however, provide a very good understanding of why systems built on these principles have severe blind spots when it comes to delivering on human needs and respecting the quality and dignity of nature.

2.1.4 *The Economic Paradigm Shift Behind Today's World: Karl Polanyi's Heritage*

In *The Great Transformation. The Political and Economic Origins of our Times*, Polanyi described what he saw as the complete overhaul of the core operating principles of societies, which took place when feudal agriculture was replaced by the capitalist industrialist market model. He used the term "Great Transformation" because it demarcated the change from one civilization to another through a process of continuous change of values, knowledge, norms, rules and regulations, starting in the late eighteenth century (Polanyi 1957: 3).

His analysis focuses on Great Britain as the origin of industrialization. While applying a historical point of view, his work does not reconstruct a sequence of events in a perfectly chronological manner, but seeks to identify trends in the emergence of institutions and social technologies and to track which philosophical and economic ideas or reasoning lay behind them. To shed some light on these ties, Polanyi describes real world developments as well as core theoretical concepts and the explanations of influential thinkers of the time. This account therefore paints a picture of how creative and reflective actors provide ideas and explanations for real world developments and in so doing influence sociopolitical responses, sometimes very explicitly.

His analysis shows how the basic ideas of what I will describe as the mainstream paradigm started emerging in the eighteenth century, and have since underpinned a massive reorganization of the social technologies and institutions guiding human development. To Polanyi, the most powerful of those ideas was the substitution of the economic motive of subsistence with that of gain. Polanyi discusses how the philosophers and scholars of that time were instrumental in presenting this perspective as a more accurate description of reality, one that was even natural or at least desirable. He singles out Adam Smith as particularly influential with his argument that it is a deeply natural human inclination to barter, trade and exchange in order to maximize gain. Smith also made self-interest the fundamental human drive behind the pursuit of those activities (Polanyi 1957: 68–70). Polanyi adds frequent references to other influential thinkers like Thomas Malthus, Jeremy Bentham, David Ricardo and Joseph Townsend, who nurtured the view that this inclination would need to be unleashed fully if man were to escape the fetters of poverty and starvation. Over time the new concept of 'interests' replaced what the

church had condemned as greed. The invisible hand of the market was the proper solution for facilitating this natural rewiring efficiently and for punishing those who were not contributing valuable assets or skills.

By spanning the differences and similarities in the work of thinkers of the period, Polanyi found that the common new imaginary for progress had become what he called the "stark utopia of a market system" or the "matrix of the self-regulating market" (Polanyi 1957: 57). He offers many quotes from key philosophers and politicians of the time when describing how, inspired by this new vision for progress, both economic theory and policymakers occupied themselves with seeking out and resolving the barriers standing in the way of the efficient and profitable running of market societies. Some of the leading thinkers even established factories or other institutions to that end. Another important theme involved outwitting the limitation that nature had put on production by applying increasing amounts of energy, machinery and capital.

Polanyi does not describe these changes as a smooth rolling out of a blueprint, but as a conflict-ridden process which involved multiple changes in technology, social groupings and regulation, all influencing each other in a paradoxical pairing of unprecedented material production capacity with unprecedented poverty. He describes intricate correlations between technological developments, new sources of energy and the introduction of big machinery and factories, land enclosures for mass wool production and a new financier class providing capital for those investments while brokering increasing international trade, which in turn incentivized even more mass production.

Instrumental in all this were state and local government regulations that either accelerated or slowed down certain trends and developments. These concerned, for example, land enclosures, definition and protection of private property, poor protection laws or their abolition, or allowing capitalist merchants access to local markets. Important also was the invention of the gold standard behind the emerging monetary system, which in turn fuelled the trend of internationalization.

Polanyi's historical observations describe how societal relationships became increasingly focused on profit in the form of money as the general expression of value. Increasingly, processes of collaboration were governed by newly created monetary tokens, social relationships, payments and newly calibrated ownership structures. Eventually most income was derived from the sale of something or other. This, combined with the structural developments of mass production, impelled a highly differentiated division of labor that would be more efficient in terms of the generated output.

So in line with the big philosophers of the period, constant economic gain became the new image for successful societal organization, supplanting culture, custom and religion. The effect was indeed transformational: 'Ultimately,' Polanyi sums up, "that is why the control of the economic system by the market is of overwhelming consequence to the whole organization of society: it means no less than the running of society as an adjunct to the market. Instead of economy being embedded in social relations, social relations are embedded in the economic system" (Polanyi 1957: 57).

It is important to note that Polanyi's critical view of the market system does not lead him to neglect the existence and importance of markets in history. Indeed, he analyzes at length how these were organized by different principles at different times and in different places. The Great Transformation lay precisely in turning away from these long-approved principles of collaboration like reciprocity, redistribution or property ownership. In his view, "nineteenth century civilization alone was economic in a different and distinctive sense, for it chose to base itself on a motive only rarely acknowledged as valid in the history of human societies, and certainly never before raised to the level of a justification of action and behavior in everyday life, namely gain" (Polanyi 1957: 30).

This interplay between theory, power and policy is the underlying theme in Polanyi's opus. Following the overarching imaginary of the market system, the key mindshift that he put center stage was the view of humans, nature and capital as that market system's input factors: successful development strategies needed to ensure that labor, natural resources and investments were available for the continuous and smooth expansion of production and consumption. In effect this meant conceiving of humans, land and money as what he calls "fictitious commodities." The frame with which their governance is approached becomes one of economic production.

Polanyi is clear that from his point of view this transformation inevitably leads to unsustainable developments. Human life, the environment and money are conceptualized and organized as if they have no other existence or purpose than to be sold for profit. To him this alone renders the market society idea 'utopian' and inherently destructive for subjects robbed of their real qualities. 'Labor,' he wrote,

> is only another name for a human activity which goes with life itself, which in its turn is not produced for sale but for entirely different reasons, nor can that activity be detached from the rest of life, be stored or mobilized; land is only another name for nature, which is not produced by man; actual money, finally is merely a token of purchasing power which, as a rule, is not produced at all, but comes into being through the mechanism of banking or state finance. None of them is produced for sale (Polanyi 1957: 72).

To Polanyi, the logical consequences of this were poverty for most workers needing to sell their skills and an overexploitation of nature. Political interventions were frequently necessary to prevent this inbuilt tendency of market systems from destroying its real basis.

Social history in the nineteenth century was thus the result of a double movement: the extension of the market organization in respect to genuine commodities was accompanied by its restriction in respect to fictitious ones… Society protected itself against the perils inherent in a self-regulating market system—this was the one comprehensive feature in the history of the age (Polanyi 1957: 76).

The influential nineteenth-century philosophers or economists whom he cites, however, see the origin of the misery precisely in these regulatory efforts. They believed that without public interference and by shedding former organizational patterns, market dynamics and their tendency toward equilibrium would lead to the most efficient allocation of resources—from which everyone would prosper eventually. Some structural adjustment costs for some groups or ecosystems might

emerge in the short- and medium-term but the less policy interfered, the faster the adjustments would be (Polanyi 1957: 135–150). Seeking an explanation for this interpretation he describes a "blind faith in spontaneous progress" that would be brought about by the freeing of the market system from the constraints of treating everything as a commodity (Polanyi 1957: 76).

Most of today's discourse around progress, successful development and individual-cultural aspirations still holds 'gain' as the overarching goal, and fictitious commodification is still expanding, even though voices are increasingly raised over its negative impacts. The imaginary of fictitious commodities is also very much alive and kicking when political decisions around environmental protection or social welfare are judged by how much 'the (financial) markets' will accept and when a society's or businesses 'productivity' or 'competitiveness' is hampered.

Under current political and economic structures—i.e., the manifestation of the market system utopia—this is of course a rational way of looking at what is likely to happen. This is why former chief economist of the UK Sustainable Development Commission Tim Jackson and other scholars speak of the "Growth Dilemma," in which the current type and rate of economic growth threatens ecosystems and social well-being alike, although the current system dynamics also mean that discontinuing it will lead to unemployment, drying up of investments and broken social protection systems (Jackson 2009: 46).

2.2 Summary: Paradigm Shifts and Large System Change: Humanity's Structured Freedom

To summarize the findings of this chapter, I will introduce a few concepts I find key to understanding how to work toward system innovation without risking system collapse or intensified rejection of change attempts. These concepts place humans as sense-making actors at the locus of intentional change. After all it is people who argue, evaluate and struggle over which purpose any SETS should fulfill, how this could best be done and whether any updates are necessary or desirable.

At its outset, the sustainable development agenda called for a repurposing of the overarching development goal, away from economic gain as an end in itself. Yet, the agenda primarily ended up positioning it as the crucial means to the higher ends of poverty alleviation and the ability to afford environmental protection. In effect, this meant that most of the sustainable development strategies actually kept it as an end in itself and tried to provide it more efficiently or in a 'dematerialized' manner. The prime agenda became that of decoupling economic growth from environmental destruction, or doing more with less. Doing less was and is simply not in the cards, anywhere or for anybody. Implementation thus sought to improve an otherwise mainly uncontested way of thinking, planning and conceptualizing development. The mental model continued to be blind to any possible solutions that would imply 'sufficiency' or 'enough' as possible goals. Poverty remained defined solely by

material possessions and monetary income. This fell short of causing the upset to the human self-image that the *Brundtland Report* had predicted would result from seeing Earth from space.

This upset to the human self-image is what system-thinking scholars like Donella Meadows call paradigm shifts. She also calls them "high leverage points" for transforming systems. To me, paradigm or mind shifts are the bridge between the radical and incremental aspects of transformation strategies: radically different imaginaries of potential future developments influence the formulation of new goals for the system that can then be implemented step by step, changing the rules, procedures, roles and norms accordingly.

This strategy is in line with Meadow's approach to working on system innovations. In a seminal article about *Places to Intervene in a System*, Meadows proposed a hierarchical list of possible leverage points for system change. As illustrated in Box 2.1, it is ordered by increasing effectiveness for transformative change, coupled with the possibility of actually influencing it. The more embedded the identified points are within the deeper or resilient structurations of a system, the more difficult they will be to change. The resulting change however, will also be more lasting.

Box 2.1: Places to intervene in a system ranked by increasing order of effectiveness. *Source* Meadows (1999: 3).

12. Constants, parameters, numbers (such as subsidies, taxes, standards).
11. The sizes of buffers and other stabilizing stocks, relative to their flows.
10. The structure of material stocks and flows (such as transport networks, population age structures).
9. The lengths of delays, relative to the rate of system change.
8. The strength of negative feedback loops, relative to the impacts they are trying to correct against.
7. The gain around driving positive feedback loops.
6. The structure of information flows (who does and does not have access to what kinds of information).
5. The rules of the system (such as incentives, punishments, constraints).
4. The power to add, change, evolve, or self-organize system structure.
3. The goals of the system.
2. The mind-set or paradigm out of which the system—its goals, structure/rules, delays, parameters—arises.
1. The power to transcend paradigms.

This list of leverage expressed in their abstract systems-thinking language works for society-wide change as much as for small systems like, for example, families or communities. The examples in brackets refer to political systems and I am most

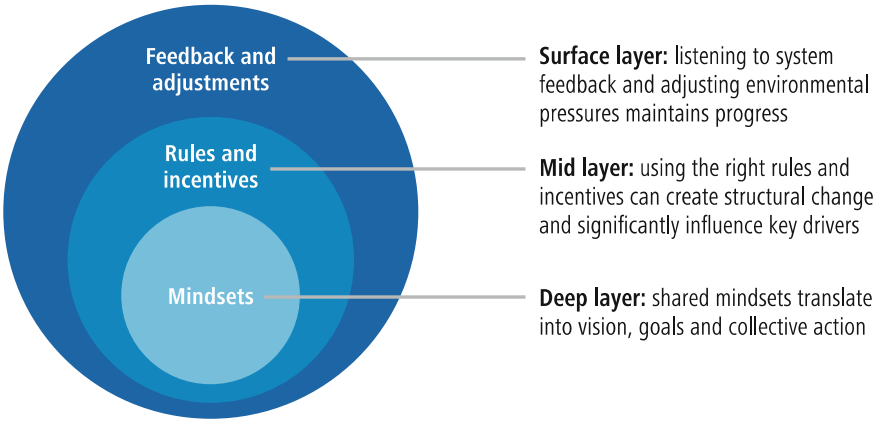

Fig. 2.4 Layers of leverage in system innovations. *Source* Based on Meadows (1999), illustration from UNEP (2012: 422)

interested in the top three points. The reasons are illustrated by the United Nations Environment Program *GEO-5* report for the UN Conference on Sustainable Development in 2012 (Fig. 2.4).

Here we see that the outer layer (or low-ranking adjustments in Meadows' list), will change little in the overall dynamic of development: Putting different people in charge of making political or managerial adjustments is not going to bring about a system innovation as long as the levers they pull are the same as before. They can only use them with the same information and the same rules as before and thus keep on pursuing the same old goal. Thus, while the exchange of CEOs or political leaders is often sold as a radical measure, it may not turn out to be radical in effect unless the new leaders start repurposing the system by tackling the high leverage points.

Unfortunately, most of the attention in sustainable development thinking has focused on adjusting to system feedbacks or tackling the symptoms of environmental degradation and of extreme poverty. Most of the resource efficiency agenda remained within this remit, as did a poverty alleviation agenda that declares yet more growth for the richest to be a precondition for redistribution measures. This is understandable given that these changes are easily visible and can be measured in quantitative numbers, both of which are important standards in project planning and evaluation under the current short-term, cost–benefit paradigm. This is also not very surprising in political and economic systems in which having more than others is seen as an indicator of merit and superiority and where the avoidance of short-term costs for voters and stakeholders is what counts most for election purposes or investment decisions. It is also very understandable in situations in which the bare necessities for life must be met and path-dependent solutions are the easiest, fastest or economically cheapest remedy for disaster prevention.

The problem is that staying on lower leverage point levels rarely translates into transformational change of the overall system dynamics. One metaphor for this has been "arranging the deck chairs on the Titanic" (Meadows 1999: 6). Only if changing these lower parameters results in ramifications higher up the leverage point list can they lead to successive, wider-reaching changes. If a government increases the minimum wage by 10 %, for example, is this because people need social security payments on top of what jobs pay and this risks ruining the state budget? Or does it advance the goal of limiting the maximum differential in income between different people working the same hours? Is it simply a measure to keep the low paid out of poverty statistics, or is it a move to lower inequality as a benchmark for sustainable societies? The first means no more than dealing with the symptoms of a remuneration pattern in which people are unable to pay their rent, even if they work full-time. The latter examples, however, stand for a qualitatively new goal according to which barriers are removed.

Thus, changing the third highest leverage point in Meadows' list—the system goal—usually means that many of the lower leverage points will have to be acted upon to adjust the system's development paths accordingly. Yet, support for a deeper paradigm shift (the top two of the leverage point list) is still not readily visible in the SDG agenda. The prime benchmark for reducing inequalities, for example, still excludes any limits to the gains of the already very rich, but instead aims to produce a comparatively faster gain for those with less. Gross Domestic Product should continue to grow everywhere, including in rich countries with stagnant population levels.

Yet, the goal of sustainable development was defined as meeting the *needs* of the people today and in the future, not as meeting rising per capita GDP. Repurposing a system accordingly raises the questions of what human needs are, how they are best understood and served, and not simply extrapolating the old unstated idea that more economic gain means more need satisfaction. If this paradigm goes unaltered, the imaginaries, narratives, models and proposals based on it simply do not capture the idea that much damage is caused only *because of the type and speed of growth to which we aspire*.

Meadows herself also makes reference to the growth example when she points out that this phenomenon is typical. People sense where leverage points are but often tend to push them into the wrong direction. Everyone sees that growth is critical, but most people push for more of it instead of thinking about the damage which would be spared if we had slower, selective, differently defined growth, or even a steady-state economy (Meadows 1999: 8).

Polanyi included this future-forward effect of a hegemonic paradigm in his analysis of the effects of the stark utopia of a capitalist market system:

> The usual 'long-run' considerations of economic theory are inadmissible; they would prejudge the issue by assuming that the event took place in a market economy. However natural it may appear to us to make that assumption, it is unjustified: market economy is an institutional structure which, as we all too easily forget, has been present at no time except our own (Polanyi 1957: 37).

A proper repurposing or system innovation process therefore begins with what the WSSR 2013 called "futures literacy": identifying and exposing "hidden, unexamined and sometimes flawed assumptions about present and past systems" (ISSC and UNESCO 2013: 8). Changing the way we see the world also changes the way we are in the world—and how we imagine promising development paths and their governance. In the words of Meadows: "Paradigms are the sources of systems. From them form shared social agreements about the nature of reality, come system goals and information flows, feedbacks, stocks, flows and everything else about systems" (Meadows 1999: 16).

This is what I seek to capture with the concept *materiality of ideas* as illustrated in Fig. 2.5. It describes how humans are both subject and object of making history, how reality today shapes the imaginary of how reality could be in the future.

As a purposefully acting species, humans create relationships and physical technologies as well as social institutions to engage with each other and with nature in the creation of goods and services deemed necessary or desirable. Thus, prevailing paradigms and their key ideas are embedded into very tangible structural outcomes that in turn confront and embed individuals within processes and systems

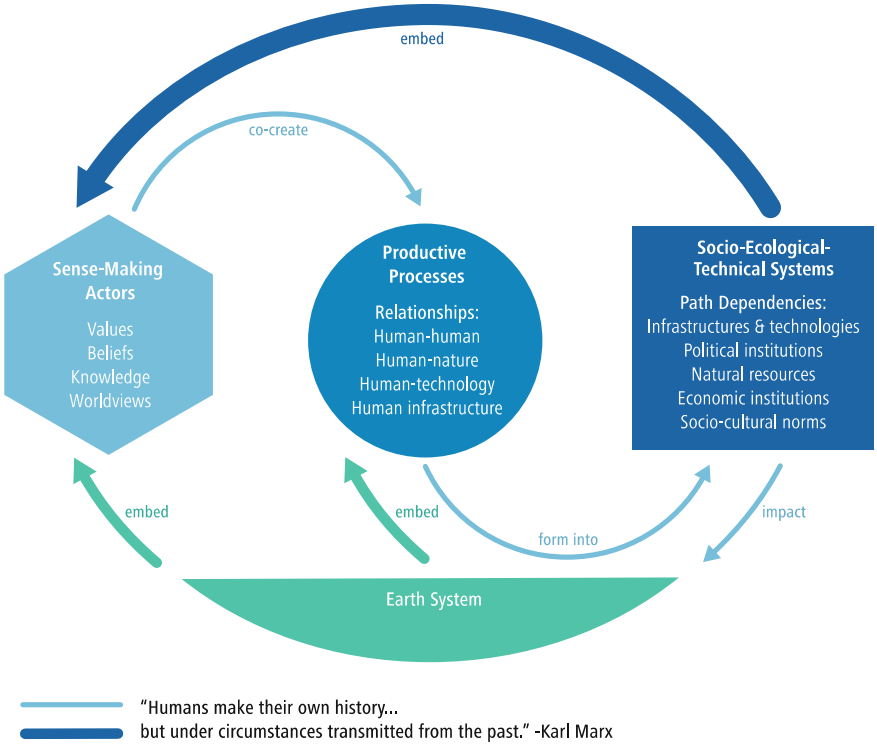

Fig. 2.5 The materiality of old ideas in today's systems. *Source* Own illustration

that shape their mind-sets and limit their scope of action. Karl Marx summarized this patterned freedom with the critical eye for which he is famous:

> Men [sic] make their own history, but they do not make it as they please; they do not make it under self-selected circumstances, but under circumstances existing already, given and transmitted from the past. The tradition of all dead generations weighs like a nightmare on the brains of the living (ibid. 1852: 5).

No one is asked to share Marx's interpretation of the past as an inevitable nightmare. But everyone is invited to acknowledge the ideational background of what we call reality today. Once we do this we see that of course reality cannot be replaced by simply thinking differently. Humans live in structured freedom. Reality does influence how humans imagine what is possible, right or just for the future. But at the same time the way we think, believe and act today will shape future reality. History becomes an open-ended process—the status quo determined not by any human or social laws but created by sense-making and purposefully acting humans.

Civilization did not cease to evolve after the first Enlightenment and modernity. Sense-making, learning and purposeful acting continues. The quantification and marketization of our world might be an incredibly strong trend now, but does not mark 'the end of history.' Human freedom lies exactly in becoming literate in deconstructing the emergence and perpetuation processes and patterns behind the trend toward economic totalitarianism and in starting to change it. Ideas and beliefs play an instrumental role in these reflection processes. They are the elements of inspiration, rationalization and argumentation and hence function on the individual as well as societal level.

The reflexive ontologies applied by most transformation researchers track the co-evolutionary interplay between actors and the structures that surround them. Some might explore behavior changes while others go deeper into analyzing changes in peoples' values and identity. The latter is what, for example, figuration or process sociology—a term often associated with Norbert Elias (1897–1990)—stands for. The German sociologist wrote about the connection between social developments and human psychology. His book, *The Civilizing Process* (also published under the title *On the Process of Civilization*), explores the relationship over time between power, behavior, emotion and knowledge and became one of the most influential sociology books of the twentieth century. In Elias' theory, status quo or circumstances are not portrayed as phenomena that occur and which humans encounter. He sees them instead as manifestations of changing human relationships. His term 'sociogenesis' thus describes the emergence of social practices, norms, rules, procedures and institutions over time. Elias links it with the process of 'psychogenesis' to capture the molding effects that prevailing circumstances have on individual learning and identity formation. The latter, explains Harald Welzer, a contemporary German sociologist in Elias' tradition, is the prerequisite of identity, of being in control of one's own fate. It carries values, habits and aspirations alike (Welzer 2011: 15).

This ontology finds application in other scientific disciplines as well. Political economist Robin Hahnel, for example, also makes this point when arguing that the mainstream economic paradigm is not objective or value-free but through its dominance in decision-making bodies and public discourse shapes future relationships and people: "When we fulfill needs through particular activities we are induced to mold our thoughts to justify or rationalize both the logic and merit of those activities, thereby generating consciousness-personality-structures that can have a permanence beyond that of the activities that formed them" (Hahnel 2002: 4–5).

Thus, ideas are both inherent in less conscious individual sense-making processes but also frequently expressed in the efforts of creating relations with others. This is what the definition of paradigms stands for in Meadows' analytical framework presented above: "The shared idea in the minds of society, the great big unstated assumptions—unstated because unnecessary to state; everyone already knows them—constitute that society's paradigm, or deepest set of beliefs about how the world works" (Meadows 1999: 17). Other researchers use the term 'worldviews' and define them as "inescapable, overarching systems of meaning and meaning-making that to a substantial extent inform how humans interpret, enact, and co-create reality" (Hedlund-de Witt 2012: 18).

Personally, I prefer the term 'mind' to 'paradigm' when speaking about social rather than scientific contexts because it expresses the way that seeing and believing differently goes beyond an update of information. It also means changes in attention, consciousness, instinct, imagination, judgment, power, sense, spirit, and psyche. 'Mind' emphasizes not so much the facts or ideas in themselves but the processes of knowing, believing and arguing in which they are embedded. This encapsulates the many ways in which our manner of thinking influences human existence.

Moving from the individual-psychological level to the sociopolitical research designs for explaining transformation we find, as one example, Polanyi-inspired political economist Nancy Fraser. She highlights how widely spread ideas, like the mainstream economic paradigm, function as the "discursive face of politics," mediating structure and agency by providing "the social imaginaries through which social conditions are experienced, interpreted and evaluated by social beings" (Fraser 2013: 125). The analytical term 'narratives' captures something similar, sometimes defined in a rather instrumental way: "Narratives reduce complexity, creative collective perspectives, support reliability of expectations, build a basis for current and future-oriented action plans, and are a foundation for the cooperation between actors" (Messner 2015: 263). Here, the emphasis lies more on understanding how humans choose communities and get energized for collective action and less on the effects that this may have on their future identities.

Both the individual-psychological and the sociopolitical are important to the transformative leverage of a *Great Mindshift*: an understanding of the imaginaries, identities and narratives that guide individual and collective actions provides explanations for the perpetuation of the status quo, an understanding of which alternative solutions might find support and who might bring them about.

A deconstruction of the overarching ideational frameworks or paradigms behind the institutions, technologies and economic instruments in place provides an understanding of which path dependencies will be particularly difficult to unlock and which pioneers and change agents are more likely to help—or block—that process.

Connecting this reflexive ontology with the MLP (Fig. 2.1) and multi-phase concept (Fig. 2.2) of transformation research leads me to conclude this chapter with the concept of *radical incremental transformation*. The MLP situates mind-sets on the landscape level. Following the discussion of the crucial role of ideas on the individual as much as on the societal level, I would like to differentiate the three layers a bit more by adding two: the mini-level of individuals that makes up any institutional setup and the meta-level of mind-sets that cut across and mediate between the structurations on the niche and regime level and individual actors (Fig. 2.6).

The purple and blue arrows illustrate how ideas function as the glue that holds societies together. The purple ones stand for the hegemonic paradigm and common sense framework that serves as a reference for individual strategies and narratives. It is embedded in regime structures as well as in niche projects. At the same time, individual mind-sets (the light blue arrows) might carry alternative paradigms that influence their pioneering strategies. In addition to trying to showcase new solutions in line with the new paradigm, all individuals can also engage in general paradigm-busting work that influences the perpetuation or challenging of the dominant paradigm. In this way, prevailing ideas also influence the way societies

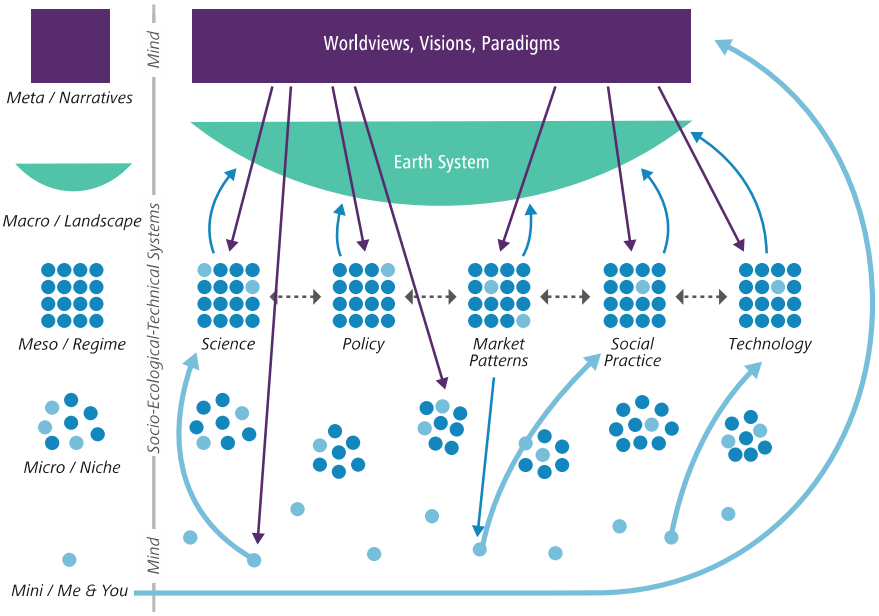

Fig. 2.6 Mind-sets in the multilevel perspective on transformations. *Source* Own illustration

decide to deal with the landscape-developments that they observe but cannot change through direct action in the short term. Their most important role, however, lies in providing the new imaginary and binding narratives necessary to ignite change initiatives and galvanize support for them.

Charlie Leadbeater, a UK-based system innovator connected with the innovation foundation Nesta, presented a list of ingredients for successful sustainability transformations that embeds this view nicely. He makes reference to the MLP when considering five successive features of successful regime transformation.

The following is my summary:

1. Failures and frustrations with the current system multiply as negative consequences become increasingly visible. This is inherent in the sustainability discourse.
2. The landscape on which the regime operates shifts as new long-term trends emerge or sudden events drastically impact the general availability or persuasiveness of particular solutions. This could be peak oil signaling an approaching end to fossil fuel availability.
3. Niche alternatives start to develop and gain momentum, coalitions start forming and coalesce around the principles of a new approach. Local Agenda 21, for example, was a program emerging from the UN Conference on Environment and Development in 1992, in which many local initiatives for implementation were linked into a network.
4. New technologies give impetus to alternative solutions, either in the form of alternative products or communication and connection possibilities. Renewable energy solutions especially, but also information technologies, form part of many sustainability projects.
5. For far-reaching regime change rather than small adaptations and cooptation into the old regime, dissent and therefore fissures inside the regime itself are key. Possibly called 'niches' within the regime, by joining coalitions for change they will help bring the system down (Leadbeater/Mulgan 2013: 31–32).

A core functional ingredient in this sequence is the 'new approach' mentioned in point 3, the new principles. In Leadbeater's example they are the principles agreed in the 1992 Rio Declaration on Sustainable Development. They provide the radical vision for a repurposed development system and inspire niche initiatives with the goal of putting the declaration into practice. As some of the quotes in the introduction showed, the Agenda 21 vision foresaw very radical institutional changes, and many different groups started experimenting with new ways of bringing them to life. The discussion of path dependencies in this chapter has provided some good insights into why these processes were not easy and were subsequently sometimes discontinued or explicitly opposed.

Writing in 2013, Leadbeater however declares that tipping points have been reached in some aspects like the energy systems, especially on the local level. Not many make explicit reference to Agenda 21 anymore, but new narratives like Transition Towns or 100 % renewable communities, etc., have gained more

momentum. Also, renewable technologies are at a completely different stage of availability and pricing, climate change impacts have become tangibly noticeable and increasing conflicts in areas with big fossil fuel reserves have added impetus to the feeling that turning away from unsustainable forms of energy is a good idea.

So it takes time, a certain degree of irritation, a critical mass of alternatives and their supporters to bring radical visions to life. The multi-phase concept captures this process well. Unless the system dynamics show a certain degree of friction or an existing willingness to change, experiments that propose to change too much in too short periods of time will cause rejection or resistance.

This pattern matches Thomas Kuhn's account of the development of scientific advancements for which he coined the term 'paradigm shift.' His 1962 book, *The Structure of Scientific Revolutions*, describes changes in patterns of thinking and basic assumptions (epistemology and ontology) behind scientific analysis. To this end, he demonstrated the parallel existence of different paradigms to be the normal state of affairs. These determine which questions will be asked when assessing a certain issue, how they will be asked, what will be required to answer them and how the results will be interpreted. Kuhn showed that there is usually one paradigm that comes to predominate and does not evolve steadily by adding insights but is rather overturned in an intellectual battle whose phases resemble those of the multi-phase pattern. Dominant ideas and research premises tend not to cede gradually and smoothly but instead to be amended until critique simply becomes too strong to justify more exceptions to the rules. After such tipping points, the situation is fundamentally altered, even if no consistent or coherent alternative explanations and solutions are yet in place to fill the emerging gap and search processes.

Unsurprisingly, the navigation or transition phase in shifting paradigms as well as governance solutions is marked by chaos, politicization, unease and power-ridden struggles. The Global Scenario Group called them 'branch points' and stressed the role of science and intellectuals in providing narratives that can galvanize enough support to become institutionalized. Thus, change agents are well advised to be mindful that the diverse changes necessary to achieve a radically different scenario will emerge from multiple sources, and might feel impossible for a long time, before a window of opportunity opens and much change happens in a short period.

At the same time, one should not assume that radical changes will emerge from less-than-radical intentionality. Reflecting on Meadow's list of leverage points and Kuhn's account of paradigm shifts, we see that only by checking which key assumptions inform which change initiatives can we get a better grip on the transformational potential they carry.

From this perspective, paradigms or mind-sets play two important roles in transformations that differ with the 4 phases (Fig. 2.2): in the pre-development and acceleration phase the role of new paradigms and ideas lies in creating or increasing irritations in the system by deploying the alternative meanings and knowledges around which pioneers develop experiments. Here the role is to create frictions in common sense and accepted justifications to create openness to change. It is about delegitimizing the status quo explanations and solutions, about defining no-go answers or views when discussing decisions on the way forward.

When forging toward tipping points in the navigation phase, however, the function of a paradigm also changes: it needs to reduce frictions and uncertainties by enabling single pioneers and followers to see and understand their common will and to highlight which regime changes align with the paradigm, thus helping the pioneers scale or multiply to become the new normal.

The mainstream economic paradigm serves as a great example here. As long as it remains a legitimate reference framework for development, conventional growth solutions remain difficult to defeat. The science and models it informs, as the next chapter will discuss, allow only for analyses and predictions that subjugate sustainable outcomes under the old economic growth development path. Or they justify a continuation of this path in the short term because they predict that changing course in the future will be less costly and thus a fairer allocation of costs and benefits. It is only since the big financial crisis in 2008 that the credibility of this paradigm and its linear extrapolations from historic trends have been severely challenged, even in the corridors of power. Yet, until now no new paradigm has found enough support to fill its place.

Kuhn stated that a new paradigm can only establish itself if it overcomes stubborn adherences to intellectual vested interests. Political economists point out that one should also be aware of practical vested interests when assessing why a theoretical framework or the worldview it informs persist. In periods prior to tipping points, those individuals and groups benefiting most from a system's development path have mainstream scientific evidence, canonized knowledge and public discourse readily available to rationalize and justify the logic and merit of their path over others.

The next 10–15 years will be very decisive for the outcome of this navigation phase: stabilization around a new, consolidating paradigm, relapse into the old dynamics with technological fixes and financialization, or even collapse because this model has exhausted its adaptive capacities. Human history-making is an emergent process of co-creation and political struggle, compromise and domination. Yet, only if the stabilization phase is oriented around a shifted paradigm will the new development dynamic of the system be radically different—or transformed. Put differently: transformation means changing the default. Ideas and solutions that have to justify their appropriateness and argue their legitimacy today will become the new normal.

This chapter gave an overview of what different strands of *transformation science* offer in response to the question of how to strategically work toward the transformative quality that the 2030 Sustainable Development Agenda foresees. This summary started fleshing out the way in which the different starting points of STS, SES, and political economy research designs can be combined into very insightful *transformative science* frameworks: concepts and heuristics for the design and conduct of transformation processes. My own filter in selecting and combining insights has been one that places human inspiration and will to act at the origin of understanding and explaining SETS's. By embedding humans into systemic models like the MLP and multi-phase concept we can see that even when we are talking about global transformations, the source of intentional change is human

thinking, feeling, and acting. SETS's are created, ordered and stabilized through human decision-making and (often) conscious creation of regime structures.

Searching for more efficient technologies and more effective economic incentives is not enough when looking for sustainability solutions. It is the institutional setups and sociocultural frameworks that define the purpose for which technologies and economic instruments are used. Here is where we find the root causes of trends. Incentives and technologies mostly function as accelerating or balancing feedback, but not in themselves as game changers. This is why the multi-phase concept as I posit it here gives the sociocultural anchoring of alternative proposals and pioneering solutions a crucial role in all phases of transformation.

In the amended MLP it is the purple and blue arrows that make the link. They indicate how mind-sets mediate between agents and structures and how the dominant paradigm functions as a reference framework for justifications and narratives of change. The big arrow on the right hand side of the graph also shows, however, that each individual is constantly involved in shaping the future paradigm. By providing reason, opinions, arguments and experiences as well as non-verbal reactions and behavior we can all participate in paradigm shifts and thus in changing reality.

Polanyi demonstrated this link in his account of the Great Transformation. The classical economic paradigm played a crucial role in making today's default solution the growth-fixated development path. This paradigm survived over two centuries of criticism by amending itself into a neoclassical version. But today its basic assumptions are challenged from so many angles and the institutional solutions and processes based on it deliver so many crises that the time is ripe to shift from diversified irritation to unifying consolidation: which insights on human needs and natural resource reproduction in today's scientific debates could become the foundational ideas of a new development paradigm?

Chapter 3
Why the Mainstream Economic Paradigm Cannot Inform Sustainability Transformations

> The theory they developed is known as neoclassical economics. Today it still forms the basis of orthodox theory, and makes up the core curriculum taught to future economists and business leaders in universities and business schools around the world. As a set of ideas, it might be the most powerful in modern history.
> David Orrell, *Economyths: Ten Ways Economics Gets it Wrong* (2010: 13).

> Wherever we look around the world, conventional economic thinking remains the principal source of solutions. Somehow, it is suggested, we must find ways of harnessing those forces that have got us into such trouble—self-interest and greed, harnessed to technology—to get us out.
> Chandran Nair, *Consumptionomics: Asia's Role in Reshaping Capitalism and Saving the Planet* (2011: 62).

> Economic thought did not adjust to the changed conditions it helped to create; thereby it continued to legitimate, and indeed directly to cause, massive and rapid ecological change. The overarching priority of economic growth was easily the most important idea of the twentieth century.
> J.R. McNeill, *Something New Under the Sun* (2001: 336).

Long before I discovered Polanyi, my decision to study political economy was a key turning point in my quest to find an answer to the question of why we, collectively, do not create the sustainable world that we, as individuals, wish for. While finishing a degree in media and communications, (surely, I thought, "we just need to get the information out!") I added sociology, psychology, political science and global governance to my courses in order to understand the gap between knowledge and practice that I had detected. It was, however, a seminar on macroeconomics that made me feel I was coming closer to understanding why sustainability remains merely an aspiration. This discipline seemed to be devoid of all the insights that I had taken away from the humanities and social sciences.

I will never forget how I was taught the Heckscher-Ohlin theorem, for example. It explains why countries with low wages specialize in labor-intensive production and those with high wages develop production that requires more capital. Because of the factor price advantage of, for example, fisheries (more capital needed) over

M. Göpel, *The Great Mindshift*, The Anthropocene:
Politik—Economics—Society—Science 2, DOI 10.1007/978-3-319-43766-8_3

agriculture (more labor intensity possible), a country with easily accessed capital would focus on fishing and scale down its agricultural sector, and a country with cheap labor would prioritize farming over trawling. As a consequence they would quickly benefit: convert the boats into farms and up shoot the exports. In the calculations for the basic model, this conversion is assumed to be free of costs and involve a workforce that instantly migrates to wherever work is available. When I asked if its adherents really believed that people would not find it very costly to uproot their entire way of life simply because of the current terms of trade, the professor gave me a stunning response: "Oh dear, a warm heart speaking."

Confused as to why a cold heart was a good thing, or at least a prerequisite for believing in mainstream economic models, I used my PhD to study theory of science and the history of economic thought as well as global political economy, institutionalism theories and the role of law. I continued to be drawn into what I described as the reflexive approaches that I put emphasis on with the concept of *materiality of ideas* in Fig. 2.5.

In the summary of Chap. 2, I discussed the way that the term 'ideas' captures more than simple flashes of thought, mere slogans or buzzwords. This chapter is about zooming in on some ideas that have been instrumental in shaping the processes and systems we live in today. According to Morten Bøås and Desmond McNeill, who have researched the role of ideas in the forming of institutions, these ideas have "some reputable intellectual basis," but they "may nevertheless be found vulnerable on analytical and empirical grounds." What is special about such ideas, they argue, is that they are "able to operate in both academia and policy domains" (Bøås/McNeill 2004: 1).

In the following I will identify some key ideas that, if changed, could induce a paradigm shift and thus trigger a very high leverage point in unlocking unsustainable path dependencies. I think the Brundtland Commission was already at this point when it urged for the "need to integrate economic and ecological considerations in decision making" because this is how the workings of the real world operate. The commission also pointed out that this will "require a change in attitudes and objectives and in institutional arrangements at every level" (WCED 1987: 55). So this chapter seeks to improve futures literacy: people's capacity to imagine futures that are not based on hidden, unexamined, and sometimes flawed assumptions about present and past systems. It hopes to serve the spirit of jointly tackling the structures and path dependencies that keep us, collectively, from bringing about the sustainable world that we, individually, wish for and have agreed to guide our policies toward.

As stated earlier, my goal is not to provide a detailed historical assessment of theoretical and methodological intricacies but to show how strong the influence of some basic economic ideas born in the Enlightenment era remains in decision-making and its rationalization or justifications today. This is why I zoom in on a few key concepts that are customarily applied when deciding how to put the goals of sustainable development into practice: delivering on the needs of current generations while safeguarding the means of need satisfaction for future ones. The 1992 Rio Declaration included the agreement that such development should

prioritize two key points. These were "the concept of 'needs,' in particular the essential needs of the world's poor," to whom, it argued, "overriding priority should be given" and "the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs" (WCED 1987: 41).

To reach these goals the Brundtland Commission urged that: "Human laws must be reformulated to keep human activities in harmony with the unchanging and universal laws of nature" (WCED 1987: 271). We will see that mainstream economic theory does not provide much understanding as to how to do this but rather offers concepts that keep us blind to these key points. The urge to 'integrate' environmental, social and economic concerns led to the expansion of the economic mind-set into the governance of ever more areas of life. This effect has been called the 'economization' of societies and its ongoing trending reifies unsustainable path dependencies instead of helping to unlock them. So it is at least as important to limit the realm of issues to which economics are applied as it is to update the entire discipline.

So to what questions do economists claim to provide answers? Perhaps the most widely used and accepted definition was coined by Lionel Robbins, the famous London School of Economics professor who wrote in 1932 that "Economics is the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses" (Robbins 1932: 15). Such alternative uses are also called 'competing ends' and Robbins argues that the only situations that fall under economic consideration are those in which choices between ends (going to the opera, sleeping or baking bread) need to be taken because the means (time or resources) are limited. Hence, economic situations are those in which some wants need to be relinquished. This means that economics can explain choice making, but cannot shed light on either ends or means. In fact, it was the aim of Robbins' essay to limit the concerns addressed by economics.

This focus is reflected in the key ideas and concepts that it puts forward and that I have summarized in Table 3.1.

All the ideas in the left column clearly fit into the overarching Enlightenment movement that started in the seventeenth century. Its ambition to free humanity from superstitious, theological, and natural limitations to progress generated a rather mechanistic-additive view of systems and the world. Each of the economic

Table 3.1 Mainstream economic paradigm effects on searching for sustainable development

Understanding the world by	Main concepts human needs	Main concepts nature
. . . dividing into pieces	**utility** by consumption	**natural capital** by extraction
. . . quantifying & monetizing	**willingness to pay**	**market prices**
. . . tracking accumulation	**more happiness** through more consumption	**more growth** through more (efficient) exploitation
. . . comparing and ranking	**cost–benefit** thinking	**capital substitutability** thinking
Effects on governing the world:	**Blind to real qualities of developments & lost in financialization**	

Source Own overview

concepts in the second and third column of this table can best be understood by remembering that they were born in an era when

- the emphasis lay on the human intellect and its capacity to dissect complex processes and investigate them empirically;
- natural scientism and its law-like predictions of developments replaced religion as the prime source of explanations of the world;
- discourse around natural limits to population size met an energy revolution that fuelled the managerial-industrial drive to improve productivity; and
- the securing of private property and pursuit of self-interest became basic tenets of citizens' freedom and were declared important drivers of progress.

Modernity and neoclassical economic developments of the twentieth century have continued to employ the same mechanistic-additive view and basic concepts, pushing quantified modeling and its extrapolating predictions into yet more dominance when computation made massive calculations possible. There is no emphasis on a deep or diversified understanding of the ends that transactions should serve (human need satisfaction) or the scarce means that are required (nature's resources). These are subsumed into the container terms 'utility' and '(natural) capital.' This is in line with Robbins' definition and understandable when reflecting back on the context in which these concepts were born. Saturation with goods and services was reserved for a very small part of the population and poverty was widespread. It was rational to equate more with better. Meanwhile, in a world of one billion people with plenty of 'undiscovered' territories, there was simply no expectation that more effective exploitation of nature would threaten its health and existence.

From a transformation point of view it is thus easily understood why the Enlightenment movement claimed the term 'liberalism': its ideas inspired collective action toward overcoming an old system that no longer delivered (as far as Enlightenment protagonists were concerned). The premise was to overcome the 'dark' epoch of the Middle Ages. These ideas were key aspects of a paradigm shift that first challenged the old order and its legitimizing narrative and later, as Polanyi showed, served as the gelling consensus between philosophers, scientists, businessmen, politicians and even church representatives working on alternative institution-building and rule-formulation. Polanyi also concluded that imagining all of society as one big market system and treating humans, nature, and money as fictitious commodities inevitably leads to sustainability problems.

So here we come to an interesting question: if Robbins says that the application of economic concepts should be limited to situations of exchanges and choice making but Polanyi argues that all aspects of the planet have been subsumed under the imaginary and logic of a market system, where does the application of economics end? Having analyzed current discourse and observed the marketization and privatization trends of the last 30 years I would say that their application is almost ubiquitous—and that is precisely the problem. It means that neither ends nor means become the center of attention and investigation. Instead, it focuses only on the choice-making of selfishly calculating and insatiable individuals. The 250-year-old

innovation of reorganizing all of society around endless gain goals remains unchallenged.

Yet, we now know that there are limits to individual gain, all the more so on a planet with nine to ten billion inhabitants. We also know that the notion that having more means feeling better or happier very much depends, in reality, on the circumstances. Surely, when we seek transformational changes toward sustainable development we cannot use a theory that has not integrated these contextual changes in its concepts? The pursuit of endless gain, as Polanyi points out, had never before in history been "raised to the level of justification of action and behavior in everyday life" (ibid 1957: 30). So it seems obvious both that it is time to repurpose our societies again and that we cannot accept a theory that cannot inductively inform but only deductively reinterpret civilizational changes to fit the universal concepts it has thought up.

Any new Great Transformation needs a different guiding paradigm if its outcome is to improve sustainability. A paradigm that puts needs (ends) and nature (means) center stage instead of hiding them in container terms. One that embraces some empiricism and qualitative reasoning once more. We need a Second Enlightenment fit for what is now known to be a very complex and full world. Luckily, natural and social sciences have moved on and freed themselves from the ideals of positivist-deductive reasoning and quantitative measuring that accompanied modernity. Only mainstream economics has fallen strangely behind in this evolution.

This chapter deals with that evolution. It runs through the columns of the table and first discusses the origins and applications of the concepts for understanding and organizing human need satisfaction, and then the origins and applications of the concepts for understanding and engaging with nature. The subchapters argue that the concepts are insufficient for any transformational sustainable development agenda and are in fact instrumental in perpetuating an unsustainable development path. Then I will add brief overviews of what twenty-first century social sciences, humanities, psychology, neurosciences, quantum physics and also alternative sub-strands of economics say that fills the black boxes of human needs and nature's laws.

3.1 How Mainstream Economics Views Human Needs and Their Satisfaction

How do we satisfy the needs of current generations while safeguarding resources for future generations? First we must understand people, their needs and what motivates them to do certain things. Mainstream economics does not make much use of the term 'needs' but has instead adopted the concept of 'utility.'

The term was invented by the philosopher Jeremy Bentham (1748–1832), who described human existence as being based on a hedonic calculus or continuous

hedonic flow of pleasure or pain. The prime goal of existence was to *maximize happiness* calculated as the sum of pleasure minus pain. Thus the utility of a certain product or practice expresses a *cost–benefit* or pain–pleasure trade-off calculation that people undertake when making choices. Since there is no such thing as one 'util,' the numerical formula became money: the purchase decisions of people indicate what they want and the price indicates how highly it ranks on their list of preferences. This *willingness to pay* expresses the utility and thus happiness they gain from consumption of, for example, ice cream, and the loss of what they give up for it, for example, money or their skills in lawn mowing.

This way of measuring utility through willingness to pay was also called 'working with revealed preferences.' It allowed for the building of mathematical, thus scientific models. Combined with the assumption that humans are insatiable when it comes to happiness or utility, this became the first 'law' of the human condition. It also supports the basic premise of ubiquitous and eternal scarcity (scarce means) that Robbins's 1932 definition of economics carries: since our wants are endless we are constantly worried about how to get more of them satisfied and where we will find those resources. For Robbins, this means not only natural and material resources but also services that are per se limited. His definition restricts the path for need satisfaction—e.g., eating or leisure—entirely to market relations: "Both the services of cooks and the services of opera dancers are limited in relation to demand and can be put to alternative uses" (ibid.: 15).

In this paradigm, trading and bartering are the essence of all relationships. Human existence means constantly improving one's balance sheet. In order for this model to work, it is assumed that actors undertake this improvement rationally, although this paradigm has a very narrow definition of rationality: it is understood as knowing all possible strategies available in a particular situation, knowing the outcomes of each of those—including the behavior of others—and ranking all of the possible outcomes according to the preferences as measured by utility (money).

So all relationships with other humans and nature are driven by the hedonic calculus and thus best governed by markets. The societal vision of a market system is born. The basic 'law' of this system is that of supply and demand. It suggests that, given unlimited wants, every product and service will always find a customer once the price is right. This law has resulted in the famous prediction that markets will always tend toward equilibrium: if I cannot get satisfying prices any longer (demand goes down or too many competitors are around), I will reduce production (supply goes down).

On these two laws all models of mainstream economics have been built. The impact of the Enlightenment movement has been studied by several scholars. David Orrell, Canadian mathematician and author of *Economyths. Ten Ways Economics Gets it Wrong*, muses: "Just as Newton believed that matter is made up of minute particles that bump off one another but are otherwise unchanged, so mainstream theory assumes that the economy is made up of unconnected individuals who interact by exchanging goods and services and money but are otherwise unchanged" (Orrell 2010: 13).

Eric Beinhocker, the director of the Institute for New Economic Thinking at Oxford, tells the story of Walras, the mastermind of market equilibrium models. Inspired by his father's declaration that one of the great challenges remaining from the nineteenth century was a scientific theory of economics, Walras spent 14 years working toward a mathematical theory that built on Bentham's utility and the related law of supply and demand to make economic systems predictable. After presenting his market equilibrium equations, Walras concluded that his "pure theory of economics is a science which resembles the physio-mathematical sciences in every respect" (Beinhocker 2007: 36, citing Walras).

Beinhocker explains that models built on these laws do not capture what science knows about behavior, decision-making and complex system dynamics today. Yet, they are still used to predict future developments and to derive policy recommendations:

> Through the 1990s, economic researchers typically started with a set of principles: for example, utility-maximizing by consumers and profit-maximizing for firms, far-sighted individual rationality, and a belief in equilibrium, which meant that structurally, individual's decisions in the models fit reasonably well together.…By the late twentieth century, these principles formed the core of economists' vision of reality, in the sense that all economic models were built on these principles, or around variations of these principles like assumptions of bounded rationality or imperfect information (Beinhocker 2007: 460, citing Collander 1999).

According to all of these models, more production is always better and the price paid indicates the utility gained from consuming that production. The policy conclusions are easy: meeting the needs of current and future generations means ramping up productivity as much as we can. This has been the prime goal of policy and business conduct. Yet, upping the productivity of the fictitious commodity labor means changing the work life of humans. And often also ending the work life of humans. What happens to human needs in this process is, as we will see, not part of the models.

3.1.1 What Is Utility and Where Is It Created?

This section continues the search for an understanding of how human needs can be satisfied and unpacks the concept of utility and its consumption-based definition. Digging beneath the market-price indicator for utility (willingness to pay) we see something that psychologists have called the 'process benefits' or 'experienced utility' of the individuals involved in producing what can later be bought. It may well decline if the amount of what is done in one hour by one person is constantly ramped up. Or, in accounting terms, the amount paid for the same output falls. This is what productivity stands for in its conventional definition.

The goal of contemporary psychologists and the economic Nobel Prize-winner Daniel Kahneman has been to shed some empirical light on the pleasure and pain that people experience during their everyday activities. His surveys seek to capture

the happiness of an individual over a period of time, e.g., while working. Experienced utility is defined "as the sum of the momentary utilities over that time period; that is, the temporal integral of momentary utility" (Kahneman/Krueger 2006: 5).

So, instead of measuring my utility and happiness solely through my shopping expenditures, these surveys seek to capture how much pleasure or pain I experience in every situation throughout the day. This sheds a very different light on notions of how we can support human need satisfaction but also requires a change to some of the basic models with which production processes are captured and analyzed.

This is the domain where ecological economics has anchored some of its most important alternative perspectives. Some of its leading thinkers, like Robert Costanza, Joshua Farley, Hermann Daly or Paul Ekins have juxtaposed wealth production functions in mainstream economics with those that capture people and planet and make them part of the economy. The following are my own synopses of slightly diverse versions in several publications (Ekins 1992: 147–155; Costanza et al. 1997: 273–275; Ekins 2000: 52–54). Figure 3.1 shows the production function of an economy as portrayed by mainstream economists.

We see that utility sits at the very end of the production process where consumption has resulted in profit for the producer and the pleasure of the buyer who has consumed the goods. Thus, an increase in consumption is identical to an increase in utility or need satisfaction. This model lacks information on both input and output—the (scarce) means of production and the potentials for utility creation (the ends). This results in two limits to attention and creativity in thinking about economic development, which are highlighted by ecological economists who add some boxes and arrows to the graph (Fig. 3.2). In particular, they amend two categories: the

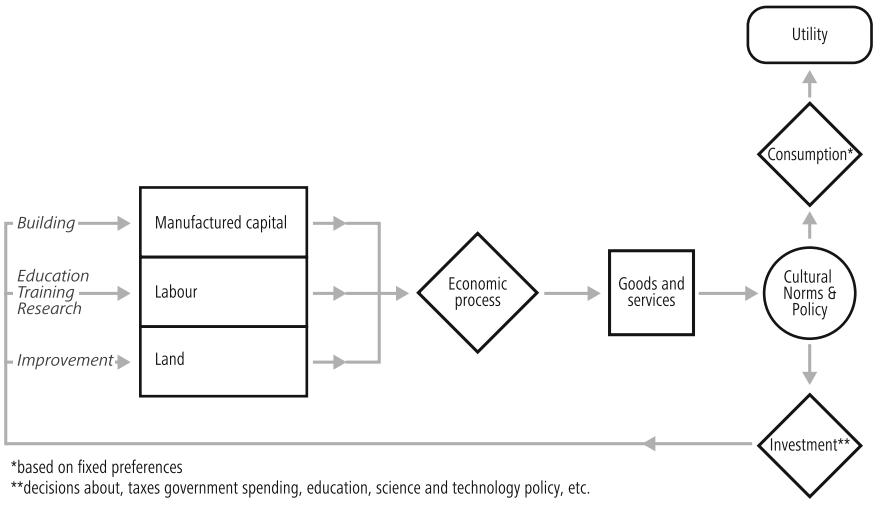

Fig. 3.1 Mainstream economics model of wealth and utility production. *Source* Based on Ekins (1992, 2000) and Costanza et al. (1997)

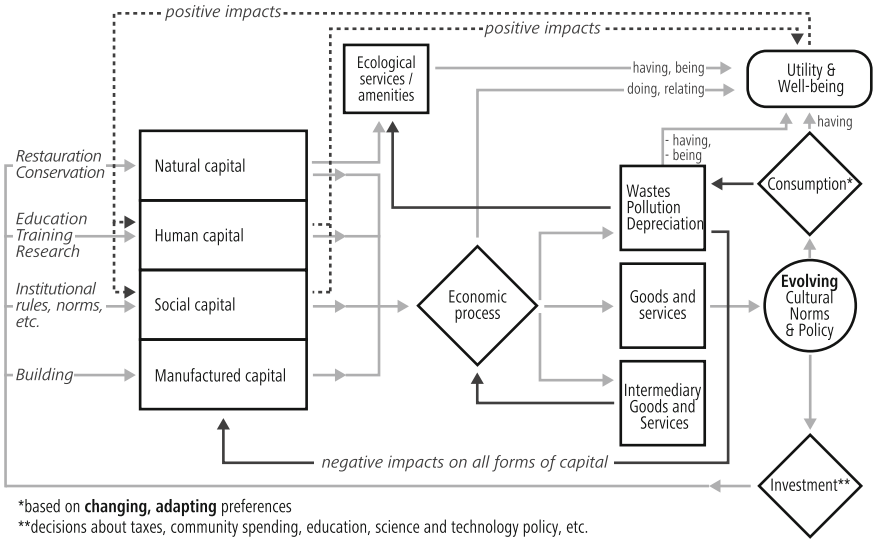

Fig. 3.2 A differentiated model of wealth and utility production. *Source* Own illustration based on Ekins (1992, 2000) and Costanza et al. (1997)

factors of production and the stages at which utility or disutility can be created during the process. The former introduced the now widely adopted four-fold concept of capital that will become relevant below when discussing how economists anticipate the future, whereas the latter is what I am interested in here: aspects of human existence that escape the category of product or service consumption.

- Land is now portrayed as environmental capital and its understanding is expanded by adding ecological services. These have a utility or well-being effect outside of economic processes through, for example, beauty and recreation in lush forests or meadows. The three economic roles are the provision of resources like minerals, grains, wood or stone; of direct ecosystem services like climatic regulation or fresh water; and supplying a sink to absorb waste, like composting organic waste into humus.
- So waste is included as an explicit category that economic processes and consumption create. It will affect utility (pleasure) directly if it stinks or pollutes the air, and it impacts the regenerative circuits in ecological systems services.
- The concept of labor has been transformed into human capital that includes not only the execution of production tasks but also the psychological, emotional and social skills around them such as motivation, knowledge, creativity and health. Also new is social capital, which embodies the relationships, norms, and procedures or institutions with which production is organized. Both are positively influenced not only by investments but also by the general level of utility and well-being on the side of the people involved—e.g., positive spirals of motivation, mutual support, a sense of accomplishment. This effect flows in both

directions, as good social and human capital tends to lead to higher degrees of reported well-being and experienced utility.

- So utility is seen to have many sources, flowing from the entire production process as well as the quality of the consumption process of the product or service I paid for. Do I sit down on a bench in the sun or do I slurp my ice cream behind the steering wheel, rushing home to feed the kids? This process quality of utility is highlighted by the introduction of four *modes* of engagement which we will discuss in more detail below: The mode of *being*, e.g., the enjoyment of a high quality environment or the discomfort due to a high level of waste or pollution in the air. Also: does my job context make me feel challenged and supported in a meaningful way to develop my skills? The mode of *having* results primarily from consumption but also directly from the natural assets to one's availability. In the mode of *doing* it is important how the work process is set up and if I, for example, feel safe and in control, whereas the mode of *relating* or *interacting* captures all the social organizational structures, e.g., do we have enough breaks and can we talk to each other, or is the work process interactive (see Ekins 1992: 147–155).
- The last difference lies in the way in which cultural norms and policies impact consumption and investment preferences. Here, choices have the potential to evolve rather than be fixed. This quality of change goes beyond the changes in preference ordering that mainstream economics includes to, for example, capture me being fed up with cars and now liking bicycles: it might mean instead that individual choices and cultural norms shift toward not wanting to consume more because people feel they have enough (Costanza et al. 1997: 273–275).

This comparison makes three points that are very important for the sustainability agenda. First, how the mainstream economic view ignores any direct utility gains from intact nature as well as the often damaging effects that waste, as a result of production and consumption, has on the future quality of ecosystems. At some point we might get to mimicking nature's symbiotic relations, in which the waste of one process serves as the input factor of the next. Yet, such cradle-to-cradle designs remain the talk of the future, and in order to transform our production and consumption systems accordingly the models must provide the information we need.

Secondly, it highlights the fact that the mainstream cost-based input–output models of production say nothing about the pleasure–pain impact of participating in such guided production processes. Here we find the connection with the concept of experienced utility and the limitation of accounting for utility or happiness only in the role of consumers: most of us are also workers and spend much more time in this role than in the one of shoppers.

Thirdly, and relatedly, it shows the massive blind spots that a consumption-based model of utility generation brings to thinking about solutions for less resource-intensive need-satisfaction strategies. It says that we only thrive when we shop or eat or watch television, while working is an unfortunate necessity to generate the money we need for that. We have to trade the production factor labor for income so we can buy more happiness.

Given that most people spend many more hours of most days working than consuming, this blind spot is huge. It also raises several questions that the differentiated model in Fig. 3.2 picks up on: Do humans not enjoy engaging in productive activities? Do we not all participate in providing and receiving services like cooking or dancing without pay? So why not emphasize need satisfaction during productive processes instead of sacrificing them to serve sacrosanct productivity goals? What have we gained if there are ever more goods and services to choose from but we have no time to really enjoy them anymore? Yes, willingness to pay for compensatory measures and convenient 'to-go' solutions might even increase, but does this really indicate overall better need satisfaction?

3.1.2 Is 'Having' Really All the Fun There Is?

Manfred Max-Neef developed a helpful tool to understand human needs that increases the creative imaginary space for sustainable innovations that target experienced utility and well-being. This popular Chilean development economist has called himself the "barefoot economist" after spending 12 years with the poorest communities in Latin America. His moment of revelation came when understanding that none of the mainstream market-based economic concepts were of any relevance to them. Much of his work has thus been built on proper empirical experience in non-marketized societies. It therefore provides some fascinating reflexive systemic insight into the effect that living with certain institutional setups has on the way actors see and experience the world.

In an interview with *Democracy Now!* Max-Neef explained that his return to immersing himself in experience rather than deducing theoretical models made him conclude that we need an entirely new language in order to understand better what people really need. According to him, mainstream economics has nothing to say in support of the poorest people in the world if strategies are supposed to emerge from local systems rather than disrupting them. If you live in poverty, behaving like the selfish, insatiable atomic accumulator of mainstream theory won't get you very far, says Max-Neef: "You cannot be an idiot if you want to survive; you need networks of cooperation and mutual aid." In those communities, he observed, competition and the promise of monetary gain are not required for people to demonstrate enormous creativity, innovation and willingness to collaborate (Max-Neef 2010).

To illustrate which fundamental human needs he observed instead, Max-Neef has developed a matrix whose key messages I summarized in Table 3.2. The matrix limits the number of existential human needs to approximately nine. He does not argue that the list of nine existential needs is definitive or set in stone, but he says he is confident that a change in those basic needs would at best occur at a very slow pace. Also, these needs should be understood as interrelated and without hierarchies, except for the need of subsistence or survival, which comes first (Max-Neef 1992: 204–205). Here Max-Neef differs from other need-satisfaction approaches, many of which place self-actualization at the top and social, as well as material

Table 3.2 Max-Neef's matrix of fundamental human needs

Human needs	Being	Having	Doing	Interacting
Subsistence	Physical health, mental health, equilibrium	Food, shelter, work	Feed, procreate, rest, work	Living environment, social setting
Protection	Care, adaptability, autonomy, solidarity	Insurance systems, savings, health systems, rights, family	Co-operate, prevent, plan, cure, help	Living space, social environment, dwelling
Affection	Self-esteem, tolerance, generosity, passion, sensuality, sense of humour	Friendships, family, partnerships, relationships with nature	Make love, express emotions, share, take care of, cultivate, appreciate	Privacy, intimacy, home, spaces of togetherness
Understanding	Critical conscience, receptiveness, curiosity, astonishment, discipline, rationality	Literature, teachers, method, educational policies, communication policies	Investigate, study, experiment, educate, analyse, meditate	Settings of formative interaction, schools, universities, communities, family
Participation	Receptiveness, willingness, determination, dedication, respect, sense of humour	Rights, responsibilities, duties, privileges, work	Become affiliated, co-operate, propose, share, obey, interact	Settings of participative interaction, parties, communities, neighbourhoods
Leisure	Curiosity, imagination, recklessness, tranquility, sensuality	Games, spectacles, clubs, parties, peace of mind	Dream, brood, remember, relax, have fun, play	Privacy, intimacy, free time, surroundings, landscapes
Creation	Passion, determination, intuition, imagination, rationality, inventiveness	Abilities, skills, method, work	Work, invent, build, design, compose, interpret	Productive and feedback settings, audiences, space and time for expression
Identity	Sense of belonging, consistency, differentiation, self-esteem, assertiveness	Symbols, habits, customs, values, norms, language, religions, reference groups, sexuality, historical memory, work	Commit oneself, integrate oneself, get to know oneself, actualize oneself	Social rhythms, everyday settings, settings which one belongs to, maturation stages

(continued)

Table 3.2 (continued)

Human needs	Being	Having	Doing	Interacting
Freedom	Assertiveness, open-mindedness, boldness, rebelliousness, tolerance	Equal rights	Dissent, choose, be different from, run risks, commit	Temporal/spatial plasticity

Source Excerpt from Max-Neef (1992: 206–207)

needs, at the bottom. The assumption is that physical and social needs require fulfillment before more transcendent ones can be realized. Max-Neef rejects such a hierarchical ordering and says that even if people go hungry every day, their lives can still host relationships of dignity, creative moments of productivity and the feeling of connection with others (Max-Neef 1992: 204–205).

The column of *being* lists personal or collective attributes; *having* registers institutions, norms, mechanisms, laws or tools in the material sense; *doing* relates to personal or collective actions; and the final column of *interacting* lists locations and milieus as defined in time and space. Max-Neef explains that this last existential category is much better captured in the German term '*befinden*' or the Spanish '*estar*,' as they combine a space with a state of being (ibid. 1992: 207).

What the matrix highlights is that *having* is only one way of satisfying existential needs and that products like food or shelter are not a need as such, but instead a satisfier of the need of subsistence. All products are thus viewed in relation to the satisfying strategy they fulfill. The desirability of economic goods like, in his example, books, laboratory instruments, tools, or computers, only comes from the role they play in strategies of satisfying needs. They are vehicles in actualizing the need for *understanding* through the satisfying strategies of investigating, studying, experimenting, educating, etc., that he grouped in the column *doing*. Here, products become the deduced variable and culture, context and resources determine which are most suitable—or sustainable. It also means that widespread individual book ownership or the simple presence of many books with high prices does not equate to better need satisfaction—an equation that mainstream economics would make. On the contrary, the process of understanding is often less painful or much more pleasurable if you have a peer group with which to discuss things or a parent reading out loud to you.

So according to Max-Neef, "a satisfier is in an *ultimate sense* the way in which a need is expressed," while "goods are in a *strict sense* the means by which individuals will empower the satisfiers to meet their needs" (Max-Neef 1992: 202). Also, one satisfier can actualize different needs at different times and several needs at the same time, depending on how the process of creating goods or consuming them is organized. Mainstream economics lacks such differentiations. Here, commodities bring utility through their consumption, as the willingness to pay for them indicates. The amount of utility generated can be measured and compared to other sources through the indicator of price. So the utility of books, for example, pops up only in moments when they are sold (again).

In the matrix, even the mode of *having* includes many elements that are very difficult to quantify and monetize, like human rights, insurance systems, and educational policies. Mainstream economics tries to use willingness-to-pay surveys to judge their importance to people. People might be asked how much in monetary terms a public health insurance system should cost per capita. But a simple twist in the question will change the answer: asking whether they have to pay to keep something renders different results from asking how much they would want to be paid as compensation for it being taken away. So just checking the price will not get you far in understanding the complete picture of how and why certain choices are being made or which needs exactly are satisfied through it.

This is also one of the conclusions of *Well-Being for Public Policy* by world-leading well-being psychologists Ed Diener and John Helliwell. It compiles the research of many psychological studies on the relationship between willingness to pay, income and the well-being that people report in surveys to conclude that "the economic decisions that people make, and the money that they have, may not be perfect indicators of the well-being that they experience" (Diener et al. 2009: 40).

The most important message of Max-Neef's matrix in terms of a Great Mindshift, however, lies even beyond exposing blind spots of monetization and price indicators. It declares the set of human needs to be *limited* and the range of possible satisfiers to be *abundant* once the economistic consumption lens is removed. This is in direct contrast to the standard economic assumption of unlimited human needs and scarce resources, and it opens up a plethora of possible solutions for good lives which do not have to cost the Earth. The satisfiers listed in Table 3.2 provide only a few examples. Consequently, the goal of development can become a holistic and endlessly creative endeavor of keeping environmental and human relations responsive to an unfolding of satisfying potentials, so that material goods serve satisfier strategies in alignment with contextually specific circumstances.

The mainstream model, on the other hand, makes material goods the ends in and of themselves and assumes that all need-satisfying springs from them. This means that successful development can only be imagined as linear in one direction: more gain. Slowing down and reducing production cannot be a strategy because then well-being will drop. According to Max-Neef, adopting this worldview means that "the speed of production and the diversification of objects have become ends in themselves and as such are no longer able to satisfy any need whatsoever. People have grown more dependent on this system of production but, at the same time, more alienated from it" (Max-Neef 1992: 204).

Max-Neef therefore criticizes prevailing development policies, which are primarily aimed at increasing consumption possibilities by market integration. They stimulate the accumulation of goods regardless of human development status in those systems. This results in an increasing dependence on externally generated satisfiers, whose control lies beyond the influence of poor communities.

One example of this has been the structural adjustment programs of the International Monetary Fund in the 1980s, in which many poor countries had to embark on export-driven development strategies. This means the focus lay on the

comparative advantage of a few goods whose production was ramped up for international competition. It sometimes meant that entire economies became dependent on the world market price of one or two products. This had some cataclysmic effects. The fates of Ethiopia, Burundi, and Uganda when the world price of coffee fell in 2001 are prime examples (Francis/Francis 2011). It also meant that the diversity of what was harvested at home was reduced significantly, leading to a simultaneous dependence on world market prices for imports. This type of double dependency becomes especially problematic when world prices are affected not simply by actual supply and demand changes but, as price hikes of up to 200 % for some grains showed in 2006–2008, food is also susceptible to financial speculation.

In addition, as the *UN Conference on Trade and Development* (UNCTAD) points out in its 2013 *Trade and Development Report*, producing for the world market means that every cent in wages is a cost to be avoided. Production for domestic markets, on the other hand, means that higher wages mean more purchasing power on the demand side. From a macroeconomic perspective this benefits everyone because price elasticity goes up. UNCTAD points out that statistics from almost all export-driven countries demonstrate how real wages in the export sectors have not increased with productivity gains over the last two decades. Coupling this with slow growth and demand on a global scale leads the authors of the report to conclude that "export-driven development is no longer viable" and that "economies will perform better with more balanced strategies" aimed at "balanced growth" and "a greater role of domestic demand" (UNCTAD 2013).

Long before these empirical numbers were gathered, Max-Neef had been arguing that human need-satisfaction strategies should emerge from each individual context, respectful of social practices, forms of organization, political models and values as well as the natural systems in which they are embedded. This may lead to less rapid increases in economic output as measured in GDP, but ensures a more balanced and therefore resilient change process controlled by the people it affects. Once the need for subsistence is no longer threatened, it may well deliver more happiness than running after GDP per capita jumps.

3.1.3 Checking Human Happiness and the Link with Income

The scholars cited at the beginning of this chapter second Polanyi in his assessment that making endless gain or growth the polestar of societal aspiration might have been the most transformational idea of the Enlightenment movement. It overarches the third prime idea in mainstream economics: the pursuit of greater happiness or utility (need satisfaction) is best done through more consumption. While the subchapters above have shown the limiting blind spots of these reductionist models of

where and how utility can be generated, this one is going to scrutinize the idea that more is always better.

In mainstream economics more income always means better lives, as expressed, for example, in the important indicator of GDP per capita in poverty and welfare statistics. Yet, the fallacy of conflating income levels with need satisfaction and well-being can be exposed by crunching the numbers. Researchers have discovered that the level of reported well-being and happiness (which, in economics jargon, is called 'perceived utility status'), stops being causally linked to GDP growth once a certain level of income per capita is reached. This observation is called the Easterlin Paradox after Richard Easterlin, the American economist who pioneered research in this field in the 1970s.

The most striking example of decoupling rising GDP and per capita income from perceived quality of life was revealed in the results of a Gallup poll in China. Some 15,000 people were interviewed between 1994 and 2005 and the researchers found that average life satisfaction had gone *down* despite a rise in real incomes of 250 % (Kahneman/Krueger 2006: 16).

There has been heated debate over this issue and the quality of data in some of the measurements over time (time series). However, the first *World Happiness Report* (2013) issued by some of the world's leading happiness and well-being researchers—John Helliwell, Richard Layard and Jeffrey Sachs—collates a lot of data from diverse sources and shows that the Easterlin Paradox is not so paradoxical after all. Once the standard economic assumption that more income naturally means more happiness is turned into an empirical research question, one comes to find this leveling off rather logical. The following presents some research results that support this mindshift.

It was qualitative empirical meta-research conducted on subjective well-being research that delivered most of the answers that solved the paradox. These affective theories of well-being have experienced a renaissance since the 1960s. Before that, modern post-Enlightenment science and the rise of behaviorism approaches in psychology in the 1930s had excluded many of these approaches and insights from consideration as 'valid evidence.' Instead, behaviorism fits well with the goals of economics as defined by Robbins, explaining choice-making without understanding people's deeper motivations in detail. This period also marked an important turning point when income began to be seen as an important indicator of well-being. The birth of GDP in the 1940s complemented the turning with a macroeconomic indicator.

The scientific study of subjective human well-being only gradually re-emerged in the 1960s and it took what was called an 'affective revolution' in the 1980s to reinstall it firmly on the horizon of the social sciences—while economics remained slow on the uptake (Diener et al. 2009: 15–16).

This revolution was about asking people how they felt. The 'objective' conditions such as income, unemployment, and sanitary provision may be captured in order to understand context but are not elevated to the status of indicators for utility levels. In an overview article, Daniel Kahneman and his colleague Alan Krueger argue, "that it is fruitful to distinguish among different conceptions of utility rather than presume to measure a single, unifying concept that motivates all human

choices and registers all relevant feelings and experiences" (Kahneman/Krueger 2006: 4). Their empirical findings support the amended production model (Fig. 3.2) and the Max-Neef matrix (Table 3.2) in many ways. Most important for subjective well-being are the quality of social relationships, the *relative* notion of income or wealth and how sociocultural environments impact on people's aspirations and values.

So while these researchers also seek to understand how to maximize happiness or utility, they make the effort of actually asking people what makes them feel good. They investigate its sources empirically rather than simply saying that it will come and grow with consumption. Also, Diener and Helliwell point out that many things, like love, social relationships, environmental pollution, fair and effective governance and virtue and spirituality all play important roles in people's experienced well-being, but are difficult if not impossible to measure through willingness-to-pay estimates (Diener et al. 2009: 37). They also observe that quite often, individual predictions of what will make for happiness go wrong.

So while most metrics and success benchmarks for progress and development involve constantly upping per capita income, when asked, people tend to claim that health, recognition and a meaningful engagement lie at the center of what makes their lives satisfying. Chronic pain and unemployment are amongst the worst things that can happen, in particular in societies where those not finding a job are viewed as lazy benefit-seekers or live with no social support and much reduced social contact.

The influence of social norms on what we believe—or at least say we believe—creates well-being has also been well documented. When comparing ratings on work and childcare in surveys in which the respondents talked to a real person with those where they anonymously press buttons on an app, the former type of survey reveals higher rankings for childcare. According to Kahneman and Krueger they are "likely to be reminded that both work and childcare are desirable aspects of their life. Reports of how much they enjoy these activities will tend to be anchored in that general assessment, resulting in a favorable bias. Respondents may also feel some social pressure to tell interviewers that these domains of life are enjoyable" (Kahneman/Krueger 2006: 13).

App technology, however, has now made it easy for people to report their feelings during the day, while engaged in different activities. Grouped into three positive categories (happy, warm, enjoying myself) and six negative ones (frustrated, depressed, hassled, angry, worried or criticized) individuals can select their current state from zero (not at all) to six (very much). In this way answers are much more immediate, and do not allow for time to reflect on the wider social context.

The results, say Kahneman and Krueger, indicate that net affect, also called "mood score," from these ratings "is highest, on average, when individuals are engaged in leisure activities (such as socializing after work) and lowest when they are engaged in market work and investment or personal maintenance activities (such as house cleaning)" (Kahneman/Krueger 2006: 12). The morning commute is viewed as particularly negative—unless it is undertaken in the company of others, which again hints at the importance of social contact.

What do these findings tell us about human needs, decision-making motivations and the importance of a constantly growing number of possessions? They indicate that Easterlin had not so much discovered a paradox as a natural development process. This is indeed what Martin E.P. Seligman, another renowned positive psychologist, seems to conclude in an overview article on well-being studies: economic indicators are extremely useful in analyzing societies in their early stages when the fulfillment of basic material needs is important but "as societies grow wealthy, however, differences in well-being are less frequently due to income, and are more frequently due to factors such as social relationships and enjoyment at work" (Diener/Seligman 2004: 1).

None of this provides much support for any law-like equation of more economic output with more happiness for everyone. If societies are built around this equation, it results in pathways of development and civilizations that psychologists have diagnosed as resembling a 'hedonic treadmill.'

In the 1970s researchers started investigating the relatively small and short-lived effects caused by changes in people's circumstances. They observed people who had suffered lasting setbacks to their health or had been afflicted with disabilities. The results showed that within two years most had returned to the average life satisfaction they had reported before their misfortune. Only those with severe disabilities did not fully recover.

The same leveling out holds true in the case of important positive events like marriage. Reported well-being typically increases one year before and after the actual event before returning to the mean. Purely economic gains like a salary increase or buying and enjoying a new car show the same adaptation effects but the return to the norm is much faster (Kahneman/Krueger 2006: 14).

In the 1990s, Michael Eysenck, a British psychologist, formulated the hedonic treadmill analogy as a generalization of these findings: the more you have, the more your expectations rise and the more things you want. So it is not so much the absolute number of possessions that matters but the relative amount of what we have and against which we judge changes (Eysenck 1990). So even with a high income, instead of being happy with what you have, you think that having more will make you happier. This is especially true when your society promotes ever more possibilities of consumption and richer lifestyles. One great example of this is the income levels deemed necessary for having a good life in the United States. The median estimate of Americans as to how much income they felt they needed to "fulfill all of [their] dreams" was approximately $50,000 in 1987 and rose to $90,000 by 1996—in constant dollars (Bok 2010: 13).

Other impressive survey results with the same message were cited by Stephen Marglin, a Harvard economist in *The Dismal Science: How Thinking Like an Economist Undermines Community* (2010). He refers to a 2005 PNC Bank survey of wealthy individuals.

> When asked how much they needed to feel financially secure in the future, respondents consistently cited a need to approximately *double* their current level of assets. Those with $10 million or more felt they needed a median of $18.1 million; those with $5 million or

more needed $10.4 million, and those with a half million to $1 million said they needed $2.4 million (Marglin 2010: 200, citing PNC Advisors 2005).

So first and foremost, people's ideas about what they need increase in line with what they have. Here, financial security represents people's perception of being able to continue living the life they know. So, just taking numbers into consideration does not tell you much about what people need in order to feel that their lives are rich. Only if we contextualize survey data in the socioeconomic environment can we start understanding the specific connections between income and well-being. If, for example, former citizen entitlements like public health care, education, pension schemes, etc., are increasingly turned into commodities sold in the market, your access guarantee starts depending on your private wealth. Thus, the more monetized and privatized a society's relationships, the more central income will be to people's sense of security and the quality of goods and services that they can afford. It does not necessarily mean that they also feel happy, however.

The role of reliable income in feeling secure is confirmed in many studies in richer societies that find secure income ranks higher than a growing absolute amount. They also support the need to contextualize: connecting income level with other losses, like a blow to health, for example, has shown that people with higher incomes suffer a less dramatic drop in life satisfaction (Kahneman/Krueger 2006: 14). And in all societies the wealthier strata are on average happier than the poor.

As long as societies hold money to be the single most powerful access mechanism to experienced utility or need-satisfaction strategies, income will be very important; but only as long as I can buy much more treatment and services to alleviate my disabilities than I could get without private pay. Max-Neef has taught us to understand the relationship between physical goods and artifacts like money and the role they play in allowing for a need-satisfaction process to emerge. Without such processes they are rather useless things.

So the use of qualitative findings to capture the relationships within a given system in a holistic way gives rise to much better insights into the property and role that individual elements play within it. Reflexive sciences would insist that the characteristics of individual elements cannot be fully captured without checking for the relationships in which they are embedded. In his 2010 meta-study on happiness research and its relevance for policy, Derek Bok, former Harvard University president, offers a rather anecdotal account of the relational benefits that being rich brings to people: "Their jobs tend to be more interesting, they have more control over how they spend their time, and they are more likely to give orders than to receive them. The mere fact that they have succeeded in what they set out to achieve should make them more satisfied with their lives" (Bok 2010: 15). Here we find a lot of pointers for satisfiers in the category of doing, being and relating, that could be served with qualitative rather than quantitative changes in economic processes like work. Max-Neef's barefoot economist findings in poor communities are seconded by data from rich societies: the range of possible satisfiers is far wider than what markets offer.

Researchers concluded that it is *attention* that plays a crucial role for the quality and intensity of an experience and that individual attention is high when something is new. With time, however, the fraction of attention concentrated on the new thing goes down and so does its influence on one's general state of well-being. Working with attention lies at the heart of mindfulness practices and therapeutic strategies deployed to cure the increasing number of people that burn out in hedonic treadmill civilizations.

Constantly keeping attention on what ubiquitous advertising is suggesting one lacks in one's life and what others have that is better is not a good recipe for happiness. Neurosciences show that mental activity creates neuronal structures and, depending on which skills people use most or what they pay attention to regularly, some wirings and associations of their brain become more connected. Some parts even grow physically bigger. So if societies create attention architectures that keep people concentrated on accumulation and monetary expressions of value, this influences their ideas about a good life, the best need-satisfaction strategies and, ultimately, their experienced happiness (Hanson 2009: 18). Neurosciences and biochemical research also tell us that a brain processing massive excitement would fry if it did this over longer periods of time. Accumulating limitless stacks of happiness is thus neither possible nor desirable. Happiness is a flow phenomenon rather than a stock that can be hoarded. Its measurement takes place on a scale between high and low and its levels are expected to fluctuate. It is not measured with aggregated growth curves.

Psychologists like Tim Kasser provide more scientific evidence against the conflation of more gain with more happiness, and also against the 'law' that all humans are naturally wired toward competitive accumulation. He shows how experienced well-being of even materially wealthy lives seems to decrease if too much attention is given to economic indicators and the satisfier strategies of having.

3.1.4 How Does a Homo Economicus *Feel and Act?*

The technical term for what has become the 'representative agent' in mainstream economic models is '*Homo economicus*.' Its character is the embodiment of the first law of the human condition: constantly seeking to improve the hedonic calculus and constantly comparing and competing with others over scarce resources and best offers. The cost–benefit analyses that this agent undertakes lie at the heart of explaining human behavior and the choices that should be expected. The financial crisis has shown how helpful the resulting predictions are for complex real world dynamics. But this is not the topic at hand. We want to stay with the assessment of how key ideas and concepts of the mainstream economic paradigm not only limit which development solutions are imaginable and justifiable but also how their incorporation in culture and institutions drives societies away from sustainable outcomes.

The latter is the theme of US psychologist Tim Kasser's *High Price of Materialism*. It collates ten years of psychological research that shows why we should speak of the 'Easterlin Logic' rather than 'paradox.' Kasser provides rich sociological evidence on the other claim that the choice of particular satisfiers impacts psychological and social development and thus future-need perception and well-being. He does so by investigating how materialistic values relate to well-being. The questions he seeks to answer are the following: "What happens to our well-being when our desires and goals to attain wealth and accumulate possessions become prominent? What happens to our internal experience and interpersonal relationship when we adopt the messages of consumer culture as personal beliefs? What happens to the quality of our lives when we value materialism?" (Kasser 2002: 4)

Values research is an important strand of psychology and in itself shows that not all humans are materialistically wired. Box 3.1 provides a brief overview of how in some research designs values have become an explicit component, next to questions of epistemology, ontology and methodology.

Box 3.1 Values research—axiological aspects of scientific paradigms

Psychologists have found a relatively high commonality of basic value orientation varieties across cultures and age groups and have grouped them into ten meta-categories that subsume several single value statements and aspirations or goals for life to which people holding these values would ascribe. In all cultures one finds the following: universalism, benevolence, tradition, conformity, security, power, achievement, hedonism, stimulation, and self-direction.

Individuals and cultures show different value sets with typical patterns of correlation and non-correlation between some of these meta-categories. It is unlikely, for example, that people with a high score in universalism will also have a high score in power, whereas benevolence and self-direction will typically rank highly together. These settings influence people's aspirations, judgments and behavior in a given context and the categories are applied when seeking to understand differences in decision-making and support of certain political or economic ideas and proposals. Approaches like that of the Global Scenario Group presented here, base their stories for potential developments on the assessments of sets of values and how these might influence the decisions people take, in, for example, policies and consumption.

For a wider discussion and a map of the typical category correlations and single values within them, see the *Common Cause Handbook* of the British Public Interest Research Centre (PIRC). It also includes instructions on how to work with value change for improved well-being and sustainability.

For his own research questions, Kasser selected people who put making money and having possessions relatively high on their overall list of things they deemed important. In order to find this group, surveys were conducted with an 'Aspiration Index' that listed a variety of goals which participants ranked according to their importance. If someone ranked, for example, financial success higher in comparison to other goals like a good family life and friendships, it indicated a materialistic value set on the index.

Each life goal was associated with descriptions of aspirations that have been observed to relate to particular values like benevolence, self-direction, security, power or hedonism. In the category of financial success, for example, these included "you will be your own boss," "you will have a job with high social status," "you will have a job that pays well," or "you will buy things just because you want them."

The study also documented aspirations in non-monetary goal categories like 'image' and 'fame' that competitive societies tend to treat with similar importance. The commonality between these three goals is that they are *extrinsic* motivations, which means they involve seeking a sense of worth outside oneself. Feeling worthy thus depends on external rewards and the praise of others.

From a methodological point of view we can see how Kasser tested how people who most closely resembled *Homo economicus* felt and how they experienced life. The complete survey also had four questionnaires to assess the individual's score on two important well-being characteristics (self-actualization and vitality) and on the two most common psychological disorders (depression and anxiety). The results showed that people whose values were centered on the accumulation of wealth, material possessions, or fame, faced a greater risk of unhappiness, including anxiety, depression, low self-esteem, and problems with intimacy, regardless of age, income, or culture. Kasser repeated the study several times with different groups and compared his findings with those of others. He added more extrinsic orientation values like narcissism and used a more open methodology in which goals were not assigned by providing pre-set aspirations but defined by the individuals themselves. Across the board he found the same picture emerging: "The more materialistic values are at the center of our lives, the more our quality of life is diminished" (Kasser 2002: 14).

Another group of researchers has found evidence that many who care a lot about making money *and succeed* can offset the loss of well-being they experience by sacrificing aspects of their life like family or leisure time. Overall, however, Kasser's finding are supported, as Bok concludes in his meta-study, because "the findings of psychologists convey a warning that being preoccupied with getting rich carries a substantial risk of leaving one unhappy and disappointed in the end" (Bok 2010: 15).

The blurb accompanying *Thrive*, the 2014 bestseller by Arianna Huffington, puts it this way: "Our relentless pursuit of the two traditional metrics of success—money and power—has led to an epidemic of burnout and stress-related illnesses, and an erosion in the quality of our relationships, family life, and, ironically, our careers." So, encouraging and training people to see and think like a *Homo economicus*

seems like doubtful advice from a life coach and a terrible flaw in the discipline of mainstream economics.

Kasser, however, went beyond individual happiness and also addressed the question of what exactly social processes and institutions created with a *Homo economicus* in mind do to the development of society. The results show that materialistic people are possessive in the sense that they prefer to own and keep things rather than borrow and rent, are less generous or more unwilling to share their possessions, and envious of other people's wealth. They also feel unhappy when others have things they want.

Furthermore—and highly relevant to sustainability strategies—materialistic values and pro-social values operate like a seesaw: people with high extrinsic value sets are likely to show lower levels of intrinsic values like self-realization, psychological growth or contributions to society that involve empathy for others or concern for the environment (Kasser 2002: 18–19). Thus, materialistic values not only reduce individual well-being and perpetuate feelings of insecurity and being constrained, but they also hamper relationships with other people and the natural environment. This effect is particularly strong when people have money on their mind during decision-making.

Psychologists like James Heyman and Dan Ariely from Harvard University, for example, demonstrated the difference between money markets in which financial compensation motivates action or effort, and social markets with no rewards, gifts or other tokens. In three experiments they show that using "monetary payments causes participants to invoke monetary-marketplace frames and norms" whereas people are actually willing to expend more effort in exchange for no payment (Heyman and Ariely 2004: 787).

Unlike mainstream economists, they use relational theory that distinguishes four basic types of social relationships, of which only one is 'market pricing,' in which cost–benefit calculations dominate. The others are 'communal sharing' with a dominant culture of 'we-ness'; 'authority ranking,' which avoids the question of who is ordering whom about and who is delivering; and 'equality matching,' in which everyone gets the same rewards and reciprocity is monitored.

Heyman and Ariely found that, as long as people are not explicitly told that they are paid, they consider themselves to be in one of the three non-money market settings and their outlook on what they should do is different. Experiments with students show that not offering a payment often results in greater efforts than when money is proffered, especially when it concerns tasks like 'helping out' such as carrying a sofa upstairs. When money is offered, cost–benefit thinking is used as people seek to match their effort to the rate of pay. High pay means more effort in solving simple tasks but low or even medium rates of pay mean less effort than no pay. Experiment results suggest that monetary incentives can have significant effects on how tasks are framed and therefore the motivation with which we engage in them. When no payment is mentioned, or when it is offered in the form of gifts, effort seems to stem from altruistic motives and the exchange is viewed as a social one (Heyman/Ariely 2004: 792).

Yet, the marketized and commodified way we live today makes cost–benefit thinking almost unavoidable. Diener et al. tentatively hint that societies could feel very different if economic indicators were not constantly present, but instead replaced with information on how many spent time with their family, did a good turn for their neighbor, exercised or engaged in meditation and prayer (Diener et al. 2009: 40).

In Sect. 3.3 I will discuss the role of price signals as guiding indicators in more detail. Here I want to conclude with a summary of what psychology, sociology and neurosciences tell us about the genesis, power and changeability of mental path dependencies. It shows that the methodological stunt of making *Homo economicus* the representative agent for all of humanity is scientifically false. In the light of this fact, merely containing criticism by tinkering around the edges is insufficient. The sociologist Welzer ridicules the way that mainstream models have started to tinker by, for example, varying exogenous preferences: some green values are brought in but the main impetus of wanting more remains the constant hypothesis of the theory from which everything is deduced. Would I now rather have two funky bikes instead of one car? In this paradigm, people's core motivations cannot change. Yet, historical studies show they can. The concept of psychogenesis, for example, encompasses changes in endogenous preferences (do I really want to have all this stuff?). This is simply excluded from mainstream economic frameworks even though sociology suggests no less than that "changes in social structure lead to the emergence of new social forms and practices, and thus to psychologically different people with different needs" (Welzer 2011: 15).

3.1.5 Summary: Human Need Perception and Well-Being Depend on the Processes Behind Creating Wealth

The research I have presented above renders obsolete the mainstream concepts summarized in Table 3.1 and used to understand human needs and their satisfaction. Human needs are not endless (although maybe the 'wants' created by advertising are) and utility or happiness are much more than fleeting sensations of joy and excitement experienced after consuming new things. After securing material needs for subsistence, the most important factors for happiness and well-being are not the absolute amount of income but income security. The other important aspect is the match between income or available money and the costs of having access to the need-satisfaction strategies one deems necessary for well-being. This quantitative ratio depends on the context in which the person happens to live and is usually corrected for by purchasing power estimates. These do not capture qualitative differences between offers of similar services, like public versus private health care or education. The bigger the qualitative gaps the less well people feel if they cannot afford access to private services. Also, the more explicit consumerist culture is advertised and declared to be normal, the more important

conspicuous consumption becomes—and the money needed to participate in it. Anecdotal evidence in Germany has it that richer people drive Porsche but buy their groceries at the cheapest discount stores. So once we dig deeper, we find that happiness is an existential feeling of being on top of one's life and its challenges. Neither the utility of a product nor the happiness of a person can be measured by the price people are willing to pay for something. Yet, constantly calculating costs and benefits and guiding one's life by comparing numbers as expressions of value makes people lose their senses of worthiness, connection and caring.

So why should we continue to build societal development paths around the idea that constant accumulation is always beneficial to people or society as a whole? Well-being research helps bring to light the underlying needs that market-based consumption is actually serving and how many different options a society has to satisfy them. By debunking the consumption–happiness–maximization law we can thus become creative in finding solutions for improved utility that align with Earth's ecosystems and other people's needs for social relations, meaningful engagement and respect. It becomes possible to imagine reduced production and consumption levels without panicky reactions or unfounded excuses that doing so would necessarily decrease happiness, well-being and freedom.

This requires and enables system innovation processes that focus on unlocking political, economic and sociocultural path dependencies that were created to serve the stark utopia of endless gain through a market system. Thinking back to Fig. 2.5 on the materiality of ideas, we can see that creating processes with such vision and beliefs in mind resulted in a system that had the growth imperative wired into its functioning. This is of course the second part of Jackson's Growth Dilemma: that any 'degrowth' undertaken today—given current institutional setups—is unstable and causes unemployment and recession. I would add the breakdown of the financial markets. Without a doubt, instant degrowth would diminish the happiness of many. But it is the result of a structural crisis and not of the violation of some natural laws of human existence. Twenty-first century empirical research shows that those do not exist.

In this the qualitative survey data of well-being research and the historical observations of figurative sociology receive supporting evidence from natural sciences. Brain researchers have observed how our experiences of the external world and our judgments of them find expression in the development of our neuronal architecture. So quite literally, external circumstances, in their appearances as social, cultural, technological and economic institutions, design our internal infrastructure. These wirings determine how we experience and judge events now and in the future.

"What happens in your mind changes your brain, both temporarily and in lasting ways; neurons that fire together wire together. And what happens in your brain changes your mind, since the brain and mind are a single, integrated system" write Rick Hanson and Richard Mendius, cofounders of the Wellspring Institute for Neuroscience and Contemplative Wisdom (Hanson 2009: 18). And the brain changes through training just as muscles do. Hanson and Mendius quote Francisco Varela, the famous Chilean biologist and neuroscientist, when describing this

mutually reinforcing relationship: "In the largest sense, your mind is made by your brain, body, natural world, and human culture—as well as by the mind itself" (Hanson 2009: 7).

These findings resonate with Welzer's 'mental infrastructures' that have path dependency effects embedded beneath cognitive processes of knowing or social fears of losing status or access. Referring to the economic growth paradigm, Welzer discusses how deeply rooted resistance to change can therefore be. Debunking it would play on people's fundamental "secret fears" that "everything they have established, everything they worked for, planned and believed in, could have been meaningless. The dimensions of meaning and identity that Western-style capitalist societies provide stand and fall with the functioning of the market" (Welzer 2011: 29).

So of course post-growth imaginaries and narratives may not necessarily gain traction right away. They may offer the least enticements to those who risk losing quite a few of their privileges if the promise of always more for everyone cedes and paradigms and narratives on fair shares become dominant.

I am not sure if this was the upset of the human self-image that the *Brundtland Report* foresaw to be necessary for sustainability to succeed. But surely, scientific concepts and models should help to understand and explain such an upset and its consequences instead of ruling it out by imposing theoretical iron cages.

The evidence behind policymaking would then look very different as well. Richard Layard, leading British happiness economist, argues that well-being research findings require turning mainstream concepts of productivity and competitiveness on their head. Given the hedonic treadmill and high price of materialism, he demands that policy should constrain the ability of individuals to earn and work much more than other people:

> If a person works harder and earns more, he may himself gain by increasing his income compared with other people. But the other people lose because their income now falls relative to his. He does not care that he is polluting other people in this way, so we must provide him with an incentive to do so (Layard 2005: 229).

The proposed incentive is significantly higher taxation on working too much given that a true benefit to society as a whole can no longer be identified. Whether or not one likes this particular proposal, the important idea is that the adoption of a historically sensitive mind-set does not lend itself to there-is-no-alternative claims. Sociocultural circumstances and politico-economic institutions like markets shape people's mind-sets and imaginary and therefore their aspirations and preferred need-satisfaction strategies. In the light of their surveys, for example, Kahneman and Krueger suggest shifting attention from increasing consumption opportunities to an emphasis on increasing social contacts; shifting the emphasis from income for well-being toward a person's relative embedding in society; making possible a different allocation of time that reduces the amount of time people spend doing things they find unpleasant (Kahneman/Krueger 2006: 18).

Given that work in its current forms ranks high among those things in life which many say they do not like doing, some interesting strategies for sustainability emerge. A popular one is to reduce working hours, because this would allow for the

wider sharing of paid work available, thus reducing unemployment—which is even worse for health and well-being. This said, one also wants to include an analysis of if or how this reduces pay and what it does to purchasing power and thus access in deeply marketized societies. In Great Britain, for example, where private debt is the highest in Europe and many low-paid workers have mortgages to service, the prospect of earning less in exchange for having more time does not mean an improved life. Unlocking path dependencies in complex settings require whole system change strategies with policy-packages hedging such detrimental side-effects.

Another approach could be to change the experienced utility itself, so that spending time at work was less of a nuisance. For this to happen, the idea of what makes a firm competitive would need to change. Its prime benchmarking purpose would become delivering high product *and* process utility in the most resource-light and resilient way—instead of myopic and narrow price competitiveness. It would include outcomes of social capital (good relationships, reported well-being, and trust), human capital (giving people skills, their ability to creatively innovate and collaborate), and the protection of environmental capital (as little resource use as possible for the delivery of certain need satisfiers). Some corporate strategies do involve such ideas, but usually not as the goals of their system: they are means to better deliver on the unchanged goal of maximum profit.

To level the benchmarking playing field for those companies that sincerely try to turn these means into goals, regulatory changes are necessary. These goals could also free corporations from the pilot paralysis they report regarding their sustainability endeavors. This would, however, require changing their business model and thus corporate charters themselves. Other measures like taxation or subsidies are of course political incentives that still induce people to work harder. In a transformational agenda the holy cow of constantly striving for labor productivity increases should have to justify its merit: "if tax-cutters think people should work still harder, they need to explain why" (Layard 2005: 228).

Today's standard measures and indicators emerged from the ideas about the world held by their inventors. Stripped of this context they function like 'objective' reference frameworks in arguing how to do things adequately. So if our culture, signals and symbols were transformative in a way that steered clear of materialistic values, extrinsic incentives and monetized expressions of worth, the perceived need for ever more gain or new stuff in materially saturated societies might well fall. The other deep wiring that needs double-checking is of course that of endless competition and individualist comparisons to define one's own worth and value.

Interestingly, with these observations we come close to Asian wisdom that has conceived of happiness as an existential and social concept all along. It stands for a way of leading a life that is content overall and in which you feel able to master challenges and enjoy what you are given. In Buddhist ethics and philosophy, as the Bhutanese example of Gross National Happiness or GNH will show in Chapter 4 a high degree of well-being for some individuals does not count as an achievement if others in the community are suffering at lower levels. The Greek term *eudaimonia,* as used by Aristotle, has a similar meaning. It describes happiness as an activity rather than an emotional state: Happy individuals are capable of living up to the

potentials of human nature and this leads to virtuous engagement for the common good. For a comprehensive overview of different definitions of happiness see the crowd-sourced Wikipedia.

So, sometimes it feels as though innovation is not always about finding new ideas and evidence but also about remembering old wisdom. After all, if thought through to its logical conclusion, the stark utopia and grand narrative of endless gain is a desperate one. There is no happy ending if humans can simply never get enough. As the numbers cited have shown, the threshold of what people report they need to feel good keeps on growing with the wealth of society as a whole. In this development vision we can never reach satisfaction. Thus, a culture and society nested in mind-sets and institutions of endless economic growth and competition appears less a stark utopia of freedom of choice and happiness, and more a dystopia of never being able to enjoy and relax.

3.2 How Mainstream Economics Views Nature and Its Governance

The second light green column of Table 3.1 assembles central concepts that mainstream economics applies when dealing with nature: forests, oceans, mountains, fields, deserts and the animals living in those locations. It provides the analytical tools available when addressing the second of the *Brundtland Report's* key qualifiers of sustainable development. That is "the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs" (WCED 1987: 41). This is relevant for current generations and for safeguarding the livelihoods and well-being of future generations, and the way the issue is phrased is very important. The message is usually framed wrongly. In line with key thinkers during the Enlightenment movement (most prominently Thomas Malthus), nature is depicted as imposing limits on human development, of which there seems to be only one right, linear version.

However, by using instead the relational complex systems view that natural sciences offer in the twenty-first century, we see that it is the manner and degree of human interference with nature's ability to reproduce its wealth that is backfiring. If we change our ideas and goals of development or progress, our choice of technology and social organization, humans and nature can both flourish over the long run. And from a less anthropocentric point of view, flourishing nature is an ethical goal in itself, totally independent of the use value that this provides for humans.

The Second Enlightenment mindshift replaces the lens of 'fighting nature's limits by extracting more natural resources faster' with one of 'aligning production and consumption patterns with her circular reproductive cycles.' This requires descriptions, measures and models that illuminate where and how human interference hampers ecological laws.

As we can see from the production function in Fig. 3.1, non-production-related environmental benefits or waste impacts on nature do not figure in mainstream thought unless producers need to pay a price for them. This way it is only viewed as a fictitious commodity, an input factor whose price producers will try to lower in order to stay competitive. The best mechanism to counter this trend and govern scarce resources is to 'get the prices right' so that markets avoid exhausting resources. With increasing scarcity, they become more expensive and therefore unattractive for continued use, hence an alternative will be found. Nature is thus not viewed as a web of life but as a heap of resources whose chunks have different exchange values (prices), depending on their scarcity. Degradation does not matter as long as alternative resources or technologies can fill the spot in production chains.

The solution to this problem requires more than merely grouping input factors into social, human, manufactured, and natural capital. As long as the models freely exchange one type of capital for another in doing the math on successful development, we see nothing of the real world changes underneath. On the input side the models track flows of single chunks of nature (e.g., cubic meters of wood) but are blind to the laws of their reproduction, which would help identify how, or which, important resources are renewed at what rate (how quickly does a forest grow and which soils are necessary for that?) and which stocks are indeed limited and therefore need careful exploitation if long-term use is necessary. Regarding the output side, superficial exchange value (market prices) says nothing about the actual use values (need satisfiers) that were generated. Growing output in the financial sector, for example, counts as positive growth in GDP standards even if it results from speculative gains on staple food commodities that make the prices of these prohibitively high for hungry people. From this point of view there is nothing beyond the economic sphere and everything within it can be converted into everything else—and nothing really gets lost. Everything is either capital as expressed in market prices or invisible.

This is why economists like Daly have argued for the introduction of non-monetized benchmarks, warning of "uneconomic growth" in which monetized indicators like GDP still show growth even though the use value (utility) created for humans becomes negative and/or natural capital stocks are destroyed beyond recovery rate. The following sections will pick up on these aspects by zooming in on each of the key concepts captured in Table 3.1 that refer to governing nature.

3.2.1 What Types of Capital Exist and Where Do They Come from?

As in Sect. 3.1, I would like to start this discussion by presenting the typical mainstream economic model that students are shown when studying macroeconomic dynamics. Figures 3.1 and 3.2 highlight the blind spots when thinking about

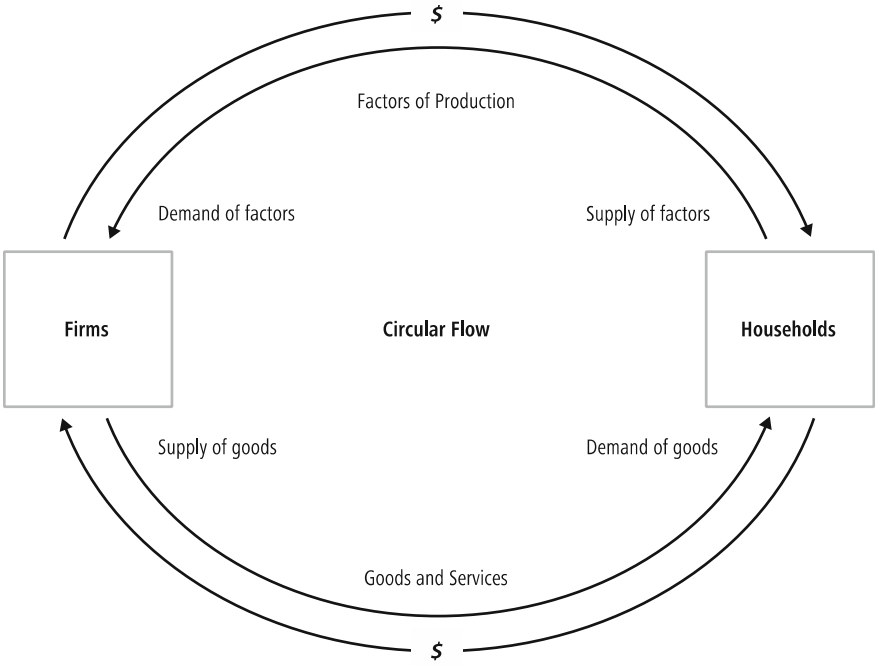

Fig. 3.3 Mainstream economics model of the economy. *Source* Daly/Farley (2010: 25)

production processes and here we turn to the model of an entire economic system. It consists of two main actor groups, producers or firms and consumers or households. The resulting image is that of a circular flow of goods and services and factors of production (labor, land and capital) in a closed loop, guided by price signals (Fig. 3.3).

In his discussion of how complexity economics diverges from this paradigm, Beinhocker returned to his "half-baked physics" analogy, which rests on the First Law of Thermodynamics, also called the Conservation of Energy Principle. It was developed in the late eighteenth century and explains that in isolated or closed systems energy is neither created nor destroyed but merely changes its forms. You always have the same total: if net energy or heat is supplied to a system it equals the net work done by the system. Energy in economics is capital. Similar to utility it needs some measurement unit and this is once again money. The value of pieces of capital is expressed in market prices, so what counts is their "exchange value."

The Second Law of Thermodynamics followed midway through the nineteenth century and refers to the irreversibility of natural processes. It states that every time energy changes its form there is an increase in entropy, a measure of disorder or randomness. This means that continued activity will eventually make any closed or isolated system decay into disorder. Only open systems, using energy and matter

flowing through, can counter this process. They can create syntropy—order, structure and patterns—by taking the necessary energy from connected systems. This is how nature uses the sun's energy for its evolutionary reproduction circuits—and how humans use nature.

Yet, this fully baked physics did not make it into mainstream economic models. The sources of energy remain invisible in mainstream economic models. Only the prices of what is exchanged are tracked. In their classic textbook *Ecological Economics: Principles and Applications* (2010) famous ecological economists Herman Daly and Joshua Farley summarize the loss of information so brilliantly that it is worth quoting at length:

> What is it that is really flowing around and around in a circle in the circular flow vision? Is it really physical goods and services, and physical laborers and land and resources? No. It is only abstract exchange value, the purchasing power represented by these physical things. The 'soul' embodied in goods by the firms is abstract exchange value. When goods arrive at the households, the 'soul' of exchange value jumps out of its embodiment in goods and takes on the body of factors for its return trip to the firms, whereupon it jumps out of the body of factors and reincorporates itself once again into goods, and so on. But what happens to all the discarded bodies of goods and factors as the soul of exchange value transmigrates from firms to households and back *ad infinitum*? (Daly/Farley 2010: 28)

The real-world impact that the discarded bodies create lies beyond what is captured by capital accounting. Mines, wells, fishing grounds or cropland are built up and replenished according to their own logics. They are not simply available because someone demands them and is willing to pay a price. Nor are their capacities to absorb and store all the discarded bodies endless.

One estimate puts the total amount of extracted raw materials that end up as solid waste at 12 billion tons per year, of which 4 billion tons are generated in OECD countries alone (OECD 2014b: 10). The only way that such waste enters the exchange value circle is in form of the cost of collecting it and storing it somewhere. What remains unaccounted for is how nature then deals with this output, which might include gigantic garbage dumps, sealed radioactive containers, or a field of plastic the size of Texas floating in the Pacific Ocean. Even more difficult to account for, in particular in price signals, is non-material waste like emissions from burning fossil fuels, the declining fertility of billions of hectares of soil, the seepage of chemicals from agriculture into the earth and then into the oceans, destroying coral reefs.

The first UN World Conference on Sustainable Development in 1992 in Rio de Janeiro acknowledged that the management of ecosystems might need different governance mechanisms than that of conventional markets. Thus, Rio created conventions for tackling climate change, biodiversity loss and desertification. Still, economic growth impacts are always of concern and already in the 1970s economists had engaged with nature by making it an input factor of production functions. Somewhat as all the pleasure (output) to be had was stuffed into the abstract container term of utility, 1970s economists simply expanded the term 'capital' to include everything that could be used productively (input). Both are handily measured in monetary terms, so that predictive models can be run.

US economists Robert Solow and John Hartwick then embarked on the question of the intergenerational allocation of natural resources and their basic idea became that of 'capital substitutability.' In line with closed system exchange value conversion assumptions, capital substitutability holds that while each generation should have the same amount of capital available, the composition of its overall stock can vary. For example, natural capital can be degraded as long as man-made capital is increased to the same value (Solow 1986: 141–149).

When the Rio Summit put intergenerational distribution of the means for need satisfaction center stage, this concept was included in the measures recommended for tracking if development had become sustainable. But instead of making calculations according to the biophysical laws of nature, policymakers used the laws of exchange value for natural assets. Capital substitutability offered a way to integrate the environment with economic calculations that need not upset the human self-image: economic growth could happily continue. It might also have helped that Robert Solow won the Nobel Prize for Economics in 1987, the same year that the *Brundtland Report* came out.

Natural scientists and ecological economists were and are critical of this move and demand that there should be limits to the use of market pricing in a good governance regime. Let us explore their criticisms and alternative concepts in more detail.

3.2.2 Market Prices and the Allocation or Protection of Scarce Resources

The term that mainstream economics uses when its models' predictions go awry is 'market failure.' There is no question as to whether markets are always the best solution; the problem is always that some policymaker was silly enough to intervene in the equilibrating checks and balances of exchange value. Of course there are many, many cases where market prices are distorted, often because private actors also seek to manipulate them. The aim of making them tell the 'truth' about the environmental and social costs involved in producing a product or service is a necessary one. But it is not sufficient to govern human–nature relations in a sustainable manner.

Here are some examples in which prices did not secure good allocation or prevent overexploitation of nature's riches. First, when the natural resources affected are needed for subsistence. The direct survival means of many of the poorest people in the world today need to be protected against price hikes fuelled by speculative interests that aggravate supply crises. Individual economic gain aspirations need to yield to survival needs. Yet, if there is a detectable pattern, it seems to be that instead of prioritizing the needs of the poor, exchange value orientation means prioritizing the rich with purchasing power. Second, and as a consequence of unequal wealth generation, market prices do not necessarily deter rich people from

consuming things that prices indicate have become scarce. In a materialist culture of competitive status-seeking, paying more means showing off—as the term 'conspicuous consumption' implies.

One example of this is the threatened Japanese bluefin tuna, whose very high price has not reduced consumption, but actually made it even more desirable. Indeed, in 2013 the first tuna of the year was sold for almost $2 million. This pretty irrational market failure was described as 'Sushinomics' by the *The Atlantic* (Narula 2014). It bears out Daly and Farley's observation that the maximum economically and technologically feasible exploitation of nature might just be too high. Even from a blatantly anthropocentric point of view, this will have disutility effects on all the manufactured goods whose successful use is dependent on an intact environment, for example, diving masks worn to observe tuna. Nature, Daly and Farley note, "provides a complementary service without which the utilities of most consumer goods are not very great" (Daly/Farley 2010: 163).

Worse, there are no price signals for all non-commodifiable ecosystem services. These include the entire cyclical management of freshwater or a healthy atmosphere in which multiple ecosystems like rivers, oceans, soils and forests are involved in cleaning water and air so that they are fit for human consumption. Emission trading schemes represent attempts to create markets for the waste absorbing or usefully transforming sinks that form part of these ecosystems. In these schemes, producers are supposed to buy CO_2 emission rights (e.g., the European Emissions Trading System), or the owners of forests are compensated for the CO_2 extracted from the atmosphere (e.g., the REDD+ mechanism under the UN Framework Convention for Climate Change). The goal is to disincentivize both the use of CO_2-emitting resources and the destruction of CO_2-absorbing ones so that the balance, or carrying capacity of the atmosphere, can be restored.

However, the creation of markets for ecosystem services only works on single atomized units of capital, like a ton of CO_2, and thus tells us little about the whole web of natural life. Living species interact and form complex ecosystems with balancing feedback loops and food chains. Thus, overexploiting one type of resource, or condemning one species to extinction may seem harmless. But without an understanding of these intricate relationships, we may create a 'missing link,' glut or shortage in the dynamic reproduction circuits of basic life support systems like water supply, pollination patterns or soil fertility (Daly/Farley 2010: 75–76).

To me, it sounds like a rational risk management strategy to amend these price signals with some biophysical data tracking and sound regulations on usage limits. This is particularly important given the minimal help that price signals can provide for future-oriented precautionary governance of scarce resources: living complex systems are unpredictable precisely because these development models are built around a mechanical additive understanding in which single elements can be freely subtracted and added without changing the overall dynamic. The *Assessment Reports* of the IPCC, for example, calculate that, if the atmosphere is to stay within its current dynamic equilibrium, a concentration of CO_2 somewhere between 350 and 450 ppm is all that the natural cycle of CO_2 transformation can take. If we exceed this amount, all the ecosystems involved in the carbon cycle face changes

and potentially drastic ones, such as ocean acidification, sea level rise, increased flooding or, by contrast, desertification, and so on.

Meanwhile, the challenge with complex systems is that they often have delays in their feedback structures, depending on the available stocks of resources that can be used, like credit, for a certain amount of time. In addition, the effects on one resource or biophysical process are typically linked with other natural cycles and may lead to accelerated feedback loops that have nothing to do with the original human activities. This means that problems often only become visible or tangible when it is no longer easy to put a halt to the damage they are causing. The linear causality image of a kettle removed from a stove when it whistles is utterly misleading. MIT professor John Sterman and Harvard education expert Linda Booth-Sweeney explain this "wrong mental model" in the context of climate change. It assumes, they argue, that it will only

> require short delays in all the links in a long causal chain, stretching from the detection of adverse climate impacts to the decision to implement mitigation policies to emissions reductions to changes in atmospheric GHG [Greenhouse Gas] concentrations to radiative forcing to surface warming and finally to climate impacts, including changes in ice cover, sea level, weather patterns, agricultural productivity, the distribution of species, extinction rates, and the incidence of diseases, among others. None of these conditions hold: there are long delays in every link of the chain (Sterman/Sweeney 2007: 214).

None of this can be captured by exchange value or market prices. The governance of nature requires multidimensional evidence instead of the typical monetized cost–benefit analyses that are popular in policymaking. In those natural protection measures, investment in education, extent of social welfare, etc., are judged by quantifying their value in monetary terms. Equipped with those numbers one can calculate when it is 'economic' to implement them. There are no general standards as to how this conversion should be done, so it is down to the ethical judgments and mind-set of the—often economics-trained—policy advisor: what is the monetary value of a human life? How much should saving thousands of lives a year through tougher pollution standards therefore be allowed to cost? When is it too expensive? Whose competitiveness might be impacted by the higher costs of production?

When it comes to presenting the 'evidence,' numerical equations radiate the aura of objectivity. But digging into what twenty-first century science tells us about nature renders equations unsuitable for sound economic governance. Ecological economists like Daly therefore demand a precautionary approach that starts from the premise that certain functions of nature—some of its *laws*—cannot be duplicated by humans but are essential to the continuation of human prosperity on this planet, at least for the foreseeable future. They determine the quantity of and rate at which nature develops the low entropy resources that humans use. For example, the humus in fertile soil that takes up to 2000 years to form, and the fossil fuels that started forming 300 to 400 million year ago. Likewise the way that high entropy waste in the form of emissions, chemicals and heat can be absorbed by plants, soil, water, and so on.

Sustainability economics will need to embed the exchange value loop model in the real world, argues Daly. During his time from 1988 to 1994 as a senior

economist at the World Bank he developed a succinct set of management principles for sustainability. They show which scientific and ethical judgments are inherent in market prices and cost–benefit analyses:

- The use rate of renewable resources cannot be higher than their rate of regeneration or they are lost for future generations.
- The use of non-renewable natural resources should not exceed the discovery of alternative sources to deliver on the same function (e.g., replacing fossil fuels with solar technology).
- Emissions cannot be higher than the capacity of the natural environment to cope with them.
- Human-made threats to or excessive risks for human health and the environment should be avoided (Wikipedia 2014).

So even if one sticks with the mainstream lens of rejecting allocation decisions through laws and agreements, the question about when prices tell the environmental and social truth will be equally political. This process cannot be left to economist modelers. In democracies the process needs to be as explicit and transparent as possible. The agenda on Planetary Boundaries, or limits to growth, is about nothing else, even though its critics like to portray it as doomsday eco-dictatorship. No one is talking about people not being allowed to intervene in nature, intentionally enhance natural resources or look for artificial ones. It is about developing a good understanding of what we have and how the laws of resource reproduction coalesce so that we can manage development processes well and equitably.

This view has also been dubbed "strong sustainability" and its advocates argue that the three dimensions—social, ecological, economic—of sustainable development should capture its paradigmatic shift away from the old development imaginary. Sustainable development should not be delineated with three pillars of similar importance—the dominant icon since the Earth Summit in 1992—it should instead be portrayed as a series of embedded systems. Figure 3.4 shows that this renders the economic system—the stark utopia of the market system—the servant rather than the master of the social and environmental system. A discussion of the arguments can be found in the first *Global Sustainable Development Report* (2014).

In line with this paradigm, ecological economists are less interested in what might theoretically, at some point in the future, be possible if technological revolutions and yet more money were available. They are more interested in preventing the irreversible harm caused by ignoring the long period of transition required between now and then. It is from this perspective—also a great mindshift—that they argue for future development paths that will host a steady state economy that remains constant instead of exponentially expanding levels of production and consumption. Getting there would require massive transformations of many path dependencies in the economic and also social systems. But ruling them out means accepting massive transformations in the ecological and social systems, which will also impact economic systems in the mid-term.

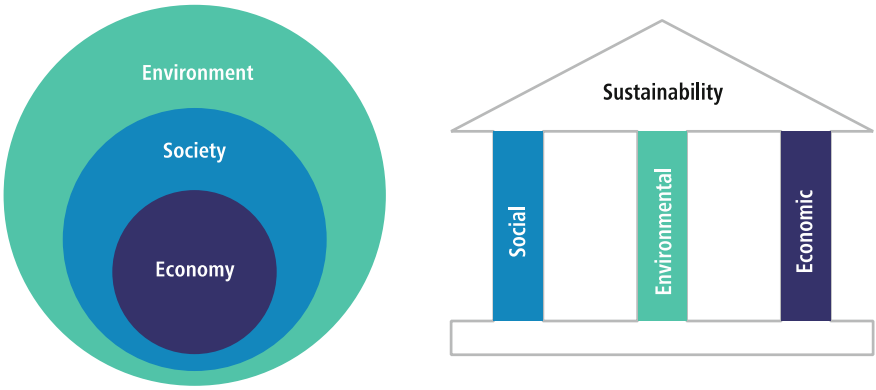

Fig. 3.4 The three-pillar versus embedded-system view of sustainable development. *Source* Own illustration

Maintaining an unequivocal imaginary and narrative of endless growth might be politically easier and convenient for privileged groups but cannot be backed by evidence drawn from the natural sciences of the twenty-first century.

3.2.3 Checking Nature's Safe Operating Spaces for Human Growth Aspirations

The third and fourth rows in Table 3.1 bring us to a deeper understanding of why only economists can argue for unlimited growth. The most popular argument we hear is that one can decouple economic growth from natural resource use. Make more with less. There is nothing to say against the efficient and sparing use of natural resources, but relative savings should not be confused with an absolute reduction of human-caused exploitation levels. Raw material extraction levels reached 70 billion tons in 2008. This is unprecedented not only in total but also in the amount per person: about 10.5 tons. Of course these numbers vary widely between countries, being lower in India and China and higher in Australia and Chile (Wiedmann et al. 2015: 6273–75). So it seems like good news that global average resource intensity or relative decoupling as measured in the standard indicator of Domestic Material Consumption per unit of GDP (DMC/GDP) has decreased significantly from 3.6 kg/$ in 1900 to 1.3 kg/$ in 2005 (Wiedmann et al. 2015: 6271). Otherwise the world would look like a big mine shaft. With this indicator, as OECD reports summarize, it also looks like some countries such as Canada, Germany, Italy and Japan have decoupled DMC from economic growth in absolute terms. They get richer but no longer need more natural resources.

Yet, a discussion of the rebound effect hinted that current consumption and market patterns do give price signals that suggest using fewer resources per product

or service (as long as there are prices on the natural resources or waste created) but don't really suggest using fewer resources in total. 'Making more' and 'consuming more' remain the dominant partners in the formula.

One study that tried to untangle what seem to be contradicting observations was undertaken by an international group of ecological economists working with Thomas Wiedmann and published as 'The material footprint of nations' in the *Proceedings of the National Academy of Sciences of the US* (PNAS). They show that DMC, despite being the lead indicator for the Green Growth and Green Economy studies and strategies of the EU, OECD and also the *UN Environment Programme* (UNEP), hosts two big blind spots:

(1) it captures only those materials that made it into the final products and leaves all the waste and extraction created in the process unaccounted for;
(2) it allocates the resource extraction figures in the country where they occur and not in the countries where the products they are used for are consumed.

This means that all the environmental impacts associated with extracting and processing raw materials into goods fall out of the picture. These include water resource depletion and pollution, soil erosion, biodiversity loss, mine tailings, and natural destruction or pollution through spillages and agrochemicals. In particular the production of metals involves digging out ores and turning them into concentrated commodities. It also means the obfuscation of the way in which the globalized supply chains rich countries use to primarily import materials or even semi-finished products relegate consumption and natural impact to two separate balance sheets (Wiedmann et al. 2015: 6273). This 'leakage' effect has already been criticized in connection with the commonly used statistics and thus negotiations about CO_2 reduction commitments.

To tackle these blind spots the research team used the *Material Footprint* (MF) as a consumption rather than production indicator. It measures all the natural impact that a particular economy creates, including unused extraction, and regardless of where resources happen to be taken out. The indicator has also been called *Total Material Requirement* (TMR) and comparing it with DMC shows a "process of externalization of resource-intensive processes of mature economies" in which the MF per capita becomes considerably larger than the standard measure (ibid.: 6273). The United Kingdom and Japan are at the extreme end not only regarding this statistical aberration but also in their dependence on imports for their levels of final consumption.

When checking for correlations with factors that influence the levels of MF—such as availability of raw materials, density of population or GDP per capita—the findings confirm "a very strong link found previously between growth in building materials, ores, and fossil fuels use and economic growth in most of developing Asia, most notably in China," and, as in many other studies working with footprint indicators, with levels of income. For "a 10 % increase in wealth, the MF would increase by 6 %" (Wiedmann et al. 2015: 6273).

So while it is commonly argued that environmental pollution drops once certain thresholds of income are reached (the famous Kuznet's curve) this cannot be documented in such meta studies. Instead they bring to the fore structural questions that will become vital in the SDG agenda, e.g., which development model can claim to be sustainable? Surely not those whose MFs overshoot what would be a fair share of the globally available resources by a factor of five to ten?

This is what Stefan Bringezu, member of the UNEP International Resource Panel, found when undertaking a per-capita calculation of fair shares of all natural resources. A "potential sustainability corridor" would be reached by 2050 if the *Total Material Consumption* (TMC) of abiotic or non-renewable resources lay between 6 and 12 tons per person, the TMC of biotic or renewable resources below 2 tons per person, and the *Raw Material Consumption* (RMC) of used biotic and abiotic materials between 3 and 6 tons per person. He concludes that "[F]or policy, a '10-2-5 target triplet' can provide orientation, when the three indicators are assigned values of 10, 2, and 5 t/person, respectively" (Bringezu 2015: 25). To put these numbers into perspective: for rich countries they mean a reduction of 40–90 % in each of the indicators based on 2014 use levels (ibid.: 42–45).

We see that before decoupling strategies can be called successful, their calculations and indicators need to tell the true story behind any Green Growth path, especially for a global agenda. The OECD as well as the EU have come around to expressing the limitations of DMC but have not accepted absolute targets for TMR as Bringezu suggests.

But why are natural scientists so concerned with defining a sustainability corridor or operating space? Because market prices can only tell the truth about social and environmental impact when these are realistically estimated. If an estimate is undertaken with a mechanical engineering mind-set it will look very different from one undertaken with an embedded systems view. According to the latter, ecosystems already risk losing the stable and resilient environmental characteristics to which humanity is accustomed. This is what the term 'Anthropocene' stands for: the 10,000 benign years of the Holocene have been ended by human interference with Earth's reproductive processes. This earth system science shows us that if we extract from the planet all that is technologically and economically feasible to harvest, it will be far too much for the planet to sustain. Price signals come too late unless caps for maximum exploitation are defined.

The research agenda on 'Planetary Boundaries' aims to avoid ecosystem cycles or reproduction being 'tipped out' of dynamic equilibrium. Twenty-six scientists published an article on Planetary Boundaries in the journal *Nature* in 2009 to highlight the fact that three out of nine central dimensions of Earth's productive processes were already in a state of overexploitation: namely CO_2 and nitrogen cycles, and the rate of biodiversity loss (Rockström et al. 2009). The title dovetails well with the mainstream image of nature limiting human growth aspirations. Yet, the article is a plea to understand these boundaries and to align human activity with them. This is what the subtitle "A Safe Operating Space for Humanity" means (Table 3.3).

Table 3.3 Defining Planetary Boundaries

Earth-system process	Control variable	Boundary value	Current value	Boundary crossed	Preindustrial value
1. Climate change	Atmospheric carbon dioxide concentration (ppm by volume) [25] See also: Tipping point (climatology)	350	387	Yes	280
	Alternatively: Increase in radiative forcing (W/m^2) since the start of the industrial revolution ($\sim$1750)	1.0	1.5	Yes	0
2. Biodiversity loss	Extinction rate (number of species per million per year)	10	>100	Yes	0.1–1
3. Biogeochemical	(a) anthropogenic nitrogen removed from the atmosphere (millions of tonnes per year)	35	121	Yes	0
	(b) anthropogenic phosphorus going into the oceans (millions of tonnes per year)	11	8.5–9.5	No	−1
4. Ocean acidification	Global mean saturation state of aragonite in surface seawater (omega units)	2.75	2.90	No	3.44
5. Land use	Land surface converted to cropland (%)	15	11.7	No	Low
6. Freshwater	Global human consumption of water (3 km/year)	4000	2600	No	415
7. Ozone depletion	Stratospheric ozone concentration (Dobson units)	276	283	No	290
8. Atmospheric aerosols	Overall particulate concentration in the atmosphere, on a regional basis	Not yet quantified			

(continued)

Table 3.3 (continued)

Earth-system process	Control variable	Boundary value	Current value	Boundary crossed	Preindustrial value
9. Chemical pollution	Concentration of toxic substances, plastics, endocrine disruptors, heavy metals, and radioactive contamination into the environment	Not yet quantified			

Source Rockström et al. (2009: 472–475)

The concept of Planetary Boundaries was developed to host an ongoing process of refinement in line with improving data and computer simulations (see, for example, Steffen et al. 2015). The work includes the identification of the best indicators for the remaining two of the nine dimensions and to understand regional thresholds in line with the actual biophysical realities in these areas. Regional assessments are necessary because, in certain regions, tipping points in some of the dimensions will be reached much more quickly than in the global average. There are prime examples in the cases of freshwater provision and soil erosion.

Another research angle addresses the correlations between the dimensions, for example, of how land-use pattern changes impact on CO_2 emissions, freshwater availability, and biodiversity. This is necessary because otherwise predictive calculations as to how many resources are left for production, or how they can be substituted by renewable ones may end up relying on one source several times over.

This issue is currently emerging with the growing agenda for a 'bio-economy.' Raw material shortages are to be circumvented by using biomass and natural fibers instead. While the political strategies tend to insist that food production has to have priority over industrial use, quantifications on what this means in practice are missing. The German bio-economy strategy of June 2013, for example, aligns its goals with those of the German sustainable development strategy that seeks to limit the conversion of land for settlement, transport, production, or agriculture from 87 to 30 ha daily by 2020. However, this policy fails to provide any safeguards for maximum conversion limits, if Planetary Boundaries are to remain intact (Destatis 2012: 15). This relative target still allows for an indefinite 10,680 ha to be converted every year after 2020. Over the long run Germany could turn every forest into a field for biomass.

It was research scientists at the UN International Resource Panel that shed some light onto how much global cropland is actually available to sustainably supply food for 9–10 billion people. They undertook extensive work to identify where thresholds lie for land-use changes if biodiversity loss, release of CO_2, disruption of water and nutrient cycles and the loss of fertile soils should not plummet under their Planetary Boundary levels.

Table 3.4 Land use predictions by the UN International Resource Panel

Business-as-usual expansion	Low estimate (Mha)	High estimate (Mha)	Source
Food supply	71	300	Based on Bruinsma (2009), RFA (2008), Bringezu et al. (2009a)
Biofuel supply	48	80	Based on Fischer (2009), IEA (2011)
Biomaterial supply	4	115	Based on Colwill et al. (2001), Raschka/Carus (2012)
Net expansion	**123**	**495**	
Compensation for built environment	107	129	Based on Electris et al. (2009)
Compensation for soil degradation	90	225	Based on Scherr (1999)
Gross expansion	**320**	**849**	

Source UNEP (2014: 20)

Their 2014 report, *Assessing Global Land Use: Balancing Consumption with Sustainable Supply*, concludes that humanity's safe operating space ends at a total of 1640 million hectares of global cropland, which leaves roughly an additional 100 million hectares yet to be converted. Were current trends to continue, this limit would be reached by 2020 and conversion would not stop there but, as can be seen in Table 3.4, eat up an additional 320–849 million hectares before demand leveled off (UNEP 2014: 23–25). To prevent this the report recommends that significant changes in agricultural practices, production and consumption patterns and the composition of diets are more imperative than the growth of a land-guzzling bio-economy.

Of course, the ranges calculated for the Planetary Boundaries are contested. Interestingly, most of the criticism comes from within the strong sustainability camp and is lodged by biologists or experts in the individual dimensions. They argue that the identification of precise thresholds is still too numerical and too mechanical, further supporting the persistence of the managerial paradigm of exploiting nature as quickly and effectively as possible. Others say that global boundaries cannot tell us much about regional challenges, among which the availability of land, fresh water or oceans, for example, differ widely.

Another caveat concerns the absence of non-renewable resources in what has become the most prominent framework in addressing the sustainable governance of nature. As the discussion on the MF showed, this omission obscures much of the picture of how much natural capital is left. It also showed that even if the boundary or carrying capacity numbers are not totally correct, the trends toward overexploitation are so clearly documented that swiftly and significantly changing course should be the rational strategy.

One crucial element in this context is indeed the much more efficient use of natural resources, the improvement of recycling rates, adoption of modular designs and a choice of materials that allows for reintegration into the natural cycles.

Measures and incentives as well as policy frameworks are needed toward this end. Yet, doing all of this without challenging the output indicator of the decoupling agenda, GDP, keeps the thinking linearly, geared at maximum possible exploitation: which means, for example, that species extinction rates ten times the average rate over time are acceptable simply because they would not destroy human welfare.

3.2.4 How Does Exchange Value Governance Impact Living Systems?

Just as introducing the logic of cost–benefit thinking in more and more areas of life numbs people to realizing what is really at stake, the logic of capital substitutability turns the perceptions of the webs of life of which nature is composed into one of a demand-satisfying raw material storage whose overexploitation will spur human ingenuity into finding substitute input factors. Ironically, the concept was developed to recognize nature's importance in economic processes but in the end made nature invisible.

It was John Hartwick who translated the concept of capital substitutability into policy guidelines in the 1980s, and after the Rio Summit in 1992 these became the measurement standards promoted by powerful international institutions. According to the Hartwick–Solow rule, sustainable development is reached as long as the rent or benefit made from degrading natural resources is invested in the augmentation of man-made, i.e., social and human capital (Hartwick 1978: 347–354). As a consequence, the world started changing its accounting systems, incorporating nature into the most influential measure of economic performance and progress, GDP.

GDP expresses the sum of the market value of all final goods and services produced by firms, individuals and the government in any given time within one country's borders. It is usually calculated annually and, with some minimal exceptions, nothing is counted that is not purchased within that year. It also provides the base line for the most common indicator of poverty and standard of living, GDP per capita. The total of GDP is divided by the number of people living in a country.

The criticism of GDP as a measure has many nuances but three points are always made:

- GDP violates accounting rules because it lumps together costs and benefits: Cleaning up after natural disasters or having to install thick absorption walls along highways for noise protection create payments for services and products but are actually defensive expenditures. They only restore or maintain a similar level of 'wealth' but do not increase it.
- GDP ignores all value created or depleted that has not been captured by market prices. This includes household and volunteer work, education and caring for children and the aged. Meanwhile, once someone starts being paid for this type

of work, it automatically registers as 'growth' even though nothing new has been created. Destruction of natural resources like healthy oceans, forests or landscapes is growth, once someone pays for their raw materials, but the same destruction is invisible if they do not.

- GDP is blind to the effects of distribution. The overall sum does not show who has been receiving which amount of income from exchanging the products and services whose market prices are aggregated. The per capita GDP of a country may therefore rise while its poverty levels stay the same.

After a first wave of debate about the blind spots of GDP as a benchmark for development in the 1970s, the ever more tangible, negative effects of the economic growth development agenda have revived criticism in recent years. Since 2007, many initiatives have formed around the world, which the OECD-led online platform www.wikiprogress.org seeks to keep track of.

Before this revival, however, the capital substitutability logic had elegantly settled the challenge of environmental limits to progress: in Standard National Accounting, as used by the UN, only the formation of fixed, produced capital was counted as an investment in the future, since it is viewed as increasing the value of the assets available to society. Likewise, depreciation of the value of this type of capital was calculated as a decrease. The World Bank engaged with the critique of an undifferentiated understanding of capital and added human and environmental or natural capital because, according to the World Bank's *Manual for Calculating Adjusted Net Savings*, they are equally important "assets upon which the productivity and therefore well-being of a nation rest" (World Bank 2002: 4). A depletion in the stock of an asset like minerals or water means that options for future use decrease and therefore should be calculated as a disinvestment.

However—and here we find the Hartwick-Solow rule—the net opportunity costs for future citizens are not necessarily negative if the profits made from depletion are invested elsewhere. The new indicator of Genuine Savings Accounting or Adjusted Net Savings expresses this substitutability view by subtracting a country's natural capital depletion and pollution from its *Gross National Income* (GNI), which is similar to GDP but counts the production of all citizens independently of where they live.

Within the discipline of the economics of sustainability this approach has been labeled "weak sustainability" because it does not make any reference to the biophysical limits that a country might well run into even if the entire population becomes utterly smart and creative. This is different from the safe operating space mind-set and became the source of peer benchmarking activities comparing the sustainability performances of different countries. As the World Bank manual explains:

Weak sustainability assumes that any type of capital is perfectly substitutable for natural capital as an input to production. From the adjusted net savings standpoint, for example, a nation which reinvested all of its profits from the exploitation of non-renewable resources in the formation of human capital through its educational system would have imposed no net opportunity cost on the country's future

citizens. Whether or not this is precisely true is a hotly-debated issue, and this study makes no attempt to settle the issue (World Bank 2002: 4).

In practice this means that an indicator of zero or more is viewed as sustainable development, whereas negative savings indicate that total net wealth is in decline and policy change is necessary (ibid.: 5). The most successful role models from this point of view are all those countries that apply high royalties on the extraction of their natural resources and use these to improve the social and human capital of their population, which will then spur further growth.

The 2011 World Bank report, *The Changing Wealth of Nations*, calculated how high the "hypothetical produced capital" of several countries would be, had they reinvested the royalties from their environmental capital accordingly. Trinidad and Tobago and Gabon could have tripled the social, human, and manufactured capital they produced between 1995 and 2005 (World Bank 2011: 16). By contrast Norway and its oil industry is always cited as the exemplary star performer.

So while Adjusted Net Saving acknowledges the growth/environment trade-off to a certain degree, its assumption of easy capital substitutability does not provide many warning signals on Planetary Boundaries. Instead it champions development role models that cannot continue if sustainable development is to be achieved. Norway is impressively rich in all forms of capital because it possesses and sells a lot of oil. The IEA predicts that about two-thirds of the oil that could be extracted and used needs to stay in the ground if climate protection goals are to be reached. How can a country win the best practice sustainability prize if its current development strategy is costing the earth?

Only monetary abstraction allows for the measurement of progress on sustainability while ecosystems are threatening to tip out of balance.

Yet, this translation of all value assets into capital is one of the explicitly mentioned advantages of the indicator. According to a World Bank manual on Adjusted Net Saving, "it presents resource and environmental issues within a framework that finance and development planning ministries can understand" (World Bank 2012: 2). But, if the outlooks on the world and the language spoken in those ministries are not conducive to finding solutions for sustainability, are they a good standard to which to convert?

3.2.5 Summary: Governing Human–Nature Relations Successfully Depends on Understanding Them

Market prices and indeed the economistic way of viewing the world clearly have their limits when it comes to respecting the environmental and social dimensions of sustainable development. This is why many scientists have argued for strong sustainability in which different forms of capital cannot simply be exchanged for others in measures of growth and progress. The clearest expression of this difference in paradigm is the replacement of the three-pillar image born at the 1992 Rio Summit

with one of embedded systems. Three pillars suggest that the economic, social, and environmental dimensions are of equal quality and could potentially be served in an additive and not integrated way: some institutions take care of social things, some protect the environment and others make sure we have enough economic growth. The total sum would be sustainable development.

I found a striking example of this during my PhD in global political economy when I was also working as a volunteer campaigner for Friends of the Earth in its international trade program. Since 1999, international civil society organizations have formed huge coalitions behind the slogan "Our World is Not for Sale." They teamed up with small farmers, fishing communities, and workers from around the globe to voice concerns about the impact that treating everything as traded commodities managed through global market mechanisms has on livelihoods, equity and ecosystem integrity. They also pointed out that this type of world trade system would primarily benefit wealthy corporate players who are empowered to expand their activities according to their own standards.

The dominant narrative found in major global institutions, on the other hand, presented a mainstream economic spin on why a global trade system and its core institution, the *World Trade Organization* (WTO), would benefit poorer people: growth will trickle down after some structural adjustment periods. Moreover, environmental issues should be dealt with in the *Multilateral Environmental Agreements* (MEAs) but not in purely economic trade negotiations. During my research into different schools of economic thought and the role that scientific expertise plays in institutionalization processes, I came across the following eye-opening passage from the WTO's tenth anniversary report. Prepared by an "international panel of experts" it states: "It is old wisdom in many cultures that you cannot kill two birds with one stone . . . So the correct policy solution is to fix the environment through an appropriate environmental policy and to maintain open trade to maximize the gains from trade and hence economic prosperity" (Sutherland et al. 2004: 14).

Wow, I thought, have these people not heard anything about the sustainable development agenda and its argument that this false dichotomy between environment and economy only holds in theoretical models? Checking the educational background of the eight experts in question, I found that all of them had studied economics at American universities. Differing passports notwithstanding, the degree of diversity of views on this panel could hardly have been lower.

Unsurprisingly, some of the most popular cases for the WTO Dispute Settlement Body and also the hottest topics in the ongoing *Transatlantic Trade and Investment Partnership* (TTIP) negotiations are things like import bans on tuna fished with tight nets that create incredible amounts of by-catch, genetically modified organisms or hormone-treated meats: because they are 'like products' (basically offering the same) they must not be treated differently under the purely economic trade law. They must be granted equal access to the market. Also prohibited are border tax adjustments that counter the competitive price advantage of products where

producers did not pay the 'true' price for environmental degradation. One prime example in the context of climate protection is CO_2 emission standards for products or companies: if only a handful of countries apply them, all foreign competitors whose home countries do not make them pay for emissions can thus undercut the more sustainable producers. It takes a degree in mainstream economics to continue to see environmental and economic concerns as two separate birds and abstracted 'evidence' to support such ideological claims in the expert reports. It also takes the popular growth narrative to justify even criminal pursuit of interests and fraudulent behavior as somewhat related to overall economic progress.

The Volkswagen scandal is a great demonstration of how an economic mind-set impacts the framing of events and thus the judgments of what is at stake: the EU raised its emission standards because it tried to prevent the all-encompassing effects of climate change and because air quality is the top environmental cause of premature deaths in Europe—about 100,000 a year. The *World Health Organization* (WHO) declared air pollution the single biggest environmental health risk (Vidal 2014). Yet, when the intentional manipulation of emission measurement software was discovered in Volkswagen cars, it was Volkswagen's plummeting stock value and the profit warnings that become headline news. The auto industry stands for 20 % of Germany's GDP and some headlines are straightforwardly asking if it will depress the country's growth. Meanwhile, the German government continued to block tougher European emission standards in the same month.

Structurally, the Growth Dilemma is real. But in societies with high incomes and stagnant or negative population levels, the Growth Dilemma resembles far more a straightjacket than an economy serving human needs: structurally it means we have to always want more or else our economic systems fall into turmoil. Billions are expended on marketing so that we do not forget that what we have is not enough.

Before the institutional setup that we are used to calling 'markets' can help to bring out the best innovations and solutions for sustainable societies, they have to be set up in a way that makes sustainable solutions their goal. Science should help to understand, untangle and overcome the path dependencies that work in the other direction. The mainstream economic paradigm and its monetary mind-set, measures and metrics are not fit for this purpose. They are laden with value judgments and power relations that disguise instead of enlighten.

3.3 How Mainstream Economics Anticipate the Future

This final subchapter turns to the dark green row at the bottom of Table 3.1. It assesses what adopting the mainstream economic mind-sets means for addressing the overarching goal of sustainable development: i.e., governing economies so that future generations can also live satisfactory lives. To begin, mainstream economics does not so much anticipate the future as extrapolate the way the economy will be

from the way it was. Or rather, what its models capture of the way the economy was. Most influential in this respect are the GDP growth predictions derived from the registered and aggregated monetary transactions. As long as these extrapolations are positive the future looks positive. But if GDP growth is low, financial markets get 'nervous,' investors 'lose trust' and politicians their jobs.

We have discussed the shortcomings of this measure above but what is important to add when thinking about the future is that calculating GDP trends is an *exponential* function. This means that zero growth, often perceived to be an equivalent to economic standstill, equals operating at the same level of output as before. And each successive percentage of growth is nominally bigger than the one before: the baseline is higher. Thus, if GDP increases by, for example, 7 % in poorer countries it is likely to indicate a far smaller increase in real production output than 1 % growth in a rich country. Many historically aware experts thus argue that high growth rates should be anticipated as temporary phenomena and not the norm.

In practice, zero growth does create several problems for the institutions behind today's capitalist market societies. But this is the result of the way they are set up and not some kind of natural inevitability. Much of the data presented above suggests that positive growth everywhere on the planet is not very likely to continue much longer. Yet, mainstream economics can by definition not imagine a positive future in which societies operate steady-state economies in which the throughput stays at more or less the same level. The idea of or need for constant growth is a natural law in any scenario or model for potential policy solutions.

This mental iron cage (Weber) is so strong that arguing for a no-growth or even degrowth path in rich societies is often conflated with attacking the ethical imperative of putting the needs of the poorest people first. *Homo economicus* cannot share existing wealth without flipping his hedonic calculus into the red. The *Brundtland Report* found that this would cause too much political resistance: The matter-of-fact assumption was that, "in most situations redistributive policies can only operate on increases in income" (WCED 1987: 47). Existing wealth is sacrosanct:

The number of years required to bring the poverty ratio down from 50 to 10 % ranges from:

- 18–24 years if per capita income grows at 3 %,
- 26–36 years if it grown at 2 %, and
- 51–70 years if it grows only at 1 %.

In each case, the shorter time is associated with the redistribution of 25 % of the incremental income of the richest fifth of the population and the longer period with no redistribution (WCED 1987: 47).

This *no-net-loss* justice definition has been, and still is, a taboo. It dovetails nicely with the liberal Enlightenment ideas behind the mainstream economic paradigm. Goal 8 in the SDGs, in particular its first target, reiterates the imperative of growth for everyone, even the super-rich:

> Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
>
> 8.1 Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 % gross domestic product growth per annum in the least developed countries (UN 2015: 16)

This time, the explicit connection with upping the chance for redistribution policies is not even made. To be fair, there is SDG 10, "Reduce inequality within and among countries"—but its target 10.1 makes very clear that this can only happen with yet more growth: "By 2030, progressively achieve and sustain income growth of the bottom 40 % of the population at a rate higher than the national average" (ibid.: 17).

3.3.1 Which Real Qualities of Development Lie Behind Monetarized Predictions?

The group hit hardest by the assumption that everything always keeps on growing is the one for which the sustainable development agenda was originally created: future generations. If we apply the no-net-loss justice definitions to our children and grandchildren, we need to ensure that they do not pay too little for the outcomes of investments that are paid for by generations today. The cost–benefit analyses of political decision-making on public or social investments should therefore include future costs and benefits. Who is paying and how much are they benefiting from building roads or alternative transport systems, schools or parks, renewable or fossil energy infrastructures, and so on?

For the mainstream economics mind-set the answer is as easy as it is convenient: since economic growth and per capita incomes will continue to rise exponentially, cost–benefit analyses almost always employ a social discount rate, meaning that the costs for current and future generations are not weighted equally but are comparatively higher for those living and paying today.

So, instead of being worried about how future generations will be able to satisfy their needs, weak sustainability economists worry that the current generation will take on the cost of investing, while most of the benefits are reaped by future generations. Adding the extrapolations of decreasing technology prices and increasing efficiency gains renders 'uneconomic' many of the projects that others would declare urgently necessary to keep within safe natural operating spaces. Criticism of these assumptions therefore comes from economists who bring some physical data into their equations. The seminal reports of Nicholas Stern, the 2006 *The Economics of Climate Change*, and the multi-scientist study *The Economics of Ecosystems and Biodiversity* (TEEB), coordinated by Pavan Sukhdev from 2008 onward, both explicitly call for zero or even negative discount rates.

Both of these studies came to this conclusion because they acknowledged the fragile state of ecosystems today. For the authors, swift and significant investment is necessary to restore their balance so that they can continue to provide the biophysical conditions that humans have enjoyed for thousands of years. The sooner these investments are undertaken, the lower the eventual costs for overall development. The economic costs of inaction today will rise so quickly that GDP growth will not be able to outstrip them. Depending on the range of risks and impacts calculated, Stern predicted losing between at least 5 % and more than 20 % of global GDP each year indefinitely, while the TEEB report estimated the cost of biodiversity and ecosystem damage would reach 18 % of global economic output by 2050.

These claims are supported by the Oxford Martin Commission for Future Generations chaired by Pascal Lamy, a former director-general of the WTO. The primary purview of its work was to check where in current analytical concepts and governance solutions the ignorance about the future was highest. The 2013 report diagnosed a structural discrimination against future generations and concluded that in "a world of considerable uncertainty about future levels of well-being" neither linear extrapolation of trends nor short-term returns on investments in imperfect markets were suitable measures for policy design. Instead, "[W]hen evaluating the costs of action and inaction, policymakers need to ensure discounting embraces a more sophisticated appreciation of the role of ethics, risk, and the scale of possible damages in the future" (Oxford Martin Commission 2013: 61).

The science on ecosystems has shown that expecting further exponential growth everywhere in the world for a long time might not be a fair base for ethical considerations. Also, data from rich countries shows that growth rates have been slumping for two decades (Wahl/Gödderz 2012). The research results on human well-being have shown that this might not be such terrible news as long as the growth-dependent institutional setups are changed and measures corrected so that one can see what is really going on underneath the growth saga. Without this transparency and accountability the GDP and monetary output measures keep us blind to where a lot of uneconomic and unproductive 'wealth' is created and concentrated.

For the majority of people on this planet—the 3 billion still living in poverty—more and better access to goods and services is urgently needed. But the dogged pursuit of absolute economic growth is not necessarily leading to this desired outcome. GDP rose from $13 trillion with 5 billion people in 1987 to $72 trillion with 7 billion people in 2012. Roughly speaking, this means we now live in a world with economic output equaling $10,000 per capita compared to one equaling $2600 per capita 25 years ago. Technically, no one should have to suffer from hunger and extreme poverty any longer. So reaching sustainability is not about more and more output of everything for everyone but about getting the right outputs in the right places into the right hands.

This is the key message that the inventors of the *Genuine Progress Indicator* (GPI) and its predecessor, the *Index of Sustainable Economic Welfare* (ISEW) want to illustrate. The GPI seeks to measure how economic growth can actually destroy

social, human and environmental wealth and this methodology is mirrored in other indices like the *National Welfare Index* (NWI) in Germany. While adhering to a monetary valuation of progress, these indicators make an effort to identify the 'use value' created or depleted in the course of a particular path of development. Starting with the exchange value numbers of GDP, these are adjusted by using 24 different components that express gains or losses in social, natural and human capital. These include, for example, pollution and ozone levels, CO_2 emissions, loss of farmland and primary forests and, in line with many well-being findings, income distribution, crime rates, loss of leisure time and also the time people spend in unpleasant activities like commuting. The benefits of non-marketized work at home, or as volunteers, are added as increases in wealth by counting the amount that it would cost to employ someone to do the babysitting and cleaning etc. (Genuine Progress 2014).

The overall goal is not to create an alternative cumulative indicator of sustainable development, as the information loss through monetarization and high aggregation levels prevails. The GPI was and is intended to deliver a warning as to where increased GDP contrasts with negative individual and social experiences, i.e., when uneconomic growth is reached and the marginal benefits of more GDP growth are lower than its marginal costs.

A growing group of researchers and some governments have calculated GPI per capita and compared results with GDP per capita. Similarly to Easterlin's findings, they observed a parting of the two curves at a certain point of development. In a 2013 journal article, many of the leading scholars in ecological economics like Robert Costanza, Tim Jackson and John Talberth brought together the insights of GPI calculations in 17 countries from five continents, representing 53 % of the world's population. Next to an assessment of where the costs of GDP growth start to outweigh its benefits they also compared GPI per capita findings with other indicators like ecological footprint, the *UN Development Programme* or UNDP's Human Development Index or HDI and life satisfaction surveys in those countries (Kubiszewski et al. 2013).

By using Purchasing Power Parity to convert all GPI and GDP findings into 2005 US dollars, they added up all the country data into Global GDP and GPI per capita figures to compare their developments. While the authors do not claim their figures were absolutely accurate, as both GPI and GDP are hard to determine, the trends are clear (Fig. 3.5).

The authors identified the start of uneconomic growth on a global scale in the late 1970s: "Global GPI/capita peaked in 1978, about the same time that global Ecological Footprint exceeded global Biocapacity. Life Satisfaction in almost all countries has also not improved significantly since 1975. Globally, GPI/capita does not increase beyond a GDP/capita of around $7000/capita" (Kubiszewski et al. 2013: 57). The primary policy recommendation taken from these findings comes very close to the *Brundtland Report*'s redistribution goal but without declaring that we first need to grow more: "If we distributed income more equitably around the planet, the current world GDP ($67 trillion/year) could support 9.6 billion people at $7000/capita" (Kubiszewski et al. 2013). In 2012 we had already reached a global

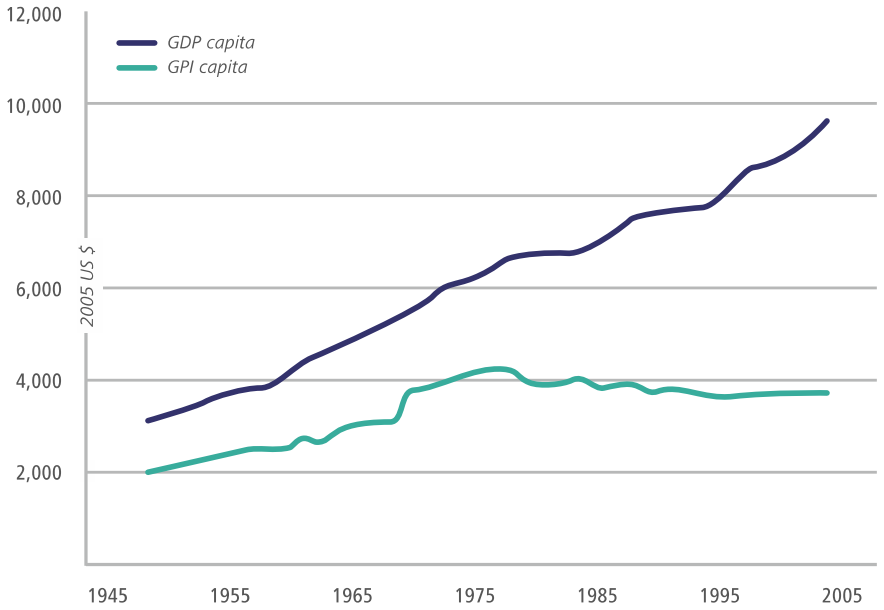

Fig. 3.5 Comparing world GDP/capita and world GPI/capita trends. *Source* Kubiszewski et al. (2013: 63)

GDP of $72 trillion. So what do these impressive numbers say about ubiquitous scarcity and thus the endless need to grow?

A proper examination of which resources are scarce, which are not, and how all of them are allocated, pushes economic accounting to the sidelines and puts ethics, political will and power relations center stage. We see utterly wasteful and unjust consumption, production and distribution patterns.

Tracking the actual output of food, for example, shows that we have what we need to feed everyone well. According to the UN's Food and Agriculture Organization, roughly one third of what is produced for human consumption is never eaten. This amounts to about 1.3 billion tons per year. Examining the figures by country, we see that people in Sub-Saharan Africa, South as well as South East Asia only waste around 6–10 kg per person per year whereas Europeans and North Americans throw away between 95 and 115 kg of perfectly edible food (FAO 2011: v).

This pattern is repeated with other goods as well. In Britain around 30 % of the contents of the average wardrobe has not been worn for at least a year, which gives us the figure of 1.7 billion items of clothing unused in the United Kingdom alone (Gracey/Moon 2012: 2).

In 2006, the McKinsey Global Institute calculated that the world's financial markets struggled to find investment opportunities for about 3.5 times global GDP at the time. This was the staggering figure of $167 trillion in desperate liquidity (Farrell et al. 2008: 7) at the same time that the international community could not

(and cannot) find enough money to supply sustainable energy, sanitation and food to a third of the world's population (Scharmer/Kaufer 2013: 94).

So, we can see that quite a bit of the capital (energy) is withdrawn from the system even though demand for more produced goods or use value is clearly there. The mainstream model of the economy in Fig. 3.3 does not capture this. But if the purchasing power among the poor does not meet capital owners' expectations of return on investment it will not flow there. Current 'growth' measurement standards are indifferent to such distributive effects. They count a euro that pays for a private jet as having created the same 'value' as one that pays for a ton of rice.

In rich countries slowing growth is usually equated with unemployment, the biggest threat to well-being. A team of economists at the *Institute for Sustainable Development and International Relations* (IDDRI) at the Science Po university in France has conducted a study on "A post-growth society for the twenty-first century. Does prosperity have to wait for the return of economic growth?" Here we find collated evidence about jobless growth, a disconnect between wage rises and productivity gains and a missing link between long-term growth and employment levels. The researchers conclude that political changes in labor policies, taxes, pension and health systems, and investment criteria would allow for much less growth-dependent societies in which individual and social prosperity are not compromised (Chancel et al. 2013).

So, sticking with the mantra in which endless economic growth is needed is a great way of avoiding the political responsibility and struggles that unlocking those path dependencies requires. This Herculean task is not helped by the perverse inequalities that the real rather than theoretical market logics, laws and institutions like our monetary system have created, overlooked or disguised by undifferentiated cost–benefit and growth analyses. In the United States, for example, decoupling productivity gains from real wage developments went hand in hand with lower taxation on capital and wealth. This cocktail has driven GDP to unprecedented heights and inequality levels back to those of the 1920s.

In a podcast for the *Economist*, Robert Reich, labor secretary under Bill Clinton and an economics professor explains: "Most of the economic gains in the past 25 years have gone to the top 15–20 % of Americans, but more recently, in the past six to seven years, most of the economic gains have gone to the top one percent…. The average CEO is making about 380 times more than the average worker—a huge gap relative to what it used to be 40 years ago—it was about 30 times" (Reich 2007). This interview predated the financial crisis, which has accelerated still further the rise in income of those controlling the factors of production.

One major cause of this trend has been documented by the OECD in its 2008 report *Growing Unequal? Income Distribution and Poverty in OECD Countries*. In countries where financial capital gains and self-employment income are taxed at lower rates than wages the pattern is clear: the top 20 % keep on diverging from the middle classes and lower income strata. Real wages have stagnated in most of the OECD countries since the 1980s and in many the trend is "moderate but significant" while some countries like Germany, Canada, Norway, the United States and Italy report 'significant' changes.

The primary policy measure, especially for any longer-term correction of this structural discrimination, was outlined as follows: "Relying on taxing more and spending more as a response to inequality can only be a temporary measure. The only sustainable way to reduce inequality is to stop the underlying widening of wages and income from capital" (OECD 2008: 3). In this context it is interesting that the OECD report did not include the income of the super-rich because it would have been hard to measure by standard income indicators. What Thomas Picketty called the rentier class (2014) earns and manages its wealth differently.

The Tax Justice Network (TJN), a coalition of researchers and activists, estimated in 2012 that some 30 % of global financial wealth was owned by the top 0.001 % of the world's population or about 91,000 people. The next 19 % was owned by the next 0.01 %, or 800,000 people and 32 % belonged to the next 0.1 %, or 8 million people. This left 19 % of the world's financial wealth for the remaining 99.9 % of the world's population (TJN 2012: 5).

These numbers are probably utterly out of date by now. Oxfam International brought new calculations to the 2014 WEF showing that the richest 85 people owned assets which amounted to the same value as those owned by the poorest 3.5 billion people. Since the report used numbers gleaned from the 'Forbes Billionaires List,' the magazine published an update three months later: the top tier had shrunk to 67 individuals.

The wealth of the wealthiest is growing so fast that the lists need monthly updates. Within one year, from 2013 to 2014, the threshold for qualification into the top 20 billionaires list jumped from $23 to $31 billion (Moreno 2014).

TJN went further and also examined levels of tax avoidance and the harmful impacts of tax competition and tax havens in offshore centers. In 2012 they published a report by James Henry, a former chief economist at McKinsey. According to him, at least $21 trillion and possibly up to $32 trillion of "unreported privately held financial wealth" is squirreled away in tax havens. This is a sum, "equivalent to the size of the United States and Japanese economies combined" (Henry 2012: 1). And this is only financial wealth. It excludes real estate, yachts and other non-financial assets owned via offshore structures.

Because this is unreported wealth, inevitably none of these sums have so far made it into the official statistics, so global wealth inequality is much higher than the data we usually draw upon suggests. In order to put the potential of redistributing *existing* wealth into perspective, TJN calculated how much a tax of 30 % on a conservative estimate of 3 % capital gains on those $21–32 trillion would generate. The resulting $190–280 billion is double the amount that the OECD countries combined spend on all overseas development assistance around the world (Henry 2012: 2). Additional taxes, for example, on inheritance, a wealth tax or a collection of tax avoided in years past would increase the numbers accordingly.

TJN estimates that the $21 trillion belongs to no more than 10 million people who can afford a team of advisers specializing in the most effective ways of avoiding tax. This casts a very different light on scarcity, just distribution practices or proper formula for redistribution policies. The ahistorical ethics of no-net-loss is unmasked as just as half-baked as closed system physics.

A future-oriented ethics and also management strategy was actually defined as part of sustainable development: sufficiency. Next to efficiency (no unnecessary waste) and consistency (solutions fit local—environmental—systems) this strategy is not so much technical but highly normative. It means embracing the idea that there can and should be enough production and consumption. Phrased this way it sounds like the baseline of sustainable development. Enough for everyone forever. Enough and not less, however, also means enough and not more. At least on one finite planet.

Yet, the economic thinking that is so overwhelmingly influential in politics and public discourse today simply excludes sufficiency from what could be a feasible solution. It is equated to a depression or moving back into caves. Moreover, it is often mainstream economists who declare that any idea of sufficiency, or no further economic growth in rich economies, would impair the 'human freedom' to invent, innovate and be creative. Not even in countries with stable population levels can their theory conceive of how living up to human potential would not lead to more market sales.

Critical conceptual environment and development thinkers like Wolfgang Sachs readily point out that only rich people can fall into the trap of seeing sufficiency solely as a regression. For every person living in deprivation and hunger the end of suffering is an aspiration (Sachs 2015: 2). In addition, Sachs continues, refraining from having more than enough might be less of an altruistic move, but instead a step toward justice and respect in a system where the overflow of wealth in some parts is directly connected to exploitation in others (ibid.).

The idea of providing enough for everyone within the carrying capacity of the planet was iconized in the 'doughnut' by Kate Raworth, UK researcher and campaigner for Oxfam in the run-up to the Rio+20 Summit. Her graph combines the Planetary Boundaries with minimum entitlements to social foundations to which every person on this planet should be granted access. The resulting 'doughnut' shows that there is a corridor or "safe and just operating space" in which development can be sustainably pursued.

The social foundations in Fig. 3.6 do not reflect a scientific assessment, but instead the results of what governments had stated to be their priorities in the run-up to the conference. They are therefore not definitive but illustrative. An understanding of the qualities of most important social foundations and of which governance solutions can most successfully embed them will become more precise with more research, just as the Planetary Boundaries will. Unfortunately, none of these empirical searches will be helped by mainstream economic approaches. In these approaches, only more monetary growth would mean that societies could pay for cleaning up the environment and grant some support to their unfit citizens—who could not otherwise survive.

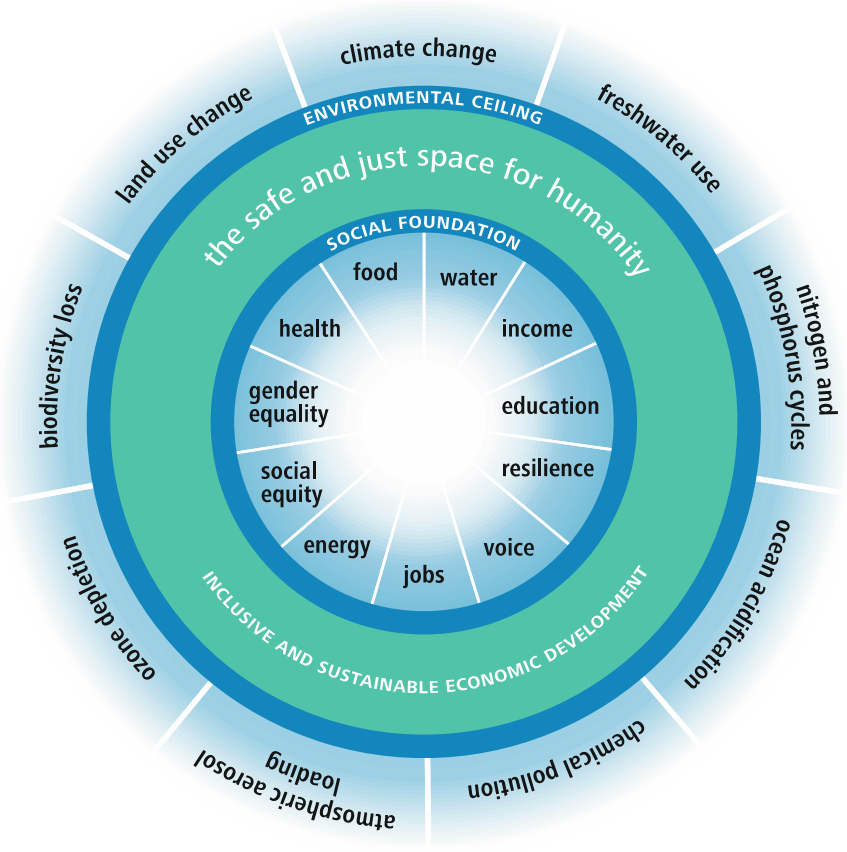

Fig. 3.6 The sustainable development doughnut. *Source* Based on Raworth (2012: 4)

3.3.2 Unveiling the Money Magic

On checking the statistics one can see that we do not have too little but far too much money racing around the globe. We live in a situation in which there is no lack of money but rather a lack of credit to fund real economic activity where it is needed. Instead, the search for trillions of dollars for good returns on investment causes frequent bubbles and economic instability. Sounds absurd? That is what I thought until I read good old Karl Marx. He explains how, in the context of the ascent of the mainstream economic paradigm, money has been given a peculiar function—a function that Polanyi acknowledged when he called it a fictitious commodity, but that economics textbooks overlook. It is very relevant when seeking to understand roadblocks to sustainable development.

Money is typically portrayed as an equivalent value expression for all types of goods and services. It is defined as serving three functions. As a 'medium of exchange' it facilitates trade between goods. If a fisherman had to barter whatever he had caught directly for all the goods and services that he needed, it would require a lot of work, or luck, to find trading partners in possession of what he wanted, and they would also have to want fish in return. Money eases barter by dividing it into two transactions. The fisherman gets money for his fish from whoever wants the fish, and gives that money to whoever happens to offer what he himself wants. As a 'unit of account' money therefore allows the fisherman to measure the exchange value of what he has and to estimate how much of which good or service he can get on selling his produce. This also allows him to start planning a more complex fisheries enterprise and to use the money as a 'store of value' until he has saved enough, so that he can purchase another boat. During periods of low catches this also allows him to continue buying goods or services without having any fish to sell.

These three functions are listed in the mainstream textbooks. Here, exchange value and use value are directly linked. Each economic process involves investing money in order to produce an output whose value is higher than that of the single input factors. Savings or credit is applied to enable productive processes. The investor or creditor often participates in the generated surplus value for the prudence that saving money took or the risk that taking on a debt involves.

Thus goes the money story, and originally, as the term 'commodity money' expresses, there was something of real value behind it, e.g., beads or rare metals like gold. Marx's equation for this function of money goes as follows: C–M–C', or in other words commodities of a given value are available as input—one applies money to enable a process of combining them—commodities with higher value form the output (Marx 1887: 102–108).

This narrative is so strong that even today we think of money as something thing-like. But it was in fact a social innovation and over the course of the Great Transition stripped of any real use value, making it 'fiat money.' This type of money exists only because of government regulation. Its paper value tokens or numbers on computer screens have no real value at all. They are not real wealth but a claim on wealth and only function because you and the person or institution owing you the money accept this relational duty—or have to accept it by legal imposition.

So money is a relationship, as the root of the word *credit*—the Latin term *credere* or believing in—indicates. The paper notes of the Bank of England still have the following pledge on them: "I promise to pay the bearer on demand the sum of…." This type of money is a form of debt: Someone owes you something of real value. It is a promise of access to something one desires in the future.

With this innovation societies gave themselves the collective illusion that such faith-based wealth tokens could be transformed into any use value at any time. James Tobin (1918–2002), who won the Nobel Prize for economics in 1981, summarized this effect nicely:

> The community's wealth now has two components: the real goods accumulated through past real investment and fiduciary or paper 'goods' manufactured by the government from thin air. Of course the nonhuman wealth of such a nation 'really' consists only of its tangible capital. But, as viewed by the inhabitants of the nation individually, wealth exceeds the tangible capital stock by the size of what we might term the fiduciary issue. This is an illusion, but only one of the many fallacies of composition which are basic to any economy or any society. The illusion can be maintained unimpaired so long as society does not actually try to convert all of its paper wealth into goods (Tobin 1965: 676).

The beauty of this transformation was that there were far fewer limitations on the amount of money that could be created. But how did this impact the functions of money? This is the key question that Marx was looking at and he showed that the useful public good or social illusion was slowly but surely turned into a private commodity serving the accumulation of ever more financial wealth in any form.

For Marx, this was one of the essential and specific features of a capitalist market economy in comparison to other forms of market economies. His original use of the term 'capital' expresses the objectification of value in the form of financial 'products' that enable people to not only *spend* money on buying other commodities but also to *apply* it, with the sole aim of accumulating more money.

Marx expressed the difference by turning the normal money function around: C-M-C' (the purpose of money is to serve a higher input/output goal of creating something with more use value) becomes M-C-M' in which the purpose of money is to make more money. It is applied in any economic transaction that promises more exchange value and thus more financial return on investment (Marx 1887: 102–108). What is actually done in this process becomes secondary.

Prior to Polanyi's fictitious commodities, Marx showed how 'financial capital' becomes an input factor just like all the goods whose value it should express. The analogy expressing what he called a socioeconomic 'craziness' was the general genus of "the animal." Imagine a world in which it would suddenly come to life and interact with lions, tigers, rabbits and all the other creatures that this term had been created to subsume (Heinrich 2005, 76). Making money a 'value object' destined to be sold in markets is the incarnation of an abstract idea that turns debt into wealth.

This new commodity, however, is the most desirable of all as long as the conversion belief holds strongly. It does not rot, it needs little room for storage and promises to transform itself into any use value at any time. And for those with more money than their own need satisfaction requires, its application creates even more money without much actual work being required. In several languages we have the expression 'make your money work for you,' which refers to money invested purely to generate interest. This became a strong desire in accumulation-seeking individuals and soon we saw the emergence of private banks and lending organizations.

This is where the 'public good' concept of the way a financial sector should be set up was very beneficial, although it no longer reflects reality. Public goods serve all of society, so a financial sector designed from this perspective would have the role of ensuring that credit could flow where it was needed for use value generation. As a consequence, the fewer the costs involved in accomplishing this service, the

better for society. So the financial sector should account for as small a percentage of total economic activity as possible (Dietz/O'Neill 2013: 110). The people working in it need to be paid for their managerial work since the actual value created for a society begins elsewhere, in the productive economy.

Does this resemble the financial system of today? Certainly not. The idea that finance is serving the economy is actively maintained, but increasing deregulation has allowed its institutions to do far more than matching the received money with credit needs. Today, private banks create a huge amount of the money themselves. While governments still control currency, over 90 % of the money supply is issued by private, commercial banks and institutions that leverage the deposited amounts multiple times when issuing credit, i.e., debt (Daly/Farley 2010: 289–291).

Under the regulation of 'fractional reserve banking,' a bank only needs to have a small sum to be able to create big amounts of money. A reserve requirement of 10 %, for example, means that the bank can use a $100 deposit to create $900 in credit, out of which maybe $500 will make it into another bank account leading to another $4500 of new money, and so on. In some cases before the financial crisis of 2008 these reserves were as low as 2–3 % or even zero.

Not all of this magically created money becomes productive credit by any means. Most of it circulates between financial institutions, while only a third of it enters the real economy (Scharmer/Kaufer 2013: 101–103). In practice this has meant that, in the last few decades, the amount of money in circulation has been growing much faster than the output of the real economy. Foreign exchange transactions of $1.5 quadrillion outnumber international trade by a factor of 75 (Scharmer/Kaufer 2013: 94). This has led economists like Tobin (cited above) to demand a financial transaction tax that would slow such speculative flows down and provide some revenue that could be used by the government institutions safeguarding the public good image with gigantic bailouts or guarantees.

So the idea of turning money into a commodity and then stripping it of any real-world embodiment has led to what has been called the 'financialization' of economies: all value that is exchanged is captured, counted and expressed in monetary figures and thus easily transformed into financial instruments that can be traded in markets. Unsurprisingly the financial sector now contributes about 10 % of GDP in countries like the United Kingdom and the United States, up from 2.3 % in the 1950s (Ferguson 2008: 6).

Meanwhile, the excess of 'wealth' leads to an increase of prices of already existing assets like real estate and stocks, but not necessarily to the creation of new production and innovation that would bring new use value to where it is really needed. This was accelerated by making shareholder value the prime goal in corporate governance, and giving it greater importance than what is actually produced and how. But if money's purpose is to be applied for a good and quick financial return, risk calculations in comparison to the estimated profits speak against poor countries and people with non-Western legislation and a lack of purchasing power.

Behind this financialization trend and the increasing protection and privileging of investors lies, of course, the view that money, as capital, is a commodity or input factor equal to all the others. Of course it entitles its owner to a share of the

generated surplus value. Some mainstream economists say that the investor is in effect paid for abstaining from the immediate utility gains that using the money for consumption would have brought, had he not lent it to someone else. Others would say that interest is necessary to incentivize paying back, and a justified premium for the risk involved in lending it to others.

All of this might have been true in times in which shareholders were also stakeholders and typically longer-term investors. Today, the vast majority of stocks are held by sharehoppers. Buying and selling within seconds is not really taking part in the entrepreneurial risk of a business. The traders doing it do not care what the companies do. Their algorithms track price developments and seek to gain from differences at times of purchase and selling. Whether the companies flourish or tank does not matter to them.

It does not come as a great surprise that profit making increasingly occurs for those inventing more and more financial instruments or 'products' like derivatives, credit default swaps, futures and options that are exchanged and traded in markets totally removed from the commodity world. We need a third equation: M-M-M′.

Financialization has several consequences from mind-sets to the structural drivers of development: the importance of financial motives and motivations increases in line with the influence of financial institutions, elites and markets in governing institutions. Big parts of the financial system today have lost any resemblance to the fiduciary role that Tobin foresaw. Trillions in desperate liquidity chase around the globe in search of good returns while money for development aid, climate protection or refugees cannot be found.

Meanwhile, the expectation of a constant return on each investment leads to compound interest developments that are simply absurd if one takes the long view of future generations. Garrett Hardin (1915–2003), a famous American ecologist, gave an example in 1985:

Suppose that the thirty pieces of silver Judas received for betraying Christ had been worth $30; and suppose that he had put this into a bank account bearing 5 % compound interest, payable in gold. Presuming the present price of gold, the initial capital would amount to 2.5 grams of gold. How long would it take for the Judas Account to be worth a weight of gold equal to the weight of the entire earth (5.983×10^{27} g)? Just 1292 years (Hardin 1985: 72).

3.3.3 *Summary: Opening up Mainstream Economic Ideas Is Key for 'Our Common Future'*

Section 3.3 highlighted how the ideas and concepts summarized in Table 3.1 are among the root causes of financialization and its utterly unsustainable patterns of exploitation, allocation and accumulation. It showed what gets lost if these concepts provide the explanations and evidence for sustainability policymaking. Most importantly, it highlighted how the mind-sets and narratives building on these

concepts encourage worldviews, personality structures and justification logics that might be very transformational, but not toward the goals and principles that the sustainable development agenda has adopted.

> "Economic thought systems matter because they are at the heart of an intellectual battle over the future direction of society," wrote MIT scholar Otto Scharmer and researcher Katrin Kaufer in their 2013 book on working toward more sustainable economies. The mainstream belief system, they continue, "has given Wall Street a de facto veto over public policy making that no other group or industry enjoys." Simon Johnson, another MIT professor and former IMF chief economist, is cited by them: "by 1998, it was part of the worldview of the Washington elite that what was good for Wall Street was good for America" (all from Scharmer/Kaufer 2013: 71).

The following summary is thus also the conclusion of this chapter. It briefly runs through the four big ideas listed in Table 3.1 and why they fall short when we seek to understand how to satisfy human needs while respecting nature's law. The discussions above have shown that they are scientifically flawed. Yet, through their materialization in today's market and government structures, these ideas have become very real in their impact on people, their decision-making and their freedom to do things differently and more sustainably.

The reflexive ontology behind this book sees the opening up of worldviews and belief systems as the first step in system innovation strategies: identify which arguments, practices or laws are built around flawed assumptions and ideas and understand how they hamper more sustainable developments. Engaging in transforming such path dependencies will of course always be a highly political, contested and power-ridden process whose outcome no one can predict. But shedding vested intellectual interests often comes before shedding economic vested interests: sense and legitimacy of the status quo start crumbling and alternative practices multiply, inspired by an emerging imaginary that there are indeed alternatives.

Trying to understand the world by dividing it into pieces creates an imaginary in which the relationships and generative rules underlying system dynamics get lost behind numbers and detailed descriptions of the individual pieces. This atomistic view of mechanical systems suggests that the single items remain unchanged and between them one can detect and thus manage linear and reproducible causalities in an additive or subtractive approach. System dynamics are viewed as predictable and controllable as long as the properties of the individual parts are understood well. There are no time delays or feedback loops that allow one to anticipate the fact that stopping a particular cause will no longer stop a particular reaction once system dynamics have reached tipping points. General ignorance of the *Tyranny of Small Decisions* is related to this: large output changes need large input changes. It is this 'particle' worldview or paradigm that leads to the common juxtaposition of incremental versus radical change.

But applying this view to complex systems filled with humans is not helpful, as the financial crises show. Using it to inform strategies of human need satisfaction offers very little insight about the matter it is supposed to address: utility or happiness is a relative and context-dependent experience and not a thing that can be privately held and hoarded. Meanwhile, natural capital is a web of life and not a

stack of resources and services to be freely disassembled, reassembled and substituted.

Neither happiness nor nature qualify as 'pieces' whose properties stay the same if they are relocated. Nor can properties be easily reinstalled once single items have been taken out of their former setting. Understanding the world in systems, on the other hand, provides a very different understanding of the developments and their trajectories. Notions of tipping points, non-linear developments, delays and run-away effects, as well as irreversible changes and uncertainty enter the picture instead. This changes the perceptions of risk and even cost–benefit analyses tremendously. Adopting a precautionary approach becomes more of a rational strategy than one easily dismissed as anti-progress. This is the effect of paradigm shifts as described by Kuhn:

> . . . the historian of science may be tempted to exclaim that when paradigms change, the world itself changes with them. Led by a new paradigm, scientists adopt new instruments and look in new places. Even more important, during revolutions scientists see new and different things when looking with familiar instruments in places they have looked before. It is rather as if the professional community had been suddenly transported to another planet where familiar objects are seen in a different light and are joined by unfamiliar ones as well. . . . In so far as their only recourse to that world is through what they see and do, we may want to say that after a revolution scientists are responding to a different world (Kuhn 1962: 111).

Understanding the world through quantifying and monetizing has subjected ever more areas of social being and collaboration as well as human–nature relations to the logic of markets. A non-market relationship or good is transformed into a commodity that is, from now on, compensated for with a payment, wage, rent or interest. It is now captured in economic statistics and an exchange value frame of willingness-to-pay enters the relation: the worth of everything is expressed in prices. Marglin dedicated his entire book to discussing how thinking like an economist undermines the earlier guiding principles and frames around those relations: people or communities who were formerly rather self-reliant and governed by reciprocity become dependent on market processes and the exchange values of their particular goods and services (Marglin 2010). With money come economistic mind-sets and financial motivations. The wider cultural meaning of work as a productive and caring activity is reduced to something done to make money.

While some may argue that this has delivered on a more efficient division of labor and specialization, it does not at all automatically mean that the relations and the quality of services like childcare, nursing, housework, etc., improves. Or that people enjoy their work more and perform better. At the same time, this way of thinking justifies anti-poor resentment because the lower the price of what one offers to society (i.e., the wage), the less worth it has. Therefore, having no job is viewed as a sign of not making enough effort.

Meanwhile, expanding financialization also means that the structural imperative of needing even more growth is expanded. Using interest-bearing or debt-based forms of money means that the borrower not only has to ensure an output that returns the input factor costs and his income in the form of profit, but also the

interest he has to pay for the credit. Each enterprise owner therefore operates under constrained conditions when it comes to making production processes more sustainable, equitable or simply constant in output. Thanks especially to quarterly reporting and very short returns on investment expectations, they work with additional drivers toward the already high incentive to externalize environmental and social costs in weakly regulated competitive economies.

Regarding natural exploitation, Trucost, a green accounting specialist, has estimated that the world's 3000 largest corporations caused $2.15 trillion in environmental damage in 2008 alone—and this did not register on their balance sheets (Trucost 2012). Imagine what internalizing these costs would mean for their profit warnings and thus stock values. So neither monetization nor market prices are neutral indicators or just allocation mechanisms, but are instead defined through highly political and power-laden processes.

Understanding the world by tracking accumulation of monetized values therefore keeps us from seeing where more productivity becomes void of productiveness and utility or where growth is causing irreversible damage in our ecosystems. Sociologist Harald Welzer describes the 'degrading' effect for humans:

> This is the exact form in which work is understood in national economic theory: as an unlimited, endless activity that does not have a specific, limited, product-related objective, but is dedicated to the ceaseless creation of value—consequently the never-ending production of 'growth.' Marx referred to this process as the disappearance of concrete labor into exchange value (Welzer 2011: 22).

In affluent countries, as Jorgen Norgaard, professor at the Technical University of Denmark, has written, "much of the growth in GDP over the last years can be ascribed to pulling activities like child care, health care, cooking, entertainment, maintaining houses, etc. from the non-paid amateur economy into the professional economy" (Nørgård 2013: 63). All of these effects are part of what the decoupling agenda will measure: the economy 'immaterializes' itself. But nothing new has necessarily been created. Only the way it is done has changed.

The same things happen when corporations run by CEOs rather than owners gear their business toward increasing shareholder value, for example, through tactical issuance, sales and buying back of stocks. Big corporations now have huge internal financial departments whose only purpose is to increase the firm's market value and top executive pay is usually coupled directly to the firm's stock market value. For societies, however, exploding prices for stocks, houses, raw materials and land cannot count as a sign of real wealth generation, particularly if lower strata of society lose access to them. Instead, this type of 'growth' is a sign of too much liquidity and at the same time perpetuates its concentration even further. The by-catch are economic bubbles and instability.

Understanding the world by comparing and ranking all of the monetized price indicators instead of the underlying items does, however, mean that fictitious wealth can continue to grow for a long time. Capital substitutability thinking allows for Tobin's social myth to be stretched so far that consultancy firms like the Boston Consulting Group really issue forecasts like the following: "for Chinese children

born in 2009, continued economic progress will mean that over the course of their lives, they can expect to consume thirty-eight times more material goods than their grandparents" (Asia Society 2012). Since 2010, the WEF's *Global Risk Reports* have, however, put water and food supply crises and rising greenhouse gas emissions among the top ten global risks of the next ten years. So while Chinese kids might keep on amassing financial capital, they could never transform it into 38 times more material goods.

Meanwhile, applying an exchange value or cost–benefit lens in all relations does affect human value judgments and our willingness to help, relate and feel connected to others and nature. One of the ongoing examples here is the cooptation of the idea of a 'Sharing Economy' by capitalist players. What started with the idea that people would make their use value items available to others (couchsurfing) has been pulled into the logics of exchange value. The mind-set of 'what could I give to others to enjoy—or enjoy with them jointly' is transformed into a financialized mind-set of 'what can I get money for from others that I did not think of before now.' The enabling technologies might be the same but the intent and purpose behind these social innovations is completely different—as will be the relations emerging from it.

I therefore side with Heyman and Ariely who suggest "that compensations for employment and effort should be considered separately for social and monetary markets and that the level and type of compensation should be designed to fit the defined relationship" (Heyman/Ariely 2004: 793).

In conclusion we see how a blind emphasis on exchange value in mainstream accounting tools and standards has helped a situation to emerge in which the financial sector does not serve the real economy anymore, but rules it. It does that at a tremendously high cost to societies and sustainability. Of course, one might argue that people wishing to exert power and undercut societal agreements do so without taking the detour into mainstream economic thinking and models. But when it comes to rationalizing one's decisions, arguing them to the public and creating narratives in which particular interests seem compatible with an image of public benefit and good, they have performed a great service.

Also, the reflexive ontology presented in Chap. 2 has shown that biasing frames and selective interpretations of situations are an unavoidable aspect of human existence. They can be a conscious act of strategic framing or tactical misrepresentation of information. But when it comes to understanding the effect of paradigms and their shifting we talk about much deeper sociocultural transformations. Elinor Ostrom in her 2009 Nobel Prize lecture highlights how the—of course—purely economic *Homo economicus* saga has impacted the design of institutions across the board:

> Designing institutions to force entirely self-interested individuals to achieve better outcomes has been the major goal posited by policy analysts for much of the past half century. Extensive empirical research leads me to argue that instead, a core goal of public policy should be to facilitate the development of institutions that bring out the best in humans (Ostrom 2009: 435).

So what could become the major goal instead? Summarizing twenty-first century research about human needs and how to align them with nature's qualities brings us very close to the differentiated framework of sufficiency of Sachs. He suggested it as early as the 1990s, and I did not anticipate this resemblance when I began to write the book.

For Sachs, sufficiency goes far beyond simply having less stuff. It tackles several unsustainable trends of the current development paradigm at once. In the framework he differentiates four 'E's' in German (*Entschleunigung*, *Entflechtung*, *Entrümpelung*, and *Entkommerzialisierung*), which I would translate as four 'D's': Deceleration, Deglobalization, Decluttering, and Decommodification. In a book on sufficiency policies another translator has called them the "four Lessens" because these concepts "express the idea that we need to lessen our speed, our distance, the encumbrance of our acquired possessions, and the role of commerce and the market in our lives" (Schneidewind/Zahrnt 2014: 30).

I like the four D's and summarize the key stance behind them by drawing on terms that were introduced and discussed in this chapter:

- Deceleration—endless efficiency and increasing speed in all areas of production and consumption reduce experienced utility and increase vulnerability of production chains;
- Deglobalization—price-driven fragmentation of production chains and transnational corporate units across the globe boosts profits but widely externalizes ecological costs and avoids fair taxation;
- Decluttering—running after ever more stuff in competition with others reduces the ability to really connect and enjoy each one of our items and also overstretches the Earth's carrying capacity;
- Decommercialization—applying mental models of commodities and financial benefits to all relationships leads to less quality of life, less concern for others or the environment, and keeps governance blind to the physical and psychological realities behind the numbers.

We can take more care of what we have, distribute it more sensibly and thoroughly, and innovate our production and consumption systems so they bring us into a safe and just operating space. There clearly is enough to go round. Spending patterns show that there is room for the reorientation of already existing wealth without ruining lives. We do not need ever more output. We need different business models, market patterns, money systems and the courage to let go of the exhausting narrative that we are insatiable egoists trapped in a constant competitive race over accumulation for accumulation's sake and a fear of falling behind.

The good news is that the wider context of what could shape into a Second Enlightenment movement holds this potential:

- Emphasis lies on reflexivity that takes circumstances into account when undertaking intellectual and empirical investigations.
- Social sciences and the role of spirituality return to the realms of understanding and explaining development patterns of the world.

- Discourse around natural limits to growth meets an information technology revolution that could enable decentralized, resource-light well-being.
- Limits to private property and financialization are discussed as tenets for securing all citizens' freedoms and the functioning of democracy.

Where this type of thinking lies at the heart of developing businesses, towns, governments, and communities is the topic we turn to now.

Chapter 4
Mapping an Emerging New Economic Paradigm in Practice

> Recognizing the importance of mind-sets in the sustainability transition allows an opportunity to reflect and examine underlying assumptions, identify shared values and cultivate common ground. Each of these contributes to defining the shared goals and the compelling visions necessary to bring these changes about.
> UNEP, *GEO-5* (2012: 422).

> Driving the system to do more will not be enough if something different is needed. When the goals and ends of the system are in question, then systems innovation has to focus not merely on new means but on a new purpose.
> Leadbeater and Mulgan, *Systems Innovation* (2013: 46).

> Vision is not enough; it must be combined with venture. It is not enough to stare up the steps, we must step up the stairs.
> Vaclav Havel

Transformation research is close to innovation research and practice in its emphasis on experimentation and the role that pioneers play when it comes to testing new solutions. Many corporations have similar prototype programs or cross-finance one unit to explore different practices. In recent years in particular, this has also been about making things more sustainably. But no corporation manages to make sustainable production the core benchmark of their business model. Instead, most of the 1000 Global Compact CEOs interviewed by Accenture in 2013 have lamented that sustainability is "not bankable." The Global Compact is a UN initiative that was launched by Kofi Annan as Secretary General with the goal of improving reporting by big corporations on their contributions to sustainable development and human rights. Unlike 2009 respondents, during the first round of interviews many of the CEOs of participating corporations were 'frustrated' that market, investment and reporting structures made the business case for sustainability nearly impossible. Without state regulation, the company bosses stated, they could not get out of what they called "pilot paralysis," in which some small-scale individual projects or units become champions for sustainability but can never scale up. Business therefore seems to have reached its "plateau in advancing sustainability" before "radical, structural change of markets and systems" make further reaching reorientations of investments and restructuration of value chains possible (Accenture 2013: 5).

M. Göpel, *The Great Mindshift*, The Anthropocene:
Politik—Economics—Society—Science 2, DOI 10.1007/978-3-319-43766-8_4

Structurally it is true that today's market regulations, investment and productivity standards lead to a competitive advantage for those externalizing their social and environmental costs. In Brussels I was part of the civil society community that had to remind the corporate representatives on the discussion panels that writing glossy reports and transferring the responsibility for change onto governments was not going to lead to substantial legal changes unless they told their lobbyists to support rather than block such a policy framework. Meanwhile, firms that put sustainable solutions at the core of their business models were hardly ever represented. Since they face tough price and access competitions with firms that externalize a lot of the social and environmental costs, they often do not have profits to spare for remunerating lobbyists.

Transformation research thus clearly differentiates between 'incumbents,' those parties, firms or organizations prominently embedded in the working of the given regime structure, and 'pioneers' whose solutions challenge this default and thus have the irritating effect that can lead to transformative dynamics. Of course there are also agents or subgroups within regime structurations that push for sustainability innovations on that level (e.g., the sustainably run units). Yet, their regime level is more likely an internal one: if their innovations were politically supported their motherships' business models would be disrupted.

So this chapter shines a light on some pioneering initiatives that were radical enough to put *recoupling* productive processes with human well-being and nature's laws at the core of their practice. Intending to check which development paradigms galvanize enough energy and support for collective transformative strategies in line with the wider SDG ambitions, I chose examples that fulfill the following criteria:

- Economic growth or growing profits may be an element in the business plan but certainly not an overruling one. Instead, the optimal rate of economic growth depends on the role it plays in fulfilling the overarching purpose of supporting human well-being and respecting nature's reproductive cycles. This subscribes to the embedded-systems-view captured in Fig. 3.4 and implies that economic processes are means to higher ends. If those can be met by a steady state or shrunk economy or turnover that is fine, too.
- In order for the recoupling purpose to inform the incremental actions and changes necessary to innovate their systems, each of the examples has developed a set of principles, symbols, indicators and measures to track changes. These are not kept within separate sustainability departments but inform the core decision-making bodies and strategies. They are communicated widely and explicitly and underpin the narratives with which reliability of expectation and foundations for cooperation are being built.
- Since single pioneering examples will not lead to transformations unless their existence and support causes sufficient irritation to overarching regime structurations, I have chosen four examples with the characteristics of a movement. The definition of values, purpose, goals, indicators, and measures within these examples is done with a degree of transparency and openness that allows others to learn, replicate and feed back. This can develop into a community of practice

(a group in itself). By sharing best practice, experiences in implementation and also difficulties, this community of practice can also identify common political interests and start advocating and acting jointly for overarching system change (a group for itself). The latter can also be done and supported by people who are not directly part of the pioneering practice but share their purpose and world-view and would like such solutions to spread.

- I also found it intriguing to check for similarities across sectors and, due to language barriers, found that easier than a proper cross-cultural assessment of, say, multiple business networks. I am aware that this has led to a set of examples that is both somewhat eurocentric and confined to those with a good internet presence, which made them easier to research.

This is how the Economy for the Common Good (a prominent business initiative in Germany and Austria), Transition Towns (an urban community initiative born in the United Kingdom), and the Commoning movement (a civil society initiative spanning the Atlantic between the United States and Europe) were chosen. Only in the context of government initiatives around 'Beyond GDP' was I lucky enough to visit the pioneering nation of Bhutan, whose Gross National Happiness or GNH framework is referenced by many.

In the Multilevel-Perspective on societal change presented in Fig. 2.1, the first three examples of Economy of the Common Good businesses, Transition Towns and Commoning initiatives would count as pioneers at the niche level. The last example of a national government strategy, the GNH Framework of Bhutan and its policy commission, would be a pioneer at the regime level, leading change from within the overarching structurations.

Of course such a short summary in a book has to be very selective. It cannot do justice to a proper summary of what exactly is happening in each initiative. So the most important focal point for the exploration has been the identification of some crucial paradigmatic differences to the mainstream concepts I presented in Chap. 3. I was surprised by the degree of commonality between the four cases in this.

I have summarized their radically new purpose as one of recoupling economic processes with human well-being and nature's reproductive laws. Since all of them confront strong path dependencies in the overarching and surrounding systems—and also partly in their own—their incremental change strategies are ones of successive *double-decoupling*:

1. Decouple the production of goods and services from unsustainable, wasteful or uncaring treatment of humans, nature and animals (do better).
2. Decouple the satisfaction of human needs from the imperative to deliver ever more economic output (do well).

The summary details core findings in juxtaposition to the mainstream economic development paradigm.

Another shortcoming of any desktop assessment in comparison to proper field research is the degree of informed critical discussion that is possible. Here, it is limited to a recapitulation of the most prominent critical voices found on the web.

Most of these address more the implementation processes than the conceptual frameworks. A lot of the criticism I found could be applied to any given plan or agreement for collective action: a proposal still allows for abuse, and some concrete actions taken by members of the network will not live up to its declared values and principles.

While it is important to highlight instances where thinking or declared purpose deviate from doing or lived purpose, the locus of responsibility for this does not necessarily lie with the founders of a movement. They cannot and arguably should not seek to prescribe how exactly people engage in putting the joint vision and goals into practice. The SDGs themselves are actually a great example for this: whilst almost all governments accepted the goals and targets and indicators, they were not made into binding commitments. Monitoring and reporting on progress is voluntary and each country is going to prioritize meeting some goals over meeting others. The idea is that peer reviewing will inspire commitment and mutual learning between countries with similar challenges.

So hardly any pioneer or UN body can ensure that everyone using their ideas or claiming to serve the SDGs will do so in the way that was originally envisioned or intended. This is an unavoidable characteristic of movements and politics, and none of the critiques I came across included a proposal on how, in real concrete practical terms, the formation of movements and government of cooperation could feasibly resolve these issues.

Others took an oppositional stance, believing that a progressive and inclusive movement could not prescribe such detailed rules and benchmarks. Here I would counter that without some agreement as to what this group of people stands for and what it does *not* represent, it will never become a political force that can jointly work for change. So in the end it will be the integrity, clarity, and courage of the people involved that influences how individual freedom and collective action are combined and thus how progressive it is. Thus, in each example I briefly pick up on what I felt were the most common reproaches, but can only draw superficial conclusions. An empirically sound assessment was not possible but would be a great project for which to seek funding. In reaching my conclusions, I found that the most important characteristic of these examples was their willingness to reflect criticism and to assess how the incremental steps taken could continue to support the radically different purpose that generated each initiative.

4.1 Pioneering Businesses: Common Good Matrix and Balance Sheets

The concept of Corporate Social Responsibility came into existence as a consequence of acknowledging the important role of business in shaping development. Business was to take into consideration the wider setting in which it operated, and to focus on more than simply making a profit. The approach of ‘triple bottom line’

reporting refers to an extension of the accounting standards of businesses that also includes information on the environmental and social impacts of their activities.

Several standards have been developed for this and some, like the Global Reporting Initiative, have become widely influential reference frameworks. Campaigns have been launched to make the entire approach obligatory and comprehensive, rather than a voluntary and selective endeavor. These campaigns have also sought transparency on lobbying behavior and a higher degree of accountability, which should involve sanctions for corporations violating certain standards.

None of these initiatives, however, have gone as far as to address the general purpose of corporations and business in society. Triple bottom line accounting is about slowly reducing so-called externalities—social and environmental costs—in the process of making profits. This is different from the 2009 initiative on the Economy for the Common Good or *Gemeinwohlökonomie.* It starts from the system view that the overall challenge of societies of thinking and aspiring individuals is to find a balance between community responsibility and individual freedom. Neither functions without the other. Individuals need to cooperate to flourish and build wealth, and the community needs creative deviators in order to keep on diversifying and adapting.

Some of the uninformed criticism of the Common Good Economy rejects the 'communist' ideology behind it. But Christian Felber, the leading proponent of this movement, sees the path toward sustainability as lying in reconnecting private entrepreneurship with the overall goal of the common good. Common good as an output goal can only be defined in democratic political processes, and private entrepreneurship can, if a business is run correctly, contribute to that common good. We see that the definition and possible redefinition of ends to which an economy should contribute are put center stage. This is unlike the mainstream economic view in which 'more growth' is the single abstract pole star.

The website ecogood.org chronicles some historical references to the common good as an overarching goal for societal development and also puts forward 20 principles or ideas for what putting that into practice could look like. None of these are seen as fixed rules but are meant to inspire reflection and dialogue on the values, norms and practices that status quo solutions nurture or even prescribe.

With this starting point, status quo solutions are judged to incentivize egoism, greed and striving for power, and to reward those who behave most effectively toward egotistical, greedy or power-hungry ends. What are called 'competition rules' have lost almost all of the *com*, the Latin word for 'together' or 'we.' They are all about 'I' and ensure that winners take pretty much all, while making even hostile takeovers of entirely healthy businesses feasible. The result is a constant incentive for asocial behavior and a structural driver of the concentration of wealth and power, because successful, attacking units are better prepared for the next round of what should be called 'contrapetition.'

The goal of the movement and the 20 proposed principles are thus "more intelligent rules of the game." The first expresses the overall mission purpose:

> The same collectively shared values that contribute to fulfilling interpersonal relationships are the basis for the Economy for the Common Good: confidence building, cooperation, appreciation, democracy, solidarity. Scientific research proves that fulfilling interpersonal relationships constitute a key factor to happiness and motivation (Economy for the Common Good 2010a).

Following from this are the basic paradigmatic changes that lead away from contrapetition to cooperation, from profit to common good output, and from market control to democratic decision-making. This is not to be confused with the socialist centrally planned state that Felber believes suffocated individual freedom. It is also not about prohibiting asocial business conduct but simply stopping the incentivization of it and making it instead the more difficult solution under an altered institutional framework. Thus the overall idea is to change the default setting so that unsustainable behavior, like the externalization of social and environmental costs, is no longer a competitive advantage. Behavioral economics is full of such ideas and has coined the term 'nudging' for non-regulatory interventions in which the architecture of choice makes sustainable behavior easier rather than harder. Supporting evidence on the anti-sustainability impact of the current default has been delivered by the Global Compact—Accenture CEO Study on Sustainability cited above.

Changing accounting rules to internalize environmental and social costs thus seems to be an obvious leverage point that would allow plenty of disruptive innovations to drive 'dirty' competitors out of markets while at the same time incentivizing efficiency technology breakthroughs. However, the question remains: can endless exchange value competition for private profit remain as the overarching goal of business and lead to sustainable systems? The answer given by the Economy for the Common Good movement is clearly negative and their prototype for new balance sheets is far more encompassing. As principle 3 states, "economic success will no longer be measured with (monetary) exchange value indicators, but with (non-monetary) use value indicators" (Economy for the Common Good 2010a).

As a consequence, similar indicators for business and societal performance can align bottom-up and top-down initiatives toward the new purpose on which economies should deliver:

> On the macroeconomic level (national economy) the Gross Domestic Product (GDP) will be replaced—as an indicator of success—by the Common Good Product. On the microeconomic level (company) the financial balance sheet will be replaced by the Common Good Balance Sheet (CGBS). The CGBS becomes the main balance sheet of all companies. The more companies act and organize themselves along social, ecological and democratic lines, the more solidarity they display, the better will be the results of their Common Good Balance Sheet. The better the CGBS results of the companies within a national economy, the higher its Common Good Product (Economy for the Common Good 2010a).

The genesis of this movement came from 70 businesses that started reporting with the first CGBS in 2010. By mid-2015 the number of companies had risen to 1811, in addition to 232 clubs, six communes or regions and over 6000 individual supporters. An interactive map of the network can be found on the website www.ecogood.org. The initial experiences of the pioneers has led to slight modifications

to the matrix of indicators and the current version (4.1) has five different categories and five stakeholder groups for whom principles are formulated. The categories are human dignity, solidarity, ecological sustainability, social justice, and democratic co-decision-making and transparency. The stakeholder groups are suppliers, creditors, employees including co-owners, customers/partners/service providers and the societal environment. Each matrix field has a short description of the type of conduct that is expected and also gives a point score that expresses the weighting of this principle in the overall set.

The rather unusual final row in the matrix is one with negative criteria, for which points have to be subtracted. These are primarily about violations of standards and principles that have been agreed by the international community, for example, in OECD, *International Labour Organization* (ILO) or UN guidelines. These include human rights, worker protection, environmental standards, tax avoidance, non-disclosure on subsidiaries, non-disclosure of payments to lobbyists, the prohibition of work councils and dumping prices. They also contain strong normative judgments about what are considered to be inhumane products such as land mines, genetically modified organisms, nuclear weapons and nuclear waste, plus unequal pay for men and women, equity yield rates over 10 %, excessive income inequality within a business or blocking patents and hostile takeovers.

The negative points that companies can 'earn' in this category are much higher than the positive ones that can be gained through common good activities. This sends a strong signal that the violation of agreements and the intentional undermining of standard practices are worse for cohesion, trust and relationships than not actively pushing up the benchmarks (Economy for the Common Good 2010b).

While the matrix calculates a final number that can be compared with others, the entire concept of it lies much more in stimulating a structured conversation and process within the business about its shortcomings and any room for possible improvements. Peer learning lies at the center of the concept and businesses decide themselves if they want to hire one of the growing network of balance sheet consultants. It is also up to them to add an external audit or not. The mid-term political goal, however, is to make CGBS reporting mandatory and, in a first step, to guarantee tax breaks or public procurement advantages for those participating or faring really well.

The initiative also encourages the surrounding community, as well as the local government, to support these businesses with customer loyalty, public acknowledgement or even to undertake their own evaluation. These are called 'Common Good Regions' and 45 of them have been launched in Austria, Germany, Switzerland, Italy, Spain, Portugal, Greece, Great Britain, the United States and recently also in South America.

In northern Italy and Austria in particular, mayors and communes are now coming together to develop visions for more regionalized, value-based, participatory and sustainable supply chains and to see how these could be institutionally supported. Some of them are considering the introduction of regional currencies to facilitate the strengthening of ties and trust and to develop local wealth indicators. The goal is to

replace the overemphasis on competition with that of cooperation and to involve the population in the process of what economies should deliver on and how.

The movement is strongest in Austria, northern Italy and Germany. Felber's 2011 book *The Economy for the Common Good* has been translated into Spanish, Italian, Finnish and French and the website is also available in Polish but not in Finnish. This rapidly growing movement is a brilliant example of how different pioneer activities align behind a clearly formulated repurposing of their small systems with a plan to drive the transformation of the overarching regime systems.

Of course this does not mean everyone involved will and can find the same incremental steps to become Common Good supporters. While the strongest criticism from the mainstream predicts that the focus on re-localization and regionalization will lead to a collapse in productivity and wealth creation, the more nuanced observers point to the creativity with which the old and unchanged business practice might now be branded differently. Some measures that would be unavoidable anyhow, like providing training for employees to, for example, catch up with newest IT trends, can now be declared common good measures. Using the common good narrative as an image campaign might then lead to better sales and therefore more profane profit—while not much else changes (Exner 2011). As mentioned above, I think it is important to check such practices by flagging them and assessing if further incremental steps are to follow. I do not think that a movement and vision should be dismissed unless such practices become the norm. Exner lists two businesses out of the group of 1811 and his judgment is based on the public statements of the managers rather than proper investigation.

The vision as formulated by the movement itself is to be an open, adaptive learning community with potentially global reach. It seeks to create self-reliance and more independence for each of the regions but also changes in the overarching regime structures so that the *normal* or hegemonic way of thinking and doing business is transformed. Here the participants point to three hegemonic assumptions: that humans (should) only pursue their self-interest, that without the intention of gain there is no entrepreneurial engagement and that competition is always the most efficient way of organizing production and consumption processes.

4.2 Pioneering Civil Society: Transition Towns for Resilient Local Solutions

Originally emerging in the United Kingdom, the Transition Towns movement has spread across Europe and beyond. While the Common Good network already had a strong focus on the local embeddedness of its members, the Transition Town movement makes 'reflexive relocalization' its core stance. The term 'reflexive' is important because it highlights the way that the process is driven by communities. It is done with a clear system view that envisions improved resilience of a town and

its people in the face of growing megatrends like climate change, rising energy prices and economic crises.

The term 'resilience' is used here to define a particular structural characteristic of a complex system. Resilient systems are those that are able to bounce back or recover their strength quickly after a shock or crisis. In the case of human systems, like cities or economies, this means that the functioning of basic services for the population will be quickly restored.

Such restorative capacity is higher if several alternative processes can deliver on important system outcomes (diversity), if these are not all easily hampered by the same shock (decentralization) and if several processes keep their potential to increase output if necessary (redundance). Resilience is therefore a very dynamic and not easily visible or measurable quality. High resilience usually means high levels of the self-organizing capacity of a system, so that it can learn, create and redesign processes essential to their functioning. The mechanistic view of systems in the mainstream economic paradigm will often lead to the sacrifice of this quality for efficient static stability and higher productivity.

Rob Hopkins, one of the leading figures in the Transition Town movement and author of *The Transition Handbook*: *From Oil Dependency to Local Resilience* (2008) adds a sociopolitical component to his definition: Resilient sustainable communities are structured along three principles. These are their 'diversity' of life-supporting solutions or livelihoods, 'modular structuration' with buffers to the outer systems that increase self-reliance possibilities, and 'tight feedback loops' that bring the results of actions closer to those responsible for them (Hopkins 2008: 55–56). The latter is generally regarded as important to ensure that negative developments are picked up more quickly.

Resilience has also become a frequent term in the context of natural catastrophes that destroy infrastructure or limit the possibilities of shipping and flying goods around the globe. Recent examples are the Japanese tsunami that caused the 2011 Fukushima disaster and energy system breakdown and the Icelandic volcano eruption that threatened the United Kingdom's globalized food supply chains in 2010. Here, as in the WEF 2012 *Global Risk Report*, it was primarily the infrastructure and its control chain that was assessed for resilience. The more decentralized units with decision-making powers and local knowledge combined were much faster in restoring the energy supply to people than centralized ones with hierarchical control. From an exchange-value-focused perspective on process design, the latter are of course much more efficient.

We see that the notions about which processes are promising and seem valid depend on which overarching system view one adopts. Transition Towns do not treat the economic system as the overarching one but as a subordinate means to ensure that human need satisfaction can be achieved in alignment with the natural laws of the ecological system. An explicit part of increasing self-reliance and resilience means turning away from certain massive economies of scale that are only possible under systems with a high division of labor. This may lead to decreases in the overall availability of consumption goods, but could lead to the higher quality and longevity of each good produced and to lower risks in terms of

supply chain interruptions when transport or credit in one part of the chain is hampered. Meanwhile, sustainable communities, according to Hopkins, do not subscribe to a culture of consumerism but seek to link "satisfaction and happiness to other less tangible things like community, meaningful work, skills and friendship" (Hopkins 2012: 20–21).

Here we find a direct connection with findings on human well-being and its origins. It was insightful to see that some workshops of the Transition Town movement were using Max-Neef's human need matrix to discuss a diversity of strategies for a high quality of life beyond 'having' things. This also ties back to the criticism of ecological economists like Paul Ekins and Robert Costanza in Chap. 3, who state that the social utility gained through the human interactions during production processes should get much more attention when assessing productivity. Meanwhile, many resilience researchers also emphasize the importance of trust as a core ingredient to well-functioning, adaptable communities and individual perceptions of well-being.

The 2012 High Level Panel on Global Sustainability did not get this far in its report to the UN Secretary-General before Rio+20. *Resilient People*, *Resilient Planet*: *A Future Worth Choosing* describes the world system as volatile and uncertain, and suggests that the panel start their recommendations with a call to "empower people to make sustainable choices" as a response to this. It does not seek to empower people to build their own communities though, but rather focuses on how the social safety nets of governments are set up so they can be resilient in times of structural change, and how disaster risk reduction and adaptation programs could be improved (United Nations Secretary-General's High-level Panel on Global Sustainability 2012: 46–47).

The Transition movement, on the other hand, makes these self-empowerment processes the essence of its existence and adapts them to systems or communities of any size, not just towns. Its mission is summarized as follows: "to inspire, encourage, connect, support and train communities as they adopt and adapt the transition model on their journey to urgently rebuild resilience and drastically reduce CO_2 emissions." The seven principles for guiding such processes in towns are set out by Hopkins and Peter Lipman on the Transition Network website (transitionnetwork.org) and can be summarized as follows:

1. Positive Visioning: Campaigning for rather than against something.
2. Help People Access Good Information and Trust Them to Make Good Decisions: Raising awareness and hearing many opinions lies at the core of rational decision-making.
3. Inclusion and Openness: Banning 'them and us' thinking and reaching out to all subsystems in the town, early in the process.
4. Enable Sharing and Networking: Acknowledge everything, including stories of failure.
5. Build Resilience: With the primacy of environmental resilience, change food, energy and economic systems in the town and across governance levels.

6. Inner and Outer Transition: Worldviews and belief systems can change and create something different and need not cause fear.
7. Subsidiarity: Self-organization and decision-making at the appropriate level (Hopkins and Lipman 2009: 7–8).

We can clearly see how many of these principles fly in the face of mainstream models. Actors are explicitly requested to change their way of thinking and being and to share instead of compete. The processes of providing energy and food are intentionally made less efficient so that they become more resilient. The economic system is analyzed as a subset of SES's that can and should fundamentally change if it hurts the balance of ecological reproduction circuits. It is therefore not the resilience of the economic system that successful development strategies should pursue but that of the ecological systems with biophysical qualities that can be irreversibly altered.

This point is important because otherwise 'resilience,' as a concept, might be used in as undifferentiated a fashion as 'efficiency.' Resource efficiency is basically always desirable, but making efficiency a core value in and of itself, for all processes, is taking it too far. The same holds true for resilience, as the financial system shows nicely. From a sustainability perspective it is utterly damaging, but its immaterial qualities mean that very quickly many new financial products and instruments emerge if others are ruled out. It thus shows a great self-organizing capacity and has bounced back from the 2008 crisis without significantly changing its functions, structure, identity or internal connections. Instead, the financial system would require a decrease of resilience so that transformation could take place.

Thus, the goal of improved resilience can only be of added value for sustainability when the purpose and setup of the system in question is one in line with what sustainable development on the macro scale requires. The Transition Town principles make this distinction (see point 5) and the idea has been exported to many places across Europe. Out of the ongoing experiences a number of guidelines, ingredients and practical steps have emerged on how to set up a community initiative. These can be found on transitionnetwork.org. Each transition or transformation of a community is expected to take 20 years or longer. The website also includes a map of where initiatives from across the world are registered, and in mid-2015 it had 479 official initiatives in 43 countries, which can be located through an interactive map at http://www.transitionnetwork.org/initiatives/map.

From the MLP point of view, these initiatives form perfect niches ready to build coalitions for regime change. Yet, some critics lament the absence of a more explicit political agenda that would be able to reach just that. They find the 'anything goes' character behind the initiatives too lofty and the building of windmills, barter trade networks and permaculture gardens too individualistic. Moreover, even if single towns become more resilient this would not necessarily change the overarching regime structures that push economies out of Planetary Boundaries. Some of this criticism may be true, in particular when rich communities work on making their own backyard lovely but do not feel much responsibility for those worse off.

On the other hand, I find it important to maintain the distinction between pioneers and change agents made by the WBGU report reviewed in Chap. 2: one and the same group or individual cannot necessarily do everything. Testing deviating practical solutions or business models is much more work than following the well-trodden path dependencies; it often binds all of the available resources. To expect the same pioneers to also develop political campaigns might well be unrealistic. During my time in Brussels, for example, politicians in favor of rewriting the green policy framework were urging civil society to provide studies and communicate how, for example, renewable energy technology or biologically degradable products could replace many dirty solutions if regulation allowed for them to be scaled up. These innovations are typically developed by SMEs that simply do not have the spare resources for significant lobbying. On the other hand, the big potential losers (the polluters and so on) do, and they shout loudest. Thus, while some people in Transition Towns can focus on experimenting with the new practical solutions, others could engage in political processes.

Or other change agents, like myself, could pick up on these examples to make them known and fit them into a political agenda. Networking support, political engagement, and visibility have been growing significantly in recent years. Transition Towns or initiatives are crucial examples of how system innovations that link an update in physical technologies like renewable energy with those of the social technologies around them, will have much more impact for sustainability than solar panels alone.

If the ecological systems and their importance for future human well-being are prioritized and the least destructive technologies chosen for need-satisfaction strategies that do not rule out sufficiency, we have a great example of system-repurposing. It echoes the two key points in the Brundtland definition of sustainable development: satisfying human needs in the long term and choosing processes that will not threaten the planet's ability to replenish the resources to do so. Such progress can only be measured with indicators that go beyond GDP.

4.3 Pioneering Governments: Beyond GDP Measures as Development Frames

Indicators frame the way we view things, which aspects we pay most attention to and which rationales are reproduced. Since the *Brundtland Report* there have been many indicator initiatives aimed at going beyond GDP at all levels of governance and some of them have gained quite a lot of public attention. The UN HDI, for example, first launched in 1990, expanded per capita GDP measurement to include education and life expectancy in its overview of successful country development. The GPI discussed in Chap. 3 seeks to correct GDP numbers according to the natural capital destroyed and the negative social impacts that this method of wealth generation causes people.

Many of these 'headline indicators' are meant to capture public attention, which is more easily done with one number than with a dashboard. Amending or correcting GDP numbers with indicators has been an incredibly important step in expressing the fact that capital substitutability accounting—the essence of weak sustainability processes—fails to capture the real state of natural, social and human capital and therefore the prospects of future development. The headline indicators or indices are, however, not the right tools for the design of actual system innovation processes. For this we need disaggregated information about causalities and correlations between the different elements measured and also sociopolitical engagement with the questions of how to weight potential trade-offs between these elements. If we do not dissect statistics and models in this way, their values and information are difficult for non-experts to understand and they can become a source of hegemonic power, rather than a telling insight for improved governance capacity and consensus-building.

The actual design process of measurement schemes with which to monitor future developments is therefore at least as important for democratic system innovation governance as finding exactly the right numbers. The biggest challenge is apparently to dethrone the dominance of economic indicators over social and environmental aspects of development. This observation held for all countries in the UN *Synthesis of National Reports* for Rio+20 on the implementation of sustainable development strategies:

> Today's challenge is chiefly implementation.. .. This is largely due to integration, inclusion, and coherence challenges.. .. Economic growth is still the chief priority for most governments, and although they increasingly integrate poverty alleviation and other social concerns into development planning, the integration of environmental considerations has lagged. The review of national reports revealed little evidence that countries see sustainability as contributing to growth; at best, governments see sustainability as compatible, or at least not interfering, with growth, but there is little indication that these countries see environmental sustainability as necessary for long-term growth (UNDESA and UNDP 2012: 2).

The report lists five priorities for tackling this implementation roadblock and brings new measurements of progress and improved democracy and empowerment for bottom-up change to the forefront:

> If national systems look only at economic performance, then people cannot hold their leaders accountable when it comes to progress on social and environmental matters. New and more tailored metrics as well as bolstered data collection systems and capacities are needed in both public and private sectors. Such metrics will be critical to the post-2015 development agenda, in particular to the sustainable development goals (UNDESA and UNDP 2012: 5).

Unfortunately, the SDGs only list the development of GDP-complementing measurements for progress as the very final target (17.19) under SDG 17 on means of implementation and global partnerships. This gives it much less prominence than the multifarious targets on GDP growth scattered across the other 16 goals (UN 2015).

This does not mean, however, that the progress metrics community is not continuing its work. Reports like that of the Stiglitz-Sen-Fitoussi Commission on the Measurement of Economic Performance and Social Progress in 2009 have already shown a growing consensus that a small dashboard of lead indicators that are easy to understand would be most helpful. These should mix monetary as well as physical measures for objective progress. There is still more debate about if and how to include subjective happiness data from surveys. Some regard it as too vague and qualitative for statistics, others say that this is indeed the problem: You can never understand a system and actor motivations if you do not ask people about their experienced reality (Stiglitz et al. 2009).

One astonishing example supporting the latter argument is the OECD's 2013 *Health at a Glance* report in which a question about whether respondents felt healthy was answered positively by 89.5 % of Americans but only 30 % of Japanese. According to objective data, however, Japan has the second highest life expectancy figures in the world and very high scores in terms of the number of hospital beds, MRI and CT scanners, the length of stay in hospital, and the number of times people go to the doctor. In the United States life expectancy is four years shorter and rising much more slowly than in other OECD countries. Its obesity rate is twice that of others and 15 % of the population live without health coverage, despite the world's highest per capita expenditure on health care (OECD 2013a).

So without talking to people directly, much insight about experienced well-being and need satisfaction may be missed. In addition, the processes of creating indicators with the people whose development they should measure already involve many mindshifting effects for better understanding of trade-offs or even the possible overcoming of trade-offs if goals and processes were changed. These effects create ownership and better acceptance for future policy measures and would rank high in the categories of social or human capital improvement for economists.

OECD and UNDP consultants Jon Hall and Louise Rickard have studied seven beyond-GDP indicator processes around the world for the Bertelsmann Foundation. They have pointed to the following happy side-effects of the bottom-up participation recommended by the UN: the strengthening of democratic processes with the direct inclusion of the population in the overall goal and purpose-setting of future policy directions, which also allows for a widening in perspectives on all sides as to how different single aspects hang together and why they are important to whom; policy coherence and acceptance are also increased through ongoing processes toward finding common ground or a clear identification of antagonistic positions and trade-offs that can then be dealt with explicitly rather than remaining as unresolved undercurrents. Linking this back to resilience, the study also found that such processes build capacity for constructive deliberation and enable participants to become more proactive in other sociopolitical contexts as well (Hall and Rickard 2013: 11–12).

Thus, if carried out in a participatory manner, many such indicator processes already lead to social benefits and reflexive processes around which values, norms and the goals a community wants to base its development. It also improves

potentials for monitoring, communication and innovation, since more people know about the drivers of current challenges.

These paradigm-shifting and change-inducing effects have also been summarized by Joseph Stiglitz, the Nobel Prize-winning economist and head of the commission mentioned above, in a presentation to the Australian Productivity Commission:

Part of the objective of rethinking our measurement systems is to generate a national and global dialogue:

- On what we care about
- Whether what we are striving for is achieving what we care about
- And whether this is reflected in our metrics (Stiglitz 2010: 15).

However, these sociocultural benefits are still not reaped in many indicator schemes, as many examples of rather technocratic sustainable development strategies show. In a major research endeavor between 2012 and 2013, the Bertelsmann Foundation and the Canada-based International Institute of Sustainable Development (IISD) developed an extensive criteria set for the analysis of 35 sustainable development strategies from around the world. They found that the best practice examples included those that have a clear mission statement or *Leitbild* connecting the otherwise abstract goal of sustainability with culturally vibrant local notions of what constitutes a good life.

The top examples here were the GNH Index from Bhutan, the *Buen Vivir* (Good Living) social philosophy in South American countries like Bolivia and Ecuador and the Finnish vision of "quality of life within sustainable societies." In general terms the importance of linking sustainable development ideas with notions of quality of life was a common theme among the successful examples (Bertelsmann Stiftung 2013: 15–16).

A review of the Bhutanese case follows, as it was the most successful strategy in the Bertelsmann/IISD study and served as a pioneering example in UN high-level roundtables for a "new development paradigm" for the post-2015 development agenda and its SDGs. It highlights how a development goal different from that of GDP has played out since the 1970s.

The development aim of GNH was set out in 1972 by Bhutan's fourth king, Jigme Singye Wangchuck. He presented it as the logical outcome of the legal code which sealed the unification of Bhutan in 1729, and stated that, "if the government cannot create happiness ('*dedidk*') for its people, there is no purpose for the government to exist" (Ura et al. 2012: 6). This is not very different from the US Constitution of 1776, which declares "life, freedom and the pursuit of happiness" to be the basic rights of each individual and their protection to be the duty of the state. However, Bhutan has made this duty an explicitly monitored and societal endeavor instead of the individualized consequence of high economic growth.

Before the creation of their indicator system, Bhutan's general idea was understood as being "development with values" that were conducive to promoting collective happiness by the creation "of enabling conditions where people are able

to pursue well-being in sustainable ways." Five of these values were, and are, fundamental. They are a holistic view of people's needs, be they spiritual or material, physical or social; balanced progress toward GNH with an emphasis on preventing one dimension from outstripping others; a collective and all-encompassing view of happiness; sustainability, so that well-being is pursued for current and future generations; and a notion of equity such that levels of well-being should be similar across society (Ura et al. 2012: 7).

The big difference from Western concepts lies in the idea that spiritual and material development are viewed as two complementary and mutually reinforcing elements of human progress. Responsibility for nature and motivations regarding the well-being of others are integral to this view of happiness because, say researchers of The Centre for Bhutan Studies in the book *An Extensive Analysis of GNH Index* (2012): "We know that true abiding happiness cannot exist while others suffer, and comes only from serving others, living in harmony with nature, and realizing our innate wisdom and the true and brilliant nature of our own minds" (Ura et al. 2012: 8). This view was already present in the 1999 government strategy paper *Bhutan 2020*: *A Vision for Peace*, *Well-being and Happiness*, which had a very explicit focus on the long-term and recognized the importance of economic growth for such a poor country but sought to keep the balance between material and non-material as well as spiritual development. The five overarching goals then were human development, culture and cultural heritage, a balanced societal development benefiting everyone, good governance and protection of the environment (Bertelsmann Stiftung 2013: 70).

The overall development strategy was always embedded in environmental programs and sustainable development strategies until the 2008 constitution declared GNH to be the official guiding principle of the country's development and introduced the new measurement system. It is important to note that this index is not intended to measure happiness as such, but to "orient the people and the nation toward happiness" by improving their conditions (NDP Steering Committee and Secretariat 2013: 30).

In practice this has led to the formulation of four strategic pillars of policy planning. These are sustainable and equitable socioeconomic development, environmental conservation and the preservation and promotion of culture and good governance. In order to specify and measure progress in these areas, an index with nine dimensions was created. They include rather common dimensions like living standards, health and education, ecological diversity and good governance, but also unique and important elements: psychological well-being, which includes, but goes beyond, subjective well-being reporting; time use; community vitality; and cultural diversity. Each dimension has a set of between three and five indicators or questions which are used for taking representative surveys and are analyzed according to a total of 124 variables.

Except for the cultural, psychological and spiritual components, we find a lot of similarities between the Bhutanese dimensions and the 11 dimensions of the OECD Better Life Index which launched in 2011. These are housing, income, jobs, work–

life balance, health, life satisfaction, safety, civic engagement, environment, community and education (OECD 2014a).

In an ongoing, non-representative online questionnaire, the OECD asks visitors to their website (oecdbetterlifeindex.org) to weigh the importance of these dimensions. Regardless of country or age group people put health, education, life-satisfaction and work—life balance highest. Income is the second lowest and community the least important. This of course is a snapshot of opinion of a small group of people who are probably already interested in the issue or they would not have ended up on the website. Also, this approach is strongly focused on today's experience of life and lacks indicators that could delve deeper into the sources of what could sustain delivery on those dimensions in the future. The environment, for example, is reduced to nothing more than clean water and clean air.

The OECD's *How's Life? 2013* report has therefore added a long section on this in which it discusses how measuring social, environmental, human and economic capital stocks is essential to securing quality of life in the future (OECD 2013b). Yet, this economic perspective leaves one with the impression of a basic collection of input factors rather than a systemic understanding of how the various dimensions relate to each other and co-develop as embedded systems. This is the strength of the Bhutanese approach, with its focus on values and culture.

Maybe the most innovative feature of the GNH strategy, however, is the fact that the survey results inform the core of government practice. Five-year policy plans respond to findings that can be differentiated by region, gender, profession, age group, etc., to identify which interventions and resource allocations are important to support those reporting the least happiness (Ura et al. 2012: 8–11). They are formulated in multilevel, multi-stakeholder processes and local consultations while each new law is evaluated in terms of its impacts on GNH dimensions and indicators. Important strategy plans include complete electrification, tripling hydro-power generation, improved independence in food provision, 100 % organic agriculture, a low ecological footprint, economic diversification, reduction in the use of fossil fuels for transport and the development of sustainable expensive tourism (Bertelsmann Stiftung 2013: 61–83; Ura et al. 2012: 1–15). All of these strategies are assessed from the holistic GNH view.

Since Bhutan's surveys have only been done twice to date, clear trends within these metrics are hard to map. But on conventional measurement schemes its development is better than other South Asian and comparable states worldwide in terms of poverty reduction, improving HDI rates, constant economic growth and successful environmental protection. The prior GNH framework has also guided a stable and still ongoing transition since the 1970s that involved moving from an absolute monarchy to a constitutional monarchy and finally into a constitutional democracy. This process was initiated by the fourth king and finished by Jigme Khesar Namgyel Wangchuck, the fifth and current monarch in 2008, when a widely discussed constitution was signed into law and first elections were held.

Since the 1980s, Bhutan's life expectancy has gone up by 20 years, its birth rate has gone down from 6.55 to 2.4 children per woman, infant mortality has halved and years spent in school have gone up by seven to the OECD average of 11 years.

Its per capita GDP is 13 times higher and unemployment is a mere 4 %. At the same time Bhutan has managed to increase the area under forest cover from 50 % in the 1970s to 80 % and inserted into its constitution a clause that this must not fall below 60 %. The total of its protected nature areas amounts to 50 % of the surface of the country and the ecological footprint of each Bhutanese is 0.8 ha, well below the world average of 2 ha. It has pledged to keep its development climate neutral and hydro-power is supposed to be the prime energy source by 2020, even allowing for exports that would reduce Bhutan's still significant dependence on official development aid.

All is not rosy in Bhutan, however. In the 2010 GNH survey only 41 % of people passed the sufficiency threshold for happiness as defined by the government, which included only 37 % of those living in rural areas. Climate change is threatening hydro-power plans and floods risk damaging the main towns as most of them sit at the bottom of a long valley in the Himalayan mountains. Urbanization and the lack of jobs for educated young people wishing to work in offices leads to problems and a lot of migrant workers from India doing the hard physical work. The media and tourism-based exposure to the mainstream global culture of consumerism seems to increase tensions. Young people who have studied abroad are also more critical of the lack of entrepreneurial spirit and availability of goods.

This is one of the core reasons why the promotion of GNH values and ideas in educational institutions has become a strategic goal. All teachers have been given training in green ideals, which involve ecology as well as intellectual, academic, social, cultural, spiritual, aesthetic, and moral values (Bertelsmann Stiftung 2013, 61–83). All schools have meditation on their curricula, even if only for a minute for small children. Bhutan's 2013 report to the UN, *Happiness: Towards a New Development Paradigm*, makes reference to well-being and neuroscience study results on the positive effects of regular mindfulness practice on health and quality of life and also social relationships and productivity (NDP Steering Committee and Secretariat 2013: 35).

In the report, Bhutan also freely admits that "as with any new attempt at multidimensional social assessment," there are still a number of technical and methodological challenges in GNH implementation, both the measurement, (interpretation of its mathematical formula, questions about correlations between results when comparing regions and groups, robustness of data on the small scale and the wording of particular questions) and the communication of policy-relevant results and their translation into concrete political measures (NDP Steering Committee and Secretariat 2013: 31).

However, the GNH data confirms many of the well-being studies referred to in Chap. 3. Happiness is high when people live in conditions providing safe areas where they trust their neighbors, have ample economic security to provide the necessities of life to their families, health, clean air to breathe, safe water to drink, green spaces for recreation, healthy natural resources to provide the necessities of life, knowledge rather than ignorance, strong social networks and a sense of belonging to a culture and community (NDP Steering Committee and Secretariat 2013: 33). In addition to these objective conditions great emphasis is put on the

inner transformation of mind-sets and behaviors so that individuals can skillfully enjoy these potentials, otherwise people may well continue to feel miserable even under such circumstances.

The report concludes that mindfulness as the "cultivation of non-judgmental, non-reactive, metacognitive awareness of present-moment experience" is one important "happiness skill" as are the conscious practices of gratitude, empathy, and patience. Referring to studies documenting higher levels of life satisfaction, meaning and happiness from volunteerism and community service, the report adds that "these and related skills combine to build the capacity for citizenship, and hence for engagement in processes of social change, that help people develop 'not just better goals, but better means as well.'" (NDP Steering Committee and Secretariat 2013: 35) Five principles were suggested for an alternative vision recognizing the complexity and interrelatedness of human reality and developed into a proposed paradigm for the UN negotiations around the Post2015 development agenda (now 2030 Agenda for Sustainable Development):

(1) transformation in what we value;
(2) reconsideration of the purpose of development;
(3) re-orientation of humanity towards service;
(4) recognition of our interconnectedness; and
(5) an ethos of cooperation (ibid.: VI–VII).

This view is very much in line with the mind-sets of common-good orientation and community resilience discussed above but another total deviation from mainstream ideas on humans and their relationships. Figure 4.1 encapsulates the paradigm with the nine outcome dimensions of GNH and their wider conceptual embedding.

Transformation researchers will particularly appreciate the arrow pointing from 'societal happiness' back to 'needs' and the 'Holistic Development Agenda' described as transformative with interconnected solutions: none of these are viewed as independent, natural or universal laws but as an integral part of continuous change, depending on the state of societies and the planetary resources drawn upon.

What struck me when visiting Bhutan was the humility with which even high officials like the princess or ministers say that they have not reached the state to which they aspire. The phrase that reflexive transformation researchers might find most impressive was that they are conducting a "living experiment with the truth."

Of course, there is also plenty of criticism. The least qualified still sneer that a country with a monarchy lacks the credibility to speak about good governance, ignorant of the fact that democratic elections were introduced almost a decade ago. Others point out that small agricultural and Buddhist Bhutan can hardly be a role model for huge industrialized countries of multiple religions. Then the refugee drama of the early 1990s remains a massive black spot on Bhutan's history. A movement toward the democratization and possible independence of the south, where many Nepalese people lived, was countered with a nationalist movement by the king. Apparently when he found out about connections the underground

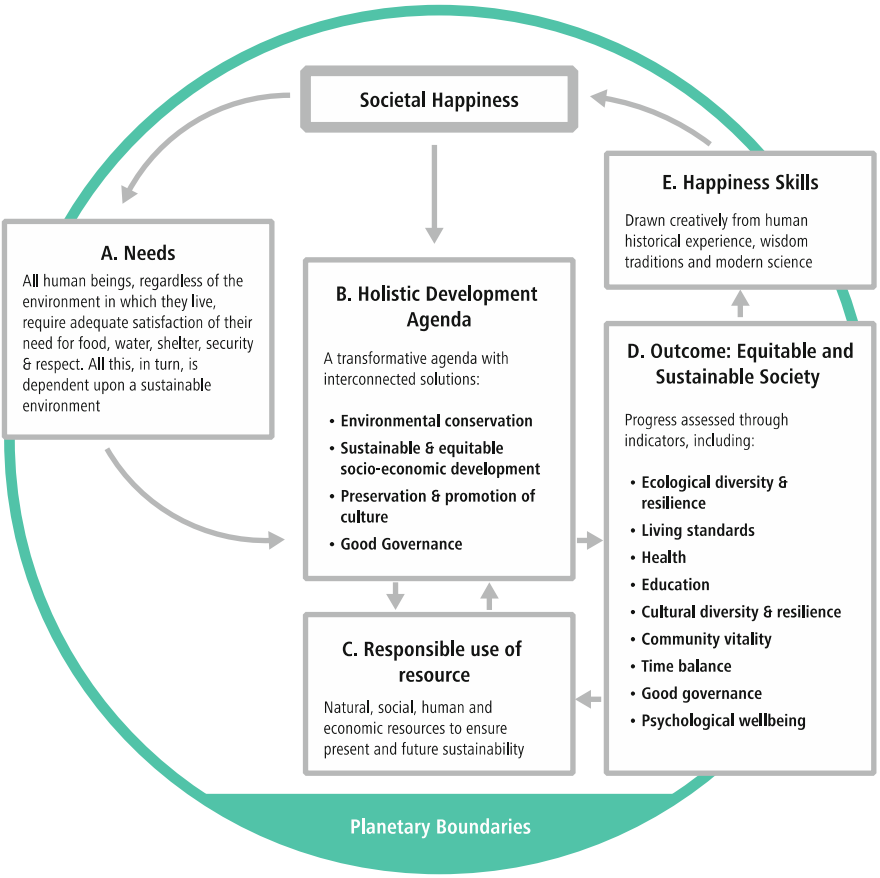

Fig. 4.1 A new development paradigm of well-being and happiness. *Source* Based on NDP Steering Committee and Secretariat (2013: 20)

activists had developed outside Bhutan (especially in India), he ordered in the country's newly trained army and up to 100,000 people fled the country. The numbers are unverified but would amount to one sixth of the population at that time. Critics argue that this event casts such a shadow that cherishing Bhutan as a positive development pioneer is impossible. Speaking to government representatives during my stay gave me the perspective that this country of 800,000 people stuck between the competing super powers China and India was worried about its very existence when it found out about the Indian support for the movement for government reform and possible independence.

I am far from able to judge any of these events in the early 1990s. What I can say is that the later policy frameworks, and even the GNH index itself, are the result of international collaboration. What I can also say is that people are quick—far too quick—to talk about the scheme being discontinued. After the elections in May

2013 the new prime minister, Tshering Tobgay, was less enthusiastic about making GNH the top priority and not interested in touring the world to promote it. But the scheme is inscribed into the constitution and thus I found it surprising to see the Wikipedia entry for GNH quickly changed into past tense, claiming that it had been abolished. The only source for that was a *New York Times* article in which no proof was to be found. Later articles and speeches of Tobgay, like this quote in *The Guardian*, cast a different light:

> What's changed with our government is that we believe our priority must be at home … We must remove the obstacles to GNH and be true to it within the country… But the job of government is not to lead debate; it is to implement the principles at home. The world should not expect too much from us, and we should not expect too much from ourselves (Confino 2014).

So instead of using GNH as a brand and becoming complacent about it, Tobgay believes Bhutan should work on the unprecedented divorce rates, domestic violence, drug abuse and suicide (ibid).

Reading such statements makes me wonder when Western countries will learn from this cultural trait: a respectful culture of experimentation seems like the best humus for radical incremental transformation strategies. One global movement that also works in this direction but originated in the West is On the Commons. It shares many of the same values and the community well-being mind-set. It can thus serve as an inspiration for all those who feel that Bhutan's model is too dependent on its Buddhist culture to have wider appeal.

4.4 Pioneering Governance Systems: Commoning as a New Stark Utopia

The term 'commons' is mentioned in economic thinking and governance primarily in the context of the idea of a "tragedy of the commons" in which freely available natural resources like land, forests, oceans or the atmosphere are used unsustainably because everyone can pursue their own benefits by exploiting them or dumping emissions and waste onto or into them. The selfish-competitive actor view therefore concluded that only private property rights or strict state control was suitable to deter such action. As a consequence we frequently hear about market failure or state failure when this is not successful.

Nobel laureate Elinor Ostrom, one of the leading thinkers that inspired this movement, rejected the universal law that all humans are selfish and that policy or competition somehow have to rein in their destructive actions. She and her colleagues also took a closer look at whether there are really only two types of goods that would justify being satisfied with two prototypical governance solutions. In her 2009 Nobel speech, Ostrom summarizes the amendments that she and her colleagues made to mainstream economic ideas. First, they widened the definition of

Table 4.1 Four types of goods and their forms of scarcity

	Subtractability of use		
		High	Low
Difficulty of excluding potential beneficiaries	High	Common-pool resources: groundwater basins, lakes, irrigation systems, fisheries, forests, etc.	Public goods: peace and security of a community, national defense, knowledge, fire protection, weather forecasts, etc.
	Low	Private goods: food, clothing, automobiles, etc.	Toll goods: theaters, private clubs, daycare centers

Source Based on Ostrom (2009: 413)

'means' or 'goods' so that they captured real accessibility and scarcity or non-scarcity (Table 4.1).

The mainstream paradigm differentiates private goods that are both excludable and rivalrous (people can be excluded from usage unless they pay) and public goods that are both nonexcludable and nonrivalrous (even if people do not pay they can consume the goods and this does not limit the consumption by others either). The excludable/rivalrous would have to be organized by the market and the nonexcludable/nonrivalrous by government control. In the latter case, people could influence the usage either by consuming or voting. Table 5 shows that Ostrom rejected this clear-cut juxtaposition and argued for more differentiated characterizations. Substractability of goods replaces rivalry of consumption and refers to the notion that consuming a good will reduce the level of the resource available for others and can be either high or low, not simply on or off. In addition, two more goods are defined: "common pool resources" contain most of the ecosystems and their provisions for human survival whereas "toll goods" have also been called "club goods" as they involve a smaller group of individuals or groups providing themselves with nonrivalrous goods and services from which only they benefit and non-members are excluded (ibid).

Ostrom and her colleagues then went on to define an analytical framework of the most general set of variables that institutional analysis would need in order to capture a diversity of human-made institutional settings, including markets, private firms, and governments, but also families, community organizations, and civil society organizations. These captured rules in use and the ways they evolve over time, the attributes of a community in terms of knowledge, social capital, participation, heterogeneity, and also biophysical conditions. The results show that there are many ways to avoid the tragedy of the commons. Common pool resources may not need to be divided up into private ownership or state control, especially once one assumes that actors know each other, can communicate and learn. So while Ostrom acknowledged that turning one or two rules into seven or eight "has been upsetting to scholars who wanted to rely on simple models of interaction among humans," her team's extensive research of case studies led them to distill eight "design principles" for successfully sustained governance regimes (ibid.: 421–422). Their summary is so short that I cite it completely:

1A. User Boundaries: Clear and locally understood boundaries between legitimate users and nonusers are present.
1B. Resource Boundaries: Clear boundaries that separate a specific common-pool resource from a larger social-ecological system are present.
2A. Congruence with Local Conditions: Appropriation and provision rules are congruent with local social and environmental conditions.
2B. Appropriation and Provision: Appropriation rules are congruent with provision rules: the distribution of costs is proportional to the distribution of benefits.
3. Collective-Choice Arrangements: Most individuals affected by a resource regime are authorized to participate in making and modifying its rules.
4A. Monitoring Users: Individuals who are accountable to or are the users monitor the appropriation and provision levels of the users.
4B. Monitoring the Resource: Individuals who are accountable to or are the users monitor the conditions of the resource.
5. Graduated Sanctions: Sanctions for rule violations start very low but become stronger if a user repeatedly violates a rule.
6. Conflict-Resolution Mechanisms: Rapid, low-cost, local arenas exist for resolving conflicts among users or with officials.
7. Minimal Recognition of Rights: The rights of local users to make their own rules are recognized by the government.
8. Nested Enterprises: When a common-pool resource is closely connected to a larger social-ecological system, governance activities are organized in multiple nested layers (ibid. 422).

While these are the empirical results of researchers observing and coding variables, there is now a movement that translates these design principles into a principled approach to governance that could be applied beyond the typical common pool goods. Commoning thus captures a mind-set that favors collective ownership and development. Regarding freely available natural resources, it holds the view that they are the common heritage of mankind, so that everyone has an equal entitlement to use them but also equal responsibility to protect them. Each generation should only take to the extent that leaves future generations with similar wealth. Also, jointly produced output is viewed as a common good rather than an asset to be divided up into individual returns on the production factors invested. Thus, in addition to being co-stewards of that which Earth and our ancestors have provided, everyone is seen as a co-proprietor of wealth created. Commoning solutions therefore seek to define new systems for reproduction that go beyond the typical market and state patterns in political economy. They break with their private or public ownership logics by creating governance and entitlement structures tailored to the type of good and local circumstances. Often this will lead to envisioning and enacting non-commodified production and consumption solutions among peers that are marked by joint responsibility for the maintenance of the system created.

The book *The Wealth of the Commons*: *A World Beyond Market and State* comprises 73 essays from thinkers and practitioners in the commoning field (Bollier and Helfrich 2012). The commonalities within this community are described as "an overarching worldview." They comprise a set of social attitudes, commitments and political philosophy, and even a spiritual disposition, all shaping an experimental means of strategic change (Bollier and Helfrich 2012: xii–xiii).

While a single definition of the commons or commoning does not exist, one website, onthecommons.org, is central to the movement and summarizes the core of this paradigm or framework in Fig. 4.2.

The inner core principles characterize all commons initiatives:

- Equity—Everyone has a fair and just share of social and natural resources that belong to us together.
- Sustainability—Our common wealth must be cared for so that it can sustain all living beings, including future generations.
- Interdependence—Cooperation and connection in our communities, around the world, and with our living planet is essential for the future (On the Commons 2012).

The second ring describes practice characteristics and hints at what social life (*Lebenswelt*) would feel like if commoning became the common-sense or normal way of viewing and doing things. Here we find quite a few overlaps with the 'novel' dimensions of the GNH index like cultural and community vitality (belonging), the connection of one's own happiness with that of the wider community (responsibility), and the spiritual aspects of psychological well-being. The following examples are given for the quality of relations and processes:

- Shared Governance—Everyone is engaged in gathering information, making decisions and exercising power to steward common resources.
- Deepened Responsibility—Together we claim the power to repair inequity, restore our common inheritance and expand opportunities for human fulfillment and planetary resilience.

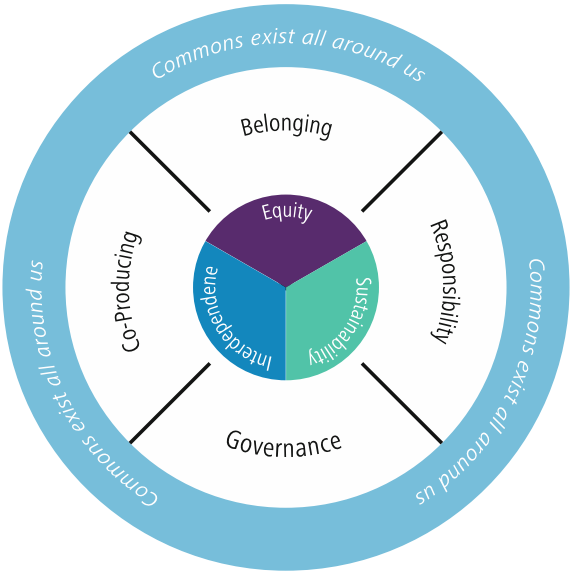

Fig. 4.2 The Commons Framework. *Source* Based on On the Commons (2012: 1)

- Belonging—A more expansive view of belonging fosters broader understandings of what ownership means and new structures for how it works.
- Co-Producing—A spirit of common purpose lets us realize that abundance, not scarcity, prevails when we invite wider participation in our endeavors (On the Commons 2012).

The outer ring expresses the general notion that all wealth is the result of our heritage and collaboration and therefore a common outcome. The emphasis is on acknowledging the abundance of many resources instead of declaring their scarcity as the norm. The premise that there can be 'enough' of something is also introduced. The introduction to the commoning book of essays gives plenty of numbers that show how much 'overwealth' or '*Überfluss*' there is in the world and that the unsustainable outcomes of today are not created by scarcity but by unsound patterns of production, distribution, and consumption. Change, once again, is less a question of better physical technologies than one of improved processes and systems with their psychological, sociocultural and institutional path dependencies.

In this context, commoning approaches take a very critical stance toward the organizational logic of markets. To them the profit motive and the individualistic competition processes discussed in Chap. 3 are core drivers of unsustainable solutions. At the center of this critique is the ongoing enclosure of natural resources, and therefore the ballooning creation of private goods out of the plenty of the Earth's resources. This creates and perpetuates the notion of scarcity that undergirds economic thinking as a foundational law. Instead, the idea is to align human systems of production and consumption with nature's reproductive laws so that there can be enough for all now and in the future. The aim is to reduce dependence on non-renewables to the minimum and ensure that the use of renewable resources is attuned to their natural circuits of replenishment. As a consequence, rivalry over resource access is significantly reduced.

This view is perfectly in line with what I had dubbed the radically different purpose of 'recoupling.' Relational qualities like sharing and the notion of sufficient or 'enough' output are frequently discussed in this community. Both are, of course, absent from the mainstream economic paradigm but very much the backbone of the imaginary of a safe and just development corridor that is captured in the sustainable development doughnut (Fig. 3.6). Also, the prime question (calculus) behind decision-making and thus the imaginary of the system is not set up around exchange value (what can be sold and bought) but use value (what do I/we need to live well) (Helfrich 2012: 36).

When researching criticism of this approach, I mostly found complaints that it would not be sufficiently critical of structures of domination and would not work strongly enough toward redistribution of wealth, instead inspiring self-defense strategies that remain eternally at niche level. The design principles do seem to suggest a cap on size in order to ensure their proper functioning. Ostrom and colleagues found that the mainstream assumptions of non-cooperation and egoistic strategies tend to emerge in settings where individuals do not know each other, do not communicate effectively, and thus cannot develop agreements, norms, and

sanctions (ibid.: 419). Processes of globalization, commodification, financialization and also computation have led to the situation in which these settings have become the default organizing structure of our economic systems.

But this cannot count as a criticism of the concept as such if one embraces the idea that human-made productive institutions can and should change if they hamper the alignment of human need satisfaction with respectful and successful resource governance. Commoning is an ideal for processes of contextually fitted governing solutions and thus cannot be benchmarked with reference to the standard organizational appearances of today that, one might want to remind the critics, are definitely not sustainable. Something different will emerge. Given the increasing attention to the concept—as well as the abuse of it for solutions that do not adhere to the principles outlined here—only history can reveal how much of this radical imaginary will be embedded in the transformed systems.

4.5 Summary: System Innovations for Sustainability by Double-Decoupling

The goal of this empirical assessment was to track which foundational ideas about human needs and the quality of nature one can find among various initiatives that explicitly reject the mainstream economic paradigm of 'good development.' I have been surprised by the degree of similarity between the ideas, missions and principles as they emerged from different disciplines and cultures.

What we can see is a wave of 'repurposing' differently sized and shaped systems and their institutional design with the radical imaginary that productive processes can be 'recoupled' with human needs and nature's laws. The Economy for the Common Good starts by turning the purpose of business outputs from private profit accumulation toward serving the socio-ecological and economic systems around them. Transition Towns originally started with the redefinition of the purpose of energy systems—from providing cheap and limitless amounts of energy to generating long-term resilient and sustainable systems. GNH is couched in long-standing cultural and religious traditions whose basic idea of what human happiness is marks a paradigm shift not so much for Bhutan but for the Western world and the dominant development paradigm with respect to the purpose of government—turning away from ensuring private property and limitless consumption possibilities toward building circumstances in which all members of the community feel confident of leading their lives successfully. The Commoning movement, on the other hand, starts by turning the purpose of institutional design away from controlling selfish, unchanging competitors into one that seeks to enable people and communities to bring out the best in themselves.

None of these initiatives claim that they already represent sustainable development in practice. But all of them have a clearly defined beyond-growth purpose that properly integrates rather than subjugates social and ecological dimensions of

development. These are spelled out, not only in quantitative key performance indicators, but also in qualitative details. These numbers, heuristics and principles change the reference frameworks against which performance and proposed solutions are judged. In effect, the strategic smaller steps amount to what I have called double-decoupling: doing better when it comes to reducing the negative impacts of economic production processes on nature, animals, and humans (first decoupling) and doing well when seeking to establish human need satisfaction strategies that do not depend on exponential growth (second decoupling).

Of course, changing the benchmark changes judgments as to what is promising or acceptable. In the newspapers we usually read that 'productivity,' 'competitiveness,' and 'value creation' need to be constantly increased. But these are empty container terms that can be filled with very different interpretations: what is the benchmark against which I am productive or competitive and create value? One where I am doing the least harm to ecological systems and contribute most to human need satisfaction—or one where my production costs and therefore market prices are as low as possible and my share prices go up? The latter usually means I seek to not account for my environmental damages and push the costs of labor per produced unit as low as possible. These strategies are not very aligned with the purpose of integrating environmental and social concerns with economic ones. Still, externalization is rational if my benchmarks are standards and measures counting an endlessly growing amount of monetary quantifications that are blind to uneconomic real world effects.

The same holds true for politicians. One important economic tool in political decision-making is cost–benefit analysis. In the context of the SDGs, for example, the Copenhagen Consensus Centre, an economic think tank in Denmark, has put forward a cost–benefit analysis of which of the proposed goals will "do the most social good" relative to their costs. They grouped the goals into the categories 'phenomenal,' 'good,' 'fair,' 'poor,' and "not enough knowledge." They claimed to identify the goals in which the money spent would save most lives. This sounds like a great idea. Yet, the analytical tool and mainstream economic mind-set they use is totally inept for transformational strategies. Overturning deeply embedded path dependencies will always produce higher transaction costs, at least in the short term. And what comes across as objective number-crunching entails massive ethical decisions and weighting. Luckily, in this case, key aims were made explicit. So the goal of "achiev[ing] full and productive employment for all" was ranked as 'poor' because "some unemployment is necessary for efficient labor markets" (Copenhagen Consensus Center 2014: 1).

This may be true under current market structures. But it falls short of any ambition for transformational change that might ask why we accept an economic system that necessarily renders some people superfluous. Especially since unemployment can lead to death in countries without social welfare, and is the most important depressor on well-being and quality of life in rich countries. I am not saying that such reasoning is necessarily unethical or wrong. I am saying that unless we pull such assumptions and value judgments out into the light from behind the 'economic evidence' and its key performance indicators, we should not be surprised

by the solutions that 'economic evidence' supports. In order to achieve deliberative processes of transformation toward sustainable economies and dignified lives, we need to make transparent what has found recognition as cost and benefit, value, utility, or capital, and so on.

The pioneers reviewed above hold assumptions and ideas about humans, their needs and relationships as well as the natural settings in which they operate that are very different from the *Homo economicus* and natural capital of mainstream economics. They see human behavior and needs as falling more in line with the ontology of reflexive transformation research discussed in Chap. 2 and the criticism of mainstream economics presented in Chap. 3.

None of the pioneering examples subscribe to the three-pillar icon for sustainable development but instead to one of embedded systems (see Fig. 3.4). It is not about dividing the world into pieces and freely moving them around until the balance sheets are optimized. Instead, each element will look and behave differently according to the context in which it happens to sit, and this context will change if parts are removed.

None of the movements accepts the quantifying and monetizing lens as having universal applicability. Market prices are viewed as historically grown institutional set ups with as many distortions, power relations and socializing effects as public institutions. Understanding these is a prerequisite for the determination of which productive relations, goods, and services are best governed by financialized mind-sets and institutions, and which are not.

None of the initiatives subscribe to the idea that maximizing growth forever by accumulating monetized value is a good or even feasible idea. Growth is one of several possible means of securing human happiness and well-being. Its pursuit through the creation of much disutility for many people and by overshooting Planetary Boundaries does not deserve the label 'successful development.'

None of the pioneers ascribe to the idea that comparing and ranking monetary value expressions can provide suitable indications as to what is really happening. All insist on qualitative and physical measures for what is going on in the real world of resources and relations. Instead of pushing a cost–benefit lens onto everything, they seek to understand and find governance and incentive solutions suitable to the actual problem and the relationships in place.

Comparing these respective repurposing decisions for business, communities, governments and civil society initiatives we see a lot of similarities with Sachs' 4 D's of sufficiency as introduced in Chap. 3: deglobalizing and decelerating processes that do not allow for sustainable, resilient and social ways of creating output and solving dilemmas, decommodifying beings and relationships whose primary reason for existence is not that they should be sold in a market, and decluttering the narratives of the future by shedding the dogma that what is here today can never be enough.

For me, such differentiated approaches qualify as trailblazing experiments on how a new, properly integrated sustainability paradigm could be lived in practice. All of them are continuously confronted with creating something new and different while being surrounded and connected with the strong path dependencies of

overarching and neighboring systems operating along the old ways. In such conditions, radical incremental transformation strategies are more promising than too fast or too drastic changes that would likely cause the old systems to push back or the new parts to be separated off.

Yet, the new purpose of true system innovations should never be left out of sight. As the Global Scenario Group aptly summarizes: "the curve of development must be bent twice. A radical revision of technological means begins the transition. A reconsideration of human goals completes it" Raskin et al. 2002: 95).

So we do not instantly have to set up new businesses, transition our towns or establish new indicators. The second bending requires engagement in what the Germans call '*Deutungshoheit*,' which essentially means that we can start exposing the flawed assumptions on which present solutions and plans are built. Work on the reconsideration of humanity's goals or the upset of the human self-image, as the Brundtland Commission foresaw it, remains an open opportunity for all of us, every day.

Where exactly it will lead in the end no one knows. But we do know that the old development model will not lead to sustainability. The final chapter ties key insights of this book together in an attempt to support the clarity, creativity, courage, trust and persistence that radical incremental transformation work requires.

Chapter 5
How to Work a Great Mindshift for Sustainability Transformations

> A transition to sustainability demands profound changes in understanding, interpretative frameworks and broader cultural values, just as it requires transformations in the practices, institutions and social structures that regulate and coordinate individual behaviour. In this context, it is essential to get to the position where people, industry and governments can easily distinguish between objective facts and opinions that are presented as facts to advance particular interests, and rely on the former to make informed decisions.
>
> UNEP, *Geo 5* (2012: 447).

> Magical leverage points are not easily accessible, even if we know where they are and which direction to push on them. There are no cheap tickets to mastery. You have to work at it, whether that means rigorously analyzing a system or rigorously casting off your own paradigms and throwing yourself into the humility of Not Knowing. In the end, it seems that power has less to do with pushing leverage points than it does with strategically, profoundly, madly letting go.
>
> Donella Meadows, *Leverage Points: Places to Intervene in a System* (1999: 19).

> By virtue of the authority with which they are endowed, i.e., as experts, they are able to influence the definition of social reality others hold … the authority of logic and, therefore, of the expert as a practitioner of logic, is what carries weight. This source of authority legitimizes the stories they tell. But the source also tends to subvert the storytellers' own recognition that they are telling stories.
>
> Don Michael, *With Both Feet Planted Firmly in Mid-Air* (1985: 96).

By tying pioneer practice back to the scientific basis of Chaps. 2 and 3, we see how essential the role of worldviews or mind-sets are in the formation of individual identity, collective vision and strategies for systemic change that have a mobilizing effect. Thus, to really innovate a system, transformation strategies also need to include futures literacy and the acknowledgement of mental path dependencies. This means engaging with core human aspirations, beliefs or values and what they mean in the historical context of any activity.

Sociologists and neuroscientists cited earlier show how different stages of civilization have influenced the formation of personalities and even psychological needs (Elias 1982). Filters of how we perceive and thus feel in situations and habitualized circuits of interpretation are modeled in our brains in parallel to our experiences in the environments we happen (or choose) to live in (Hanson 2009).

M. Göpel, *The Great Mindshift*, The Anthropocene:
Politik—Economics—Society—Science 2, DOI 10.1007/978-3-319-43766-8_5

The canonized knowledge that comes with education impacts rational search strategies for alternatives and becomes part of our mind-sets. These encompass basic assumptions about what we say exists, what its characteristics are and which development solutions seem possible or rational, including guiding values.

In scientific contexts this is what paradigms entail: epistemological questions surrounding what we can know and ontological ones on the state of the world will be combined into methodological approaches to capture reality or seek truthful answers. Some researchers explicitly add axiological value questions when presenting their research designs.

Worldviews or paradigms serve as central reference frameworks for epistemic communities in research but also for the pioneers or situated groups that transition researchers observe taking action on strategic change. The worldviews and paradigms inform the narratives of where this social system or economy is heading, what its purpose is and why a particular ordering of roles, technologies, remuneration structures, and infrastructures are promising, or at least acceptable for this destination. Reflexive theory sees them as the mediating 'glue' between actors and structures in a society.

We have seen that all the pioneering practitioners reviewed above started with principles, guidelines, indicators and measuring tools to express the purpose of their particular initiative and how it can be enacted. Gradually, such enacting is changing the productive processes and system setups that people encounter in their 'reality,' which will foster different experiences of how life 'is.' The imaginary space of possible human–human, human–nature and human–technology relations is widened and thus creativity and courage expand in the innovation of systems organizing economic activities. As a consequence of learning from such experimental test cases, it becomes easier to change regime rules and path dependencies, which all transition and transformation scientists agree is necessary for lasting changes. This potentially virtuous spin on the materiality of ideas (Fig. 2.5) is summarized in the UNEP *GEO-5* report:

> Coordinating deep and enduring system change is neither a single pathway nor a linear process. For example, the rules of a system often arise from a change in mindset, but in turn help support mindset shifts. At this level of system intervention the emphasis is on getting the signals right. Because rules and incentives can institute structural change, they represent the game changers that can catalyse and retain a strong influence on system behaviour over time (UNEP 2012: 422).

In democratic societies in particular, individual and collective sense-making and narratives are crucial for an understanding of which rules and incentives are put in place and accepted. They create the "discursive face of politics" (Fraser 2013) and influence the development of "consciousness-personality-structures" (Hahnel 2002), both of which will determine how policies and technologies are innovated and which solutions appear as economically sensible or normatively justified. Low leverage points that can accelerate or balance feedback in a system—and thus also existing development trajectories—involve tweaking technological solutions or economic incentives. But they will not be the source of any intentional bend of a trend. This requires a deeper repurposing on the levels of imaginary and sociocultural belief systems.

5.1 The Role of Mind-Sets in Unlocking Path Dependencies: Antonio Gramsci's Heritage

One scholar I have found particularly insightful for an understanding of the governing role of a dominant paradigm or common sense is Gramsci (1891–1937). An Italian political economist of the twentieth century, he wrote most of his work while imprisoned by Benito Mussolini's fascist regime in the 1930s. His quest was to find an answer to the phenomenon of democratic orders whose citizenship rights were presumed to be democratic, but in which a small number of people enjoyed far more privilege than the majority (Gramsci 1971: 377).

For Gramsci, shaping or changing regime structurations or governing institutions requires a "collective will" that can mobilize sufficient support, either in numbers of people or in politico-economic power. This collective will is represented by a group of people whose political program "presupposes the attainment of a 'cultural-social' unity through which a multiplicity of dispersed wills with heterogeneous aims are welded together with a single aim, on the basis of an equal and common conception of the world" (Gramsci 1971: 349).

The essential ingredient is the common conception of the world, and from it springs the agreement that a particular program, its aim and its underpinning values and norms are of general interest for the given community—or at least the best possible solution for it. Of course here we find a resemblance to what I discussed as paradigms or worldviews, and the role of narratives in generating collective action.

Gramsci uses the term 'aim' for what I formerly described as the declared purpose of systems or strategies. Successful aims would have the quality of a "social myth," which is "a political ideology expressed neither in the form of a cold utopia nor as learned theorizing, but rather by a creation of concrete fantasy which acts on a dispersed and shattered people to arouse and organize its collective will" (Gramsci 1971: 126). This "concrete fantasy" is close to what I used the term 'imaginary' for in this book, and both are essential for the emergence of the will to act and change.

In successful transformation processes, slowly but surely, the originally new aim or purpose becomes the norm or basis of consent that I have called the 'default.' It is produced and reproduced through a set of institutions, social relations, and ideas that live in science or canonized knowledge as much as culture. Here we find the analogy to the changing yet objectified role of old ideas in today's path dependent systems, taking the shape of infrastructures, technologies, political regulation, market patterns, sociocultural norms, and mind-sets (Fig. 2.5).

Gramsci puts most emphasis on the sociocultural aspects when seeking to understand why capitalism, despite its clearly unequal distribution of benefits and power, was not leading to the revolution that Marxists had predicted. This is what he coined the term 'hegemony' for: it is the soft or invisible factors like values, ideas, knowledge, and norms about what is good and right that filter which solutions appear to be of general interest or acceptable. A successful collective will's narrative thus provides "not only a unison of economic and political aims, but also

intellectual and moral unity, posing all the questions around which the struggle rages not on a corporate but on a 'universal' plane, and thus creating the hegemony of a fundamental social group over a series of subordinate groups" (Gramsci 1971: 181–182).

This means that the governance of societies is anchored at very deep and informal levels (as highlighted in the s-curve presented here) and the groups whose particular interests are best served by the currently accepted social myth will benefit from an effect that Gramsci called "leadership with least resistance." Even in highly unequal societies control is maintained not so much by violence and political or economic coercion as through an ideology that expresses the idea that there is no valid or realistic alternative (Gramsci 1971: 242).

Gramsci's concept of hegemony is therefore very close to that of the uncontested paradigm of Meadows, who says: "The shared idea in the minds of society, the great big unstated assumptions—unstated because unnecessary to state; everyone already knows them—constitute that society's paradigm, or deepest set of beliefs about how the world works" (Meadows 1999: 17). While Meadows leans more to the camp of overcoming paradigms and path dependencies by learning, Gramsci highlights political interest and domination when thinking about the persistence of paradigms. He therefore argues against restricting the idea of coercive rule to official laws but to understand how the private context equally defines codes of conduct and shapes the way in which individuals fit in. He explained that the concept of the law

> will have to be extended to include those activities which are at present classified as "legally neutral," and which belong to the domain of civil society; the latter operates without 'sanctions' or compulsory 'obligations,' but nevertheless exerts a collective pressure and obtains objective results in the form of an evolution of customs, ways of thinking and acting, morality, etc. (Gramsci 1971: 242).

Contemporary political economists like Stephen Gill from York University in Canada have used Gramsci's work to track manifestations of the mainstream economic paradigm in contemporary societies. Gill's concepts dovetail nicely with the original three levels of the MLP, and help us sharpen our understanding of the degree to which the mainstream economic mind-set has been encoded into our societal systems. They also show why I think that changing this paradigm would be one of the most powerful leverage points for transformational changes in development. In his analysis, the mind-sets component is inherent in all three levels, but given their important role in understanding system perpetuation and change, I decided to single them out into the meta- and mini-levels as well as cutting across them (Fig. 2.6).

On the landscape level, Gill's "market civilization" resembles Polanyi's stark utopia of a market system. It describes the ongoing structuration in which social relationships, and relationships with nature, are commodity-shaped, fitting everything into the pathway of price-governed exchange value growth. According to Gill, this institutional setup and with it the personality-shaping effects nurture an

ahistorical, economistic and materialistic, me-oriented, short-term and ecologically myopic perspective on how the world works (Gill 2003: 119).

In this setup the regime level is marked by what Gill calls "new constitutionalism," referring to the reifying establishment of laws and regulations necessary to create fictitious commodities or market patterns in ever more areas of life. These rules and norms armor the market civilization's imaginary with legitimized options of coercion against those unconvinced by its promises and unwilling to conform. As a consequence, these institutions protect not only the interests of those groups and individuals benefiting most from a market civilization, but also, slowly but surely, turn the experienced reality of humans into what the theory foresees: ubiquitous market patterns in which everyone has to possess and sell capital, labor or nature in order to make a life (ibid.: 120–124).

The effect that this has on individual identities was described as psychogenesis in Sect. 2.1 and dubbed "disciplinary neoliberalism" by Gill. He refers to Weber (1864–1920) instead of Norbert Elias. Weber, the famous German sociologist, analyzed how classes, status groups, political parties, etc., are all social phenomena expressing the distribution of power in society and embodying typical customs. They discipline without employing coercion those who wish to be part of them, something that Gramsci also pointed out when arguing for the expansion of the law into the private realm. In the words of Weber: "What is decisive for discipline is that obedience of a plurality of men is rationally uniform" (Weber/Eisenstadt 1968: 28). In effect this means that everyone seeking to fit in with the standard groups of society will, in a self-governing way, seek to master ideas, habits and social practices in line with market society and new constitutionalism patterns (Gill 2003: 128–130).

Gill's neo-Gramscian concepts offer a particular political-economist-style interpretation of current path dependencies from mental to regime infrastructures commensurate with the general MLP concept of transition studies. They show how expressions of the mainstream paradigm and mind-set cut across the different levels of structuration. Some present-day examples of the hegemony of market civilization and disciplinary neoliberalism come to mind. You may not even have found anything awkward about some contemporary instances of fictitious commodification—not even when someone talked about making the labor market more flexible, improving the return on investment on financial products or expanding the Emissions Trading System. And great examples of new constitutionalism can be found everywhere. One of my favorites is the 2013 coalition agreement of the parties making up the current German government. It refers unabashedly to a health 'economy,' a culture 'economy' and a 'bioeconomy' as if this was the natural way of viewing and organizing what were formerly public goods, human rights, the arts, or nature and agriculture.

After fictitious commodities, Polanyi of course also singled out the importance of the idea or social myth of endless gain and growth for the democratic governance of highly unequal societies: eventually, everyone should benefit from the expanding cake, and as a consequence everyone contributing to growth is serving the common good, regardless of what is hiding behind the numbers.

So how does Gramsci say we can escape hegemonic rule? As a political economist he of course refers to structural problems within the production processes. Resource constraints or too high levels of inequality might challenge their smooth continuation and therefore the acceptance of the division of labor and revenues within them. But, most relevant for this book, he also suggests the weakening of the cultural and ideational consensus or dominant paradigm that helps to justify the unequal distribution patterns and provide moral hazard on a sociocultural rather than structural level.

Public discourse after the financial crisis, at least in Germany, was full of statements—for example, that human nature is simply greedy and that it was not the fault of individual bankers but of regulatory loopholes that they basically had to use. The question these articles never answer is which of these implacably greedy humans should then suddenly be enlightened enough to write laws without loopholes. Nor do these articles suggest how it might be possible to find laws without loopholes for globalized systems. The moral hazard discussion so far points out that systems too big to fail and contracts with golden parachutes are not very conducive to good governance.

But there is also a sociocultural moral hazard perpetuated by a narrative and proclaimed common sense in which people are innately greedy. The ethical default changes from one of 'intending no harm' to one of 'do everything that is not explicitly forbidden because this is legitimate.' Even regulatory and judicial consequences will differ from those of a society in which egoistical behavior to the detriment of the great majority is considered an individual and civilizational failure. Different sentences for corruption or rape in different cultural settings are just one example of this hazard effect.

German philosopher Richard David Precht offers a forthright view on the effects of the widespread adoption of mainstream economic ideas and the commodification of human relationships: "Strict and tough calculation of utility, ruthlessness and greed are not man's main driving forces, but the result of targeted breeding. One could call this process 'the origin of egoism by capitalist selection', following Charles Darwin's famous principal work" (ibid., here cited by Habermann 2012: 15).

More subtly, Gill writes: "a change in thinking is a change in the social totality and thus has an impact on other social processes; a change in the social totality will provoke change in the process of thought. Hence the process of thinking is part of a ceaseless dialectic of social being" (Gill 2003: 22). This means that many of the ultimate drivers of societal change are located within each one of us. Here, as indicated in purple and blue arrows in Fig. 2.6, we find the connection between the big picture of meta-level paradigms and hegemonic narratives on the meso-level and the mini-level of individual thinking and acting: everyone can challenge the declared system-purpose and the ideas and assumptions it needs to appear as beneficial or legitimate. By questioning the standard answers and ways of doing things we can drive change from below, within and above, at the same time.

5.2 Transformative Literacy: Hacking Systems and Their Purpose

We saw from Meadows' list of leverage points that shifting the paradigm is the most difficult and yet most effective or radical leverage point for system innovations. She paraphrases Kuhn when describing it as long and tedious work:

> In a nutshell, you keep pointing at the anomalies and failures in the old paradigm, you keep speaking louder and with assurance from the new one, you insert people with the new paradigm in places of public visibility and power. You don't waste time with reactionaries, rather you work with active change agents and with the vast middle ground of people who are open-minded (ibid.: 18).

The good news is that even if there might not be visible changes for a long time, this work is not undertaken for nothing. Think back to the development and also ignition phase in the s-curve. Each choice to do differently, each questioning of the stated purpose or reasons, impacts the former reference frameworks, mind-sets and knowledge reservoirs. It offers alternative meaning, delegitimizes the notion that there are no alternative claims, and offers ideas about other ways of acting or doing things. Of course much structural power rests with those who benefit from the status quo and its hegemonic paradigm. But as Meadows wrote, many individuals—change research suggests about 60 % of people in a system—are open minded and willing to learn.

This is where *radical incremental transformation* begins, as illustrated nicely in Fig. 5.1. It stems from Ray Ison, professor of the Systems for Sustainability program at the Monash Sustainability Institute in Australia. I was fortunate enough to sit next to him at a conference on decoupling human well-being from resource use and after my presentation he told me he had just finished an article that he felt was relevant to my thinking. The following illustration (Fig. 5.1) is indeed spot on, even though his terminology is of course different:

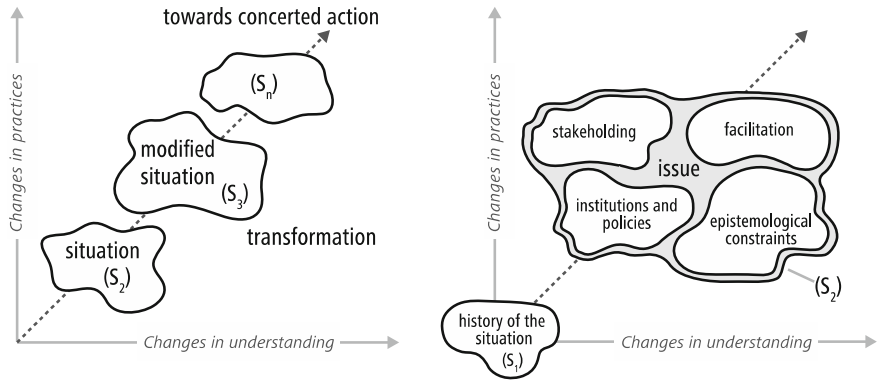

Fig. 5.1 Processes of radical incremental transformations. *Source* Ison 2016 forthcoming, Fig. 2.4

Ison's article summarizes 14 years of experience in transdisciplinary research on system innovation processes. As a result, he and his colleagues put "social learning" at the heart of their framework: humans engage in making sense of a situation by socially constructing the issue at stake. Through this process they either reify or change both their understanding of a situation and the practices in which they engage. Sometimes this entails amending the institutional setup (made visible as elements of a situation in the right hand graph). Change and dynamic adaptation is the normal state of being in a complex living system. So each alternative viewpoint, each act done differently, amends the framework for action in the future.

So, in essence, we cannot *not* be part of changing the world. The decision that lies with us concerns our choice to become aware of this and use it intentionally—even if cause and effect are not always visible or impressive. Over time and through collective or concerted action, the situational amendments transform the system in question even if each shifting from one dynamic stage to another is in itself not very radical or disruptive (here indicated as S_1 to S_n in the left hand graph). As part of this process, the boundaries of one system may also be adjusted and thence the scope of what a particular transformation process involves.

So each questioning sparks thought processes in others—an inspiration or irritation that influences the dynamics. Each silence might be interpreted as others please. And we never know when exactly that last incremental activity necessary to prompt a social or ecological tipping point for wider and deeper—radical—regime changes occurs. Social scientists' research findings suggest that 10 percent of the people in any given system provides the critical mass where new ideas or opinions start spreading rapidly (SCNARC 2011).

In order to strategically influence these permanently ongoing processes of learning and adaptation, it is important to open up a target system: to assess and understand the crucial path dependencies and which purpose or generative imaginary they are serving. This involves infrastructures and technologies, as STS research would point out, the ecological embeddedness that SES approaches highlight, and the enforceable laws, role definitions, and mind-sets that political economist emphasize.

To capture this holistic view I created an image with 5 P's that are important to bear in mind when opening up a system in order to repurpose it (Fig. 5.2). It is supposed to serve what Uwe Schneidewind, president of the Wuppertal Institute in Germany, called "transformative literacy": "the ability to read and utilize information about societal transformation processes, to accordingly interpret and get actively involved in these processes" (Schneidewind 2013: 83). He argues that those seeking to understand and plan sustainable development need to consider not only economic and technological solutions but also put more emphasis on the cultural and institutional dimensions of societal development. These will eventually determine if and how technologies are used and how many material goods people aspire to in the first place.

Schneidewind's four-dimensional perspective fits that of the STS camp of transformation research and was meant to complement what Roland Scholz, former ETH Zurich professor called "environmental literacy" in a book with the same title

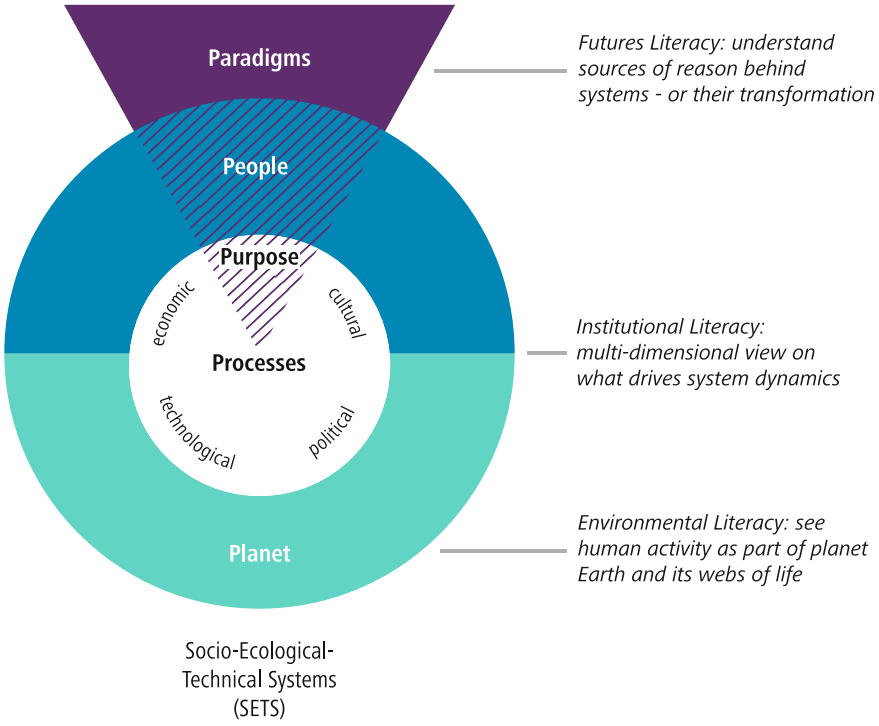

Fig. 5.2 Transformative Literacy—5 P's to map SETSs. *Source* Own illustration

(2011). Scholz discusses what has been introduced here as the SES camp's view of embedded systems, and provides analytical tools for a better understanding of the inseparable systemic relationships between humans and their natural environment.

His definition of 'environmental literacy' captures "the ability to read and utilize environmental information appropriately, to anticipate rebound effects, and to adapt to changes in environmental resources and systems, and their dynamics" (Scholz 2011: 540).

In line with my ambition to integrate relevant SES and STS concepts and combine them with political economy, I also introduced futures literacy, as defined in the 2013 WSSR: "people's capacity to imagine futures that are not based on hidden, unexamined and sometimes flawed assumptions about present and past systems" (ISSC/UNESCO 2013: 8). With reference to the Global Scenario Group report (2002) I discussed this view as SETS camp: without checking for biases and differences in these assumptions, no change agent will understand how and why people expressing the same goals can so utterly disagree on the best ways forward.

Although my intention is to bring all of these perspectives together, I refrained from adding a fourth literacy concept. The definition of transformative literacy captures exactly what I am after and I am thus suggesting that the realm of what is required to attain it should be amended with the key points of the other two

literacies—understanding ecological embeddedness and differences in mind-sets. These are essential for active involvement in transformational activities for sustainable development. So Fig. 5.2 integrates Schneidewind's approach as 'institutional literacy' into an amended understanding of what transformative literacy for sustainability involves.

The bottom half-circle (Planet) is the home of environmental literacy. It represents the fact that humans need to interact with their environment for survival and well-being. No system innovation for sustainable development can ignore these relations. A system innovator would be interested in understanding the actual physical ties in the problem that she is tackling as well as the paradigm with which nature's reproductive capacities and role is captured by influential evidence or people in the system she seeks to change.

The top half-circle (People) illustrates my conviction that system innovation theory is well advised to recognize the role of humans as social beings when wishing to capture agency behind the nouns that dominate the explanation of change there, for example: "innovation cascades," "knock-on effects," "diffusion of new technologies" and "(re)alignments between multiple elements and interactions between multiple actors" (Geels et al. 2015: 2). It captures the fact that humans make history and in doing so influence the future development of people and the planet. Actors reason and struggle with each other over how to organize people–people–planet relations, and create and apply technologies, infrastructures and institutions intended for particular purposes.

The results are the self-stabilizing path dependencies that can afford continuity, but can also lead to crises (Processes). Schneidewind's institutional literacy approach is a reminder that not only technological and economic dimensions are important to consider, but also political and sociocultural ones.

Since there are always many possible ways to organize such processes, opening up a system also entails a historical perspective that seeks to deconstruct which goals and imaginary are wired into the processes in question (Purpose). Futures literacy thus entails—as the first step—becoming sensitive to the existence of different mind-sets and thus different rationalities. The second step is to understand how each point of view leads to different interpretations of what is at stake, and how a purpose might best be served—and the link with the overarching Paradigm.

This is why Fig. 5.2, in line with Meadow's work on leverage points, lists paradigms as both the sources and stabilizers of systems and peoples' mind-sets, but also as drivers of transformative engagement toward innovating them.

Transformative literacy can inform both types of analyses, those mapping a given organization or society from a systemic point of view, and the problem-driven approaches in which scholars define system boundaries according to the challenge they seek to address. It is equivalent to hacking the system: hackers take systems apart to understand their inner workings and see where they can manipulate them to change their performance. For human systems, this means going back in history and deconstructing which ideas, actors, technologies, economic or environmental factors and institutional as well as cultural aspects were instrumental in their emergence and how they now interact in a mutually

reinforcing manner. In both types of analyses checking for the 5 P's helps develop a thorough understanding of path dependencies: which ones lie at the roots of the development trajectory of the system or thorny problem one is tackling? Where in their dynamic interplay do stabilizing feedback loops or the potential to unlock them lie? And, linking it back to humans as the loci of change: where do the power potentials to achieve that unlocking lie?

Each specific system setup harbors different types of power potentials that will make it easier to induce change for some actors and less so for others. Of course, money and role-defined authority come to mind, but following Gramsci's guidelines also means being sensitive to the structural power enjoyed by those privileged under the status quo and its overarching paradigm: it tends to be perceived (or presented) as the default position against which proposals for change have to argue their case, and the arguments have to fit with the prevailing common sense.

With this in mind, the following provides a slightly more detailed description of what 'hackers' should look for in each of the P's, and also serves as a very brief summary of the arguments in this book:

- 'People' and 'Planet' are more explicit reminders that this is what sustainable development is about. Also, that these elements exist independently of the human-made institutions in the process circle. Yet, the manner in which they exist and develop lies exactly in the contextually and historically diverse ways that processes are set up. Statements that humans are just x, y, or z, or analysis based on this kind of assumption signal a difficult mind-set for repurposing work.
- 'Processes' comprise the dynamic workings that 'defend' particular behavioral patterns and development trajectories over time. The term 'path dependencies' highlights that this encompasses physical infrastructures and technology choices as much as politico-economic rules and incentive configurations like remuneration standards or interest-bearing money. This book makes the point that they also include sociocultural and individual role definitions, identities, habits, and mind-sets that shape what seems possible, justifiable or desirable. Usually, an alteration of some process configurations will impact the dynamics of the entire system, and change that is too abrupt or intense will lead to resistance or crisis. Given the multiple mutually reinforcing feedback loops behind path dependencies, existing systems show a high degree of resistance to transformational change. This is especially high if the system's generative rule or aim is challenged.
- So 'Purpose' lies at the heart of any system's behavior because it encapsulates its raison d'être. It connects overarching paradigms (assumptions about how the world is) with collective choices (which processes should we therefore set up) and individual values, beliefs, and actions (is this good and what is my role). A change in purpose is therefore a radical decision, and due to the multiple limiting factors referred to above, will usually require incremental steps to be successfully accomplished. Another possibility is not so much that the purpose will be changed, but the overarching paradigm changes and thus makes the

processes in place seem ineffectual. Or the purpose is changed but not the paradigm, so the paradigm is inapt for informing proper strategies to get to the declared purpose. This is the case that I made in this book: if the main paradigm informing development decisions—mainstream economics—is not updated, the declared purpose of sustainable development cannot be reached. The mainstream economic paradigm is blind to key aspects of this purpose (human needs and nature's integrity).

- 'Paradigms' are thus the source of system designs. Hegemonic ones stabilize processes and work as reference frameworks for the narratives with which actors engage in the creation and application of institutions and technologies. They translate into unconscious programming and routine habits that psychologists and neurologists explain are necessary for coping with the complexity of life. So holding paradigms or biased mind-sets is both unavoidable and helpful in organizing social life. However, there are always alternative paradigms, and with them alternative individual and collective wills that have the potential to incrementally irritate the status quo until windows of opportunity for conscious questioning and more radical political action arise. Depending on how the system is re-stabilized—a change in default or not—one might speak of a paradigm shift and radical system innovation, or not.

The speed with which a system purpose can be changed—and the likelihood of this change lasting—will depend substantially on the support or resistance of powerful actors in the SETS. Power, here understood as the capacity to influence processes and their purpose, is unevenly distributed in any SETS. It can be dispersed or concentrated, and has many facets that vary with each system's configuration; control over production sites, infrastructure or land are obvious loci, but outlets of public opinion, a recognized expert status in strategic discussions, or good connections with key decision-makers can be equally important. Describing such qualities as power potentials expresses the notion that one and the same aspect can convey considerable influence in one system, but not in another.

One example for this could be fiat money: it needed new laws and regulations to come into existence and many incremental changes in regulation and strong paradigm support to become the powerful tool of private rule that it is today. Yet, if a financial crisis wiped out trust in virtual wealth, this tool would cede its power to material possessions or to human capabilities to actually plant food, educate children, build houses, and fix cars.

To sum up, large-scale transformations are tremendous, conflict-laden and long-term tasks. The outcomes will typically be different to what the individual actors in the processes foresaw. Nor are the processes linearly predictable. A comparably small change in one subsystem may have huge ripple effects in another. Often there are time delays between cause and effect, especially between small single causes and the accumulated effect of a tipping point. No one knows exactly when a critical mass or threshold is reached at which the fetters of the old can start thriving, but the estimates of 10 percent of the people being sufficient are rather encouraging (SNARC 2011).

The MLP shows that each large scale system is composed of many, many subsystems, and reflexive research and action frameworks help to connect the big sustainability challenge of a Great Transformation with the small sustainability potentials of each individual's decision to learn more, be mindful about his or her intentions, speak truth to power or organize change initiatives. In essence it means that a transformational 2030 Agenda for Sustainable Development begins with challenging and changing our self and inspiring those that we can reach. Gramsci called this the "progressive self-consciousness," explaining that: "The awareness of self is reconstituted through an appreciation of prevailing thought-patterns and the nature and distribution of life-chances. Hence the moment of self-awareness leads to a more complex and coherent understanding of the social world and is a form of historical change" (cited by Gill 2003: 31).

Such a change in personal mind-sets might bring about exactly what all innovation needs: the energy-sparking imaginary of what could be if x, y, or z were different. Offering alternative ideas, interpretations and practice experiences also means offering alternative meaning, legitimacy and knowledge about solutions. This can foster deliberative co-creative processes—or at least delegitimize claims that there are no alternatives. The future constellation of imagination, rationalization and justification patterns in which decision-making processes take place is changed. And even if it does not trigger alternative decisions or practice right away, the mind-sets of the people involved are altered. A spark of inspiration or resentment of complacency has been planted. The radical intention fuels another incremental step.

Award-winning complex system and leadership researchers Margaret J. Wheatley and Deborah Frieze of the Berkana Institute found that from separate local efforts might arise networks which solidify into communities of practice once people join them not only out of self-interest but also for a jointly aspired-for outcome and out of concern for the others. From these networks might emerge new "systems of influence" that possess qualities and capacities that did not exist in the individuals before and were not anticipated: "the system that emerges always possesses greater power and influence than is possible through planned incremental change. Emergence is how Life creates radical change and takes things to scale" (Wheatley/Frieze 2006).

What Wheatley and Frieze call the "aspired outcome" equals Gramsci's 'aim' and my purpose: it can unify different expectations into a collective will for change. This outcome imaginary is not understood as a blueprint. Those, as complex system researchers agree and empirical research will show, are not available for living systems. Rather, when there is clarity about which default practice and arguments can be jettisoned, a corridor of steps that qualify as going in the desired direction can emerge, and movement both as a team and in a strategic fashion is facilitated.

This brings me back to the radical imaginary of recoupling, a common thread in twenty-first century science (Chap. 2) and one suitable for capturing the contextually different repurposing efforts of the pioneering initiatives presented in Chap. 4. Under current circumstances, their incremental strategies are ones of double-decoupling: doing things better when it comes to treating nature and

humans and finding ways to free their systems from the growth-for-growth's-sake imperative in order to do be able to do things well in the longer run.

In most of the Green Economy discourse, also in the context of reaching the SDGs, 'decoupling' is stated as the prime goal rather than a strategy. Also, the term only refers to single- and not double-decoupling. The GDP growth imperative remains the uncontested default. From my point of view this falls short of a paradigm shift and thus transformational leverage. It keeps one trapped in the mental model that created unsustainable solutions of uneconomic growth in the first place: can economic processes really be disconnected from nature or people?

Also, single- rather than double-decoupling means strategies claim success when more fictitious commodities are created: more natural life and resources are priced and thus push up exchange value output statistics, while 'immaterial' growth often stems from the same effect in social relations or the yet further financialization of the economy.

Of course, every paradigm, theory, model, or narrative is invariably a distortion of the real world. But it is important to reflect on them and decide whether the blind spots are acceptable given the declared purpose that one seeks to achieve. To me, a mind-set suitable for guiding transformational strategies for sustainable development can only be one that helps illuminate the qualities of human–human, human–nature, and human–technology relations so they can be governed toward thriving in harmony. The monetized growth imaginary of the mainstream economic paradigm fails miserably. The recoupling imaginary qualifies. It can become the radical backbone of a new narrative that organizes incremental transformation strategies for sustainable development.

5.3 Summarizing Outlook

Given the magnitude of change required to reach sustainable development, a focus on ideas and paradigms may seem a bit lofty. But a systematic exposure of the blind spots in the paradigm most influential in imagining futures today enables critical reassessments of common sense and the way the institutions built around it shape developments. Opening up today's SETS's to understand on which basic ideas individual positions as well as institutional designs rest will also shed a different light on joint interests, decision-making patterns, and coalitions—especially in contrast to the typical container concepts of 'government,' 'business,' 'civil society,' 'science,' and 'media.' While these institutions have been set up for particular purposes and thus carry mandates and role expectations (some of the famous path dependencies) that differ from each other, the way that individuals carry them out will depend on their respective mind-sets, evidence sourcing, and ethics.

Deciphering political dynamics by using such paradigmatic factors rather than institutional affiliation is thus very helpful for the transformative literacy needed to conduct system innovations. Also, on the individual level I believe that once we have started to see the world differently, the old ways will not feel 'right'—or at

least will not seem inevitable. The term 'mind' captures all of those less intellectual aspects of human existence, too: sense, meaning, soul, intention, or spirit. The seeds of imagination, belief, and argumentative ammunition for becoming a change agent have been planted.

The emphasis in this book lies on exploring the transformational potentials of a Great Mindshift in mainstream economics for the agenda of sustainable development. Of course one could also open up the blind spots and contingencies in other dominant paradigms of the development agenda, like nationalism and sovereignty or human rights and individualistic justice systems. But none of these are built on ideas or 'scientific concepts' that involve such a degree of flawed assumptions about the things to which they are applied: human-need satisfaction and natural resource governance.

Sustainable development is about integrating social, environmental, and economic goals in the short and long term. So while the monetized numbers and mathematical equations appear to provide a high degree of scientific certainty and predictability, they do not say much about the trade-offs behind the cost–benefit weighting that happened in the quantification process. The models running predictions of growth, employment, productivity, and competitiveness are equally intransparent and based on the assumptions that nature and humans can be freely substituted and should move around in the correct amounts needed for efficient markets. This is very unhelpful for informed decision-making. For democratic decision-making, it is a real problem. It means one can present computational graphs and numbers instead of having to make serious ethical and moral judgments explicit because they might be politically risky or detrimental for the justification of one's privileges.

Concepts such as utility, capital, market price, and growth are, as discussed, laden terms. Whether we like it or not they include many value judgments. Also, according to the mainstream economic theory, only more is better. Any idea of enough or sufficiency necessarily translates into limiting and unsatisfying results. Any vision of arriving at steady-state equitable prosperity is *ex ante* excluded from the imaginary. This is at least ideological. When looking at the triple crisis in environment, social equity, and economic stability today it seems future-foreclosing. History is an open-ended process and the security-, justice-, and well-being-providing potentials of sufficiency strategies become imperative for a world of nine billion, in particular with regard to future generations. They should not be qua theory excluded from the choice set of rational actors.

Interestingly, some important economic thinkers like Mill (1806–1873) and Keynes (1883–1946) also had sufficiency ideas for the scenario in which economic output growth led to a certain degree of material saturation. At levels of sufficient supply, they reasoned, humans would work and produce at a constant level and efficiency or technology improvements would lead to more time with family and friends, cultural events, education, recreation, and so on. These thinkers also always limited the realm of an economy, and therefore economics. Neither the governance framework nor the paradigm were foreseen to impact all of human existence and natural life.

In 1844, Mill criticized a too-narrow and too-widely applied definition of political economy: "Political Economy considers mankind as occupied solely in acquiring and consuming wealth," and it would seek to explain all realms of societies, even "though many of them are really the result of a plurality of motives." He went on to say that "with respect to those parts of human conduct of which wealth is not even the principal object, to these Political Economy does not pretend that its conclusions are applicable" (Mill 1844, Essay V. V.38). I am sure he would be rather surprised by how matter-of-factly the public discourse today speaks of the culture economy, the wellness economy, the health economy, or the nursing economy.

So I hoped to show that this overstretched application of the mainstream economics mind-set has produced framings and frameworks of reference that limit rather than expand creativity, innovation, caring, resilience, and even happiness. There are a lot of things about human beings and nature that are much better experienced if economic mind-sets are shed and much better captured with non-quantified variables. So while recent amendments to economic models might improve the predictive capacity of econometrics, their universal application to everything and everyone in this world cannot continue. Neurosciences, psychology, and sociology show the detrimental effects of living with a quantifying cost–benefit mind-set for both individual well-being and that of societies.

Empirical economics like the work of Elinor Ostrom has been dam-breaking in showing that the assumptions of rational choice models, for example, are fit for highly competitive markets for private goods but not for public goods or common pool resources like most of our ecological systems—or for a financial system serving the real economy. Ostrom also pointed out how the political-institutional de- and re-regulations of the last four decades in particular have been influenced by the mainstream model and its *Homo economicus* assumptions. Such ongoing 'deregulation' has done its very best to reregulate societies into resembling Polanyi's stark utopia of the market system, a world composed solely of highly competitive markets for private goods. But this is not proof of the rational choice model's validity. On the contrary: the sustainable development agenda is proof and evidence of the problems that this is causing, and urges us to stop this totalitarian approach to running the world.

Transforming a system in full operation without risking its collapse is, of course, a dire task and I am not saying that the structural path dependencies behind growth economies can simply be thought away. Too rapid or too sudden interference with interdependent value chains and relationships would have devastating effects. But I am saying that the cultural and political dominance of a worldview and paradigm that has led us to building these institutions can and needs to be quickly and radically challenged. It obfuscates or even justifies utterly unsustainable behavior and developments while being void of any meaningful insight about the quality of good lives for all, led in harmony with nature.

What I am therefore saying is that the normative underpinnings and impacts of predominant science and political narratives need to be put firmly on the table. They are the ideas that shape future realities. In her 1978 book *The Life of the Mind*,

philosopher and political theorist Hannah Arendt expressed this as follows: "The activity of knowing is no less related to our sense of reality and no less a world-building activity than the building of houses" (Hannah Arendt Center 2013).

This is different from today's ubiquitous call for an unspecific boost in education that is supposed to somehow bring all the unemployed young people into structurally unavailable jobs and transform the wealth gap between the rentier class and working people. Instead, the first challenge is to jointly identify which kind of knowledge is important to quickly spread transformative literacy and the courage and connections to help unlock the unsustainable path dependencies that keep societies hostage today. Arendt unequivocally declares such normative aspects to be part of any scientific endeavor: "Thinking, no doubt, plays an enormous role in every scientific enterprise, but it is a role of a means to an end; the end is determined by a decision about what is worthwhile knowing, and this decision cannot be scientific" (Hannah Arendt Center 2013).

This is what The Great Mindshift stands for. Since thinking does not happen in a vacuum, it needs to be embedded in a great institutional shift. Not only, as discussed in detail in this book, is a particular way of seeing and experiencing the world turned into the powerful default by enshrining it into 'the ways things are done.' These 'ways in which things are done' will also either support conditions for change or inhibit them and host unevenly distributed forms of power for different groups or individuals. There exist brilliant scientific studies on the politically motivated and strategic build-up of the mainstream economic worldview through think tank funding, lobbying and financing of elite university chairs, political campaigns and media outlets (e.g. Gill 1990; Scherrer 1999; or Sklair 2001). The perception of what is the 'right' thing does change with believes about how the people and the world work—and of course with intended outcome. So thinking and knowing differently is a necessary but not sufficient precondition for behavioral change. Complex system theory as well as empirical studies in sociology, psychology, and institutional economics show the importance of feedback mechanisms that reinforce positive or negative learning and create anticipation about the reliability of others changing as well (Ostrom 2009: 431).

But so far, collective action theory, once again influenced by the mainstream economic paradigm, has placed more attention on transaction costs and payoff-functions than on how individuals can build the trust that allows them to take the risks of actually doing things differently. That would lower both structural and sociocultural moral hazards and could keep power abuse in check.

All of the pioneering examples in Chap. 4 have design principles that emphasize the reflexive-adaptive aspects of navigating change in complex systems: explicit learning and amendment of their indicators or matrix or principles through ongoing engagement with the groups that decided to be governed by them. All of them were conscientious about their governing structures and how these would enable or inhibit sustainable development principles. This also meant that their benchmarks for progress made the integrated perspective explicit, and contained qualitatively differentiated and contextually fitted ideas and measures of value, productivity, cost-benefit, or progress. Furthermore, the benchmarks involve the scrutiny of

which types of competitiveness and growth in any given circumstance are promising, and which are harmful. All of them engage with the potentials that principles and goals of enough or sufficiency can bring to a development ideal and strategy. Also, all of them put a great emphasis on processes instead of products in order to ensure that utility can increase by economic activity and that the latter meets jointly defined ends.

To me, these are pioneering initiatives from which a transformational 2030 Agenda for Sustainable Development can learn. Of course there are many, many, many more around the world. These have already inspired significant movements that easily make it onto the radar screen of a Europe-biased scholar searching for radical incremental change examples in practice. They share the conviction that changing the management of our economies and our relationship with our one and only planet—the declared purpose behind the SDGS- cannot happen without changing our dominant development paradigm and its institutional embedding.

It is this insight that I think is spreading quickly around the globe right now. The old way of doing things will not deliver. Something new is needed, even if we do not know yet what it can and should look like. It provides a renewed window of opportunity for the deeper and wider changes that the 1992 Rio Declaration in parts clearly foresaw. The late 1980s and early 1990s thus had a moment of paradigm-shifting potential, but it was overrun by the fall of the Soviet Union and the subsequent 'End of History' claims.

In his review, Simon Dalby asked me why I think that deeper changes should be possible today. I think we once again face the conditions of a structural crisis that Gramsci said was necessary to break the hegemony of a particular system setup. And we have the experience of a first round of less radical responses to the ecological and social costs of the market system utopia. In all three dimensions of sustainable development—also in the economic one—even rich countries are experiencing setbacks and widespread disbelief in the promises of the ruling elites. The typical North–South divide, the patronizing distinction into 'developed' and 'developing countries' starts giving way into either the acceptance that not one country can keep its development strategy (the universal approach behind the SDGs), or into something that resembles feudalism on a global scale. In both cases we reach the tipping points where the power of the default cedes: the burden of proof starts shifting toward those who still claim that the continuation of the status quo is possible and desirable.

The gap between the top 1 % and the rest of the world is too great, the impunity of the haves too visible and the increasing squeezes on the have-nots too strong, as the recent upsurge of conflict refugees and desperation-based migration shows. The war zones are too suspiciously concentrated in oil-rich areas and other resource reserves and the weather changes, droughts, floods, and storms experienced across the globe are too much of a physical sensation.

Thus, I would say we are already experiencing the preconditions in which more strategic and conscious paradigm shifting work can boost the emergence of a development vision that finally lives up to the integrated perspective of sustainable

development. This makes me less pessimistic than sociologist Harald Welzer, who recently wrote:

> For the time being, the transformation necessary today lacks guiding principles of the kind that early industrialized societies had in terms of progress, freedom, prosperity and growth. It will not be possible to establish new mental infrastructures without guiding ideas, yet if they do not dovetail almost naturally into day-to-day lives and lifestyles, visions of the self and frames of reference for the future, they will remain just that—ideas (ibid. 2011: 32).

For me it is not so much that we have to find an alternative to freedom and prosperity, or even growth. We have to reclaim their meaning for a world with 9 billion instead of 1 billion people who have too little spiritual guidance rather than too much, and a degree of commodification and homogenization in productive activities and consumption that limits need-satisfying possibilities rather than expanding them. In the midst of this, functioning as a great positive feedback for these trends, the next technological revolution, digitalization, is unfolding. With it comes an overturning of former standards of communication, speed, size, and reproducibility of goods and services. At the same time, knowledge and evidence about the dimensions of human impact on the pattern of oceans, greenery, and soils that make up the fragile ball of Earth has led to the emergence of a new term: the Anthropocene.

The political, cultural and economic circumstances from which the Enlightenment movement sought liberation simply no longer exist. A Second Enlightenment in the twenty-first century would seek liberation from very different types of totalitarianism and limitation to human potential. So which imaginary could progress, freedom, prosperity, and growth, the principles mentioned by Welzer, carry for the era of the Anthropocene? In my view both theory and practice reviewed in this book offer the tenets of the guiding ideas a Second Enlightenment could foster:

- Instead of being an output measured only by money, progress can mean the equitable and balanced progress of the whole SETS as measured by differentiated social, environmental, and cultural indicators.
- Instead of freedom meaning the absence of obstacles to individual purchasing desires, it can embody human security and sufficiency: freedom from the fear of falling behind in the race for resource accumulation, and freedom from the culturally created endless want that impedes well-being.
- Instead of prosperity embodying ever more consumption choices, it can stand for a holistic and adaptive understanding of human needs and resilient access to diversified need-satisfier strategies.
- Instead of economic growth being an end in itself, different types of economic output and activity grow, stay steady, or also de-grow as means to the end of securing well-being within Planetary Boundaries.

Many of the SDGs and their targets speak to these principles, albeit with the exception of the dogmatic clinging to GDP growth and greater income for even the rich. Many say they are not specific or binding enough. But in system innovation strategies, it is more important to map where not to go (anymore) and then outline

several acceptable trajectories for change. The 'instead of' in the list may well mark such no-go areas and fit well into the double-decoupling strategy: freeing economies from both human and natural overexploitation and growth-for-growth's-sake financialization.

The actual repurposing work comprises three key aspects that can also be done in a division of labor: delegitimize the traditional arguments, offer alternative meaning, and shine a light on alternative practice options. This means the Second Enlightenment does not happen solely in universities and institutes while everybody else applies the instructions they're given. Polanyi's account of The Great Transformation showed how many of the eighteenth- and nineteenth-century thinkers or philosophers he cited were also factory owners, priests or involved in politics. The Second Enlightenment can thus emerge from networks of pioneers and engaging innovators from all walks of life.

Finally, a successful *Great Mindshift* for sustainability does not mean replacing old universal theoretical laws with new ones. Instead, the emerging twenty-first century paradigm is about reflexivity and transformative literacy: working on a properly integrated perspective with clarity and transparency about one's own assumptions and value judgments. Shunning commodification, corporate interests, and contra-petition from scientific inquiry would allow for precaution, respect for diversity, and remaining open to what emerges. Donella Meadows called this "transcend[ing] paradigms" and positioned it as her highest leverage point for system change. Engaging in a Second Enlightenment therefore needs to be married with futures ethics: what are the novel frames and imaginaries that I am proposing —and with which intention?

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Wuppertal Institut

Sustainable development requires an integrated approach to policy and science because many of the issues it raises cannot be addressed within a single department or using the tools of individual scientific disciplines. This is where the Wuppertal Institute's research programme begins—by taking an interdisciplinary approach and working towards systems understanding. Designing transitions to a sustainable development at local, national and international level is the Wuppertal Institute's stated mission. Its research focuses on the resources, climate and energy related challenges and their relation to economy and society. Special emphasis is put on analysing and stimulating innovations that decouple economic growth and wealth from natural resource use.

Research focus are the transition processes towards a sustainable development. This requires an integrated approach to policy and science because many of the issues it raises cannot be addressed within a single department or using the tools of individual scientific disciplines.

Since 2010 Professor Uwe Schneidewind has been President of the Wuppertal Institute. The Institute was founded in 1991 by Professor Ernst Ulrich von Weizsäcker who directed it until 2000.

Professor Peter Hennicke headed the Institute from 1 November 2000 until the end of January 2008. Until the appointment of Professor Schneidewind, as from March 2010, the Vice President Professor Manfred Fischedick provisionally headed the Institute's research. The Business Manager is Brigitte Mutert-Breidbach. The institute's seat is in Wuppertal. It is represented in Germany's capital by its Berlin Office since 2004.

An scientific International Advisory Board supports the Institute in defining fundamental research strategies as well as ensuring the quality and independence of its research.

M. Göpel, *The Great Mindshift*, The Anthropocene:
Politik—Economics—Society—Science 2, DOI 10.1007/978-3-319-43766-8

The Wuppertal Institute has the legal status of a non-profit limited company (gemeinnützige Gesellschaft mit beschränkter Haftung, according to German law) and receives basic funding from the Land North Rhine-Westphalia. Third-party funding supports most of the Institute's budget and projects.

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Wuppertal Institut's Research Focus on Sustainability Transition

Sustainable developments require integrated policy and economy approaches. Questions regarding developments that are fit for the future can most likely not fully be answered or addressed within departments or individual science disciplines. That's where the Wuppertal Institut's research programme with its transdiciplinary and system knowledge oriented approach begins. As part of a transformative science, it is aimed at designing transitions towards a sustainable development.

Transformative research contributes to solving societal problems and is characterized by an explicit aspiration to get involved: The aim is to catalyse processes of change and to actively involve stakeholders in the research process. In this way, transformative research generates "socially robust" knowledge needed for sustainability transitions. Research at the Wuppertal Institut thus follows a transdisciplinary concept of knowledge: it does not only serve to generate "systems knowledge" (e.g., technological or resource-oriented systems analysis), but also integrates stakeholders in the process of generating "target knowledge" (visions and guiding principles) and "transformation knowledge" in concrete settings of urban or sectoral transitions to sustainability.

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The quality of transformative research must be measured on the basis of its own aspiration to catalyse societal change for sustainability. Assessment schemes for transformative research thus include not only academic quality criteria, but also new forms of measuring societal impact. At the Wuppertal Institut, transformative research approaches and innovative methods of assuring their scientific quality are being developed. This is done in cooperation with leading national and international institutions in the field of transdisciplinary sustainability research.

See at: http://wupperinst.org/en/research/transformative-research/.

About the Author

Dr. Maja Göpel is head of the Berlin Office of the Wuppertal Institut. For the past 20 years she has been following the quest to find out why humans collectively do not create the sustainable societies that they individually state to wish for. This took her back and forth between theory and practice, reflection and change making in different sectors. She visited six universities in four countries for a Ph.D. in global political economy and a diploma in media and communications and still enjoys lecturing and learning. For several civil society organizations she served as a campaigner, advocate, and expert in world trade, climate change, financial reform, and sustainable development. From 2006 to 2012 she helped start up the *World Future Council*, created its *Future Policy Award* celebrating integrated policy solutions and the Future Justice programme tackling today's short-termism in politics and economics.

This enabled work with change leaders from all walks of life, took her around the world and into EU and UN policy-making. In 2013 Maja went back to research with the *Wuppertal Institut* where her work focuses on the role of mind and paradigm shifts in transformation processes and the translation of large system change analysis into local change maker strategies. She is a member of the Club of Rome and the Balaton Group and currently serves on the steering committee of the German Sustainable Development Solutions Network (SDSN) and the scientific advisory boards of *terre des hommes Germany* and *Development and Peace Foundation*. Her daughters are 1 and 4.

Among the selected English publications are:

"Shifting paradigms: unpacking transformation for climate action; a guidebook for climate finance and development practitioners, working paper, Wuppertal Institute, 2014, at: http://epub.wupperinst.org/frontdoor/index/index/docId/5518;

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"Navigating a new agenda: questions and answers on paradigm shifts and transformational change, working paper, Wuppertal Institute, 2014, at: http://epub.wupperinst.org/frontdoor/index/index/docId/5517;
"The Responsibility to Prevent: Early Warning Systems to Protect Future Generations", in: M.C. Cordonier Segger, S. Jodoin (Eds.) '*Sustainable Development, International Criminal Justice and Treaty Implementation* (Cambridge: Cambridge University Press, 2013);
"The Tragedy of our Growth Saga", in: F. Hinterberger, E. Pirgmaier, E. Freytag, M. Schuster (Eds.): *Growth in Transition* (London: Earthscan, 2011): 147–153;
"Shared responsibilities and future generations: beyond the dominant concepts of justice", in: Council of Europe (Ed.): *Towards a Europe of shared social responsibilities: challenges and strategies*,' Trends in social cohesion No. 23 (Strasbourg: Council of Europe Publishing, 2011): 135–155, at: http://www.coe.int/t/dg3/socialpolicies/socialcohesiondev/source/Trends/Trends_23_EN.pdf;
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Her recent German publications include:

"Warum wir der Zukunft einen Platz am Verhandlungstisch geben sollten: zukünftige Generationen in der Post-2015-Agenda", in: Michéle Roth (Ed.): *Globale Trends 2015* (Frankfurt: Fischer Taschenbuch, 2015): 155–160;
"Vordenker einer nachhaltigen Gesellschaft: Karl Polanyi und die "Große Transformation", in: *Gaia*, 23,1 (2014): 70–72, at: http://epub.wupperinst.org/frontdoor/index/index/docId/5276;
"Ombudspersonen für zukünftige Generationen: Diktatoren oder Bürgervertreter?", in: Bernward Gesang (Ed.): *Kann Demokratie Nachhaltigkeit?* (Wiesbaden: Springer VS, 2014): 89–108;
"Mitweltkommunikation 2030 als Beitrag zur Bürgerbeteiligung: Themen, Akteure, Methoden", in: Paul Bellendorf (Ed.): *Nachhaltigkeit gestalten: Trends und Entwicklungen in der Umweltkommunikation* (München: Oekom, 2014): 359–367.

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About this Book

Sustainable development is the 21st Century's wicked problem. For over 40 years, the world has known about ecological limits to economic growth and social limits to economic inequality. Yet, our attempted solutions—mostly more efficient technologies—have reversed few unsustainable trends. So sustainability advocates now call for a *paradigm shift*, *Great Transformation*, *radical change* or *system innovations*—changes which evolve the current design of incentives, policies and institutions.

This book describes the path ahead. It combines system transformation research with political economy and change leadership insights when discussing the need for a *great mindshift* in how human wellbeing, economic prosperity and healthy ecosystems are understood, illustrating its nature through mapping pioneering practices and their commonalities.

Maja Göpel places individuals and their world views centre stage and shows why empowering individual's through *transformative literacy* is essential for the Great Transformations ahead to lead to more sustainabiltiy. She presents the case for *radical incremental strategies* in the socio-ecological-technical systems which humans shape the planet's future.

This book

- Combines a scientific critique of what needs to change and why (here: the economic paradigm) with an equally scientific discussion of how this change can happen and who can engage in it (here: system transformation theory).
- Brings a political economy lens into sustainability transition research that highlights how system innovations cannot be understood without addressing economic drivers, vested interests and power relations.
- Puts human transformative literacy centre stage when proposing radical incremental transformation strategies for large-system change.
- Showcases empirical assessments of pioneering movements working for a recoupling of economic processes with nature and human wellbeing.
- Provides an easily accessible introduction to system transformation research and key aspects of an emerging new economic paradigm for sustainability.

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Contents

Wuppertal Institut—About the Author—About this Book
On this book: http://afes-press-books.de/html/SpringerBriefs_APESS_02.htm