CHAPTER 2

Steering the circular economy: A new role for Adam Smith's invisible hand

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1. Introduction

1.1 Defining economics

Robbins (1935) defined economics as "the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses." What is interesting about this definition is that it positions economics as a social or behavioral science, rather than a mathematical subject. Robbins was a great admirer of the work of Adam Smith, who underpinned his economic theory with social theory. Indeed, Smith's work in economics, as espoused in his second book, An Inquiry into the Nature and Causes of the Wealth of Nations (Smith, 1776) was built upon his first book, The Theory of Moral Sentiments (Smith, 1759), wherein he emphasized the emergent morality of a functional society as underpinning the "invisible hand" that would steer free trade in a positive direction. This in turn would strengthen that society. He wrote: "[The rich] consume little more than the poor, and in spite of their natural selfishness and rapacity . . . . they divide with the poor the produce of all their improvements. They are led by an invisible hand to make nearly the same distribution of the necessaries of life, which would have been made, had the earth been divided into equal portions among all its inhabitants, and thus without intending it, without knowing it, advance the interest of the society, and afford means to the multiplication of the species" (Smith, 1759).

Unfortunately, the interconnected concepts within these two books, society and economics, became separated and the outcome has been an increase in inequality that has damaged society, resulting in a withered hand and the death of societal feedback. Zucman (2019) reports that wealth inequality has increased dramatically since the 1980s.

In the USA, the share of the national wealth owned by the richest 0.00025% of the population (amounting to around 400 individuals) has increased fourfold since the early 1980s. In this chapter, we explore the significance of the invisible hand and its relevance to the circular economy. We then examine the honey economy of the Ogiek people, an indigenous tribe from Kenya, and introduce the concept of the invisible tripartite embrace, a more expansive

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version of the invisible hand, which interconnects the three arenas of human activity: economics, society and the environment. It is suggested that only such connectivity can steer the circular economy in such a way as to integrate our economic activities within the Earth system, thus delivering meaningful sustainability. We conclude by realigning the circular economy within a truly sustainable context.

1.2 The circular economy

The circular economy is a broad church with a global outreach. The Chinese version, ensconced within the 5-year plans of recent times, has a very different political context in comparison with that proclaimed by the EU (Skene and Murray, 2017). The underpinning theory was in place many years ago. Waste in food (Simmonds, 1862) and industrial symbiosis (Devas, 1901; Parkins, 1934) can be traced back over a century, while Desrochers (2001, 2002, 2008) argues that the concepts of recycling and resource-use efficiency can be found in ancient times, driven by a scarcity of resources due to technological shortcomings in terms of extraction, rather than the current drivers of excessive extraction and the profligacy of waste.

Kirchherr et al. (2017) encountered 114 different definitions of the circular economy, and summarized these with the following working definition: “a regenerative system in which resource input and waste, emission, and energy leakage are minimised by slowing, closing, and narrowing material and energy loops. This can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing and recycling.” Quite clearly, the circular economy is defined strictly within the limits of resource use and waste. Obviously, this is important, but it misses out on two other essential elements of sustainability: society and the environment. Economics is not an isolated realm, wherein greening of supply and waste chains will deliver a perfect world. While the circular economy relates to the economics-environment nexus, the restoration of ecosystem function requires a much deeper response than this; and ecosystem function is an essential component of sustainability. Adam Smith recognized the importance of the society-economy nexus, and his foundation was not economics, but society.

In order to understand the environment-society-economy nexus, we need to ask what sustainability actually means.

1.3 What do we mean by sustainability?

Sustainability is often interpreted as a form of dynamic equilibrium, where losses and gains balance each other, resulting in the maintenance of some status quo (Giampietro and Mayumi, 1997; Lozano, 2007; Sakuragawa and Hosono, 2010). In terms of sustainable resource use, for example, some form of circular flow is envisaged, where materials are used but then recycled in such a way that the stock is not diminished.

There are three forms of sustainability recognized today: economic, social and environmental. These are often referred to as the three arenas and are frequently represented as three overlapping circles.

The history of humankind in many ways reflects changes in the emphasis between these arenas. For around 95% of our existence as a subspecies on Earth, *Homo sapiens sapiens*, akin to the rest of nature, found ourselves within the environmental arena. Our evolution, ongoing existence and societal structure were emergent from and contingent upon this arena and represented our natural ecology, wherein we interacted with each other and the landscape, which in turn formed the context of our survival.

Some 12,000 years ago, near the conclusion of the last ice age, we began to settle, to farm, and to trade. The economic arena was formed and steadily grew, coming to dominate our behavior and our relationships both with each other and with our environment. Nature was no longer recognized as the designer, director, and arbitrator, but merely as a sink and source, a utility. The surplus theory of stratification became a reality, wherein surplus food allowed the population to proliferate, leading to specialization in work, with increasing complexity in social organization, ownership, inheritance and exchange. Inequality also increased, as did the emphasis on individualization as opposed to the collective. In many ways, the rest of our history has merely been an intensification of all of these characteristics, through industrial and technological development.

Nature's value became unilateral, wherein the benefits to humans were not counter-balanced by the costs to ecosystem functioning (Costanza et al., 2014; Sejak et al., 2018). Since the end of the 19th century, it has been acknowledged that any objective valuation of goods and services cannot be derived from benefits to humans alone. Marshall (1920) attempted to reconcile the classical (cost) supply-side and neoclassical demand-side (marginal utility) theories of economic value in his "two blades of scissors" analogy. Yet today, the unilateral value concept has regained traction, where valuation of ecosystem services, also referred to as nature's contributions to people (Diaz et al., 2018), is seen as representing natural value. One of the reasons for this is that our thinking is dominated by empirical, reductionist philosophy, wherein interventionist strategies are legitimized by a comprehension of the planet as being built of small blocks, which can be rearranged and shifted at will, allowing us to replace natural capital with man-made capital. To understand the meaning of this, we need to discuss the two schools of sustainability: weak and strong sustainability.

2. Weak and strong sustainability

Weak sustainability is defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs (WCED, 1987). The focus is on our needs, and the three arenas are interchangeable, meaning that it doesn't matter if the environmental arena diminishes, as long as the economic and societal arenas can replace it. Technology is seen as central to this exchange of capital.

It is argued that technology can replicate nature in providing ecosystem services for our future survival, whether it be through genetic engineering (Gates, 2018), cloud seeding (Rasch et al., 2009), iron enrichment of the oceans (to move CO_2 from the atmosphere into the hydrosphere) (Zhang et al., 2015) or biomimicry, where we borrow ideas from nature and implant them within technology (Benyus, 1997). Weak sustainability allows for almost unlimited substitution between man-made and natural capital (Pearce and Turner, 1990).

In a weak sustainability paradigm, provided that mean global wealth and welfare increase, those countries doing the best (i.e., the developed nations) can compensate the less successful. Not only can each arena compensate for the others, paying our way out of trouble, but the inequalities, while maintained, can be ironed out too. It is a morally contestable position, but lies at the heart of this form of thinking.

On the other side of the sustainability argument lies strong sustainability, which advocates that nature cannot be replaced by technology, but rather, each pool of capital (economic, social, and natural) should be maintained independently (Brekke, 1997; Daly and Cobb, 1989). Strong sustainability can be defined as development that allows future generations to access the same amount of natural resources and the same economic and social capital as the current generation. Ott (2003) argues that: "Natural capital is characterized by internal and dynamic complexity. Its components form a network of relationships. In principle, they are mutually non-substitutable."

There is a problem at the heart of both schools of thought, in that, given the damage that already exists, these definitions translate as the maintenance of the current damage as well as the current capital, be it total capital or in separate pools, without including any measure of restoration. The circular economy suffers from a similar weakness, allowing no pathway to recovery, but, rather, halting the increasing depletion. However, the Earth system is seriously damaged already, and halting the damage will not be enough.

Thus, we see that any position on sustainability will depend upon which school is advocated, and can have a very different meaning, according to this choice. These differences depend on your philosophical foundations. The reasoning underpinning strong sustainability arguments lies in the reality that the Earth system is an emergent system. Weak sustainability rests upon reductionist thinking, where we can build structures that substitute for the Earth system, in a form of terraforming. To understand the importance of this we need to examine systems theory.

3. Systems theory

Any complex system, such as the Earth system, is composed of multiple parts, which are connected to and interdependent upon each other and their environment (Nicolis and Prigogine, 1989). Systems are self-assembling and self-organizing. The Earth system has

self-assembled, self-organized, reassembled, and reorganized many times over the last 3.4 billion years, recovering from mass extinctions along the way. It has a creative force within it that allows it to restructure itself without human intervention. Nature has no need for the wisdom of humankind and doesn't require the formation of an organizing committee nor an action plan to repair itself.

Systems have a number of key characteristics. They are nonlinear, meaning that they do not display cause and effect, but are asymmetrical. Folke et al. (2010) highlight the point that "Causation is often non-linear in complex adaptive systems with the potential for chaotic dynamics, multiple basins of attraction, and shifts between pathways or regimes, some of which may be irreversible." This is important, because systems can undergo dramatic change with little warning, switching to a new state. Unintended consequences can result, wherein outcomes are unpredictable and rapid in nature. Such outcomes are an expected result of the dynamic nature of complex systems (Aoi et al., 2007).

Systems are emergent, meaning that they exhibit properties that belong to the whole, rather than the parts (Bedau and Humphreys, 2008). This means that they cannot be understood using reductionist thinking. Emergent characteristics are both autonomous from the underlying components and consequent upon them (Bedau, 1997). The whole is not unrelated to the parts that make up the whole, but it is the interaction of these parts that adds complexity to the whole, which then behaves and responds in ways that cannot necessarily be deduced through a reductionist approach.

Systems are also suboptimal at each level of organization, a prerequisite, given the necessity of trade-offs in a multi-challenge solution space. One cannot optimize for any single level, as this would prevent functionality at other levels. Farnsworth and Niklas (1995) concluded that, as the number of challenges increase upon a process, only solutions that are increasingly suboptimal for each challenge will work. This is a classic design reality in natural and human-driven design. Trade-offs exist everywhere. For example, a car with large storage capacity, such as a family saloon, will not have the aerodynamic properties of a Lamborghini sports car, but will have much greater space for offspring and a pram. Orchid seeds are so small that they have insufficient food stores to allow germination, but can spread huge distances (some weigh only one millionth of a gram; Arditti, 1967). However, they require specific fungi to scavenge food for them and this places limitations upon where they can germinate successfully (Batty et al., 2001; Bernard, 1906).

Finally, systems rely on real-time feedback, an essential element in self-organization. Feedback lies at the heart of a system, conveying information between different levels of organization and within the one level. Feedback is what leads to dynamism, wherein change is constantly occurring, impacting on functionality at all levels. It is like an electric current running through the system, and a glue that binds the entirety together. The Earth system is continuously providing feedback, but we humans have so distanced ourselves from our environment that we do not hear it.

The Earth system displays these key characteristics throughout all of its levels of organization. As the fundamental basis of life on Earth, with its inbuilt, complex interactivity and resilience, the question of sustainability is within its domain, not our own. If we are to continue to thrive on the planet, we can only do so if our activities resonate with the Earth system. It is not a matter of human conservation programs, or of replacing parts of the natural system with technology, because this is not a reductionist challenge. Emergence rules, and such is the complexity that our interference is unlikely to result in what we expect. Furthermore, nonlinearity can result in rapid and irreversible transition.

This doesn't mean that technology is without its place. The internet of things, with its many billion smart devices (not including smartphones, tablets, and laptops) scattered across the world, provides a powerful array of ears and eyes to deliver the feedback that we need (Skene, 2020). Remote sensing can give us insights into planetary health, while artificial intelligence offers powerful analytical approaches to interpret the vast sea of data that now flows through the infosphere. This information can act as a portal, allowing us to reconnect to the natural world in ways never before available. While indigenous people have never lost their ecological intelligence, the rest of us have become isolated.

This isolation is important in terms of a meaningful circular economy for two reasons. Firstly, it has blinded us to the damage we are doing to the Earth system, by impacting on our decision-making. Evidence is accumulating that economic and cultural globalization is decoupling social and ecological systems, through innovation, increased technological connectivity and the speed and scale of linkages that drive social system change (Young et al., 2006). This has resulted in a loss of what Curry (2006) refers to as ecological ethics, wherein nature is the ultimate source of all value. Without such a value system, decisions lack systemic context, further exacerbating the problem.

We suggest that this resembles what has happened to Adam Smith's invisible hand. Once free-market capitalism, espoused by Smith, became isolated from the nudging and nurdling of a functional society whose members practiced virtuous self-interest, then it became a different beast. What had been set out as an economy that would work alongside an ever more enlightened humanity instead became the conveyer of inequality, greed, and injustice. We further suggest that these two breaches, between society and environment and between society and economics, lie at the heart of the current environmental crisis.

4. The tripartite invisible embrace

True sustainability can only be delivered by restoring these relationships, and thus the circular economy must fundamentally facilitate this restoration if it is to work as a path to a sustainable future. Returning to Robbins' (1935) definition of economics as a behavioral science, it is society that takes center stage here, responding to a reawakened environmental

awareness, while ameliorating its actions in terms of economic activity for the good of the Earth system. This we call the tripartite invisible embrace: “tripartite” because it reaches across the three arenas, “invisible” because it is, ultimately, a resonance, and “embrace” because it is seen to bring these arenas together, allowing a “sympathy,” as Smith would put it, across these formerly counter-positioned areas.

Stretching across all three arenas, it is an emergent property, wherein the resonance between ourselves and our landscape informs our activities. Marie-Jean-Antoine-Nicolas de Caritat, Marquis de Condorcet, the great French revolutionary and educationist, wrote that “Nature has fixed no limits to our hopes” (Condorcet, 1955). We may have been the product of its tormented and mindless struggle, but we were better than this. Emile Durkheim, the sociologist, claimed that “it is civilization that has made man what he is: it is what distinguishes him from the animal: man is man only because he is civilized” (Durkheim, 1973). Individualism became the clarion call of our age, whether it be individual empowerment (Staples, 1990), individual actualization (Rogers, 1959), or personalization (Needham, 2014). Lord and Hutchison (2009) define empowerment as “processes whereby individuals achieve increasing control of various aspects of their lives and participate in the community with dignity.”

The neoliberal dogma emphasizes the centrality of the individual (Clements, 2008), leading to a move away from society as a meaningful reference point (Rose, 1999). The neoliberal tradition, particularly in Britain, has sought to rebuild society through economic means, or as Margaret Thatcher put it: What’s irritated me about the whole direction of politics in the last 30 years is that it’s always been towards the collectivist society. People have forgotten about the personal society. And they say: do I count, do I matter? To which the short answer is, yes. And therefore, it isn’t that I set out on economic policies; it’s that I set out really to change the approach, and changing the economics is the means of changing that approach. If you change the approach you really are after the heart and soul of the nation. Economics are the method; the object is to change the heart and soul (Butt, 1981).

This was a reductionist approach, where values were to be internalized by all, one individual at a time, in response to economics (Sutcliffe-Braithwaite, 2012)—quite the polar opposite of the invisible hand of Smith.

However, this concept of the individual as the unit of social currency has been challenged. In addition to the work of Smith, who espoused the functioning society as essential to progress, Husband (1995) writes “In non-European cultures, the self-evident primacy of the individual in relation to the collective cannot be assumed.” Mbiti (1969) states “I am what we are.” Ubuntu, a sub-Saharan African philosophy, can be summarized as the concept that no one can be self-sufficient and that interdependence is a reality for all (Nussbaum, 2003). Other philosophical positions broaden the interactive net still further. Buen Vivir, the Andean philosophy, stresses that wellbeing can only exist within a community, and the concept of community is expanded to include nature (Gudynas, 2011).

Friluftsliv, meaning “free air life,” is a Scandinavian philosophy. Steering the circular economy 27 Gelter (2000) defines it as a “philosophical lifestyle based on experiences of freedom in nature and spiritual connectedness with the landscape.”

MacIntyre (1999) concluded that we do not have individual rights at our foundation, but that we are irreducibly social animals. He discussed the virtues of acknowledged dependence, contrasting this with the virtues of independence of Friedrich Nietzsche, who sought freedom from the imprisoning power of relationships in his novel, Thus Spoke Zarathustra (MacIntyre, 1999). Wilks (2005) suggests that “feminist ethicists have argued that our moral identities are located in and constructed through our caring relations with others.” Ecological ethicists would argue that this duty of care extends to nature.

How then could such a tripartite embrace work? How can the circular economy concept be steered in order to deliver true sustainability? To explore this, we need to examine cultures as contextualized entities, whose societies function within their landscapes and whose economies are in resonance with the society-environment relationship. One excellent example is the honey economy of the Ogiek people of the Mau forest in Kenya.

5. The Ogiek people and the honey economy

The Mau forest complex grows on the edge of the Mau Escarpment, rising 1000 m above the floor of the African Rift Valley. Occupying 900 km^2 , the forest supplies 40% of the freshwater of Kenya. Within this forest live the Ogiek people, some of the last indigenous forest hunter gatherers on the planet. The name Ogiek means caretakers of the plants and animals (Sang, 2002). They are some of the earliest known inhabitants of East Africa, originating in the Nile Valley until the expansion of the Sahara forced them south (National Archives, 1913).

Because their territory occurs between 2000 and 3000 m above sea level, it contains at least five ecotypes, each with different plant and animal species. This habitat complexity offers food all year round. Thus, the Ogiek are seminomadic, moving between ecotypes depending on the season.

Central to this people is honey. Honey is the most important commodity in Ogiek life. In order to understand the Ogiek, you must understand the bee. Honey is central to trade, ritual, social communication, medicine, and nutrition. A working member of the Ogiek will eat up to 2 kg of honey each day. Prior to colonialism, the Ogiek had the “honey barrel rule,” which stated that wherever they hung their barrel-shaped beehives was their land (Kitching, 1980).

For the Ogiek, the three arenas of the environment, society, and economics are permeated by honey. The Ogiek are embedded within the ecology of the bee. There is no word for beekeeping in the Ogiek language, emphasizing the collaborative nature of the relationship between humans and the bees.

The council of elders, made up of all senior male and female members of sound mind and good character, determines how many beehives should be built (Blackburn, 1970). In the Mau forest, the main sources of nectar are tree flowers. There are always trees in flower all year round at different altitudes, and the Ogiek follow the bees and the flowering seasons. No tree may be cut down unless the elders agree. A single tribesman may gather around 400 kg of honey each year. Honey is shared within the community, allowing families that have suffered hardship to be cared for. In addition, excess honey is traded with neighboring tribes such as the Maasai. This trade also incubates peace between the tribes. The Ogiek alone have the ecological intelligence and skill sets to gather honey, while ensuring that the bees are unaffected by this activity, and so have secured an important position amongst the other tribes. Honey is also used to preserve meat.

Socially, honey water and honey wine play central roles in important rituals such as births, purification, marriages, new homes, and communicating with the deceased, while honey is also important as a dowry and for legal compensation (Kimaiyo, 2004; Nganga, 2006; Nightingale, 1983). The use of honey in such rituals would seem counterproductive in terms of economic profitability, meaning there is less honey for trade. However, the Ogiek recognize the importance of ritual in culture, tying together society and ecology in deeper ways.

Thus, the three arenas of economics, society and the environment are tied together through honey. It is honey that forms the invisible embrace metaphysically and physically, binding the activities across each arena. Ecological intelligence and ecological ethics inform decision-making. By protecting the trees, the bees have access to their flowers. By the noneconomic use of honey in society, the entirety is bound together. The integrity of the forest is central to the success of the bees.

Meanwhile, a healthy, functioning forest is important in terms of soil stability, water cycling, and as a habitat for wild birds and animals that provide meat for the tribe. Hunting and gathering are also carefully controlled by the elders. Animals with young offspring are not allowed to be killed for any purpose, nor are those in their late gestation period (Ronoh and Barasa, 2012). No cultivation is permitted either side of streams and rivers, protecting the water from soil erosion and pollution (Ottenberg and Ottenberg, 1960). The land is divided up amongst the people so that each clan has ample trees for honey production. This territorial approach ensures accountability and resource management at the level of the family in situ, avoiding the tragedy of the commons as portrayed by Hardin (1968): if you chop down a fruit tree to burn the wood, you won't have any fruit. Because they are not exporting the consequences of their supply chains, the Ogiek are fully aware of the repercussions of their actions based on direct feedback.

Fundamentally, their indigenous economic system has had a very low impact on biological diversity (Towett, 2004). The Ogiek focus on managing their own behavior, in tune with the ecological feedback and ecological intelligence gathered over years, rather than increased honey production efficiency and maximum beehive yields. By working with the bees, this

ensures that pollination within the forest continues, allowing the ecosystem to function well (Agera, 2011). Rituals are important, as is participatory education (Kratz, 1989). This gives us a unique insight into the invisible embrace, wherein intergenerational knowledge transfer, married to ecological ethics derived from a value system emergent from the landscape-society interaction, provides the perfect basis for decision-making. The oral tradition of storytelling also plays an important role, as it does in many indigenous cultures (Deloria, 1979).

A recent IPBES report (IPBES, 2019) demonstrates that lands occupied by indigenous peoples such as the Ogiek are declining less rapidly than the rest of the planet. This is because these people are rooted within their ecology, not separated from it.

6. Conclusions

Commoner (1971) explored circularity in terms of closing the circle between economics, technology, environment and government. Here we set out the idea of the circularity of a functional, sustainable economy relating to the resonance between landscape, society and economics, wherein sustainability can only be delivered within the framework of the Earth system. This doesn't mean that we must all head for the hills and place our honey barrels in the trees. Rather, we can beat our technological swords into ploughshares, utilizing the power of the internet of things and artificial intelligence to open ourselves to natural feedback, reintegrating ourselves and our activities within the Earth system (Skene, 2020).

For the circular economy to truly aspire to contributing to a sustainable role, it must be integrated within the Earth system, in terms of both the social and environmental contexts. Merely addressing resource use and waste is insufficient. Important elements, such as suboptimality, feedback, accountability and restoration must play central roles, wherein our economic activities are actively addressing ecological and societal empowerment, actualization and recovery. The tripartite embrace, much like the invisible hand, can only work if society is functional and demonstrates relatedness to the environment, and thus the circular economy must facilitate this if it is to be part of a positive future for humanity.

Given that the Earth system is unquestionably the only system that matters, then our economics must resonate with it (strong sustainability) rather than attempt to replicate it (weak sustainability). However, technology has an important part to play, not in mimicking nature, but as a portal of feedback, allowing our activities to dynamically respond to the emergent, nonlinear properties of the Earth system, while tracking the impacts of our decision-making. In conjunction, technology and the Earth system can reconnect us with our ecology, in a powerful, albeit very different approach to that used by indigenous people, who dwell within their ecology already. In order to be fit for purpose, the economy must become

an emergent property, serving the societal and environmental arenas rather than destroying them. This is a truly circular economy.

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