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WHAT CAN WE LEARN FROM EVOLUTIONARY THEORY WHEN CONFRONTING THE DEEP CHALLENGES OF OUR TIMES?

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Deep Challenges

Contemporary societies are confronted by an array of 'deep' challenges: there is broad agreement about the need to act – and act urgently – but consensus about what and how to do in practice is lacking. Even when tentative unity regarding possible solutions exists, the interventions face ostensibly unsurmountable resistance to change under the status quo. The list of challenges that share these characteristics is long and diverse. It includes daunting ones such as the need to cope with climate change; the need to shift to an environmentally sustainable economy; the need to drastically reduce if not eliminate economic, social, cultural, ethnic, gender and other forms of inequality and discrimination; and the need to lessen the tensions and realize the coexistence potentials between different cultures and identities. Many of these challenges are not new, but today they display heightened intensity, urgency and complexity – in short, the problems have become much 'deeper'. The overarching question is how can societies change in the face of a widely felt perception of the need to change, but also under the irreducible uncertainty about what and how to change.

Many attempts to cope with these and similar challenges, and also hopeful success stories (Solnit, 2016), can be noted, but a conclusive 'solution' is nowhere in sight. Accordingly, there is intense debate about which approach to follow, within society in general and especially within the policymaking field. Looking at the latter, two ends of the spectrum can be broadly identified. On the one end are policy approaches based on long-term strategies and far-reaching coordination of stakeholders, with a focus on established institutions as the main agents of change (as in 'strategic planning': Albrechts, 2010; Albrechts & Balducci, 2013). Critics point, however, at the severe difficulty of implementing such consensus-based approaches in the face of fundamental disagreement about what does and does not work, or even about the desirable outcome (see Boelens & De Roo, 2016; Salet et al., 2013).

Others wonder whether established institutions could ever act as agents of change, due to their vested interests in the status quo (Purcell, 2009). At the other end of the spectrum are policy approaches based on incremental interventions and innovative, disruptive practices as the main agents of change (as in 'government by experiments': Bulkeley & Castán Broto, 2013). Some key limitations highlighted by critics are the inadequacy of the scope of change relative to the scope of the challenge, the insufficient leverage vis-à-vis broader societal structures, and the risk of lock-in (i.e. of reaching a situation that is not desirable, but where no further change is possible) (Savini et al., 2015). There are also emerging, intriguing visions of hybrids between the two: top-down approaches open to bottom-up experimentation, and bottom-up approaches that are able to impact top-down structures (as in 'transition governance': Grin et al., 2010). At a more general, epistemological level, the very goal of this book – enabling a dialogue or even integration between institutionalist and pragmatist views of planning (see Salet, Chapter 1, in this volume) – can be also seen as such a hybrid, and the chapters by Healey (Chapter 2) and Boelens (Chapter 6) highlight potential pathways to realize it.

In order to help structure and advance this debate, and further articulate hybrid approaches, this chapter looks for inspiration in the theory and empirical evidence of biological evolution. Underlying the intellectual project is the observation that biological evolution is a quintessential process of adaptation to emerging threats and opportunities, in the absence of knowledge about what does and does not work, and without a projected end state. In other words, evolution can be seen as an unparalleled depositary of responses to 'deep' challenges like those identified above: urgent, but with no predetermined path to a solution and facing systemic resistance to any fundamental change of course. As such, it can be expected to have a high heuristic value when looking for ways of coping with such challenges. The prime aim of this chapter is to explore this heuristic potential. The application of evolutionary insights in the policymaking domain is not new (see Bertolini, 2010; Mehmood, 2010; Moroni, 2010); however, many or even most of these applications do not acknowledge the great enrichment of evolutionary theories in the last decades. Evolutionary theories have moved far beyond their original, narrow Neo-Darwinian features (Laland et al., 2014). Thus, the second and more general aim of this chapter is to bring this enrichment to bear on applications of evolutionary theories in the policymaking domain.

In what follows, I will first summarize this extended view of evolution. An underlying, central concern will be the identification of potential dynamics to accelerate evolution in the face of emerging environmental threats and opportunities. Next, I will adapt this extended view to the policymaking domain and illustrate its heuristic potential by applying it to a deep challenge in the field of urban planning. Urban planning is a particularly relevant field of application because by definition it is oriented towards the future – a crucial difference from other social sciences and practices. As Myers (2001, p. 366) notes: "[t]he future is the only topic that other professions have ceded to planners as relatively uncontested turf". For urban planning, therefore, confronting emerging threats and opportunities is a central and defining task. Furthermore, the chief object of urban planning is the social and spatial arrangement of cities, and today's rapidly urbanizing cities are the locations where the deep challenges mentioned above are most intensely felt, and finding approaches to cope is a most pressing issue (Barber, 2013). Finally, the contribution aims to stimulate a debate within the urban planning field itself. In particular, it explores what a planning oriented towards enabling transformative societal change could entail. The specific urban planning challenge considered in this chapter is the transition to sustainable urban mobility. This challenge is directly related to a number of the broader societal challenges named in the opening paragraph (Bertolini, 2012).

Evolutionary Theory beyond Narrow Neo-Darwinism

In its essence, the Neo-Darwinian view of biological evolution centres on processes of variation of the hereditary characteristics of individual organisms determined by random and blind genetic mutations, and the selection of these characteristics by an exogenous natural environment. During the past several decades, new insights have enriched this view in three important respects (Jablonka & Lamb, 2014). First, current research does not only focus on processes of variation and inheritance at the genetic level, but also at three additional levels: the developmental or 'epigenetic' level of organism development, the level of animal behaviour, and the level of human culture. Second, they do not only focus on processes of blind and random mutation, but also on processes of more focused, 'directed' variation. Third, they do not see the environment as exogenous to processes of variation and inheritance but as co-determined by them – that is, they characterize the relationship between organisms and environment as one of co-evolution. This extended view of biological evolution is summarized below. The account is mainly based on the comprehensive overview by Jablonka and Lamb (2014). It is important to stress that, for the sake of clarity, the presentation is simplified by schematically contrasting a 'narrow' and an 'extended' view of biological evolution. This simplification does not do justice to the many nuances and lively debates among evolutionary biologists (see Laland et al., 2014). The aim is not to highlight all of these nuances or to take a stance in the debate but rather to identify the widest possible range of evolutionary dynamics, as a basis for exploring their potential significance in the social and policy domains.

Determination and Transmission of Characteristics

A basic prerequisite for evolution is the existence of variable characteristics that can be transmitted between different entities. In the narrow Neo-Darwinian view of evolution these are the variable characteristics of individual organisms, as determined by the genetic code contained in their DNA and as transmitted by their reproduction process. More recent views of evolution add three other potential levels of determination and transmission of characteristics.

First is the developmental or 'epigenetic' level. This is the level where during the development of an organism from its embryonal to its mature state, cells diversify and reproduce, activating or deactivating genes in the process (hence the term 'epigenetic'). According to the narrow Neo-Darwinian view of biological evolution, these acquired characteristics cannot be transmitted to descendants. However, there is increasing evidence that at least in some cases they could be. While there is heated debate among biologists around the evolutionary significance of these processes (see the sceptic's view of Dickins & Rahman, 2012; and the response by Mesoudi et al., 2013), conceptually they add an important evolutionary path. This is because developmental/epigenetic processes are sensitive to environmental conditions and provide a much more directed response to a change in the environment than random and blind processes of genetic mutation, and thus a pathway for accelerating evolution when the need or the opportunity arises. This acknowledgment of the potential role of development in evolution has branded its advocates as 'Neo-Lamarckians' and the view 'Neo-Lamarckian', adding another twist to a long-standing debate (Bowler, 1983, 1988).

A second additional level of the determination and transmission of the characteristics of living organisms is provided by behavioural processes in the animal world, resulting in so-called 'animal traditions' (Avital & Jablonka, 2000). A typical evolutionary pathway involves the discovery of a better fitting behaviour for the environment, either by accident or by trial and error,

and its transmission by means of imitation. Examples include the discovery and diffusion of strategies for procuring food or for escaping predators.

At a third level characteristics are determined and transmitted through human cultural processes – that is, symbols. A prominent and well-researched example is the evolution of language; however, in any area of human life there is evidence of individual and group characteristics determined and transmitted by means of cultural processes: from raising children, to work practices, to care and leisure in adulthood, to the relationships people have with others, and to the very values and norms driving individual and group choices (Mesoudi, 2011). What human cultural processes add to animal behavioural processes is the possibility to imagine the future, and thus bring expectations of potential outcomes to bear on present choices. It should be immediately emphasized that imagining the future is by no means equal to predicting it and that potential outcomes do not necessarily evolve into actual outcomes.

The evolutionary significance of behavioural and cultural processes is less heatedly debated among evolutionary biologists than that of developmental, epigenetic processes. However, their implications for evolutionary pathways are also far-reaching. Again, they open up additional and fundamentally different pathways of evolutionary change. Animal behavioural processes add the possibility of determining and transmitting characteristics that do not require any changes in the nature of the organisms, either of their genetic or of their developmental characteristics. Furthermore, and related to this point, they add the possibility of the horizontal transmission of characteristics (as in learning among individuals of the same generation) next to vertical transmission (as in genetic and epigenetic processes, and in learning from one generation to the other). Animal behavioural processes thus provide the possibility of a much more directed and rapid response to emerging environmental threats and opportunities than random and blind genetic mutation. Human cultural processes dramatically increase the range and reach of potential responses, as they allow the exploration of yet non-existing realities. However, they also introduce the possibility of a deliberate negation of real environmental cues, with potentially disastrous consequences (for a thought-provoking account, see Diamond, 2005).

Next to the consideration of processes at different levels, in the extended view of evolution there is also a lot of attention paid to the interaction between levels, for instance between genetic and cultural processes (Laland et al., 2010). What these interrelations add to the general picture is the relevance of positive and negative feedback among a great array of processes, and their potential to greatly accelerate (in the case of positive feedback) or constrain (in the case of negative feedback) evolutionary change.

Variation

Evolution requires varied traits to be produced and transmitted. In the narrow Neo-Darwinist view, the key sources of variation are random and blind genetic mutations; however, emerging views of evolution are broadening this notion. Already at the genetic level, there is evidence of varying and non-random rates of mutation, with environmental stress both inducing an intensification of mutation rates and localizing this intensification in specific genes. Variation at the developmental, epigenetic level is by definition directed (it is directed towards reaching the mature state of an organism). However, next to this built-in directionality of the organism's developmental process, there is also the possibility of variation that responds to the environment and changes therein, be it inside or outside the egg or womb (e.g. the embryo's responses to the eating and drinking patterns of the mother during pregnancy). The latter is particularly relevant, as it entails the possibility of an adaptive variation – a variation better fit to the environment. Variation at the behavioural and cultural level is also a process that involves directionality. It is

perhaps best summarized by the notion that it is by and large a goal-directed process, geared towards the achievement of a particular goal (e.g. procuring food, avoiding predators, preserving a social order or creating a new one).

Altogether these sources of variation show that next to random and blind genetic mutation more directed processes of variation may also take place: either by focusing variation at specific times and locations or by directing variation towards addressing specific challenges, real or imagined (in the case of cultural variation). This does by no means imply that such variations will be successful (i.e. adaptive), but it can be argued that they might increase the chance that when faced with emerging environmental threats and opportunities, species or communities might adapt more rapidly.

Selection Environment

The third and final basic component of evolution is the selection environment. In the narrow Neo-Darwinian view, the environment and its changes are by and large exogenous to the processes of variation of individual organisms and communities. The extended view of evolution adopts a much more bi-directional stance, where individual organisms and communities construct 'environmental niches' which in turn will shape their further development, in a co-evolutionary process fuelled by self-reinforcing feedback cycles (Laland et al., 2010; Odling-Smee et al., 2003). In some conceptualizations the distinction between the environment and living organisms almost entirely blurs. In these more extreme conceptualizations the environment is seen as the sum of the organisms it contains, and all organisms evolve following interaction with the environment – that is, interaction with all other organisms. Perhaps the most suggestive example of such a view is the so-called Gaia hypothesis, which applies this logic to the whole planet (Lovelock, 1988).

The philosophical and practical implications are profound. Philosophically, it suggests a continuous and interconnected development of organisms and the environment rather than an environment that separately 'is', and organisms that separately 'become'. Practically, this perspective opens the possibility of evolution by means of actively shaping the selection environment by the very entities being selected by it.

A Plurality of Evolutionary Dynamics

The evolutionary dynamics highlighted in the discussion above can be summarized in the following way.

First, evolution unfolds at several, interrelated levels. Characteristics are determined and transmitted through genetic, developmental/epigenetic, behavioural and cultural processes, and these processes are interrelated. This greatly enlarges the array of elements and processes involved in evolution, multiplying the range of evolutionary paths available.

Second, next to blind and random genetic mutation, there is also more directed variation (i.e. variation more directly responsive to a specific environmental stimulus), both in terms of rate, timing and location (also in the case of genetic mutation), and in terms of scope (in the case of developmental/epigenetic, behavioural and cultural variation). This directionality amounts to an additional possibility to accelerate evolution in the face of environmental change. This possibility does not, however, imply a certainty, as there is still no prior guarantee that the variation will be successful (i.e. adaptive). Furthermore, in the case of cultural variation, the possibility opens up of deliberately negating an environmental signal – that is, deliberately blocking the evolutionary process (e.g. if it is not seen as consistent with the prevailing social values and norms).

Third, the selection environment is not exogenous to processes of genetic, developmental/epigenetic, behavioural and cultural variation, but is also shaped by them through co-evolution. This process identifies a distinct evolutionary pathway, in which individual organisms or communities may contribute to creating an environmental niche, which in turn will facilitate and condition their further development. For humans, this pathway opens up the option to try and deliberately shape a selection environment consistent with their present culture. It also, however, entails the risk of overestimating the degree to which it is desirable and feasible.

Altogether, these evolutionary dynamics and pathways document many ways of accelerating evolution in response to emerging environmental threats and opportunities. In the biological domain, this provides potential additional explanations for the richness and speed of evolution (Jablonka & Lamb, 2014). In the social and policy domain, this arsenal of dynamics might provide many sources of inspiration for pathways to realizing change in the face of uncertainty and resistance (which are explored below).

Insights from Evolutionary Processes for Coping with Deep Societal Challenges

Figure 10.1 synthesizes the evolutionary dynamics described above, and adapts them to the social domain. It is important to underline that this adaptation from the natural to the social is not intended to be literal, nor does it imply direct equivalences between elements and processes. Rather, it aims to provide a conceptual framework for exploring potential analogies between the dynamics of stability and change at a meta-systemic level. The translation is inspired by sociological theories positing a two-way relationship between social structure and social agency, most characteristically captured by Giddens's (1984) structuration theory (see also Healey, Chapter 2, and Boelens, Chapter 6, in this volume). In the natural world (Figure 10.1, left half) living organisms with varying and interrelated genetic, epigenetic/developmental, behavioural, and cultural characteristics are selected by the natural environment and at the same time produce it (through processes of niche creation). In the social world (Figure 10.1, right half) instead of living organisms there are social practices (i.e. 'what people do' on an everyday basis: Reckwitz, 2002). Instead of the natural environment there are social institutions (i.e. 'patterns of social norms' as defined by Salet, Chapter 1, in this volume) and human artefacts, such as the physical fabric of settlements. Analogously to the natural world, in the social world social practices with varying and interrelated characteristics

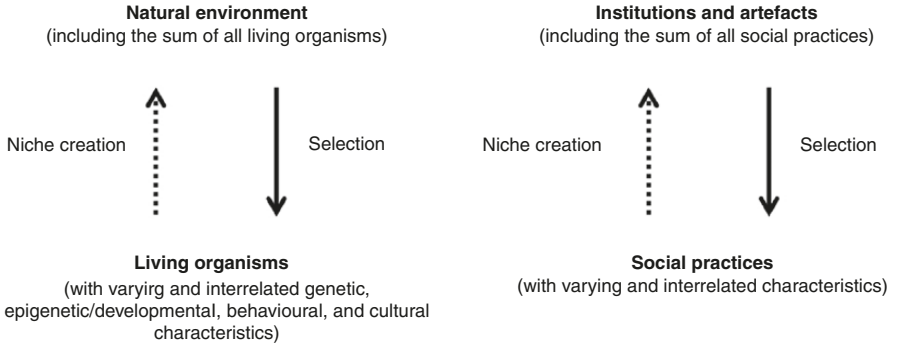

Figure 10.1 Dynamics of biological evolution (left) and translation to the social domain (right)
Source: Bertolini

are both selected by institutions and artefacts (in the sense that institutions and artefacts shape the conditions that facilitate or hamper the performance of social practices) and produce them through processes analogous to niche creation.

Figure 10.2 further articulates this framework with a focus on the dynamics of system stability and change. Key sources of inspiration are studies of socio-technical transitions, in particular the idea that niche–regime interactions are at the core of processes of social and technical change (Geels, 2005; Rip & Kemp, 1998; Schot, 1998). This inspiration also extends to more recent proposals of how to integrate social practices within this socio-technical dynamic (Shove & Walker, 2010; Watson, 2012; see also on both points Healey, Chapter 2, in this volume). The framework in Figure 10.2 distinguishes on the one hand between 'prevailing' and 'niche' institutions and artefacts, and on the other hand between 'conformist' and 'non-conformist' social practices. These distinctions give rise to a variety of potential evolutionary processes. 'Conformist' social practices are both enabled (i.e. positively selected) by prevailing institutions and artefacts, and reproduce them. 'Non-conformist' social practices are both hampered (i.e. negatively selected) by the prevailing institutions and artefacts, and contest them. 'Non-conformist' social practices have instead a positive, two-way relationship with consonant institution and artefact niches: they are both enabled by and reproduce them. These conflicting and contradictory dynamics can produce systemic stability (the more common outcome, as the niche disappears or remains marginal) or systemic change (a niche becoming prevailing, which happens much less frequently).

Moving from this framework, how can the evolutionary processes, discussed above, be translated to the social and policy domains? And more specifically, how can the evolution

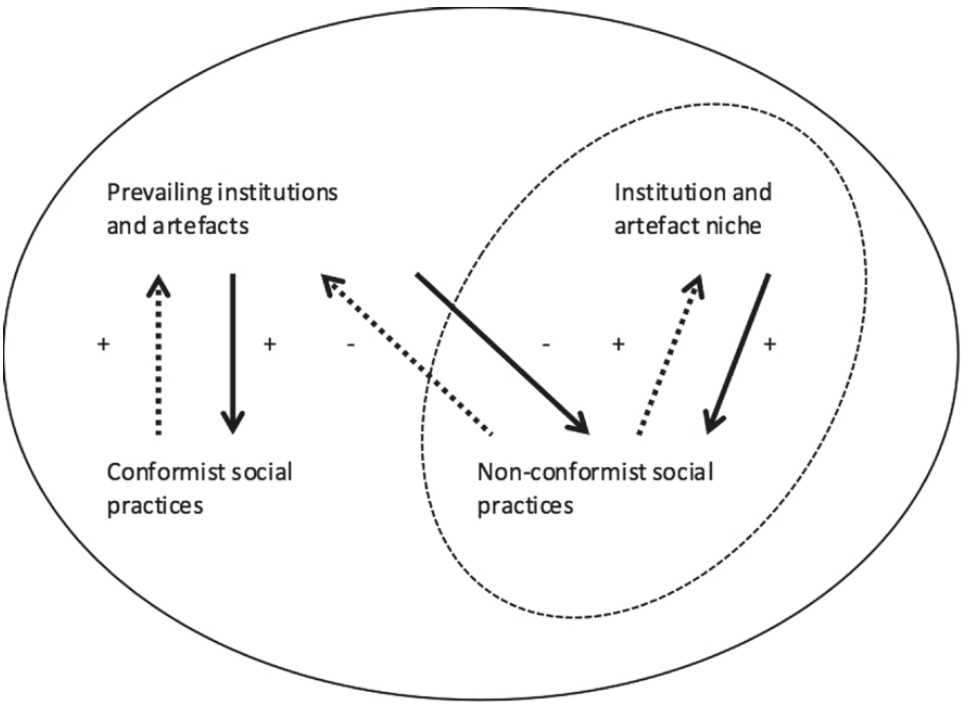

Figure 10.2 Dynamics of stability and change in the social domain
Source: Bertolini

of social practices, institutions and artefacts be accelerated in the face of the deep challenges outlined in the introduction? Let us look at each of the three ways in which biological evolution is being reconceptualized, and what each implies for the answer to the latter question. The argument in this section is mainly conceptual, supplemented by more concrete illustrations in the next section.

Determination and Transmission of Characteristics in the Social Domain

In the biological domain, according to the extended view, evolution is determined and can be accelerated by processes at different and interrelated levels (genetic, developmental/epigenetic, behavioural and cultural/symbolic). By analogy, in the social domain, evolution is determined and can be accelerated by varying/experimenting at the same time with different and interrelated social practices, in order to find new and self-reinforcing combinations of them. For example, by varying/experimenting with both different work and different care practices (such as working less and spending more time to care for relatives or neighbours), new and self-reinforcing work and care combinations can be found (new solidarity arrangements within a family or the community).

Variation in the Social Domain

While the role of accidental change/variation in fuelling evolution should be always acknowledged (as with contingent events in path dependency theory: Mahoney, 2000), also more directed change/variation is a source of evolution, and might be an essential condition for accelerating it. This would require increasing variation/experiments in times of crisis and at most affected locations (geographical and functional). It would also mean that variation/experiments should match the scope of the challenge – that is, should provide a plausible potential solution. While this last point might seem obvious, one can recall how many policy interventions have the declared aim of addressing the challenges mentioned in the introduction but do not have the potential, even if successful, to provide adequate answers.

Selection Environment in the Social Domain

Two notions are central here. First, the complex, undetermined and undeterminable interplay of variation and selection remains the key process in producing evolutionary outcomes. This means that in the face of deep challenges such as climate change, sustainable development, social inequality or cultural diversity, naïve (i.e. deterministic) planning or design approaches are not likely to succeed, or worse, risk being the superimposition of the will of the few on the lives of the many (see e.g. Scott, 1998). Second, the selection environment is not external but rather is co-shaped by social practices; implying that institutional and artefact niches can be deliberately created to allow experimentation with non-conformist social practices (cf. Figure 10.2).

Without changes in institutions and artefacts it is unlikely that very different practices will develop. On the other hand, changes in institutions and artefacts are likely to elicit different practices (even though unpredictably so). Furthermore, following the relations outlined in Figure 10.2, social practices are not only shaped by but can in part also shape institutions and artefacts (as institutions and artefacts are, in fact, the accumulation and consolidation of those practices). New social practices can thus also try and create institutional and artefact niches where they can develop further.

An Evolutionary Approach to the Deep Challenge of Achieving Sustainable Urban Mobility

The processes described in the preceding section together provide cues for possible ways to achieve the acceleration of the evolution of social institutions, artefacts and practices to address the deep challenges of today. But how would this process play out in a specific case? What kinds of concrete policy interventions might it demand? The following paragraphs outline a few possible directions in the case of sustainable urban mobility.

Varying/Experimenting with Different and Related Social Practices

In urban mobility, varying/experimenting with different and related social practices demands that not only different ways of transporting people and goods should be experimented with, but also different ways of related practices such as working, shopping, spending leisure time or socializing. Practically this would imply not only, for instance, promoting more walking and cycling, but also reducing the need to travel long distances by encouraging more proximate types of working, shopping, leisure time and socializing activities.

This timely and consistent change in multiple related social practices is important because of the strong interrelation between mobility and other human activity domains such as work, education, leisure and socialization. This deep interrelatedness has led some to speak of the present car-based urban mobility model as a 'system of automobility' (Urry, 2004). The difficulty of changing such a highly interrelated system has prompted others to highlight the current 'automobile/car dependency' (Jeekel, 2013; Newman & Kenworthy, 2015). On the bright side, it means that when change in multiple related practices is timely and consistent, the chance of creating positive, self-reinforcing feedback loops with potentially disruptive impacts on the dominant system will be greatly enhanced. One example of such a process currently underway is the interrelation between the rediscovery of urban living and the increased use of alternative modes of transport to the personal motor vehicle (Newman & Kenworthy, 2015).

Increasing the Rate of Variation/Experiments in Times and Places of Crisis

Urban mobility is everywhere in a state of crisis: no city can claim to have 'squared the circle' between on one side the dependency on high mobility of contemporary lifestyles and business models and on the other side the lack of sustainability of contemporary urban mobility patterns (Bertolini, 2012). In response to this crisis, every city faces the need to increase the rate of urban mobility variations/experiments, with some locations facing a more deeply felt urgency (most notably the rapidly growing, congestion- and pollution-ridden cites in China, India and other urbanizing countries). In these places both the need and the opportunity to experiment with different mobility arrangements are arguably the highest. It is, however, also a matter of perception. Cities are essentially created by the people who live there, and unless the inhabitants can start worrying more about their health, quality of life and the climate than about getting a job, a house or even just food for the day, the urban mobility crisis will not, in fact, exist. Conversely, in cities with an apparently much less dramatic situation, the urgency of change away from prevailing urban mobility might be more deeply felt; perhaps because more basic problems have been solved for many, and a shift in priorities has taken place (think about several European cities).

The point that the urban mobility experiments/variations should match the scope of the challenge is a very relevant one. While some cities might claim to have policies in place that are leading them towards solutions to some transport-related problems (e.g. safety, pollution,

congestion), many cannot. Furthermore, no city can claim success in the face of more complex urban mobility challenges like mitigating climate change, or reversing the depletion of non-renewable natural resources. The sustainable urban mobility discourse is often not matched by outcomes (Boussauw & Vanoutrive, 2017). Let us look at some concrete examples of what matching the scope of the challenge might mean.

If air pollution or noise is the problem, a shift to transport that reduces air pollution or noise, as with electric or human-powered vehicles, is essential. Marginal improvements of present, fossil fuel-based car technology will arguably not do, and yet they are often advanced as solutions. If greenhouse gas emissions are the problem, the primary energy source is crucial (it should not be fossil-based, even in the case of electricity), but arguably, using less energy (e.g. shifting to collective and non-motorized modes, or travelling shorter distances) is essential, because non-fossil energy sources are not yet widely or readily available. Again, marginal efficiency improvements in fossil fuel-powered engines will not do, in spite of their many advocates. If congestion and the encroachment of public space are the problem, a shift in the type of transport used (e.g. from using cars to taking public transport or cycling or walking) means that significantly less space is needed. Marginal adaptations of the car-based transportation system (e.g. more temporal spreading of trips, higher car occupancy, or even self-driving cars and car sharing) will not do, whatever the contentions to the contrary. There is a common thread throughout the argument and examples above: in many, if not most cases, improvements in car technology will not be sufficient, and the reliance on cars needs to be reduced. This scope is not matched, however, by most present policy approaches.

Creating Institution and Artefact Niches for New Social Practices

Institutional niches could be places (for instance a street or an entire neighbourhood) and time periods (for instance for a few months or during the weekend) where radically different rules for the use of street space can be tested. For instance, motorized traffic can be greatly curtailed or entirely prohibited; local residents and businesses, instead of the city council, can decide how to use street space. But institutional niches could also be less geographically and more functionally defined, such as a set of incentives to actively lower car use by workers in an organization (as in intra-firm competitions for who drives less, coupled with information on and improvement of alternatives, and salary benefits favouring more sustainable modes of transport). There could also be a road pricing scheme in a city, a different urban parking regime, and other financial or fiscal incentives. Empirical evidence shows that under such conditions behavioural change can exceed expectations and be of a different order of magnitude than the predictions of transport models that assume an unchanged institutional context (e.g. EPOMM, 2013).

Artefact niches could be areas in a city with a different transport provision (e.g. more cycle lanes and fewer parking spaces) and urban fabric (focused on non-motorized and/or public transport, rather than being car-oriented). An example of what this might achieve if other favourable environmental conditions are in place, such as an urban fabric that allows reaching many destinations within short distances, is the impact of the provision of bicycle lanes, which is proven to induce a dramatic surge in cycling virtually in every mixed-use city district where it is implemented (Buehler & Dill, 2016).

It is important to emphasize that institutional and artefact niches need not to be benign, and not all demonstrate or even seek possible ways of coping with the deep challenge of urban mobility. However, even 'perverse' niches could still be instructive, as they might show what not coping with the dilemma of mobility might imply. Let us take the example of North

American or Australian cities. Sprawling North American or Australian cities are much more car dependent than the majority of cities in the world, and in that sense form a planetary, 'perverse' niche. They are a model that cannot be seemingly extended to the entire planet if challenges such as climate change or the depletion of non-renewable energy and other finite natural resources (such as land) are to be dealt with. From this vantage point, there are reasons to try and contain, if not counter this extremely car-dependent niche. However, this already sizeable niche could instead grow, and even become prevalent, as cities in rapidly urbanizing countries follow this model instead of the European or Asian models (or their own, new, non-car-dependent model).

A final observation should be made here. While the argument has focused on the creation of new, alternative institutional and artefact niches, it is also conceivable that existing, prevailing institutions and artefacts are marginally changed from the inside through 'reformist' policies. While these actions might be easier to implement, and might have a wider impact, they also might – and often do – result in a degree of change that does not match the scope of the challenge, pointing to an interesting and recurring theme for the debate.

An Illustration: The Living Street Initiative in Ghent, Belgium

An example from Ghent, Belgium provides an illustration of a concrete urban mobility policy initiative that innovatively and uniquely expresses many of the directions identified so far. The 'living street' is an initiative that envisages the temporary but extended closure (for one or two months) of residential streets to motorized traffic so that they can be used for other purposes. During the closure, alternative mobility options to the private car are promoted or offered, such as car sharing and cargo bikes. The initiative was taken by the inhabitants of the streets and was facilitated by a civic organization, the Lab van Troje, and the city council.[1]

It started in 2013 with just two streets, and has expanded each year to involve 19 streets in 2016. It is being followed-up elsewhere – for instance, in Rotterdam, Utrecht and Amsterdam in the Netherlands. The initiative is part of a broader ambition of the City of Ghent to explore the real-life conditions in a carbon-free city, and the barriers and opportunities for scaling-up from individual streets to the entire city.

The living street initiative is distinctive in several ways that sets it apart from mainstream urban mobility policy practices. First, and with reference to the first of the three clusters of insights mentioned above, it experiments at the same time with different ways of moving around and transporting goods (by non-motorized modes of transport and shared vehicles) and with different interrelated social practices (playing, socializing, working, shopping, running a business). As a result, there is a higher chance to create an interconnected whole, or a system where the components reinforce each other through positive feedback loops. This sets it apart from a recurring feature of mainstream urban mobility policy, where typically only some of these elements are altered or elements are not changed consistently, with negative, status quo maintaining feedback loops ultimately prevailing (see, for some telling cases, Boussauw & Vanoutrive, 2017).

Second, Ghent is an example of how the perception of a crisis might count more than the crude facts. At the local level, mobility in Ghent is not especially problematic, particularly when compared to megacities in emerging economies, for example. However, there is a shared awareness of the highly problematic planetary implications of the present local mobility patterns, as highlighted by the aim of becoming a carbon-neutral city. Furthermore, with respect to the scope matching the challenge, mobility practices during the living street experiment aimed – and to a large extent succeeded – to drastically reduce their environmental footprint.

Importantly, while still temporary and local in nature, they are explicitly seen as practices that could become permanent and extended to the entire city, and beyond.

Third, perhaps some of the most interesting and distinctive features of the living street initiative are related to how it succeeds in creating an effective institutional and artefact niche. Institutionally, a niche is created because other, exceptional decision-making procedures and regulatory regimes apply: inhabitants take the initiative; a civic organization facilitates the process; the city supports but does not lead and allows non-conforming regulations for the use of street space to be temporarily implemented. There are also signs of different norms, with the value of localism and sociability rising at the expense of the value of footlessness and detachment. An artefact niche is created by means of a different allocation of street space and the availability of different mobility options.

Overall, and as a result of all the above, the living street initiative is distinctive because it seamlessly couples transformative ambitions with an experimental attitude, thus possibly showing a way to bridge the gap between top-down and bottom-up approaches to change.

Summary and Research Agenda

Summary

In this chapter, an emerging, extended theory of biological evolution was used as a reference to identify ways of addressing the deep societal challenges of our time, characterized by a broad consensus on the need to act, but profound disagreement about what to do and endemic resistance to change. Building on this understanding of evolutionary processes, a number of potential coping strategies have been discussed:

- Vary/experiment at the same time with different and interrelated social practices;
- Increase the rate of variations/experiments in situation of crisis (and conversely enhance the very perception of crisis), and make variations/experiments match the scope of the challenge;
- Create institutional and artefact niches where new, non-conformist social practices can develop (or possibly modify prevailing institutions and artefacts to allow for the incremental adaptation of conformist practices).

The case of urban mobility and the example of the living street initiative in Ghent were used to illustrate the possible implications of these strategies in real-life practice.

Altogether, I suggest that these strategies might show a way of reconciling the tension between 'top-down' and 'bottom-up' approaches to policymaking, and help further articulate a 'hybrid' approach. On a more abstract level, I suggest that the overall conceptualization introduced in this chapter, and visualized in Figures 10.1 and 10.2, can offer a way to connect pragmatist and institutionalist views of planning. Institutionalist and pragmatist views of planning can be seen as pointing at distinct but interrelated components of an evolutionary process where social practices are conditioned by social institutions and artefacts (the institutionalist view) and also produce social institutions and artefacts (the pragmatist view).

Research Agenda

The conceptualization, strategies and illustrations in this chapter also reveal several possible themes for a research agenda, most importantly including:

- Refining and testing hypotheses about the effectiveness and workings of the suggested strategies by comparing the transformational impacts of policy experiments with different characteristics, and of policy approaches not based on experimentation;
- Looking into institutional and artefact conditions that enable or hamper transformation of social practices by experimentation, and into opportunities for modifying such conditions.

Last but not least, in the chapter there was no discussion of the interrelations between the processes of natural and social evolution. Simply, one process was seen as providing an analogy for the other. However, the two processes are not separate: humans are not only an integral part of biological evolution, but also play an increasing crucial role in shaping it (as recently captured by the notion of the Anthropocene: Bonneuil & Fressoz, 2016). In fact, many of the noted societal challenges concern this interrelation and the growing tensions between natural environments and prevailing social institutions, artefacts and practices. These natural–social interrelations should be given a more central place in future conceptualizations.

Note

1 For further information see the following three webpages: www.labvantroje.be/, last accessed 1 April 2018; www.leefstraat.be/, last accessed 1 April 2018; www.klimaat.stad.gent/, last accessed 1 April 2018.

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