URBiNAT

Analysing the Role of Policy for Nature-based Organisations

Thomas Andersson, Ingrid Andersson, Emma Björner

Published	March 2024, IKED, Malmö
Project	Healthy corridors as drivers of social housing neighbourhoods for the co-creation of social, environmental, and marketable NBS
Acronym	URBiNAT - Urban inclusive and innovative nature
	This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 776783

Table of Contents

List of tables

List of figures

Purpose

The present report sets out to map, explore, and recommend polices in support of value creation from Nature-based Solutions (NBS) through so-called Nature-based Organisations (NBOs). In this, it considers a spectrum of such organisations, ranging from formal enterprises, so-called Nature-based Enterprises (NBEs) to informal and community-based networks and organisations. As for policymaking, the report goes beyond considerations at the national and supranational levels to highlight the role of the local or city level. It takes account of the diversity of benefits propelled by NBS, including variation in what can and cannot be commercialised. An improved understanding of policy support for scaling and replicating best practice NBEs forms an important aspect, along with other means of leveraging contributions of NBOs to NBS and sustainability. All in all, the report aims to map - and facilitate for policymakers to navigate - the range of issues and opportunities surrounding NBOs in this context. The approach is exploratory in nature, reflecting the significant territory covered and the ambitions to differentiate between generic and context-specific requirements for success.

Executive Summary and Main Findings

The importance of NBOs is partly linked to the need of greater private sector investment in support of NBS and sustainability. Increased engagement of NBOs carries great potential too for spurring innovation, higher demand, and collaboration surrounding NBS. Reflecting their capacity to deliver multifarious benefits, NBS suffer from "under investment", especially from the private sector. The experience of "best practice" NBOs provides ample examples of what can be achieved. Yet, each NBS project is marked by special conditions, presenting different combinations of commercial and non-commercial benefits, along with hurdles to scaling and replicability. The revenues that can be raised from commercialisation and monetisation risk, at the same time, to create a bias against less tangible benefits such as biodiversity and social inclusion.

Traditional national-level government regulation, subsidies, taxes, public procurement, infrastructure provision, and the removal of red tape, continue to exert a major impact on the framework conditions for NBOs. Beyond that, however, there is a case for locally adapted, tailored NBO policy strategies in support of viable ecosystems, as well as for countering risks of downsides.

The supranational level, notably in the EU, has framed the building blocks of a shifting momentum, catalysing a wave of collaborative and inclusive projects featuring inter-city collaboration in the piloting and experimentation with novel approaches to harness value creation through NBS. Common elements include coaching, indicator development, and toolboxes for measurement and evaluation, underpinning structured exchange of experience, learning, and putting the lessons of evaluations to practice. The report argues for a need of strengthening conditions for the development of NBOs and their various contributions, ranging from raising the marketability and bankability of NBS to boosting prospects for citizens and civil society to advance social economy benefits and strengthen the public goods aspects of NBS. It maps and examines five novel domains, spanning: i) co-creation; ii) digital enablers; iii) NBO life cycle; iv) policy in support of demand, and; iv) financial solutions. Related to this, the report advocates improved NBO policy tailoring, reformed governance, and strengthened humanity-nature links – "Co-nature'ing".

1. Introduction[1]

Increasing evidence has accumulated on the multifarious benefits of Nature-based Solutions (NBS). Fulfilling their benefits hinges on realising locally attuned processes where various actors come together in working out solutions of relevance to the specific social contexts (Nesshöver et al., 2017; Raymond et al., 2017). As an integral part of this dynamic, effective engagement of the private sector attains high importance. In regard to the contributions of NBS, as when it comes to achieving sustainability more broadly, the private sector is uniquely placed to contribute by way of finance, logistics, construction, R&D, innovation, entrepreneurship, and industrial dynamics broadly.

The mainstream orthodox view of the natural environment as a basically limitless source of abundant building blocks for human civilisation, is long gone (Goodland et al., 1992; Stern, 2008). Insights how to enact adjustments to mainstream institutional frameworks and market dynamics, so to reflect the rich array of value streams from nature, have been slow in coming, however. For long, policy analysis has placed the focus on how to tackle market externalities. Attracting less attention is the fact that the wide diffusion of omnipresent benefits arising from nature, compared to the more concentrated costs of halting the damage, plays into the hands of vested interests (Olson, 1971). Today, a spurt in government regulation and certification schemes such as ESG places demands on corporations and financiers to report and act on sustainability, which adds to pressures from citizens, courts, the media, board members, etc. Yet, the actual results remain vague. Effective resistance to restraining environmentally damaging practices remains visible in virtually every sector and policy domain faced with calls for transformational change.

The lingering under-investment in preservation and value-generation from nature is ill-managed by a traditional piecemeal approach to policymaking. The case for crafting a systemic policy to account for synergetic relations was recognised from early on in various disciplines[2]. More recently, the implications were elaborated in "new growth theory" (Romer, 1986), the innovation systems literature (Freeman, 1987; Lundvall, 1991), firm level interactions (Kline and Rosenberg, 1986), and cluster policies (Porter, 1990). The richer the links between different value-creating activities, the greater the importance of co-ordination mechanisms to shore up synergetic benefits, drawing on mutual learning, innovation, and co-creation.

While realising the benefits of NBS depends on the constructive engagement of multiple actors and competences (Frantzeskaki, 2019; Wolfram, 2016), a relatively weak private sector contribution is a common liability. In this, impediments to internalising returns are interwoven with the challenges to measure societal benefits, short time horizons, high transaction costs to undertake due diligence, lack of trust, misinformation, the influence of vested interests, and a tendency for projects to be idiosyncratic, complicating replication and scaling of success (EIB, 2023). At the same time, private sector engagement, when it comes about, tends to prioritise value streams that can be commercialised. Public goods aspects risk being pushed aside, and unwanted distribution arise.

Although achieving profitability on market terms remains the primary preoccupation of the private sector at large, corporate Governance Frameworks display signs of a shifting balance between shareholder and stakeholder concerns. Corporate Social Responsibility (CSR) operations have changed face in many organisations. In parallel, agreements at multilateral level, notably on Climate-related Financial Disclosures (TCFD) and Nature-Related Financial Disclosures (TNFD), place financials and corporations under high pressure to disclosure of impacts on sustainability, as

[1] The authors are grateful for the insightful inputs and comments provided by Knut-Erik Hilding-Hamann, DTI, Susanne Siebald and Tom McKenzie, ITEMS, Susana Leonor and Américo Mateus, GUDA, and Guido Ferilli, IULM.

[2] In economics, Marshall (1890) introduced observed externalities, or synergies, in the context of industrial districts. In economic geography, Christaller (1933) characterised "spillovers" that diminish with distance. The importance of framing complementary building blocks at local level was elaborated by Dahmén (1950).

well as present plans for rectifying action. Meanwhile, the EU's Green Deal, the Taxonomy regulation, the Biodiversity Strategy and, most recently, the Corporate Sustainability Reporting Directive (CSRD), subject industry to rapidly firming reporting requirements.

In parallel, Environment-Society-Governance (ESG) certification along with the international B-corp, science-based targets initiative, global compact, cradle to cradle etc., push business to assume a favourable environmental image. This coupled with the inherent difficulties to verify and validate what actions are in fact pursued and what impacts achieved, have resulted in serious concerns with what has been coined "greenwashing" (Font and McCabe, 2017). The term has attained even broader application, extending beyond business and finance to encompass the acts and deeds of, e.g., governments and multilateral institutions (Koplow and Steenblik, 2022)[3]. A case in point is the weight of continued government subsidies along with entrenched practices that, in effect, keep propping up pollution, grey infrastructure, and exploitation of nature, by far outweighing the resources allocated to activities crafted in support of sustainability[4].

Beside this state of affairs stands the rise of entrepreneurs and business owners that place genuine priority on product/service offerings based on sustainable use of nature (Anderson, 1998). While such enterprises were long viewed as a marginal phenomenon, there is growing evidence of various so-called Nature-based Organisations (NBOs) lending support to realising the potential benefits of Nature-based Solutions (NBS), along with associated wider contributions to sustainability.

In Andersson et al. (2023), significant work went into selecting and characterising so-called "best practice" Nature-based Enterprises (NBEs), a subcategory of the broader NBO concept, in URBiNAT frontrunner[5] cities. This was followed by hands-on examination of opportunities for their replicability and scaling opportunities in the follower[6] cities. Indications of success factors were observed at the organisational level, in the external environment, and related to the matchmaking process. A separate report (Caitana et al., 2024) examine success factors pertaining to other kinds of informal, social and solidarity based NBOs.

Building on from those strands of preceding work, the present report constitutes a first effort to present a consolidated policy agenda advancing NBOs and their contributions to NBS and sustainability. By inevitability our approach is of exploratory nature, given the idiosyncratic features of each organisation, the complexity of measuring and determining their impacts, and also interdependency of policies in this area with other determinants of success or failure. While including the task of advancing best practices, due to the systemic nature of challenges confronting NBOs, as well as NBS value generation, the policy domains examined span a broader mission; what we refer to as *NBO-policy*.

Compared to traditional mainstream policy work - rooted in industrial, business, and environmental sector traditions – our approach places emphasis on the local and regional context, particularly the urban environment. This agenda brings to bear on spatially embedded entrepreneurship and innovation in realising value streams, distinguishing between generally applicable approaches relative to those that are context specific. Where possible, we take note of relevant variation in the potential benefits arising from NBS. In some cases, such variation can be observed between kinds of NBS, as reflected in URBiNAT's NBS catalogue. Beyond this, high attention is devoted to the differences pertaining to those benefits that can be commercialised compared to those that cannot.

[3] Regarding the World Bank, see: https://www.urgewald.org/world-bank-drives-billions fossil-fuel-investments.

[4] The aggregate fossil fuel subsidies pursued have for instance been estimated at $7 trillion, or 7.1 % of GDP in 2022 (Black et al., 2023). Explicit subsidies, undercharging supply, amount to 18% of the total, an amount twice as high as in 2020. Undercharging for global warming and local air pollution accounts for the lion share, though, about 60 % of the total.

[5] The Frontrunner Cities are: Porto, Nantes, and Sofia.

[6] The Follower Cities covered in the present report are: Nova Gorica, Høje-Taastrup, Siena, Bruxelles, and Khorramabad.

The virtues of nature are inevitably linked to the economy and society in complex and sometimes conflicting ways. Green infrastructure – such as parks and waterways – has a tendency to invoke sharp increases in property prices (Millward and Sabir, 2011; Trojanek et al., 2018). Windfalls in that respect make it hard for low-income households to afford living in the area, risking pitting economic and social outcomes against each other. Such discrepancies in outcomes tend to appear also at the level of sectors, regions, and nation states.

As a key tenet, we underline the importance of framing a comprehensive policy approach which awards attention to the diversity of NBOs and the richness of NBS benefits and impacts. Building a case for stronger mandates in that respect needs to be accompanied by capacity-building and enhanced implementation capabilities by authorities at local and city level in non-conventional policy domains. The purpose is to underpin robust supportive interventions where they matter most[7]. In this we link as well to the overriding subject of how to expand private sector engagement and business investment in NBS more generally, while coping with social concerns and risks of exclusion.

The report is organised as follows. Next, Chapter 2 reflects on the concept of NBOs, its definition and subcategories, and how the rationale for "NBO policies" extend from corporate governance and traditional policy roots to shoring up underperforming NBS and sustainability. Chapter 3 considers the scoping of an adequate NBO policy framework. Chapter 4 maps and outlines five domains of NBO policy that form part of a forward-looking strategy aimed to strengthening local and regional ecosystems conducive to NBOs. Contemplating ways forward in crafting a viable policy mix, Chapter 5 addresses tailoring to specific conditions, capacity building, and governance issues. Chapter 6 concludes, placing emphasis on adopting a policy approach that is based upon and responds to the systemic challenges pertaining to NBS and sustainability, where the potential contributions of NBOs are in full force.

2. On NBOs and Policy Rationale

According to conventional perceptions of the firm, incorporation of "green" considerations in business decisions depends on the internalisation of the associated benefits, for instance by way of positive environmental preferences among relevant stakeholders, such as citizens and consumers (Lemos and Agrawal, 2006). Organisations for which "green" behaviours and achievements have been observed to define a distinct objective of its own, are here referred to as NBOs. As noted, such organisations are often spun around NBS and tend to weave value-enhancing links between nature and the economy, communities, and society. There is no single formula, however, neither to the rise, fabric, or orientation of best practice NBOs, nor to the means of promoting their scalability and replicability. With Nature-based Enterprises (NBEs), we refer to NBOs that constitute formal enterprises, profit-motivated or not-for profit. NBOs of informal nature may be community-, social- or solidarity economy oriented.

In this chapter, we start out by reviewing the nature of NBOs, after which we turn attention to the rationale for NBO policy.

[7] For the US, Tang et al. (2010) found local climate change action plans marked by high "awareness", moderate "analysis capabilities" for climate change, and weak "action approaches". In the present work, representatives of URBiNAT cities commonly pointed to lack of experience and mandate in relation to NBEs.

2.1 The corporate sector and green driving forces

To what extent the corporate sector acts on environmental concerns, and then why and how, is a long-debated issue. A range of factors impact on the outcome, including personal preferences and motivations, internal organisation, and the external environment.

The traditional notion - that companies are viewed as squarely driven by the motive to maximise shareholder returns - never held true. A firm's impetus on a broader range of "stakeholders" matters for the way its brands and outputs are perceived and perform. While stakeholder considerations have thus always been part of corporate governance, diverse approaches have existed and evolved side-by-side. At the systems' level, the stylised "market-based" Anglo-Saxon corporate governance model has conventionally been contrasted with the "bank-based" model, typically associated with Continental Europe or Japan. In this case, the differences in corporate governance have been shown to matter for the time horizon of corporate strategy, investment decisions, flexibility, and related factors influencing business performances across industries (Mayer, 1996).

At the firm level, corporate culture as well as individual motives matter. Top management may pursue firm strategies coloured by their personal interest. Aspiring for extended power and bonuses they may, for instance, push through mergers and acquisitions (M&A) despite adverse impact on stock prices. Inter-firm co-dependency among boards and managers may mutually shore up compensation levels (Maher and Andersson, 2000).

What drives changes over time in corporate strategy regarding sustainability? Whether regulation and other policies incentivise or enforce change used to be viewed as decisive (Pearce, 1989; Jaffe and Palmer, 1997). Much attention has been awarded to corporate responses to regulation vs. taxes and other incentives for environmental protection, by way of innovation and technical progress (Dillon and Baram, 1993; Irwin and Hooper, 1992, Acemoglu et al., 2012). Empirical reviews found little evidence of shifts in corporate behaviour on a "voluntary" basis (Garrod and Chadwick, 1996). Most of the policy debate remains focused on incentives as a driver for sustainable business.

Having said that, the competences as well as preferences of entrepreneurs and managers are known to differ, as reflected in varying types of sustainability business (Muff and Dyllick, 2014; Dyllick and Muff, 2014 and 2016). Some analysts have outlined principles for measuring the grade of sustainable entrepreneurship (Schaltegger and Wagner, 2011), distinguished from social entrepreneurship whose primary objectives are socio-ecological (Kraus et al., 2018). Distinctions have been made between transient vs. dedicated investors (Lydenberg, 2012). Other sources of classification include NBEs' transformative role, whether achieving change in their own organisation and outputs, and/or in the market (Loorbach and Wijsman, 2013). Exemplified consequences of variations in strategy orientation, here referred to as reactive, neutral, proactive, are illustrated in Table 1.

In URBiNAT, a pool of best practice NBEs were identified across the frontrunner cities and examined in-depth, particularly with focus on their potential for scaling and replicability. Based on interviews with the owners/managers, their business models were classified as Social Economy, Hybrid, or Traditional, ranking from high to low by way of influence from a personal sustainability motivation[8]. Within the studied sample, NBEs scattered across these categories, as did their association with kinds of NBS (Andersson et al., 2022*a*).

Over time, a growing number of corporate leaders appear to display a sustainability-orientation (Muff and Dyllick, 2014). Meanwhile, CSR has evolved from being perceived as a marginal side-

[8] Early empirical findings supported the traditional model (Irwin and Hooper, 1992; Dillon and Baram, 1993; Garrod and Chadwick, 1996)). The social model has been advocated by, e.g., Laville (2014), Defourny and Nyssens (2014), and Kooijman et al. (2021). On the hybrid model, see Freeman et al. (2007) and Gupta (2011).

Table 1: NBE sustainability typology grid

Criteria	Bus-as-usual	Reactive	Neutral	Proactive
Value creation	Shareholder value maximisation	Improved shareholder value	Triple value, expanding beyond shareholder returns to include social and env.	Creating significant positive impact in critical areas of societal/planetary concern
Primary corporate attitude	Maximise profit	A pattern of reacting to societal pressures	A pattern of active exchange with broad stakeholders	Voluntary, pro-active and inter-active collaboration with new players
Primary focus	Inward, main customers	Shareholder	Stakeholder	Society & planet
Strategy	Managing risks ensuring compliance	Managing primarily risks, embryonic embrace of environmental and social opportunities	Triple bottom value is created not just as a side-effect,but as the result of deliberately defined goals and programmes addressing specific sustainability issues or stakeholders	Societal concerns trigger an "outside-in" view on the company's capabilities and resources, built upon to generate societal & planetary value whileensuring the long-term wellbeing of the company
Market definition and positioning		Mostly reactive to challenges from outside the traditional market	Exploration of new opportunities outside existing markets	Defining business activities outside existing markets
Product & services	Core business	Probably no changes (beyond cosmetics)	Most likely adaptation of products/services (but not questioning their societal value)	New products and services as a voluntary & pro- active response, likely in collaboration with new partners
Governance & leadership		Probably not yet affected	- Cross-functional sustainability committee - Compensation of (top) management includes triple bottom line value creation	- Relevant societal representatives are fully integrated in the relevant decision-making processes at all levels of the organization
Type of CEO	Traditional economist	Opportunity seeker	Integrator	Pioneer
Type of companies	Mainstream	P&G, Nestlé, Danone, Walmart	Novo Nordisk,Bodyshop, Unilever (from business-as-usual)	Conservation International, Re:wild, Groasis, Grameen Bank
Sustainability implementation		Most likely centralised	Likely integrated into line functions	Re-organisation around societal-env. using inclusive new dynamic vehicles
Processes		Focus on expanded value chain	A secondary focus reflecting the strategic changes	Becomes a service-function key to deliver the value
Reporting		Minimalistic, highlight good news (risk: green washing)	- Internal reporting includes triple bottom line External reporting on sustainability	- Reporting reflects the societal value created and includes voices of beneficiaries
Stakeholder influences		External non-market (media, government, NGOs, communities)	- Internal stakeholders (employees) as well as suppliers, customers and (new) external partners/cooperation	Company takes a pro-active approach in identifying and engaging concerned stakeholders

Source: Adapted from Muff and Dyllick (2014)

activity (Solow, 1992; Montiel and Delgado-Ceballos, 2014) to commonly appear as a strategically important element of headquarter functions (Greenwood, 2007).

This changing positioning of CSR constitutes merely one aspect of sustainability issues attaining increased attention in the corporate and financial world. Multiple driving forces are at work, with individuals in their capacity of board members, managers, employees, and consumers playing their part. The EU Green deal, CSRD, ESG certification, multilateral and government regulation, etc., have clearly upped the stakes for companies to measure and disclose their carbon footprint and other relevant sustainability performances, as well as to develop credible plans for amendment (Möllers, 2022). Their brand and ability to maintain access to favourable funding as well as healthy customer and business relations may be at stake (Branislav et al., 2012).

Associated far-reaching changes in corporate priorities appear across diverse sectors and economies (Poojaa and Krishnamoorthy, 2021) [9]. To what degree these developments bring a change in the quality and actual impetus on sustainability, is another matter.

2.2 Definitions and NBO categories

Beside green and blue reporting as such, in focus here are the organisations that set out to achieve sustainable use of nature as a core element of their product/service offering[10]. An extensive research literature has examined and characterised such entities from various perspectives (Anand et al., 2020). While various distinctions can be made, here we apply the term *Nature-based Enterprises (NBEs)* when referring to formal business entities, whether they operate for profit or not-for-profit. NBEs typically arise through "green" (or sustainable) entrepreneurship, or the conversion of mainstream business. Typically, NBEs may be investing in new technology, innovate, undertake organisational change, engage in marketing and training efforts, resulting in potential benefits from conservation and the responsible management of nature and nature's resources.

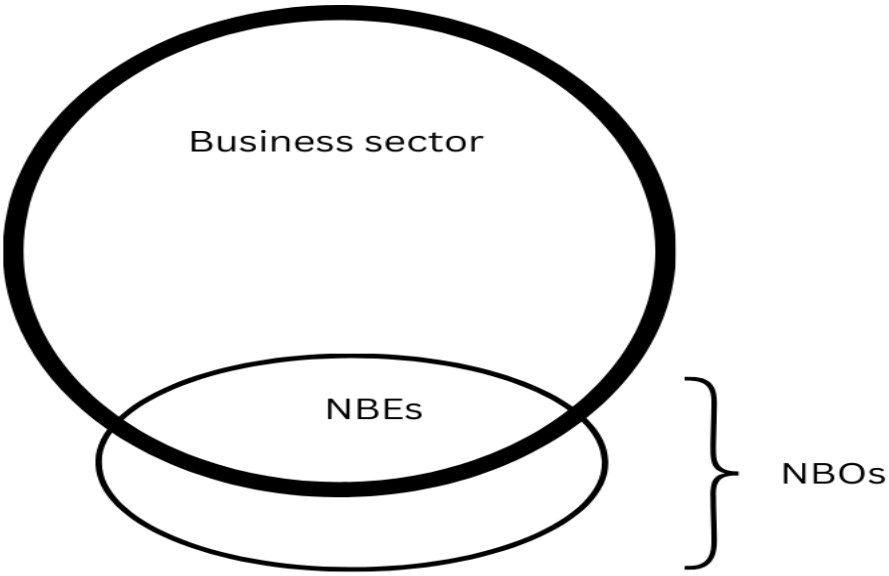
Separating NBEs from business in general is far from trivial. The distinguishing factor comes down to basic orientation. The actual record of mainstream businesses by way of carbon footprint, biodiversity, pollution, waste generation, or circularity may not necessarily be harmful. They may run CSR activities and issue green bonds, support plantations, advocate a green transition, etc. Yet, in contrast to NBEs, achieving sustainability will not appear as a core business.

Rather than limiting to NBEs, the present report applies the broader term *Nature-based Organisations (NBOs)*, when referring to any kind of organisation with a sustainability orientation, including informal networks or community-based organisations. Figure 1 illustrates our conceptualisation of the partly overlapping domains populated by: i) business; ii) NBOs, and; iii) NBEs. The term "business" is applied broadly, referring to all formal private sector entities, for-profit and not-for profit. The category NBOs include "green" businesses as well as informal networks, social and solidarity-based community organisations, etc., which fall outside the realm of business. The business sector thus incorporates NBEs as a sub-group, while NBEs belong as well within the scope of the broader NBO category.

[9] According to a survey of the World Economic Forum 2022, 90% of executives believe sustainability is important, but only 60% of organizations have sustainability strategies, see https://www.weforum.org/agenda/2022/06/why-sustainability-is-crucial-for-corporate-strategy/

[10] According to a mainstream definition, sustainable use of nature is core to the product/service offering of Nature-based Enterprises (NBEs). Nature may be used directly by growing, harnessing, harvesting, or restoring natural resources in a sustainable way and/or indirectly by contributing to the planning, delivery, or stewardship of Nature-based solutions (Kooijman et al., 2021).

Figure 1: Domain relations: Business sector, NBEs, and NBOs



***Source*:** IKED

Broadly speaking, community-, social- and solidarity-based NBOs, outside the NBE category, are more uniformly motivated by convictions and determination by those engaged to develop initiatives in support of sustainability. Through this approach, they put more squarely, compared to formal NBEs, their emphasis on social engagement, network, and shared benefits at the local and community level. The issues and ethos driving them means that their activities oftentimes focus on deprived areas and disadvantaged groups, possibly women, children, or the elderly, or ethnical minorities. Through such focus they tend to exert more directly favourable impacts by way of income distribution, or social benefits. In terms of other credentials, such as size, growth, or degree of support for NBS, it is hardly possible to generalise differences between informal NBOs and NBEs. Due to their informal nature, however, NBOs tend to require less administration while also mustering less capital and developing less significant monetary impetus. Their environmental and social impact may be no less substantive though.

Those NBOs that form informal networks, community and voluntary, social enterprise, co-operatives, all not for profit, still depend on instituting administrative practices capable of performing certain support functions over time. While many are run on a voluntary basis, raising, and using little or any financial resources, they may still at certain point embark on activities, or meet with challenges, that require an ability to raise and make effective use of funding. This matters particularly when judging the stamina and development of organisations over time.

In the modern area, perpetuating a network and activities involving large numbers of people nevertheless tend to require certain organisational and administrative efforts that may be hard to keep up without the ability to raise and manage financial resources. Innovative practices have been visible for years, however, such as diversified private equity, bootstrap investment, and bricolage (Brears, 2022).

Social entrepreneurship is driven by not-for-profit motives and typically evolve despite few income-earning opportunities or other substantive sources of revenue (Desa, 2012). In a sense, their rise is motivated by the void of public action to address outstanding issues, possibly in deprived areas and for disadvantaged groups (Puffer et al., 2010).

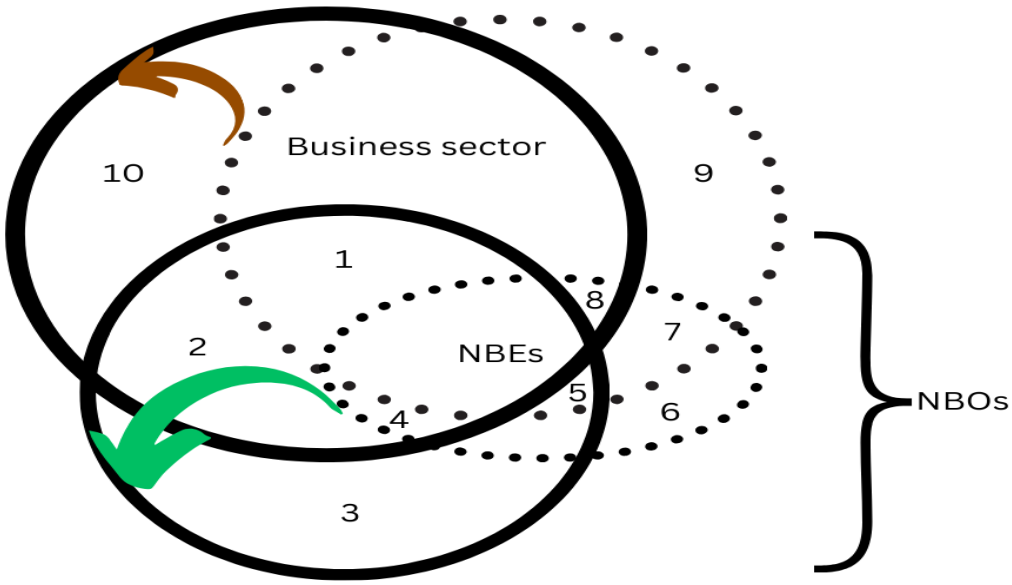
Effective use of scarce resources for the purpose of meeting outstanding social needs is a common feature (Mair and Marti, 2009). By pursing bricolage, reconfiguring existing resources, entrepreneurs may legitimise institutional change, notably under the duress of weak institutional systems (Campbell, 2004).

Although public support targeting green start-ups may be on offer, donations and voluntary contributions remain essential for many. Orderly access to diverse and blended sources of funding may greatly facilitate linking to supportive competences. In the digital era, crowdfunding offers exemplifies the kind of schemes which can enable NBOs to combine raising capital with expanding and deepening their member/user networks (Lehner, 2013; Böckel et al., 2021; Hörisch, 2015).

Social innovation represents a core source of value-generation for many network-based NBOs. Ample empirical observations show their durability often to be dependent on the stamina of the founder or another committed individual who assumed informal leadership at some stage. Achieving an organisational fabric capable of continuing the operations once the founder or such another chief responsible is no longer around, or unable to keep going, appears decisive for the longevity of many such NBOs.

NBEs may similarly depend on individuals creating vulnerabilities in terms of durability. In their case, however, mechanisms translating social and environmental amenities into products and services that can be commercialised, at least in part, usually play a bigger role. One way or the other, however, the lasting success of NBOs hinges on propelling value streams associated with NBS on terms that lend long-term support to their organisation as well as to the wider good of society.

Figure 2: Evolving demarcation lines: Business sector, NBEs, and NBOs



1. *Existing businesses converted to NBEs*
2. *Green entrepreneurship*
3. *Social entrepreneurship*
4. *Community NBOs turned NBEs*
5. *NBEs turned Community NBOs*
6. *Community NBOs ceased to exist*
7. *NBEs ceased to exist*
8. *NBEs reversed to mainstream*
9. *Mainstream business closure*
10. *Mainstream entrepreneurship*

Source: IKED

Figure 2 illustrates the evolving nature of the business sector, NBOs, and NBEs, along with shifting boundaries between them. The dotted lines indicate a past position (depicted in Figure 1) compared to a later state, marked by thick boundary lines. In this case, the NBE category (whose shift is marked by a green arrow) expanded through a combination of conventional business converting (1), green entrepreneurship (2), and (3) conversion of informal NBOs to NBEs (3). The category of NBOs outside the NBE realm, expanded through social entrepreneurship (4) plus entities "converting" from NBEs (5). Meanwhile, some such NBOs have ceased (6), while some have become NBEs (7). As an example of the latter, a community-based social network may form a social enterprise in order to legalise its operation and facilitate access to funding (Austin et al., 2006; Bornstein, 2004). Appearing as another small sub-set, some previously defined NBEs have lost that status, and reverted to mainstream business (8). Finally, the mainstream business sector (whose shift is marked by the brown arrow), apart from having shrunk by conversion to NBEs, will as well be void of those firms that went out of business (9). On the other hand, it will incorporate those new entities that have come about through mainstream entrepreneurship (10).

All in all, as Figure 2 stands, the NBO sector grows relative to mainstream business, with expansion of NBEs as well as of other NBOs. While this arguably reflects present trends, the precise relations, and the significance of the shifts appearing thus far, is less clear.

2.3 Rationale for NBO policy

The present report focuses on the role of policy in relation to NBOs, including NBEs. This aggregate category is viewed as increasingly importance as a means to working out viable solutions to tackling climate change, bio-diversity loss, pollution, and achieving a nature-positive economy and sustainability more broadly. As outlined in the previous section, their rise partly reflects a transformation of existing business, partly the contributions of green as well as social entrepreneurship and community engagement. At the end of the day though, the impetus of NBO comes down to the significance of their activities.

The importance of NBOs partly emanates from their role in realising potential benefits of NBS. In the absence of NBO engagement, again, the diverse and multifaceted character of their value streams in effect feeds under-investment, mismanagement, and over-exploitation by conventional market forces, and also in some sense by government. Addressing these challenges requires a major upgrading and advancement of the capacity, innovations, and concrete activities pursued by NBOs.

Determining policy rationale conventionally requires specifying what value, or additionality, "policies" invoke. Unless policies result in greater gains than would have applied in their absence, to a degree that exceeds the costs inferred, there is no rationale. Determining additionality in this sense meets with complex, interrelated issues (Gillenwater, 2012). The gap between financial and societal values requires the application of adjusted shadow prices. Many of the benefits of ecosystem services are literally unknown, of indirect nature, intangible, elusive, and extremely long-term.

Standards agreed at supranational or international, level aim to guide and facilitate verification and validation of outcomes under various circumstances[11]. The systemic nature of the challenges at hand never-the-less requires shifting away from a piecemeal to a systemic approach to pursuing and evaluating policy. On a related note, in line with the concept of reflexive governance (Karvonen, 2018; van der Jagt et al., 2021), policy experimentation and learning should be devised as a means

[11] An example is the European Committee for Standardization (CEN), Technical Committee 465 on Sustainable Cities and Communities. Complementary efforts at product- and/or sector level may help underpin recognition of NBO efforts in support of sustainability.

to underpin capacity building and operational lessons. The scope for benefits is greatly expanded in the presence of favourable impetus on future policies.

Achieving policies that are effective and relevant requires communication and collaboration cutting across borders. Existing deficiencies and distortions need to be taken into account, wherever they reside. Land-use rights or environmental and building permit schemes, plans, or codes, or sectoral policies, tend to conflict with environmental management needs, in effect hindering NBS uptake and advances by NBOs. Existing subsidy schemes generally favour incumbents and conserve grey infrastructure and practices. Conventional norms are intertwined with prevailing mindset, ruling professional codes and modes of decision-making. The aggregate weight of such institutional fabric is compounded by the lack of awareness and understanding of the multifarious nature of the benefits surrounding ecosystems and the services engineered by NBS. Realising their potential will much depend on making headway in building joint capacity spanning diverse disciplines as well as administrative and jurisdictional partitions (Seddon et al., 2020; Goldstein et al., 2023).

The situation is reflective of nature's value streams knowing no limits, neither in terms of sectors nor geography. This applies strongly to nature-regeneration by way of Nature-based Solutions (NBS), often applied in an urban environment where linkages to nature may be weakly present, leaving people to suffer alienation from nature. NBS have been documented to open for ample environmental, social, cultural, and economic benefits (European Commission, 2016). While some outputs are short-term, near-by, and direct, others are long-term, dissipate widely and materialise only indirectly in synergy with other factors (Kabisch et al., 2022).

In effect, markets as well as institutions are highly imperfect when it comes to valuing and responding to the needs of managing the wide-ranging virtues of nature, including NBS. Government organisation is marked by compartmentalisation implying a piecemeal approach. Private entities similarly cannot spread themselves thin but need to focus on certain return. The fundamental policy rationale at hand emanates from the lack of abilities to internalize the benefits of natural assets. The result is "under-performance" including forgone benefits by the absence of adequate efforts devoted to investment, innovation, and management of such resources. This in turn results in the increasingly pervasive evidence of retreat for the environment. While this might once have been viewed by economists as a non-issue, as natural assets were viewed as in abundant supply, decades have now passed since it became widely recognised that the demise of nature has started to confront human activities with severe constraints, the continued bulldozing of which gives rise to steadily increasing risks (Goodland et al., 1992).

The consequences of under-investment are magnified by interdependences and risks operating at the aggregate, or "systems", level. Nature's resilience up to the point where inflicted damage passes a thresholds level, may hide the accumulation of damage over extended periods of time. Once the threshold is past, and wider ecosystem collapses unfold, the consequences may have become irreversible. While hard to anticipate beforehand, such non-linear relations warrant improved means of packaging and communicating relevant information to policymakers, along with their ability to pursue precautionary policy measures from early on before the situation gets out of control.

Success in such respects will require adequate policy coordination. Where individual measures are pursued in isolation, transformational change will be an uphill struggle. Governments as well as other policy-institutions are commonly bogged down in a "silos-mentality", which impedes the identification and realisation of synergies between sectors/policy domains (Paterson, 2021). In each ministry, for instance, sectoral considerations typically assume first priority, with sustainability appearing second or third – that it wields the highest importance overall ends up of little practical significance. Given that any decisive strategy in support of sustainability requires a systemic

response, entailing far-reaching social and economic transformation, traditional sectoral policies run far short of what is required (Worker and Palmer, 2020).

This calls attention to NBOs as a result of insights, initiatives and aspirations by individuals as well as organisations, to act in support of sustainability. NBOs may enable greatly improved management of green & blue assets, emanating from high motivations along with skills and gradual learning how benefits from NBS can be enhanced and internalised. The founders of NBOs tend to be driven, in one way or another, by observations of outstanding needs and opportunities related to nature. Entrepreneurial spirit, along with social and ethical ethos, blended with ingenuity to innovate, and thus comes with offerings by way of "green" products, services, networks, or activities, that would otherwise not have come about.

Further, the private sector, including NBOs, account for R&D and innovation aimed at unleashing such benefits from NBS linked to increased mobilisation of demand by citizens. In this, effective organisation and capturing of synergies between various kinds of competences tend to be required (Adams et al., 2016). Strengths may hinge on shared recognition of NBS benefits along with means at hand for collaboration, including co-creation of NBS by citizens (URBACT, 2019).

In a sense, NBOs represent a vital go-in-between environment and society, a vehicle propelled by "bottom-up" momentum to visualise and realise previously unbaked value-streams. Enabling NBOs to unleash innovativeness and new competences, drawing on, mobilising, and leveraging the inherent value streams of NBS, can be perceived as a counterforce, or healing mechanism, in the presence of combined market and government failures (Dean and McMullen, 2007; Ball and Kittler, 2019). What they can achieve though, hinges on a range of interrelated influences, related to supply as demand, playing out on the ground (Bergset, 2015).

Against this backdrop, compared to policymaking at the level of the nation state, policy makers that are closer to the issues, meet with a different rationale for NBO policy. Based on greater awareness of outstanding issues, practical and institutional hurdles, impediments to collaboration including a mismatch by way of actor interests and competencies, they may better decipher ways of pursuing an enabling role. In some instances, this may translate into policymakers doing "less" rather than "more", i.e., removing red tape or cutting back on institutional rigidity. One way or the other, however, policymakers importantly need to ensure conditions that promote increased private sector engagement, innovation, and investment in NBS, along with greater appreciation and rewards for the spectrum of potential benefits they stand to generate. There is no universal recipe at hand – what matters is to unlock those factors relevant to the specific context, that can help engineer a vibrant ecosystem in support of sustainability, where NBOs meet with favourable conditions to play their part.

Other sources of rationale for NBO policies are at hand too, reflecting that the multifaceted value-generation of NBS comes with side-effects that may be problematic and exacerbated by private sector involvement. An example is the increase in land prices and rents that regularly occur in their vicinity, which may be accompanied by problematic social and political issues. Awareness of what is at stake from early on will facilitate for policy makers to take precautionary measures, such as reserving public space, or put in place other means of protecting disadvantaged and vulnerable groups. The provision of social housing, where rents are kept low, may serve as an example. Subsidies targeting those affected, for instance lowering their energy costs through access to renewable energy, or offering privileged access to education and training, offer alternative avenues, although apparently seldom applied in practice.

3. Scoping NBO Policies

Having taken stock of the traditional approach to corporate governance and policy rationale, we underline the need of recognising the imperfect state of conditions surrounding both NBS and NBO development. While the benefits of NBS are under-valued and under-invested in, rectifying actions need to deal with stifling distributional challenges (Aklin and Mildenberger, 2020). The role of NBOs, appearing as a critical source of counteraction through, e.g., innovation and new skills development, is similarly frustrated and under-utilised. The rise of best practice NBOs present, examined in Andersson et al (2023), has allowed for important lessons how success can be achieved, which needs to be further absorbed and built upon by policymakers.

In scoping NBO policies, we make a point of not being constrained to a traditionalist definition of what is meant by "policy". We start out with reflections on the roots of NBO policies in traditional mainstream policy frameworks.

3.1 Traditional policy roots

In terms of traditional policy domains, the roots of NBO policy can be located across industrial, enterprise (or business), and environmental policy. Each of these have met with hurdles of their own, which partly undercut their legitimacy in mainstream policy circles, and prompted adjustments in how they were pursued and communicated.

In the case of *industrial policy*, the notion that governments could "pick-the-winners" among industries or actors in the marketplace, fell out of favour as planned economies were seen to lose steam in the second half of the 20th century. That governments favoured some industries above others became associated with corruption and state-sponsored privilege and injustice. Some pointed to industrial policy as the antithesis to free market (laissez-faire) policy. The rise of Japan and the Asian tigers in East Asia fostered a competing industrial policy model, however, based on promotion of competitive advantages within a dynamic model that placed high emphasis on export-led growth (Shinohara, 1978; Komiya and Irie, 1990).

Ironically, the developed markets that found themselves at the losing end in the face of stiffening competition from newly industrialized countries, resorted to a degenerated variant of traditional competition policy – originally developed to protect against the threat by monopolies - to institute market protection. So-called "anti-dumping" policy and other non-tariff barriers were thus happily applied to protect ailing industries. In a third wave, industrial policies were seen as motivated by economies of scale (Helpman and Krugman, 1978), positive externalities of R&D and strategic advantages related to innovation systems (Friedman, 1978; Lundbäck, 1992). These various strands of argument have been of some practical importance. In parallel, however, virtually all developed countries continued to pursue traditional industrial policy one way or the other, to protect sunset industries, or fulfil various pertinent political objectives.

Enterprise or business policy has long existed by way of regulatory and fiscal instruments. Some frame orderly conditions for business transactions and for settling disputes. Fostering favourable information exchanges and network effects have further seen as a natural playing ground for public-private cooperation, lending support to the establishment of chambers of commerce, incubators, science parks, and so forth. A special track appeared under the heading of SME policy and. partly related, the promotion of entrepreneurship. Operating at a disadvantage relative to incumbent business, in possession of entrenched relations with regulators and customers, SMEs and start-ups face inherently more risky conditions, yet represent efforts and experimentation in support of socially essential renewal processes. They moreover consistently account for most new

employment opportunities, as established enterprises put higher focus on raising productivity in core business and thus rather engage in gradual slimming of their workforce.

Taken together these observations built a strong rationale for policy support of new business development. Along other tracks, the observation of partly untapped synergies in working out geographically bounded collaborative linkages between enterprises were argued to create a case for cluster policies (Andersson et al., 2004). Intensifying interdependencies represent a stark characteristic of technological systems in the era of digitalisation. Abilities to patent and innovate around green technologies critically depend on the specific combinations of relevant capabilities flourishing in particular locations, including cities (Barbieri et al., 2023*a*).

Environmental policy arose later, in response to the growing uncontrolled damage caused to the natural environment. At the start, the focus was on instituting "end-of-pipe solutions" to halt emissions. The policy rationale again relied on environmental impacts taking the shape of externalities that were disregarded in market transactions, i.e., affecting "third parties". Air pollution by way of Sulphur and other substances causing acidification were cut back successfully at the start. In the 1970s, Chlorofluorocarbons (CFCs) were found to cause a rapid degeneration of the atmosphere's ozone layer. Despite wide recognition that a deadly threat was at hand, international negotiations to curb the problem initially failed (Bohm, 1990). The chemical industry attacked Greenpeace in 1982 for their anti-CFC campaign while offering no solutions. After Greenpeace had summoned engineers to develop a prototype of a refrigerator not reliant on CFCs and industries found costs of a transition manageable, the world community could achieve the breakthrough "Montreal Protocol" in 1987.

On that basis, one might have concluded that environmental policies were onto a winning streak. That is not quite so. A second "generation" of issues, associated with unsustainable production and consumption patterns, have proven a nut hard to crack. The third generation - addressing systemic challenges, coping with the breakdown of entire and interrelated ecosystems, resilience effects and passing thresholds, that we associate with the global crises of climate change, biodiversity loss, and (yet ongoing) pollution, means that environmental policy is falling short. The task at hand comes up against the combined weight of sectoral, financial, industrial, and other proponents with the natural inclination to defend entrenched ways of working within each individual other policy sphere. The case for transformational change thus runs into strenuous resistance from diverse policy domains whose participation is essential if real results are to be achieved.

3.2 Policy levels

Policies of relevance to NBOs originate in all the fields above, although with new elements and combinations appearing. As already indicated, this calls for some revision in the perspective and understanding of the rationale for NBO policy, recognising the presence of interrelated predicaments at hand, and the case for "freeing up" initiatives of NBEs in realising the benefits of NBS that fail to materialise within the realm of mainstream market mechanisms and institutions.

As for the definition of "policies", those enacted by *national* governments represent merely a sub-domain of what can be referred to as "policies "in a wider context. Public authorities at *regional and local* level, for instance at the helm of counties and municipalities, pursue policies as well – although of a different nature, and with another mandate, compared to national governments. Equally, policies are crafted at *supranational* level, as by pan-European institutions or multilateral bodies.

Besides the rationale for NBO policy, the measures pursued as well as results aimed for, varies between policy levels. At national level, much attention has been paid to the scope for expanding economic incentives, by way of taxes or market-based instruments, to replace less efficient

regulations. Adequately devised, the former have proven more conducive to stimulating demand and green growth (Tarui and Polasky, 2005). Among other approaches to incentivize sustainability, Macron's "ecological plan" aims to reduce France's greenhouse gas emissions by mandating the heaviest polluters to sign agreements to achieve substantive emission cuts. In the US, the Inflation Reduction Act, signed into law by President Biden, promotes the production and adoption of clean energy partly by granting preferential access to markets. With the latter serving basically as a non-tariff trade barrier, the EU and others have protested vehemently, thus far to no avail.

At the other end of the spectrum, conditions for NBOs are affected by processes shaped in their geographical proximity. Community relations blend with personal interactions as well as local culture and the social context. Information exchange become a matter of knowledge transfers. Organisational and institutional fabric enter the scene by way of reward structures vs. scope for sanctions, which may translate into openings for value-enhancing synergies and collaboration, or for hurdles and impediments due to the closing of doors (Coleman, 1988; de Vries et al., 2018). There is no right or wrong in such leads. Policies pursued at local/municipality/regional level influence the pre-conditions, however, for such processes playing out on the ground. We may conceive of an ecosystem where actor categories, competences, and actions, are intertwined. At this level, policy makers meet with a rationale not to determine specific exchanges, but to exert a favourable impetus on the functionality and output of the overring dynamic, in particular where externalities and public goods play a major part (Foray et al., 2021).

Promoting green entrepreneurship and NBOs links to promoting constructive inter-active relations, marked by enhanced awareness and alignment of interests in achieving transformational change. In practice, however, the overall conditions for entrepreneurship and enterprise development display limited progress in many parts of the EU and are viewed as being on a downward trend in some cases (Decker et al., 2020). This applies as well to potential high-growth areas, including high-tech, knowledge intensive services and green innovation, raising concerns that the EU is failing in offering adequate conditions for NBOs as part of this wider context.

Innovation hubs, business labs, incubators, and start-up accelerators may serve as building blocks for fostering local dynamic in value-generation from NBS. Porto Innovation Hub (PIH) in Porto, Portugal, was launched in 2016 with the aim to serve as a platform for reinforcing participatory innovation and entrepreneurship. PIH aims to bring together all innovation agents of the city and the region, for "positive contamination" through actions and activities related to NBS.[12] Among the follower cities, both Khorramabad in Iran and Høje Taastrup in Denmark have taken initiatives to developing such facilities, following exposure to potential opportunities related to the replicability of best practice NBEs from the frontrunner cities (Andersson et al., 2023).

Figure 3 illustrates the demand for policy-related initiatives expressed in interviews by green entrepreneurs/owners of NBEs in Sofia (Andersson et al., 2022*a*). At display here are specific initiatives they wish to see materialise as a basis for enabling enhanced green and social business growth. While the responsibilities of some reside with national government or at EU level, others are rather up to authorities or stakeholders assuming responsibilities in the local context.

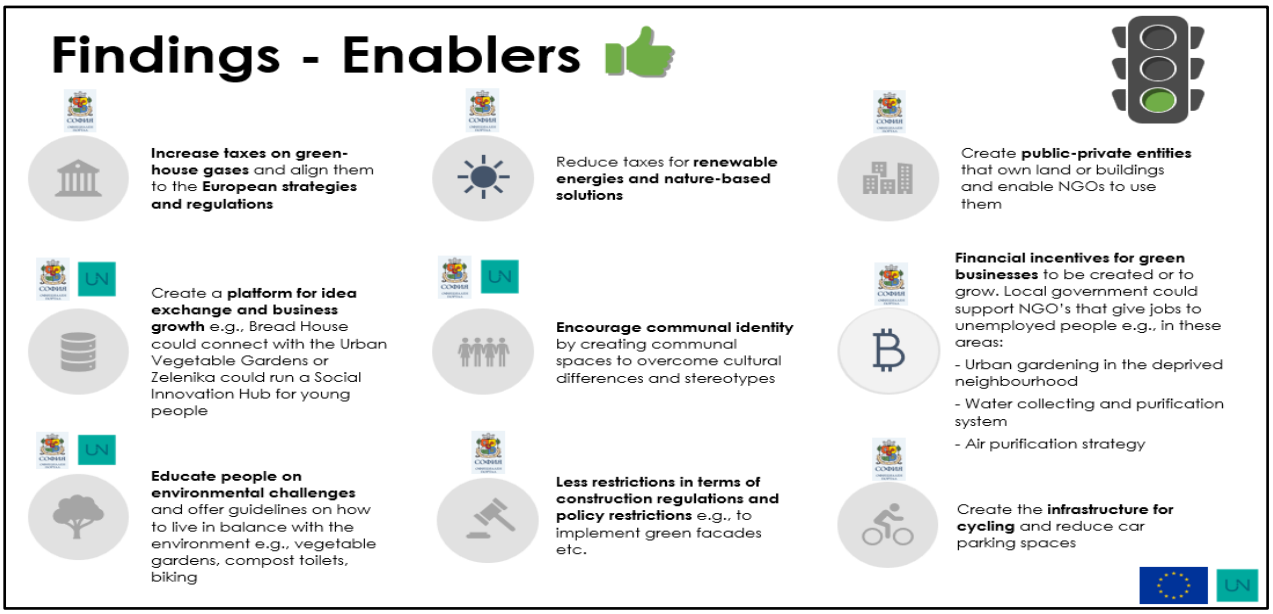
The policy-related measures identified as important for NBE performances in Sofia, can be characterised as directed towards the following main actor categories:

National government authorities:

- Increase taxes on greenhouse gases;
- Reduce taxes for renewable energies and nature-based solutions;
- Less construction regulation.

[12] https://portoinnovationhub.pt/en/home-page/

Figure 3: Activities enabling green and social business growth, Sofia



***Source*:** Andersson et al. (2022*a*)

<u>Authorities at local level:</u>

- Assume a responsibility for further infrastructure for communication and mobility.

<u>More open-ended requests (may be picked up by authorities nationally or locally, and/or by other stakeholders)</u>:

- Encourage communal identity;
- Educate citizens on environmental challenges;
- Create public-private entities arranging with space accessible for NGOS;
- Create a platform for idea exchange, entrepreneurship and business;
- Propel financial incentives conducive to green business growth.

For three of the activities in Figure 3 - those with URBiNAT's logo marked next to them - measures have been instigated as experimental processes under the aegis of this EU Horizon project.

Contributions of NBOs depend on circumstances. Their role in instilling "sustainability-oriented" innovation or shoring up demand for ecosystem services may hinge on systemic change in corporate culture, spanning internal organisation as well as external stakeholder relations (Adams et al., 2016). Applying to NBEs, countering corporate myopia and shifting from a defensive or neutral to a proactive stance may be key (cf. Table 1). Issues nevertheless remain by way of focus away from public goods aspects towards maximization of revenues from NBS that are prone to monetisation. Although commercialisation/internalisation of externalities provides critical support in many situations, it is no panacea for sound and fully impactful management of NBS. Commercialisation of genuine public goods isn't practically feasible, nor desirable.

All in all, policy needs to manage a delicate balance act. In supporting dynamic conducive to value-enhancing green entrepreneurship and NBOS, it needs to ensure monitoring the consequences and defend the public good. On both accounts, means of facilitating participatory governance, collaboration, and co-creation are of high importance.

3.3 Factors influencing NBEs

Work on best practice NBEs across URBiNAT's frontrunner cities, along with the extensive data collection under the aegis of Network Nature, have provided ample new empirical evidence what determines NBE performances[13]. Below we list and structure 'such factors divided into four sub-areas. Influences on other NBO are commented on in the subsequent section. Additional areas can be conceived of as well, e.g., environmental and political, as listed in the inner circle of Figure 4 (we reflect on environmental influences separately in the next section, however, related to NBS, and politics are addressed elsewhere too). Corresponding enablers and barriers are placed in the rings further out. The listed influences range from those that are conceived of as generally relevant for the success of entrepreneurship and enterprise development, to those that influence NBOs specifically[14]:

Legal / Regulatory

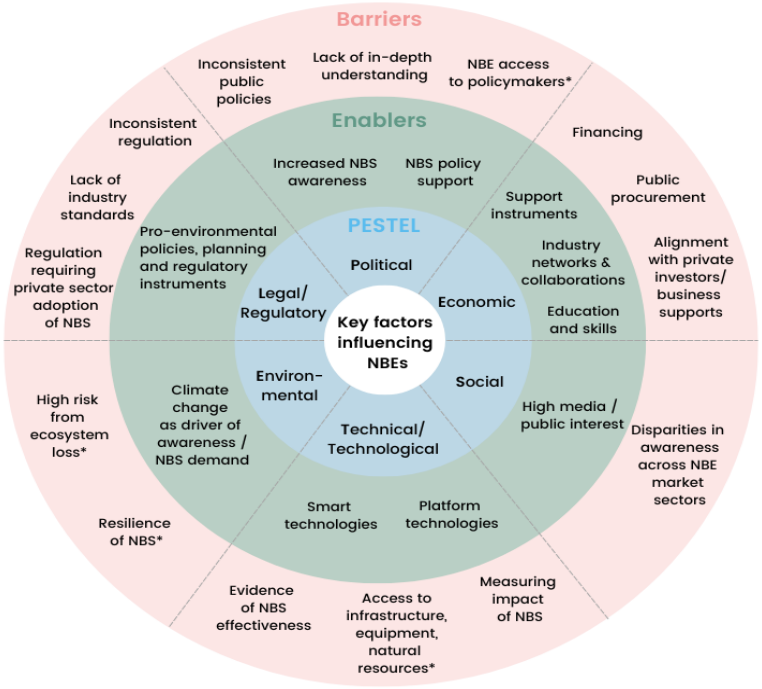
- Laws and regulations are typically pointed to by many entrepreneurs as constituting barriers to their operations and ability to succeed. This may be as they limit options, account for rigidity, and tend to impose costs.
- Laws and regulations may assume enabling roles as well however, for instance by facilitating access to funding and accounting for reliable dispute resolution mechanisms which facilitates contracts and their reliability.
- Vagueness and lax implementation of laws, by contrast, weaken contractual arrangements.
- Lack of consistency in public policies undermines the driving forces for investment, by making long-term planning more difficult and weakening the driving force for innovation. Contradictions between the approach to NBS, for instance between climate policy, regulations governing planning, construction, and public procurement, similarly erode incentives.
- Where policies fluctuate over time, enterprises hedge their options and proceed with less vigour to transformational change. They also favour short term effects over those that are long-term, to the detriment of sustainable development.
- Public practices for procuring NBS tend to fit poorly with the situation and limitations not well suited to smaller nature-based enterprises.
- NBEs tend to identify an absence of standards as an obstacle to defining and communicating quality in NBS implementation, risking reputational damage and inhibited future uptake. NBEs recognise a need to demonstrate verified impacts and increased awareness of best practice as a driver of capacity building and for overcoming knowledge deficits.

Economic

- Access to funding is a major issue for firms in early-stage development and equally matters greatly for their growth trajectories. The depth of financial markets, including the scope for blended finance, distinguishing potential high-growth opportunities as well as managing diverse kinds of risks, are key to breeding potentially high-value added new firms and industries. The green and blue economy raises specific demands in this respect, due to the complex blend of outputs that are marketable and bankable vs. public goods, in effect confronting NBEs meet with particular challenges (Kooijman et al., 2021).

[13] For detailed information on the NBS Knowledge Database, visit: https://networknature.eu/nbs-knowledge-database
[14] This review has been adapted from McQuaid et al., (2022).

Figure 4: Influences on NBE performance structured across areas



***Source*:** McQuaid et al. (2021*a*)

- Where demand for NBS outstrips supply, this may reflect supply barriers to NBOs, i.e. lack of conversation from traditional business to NBEs, or barriers to green entrepreneurship, etc., as outlined in Figures 1 and 2.
- Public entities assuming responsibility at local or city level generally have access to limited own funding in support NBS. They may possess, however, other means to craft frameworks and strategies in support of private sector collaboration. Local demands may be framed on terms that instigate market mechanisms and underpin green start-ups.
- Lack of willingness to pay for eco-friendly products represents a barrier for NBOs which may be addressed by awareness campaigns along with complementary means to ensure public trust in NBOs as well as specific green products.
- Lack of detailed understanding of the economic logic, e.g., the cost structure of NBS and need to budget for long term maintenance costs, along with the difficulties to internalise the benefits, counter effective policies. NBEs bring practical and innovative capabilities to resolve such issues, and naturally aim to advanced trusted brands and concepts capable of achieving broad user uptake and diffusion.
- In drawing on and leveraging NBS assets, NBOs are instrumental for realising their potential value streams are manifested in tangible commercial or other benefits, e.g., at community level. The resulting momentum translate into economic gains, jobs, and other favourable spin-off effects. The distribution of such gains may be uneven, however. Rising real estate prices, rents, and cost levels may create social tensions and push out vulnerable groups.

Technical / Technological

- Lack of indicators and evidence proving the effectiveness of NBS remains a major stumbling block which is compounded by a lack of knowledge on how to measure the multiple impacts of NBS.
- Access to independent platforms that are relevant for awareness creation and information exchange may assist NBEs in structuring knowledge and establishing trusted relations.

- Undeveloped network channels may hinder the rise of green clusters and ecosystems, hindering the rise of stakeholders relations as well as the new clients and partners to back new ventures, pool competences and share experience (innovation networks).
- Mobile applications are increasingly developed and utilised by NBOs in support of NBS benefits. Examples are at hand linked to utilities such as transport, water, energy, and air quality. Mobile apps can guide users to act so to increase their benefits while avoiding downsides such as congestion and pollution.
- Participatory Geographic Information Systems (PGIS) and related tools offer novel means for citizens to engage in spatial mapping, backed by big data. Complementary messaging using social media platforms and chat bots can help achieve buy-in of new solutions by large numbers of users, irrespective of geographical distance (Andersson et al., 2021).
- Many NBEs co-operate with research institutions. Universities and other research and development actors are seen as a knowledge base for innovation.

Social

- Cultural factors and social relations blend in influencing values, attitudes, and mindset, which in turn influence the preferences in regard to NBS and NBOs.
- Social factors influence abilities to collaborate and discern joint interest with others, as well as the readiness to gain new awareness and adjust.
- Culture and social factors often go together with discrepancies in income and status, operating at community- and group level. Cities are commonly fractured and polarised by evolving processes of demarcation and alienation where different city parts become separated and carriers of inequality and exclusion.
- Entrepreneurship and enterprise development are strongly influenced by cultural and social factors, blending in with education, skills, and training. For nature-based enterprises, such skills link with appreciation, dedications and insight how to environmental and other aspects of sustainability can realise NBOs.
- Communities that are deprived or disadvantaged may generate fewer and less profitable NBOs but can also breed special cases especially drawing on participatory and social NBS, linked with social innovations.
- NBS and NBO development may lead to an increased economic momentum raising prices and cost levels and thus create new social tensions and challenges.

3.4 NBS influence on NBOs

The value generation of NBS features a rich scope of benefits relating to the environment supporting biodiversity and natural ecosystems. Many connects to social parameters including well-being and health (Bockarjova et al., 2022). Some of these emanate through enhanced quality of air, water, soil, etc (Ghafourian et al., 2021).

NBOs play a role in mobilizing and linking the benefits of NBS to various actor categories, such as citizens, communities, and stakeholders. This is because, unleashing the creative spirits of “green” entrepreneurs (Loorbach et al., 2013) as well as that of social innovators and community leaders, opens for unforeseen means of capturing and leveraging the potential value streams of NBS.

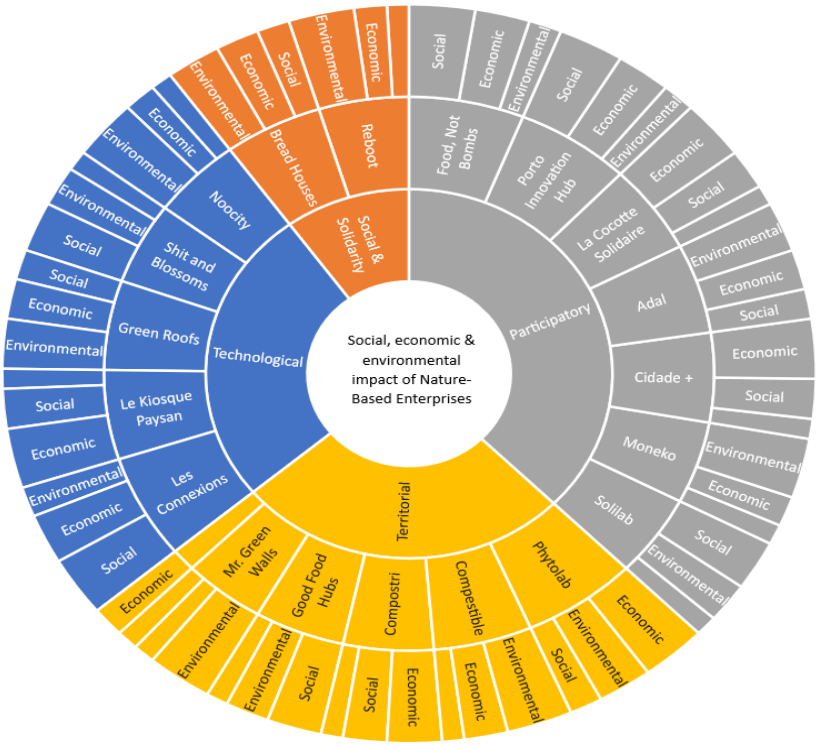
As observed in Andersson et al. (2023), NBE characteristics vary somewhat across NBS categories, as defined in URBiNAT’s NBS catalogue. The four categories of NBS - already referred to above (territorial, technological, participatory and social & solidarity) - link with different dimensions through which NBS generate value, and hence how NBEs relate to them. Yet, NBEs appear important in relation to all the main categories of NBS.

Examining NBOs in URBiNAT frontrunner cities, selected best practice cases of NBEs have been identified in previous work, spanning each of the four NBS categories referred to. The highest prevalence was observed for the last two, however (Andersson et al., 2023). Participatory NBS create various benefits for citizens and other stakeholders, improve collaboration within communities, and empower individuals in the decision-making process. Meanwhile, identifying opportunities for best practice NBEs to be scaled or replicated in URBiNAT follower cities, one of the main facilitators showed up as "Communities of Interest" (Andersson et al., 2022*c*), i.e., networks held together by the joint interests displayed by members. As indicated by Figure 5, the mechanisms for value-generation of NBS pick up on combined features pertaining to the respective NBS categories, specific NBEs, and the kinds of CoIs they connect with.

Rather than playing out in isolation, the value streams and opportunities offered by NBS are interlinked with various aspects of the surrounding fabric. The concept of "Healthy Corridors, championed by URBiNAT, places emphasis on the importance - ranging from the stages of local diagnostic to the design and implementation of NBS - of synchronised parallel NBS based initiatives. NBOs stand to contribute in various ways, through innovations that open for additional output, achieve user buy-in, and remove hurdles to success. Without active engagement and investment by private sector entities more broadly, the funding required for achieving a critical mass or scaling of such efforts may not be accessible.

In parallel, ensuring inclusive, engaging community processes could importantly counter risks of social exclusion. This may hinge on the participation and contributions of community-driven informal social and solidarity network based NBOs, which tend to operate on other terms than NBEs. Rather than depend on corporate affairs, their scope rather draws on fertile grounds for civil society. Rather than short term profitability, a critical factor has to do with their ability to establish and sustain operations that are economically viable for the long term.

Figure 5: Overview NBS categories, best practice NBEs and CoIs



Source: URBiNAT (n.d.)

3.5 On EU NBS Horizon and URBiNAT's approach

The case for a strengthened resource base, mandate, and competences at local and regional level, notably in cities, is strongly reflected in the EU Horizon NBS research and innovation project agenda. In the recent years, the European Commission altogether warded some 660 million euros backing a pool of more than 70 responsive cross-border consortia - featuring cities along with associated partners spanning academic and research organisations, businesses, and other relevant entities. Their core tasks feature the realisation of collaborative NBS development, testing and learning how to achieve favourable outcomes on terms conducive to sustainability.

Through this programme, the Commission has effectively put in place a mechanism for substantially and academically founded boosting of cross-border and multi-stakeholder collaboration devoted to far-reaching experimentation, associated learning and capacity building centred on NBS. Special task forces were established since early on to compare results and draw joint lessons in areas judged of highly universal relevance. Among these, at least two, addressing *Co-creation and Co-governance*, and *Business Models and Financial Mechanisms*, respectively, have been of direct relevance for advancing the understanding of NBO performance (McQuaid et al., 2022; Andersson et al., 2024). As part of its specific contribution, URBiNAT has added unique insights to means of including disadvantages areas and marginal groups. This has included work on community, and social and solidarity driven initiatives (Caitana et al., 2024).

The realisation of green parks and popular public space, meanwhile, while likely benefitting the majority of citizens, carries a strong tendency to push real estate prices to levels which become unmanageable for less affluent citizens. This exemplifies how NBE operations in support of sustainability may inadvertently cause market price increases and distributional consequences. In order to work out a way forward – a policy response to the sustainability crisis and in support of NBS that is perceived as relevant and fair, as well as effective, such issues need to be confronted.

Extending beyond mainstream applications, URBiNAT placed high emphasis on participatory and social aspects from the start. The more than 40 specific NBS featuring in its NBS catalogue were divided into four categories: i) territorial; ii) technological; iii) participatory, and; social and solidarity, NBS. This scope, along the framing of these categories, presented the URBiNAT cities with a rich set of selection opportunities when gauging which NBS to design and implement.

URBiNAT further covered new ground in its framing of digital enablers, a vehicle to facilitate and leverage citizen's engagement and adoption of NBS. Rather than putting the emphasis on technical aspects, the focus is on examining how digital tools may combine with methodologies and content devised to achieve specific purposes. The analysis of the resulting digital enablers focused on their role in achieving value-enhancing participatory processes, including co-creation by citizens across the various stages of NBS deployment. Additionally, attention was paid to stakeholder engagement and the contributions of collaboration mechanisms such as living labs, URBiNAT's Community of Practice (CoP) and particular Communities of Interest (CoIs).

Another key aspect comes down to achieving synergies between complementary NBS, joined together by the framing of Healthy corridors, to create an entire system of bonding public space while addressing wider implications of urban fragmentation and polarisation (Moniz and Lameiras, 2024). Novel contributions have highlighted the interlinkages between combinations of NBS, physical activity, social cohesion and health effects (Cardinali et al., 2024).

Broad-based inclusion, engaging multiple stakeholders, including marginal and disadvantaged groups, has become practically more feasible with the help of digitalisation. Co-creation has been put to action partly to ensure relevance and broad-based buy-in, including by those that tend

otherwise be excluded. Citizens in prioritised focus areas have become aware of the options brought by URBiNAT's NBS catalogue, as well as awarded the means to become involved and exert genuine influence on their application and design in countering concrete local issues. By offering citizens user-friendly methods based on 3D to frame content, moreover, technology by way of digital enablers such as Superbarrio, have served to facilitate a structuring of citizens' perceptions and their formation of suggestions from early on in co-creation processes.

Various NBOs have played a role in realising important building blocks of URBiNAT's Healthy corridors. Often, the NBOs become engaged based on their unique access to, and ability to mobilise, relevant actors and competences. An organisation that has played such a role is Associação do Porto de Paralisia Cerebral (APPC) in Porto. APPC gathers, supports, and promotes quality of life among families, employees, volunteers, and clients, and organises farmers' markets and various events. Meanwhile, as noted, URBiNAT set out to identify a select pool of best practice NBEs across the frontrunner cities. A list of those examined in detail appears in Appendix 1, along with an overview of specific characteristics for each, as will be returned to. "Mr Green Wall" in Sofia, and "Compostri" in Nantes, are among those that plugged into the Healthy corridor agendas advanced by the project.

The mapping and structuring of best practice NBEs entailed some in-depth analysis of links to NBS categories, as well as to stakeholders and other community elements. Further examining success factors for replication and scaling, NBEs matching with existing or emerging local networks, so-called communities of interest (CoI), was observed to constitute a breeding ground for new knowledge development and increased capabilities in areas pinned down as a priority by bottom-up processes. Observed examples include food and the circular economy. Especially the community-based, social and solidarity economy NBOs have been shown to achieve great reach and mobilise significant action and learning processes in disadvantaged areas.

4. NBO Policy Domains

Extending from traditional corporate governance models and policy rationale, we have concluded on the need of adjusted approaches to understanding NBO performances as well as determining strategies to support their contributions to NBS and sustainability. Having drawn lessons from the extensive work undertaken on such organisations notably in urban areas, including the barriers and enablers affecting them, here we proceed by mapping what we view as compelling novel domains for pursuing "NBO policies". These, we argue, are merited careful consideration as prominent building blocks of a strategy devised not just to support best practices, the means for scaling and replicability of NBOs, but more broadly for crafting operational avenues to pursue value-generation through NBOs in close connection with real-world needs.

An intrinsic element of the nature regeneration enabled by NBOs has to do with their role in linking environment and society, nature and people. The extent to which NBOs are able to rise, develop and diffuse services based on NBS, carries the potential to counter the "under-appreciation" of NBS, at least in part. Where NBOs fall short of realising their potential, the problem of "under-investment" in NBS is likely to remain more serious. On the other hand, the contributions of NBO themselves encounter serious impediments, some of which coincide with the impediments to NBS. Their actions and successes may also meet with scepticism about some strands of society, as well as give rise to problematic distribution effects.

In addressing NBO policies, we underline the following characteristic: i) policy is not a monolith, but represents an amalgam of institutional fabric that responds to underlying circumstances and power structures; ii) the policy challenge at hand is idiosyncratic, i.e., requires a context-specific solution,

when it comes to aligning stakeholder interests, complicating scaling and replicability; iii) policies framed based on sectoral considerations are weakly placed to take account of cross-sectoral aspects, which typically are of high importance for the wider social good; iv) policies are framed at different levels, defined by distance to issues on the ground as discussed elsewhere. The local-nation-supranational "levels" may be viewed as a continuum. Yet, the actors operating at each draw on particular mandates which tend to display systematic variation. The same applies to their capabilities as well as the terms on which they can access resources. What division of labour prevails nevertheless varies, of course, and is not given.

Impacts of NBS appear systematically different reflecting at what policy level they are perceived. Effects that diffuse outside the local realm may not be accounted for by those in charge of that. Benefits that spill across international borders may be neglected by nation states, and/or utilised for exploitation. Countries located upstream, for instance, regularly prop up rivers by constructing dams to satisfy own energy consumption, ignoring the destruction of agriculture in countries downstream while also frequently utilising their dependency by subjecting them to costly concessions for some partial alleviation of the damage[15]. Significant benefits of NBS that accrue most directly to those in the immediate proximity may be viewed as irrelevant by responsible government authorities. Those residing next to green parks, for instance, suffer less mental stress, breathe better air and enjoy relief in the shadow of trees when heatwaves hit (Mees et al., 2015; Andersson and Cardinali, 2023). Such benefits are of substantive monetary relevance to taxpayers and nation states, but silo mentality in national governments may translate into neglect.

Over the past decade, the supranational level, applying at least in the EU, has funded extensive transdisciplinary research to examine in depth and cast light on such relations. The resources mobilised have additional brought about a greatly enhanced mandate and momentum at the local/city level to step up engagement in NBS. Part of the explanation is rooted in the greater concern at supranational level with cross-border spillover effects, coupled with the appearance of a looming systems crisis as nature is systematically depleted. Adding to this, the EU has clearly identified the local policy context as greatly important for instigating constructive change processes on the ground. By incentivising structured exchanges, collaboration, and shared learning between cities and communities in different countries, moreover, heightened local action has been paralleled with the benefits of gaining exposure to outside perspectives along with peer review dynamics.

Tendencies to underappreciate and under-invest in NBS may coincide with distortions against business in general, and NBEs in particular. From the viewpoint of a green entrepreneur or manager, a policy bias downplaying NBS may weaken the prospect of establishing a viable business case. On the other hand, by making NBS scarcer, under-evaluation by policy may conversely create an opportunity for NBEs to deliver and take to the market a service package that draws on a more valuable underlying resource. In this sense, policy bias against NBS may be compensated for by NBEs. This is most likely though, in the absence of a bias – within policy circles and/or in society - against green business. In the presence of barriers to business of such kind, the scope may instead grow for informal NBOs, as they meet with an outstanding need of filling the gap caused by the decline of MBS without rectifying compensation pursued by NBEs.

Against this backdrop, NBOs stand out as potentially important for policy making in support of realising NBS benefits and sustainability. Policies removing undue hurdles by way of market and institutional imperfections should be taken forward. Linked to this, we argue for a strengthened

[15] Conspicuous examples include several of the rivers credited for constituting the cradle of human civilisation, including the Nile (Ethiopia's Grand Ethiopian Renaissance Dam vs. Egypt), the Euphrates-Tigris river system (Turkey's construction of damns and diversion projects vs. Syria, and Iraq), and the Ganges river (dam-building by India vs. downstream Bangladesh).

policy mission notably in the urban context, tailored to supporting a viable ecosystem for value creation through NBOs and NBS, featuring synergetic actor-relations and mechanisms for resource mobilisation, as well as for managing socially acceptable outcomes.

In this chapter, we proceed to map out five such partly inter-related policy domains, each framed with these purposes in mind. In the world of conventional policymaking, these may all appear quite unorthodox. Yet, in some respects, measures in these areas are already in place, or at least in formation. For each, we reconnect to the rationale, take note of opportunities, reason around the implications including potential benefits as well as downsides, and exemplify their usage. A summary table in this respect has been included at the end of each section.

4.1 Co-creation

In the corporate sector, co-creation with clients, suppliers, and partners has arisen as a potent value-creator along the supply chain (Hair, et al. 2016).

Citizen involvement and co-creation are equally on the rise as a respected element of mainstream policymaking, entering the limelight notably in the context of e-government public service. Although digitalisation still serves primarily a vehicle for one-way diffusion of public information and a conveyer of citizen obligations, e-government has entered onto a trajectory of increasingly opening for two-way, interactive communication and a formative role for citizens. Novel applications utilising Public Participatory Geographic Information Systems (PPGIS), digital games, or other innovative smart tools, have brought about a rapidly expanding list of cases in which citizens are invited to attain a driving seat in forging spatial planning and urban development.

Co-creation appears as an integral feature of NBS, notably in the category of participatory NBS (URBiNAT, n.d.). Proponents view it as greatly important for realising an improved matching of NBS design and benefits with outstanding needs. Co-creation is also viewed as helpful for arriving at solutions that are favourably perceived by people and organisations on the ground. Improved articulation of needs and active participation in decisions what solutions to apply is typically accompanied by an enhanced willingness to utilise the same (Hofstad, et al. 2021; McQuaid et al., 2022). Finally, the value of co-creation processes reflects the diversity of participants, along with use of methods that match their special characteristics and motivational drivers (Trischler et al., 2017).

Reporting on the state of EU-funded NBS projects have pointed to common issues in regard to the actual scope for participation and inclusion (Bulkeley, 2020). Co-design and co-production exercises may run into various kinds of constraints, and there is room of improvement in measurement and evaluation (Croci and Lucchitta, 2021). In some instances, co-creation appears merely to legitimize existing solutions while leaving little room for citizens to play a meaningful role in communicating local needs set directions for progress (Brabham, 2009).

Participation and co-creation thus do not automatically promote behavioural change, nor increase demand in support of sustainability. In the absence of a silver bullet for how to achieve success, more research and real-world experimentation is merited to generate lessons and effective guidance for productive usage (Wamsler et al., 2020). A growing body of test cases nevertheless offers plenty of inspiration for what can be achieved. The experience of URBiNAT in this respect lends support to recommendations along the following lines (Andersson et al., 2024):

- Co-creation should not appear as an after-thought, but be framed from early on, starting out with a role to play in diagnostic of the issues, and subsequently through the stages of planning, design, implementation, and also monitoring and evaluating NBS.

- It is recommended that co-creation becomes part of city policies (a continuous mindset and culture) for development of NBS.
- Apply a transdisciplinary participatory approach, involving a variety of stakeholders, such as residents, local authorities, companies, academics, and communities.
- Special attention should be paid to inclusion, citizens, and communities beyond the "usual suspects", reaching deprived areas and engaging disadvantaged groups.
- A proactive approach should be taken to awareness creation and framing of attitudes in support of constructive inter-active relations and social acceptance.
- Orderly communication and learning as when building on a functional COP or CoI, could leverage the process and impacts.

The presence of NBOs, as instigators of innovation with the ability to pick up on and respond to latent demand, can importantly leverage the benefits of co-creation. Examples abound in various fields, including alleviation of poverty and unemployment, health conditions, social cohesion, insecurity and vandalism, and cultural alienation (Madzak et al., 2020). Among relevant specific cases, Accoord in Nantes, Centre Unique de Bricolage (CUB), "do it yourself" offers access to equipment for all inhabitants, in effect inspiring and supporting citizens to improve or renovate

Table 2: Co-Creation Policies for NBOs

Rationale/ Issue	Opportunities for policy	Implications for policy	Examples URBiNAT cities and elsewhere
Lack of awareness and information about NBS as well as offerings of NBOs	Better articulation of needs, matching with NBS and NBOs	Visualise and invite NBO competences	Solilab, Nantes
Transaction costs and rigidity hindering access to NBS benefits	Identifying and removing hurdles, followed by catalysing and facilitating collaborative initiatives	Mobilise NBOs along with citizens and stakeholders in disclosing needs and innovating solutions	Accoord, Nantes, Centre Unique de Bricolage (CUB), "do it yourself"
Dominance of incumbent and vested interests protecting status quo	Embed co-creation in processes effectively challenging existing structures	Involve NBOs in collaborative projects supporting diversity and alternative models	Local currencies, e.g., Moneko, Nantes
Lack of relevance in incumbent practices, grey infrastructure	Raise enhanced interest in NBS and underpin quality demand	Award citizen ownership, promote cultural affiliation, engage NBOs in service delivery	Allotment of land for urban agriculture, Nova Gorica, Nantes
Fragmentation, income gaps, social polarisation	Frame public space and Healthy corridors support of bonding and inclusion	Local diagnostic involving NBOs in inclusive strategies	All URBiNAT cities
Bias against entrepreneurship and innovation	invite NBOs in co-creation while aware of social cohesion, awareness creation, and socially bonding outcomes	Promote inclusive business models, assess and support conditions for social and solidarity economy	Irish legal facilitation for social enterprises, CIC in the UK, policy-process for social enterprises in Brussels

their homes. It serves as a workshop and facility offering training in craft techniques as well as advice or assistance by specialist competences. Meanwhile, Brico Mobile serves an experimental mobile device aiming for increased community reach in access to training[16].

Community based NBOs commonly spring from residents' needs. Many apply co-creation strategies on a regular basis, although the precise practices vary (Caitana, 2024). Building on from there, some citizens engaged in active participation are likely to proceed from there by engaging themselves in green, or social, entrepreneurship. Opportunities in that regard are bound to depend in no small part on policy-induced conditions, ranging from the regulatory environment to the availability of seed funding, risk management, and governance structures (OECD, 2023*a*). Given sufficiently favourable contingencies, a synergetic relationship is likely to evolve between citizens' active participation and co-creation, on the one hand, and the rise the performance of novel NBOs. New ideas may thereby translate more fluidly into co-production/service delivery motivated by high social reach. Some NBOs have taken the lead in assisting vulnerable groups to communicate and address outstanding problems, as has been observed to result in a push-back against urban violence, social exclusion, and other favourable impacts (European Commission, 2016).

Key channels through which participation and citizen engagement matter for NBO policy, are summed up and characterised in Table 2. In a sense, these results highlight an 'ecology of knowledge', a 'living' framework. Citizen engagement has to do with articulating and responding to the needs of various segments of society, taking account of specifics in participatory culture, while additionally linking to, and opening for, entrepreneurship and innovation. The table, to be followed by corresponding ones reflecting the contents of each of the subsequent sections in this chapter, lists in each row -from left to right – issues presenting a rationale for policy, then opportunity for policy, implications for policy, and finally in the column furthest to the right, examples of such policy responses in the URBiNAT cities, or from elsewhere.

4.2 Digital enablers

Digitalisation has arisen as an integral element in the development of business along with virtually all other kinds of organisations, private, public, and not-for-profit. Enhanced capacity to collect, structure, and utilise data, coupled with more effective two-way interactive communication, opens for improved information services, faster diffusion, and closer connections with specific audiences in-real-time. This relates to radically enhanced means for targeted and tailored interactivity with different user categories, adapted to their special situations and interests.

National governments pursue digitalisation with a view to achieving a range of public service objectives, spanning e-democracy, e-health, e-learning, cyber-security, or servicing business broadly. In the urban context, smart sensors, IoT, and Industry4.0 have been vigorously applied as part of the so-called "smart cities" agenda. Here, a new wave of interactive service development and functionalities continues to evolve, closely integrated with daily life (Gabrys, 2014; Brorström et al., 2018). Frequent criticism has been raised, however, of tech-obsession and a supply push of prestige projects (Grossi and Pianezzi, 2017; Falco and Kleinhans 2018; Webster and Leleux, 2018; Kleinhans et al., 2022).

Countervailing forces place emphasis on holistic perspectives, harmonious living and working conditions, health, and well-being. Led by such objectives, digitalisation is increasingly drawn upon for the purpose of bolstering innovation in support of sustainability and the "eco-city" (Cugurullo, 2018; Digital Europe, 2019; Said and Tolba, 2021). Combining "green" and "smart" hinges on constructive interfaces and synergy between diverse competencies. Productive linkages and

[16] https://www.accoord.fr/activite-enfant-nantes/apprentissage-entraide-et-solidarite

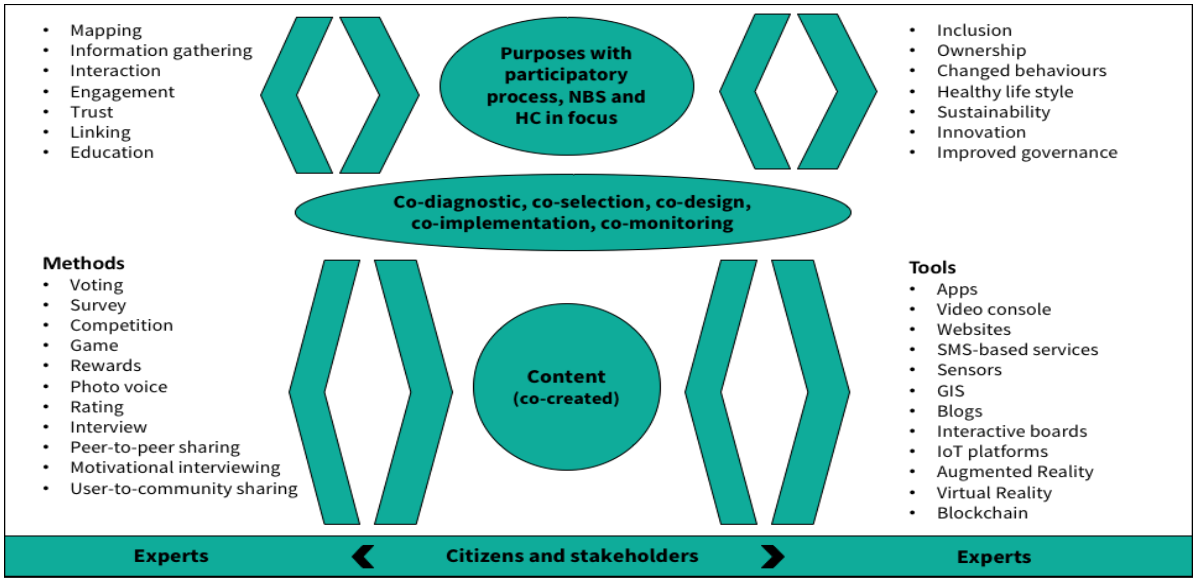
collaboration between universities, research institutes, NBOs and citizens/local communities all matter. URBiNAT has framed the concept of “digital enablers”, illustrated in Figure 6, referring to synchronised framing of methods, content, and digital tools tailored to co-creation linked to the value-creation of NBS (Andersson et al., 2021).

Digital enablers offer special opportunities for policymakers to fuel constructive communication and collaboration opportunities. Some of these have to do with the bonding brought by Communities of Interest (CoI). While commonly forming part of such networks, NBOs tend to be active both in processing and improving access to NBS services, and in increasing awareness and demand - realising enhanced revenue streams and greater marketability and bankability of NBS assets (Nisbet, 2009).

With AI, the power of enacting tailored communication is staged in exponential growth. The risks and downsides reflect the massive resources ploughed into accessing, processing, and misusing data by proprietary vendors such as Google and Microsoft, as well as by vested interests of various kinds. Implicated categories span the commercial sphere, populist and opportunistic politicians, foreign adversaries, and organised crime (Egan and Megan, 2017; Applebaum, 2018, Ginsburgh, 2020). Mega platforms such as X and Facebook meanwhile offer fora suited for exploitation of such sorts. Among their well-documented objectives, as will be returned to, we observe the case for causing confusion and aggravating social polarisation through misinformation and fake news targeting climate change (Hu, 2023).

Turning these developments on their head represents a daunting task for which no simple solutions are at hand. Policy coordination at EU- and global level advancing protection of privacy and biting back against data misuse and cybercrime is clearly of high importance (GSMA, 2017). How far and how swift regulatory frameworks can respond is far from clear, however. More effort must be devoted to mobilising AI for innovation in support of trusted user-centric data management and control, requiring public-private quality collaboration. Part of this agenda entails enabling, measuring, and rewarding NBOs for favourable impetus on sustainability.

Figure 6: Building blocks of digital enablers



Source: Andersson et al. (2021)

Table 3: NBO Policy for digital enablers

Rationale/ Issue	Opportunities	Implications	Examples URBiNAT cities and elsewhere
Unreliable reporting and greenwashing	Counter greenwashing and strengthen rewards and incentives for NBOs	Promote trusted verification and validation of "green" impacts	IECQ
Lack of demand for trusted data and undervaluation of NBO brands and "green" products	Improve measurement, strengthen standards and promote their diffusion	Improving trust and the demand for NBO goods and services	Air Quality App, Nantes
A deficit in developing and using smart data to measure impacts on sustainability	Mobilise applications for open-source data processing and use	Ensure access for NBOs to smart data and platforms on sustainability	Tree Tracker, iNaturalistFi
Limited processing and use of data in support of sustainability	Boost substantive data repositors and activate NBOs for diffusion	Propel NBOs to translate data availability into usage guided by impact	ESA, Earth Observation
Dominance of proprietary data providers coupled with privacy violation and data misuse	Foster open source and open access	Smart procurement of data protection	NBO accelerators, Porto, Nantes, Brussels Khorramabad
Inability of communities to manage complex trade-offs in sustainability	Promote digital enablers building on group dynamics to alignment of interests	Promote apps using peer processes and social interactions to facilitate prioritisation	Mundraub, CODES
Fragmentation/silos mentality	Stimulate group dynamic and team processes in support of empathy	Support NBOs in bonding app development and diffusion	Cities promoting Cycling Without Age

In project activities of related to climate mitigation and adaptation, or other sustainability agendas, methods and working practices at local level may importantly favour open access, open innovation, and also the backing of user-friendly data repositories. Specialised platform development may be called for to achieve inclusion of socially vulnerable groups (Shaffers et al., 2011; Vanolo, 2014). Smart public procurement practices can be deployed to engage NBOS in the development of niche solutions and counter dependency on proprietary vendors or other incumbent interests.

Advancing resourceful applications of open source and open access can further new avenues for green data provision and use. Sources of public data such as European Space Agency (ESA), provider of *Earth Observation*, the World Meteorological Institute, World Ocean Institute, or UNEP-Grid, are in search of avenues to achieve greater reach and relevance for addressing sustainability challenges on the ground. Examples include sustainable land-use, pollution control, optimising transport and logistics chains, water management, and so forth. The rise of NBOs offering complementary service provision may help transpose benefits to the surrounding area. Actively bestowing and encouraging NBOs to innovate in this space could speed the diffusion of distributed competences and their effective uptake and operationalisation of the most useful data sets. NBOs may for this purpose engage in training, logistics, counselling of decision-makers, etc. By diffusing awareness and facilitating user-friendly access to high-quality data, tech oriented NBOs can help advance various applications in support of sustainability.

Through various means, local policymakers can double down on opportunities for NBOs to engage in novel product and service development in support of vulnerable groups, including by stimulating

frugal or inclusive innovation. Benefits thereof may transpire by reducing Internet access costs or differentiated communication channels capable of reaching and incentivising "unusual suspects", i.e., those who would stay on the side lines when approached through mainstream channels. Again, smart mobilisation of CoIs offer a handy vehicle, e.g., operating through channels that relate to food, art, sports, or other key interests. Progress in such respects sometimes may be backed by informal, community based NBOs, which engage pro-actively to support social cohesion[17], or occur through public or private networks or centres, often with associated, foundations devoted to support in this regard[18].

Contrary to coming out in support of sustainability, citizen participation at times leads the other way. "Cherry-picking" readily available benefits may come out on top of making decisions on hard trade-offs. Pondering such risks, Healy (1999) proposed framing extended peer communities to build trust required for taking on complex societal problems. Again, by instilling more constructive dialogue and cooperation, mindsets can be navigated away from a narrow "what's in it for me?" to "what's in it for us?" Governments may procure smart apps and design methods, for instance, in support of participatory processes operating at community, or group level (Nam and Pardo, 2011). Albino et al. (2015) recommended applying an "integrated approach", featuring both "hard" aspects – technology-based, material compensation – and "soft" (social) rewards. Two such approaches, developed through a combination of academic research and end entrepreneurship - motivational interviewing and Learn-for-Life – have been applied, both serving to operationalise peer pressure for step-by-step impetus on behavioural change (URBiNAT, n.d.).

Summing up, digital enablers draw on several complementary building blocks to form a formidable vehicle for achieving faster, more far-reaching, tailored, and engaging communication. Fulfilling these opportunities connects closely to realising a stronger engagement of NBOs and green entrepreneurship in support of innovation, using open source and open access, and countering proprietary vendors and vested interests. For specific challenges, needs, and examples, see Table 3. To conclude, policymakers at local level should include digital enablers as an integral part of their toolbox to provide scope for NBOs to play their part in shaping a viable ecosystem and value-creation around NBS.

4.3 Business life cycles

NBO policies stand to gain momentum through consideration of the *life cycle* of such entities, i.e., distinguishing between phases of firm and organisational development.

In entrepreneurship and enterprise development generally, seed stages are associated with particular challenges as lack of traction drives up the perceived risk for financiers, contrasting with the social benefits of experimentation and learning. Not only will the fruits of success by a few outweigh the failure of many, but those who try but fail, are exposed to benefits through learning.

This context presents policymakers with a rationale to underpin a functional ecosystem for green entrepreneurship and growth, rather than coming up with piecemeal remedies. A coherent response aims for enabling intermediary actors, such as universities, knowledge parks, incubators, etc., to play their part in breeding skills, connectivity, and offering hands-on support and mentorship where fitting. Meanwhile, relevant seed funding bodies, business angel networks,

[17] E.g., the support and coaching of Joujou, a sports recycling shop in Nantes, by Ecossolies (Caitana, 2024).

[18] In Sofia, the Centre for Art Education and culture, a school for dancing and fine arts music in Nadezhda, form part of the non-formal education for children. The Danish foundation for culture and sports facilities serve similar functions. "Food not bombs" is a network of non-profit organisations, with a presence in Sofia, that supports production of organic food by the less privileged.

foundations and VC investor networks represent assets which can be nurtured but also regulated and evaluated in the light of the fulfilment of their respective roles in the wider system.

A related key consideration has to do with the interrelated dependency of modern technologies which is of high relevance for green and blue innovation systems and industrial clusters (Barbieri et al., 2023*b*). Analysis of patent data points to green innovation benefitting from unrelated diversity across technological fields in early development stages. Conversely, related diversity assumes a role as positive predictor of green innovative activities in mature stages of technology and firm development (Barbieri et al., 2020). This indicates how the role of related and unrelated diversity across technological fields is likely to shift between organisations depending on their level of maturity and specialisation.

Some administrations at city and local levels are busily progressing beyond general support of university and science parks development to engage in more targeted strengthening of linkages with green accelerators, or NBO clusters (Nicholls and Pharoah, 2008). Porto Innovation Hub in Porto, Portugal is one example, engaging entrepreneurs and other stakeholders in technology for sustainability and enabling the use of Porto as a test bed for sustainable solutions. New initiatives are under way to devise university programmes and associated stakeholder collaboration in support of social innovation, inclusion, and resilience. Meanwhile, Le Solilab in Nantes, France, exemplifies an incubator mandated to gather entrepreneurs with a common mission to do good for society and the planet.

Public procurement tailored for this purpose can be devised to effectively pull green innovation in early stages of NBE development. Start-ups are generally likely to depend on a limited circle of early adopters. In sustainability business, those typically represent the most environmentally aware and knowledgeable minority share of the population. Similarly, a few dedicated pioneers tend to form the backbone of the internal organisation, coinciding with multiple internal as well as external factors in influencing the degree to which “green” start-ups survive and are able to flourish (Demirel et al., 2019).

A voluminous literature examines how organisational and competence factors shape the character and performance of NBEs. Organisational culture has been studied extensively in relation to innovation and stakeholder engagement (Schein, 2004; Büschgens et al., 2013). The ability to overcome sectorally bounded limitations appears a salient feature (Egusquiza et al., 2019; Mayor et al., 2021). Founders/senior managers are depicted as looking beyond immediate returns (Dyllick and Muff, 2016). They grow a workforce combining efficiency in core business with a customer and client-orientated approach that aims to fulfil wider needs (Ambec and Lanoie, 2008; Shieh, 2011; Szymczyk and Kamiński, 2014). Green credentials, communication, verification, and certification of outputs are secured without falling prey to administrative and bureaucratic burdens, achieving genuine trusted differentiation from incumbents or new competitors.

A gradual attraction of diverse competences is commonly required in early stages, favouring locations marked by a rich, varied supply of competences. In later stages, as core business becomes more clearly defined and pressures increase for raised productivity, corresponding specialised skills need to be engineered. At the same time, achieving receptiveness and uptake of NBO services among a growing share of the population will much depend on moving in sync with social trends and public sentiments. Best practice NBOs nurture vision and responsiveness to wider social and environmental needs in the long term, establishing relevance in relation to wide stakeholder interests, as an inherent strength side-by-side with operational efficiency (Mayer, 2018). Customers, partners, and financiers appreciate, are comfortable with, and rely on that combination. In relation to NBS that they draw upon, their-value enhancing innovation and other activities may leverage the marketability and bankability of the assets they engage with. These are critical aspects related to

the organisation, human resources, and business model that separate NBEs from mainstream businesses. That difference in turn shows up in strategy and mindset (cf. Table 1).

The examination and characterisation of best practice NBEs across the frontrunner cities of URBiNAT offer instructive examples. For an overview of the cases examined in detail, see Appendix 1. Here, a few main characteristics of these NBOs are taken note of, along with connections to NBS categories as well as functionality apparently leveraged due to the NBO activity. Other illustrative examples of favourable NBOs impacts on NBS are provided by WWF (2024). Those include, for instance, improved bankability of NBS realised through additions of technical skills, economies of scale, and financial innovations, in one case a green credit line.

Policies may help realise such outcomes through various enabling initiatives. We may separate between a challenges/solutions-driven, or an identity/strength-based, approach (Andersson et al., 2022*b*). The former focuses attention on combating perceived threats, which may come down to removing hurdles or offering means of risk reduction. With the latter, positive connotations are picked up, e.g., joint appreciation for arts, food, "green", gardening, or sports.

In parallel, the consistency of the surrounding policy framework, including a credible outlook of reliably tightening green demand, matters greatly for the viability of private sector investment in green technology and skills. Influences in this respect are interwoven with firms' time horizon and readiness to invest in long term value generation. Firms across many sectors face volatile and disruptive market conditions, commonly due to a combination of accelerating technical progress, structural change, and the looming sustainability crisis. Uncertainty hurts the motivation to carry costs with a long term pay-off, which is the anticipation for much green R&D and product development. On a related note, a first-mover advantage may prove only temporary, since the know-how and skills attained gradually "spill over" to competitors. Proponents of assuming costs for building green capacity ahead of competitors may therefore suffer double damage from short-termism and free-riding (Dillon and Baram, 1993; Irwin and Hooper, 1992).

Other kinds of NBOs, social and solidarity driven along with other informal networks, have less access to financial resources while also being less reliant on capital injections. Equally powered by the visions and actions of founders, whether as individuals or groups, success tends to align strongly with their ability to engage wider communities, plugging in with participatory culture. Whether they can be sustained for long periods may come down to the stamina of that individual leadership. The day when prime champions no longer play their part, survival may come down to a successful succession to other constructive leadership. Alternatively, such NBOs may transform themselves, possibly into a formal enterprise. Policymakers may be proactive in facilitating transition of such kinds, although care is warranted not to risk undoing own responsibility and bottom-up spirit.

For formal NBEs, continuity is hardly a policy concern, reflecting their status as market actors. Apart from the already noted challenges of achieving an expanding customer base, the URBiNAT project has dwelled into the presence of various conditions influencing the scope for replicating and scaling best practice NBEs (Andersson et al., 2023). A "transfer" of such an entity to another geographical or institutional context may occur through "imitation" by competitors, or with NBOs themselves actively engaged through licensing, joint ventures, establishment of a subsidiary, or a trading arrangement. Reflecting their character, the motivation of NBEs for such moves would not just be commercial, protecting their intellectual property or reaching new customers, but leveraging their contribution to sustainability would be inherent to their objectives.

Replicability and scalability meet with inherent challenges though. Products and services that succeed in one context may meet with uncompromising competitors in another. Societal appreciation for environmental and social virtues may not be perceived the same way. Transitioning from one business environment to another is thus associated with real costs, in effect translating

into a barrier to diffusion[19]. As discussed, these partly reflect the role of context-specific factors, translating into transaction costs when new territories or markets are approached.

If such hindrances can be overcome, benefits accrue to society in part through the operations of the entities involved, but also through their role in realising the potential value streams of NBS. This relates to hurdles to the marketability and bankability of NBS, which best practice NBEs can help alleviate[20]. This presents a particular rationale for policy to work out means of overcoming undue hurdles, e.g., by speeding and promoting exploration, replication, and scaling of best practice NBO solutions. The objective of such policy intervention is basically to reduce friction, thereby enabling the realisation of beneficial transfers. Concretely, this may occur by creating access points on the ground for testing the validity of collaboration opportunities around the transfer of NBEs.

An example of EU-induced such activity, spurred through inter-city collaboration, is the Connecting Nature Enterprise Platform (CNEP), which provides access to a data bank covering extensive NBEs (Connecting Nature, n.d.). Initiated in 2020, CNEP observed that NBEs tend to operate in isolation. The platform has been devised for enhanced connectedness, capacity building and sharing of intelligence on industry and market trends. It also offers means to facilitate matching of customers and service providers by highlighting their respective needs and expertise.

In a similar vein, best practice NBEs, identified across URBiNAT frontrunner cities, have been subjected to a process aiming to facilitate their replication and scaling potential. The focus has been on examining ways of increasing awareness, communication, and contact points in support of identifying matching opportunities with fruitful conditions in other cities. In effect, the outcome has unfolded as a consultative process influenced by what actors become involved, including policymakers, members of the enterprise community, NGOs, citizens, and so forth.

This sort of unconventional intervention has here been pursued not under the aegis of policymakers as such, but by the URBiNAT consortium of partners in research and innovation. By activating the project's CoP, a combined inter-city and intra-city communication and learning process has been set in motion to assess and support opportunities around replication and scaling. As for actual results, the cases picked up appear to benefit from a combination of cities having a presence of potentially matching activities and having a way to establish a constructive interface with those. Once an opening is perceived by both sides, such as the possibility of two sets of actors joining forces to achieve a product presently lacking, further policy initiative in support of replication of scaling needs to shift focus. Ensuing a task for policy to bring about the opportunity, actual delivery may rely on the removal of hurdles, or on putting in place enablers. This calls for a need of engaging competencies with a better understanding of the specific market and organisational issues at hand.

The team and the cities engaged in the consultative interfaces arranged for these processes have benefitted from adjustments made along the way. The initial workshops opened for lessons both based on which actors were invited and which ones contributed most constructively. The matchmaking process became more effective where a sequence of consultations ensued, allowing for a shift in attendance driven by insights which competences were relevant in each case. Concrete take-aways include:

- Outcomes are influenced by the matching process, and the degree to which structured dialogue can help inform and guide enterprise/community/market actions;

[19] Hymer (1960) observed that transferring from one institutional context to another meets with hurdles that can be depicted by fixed costs, requiring compensating sources of benefit in order for the transfers to happen.

[20] Specific examples from URBiNAT include "Mr. Green Wall" in Sofia, commercialising territorial NBS, or La Cocotte Solidaire in Nantes for participatory NBS. Numerous other examples are described in Andersson et al. (2022*a* and 2023).

- Complementary specific initiatives may be key to support adoption of NBE best practice, e.g., instituting a circular economy incubator in Høje-Taastrup as well as Khorramabad Entrepreneurship School, both inspired by Le Solilab in Nantes.
- Cases of best practice are primarily picked up on by cities having a presence of similar activities, where both sides, the NBE and local actor-networks, identify scope for improvement and value-added from engaging in a collaborative cross-border efforts;
- Related revised offerings to the customer base, possibly directed to enlarged or more differentiated target groups, may hold the key to enhanced quality products, customer reach and citizen satisfaction, as well as revenue growth and profitability;

More general take-aways:

- Adequate preparations are advisable before actual efforts to pursue consultations and matchmaking begin;
- What constitutes an effective consultation process varies across kinds of NBEs and the NBS categories they relate to, and also depending on the recipient environment, including the presence of relevant local networks;
- Successful matching appeared where a best practice NBE was found to match a clearly identified need at the recipient end, embedded in a fruitful local community context;
- The best practice NBEs meeting with the most tangible responses tended to associate with NBS carrying markedly participatory and social features.

Table 4: NBO Policy for business life cycles

Rationale/ Issues	Opportunities	Implications	Examples across URBiNAT cities & other
High risks coupled with lack of competency and support services in green entrepreneur-ship and start-up stage	Support competences and capacity directed to overcome the special complex and systemic risks	Devise locally adapted NBO-relevant vehicles for hands-on mentorship and regular improvement	Entrepreneurship Centre in Khorramabad and start-up hub in Hoje-Tastrup
Challenges with sustainability for informal NBOS	Step in at strategic stages to induce support without derailing purposes	Build competency and capacity to play a role in lending stability to informal networks supporting sustainability	Maternity box, Lovisa, Finland
Barriers emanating from transaction costs impeding diffusion of best practices	Remove barriers and strengthen enablers by activating CoI in relevant product areas/industries	Food CoI for matching in support of partnerships	Food cluster development in Siena and Nova Gorica
		Circular economy CoI in support of partnerships	Solilab, Nantes; Høje-Taastrup circular economy incubator
Static unresponsive structures	Instigate structured action and learning	Combined intra- and inter-city CoP	URBiNAT's CoP
Time horizon and RoI-related	Induce appreciation for longer term impacts, broadening beyond shareholder interests	Inspire patient investing and stakeholder considerations, countering short-term exploitation	Phytolab, Nantes

A context marked by strong advances in the innovative capabilities of NBEs, tends to feature intense, productive collaboration with quality partner and client networks. Such conditions, accompanied by a favourable outlook for their revenue base, expanding customer circles, and a honing of their investment literacy along with access to attune investor networks, is likely to belong to the most effective vehicles for boosting the marketability and bankability of NBS.

Deprived city districts typically feature a relatively undeveloped business sector, including NBEs. They also suffer drawbacks from less developed connections with the prime decision-makers or influential stakeholders. On the other hand, as noted, other kinds of NBOs, network-based and of informal nature, may arise, link with, and engage local communities in addressing outstanding social and environmental issues. NBO policy needs to adopt a holistic approach, however, with the capability of propelling and drawing support from the success of a diversity of NBO categories.

4.4 Demand policies

While commonly playing second fiddle in traditional industry and enterprise policy, business success ultimately hinges on customer demand. Yet, in the present context, demand-led policy has attracted attention only relatively lately. It now shapes up as one of the most potent, if not well understood, vehicles for stimulating green business development.

Demand-led NBO policies are complicated by the diversity of value-streams emanating from NBS. Governments have at their disposal various instruments capable of boosting demand directly, such as public procurement or taxes and pricing, as well as others that may influence demand indirectly, such as education, standards setting, etc. A strategy bundling different categories of measures may be most effective.

Value streams that are prone to conversion into private goods and services (such as green buildings, or assets breeding ecotourism) tend to be the best suited for tapping into value-generating processes instigated by NBEs. By contrast, those that appear as public goods or services (e.g., urban parks owned and paid for by the public sector), are less so. The latter nevertheless create opportunities for private business to widen their reach and achieve synergies between commercial products and public goods, as in the case of coffee shops adjacent to green parks.

Of high importance is the scope of NBOs to serve as important intermediary actors influencing demand over time. The introduction and diffusion of more sustainable goods and services can be assumed to permeate the population through a gradual process. First in line will be a few early adopters that are open to new ideas, while pick-up by the majority of the population, and notably laggards, is bound to take time (Rogers, 1962).

Frontrunners, notably in early stages of market development, must typically prioritise demonstrating and convincing their offerings to a narrow, new customer circle. Later on, when some customers have been won over, existing demand must be harnessed, perhaps through product differentiation or after-sales-service. Continued expansion, meanwhile, will require an adjusted strategy, perhaps mobilising champions or framing other mechanisms to break into much bigger and, initially, less susceptible market segments. Convincing and maintaining the interest of alert first-movers is one thing – catching the attention of and bringing on-board the majority will require greater, more broad-based means of communication and scaled resources.

Today, numerous citizens display green preferences of some sort. Public awareness of sustainability issues has increased dramatically since the early wake-up call of Rachel Carson (1962). Green parties have arisen throughout Europe and multiple activists have acted on the ground. Yet, broad-based societal change, manifested in forceful voter demand for policy change or enhanced willingness-to-pay for eco-products has been less swift in coming (Moisander, 2000; Autio et al., 2009). Despite

generally positive views on, for instance, organic food, in most countries market demand continues to emanate from a limited share of the population. A positive response to assertions by NBOs that no pesticides or antibiotics have been applied, or that livestock spend time outdoors, typically hinges on the willingness of customers to pay more, and perhaps to go the extra mile to obtain such products at special outlets. Whether other actor categories, by way of public authorities, business associations, consumer groups or other NGOs, engage one way or the other in supporting transitional change, may matter greatly for tipping the balance in large market segments. Again, as markets mature, what support measures are effective inevitably changes.

With worsening degradation of the world's environment resulting in tangible and publicly visible consequences, due to global warming, fires, flooding and other extreme weather events, demand for counteractions has been expected to gain pace. In reality, a systematic public response is slow in coming. Questions arise what it takes for citizens to display radically changed behaviours.

Various factors are at work. During times of recession, public opinion tends to shift attention towards economic growth and recovery, countering environmental and social policy (Kayser and Grafström, 2016; Abou-Chadi and Kayser, 2017). Examining cross-country variation in public opinion, various studies conclude that "higher incomes" are accompanied by stronger demand for environmental policies. On the other hand, levels of income may represent the result, rather than the cause, of the behaviours under consideration. Some have concluded that, rather than decided by income, green behaviours as well as higher incomes are fundamentally supported by other underlaying determinants. How to positively engineer the two is critical (Hobson, 2003).

Much attention has recently been awarded the roaring expansion of social media activity undermining the credibility of climate change. While comprehensive information is lacking, it appears that outright misleading social media campaigns are consciously devised and propelled for the purpose of discrediting and ridiculing green policies, or those who champion them. With the help of big data and AI, such tactics can be multiplied while at the same time tailored to influencing particularly vulnerable user categories. Meanwhile, serious manifestations of the sustainability crisis, e.g., by way of forest fires, flooding, draughts, or storms, have been found to instigate so-called "confirmation bias" (Drobner, 2022). Under such conditions, visible, painful consequences of environmental degradation may thus result in defensive responses among large parts of the population, playing out as reinforced polarisation in the aggregate. Affirmative policy responses are then counteracted (Egan and Megan, 2017), in turn weakening the case for long-term investment in sustainability by businesses and communities (Anderson and Robinson, 2024).

It appears that increased public awareness will not by itself induce more sustainable consumption patterns (Midden et al., 2007). Enhanced environmental knowledge need not result in pro-environmental behaviours (Kollman and Agyeman, 2002; Clark, et al., 2003). Personal attributes reflecting culture, education, income level, employment, and family situation are all known to play a role. The degree to which environmental knowledge underpins 'pro-environmental consciousnesses' links to values, attitudes, and emotional engagement. According to Hughner et al. (2007), actual demand may reflect a "value-action gap". A response may entail instilling feelings such as threat and fear (Dutta-Bergman, 2005), or positive associations may be invoked, underpinning self-respect and a sense of empowerment (Bandura, 1977; Schultz, 2014).

Some people associate the sustainability crisis with a state of unfairness, where demands for rectifying action fall on others than those who are responsible for causing the problem[21]. Such impressions and opinions gain traction among those most affected by other sources of stress and uncertainty. Lack of trust in general, and in information on sustainability issues in particular, adds to these kinds of sentiments.

[21] https://www.economist.com/international/2023/10/11/the-global-backlash-against-climate-policies-has-begun

Buyers are regularly at an information disadvantage relative producers and sellers. The consequence of such asymmetric information is particularly striking in the case of environmental impetus, where industry is subjected to strong influences from various directions to appear "nice". The recent uptick in regulatory requirements along with accompanying guiding frameworks for reporting by private sector entities on carbon as well as biodiversity footprints, along with other environmental and social impetus, has hardly been accompanied by a communication strategy of high relevance to the general public. For green start-ups, or small and medium sized companies across-the-board, meanwhile, the reporting requirements at hand tend to inflict costs and efforts that are simply unsurmountable for most. Besides, doubts linger on the effectiveness of the reporting industry to instigate actual changes in impact on sustainability where it matters. In important respects, adequate standards in fact remain undeveloped. Information is not required, for instance, on the value of ecosystem services that have gone missing due to the operations of major organisations, or the provision of products with high imprints in this respect (Dasgupta, 2021). Some argue that measurement tools and reporting should combine more directly with protection of consumer and citizens' rights (McQuaid et al., 2022).

Certain change processes of high relevance to sustainability have been pursued successfully over the years. The habit of smoking cigarettes, widely prevalent around the world for decades, appears on course to be phased out in most developed countries, following a systematic push at multiple levels. Once environmental morality has transcended into a stage of "privatisation", encompassing significant shares of the population, far-reaching shifts in demand do occur at times. Such advance of pro-environmental behaviours seems particularly likely when "internal" and "external" influences combine synergistically (Knussen et al., 2004). In many cases, however, lasting impacts appear to require going beyond piecemeal interventions, such as attempting to revise habits within a given framework. Examples of markedly improved results are at hand in situations where it has been possible to engineer a perceived change in context. Strong influences may be exerted, moreover, by invoking impetus from engaging social relations, as in the case of high expectations communicated by peers (Marteau et al., 2013; Teyhen et al., 2014).

Taken together, insights into the role of social relations in engineering changed behaviours, attention to emotional aspects has gained ground and helped breed the so-called "nudging" profession, which operationalises personalised techniques to instigate behavioural change (Schultz, 2014; Thaler, 2015). NBOs innovate naturally in this space, testing and finetuning means tailored to impacting specific target groups. Examples are at hand in energy (O'Keefe and Jensen, 2006), transport and mobility[22], and a healthy environment (Myers et al., 2012).

Further, prominent "cluster" or "contagion" effects may emerge. Where pro-environmental behaviour takes hold in one domain, e.g., household energy conservation, parallel advances may occur in waste management or use of collective transport. Technological and organisational interventions may help engineer such impetus. In Aarhus, Denmark, for instance, a green mobility charter partnership has been worked out, committing large employers to accelerating the transformation of their car fleet and stimulate green mobility more generally, e.g., by way of bicycle lanes, walk paths, and public transport as a basis for commuting and business transport. Innovations applying smart apps may similarly connect, visualize, and render pertinent linkages between otherwise disparate factors, such as air quality, intake of nutrients, physical activity, etc., and forge aggregated individualised ranking and reward systems on top. On this basis, new openings are at hand for innovative solutions to connect with evolving citizens/consumer sentiments. Those aware and alert may encourage, catalyse, or facilitate such agendas. Supporting

[22] https://www.neste.com/news-and-insights/sustainable-mobility/what-is-sustainable-mobility

novel digital platforms, capable of shortening and strengthening linkages between demand and supply, are increasingly looked to as means of achieving a more broad-based momentum.

The slow-moving response by vast population segments to offers of support for transitioning to renewable energy, serve as a case in point. A series of proposals for instituting an EU-led matchmaking platform earmarked to speeding this process, has been made. The purpose has been described as empowering and linking citizens within Renewable Energy Communities (REC), in support of their collaboration with key stakeholders (Bertram et al., 2024)[23]. While NBOs stand to play a prominent role in the various facets of such a market, their active participation in developing such a networking mechanism is arguably crucial for its wider relevance and success. Policies may at the same time work out smart incentives engaging platform providers to frame an interface that incorporates concern for social benefits, aligns conflicting interests, and internalises externalities.

Impetus can further be engineered by NBOs joining forces to underpin representative advocacy groups. These may take the form of associations or other bodies, more or less loose, formed for the purpose of promoting the wider interest of users and/or producers. Granted a critical mass of resources and administrative support, such actors are better placed to identify and address contact points that are critical for maturing and operationalising new green market segments. An example is the European Green Roofs Association[24] currently with 13 national associations as Members, along with Supporters and Friends. Each national association includes a large number of NBEs.

By joining forces, sharing experience, promoting research, and creating awareness, the European association adds weight to the efforts of speeding the adoption of green roofs, arguably offering enormous opportunities for adding new green space, however advancing slowly, in part reflecting the hurdles to replace incumbent practices. Among its activities, the Association is working towards establishing standards for qualifications and labelling of green roofs, thereby underpinning trust in support of demand. The Supporters category features a range of companies promoting green infrastructure projects where climate change and biodiversity play a critical role. The Friends category consists of organisations supporting research on NBS and sustainability.

Public procurement represents the prime vehicle at hand for policymakers to stimulate NBOs from the demand-side. Challenges linger, however, to better align conventional procurement practices with NBS non-monetary values and cost structures, to measure impact and effectiveness, manage risk, make it easier to target smaller suppliers, etc.

Photos: Examples of green roofs in a European context.

[23] See https://www.iea.org/commentaries/empowering-people-the-role-of-local-energy-communities-in-clean-energy-transitions, and;
https://managenergy.ec.europa.eu/system/files/2023-05/Energy%20Communities%20Repository%20-%20Short%20Guide%20-%20FINAL.pdf

[24] See https://efb-greenroof.eu/

Table 5: NBO Policy for demand

Rationale/ Issues	Opportunities	Implications	Examples URBiNAT cities and elsewhere
Environmental knowledge does not in itself translate in green behaviours, so unsustainable consumption sticks	Identify openings for combining growth and green behaviours	Promote innovation by diverse NBOs. Visualise social and ethical implications	Farmers Market, Sofia, Nantes, Brussels, Siena
Asymmetric information places the public at a disadvantage relative to polluters	Requiring transparency on impacts, and link rewards to real results	Build competency in reliable measurement and its diffusion	Measuring mobility density, Porto, and traffic patterns, Paris
Public procurement loses out on incentivising NBOs and protect diverse benefits of NBS	Align procurement specifications with NBS non-monetary values and cost structures	Creative combinations of specifications, build and link competences horizontally	Helsinki Malmö
Lacking effective market pull for green R&D, innovation, and capacity building	Framing public demand for green mission research and industrial institutes	Frame calls for mission R&D. Incentives for green training and professional development	Targeted university grants, Nantes
Obstacles to newcomers	Open procurement processes to smaller private sector suppliers.	Agreeing NBS standards or quality assurance mechanisms as reference criteria.	Incentivising open source
Unfulfilled opportunities to capture indirect benefits and synergies	Removing hurdles and rigidities facilitating innovative value-enhancing combinations	Enhanced drive for NBOs to innovate incl. in how to promote behaviour change	Høje Taastrup (EEC), HETO BYG
Hurdles to transitioning towards sustainability	Initiate dialogue and other mechanisms to facilitate collaboration and trust-building	Engage NBOs in spurring system-level adaptation facilitating reach beyond first movers	Høje Taastrup applies sustainability requirements in procurement optimising material reuse and reducing emissions from construction

Another often-cited obstacle has to do with the room to manoeuvre/flexibility to include green criteria in the design of public tenders, which in some respects is limited by national guidelines and standards, as well as international agreements. Efforts can be made however to search out and apply NBS standards, or other suitable quality assurance mechanisms, e.g., local NBS codes (e.g., building codes for NBS) as reference criteria in procurement processes. Incorporating Natural Capital assessment considerations into public procurement policies could further help specify and evaluate public goods and their contributions to nature.

Further, novel approaches can be propelled by framing more open-ended and challenge-based criteria, by testing the ground for small-scale pilots, or by inviting novel links between diverse actors engaged in different social spheres, or parts of the value-chain. Mission-based PPP offers a well-

established instrument for promoting collaboration in the realm of public research, while leaving rivalling businesses to compete in markets for final products[25].

Launching and administering schemes offering effective support of NBOs' contributions to NBS and sustainability requires improved coordination capabilities. Communication gaps between departments need to be overcome, coupled with parallel knowledge and skills upgrading, e.g., on monetary/non-monetary valuation of NBS benefits, or how to frame tender processes amenable to accommodating diverse kinds of NBOs. Corresponding enhanced literacy in procurement processes may have to be supported for NBOs as well, typically arranged through professional training bodies, some of which may themselves represent NBOs.

Given such coordinated capacity building, public procurement can be upgraded to serve as a vehicle for linking diverse sources of demand, e.g., public space, amenities, less polluted air, clean water, support for wellness, etc. Non-conventional kinds of innovation can be stimulated, spanning green products, processes, and services. Through requirements added onto physical or industrial activities, NBOs may be stimulated to bring about indirect benefits from NBS in human resource management, health, and wellness (Myers et al., 2012). Parallel to the use of recycled materials in new construction, Environment & Energy Centre Høje Taastrup (EEC) HETO BYG, assists citizens in making sound choices on usage and repair, in part through behavioural adjustments. Additionally, for young people in a vulnerable situation, this NBO offers openings to vocational training as lead-in to employment in construction.

4.5 Financial solutions

Private sector investment in NBS is known to meet with several barriers, related to markets as well as institutions. The actual funding mobilised to date is dominated by public sources. According to EIB (2023), only some 3% of all NBS projects receive more than 50% funding from the private sector.

As a fundamental concern, mechanisms are lacking for project owners to reap full returns on investments in NBS. An important reason has to do with the public goods nature of many benefits, implying they "dissipate" by spreading thin among large numbers of people, and also materialise only in the long term. This state of affairs in itself results in under-investment in NBS from private sources, and in fact also by the public sector. Lack of knowledge about the impacts, coupled with uncertainty about future policies and market conditions, hampers due diligence and drives up transaction costs for private financiers to evaluate investment in NBS and assess risks.

Although the precise situation differs from project to project, what accrues to the investor will deviate from what applies to society at large. Chances of aligning the two in support of sustainability are weakened by short-termism, as associated with strict consideration of shareholder interests (Schohenmaker and Schramade, 2020). Venture capital funds tend to be exceptionally focused on narrow performance criteria linked to short-term pay-off.

Investor competences, perception of risk, time horizon, and mindset all play a part in limiting perceptions of what represents a viable business model. Conservative university programmes, ranking institutes, management training, and professional trademarks play their part in underpinning prevailing practices.

Improved measurement, transparency, and visibility of social and environmental gains tend to go together with a broadened perspective, consideration of stakeholder interests, a more aware and demanding customer base, and the adoption of longer time horizons. Changes in such respects may

[25] The pros and cons of procurement of innovation through mission oriented Public Private Partnership was introduced in a working paper of the OECD (2004).

come down to skills development and changed mindset, e.g., as reflected in the number and quality of long-term analysts found in a financial institution (Lo, 2017).

Where green project managers gain competences in investment literacy, i.e., how to structure information on terms that meet with investor requirements, the outlook strengthens further. Having said that, green start-ups may meet insurmountable scepticism in entrenched investor circles, raising the need of capabilities to liaison with alternative investors (Demirel and Parris, 2015; Bergset and Fichter, 2015). Where there is poor access to institutional sources of funding, increased demand can be observed for informal sources of investment (Herrington and Coduras, 2019). Success in this regard may hinge on start-ups adapting in other ways, e.g., by giving up part of their equity, or meeting with other demands depending on which particular partner arrangements are at hand. Where incubator or accelerators are in place, they may gain access to low-cost office space and become eligible for qualified mentorship and guidance linked to upgrading their business model, product development, or customer relations. Business angel networks which view NBEs as part of their central remit are most likely to emerge in the presence of linkages to relevant university research and education.

Governments are ill-suited for judging corporate risk or playing a direct role in determining funding allocations to private sector entities. On the other hand, public actors, including at local and city level, possess various means to facilitate improved financial market conditions for NBOs. We have already noted that adequately framed procurement practices can play a part. Publicly instigated small size grants can further be mobilised in support of seed stages, tailored to help framing a viable base for green entrepreneurship and NBO piloting[26].

For more mature companies, a mainstreaming of budgetary allocations, making investment in NBS and NBOs an integral part of infrastructure planning and implementation, may be required for improving their funding prospects in large scale projects, such as those related to dams, rivers, coasts, land use, and so forth. The push at EU level, not least through the Horizon research and innovation project agenda, has been essential for expanding the scope for public investment in NBS. One way or the other, fulfilling the potential of NBS hinges on accessing private sector investment, thereby easing today's one-sided reliance on public sources. As noted, however, because NBS projects result in multiple benefits, of which some can be commercialised while others cannot, outcomes may be skewed towards the former. Even their socially most valuable outputs may simply not attract any interest from conventional investors.

A response observed in various countries consist in foundations earmarked for offering funding related to NBS for philanthropic purposes. These often focus on certain functions, such as community development, health, education, animal or plants protection, and so forth. Some foundations combine social purposes with investments aimed at resulting in financial pay-back. For those that do not, synergies may nevertheless arise with various kinds of commercially viable NBO activities, e.g., related to utilities including sanitation or renewable energy provision, or by way of shops, tourist attractions, or provision of other amenities.

Blended finance models are increasingly looked to as a means of increasing private investment. This is partly as the public component can be devised to reduce risk for the private investor. More generally though, blended finance can be devised so as to allow each party to contribute based on their priority interests and capabilities. Along these lines, public engagement can take the shape of a PPP, combining private sector management, innovation, customer-relations & marketing with public investment and infrastructure development in support of inherently public goods.

[26] In Brussels, small-scale municipal-based support has been made available for shopping/commerce zones, see https://www.entreprendrebruxelles.be/

While the precise means enabling success are bound to vary, polices should aim to facilitate for NBOs to effectively innovate around synergetic combinations of value streams while leveraging the marketability and bankability of natural assets, creating sustainable competitive advantages and driving long-term success.

Beside the advancement of funding sources or instruments, other incentives (carrots and/or sticks) can be put in motion to award impacts on sustainability. Examples include debt-for-nature swaps, green credit lines, green bonds, public subsidies, environmental taxes and charges, and compensation for ecosystem services.

Existing markets for sustainability-related impacts, as for carbon credits, or those yet in a formative stage (such as biodiversity credits) – offer means to monetise environmental benefits, given fulfilled eligibility criteria along accompanied by verification and validation. The global framework for carbon credits has gone through significant adjustments, notably transitioning from the Kyoto protocol to the framework of the Paris Agreement of 2015. Responding to criticisms of loopholes, Article 6 of the latter feature provisions devised to counter double counting. At the same time, there is now less scope for offsetting between developing and developed countries. Heavy administrative procedures and other sources of inefficiency remain (Michaelowa et al., 2019). Problems with volatile and divergent prices persist (Hermwille, et al., 2015; Narassimhan, et al., 2018).

Projects in developing countries, presently referred to certification in voluntary markets, meet with a poor market outlook. Attaining somewhat more favourable compensation requires working out often cumbersome procedures for matching on a bilateral basis with organisations or countries with a need to offset their emissions. Meanwhile, a series of studies has criticised projects certified on these markets to miss out on net carbon absorption (Kollmuss et al., 2015; West et al., 2023). Others, however, point to a negative bias in this evaluation agenda, and unfair discrediting of local developers in the least developed countries (Mitchard et al., 2024). Taken together, these conditions leave scanty returns reaching the ground, in effect maintaining a dearth of investments in NBS where they are most needed.

Carbon offsets are de facto in high demand, among corporate as well as sovereign emitters that meet with steep costs in reducing their own emissions. Improved channels of communication among the market actors along with regulatory clarity and institutional support conducive to overcome the intricacies of the Paris Agreement, would open for NBOs to realise substantially better outcomes. In the case of forestation projects, the demand for solution providers would likely surge in land and water management practices, species selection, monitoring, verification, validation, etc., and other tedious tasks that must accompany viable projects. Particularly, environmentally and socially valuable activities (e.g. sustainable forestry, regenerative agriculture, biosaline agriculture, etc.) should arguably enjoy orderly mark-ups in the carbon market, or be made eligible for separate compensation, e.g. by way of biodiversity credits, or water credits. Either way, making priority sustainability contributions more attractive, in sync with conventional return-on-investment, remains a mostly untapped opportunity for all relevant regulatory parties involved.

A separate cross-border issue appears through the actual or potential location decisions by footloose industrial activity in response to variation in competitive advantages. Many concerns have arisen from the prospect of carbon leakage caused by industry relocating to where policy regimes are less stringent. As a consequence, carbon-intensive industries are often de facto exempt from emission-reduction requirements, and governments have been observed to underinvest in green R&D (Jaakkola and van der Ploeg, 2019; Zhang, 2023). Whether and how such collective action and free-riding issues exercise a significant impact on international carbon policies remains a contested subject (Saikawa, 2013, Aklin and Mildenberger, 2020).

Photos: Private sector investment next to Campanhã, Porto.

Increased value of land and real estate represents one of the main sources of rents from NBS that tend to translate into private sector returns. These, in turn, spill over into rents for offices and living, resulting in the sort of distributional consequences just noted. In the case of Campanhã and the Healthy Corridor instigated in Porto through URBiNAT, land prices shot up by some 400% since the project start, during a time span of about four years. In this case, the municipality set out to protect the original inhabitants with a focus on affordable living costs. This was managed through fixed rent arrangements for social housing at the core of the area. In the surroundings, the booming real estate opportunities have mobilised significant private investment for new construction.

Value generation manifested in land price increase translates into a powerful demonstration effect. In Porto, private sector consortia are thus planning to replicate the Healthy corridor process and concept in other areas, in strategies that are set to advance at much higher speed and backed with more investment compared to the publicly funded project. Public policy needs to be aware and vigilant in view of the risk of adverse social consequences. The municipality may, for instance, stay engaged to ensure that genuine co-creation by citizens is maintained, and that serious measures are taken from the start to counter risks of exclusion and polarisation.

In the case of Nantes, as well as other leading green cities in France, a significant share of the existing green areas were established by, and remain under the ownership of, the private sector. Raising private sector funding for expanded NBS still represents a struggle.

Many informal, social and solidarity economy NBOs that are of high importance for local communities, rely on charities or meagre public support programmes that offer only temporary support and whose mandates may be erratic and unreliable. Le Petit Lieu represents a formal French association legally constituted and subsidised, forming part of a network of resource providers that draws on blended sources of funding. Complementary specialised organisations have arisen, coaching, and offering support for innovation as a basis for more diverse and reliable revenue flows. Les Ecossolies in Nantes, for instance, release an annual catalogue of social and solidarity activities and assist local leaders in building project management skills (Caitana, 2024).

Other funding mechanisms of relevance for NBOs include crowdfunding (CF), which serves not just as a means to raise capital on favourable terms but also to the build-up of a highly engaged client base. CF may effectively support inclusion and co-governance and stimulate customer and citizen appreciation of diverse value streams. Its use has been widely observed across sustainable entrepreneurship (e.g., Böckel et al., 2020) as well as ecological and sustainability entrepreneurship

(Gast et al., 2017). CF has been depicted as having three main groups of participants: entrepreneurs, crowdfunders, and mediators (e.g. crowdfunding platforms, CFPs). Governments and authorities influence CF in various ways, e.g. through legislation and taxes. Laws and regulations influence the scope for financing options and the CFPs available to enterprises (Kukurba et al., 2021).

Sustaining progress over time typically comes down to working out several complementary pathways. Studying green roofs, Calheiros and Stefanakis (2021) conclude that successful implementation hinges on the presence of several facilitators. They call for parallel efforts to identify and remove barriers, devise support structures, sharpen financial incentives, build awareness, and disseminate information. According to the EIB (2023), rather than any one-size-fits-all instrument for NBS, tailored packages, combining different funding, financing, and revenue streams for various operations, are the most effective strategy."

On the quest of supporting the rise of viable, vibrant ecosystems, a spurt in relevant public investment may help trigger private sector action by signalling government priorities (Lerner, 1998). The bankability of NBOs and NBS projects benefits directly from a credible outlook by way of consistent and reliable policies conducive to green investment. Applying to both formal and informal environmental regulation, on the other hand, by increasing uncertainty and unpredictable risks, policy fluctuations have been demonstrated to discourage investment and technological innovation by corporations and investors, stifling their willingness to contribute to innovation activities and leading to a diminished level of innovation overall (Xie et al., 2022).

Promoting success requires, finally, improved methods for risk assessment of NBOs which integrate a better understanding and appreciation of their wider societal benefits. Ongoing EU projects aim to result in structured guidance for policy makers how to lend support to capacity building among practitioners in this respect (Wendling and Dumitru, 2021; Cardinali et al., 2021).

Through the combination of EU directives, multilateral initiatives, ESG (Environment, Society, and Governance) certification, etc., financial institutions and the corporate sector are subjected to increasing pressure to report on sustainability impacts as well as their plans to rectify them. The requirements concern not just on own performances, but their supply chain relations as well. Having said that, the linkage between reporting and actual results appears questionable. Mounting observations of a striking contrast between pledges and actions have fuelled a deepening scepticism of sustainability reporting as a smokescreen, a way for companies to capitalise on increased environmental awareness in the population while in practice continuing with business-as-usual.

ESG measurement favours making a case of addressing measurable ecological issues, at the expense of what cannot be measured. Tactical box-ticking exercises tend to take the front seat, rather than bringing about integrated sustainability strategies. With ESG scoring neither standardised nor harmonised, multiple examples abound of firms attaining high rankings even though actual circumstances show them to perform abysmally. The same applies to most other systems designed to measure and evaluate a company's environmental performance, such as energy usage, waste management, carbon emissions, and environmental compliance.

On a related note, social media has come to serve as a main channel for misinformation. Tailored to influencing vulnerable users, the main objectives appear to include undermining trust in mainstream institutions and to sow confusion about climate change. When extreme weather events and other environmental disasters hit, blame is regularly diverted to suitable scapegoats. Scientific reports in this realm are depicted as a hoax, invented by the elite to fool ordinary citizens. Through such means, the case is weakened for industry as a whole to pursue serious action in support of sustainability, while pressure is reduced on those responsible for mismanagement to rectify their action (Font and McCabe, 2017).

Table 6: NBO Policy for finance

Rationale/ Issues	Opportunities	Implications	Examples URBiNAT cities and elsewhere
High transaction costs for private financiers to evaluate NBS projects	Locally, profiled training accelerators, university-NBO linkages increase investor literacy of NBOs	Adjustment of finance and accounting training and professional skill requirements	Examples NBO response: https://www.viva-maris.de/
Lack of stable and reliable policy hinder long-term investment	Broadened support consistent and lasting reward structures	Facilitate shared understanding and joint interests as a basis for more stable governance	
Lack of funding for managing diverse revenue streams	Institutional support of profiled investment capabilities, working out investment channels specialised in acting on diverse revenue streams	Facilitating the formation of public and private foundations that invest only in sustainable urban and rural projects	Utrecht University[27] Maastricht University[28] BI Norwegian Business School[29] Positive Impact Rating[30] RealDania, investing in 4700 Danish projects.
Investor narrow perception of risk, time horizon and mindset create a bias against NBOs	Work out means of impact investor strategies	Nudge and engage financial sector actors in support of sustainability	https://startupsavant.com/startup-center/grow-a-wish
Lack of funding for green start-ups	Improve risk management and overcome information and trust issues in early stages	Foster specialised ecosystems incl. accelerators, business angel networks and VC functionalities	London, GEP Swedish Climate Start-up Map
Leveraging of NBS increases land and real estate prices, pushing up rents and living costs in their vicinity	Case for policy strategy to take active stance in support of social cohesion and vulnerable groups	Take action on the systems level, by way of Healthy corridors, along with specific measures to counter unwanted distribution effects	Cross-border social housing collaboration by Høje Taastrup, Helsingborg and Landskrona, powered by NBOs;
Under-investment, especially in values least prone to commercialisation	Opportunity for public sector to "pull" private sector investment in NBS	• EU R&D • PPP • Crowdfunding	Netherlands Horizon 2020 MyParksScotland
ESG and other green reporting frameworks aim for firms "to look good" but miss out on impacts	Build on the Green Deal, EU Taxonomy Regulation, etc., to measure and reward impact[31]	Stimulate NBOs to innovate stronger mechanisms for funding and investing "green", such as green cards	Davos Initiative IECQ Global Forum Transition foundation

[27] For relevant university rankings, see https://www.bi.edu/programmes-and-individual-courses/master-programmes/sustainable-finance/
[28] https://curriculum.maastrichtuniversity.nl/education/master/master-international-business-track-sustainable-finance/ranking-recognition
[29] https://www.bi.edu/programmes-and-individual-courses/master-programmes/sustainable-finance/
[30] https://www.positiveimpactrating.org/home
[31] Check https://climatelaunchpad.org/how-will-europes-green-deal-benefit-entrepreneurs/

5. Towards A Viable Policy Mix

Having reviewed the rationale for policy as well as specific domains for action, in the following we take a step back to consider factors or relevance for shaping the ability to frame and pursue such NBO policies successfully.

There is no doubt about the importance of green entrepreneurship, businesses and other organisations emerging as pillars of a sustainable economic development, e.g., through innovation, technology, and product development, stimulating demand, interfaces with clients and suppliers, and by way of jobs and skills development (ILO, 2020). The presence of remaining barriers and hurdles, however, coupled with the lack of stipulated generically applicable solutions how to proceed, provides a strong case for promoting, scaling, and diffusing best practices.

How this is to be pursued is less apparent. A central theme has to do with the evolutionary and systemic nature of the agenda at hand. In the present report, we underline the importance of navigating a changing landscape for NBO policies, marked by a shifting balance between national, supranational, and regional/local constituents. Related to this, there is the question what governance reform can be enacted in support of NBO policy. Finally, emphasis is placed on working out a way to overcome the disconnect and alienation between nature and humans that has come to denote the modern urban environment.

5.1 A changing NBO policy landscape

National government traditionally represents the focal point for policy formulation and decision-making in regard to implementation. While parliament and government institutions tend to reside in capitals, some public authorities are commonly outsourced elsewhere, normally to other major cities - at least in nation states covering significant geographic territory. Outsourcing may serve to reduce congestion in the capital, or reflect natural advantages, e.g., locating authorities responsible for fishery on the coastline. Motivations may be political too, such as satisfying voters or special interest groups outside the capital. Normally, however, most national authorities whose authorities have national reach remain concentrated in capitals.

Other policy institutions, such as county boards, regional authorities, or municipalities, tend to have limited mandates and less scope for raising resources on their own. Their mandates are normally limited to areas viewed as inherently local in nature. Primary and secondary schooling are cases in point. Tertiary education, by contrast, is mostly subjected to national regulation, evaluation, and funding decisions. Yet, physical proximity tends to matter greatly for university-industry collaboration, particularly in regard to research and innovation, but also for student uptake.

National policy remains of paramount importance for framing generally enabling conditions for entrepreneurship and business development. In regard to NBEs specifically, relevant national policies include:

1. Promoting urban nature restoration plans, as for 2030, collaborating between national, EU, and regional level[32];
2. Taxes on greenhouse gas emissions, possibly aligned with EU strategies and regulations;
3. Subsidies, or reduced taxes, supporting renewable energies and NBS;

[32] Dutch initiatives on green deals, for instance, bringing together all relevant actors in joint commitments to co-create and develop knowledge as well as solutions: https://nextgreen.nl/en/projects/green-deal-infra-nature/

4. Public procurement frameworks favouring “green” applications or solutions, along with regulations and standards targeting specific product categories or sectors, along with verification and enforcement mechanisms;
5. Instituting educational programmes to build awareness and knowledge about environmental challenges across the population at large;
6. Supporting research capacity at universities or establishing industrial institutes to develop new « green » solutions;
7. Creating green infrastructure, e.g., for cycling, walking, or accessing green areas.

With increasing concerns for sustainability, mainstream national policies as well as EU initiatives and support programmes have attained a novel kind of interventionist tendency, or what may be referred to as a “new industrial policy”. Some observers express concerns about this development, calling attention to historical records of “picking-the-winner” policies failing badly over the years. According to Henrekson (2024) “wicked problems” cannot be resolved by mission-oriented policies since; i) governments are not exempt from self-interest; ii) Rent seeking and mission capture; iii) policymakers have inadequate information; iv) Competition will be distorted; v) Moral hazard problems, and; vi) high opportunity costs.

Beside the trends in traditional policy, the focus here is on another shift in momentum, namely the increasingly important dynamic surrounding NBO development at local/city level. As discussed, progress in this regard is inter-related with utilisation and appreciation of NBS. as well as with the conditions for green entrepreneurship and NBO development (Wei et al., 2023). According to UNCTAD (2024), a major uptick is taking shape across the developing world in local entrepreneurship applying circular and regenerative business models. Speeding such a process is concluded to depend on: i) a collaborative stance enabling cross-sectoral coherence; ii) the availability of public investment on terms that catalyse private investment, and; iii) supportive mindset change propelled through, e.g., knowledge exchange platforms, incubators and accelerators focused on the circular economy, facilitating information exchange and capacity-building.

Part of the picture has to do with context-specific social capital (Guzman and Stern, 2014; Leyden et al., 2014; Audretsch et al., 2015; Song et al., 2021). Related to this, culture and heritage stand at the centre of human ingenuity, creativity, and entrepreneurship, where the ability to draw inspiration, benefit and synergies from multicultural and transdisciplinary diversity plays out in distinctly unique manners at local level[33]. Some NBOs engaging in social innovation around NBS can be seen to draw on culture, e.g., in the spheres of education, tourism, and experienced-based industry more broadly. Cidade+, established in Porto by a group of individuals experiencing the absence of a platform for conversation about sustainability, responded by the creation of a festival rooted in local culture. By uniting academics, activists, and policymakers on this basis, Cidade+ has mustered improved wellbeing and welfare of individuals and communities through broad-based backing of environmental values (Andersson et al., 2022*a*).

Examples from around the world underscore the scope for rapid technological and economic advancement centred around NBEs, where diverse actors join forces in capacity building, competence development, and resource mobilisation at local and regional level. This is the case not least in some of the largest nation states which, moreover, rank among those most aggressive in promoting entrepreneurship and business growth. In the US, for instance, Silicon Valley is in the midst of an AI-generated green comeback, featuring supply chain optimisation, new materials, smart grids, energy management, waste management and other sustainability-related innovations and start-up development. China and India similarly display a range of highly competitive local and

[33] These aspects have received attention in the “New European Bauhaus Compass”, see https://new-european-bauhaus.europa.eu/get-involved/use-compass_en.

regional clusters which thrive on private sector investment in the "green" or "blue" economy, supported in various ways by public-private collaboration[34]. Yet, the EU clearly attains the lead in promoting cross-national border collaboration, calling attention to public goods' aspects, and in engaging broad-based multi-stakeholder attention to NBS. Various European initiatives are taken as well to promote green entrepreneurship[35], as well as in regard to mapping and encouraging diverse kinds of NBOs (McQuaid et al., 2021*a*). The European Green Deal and related initiatives further aim to transform the EU into a resilient society along with an efficient resource allocation and a competitive economy. Despite such efforts, however, Europe evidently continues to suffer from weaknesses, playing out at the micro level, hampering green entrepreneurship and NBOs (Vasilescu et al., 2020; Haltiwanger, 2022). Weaknesses on this account are bound to stifle the innovative capacity and dynamic of European sustainability efforts.

In contrast to the traditional reliance on authorities operating at national level, cities and local authorities are naturally more concerned with enabling relevant knowledge exchanges and joint efforts between complementary competences. Whether they possess adequate capabilities in this regard is a different matter. Limitations to expertise is likely to appear in several respects and resources tends to be highly constrained in the area under development.

Given the importance of the local dynamic and action arena, however, NBO contributions therefore stand out as even more critical. This applies to investment, skills, and innovative capacity to leverage NBS benefits. The distinct role of NBOs partly flows from their independence from government planning and decision-making, in effect making up for deficiencies on that side.

Part of the policy mission comes down to offering opportunities for outright collaboration on joint projects, as through public private partnerships and other variants of blended finance, which are increasingly looked to as a critical means of increasing investment in support of NBS. Part of the benefits are commonly referred to as the public reducing private sector risk. The key contribution, however, comes down to enabling investment through a collaborative arrangement that allows each party to contribute in line with their priority interests and capabilities. Typically, private sector management, innovation, customer-relations, marketing and market penetration skills can join forces with public investment and infrastructure development in parallel support of public goods aspects.

The precise means enabling success are bound to vary. The bottom-line, however, is for policies to help facilitate the full spectrum of favorable NBO activities, spanning innovation, green and social entrepreneurship, breeding new markets as well as market expansion, including the scaling and replication of best practice NBOs. Policies should welcome research collaboration with other organisations, as well as synergetic linkages with stakeholders, and communities, aimed to leverage collective expertise and resources (Guerrero et al., 2015)[36]. NBOs naturally carry the responsibility for their value proposition of green products or services, and for building genuine brand reputation and credibility. Their success drawing on synergetic combinations of value streams, leveraging the marketability and bankability of natural assets, benefit society in its entirely through, propelling a circle of sustainable competitive advantages and new rounds of innovation and green organizational development.

[34] In China, public support has helped trigger massive investment in clean tech, renewable energy, and sustainable infrastructure, spun around green technology hubs in cities like Shenzhen and Shanghai (Wang, 2023). In India, where the government's National Solar Mission and Smart Cities Mission promote renewable energy adoption and sustainable urban development, Bengaluru, Pune, and Hyderabad are among the novel hotspots that have arisen for green startups and innovative financial solutions (Bhatnagar et al., 2022).

[35] EUR-Lex - 52020DC0380 - EN - EUR-Lex (europa.eu), see also https://climatelaunchpad.org/how-will-europes-green-deal-benefit-entrepreneurs/

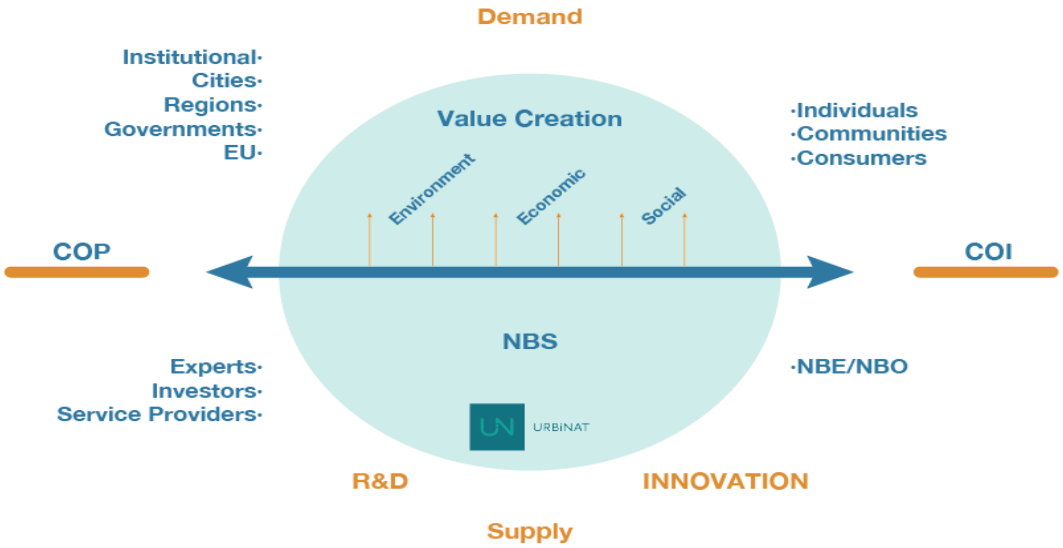
[36] Vejle Sustain center at Dandy Business Park https://dandybusinesspark.dk/om-os/ is a case in point.

In this regard, there is the role of guidance and coaching the rise of such NBO-friendly ecosystem Meanwhile, through the EU NBS Horizon Research and Innovation projects, cities have entered into structured experimentation and learning with one another, as well as with research institutions and NBOs, encompassing experimentation and learning in support of structured diagnostic, co-creation of NBS, and the adoption of toolboxes and indicators tailored for measurement and evaluation of high relevance to the specific context.

For a stylised illustration of the NBO ecosystem, see Figure 7[37]. Demand factors are pulling value-creation from the top. Supply is operating from beneath, linked to NBS. Policy-institutions are placed in the upper left corner, while experts and service providers are on the lower left. These categories are here linked through a COP, as devised by URBiNAT. On the right-hand side, individuals, communities, and consumers are included in the upper corner, as part of demand, and may via Is link to NBEs and NBOs, staged closer to the supply side, in the corner below. Viewed in this way, NBS are the core of the ecosystem, requiring both supply and demand forces to underpin value-creation along the various sustainability dimensions – environment, economy, and society.

Balance and inclusion matter for what outcomes can be achieved. Where some are left out, they may experience negative sentiments, based on a sense of neglect or exploitation. Where such sentiments flourish, vested interests have more leeway to stir scepticism, confusion, and resistance towards NBS projects, or towards green policies more broadly. Those left out may also resent the success of green entrepreneurs and NBOs. Backlashes against efforts to reign in environmental damage has become commonplace in much of the EU. Examples include the "Yellow-Wests" movement in France or strikes pursued and barricades raised in and around Brussels and other major European cities by farmers and others. Many of those protests have raided against higher prices on fossil fuels or other measures adopted for purposes of combating climate change, unsustainable land use management, or support sustainability in other respects.

Figure 7: Stylised ecosystem for value-creation of NBS



***Source*:** IKED and GUDA

[37] The figure is an adaption of material developed for URBiNAT (2022).

5.2. Tailoring to the local context

NBO policies range from what represents more or less universally applicable removal of barriers or framing of conditions that promote sustainability, to those that are adapted to and plug into a specific context. The former are mostly shaped as the outcome of political decision-making and central government administration. The scope for the latter is less clear.

Over the past decade, the European Commission embarked on an ambitious research and innovation agenda centred on NBS in the urban context. Consequently, substantive resources have been allocated to more than 70 approved consortia, each of which were framed from the outset to advance a particular strand of cross-border collaboration at sub-national level. Operating based on mandates that have been gradually refined through highly competitive application and evaluation processes, each of these projects have generated new knowledge and lessons pertaining to the processes of preparing, implementing and evaluating NBS projects, not just in Europe but also with partner cities and organisations in other parts of the world.

In part, the advances made possible by the EU in this respect may be interpreted as cautious practicing of the subsidiarity principle, i.e., enabling decisions to be made as close as possible to citizens, while yet at a level capable of ensuring effectiveness - in this case deferring policymaking to cities and local communities which, at the same time, are embedded in cross-border collaboration[38].

While various kinds of actors and competencies are welcomed and have taken part, NBOs arguably appear under-represented. As such organisations are driven by concrete operational objectives and often meet with severe time and resource constraints, realising their effective engagement in research and innovation consortia arguably meet particular challenges. Some of the Horizon projects referred to, engage extensively in mapping NBOs, and aim to promote knowledge diffusion of relevance to their development. Some studies have developed recommendations for NBO policies, applying a systemic comprehensive approach (McQuaid et al., 2021*b*). More is required though, to foster capacity building in support of effective NBO policy strategy. In providing inputs to the present work, several representatives of URBiNAT cities pointed to a dearth of initiatives of relevance to NBOs specifically.

Different kinds of competencies require consideration. Balancing short vs. long term, or sectoral vs. broader interests, forms part of the picture (Walker, 2013). So do technical abilities of relevance for propelling NBO policy in unorthodox domains such as those presented in Chapter 4. A welcoming attitude to entrepreneurship as well as community engagement, strengths in communication and liaison with stakeholders, receptiveness to evaluation and readiness to translate lessons into improved practice, are among those that matter (Ezuma and Matthew, 2022).

The shift in policy mandate and orientation outlined in the present report relates to the concept of smart regional specialisation (Balland et al., 2019). At the heart of this approach, regional growth possibilities are leveraged by building on existing place-based capabilities, while placing high emphasis on freeing up mechanisms for renewal through innovation and entrepreneurship (Foray, 2016). Fulfilling the potential of the latter hinges on freeing up new opportunities along with the removal of hurdles. A practical example which incorporates a central role for NBOs is that of London's "Green Enterprise Partnership (GEP)" In this case, local enterprises are brought into interface with leading business and organised interested groups to test net-zero business models and foster innovation for new sustainable products and services in South London (OECD, 2023*b*).

[38] The EU Treaties aim to ensure that powers are exercised as close to the citizen as possible, as referred to in https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:115:0013:0045:en:PDF

In terms of targeting, priority areas may span one or several sectors, along with a direction of change, again reflecting the smart specialization literature (Mccann and Soete, 2020; Foray et al., 2021). Rather than favour specific sectors or activities, the trick is to identify and strengthen mechanisms that can be effective in inducing a genuine "green" transformation in the local space at hand. If the critical problems have to do with human capital, countering measures need to be identified in that area. If key challenges have to do with finance, a matching response is searched for, and so forth. Policies may be oriented to coaching and facilitating progress defined in terms of a desired transformation process, not specific achievements or outcomes.

This kind of approach cannot merely be crafted based on expert/academic work. An active inclusive discovery journey brings distinct advantages. Local diagnostic, involving key competences and actors, including citizens and relevant stakeholders, matters for achieving relevance as well as buy-in among the citizens and stakeholders that make up the local ecosystem. Public authorities, at local and regional level just as at national level, are simply not in the possession of adequate knowledge, nor led by motivations which squarely reflect the societal good, to a degree that would make them well placed to determine which actors should be winners, nor what targets they should fulfil. There is much to gain from enabling entrepreneurship and innovation, based on competition, to be in full swing. Yet, policies need to somehow counter, or make up for, the stark presence of externalities, negative as well as positive - depriving NBOs of returns.

At the end of the day, a range of conditions, among which both generic and specific policy impetus forms a part, is at work in influencing observed performances and successes by NBOs. Figure 8 illustrates a mapping and provisional rating of conditions influencing NBOs, based on comparative analysis across URBiNAT's frontrunner cities. This stylised assessment amounts to profiling where each city stands relative one another in domains that have been selected based on the combination of importance to NBOs, and the presence of rationale and scope for policy to induce improvements. Thus, what appears in this mapping is not exactly a policy-ranking, rather a rating reflecting the observed results of the totality of influences. The further out from the centre, the stronger a particular city scores in a certain aspect. Judged on this basis, among these three cities, Nantes appears as offering the most favourable conditions overall. The broader policy framework notably comes out as most conducive to NBOs in the case of Nantes, with Porto in second place. As for the specific policy domains laid out in this report, the three cities mainly appear in the same order, except that Sofia is ranked as coming out on top in digital enablers, and Porto in co-creation as a driver of NBO performances. Sofia is placed on top when it comes to start-up culture, although its weaknesses in the other domains influencing actual NBO performances, such as finance, demand, and conditions for NBO growth, influence the actual performance of entrepreneurs.

The actual rating as appearing in Figure 8 is not the point. This particular representation draws essentially on ad hoc insights flowing from URBiNAT's project work, not a careful evaluation of the specific conditions that apply in each policy domain, nor on undisputable, statistically verified variation in outcomes. It should be stressed, moreover, that the focus here is on gaining an understanding about the scope and impetus of policy on NBOs specifically, not on conditions for citizen participation or for enterprise or NBS performances as such. As discussed, the wave of recent and ongoing EU programmes spurring increased local and regional investment and engagement in NBEs, have typically devoted less attention to the contributions of NBOs, and the private sector more broadly.

By reflecting to what degree, a particular city displays a gap in the conditions offered for NBOs across key policy domains, Figure 8 aims to cast light on relative strengths and weaknesses. It offers an indication of needs to close the gap relative peers. Naturally, each city may usefully further the analysis which areas of influence/policy domains are most important given its specific context, as well as select relevant peers accordingly.

The importance of a holistic assessment and understanding of reform efforts should be born in mind, as no individual support measure is likely to make a major difference by itself. Strategic analysis is merited to consider ways of building or strengthening a local ecosystem conducive to a vibrant NBO sector, and thereby value-creation through NBS. Success in that regard is likely to require broad-based stakeholder support along with fruitful collaboration and learning "in action".

Conditions for NBOs vary. New business formation tends to be lower in deprived areas compared with those that are more affluent (Lee and Cowling, 2012). Weaker economic fundamentals tend to combine with insecurity and social stigma, translating into scepticism against business and entrepreneurship. Particularly "green" sentiments may be seen as a forebearer of higher costs, rents, and the downfall of traditional ways of life. Green entrepreneurs may thus meet with particular barriers in deprived neighbourhoods, adding to skill shortages and weak demand for eco-friendly products. On the other hand, opportunities appear too, possibly embedded in diversity and multiculturalism coupled with strong local identity. Alternative forms of asset and skills development, as in the case of art and music, may appear although possibly latent and subjected to low visibility until unleashed by enabling conditions.

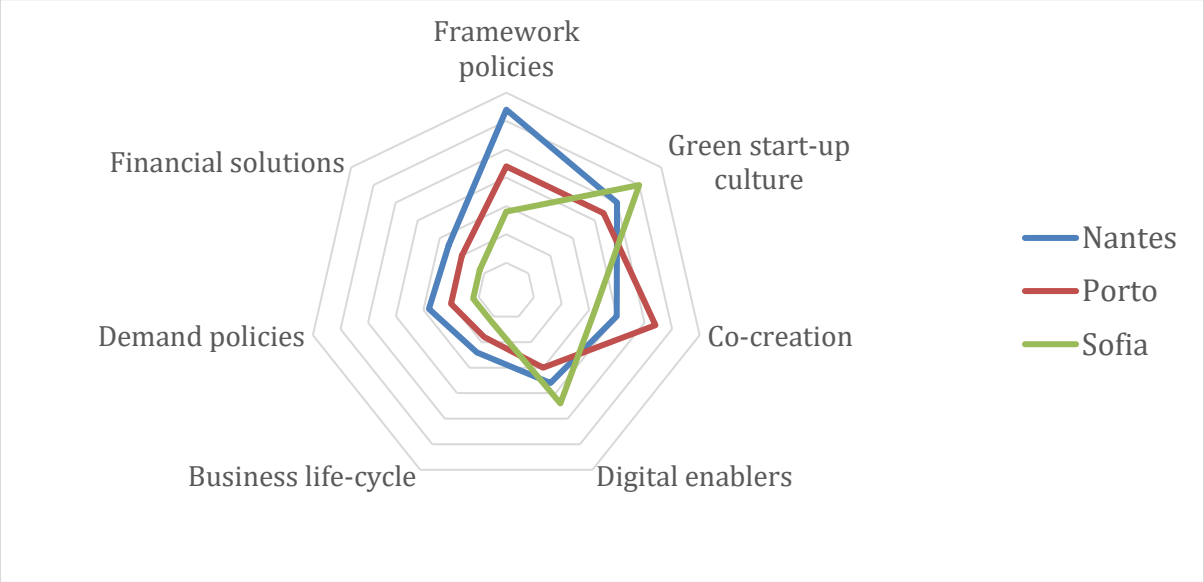
Strategies including the injection of tailored green growth initiatives have proven capable of turning things on their head. The offering of social housing along with investment in supportive services may serve as a protection for vulnerable groups against higher rents and price levels. The active engagement of locally rooted competences among change agents bestowed with an understanding of citizens' perceptions, mindsets, and values, is key for navigating stakeholder relations. PPP may leverage private sector investment and growth combined with enhanced accountability and responsible management of public goods (Dubina and Carayannis, 2016; Deloitte, 2018).

Measures at the community and systems level matter too for removing cultural and social hurdles. Even though the development of enterprises in deprived areas has been regarded an essential component in the renewal of deprived neighbourhoods, many local authorities struggle with shaping and delivering sustainable and viable action (Mouraviev and Avramenko, 2020). While national policies may be of relevance to improve the situation of entrepreneurs and NBOs, regional and local action of relevance to the ecosystem of deprived neighbourhoods, is key. Part of the issue in deprived neighbourhoods has to do with entrepreneurs and NBO's distance to policymakers as well as their 'weaker voice' and consequently lacking influence.

Although the intervention areas of the URBiNAT cities display an undeveloped business sector overall, including the NBE segment, each of the feature examples of vibrant NBEs as well as informal network based NBOs. Solilab in Nantes offers facilities for start-ups embracing sustainability, inclusion, and profit-sharing principles. Solilab started as a network of a few likeminded entrepreneurs and took off by being granted land for establishment of an incubator ecosystem. Currently Solilab hosts over 50 enterprises of varying sizes and by this has generated over 250 employment opportunities. The food market "la Bourgeonnière", co-constructed with inhabitants, provides space for diverse initiatives in this field, carried out by local associations.

Another example is Good Food Hubs in Porto, with a focus on creating a food network, pop-up spaces and meeting moments with the aim to activate healthy, sustainable, and eco-food production and consumption. The Bread House Network in Sofia is another example, which supplies homeless people with self-made bread. The bread-making is offered and sold as an experience for team building activities or celebrations. Conducive institutional fabric may matter greatly for NBOs to thrive. While varying depending on the local context, green science department, university-industry interface, nature-positive incubators, green clubs or co-working space, etc., may sow the seeds for collaborative ventures and green cluster dynamics. Potential benefits of NBS that otherwise would likely remain marginalised and undeveloped, can thereby catch attention as potential assets and sources of solutions in response to outstanding issues.

Figure 8: Mapping and rating of selected policy-domains influencing NBOs



***Source**:* IKED & ITEMS (2024)

Photos: Citizen participation, Siena, provided by Iridra

Applying the concept of Healthy corridors, URBiNAT has highlighted the importance of tools to synchronize parallel NBS based initiatives. NBOs are critical for realising seamless coordination along with specialised skills and value-enhancing networks. Siena for example, benefitted from Legambiente (RigeneraSI Project), an NBE assuming the lead in instigating knowledge sharing on the Ravacciano valley, coordinating with the URBiNAT team. Their strenuous efforts were instrumental for realising key elements of the Healthy corridor, such as the bee house, urban garden, and also the Autochtonous Urban Forest. Siena further collaborate with Codesign Toscana, an association which in turn engaged Iridra, an NBE, to create maps supporting planning of its Healthy corridor. The risks posed to disadvantaged groups should be kept in mind through, along with the importance of adopting inclusive community processes.

5.3 Governance

Governance signifies objectives as well as the means – rules, practices and processes – for delivering on them. The traditional Anglo-Saxon approach to *corporate* governance placed emphasis on maximising the returns to shareholders, begetting high operational efficiency in the fulfilment of narrowly defined core business. Today, balancing the interests of stakeholders – senior management, customers, suppliers, lenders, authorities, local communities – beside the board of directors, is widely viewed as the leading principle. To what degree companies actually adjust their behaviours as a consequence, including by taking the environment and sustainability into account, is another matter.

As for governments, autocratic leaders shaped their own versions of accountability over the ages and may still do. By contrast, extending from roots in the legal codes of the ancient Middle East, Roman Law became the cradle of modern-day national constitutions - the oldest dated 1600 in San Marino. On this basis, many sovereign nations have laid down a legal framework for their governance, including citizens' rights. Most national constitutions applied a similar structure and content since their inception and have been amended only occasionally since then.

The orientation and effectiveness of governance structures has a bearing on the preparation, implementation and enforcement of sustainability objectives. Weak, unreliable governance results in inconsistencies, inadequate regulation and enforcement of environmental standards, allowing unsustainable practices to persist unchecked. Inadequate stakeholder participation along with corruption reduce the legitimacy of policies, breeding resistance or non-compliance from affected communities. Short-term electoral cycles have a tendency to favour immediate economic gains while undermining long-term credibility along with green investment, as discussed.

On a related note, institutional fragmentation and poor horizontal communication and coordination, between authorities and also across ministerial departments, tends to show up in traditionally framed sector-specific "hierarchical pipes". Populated by technocrats specialised accordingly, operating within circumscribed chains of command, efforts are primarily directed towards short-term fixes of narrowly defined problems. Challenges of sustainability, regularly transcending such entrenched boundary lines, systematically lose out under such circumstances (Hölscher et al., 2019).

Processes stipulating public consultation in advance of major political decisions aim to account for reality control and to act as a shield against administrative lock-in of various sorts. Such processes are unevenly developed though and tend to weigh lightly (Kitchin et al., 2017). Civil society acting outside the mainstream institutional realms, clearly represents a major driving force for social change in its own right. As outlined in the Quadruple Helix, bottom-up engagement by individuals, on issues of high societal and economic relevance for the purpose of promoting better and more relevant outcomes represent an important addition to diversity in the innovation space (Carayannis and Campbell, 2009). Additionally, managing a common resource pool generally stands to benefit from stakeholders being part of the governance and rule-setting process, with high applicability to resolving the challenges associated with sustainability (Renn and Schweizer, 2009; Barney, 2018)

Protesters who stand up to defend natural values are regularly jailed and punished in a fashion more repressive than what applies to many who steal or even commit murder, applying not just to Kongo or Myanmar but also in a country such as Sweden. Oftentimes, however, defence of the environment is hardly possible without going against authority – while titled a crime, such civil "unrest" may represent the only way to assume moral responsibility.

The situation is not much different where local communities and change actors push for new NBS projects. Multiple observations point to stifling influences of government institutions. Especially in

developing and emerging economies, initiatives on the ground by farmers, fishermen, entrepreneurs, etc., are commonly held up not by lack of funding but by government resistance. Not least a civic movement in vulnerable areas may be left for years awaiting “permission”, perhaps a signed non-objection letter. Even with that is in hand, financiers and others must regularly worry about authorities changing the rules, or derailing projects, raising the risks.

Working towards a healthy synergetic relationship between policy and sustainability is of critical importance notably in the medium to long-term. Governments or public authorities do not, as is regularly assumed, demonstrate any consistent early-stage edge in championing NBS. Basic awareness of the issues and what is needed mostly reside with local communities, or other key stakeholders, as picked up in the push for co-creation by citizen as a key vehicle. Similarly to other societal spheres, relevant policymaking in a state of transition is dependent on the ability to learn and adjust course in the face of compelling evidence one has ventured onto an unsustainable path.

Against this backdrop, the call is on for fuller participation and diverse representation to realise deeper accountability (Peixoto and Fox, 2016; Elelman and Feldman, 2018). Co-management, public-private partnerships and social-private partnerships, are in high demand for coupling social and natural systems (Lemos and Agrawal, 2006). In parallel, ensuring that technological advances are in sync with the requirements of sustainability, public space, social fabric, and the well-being of citizens needs to shift from being a side-affair to becoming a major watershed factor, defining the central tenet for smart city designers, urban planners, and decision makers (Meijer and Bolívar, 2016; Ismagilova et al., 2020).

The means through which citizens and stakeholders engage matter for what results can be achieved (Greenfield, 2013; Calzada and Cobo, 2015; Mosannenzadeh et al., 2017). The terms on which citizen engagement and inclusion play out are essential (Kabisch et al., 2016). The degree to which citizens frame engagement in the light of their daily life and the issues confronting them, what time and effort they devote, and with what creativity and constructiveness they enter a collaborative process critically influence the scope for constructive linking to stakeholders, and NBOs.

Ethical considerations and the ability of citizens to contribute through the NBS process, from local diagnostic onwards, matters for entailing participatory culture and co-creation in support of NBO policy (Björner and Andersson, 2024). High emphasis has been placed on consistent staging of co-creation, spanning co-diagnostic, co-design, co-implementation, and co-monitoring. Co-creation must not be limited to a few privileged, neither must it feature as an after-thought, a correction of glitches in overriding technical or social frameworks. Achieving inclusion from early on matters greatly for lasting success (Zingraff-Hamed et al., 2020).

In practice, urban planners lacking adequate training are poorly equipped to handle such concerns, calling attention to the need of engaging complementary required competences to accompany organisational change and novel work practices. While the precise needs vary, new perspectives and hands-on skill sets spanning attitudes and aptitudes, mindset, social change, and behavioural psychology, attain priority. Corresponding capabilities need to be reflected in frameworks, for monitoring and evaluation (Shipley and Utz, 2012; Sadik-Khan and Solomonow, 2017; Croci and Lucchitta, 2021). Effective improvement requires the ability to channel new insights back into amended prerequisites for policy action, in turn dependent on adaptiveness, bottom-up programme design, discretion regarding project selection and active project management.

In practice, governance systems are neither totally top-down, nor purely bottom-up. Either approach, practiced in a simple form, is likely to run into issues (Cairns, 2003). A “top down” approach, led by top management or government directives institutions, is often criticised for lacking ability to encompass the perspectives and values of relevant stakeholders, which risk undermining support. Without back-up and adherence, conversely, a “bottom up” approach,

generally understood as viable mechanisms for genuine engagement by individual citizens, may lack ability to confront trade-offs, and also suffer from lack of engagement by authorities in charge of financial resources.

Progressing the novel NBO policy domains at local/city level, as set out in previous chapters, will much depend on the enactment of a constructive governance model featuring healthy relations between top-down and bottom-up along these lines. The following exemplify elements related to governance conducive to NBO-contributions in this context:

- Instigate support measures that are efficient, do not result in unfair competition, and are consistent with KPI evaluation results;
- Embed NBS impacts in mainstream KPI where possible;
- Consider opportunities for NBOs leveraging other actor initiatives related to NBS;
- Develop a strategy for promoting viable ecosystems for knowledge transfers and collaboration in support of green entrepreneurship and NBOs;
- Improve urban data collection and accessibility for stakeholders and NBOs broadly;

The opportunities brought about by digitalisation, meanwhile, have been observed to instil changing relations between decision-makers and constituents, placing greater weight on citizen engagement and open-ended decision-making processes (Geissel and Newton, 2012). An example is that of "FallingFruit.org", through which fruits and food are collected by citizens from various local sources, based on relations having been developed organically with the help of location-based digital enablers (Møller and Olafsson, 2018).

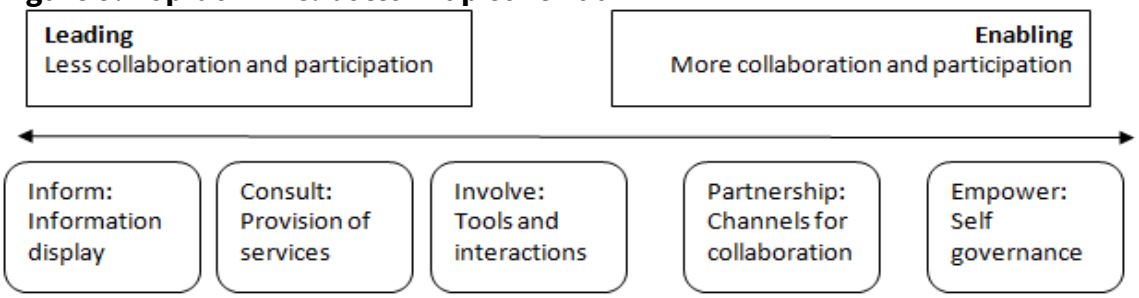
Figure 9 illustrates a continuum of top-down one-sided vs. bottom-up two-way communication practices. To the left, digital tools are used merely for information provision, in effect by government to citizens. Ruling squarely "top down" this way may account for fast completion, cheap planning and simple implementation procedures. Moving right in the figure, digital tools are applied not just to inform citizens but also to activate and empower them. This in effect extends into arranging with a viable invitation, possibly to propose, design, and evaluate solutions. At the extreme right end, citizens are basically self-governing. So-called "eco-cities" or "green cities", where sustainability and circularity gain high traction, are commonly anticipated to extend far in that direction.

In order to devise interactivity and such modes of self-governance, authorities need to partly transform their working methods and organisational culture, partly stimulate supportive innovative solutions by external, non-government entities. These may take the form of specialist service provision, or initiatives by community-based entities bestowed with high levels of trust. As we have seen, decentralisation and participation are not free from risks and downsides. Moreover, special efforts are required when targeting communities confronted with special challenges, such as deprived neighbourhoods marked by low awareness and weak activity levels.

Against this backdrop, URBiNAT has featured emerging hybrid modes of governance, softening up conventional state-market-community divisions. In considering building blocks in this respect, we revert to lessons advanced within the project's Community of Practice (CoP) over the past six years. In doing so, we limit our consideration to the following 3 levels of the CoP:

Level/Circle 1. Inside URBiNAT cities, those actors that are directly engaged or implicated, including stakeholders in cities, municipality officials, urban planners, technical experts, community leaders, citizens, local organisations;
Level/Circle 2. Between the cities, cross-pollination, including exchange of experience and opportunities for scaling of best practice NBEs, and;
Level/Circle 3. The wider world, sister projects, academia, other cities, wider communities of NBOs.

Figure 9: Top-down vs. bottom-up continuum



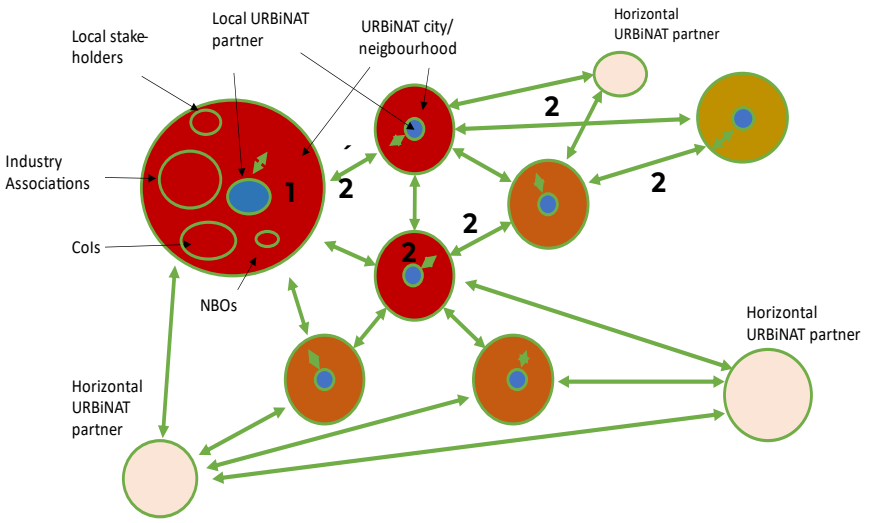
***Source**:* Adapted from Møller and Olafsson (2018)

Early in the project, the initiation of living labs and related activities strengthened interfaces at level 1, with focus on the study areas and key stakeholders within each city. Level 2 was initiated mostly by exchanges involving representatives of the participating cities with the aim of framing joint learning processes backed by scientific partners. These two levels are illustrated in Figure 10. Meanwhile, exchanges two-way have been cherished by key stakeholder categories in the outer world, added in Figure 11.

The external players include Horizon NBS sister projects, where structured learning has been facilitated by clustering activities promoted by the European Commission. We stress the importance of linking the CoP to progression of the concrete activities at the core of the project. Continuous effort is warranted to ensure inclusion, involving citizens and communities as a basis for the CoP to maintain relevance and momentum.

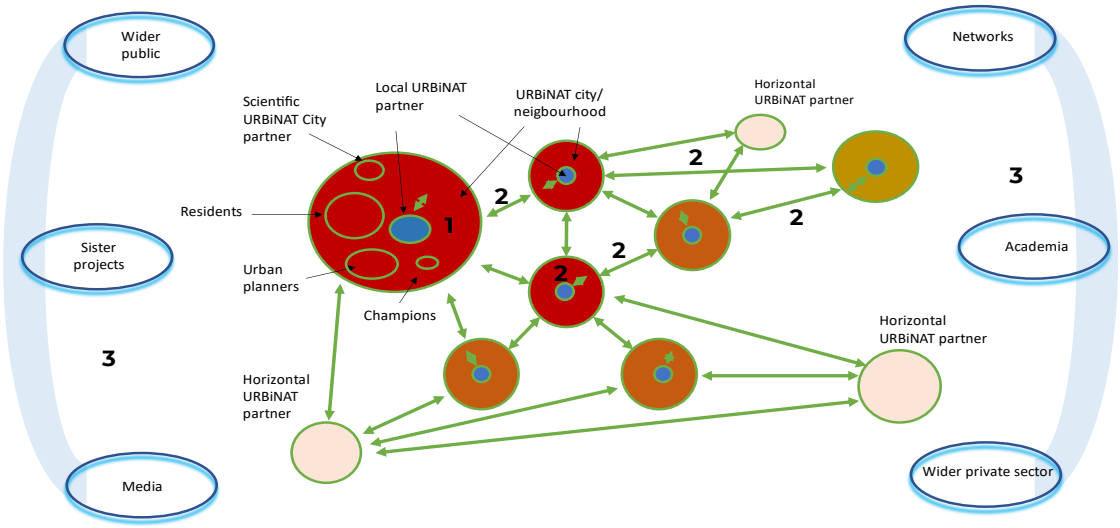
This kind of approach adds to the previous literature by outlining novel means of achieving synergetic "top-down" structuring and "bottom-up" involvement and initiative (Homsy et al., 2019). The merits of such combinations are well-known from the innovation literature (Gaynor, 2013). We applied a stylized CoP architecture with a view to working out constructive parallel processes

Figure 10: Main actors and CoP levels (Circle 1-2)



***Source**:* Adapted from Andersson et al. (2020)

Figure 11: Main actors and CoP level (incl. Circle 3)



***Source**:* Adapted from Andersson et al. (2020)

involving multiple actor categories, broadening the framework for their interactions by the application of Healthy corridors. On this basis, we gained ground in working out the basis for wide-ranging support and engagement in designing and implementing complementary NBS. In a sense, we have aimed at achieving self-reinforcing virtuous circles of governance reform, featuring two-way (bottom-up and top-down) adaptation and transition towards circularity and sustainability. The parallel strengthening of capacity at the various key levels of the CoP we regard as key to broad-based, lasting support.

In practice, most existing mechanisms for local-exchanges and learning embed primarily policymakers, along with a few experts. Means to connect citizens or communities around a common interest of relevance to sustainability, are far and few in between. Against this backdrop, a novel concept and method for filling this gap, breeding such communication engineered bottom-up, has been developed by URBiNAT under the heading of Circular Cities Café (C3). A brief introduction is provided in Box 1, including an illustration of fruitful implications associated with actor categories linked up to it on terms coinciding with those of a functional CoP.

In effect, C3 represents an interactive participatory platform launched in support of exchanges and exploration of collaboration opportunities around NBS, structured for direct exchange powered by a network of inter-linked hubs residing in different locations. An interactive platform is in place, linked to URBiNAT's website (https://urbinat.eu/circular-cities-cafe). C3 features the profiles of participants, while linking them to specific NBS from the URBiNAT NBS Catalogue as well as to their geographical location. The hubs joining to date draw primarily on CoIs that address the following five themes: i) Food, spanning buying, cooking, eating; ii) Urban Gardening and Farming; iii) Culture including Music, Arts, Film, Theatre; iv) Repair & Reuse, and; v) Entrepreneurship.

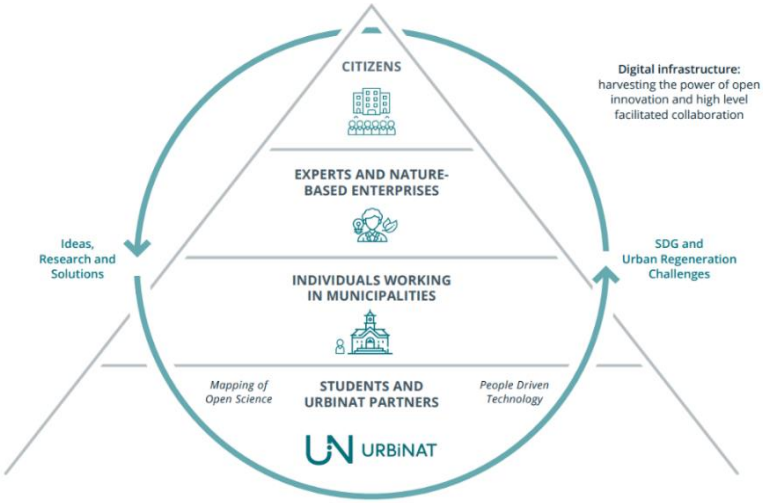
The hubs consist of selected specific cafés, one in each participating city, where citizens with joint interests, and also representatives of associated NBOs, meet on-site, discuss, and advance sharing and learning on topics of joint interest. A link is opened to other hubs in C3 for exchanges and in support of creativity and idea-generation throughout the network. Further, on scheduled occasions, the participating hubs/cafés link up with others for a joint online session. This hybrid model and extension of URBiNAT's CoP, can be understood as a vehicle for broadened, inclusive inter-actor exchanges at local level.

Box 1: Circular Cities Café Agenda

Figure 9 depicts the Community of Practice approach within the Circular Cities Café (C3) concept. In effect, C3 serves to connect community-based platforms that share fruitful commonalities, generally related to existing CoI. The purpose is to enable constructive mutually inspired exchanges, learning, and joint initiatives, shifting the lead for community-twinning from policymakers and experts to citizens and communities.

As for the operating fabric, C3 applies a hybrid approach. Physical hubs featuring favourable local interactivity and creativity constitute the anchor in each participating local district. Linking those, a digital collaboration space has been framed with a view to stimulating citizen-centric urban regeneration processes. While cherishing complementarity and shared interests, the approach is based on interactive communication, diversity, inclusion, and the promotion of open innovation. Scope for continued exchanges blend with regular arrangements of bonding exercises, entailing diverse communities and competences where NBOs form a prominent part.

Figure 12: Community of Practice in the Circular Cities Café



***Source**:* IKED, 2021

The framing of C3 has emerged from lessons generated through the mapping and analysis of participatory culture pursued in the URBiNAT project. Combining physical meetings that pull together the local CoI with an on-line interface towards other corresponding ones, aims to achieve an elevated joint "group-exchange". Orderly preparations are important for putting in place an agenda and envisaged progressive flow of activities that can help grow gradually enhanced outputs of shared interest.

The participating cafés represent URBiNAT cities (Nantes, Siena, Porto and Khorramabad) observer cities (Nicosia, Sur) and also other cities (Palermo) that have become connected with the initiative and expressed an interest in joining. Three of the hubs have been involved in operational activity to date. It is envisaged that the network will grow further, as the activities mature. Meanwhile, preparations are in place for broadening as well as deepening of the substantive agenda. The former may be brought about by expanding the set of CoI-related topics covered in the upcoming rounds. The latter amounts to opening for realising concrete sustainable joint value-enhancing activities. Working out an operational footing for this will importantly hinge on mobilising and drawing on the capabilities of the participating NBOs, induced to link up with and initiating collaboration with partner NBOs in the other hubs.

Along these lines, the set of activities framed at the core of C3 aims to stimulate interlinkages and fruitful exchanges between local and regional hubs, each of which is able to attract citizens, representatives of NBOs and other actors that share a natural interest and motivations to tackle related challenges. New knowledge and inspiration surrounding practically useful solutions can thereby be transmitted in a broader inter-actor circle that normally gets involved in such exchanges. A widened and more inclusive channel for replication and scaling of NBOs arises as well.

This kind of construct can contribute to breeding a dynamic ecosystem at local level on terms that realise improved conditions for NBOs to fulfil their value-enhancing contributions in this context. Local authorities will benefit from the demonstration of constructive bottom-up initiatives that can play a role in creating awareness and supporting competency and institutional capacity (Peixoto and Steinberg, 2019).

Deprived areas and disadvantaged groups tend to suffer from less connectedness with policymakers/influential stakeholders. Typically bestowed with a weaker business sector, less prevalence of innovation and citizens burdened more by pressing social concerns, they typically foster fewer NBE. Such areas are, however, in great need of economically sustainable operations offering job creation and higher incomes, as well as a reinforcement of public goods such as those that tend to flow from green space.

In URBiNAT, special study areas were selected from project start, encompassing typical characteristics of such areas. While delving deeply into local diagnostic and inclusive citizen participation, and out-right co-creation, the point of departure for URBiNAT's approach has been the holistic approach. The issues of marginalized communities have been transposed and integrated into the wider context of urban fragmentation, which in turn has been addressed by linking a series of parallel locally co-created NBS solutions into the wider construct of healing Healthy corridors. The presence and activation of various dynamic NBOs, many community-based and marked by social and solidarity characteristics, have played a major role in introducing and maturing various elements of the process (Caitana et al., 2024).

The extent to which different actors, with diverse knowledge and experiences, can take part in designing and implementing NBS, influences the scope for further value-creation. Improved communication, coordination, and alignment of interest between diverse strands of public administration, as well as cross-border between countries, appears a prerequisite for fuller consideration in policymaking of the synergetic benefits of nature.

5.4 Co-Nature'ing

The strategies and policies outlined thus far hold a promise of significant progress, given the engagement of main actor categories and that key issues are identified and addressed consistently. Systematic improvements in the conditions for green entrepreneurship and NBOs stand to unleash ingenuity and collaborative fervour realising a positive impetus in support of sustainability.

Having said this, it is hard to visualise compelling progress on all fronts frustrating advances by NBOs along with their contributions, and those of NBS. to sustainability. The vicious circle surrounding measurement and communication of valuable but intangible ecosystem services, coupled with the resistance to remedial action brought about by vested interests, links to the rise of populist and opportunistic politicians, and keeps underpinning a state of confusion and risks of lingering inaction. Flying in the face of extensive reporting requirements by financials and corporations on plans to cut carbon footprints, etc., insufficient linkages between pledges and promises by the private sector as well as by government, and what results materialize thereof, breed an uptick in greenwashing.

The scope and wide-ranging impetus of these interrelated challenges limit the progress that can be achieved through piecemeal actions. This situation prompts a search for more fundamental influences, to enhance communication and buy-in more broadly. For this, it is necessary to return to and revitalise potent enablers of behavioural change (Anderies and Folke, 2024). As discussed in Chapter 4, lasting impacts in this regard appear to require going beyond marginal revision of existing habits. Approaches setting the scene for a change of context, drawing on the impetus of social relations and experience-based emotional influences, have demonstrated that success is possible (Marteau et al., 2013).

A pertinent aspect of today's media attention around sustainability tends to centre on the prospects of disaster, fear, and guilt. On this basis, and taking into account the complexities of the issues, various studies examining the behavioural responses have pointed to high risk of outright denial as a consequence (Moisander, 2007; Young et al., 2010). This is what has as well been picked up on and been engulfed by counterforces, with social media appearing as a powerful instrument. Insufficient willingness is displayed, meanwhile, by citizens as consumers, voters, or professionals, to place a premium on the defence of public goods.

This state of affairs is rooted in a lack of connectedness to nature, which has gradually taken hold through history (Turner, 1980). Yet, nature's connotations for human wellbeing remain of high importance, as demonstrated in a myriad of ways. Green space between residences and heavily trafficked roads reduces noise annoyance and bestow benefits through enhanced privacy and social wellbeing (Day, 2000; Nilsson and Berglund, 2006). Further, a voluminous nature addressing the causes and remedies relating to a spectrum of health issues, including mental disorders, have concluded on the healing effect of nature (Sugiyama et al., 2022; Mas et al., 2009). Many studies have examined the impetus of proximity to green areas in dense cities, studying not only distance but quality factors as well. Access to green areas alleviate negative stress, partly through restorative process associated with recreation, and physical movement. In Korea, Min et al. (2017) found significant influence of such factors on the rate of depression and suicide in the adult population. Meanwhile, attenuating urbanisation-related health challenges by reducing air and noise pollution combine with mental wellbeing.

Indigenous people, living at the fringes of modern civilization across various parts of the world, tend to exercise a close connection and strong affinition with nature. Inter-related with deep dependency, these groups commonly profess a culture, and sense, of being "one" with nature. In the face of infringement by the outside in their natural heritage, such groupings tend to go to their limits, to fighting back. Today, they frequently represent the only standing force protecting conservation of remaining precious natural ecosystems.

In modern societies, some people give up on hopes to inject change via orderly institutions, turning to civil disobedience. Such means have, in fact, been key to much of institutional change occurring around the world over centuries. Voting rights for women, putting an end to racial and other discriminatory practices, halting the destruction of traditional city centres, exemplify the many kinds of game-changing developments which governments initially rejected, and surely not assumed any lead on, before broad segments of society had made up their mind.

The shift towards collaborative stakeholder engagement, and co-creation, represents current means to broaden the base for transitional change on sustainability. Acting on the notion that viable solutions are at hand, collaborative efforts are initiated and pursued to simply put them into practice. Here, NBOs play a key role, dedicated to innovation and overcoming obstacles to the implementation of green solutions. Where NBOs are regarded favourably, policymakers are more easily convinced of the merits of professional training, competence development and institutional backing of user- and business-friendly green solutions.

Aiming for transformation change in this direction, a novel concept, “Co-nature’ing,” has emerged as an advancement, or substitute, of co-creation methodologies in design processes[39]. Co-nature’ing emphasizes placing both nature and humanity at the forefront of design endeavours, aiming to foster sustainable and harmonious interactions between human creations and the natural environment. At the interface between existing design paradigms and ecological principles, practical strategies can be distilled for integrating Co-nature’ing into contemporary design practices and means of communication, highlighting and promoting a holistic and constructive approach to innovation in response to pressing environmental challenges.

The contemporary design landscape is characterized by a growing recognition of the interconnectedness between human activities and the natural world (Jones, 2021; Crutzen and Stoermer, 2000). Traditional design methodologies, often centered around human-centric approaches, have led to detrimental effects on ecosystems and biodiversity. In response to these challenges, there is a pressing need for paradigm shifts in design processes that prioritize ecological sustainability and ethical responsibility. Co-nature’ing emerges as a transformative concept that redefines the relationship between architects, urban planners, designers, users, and the environment, fostering collaborative engagements that honour both human needs and ecological integrity.

Drawing from ecological theories and systems thinking, Co-nature’ing acknowledges the inherent interdependence between human societies and the natural environment. It embraces principles of symbiosis, resilience, and regenerative design, advocating a shift from anthropocentric to eco-centric perspectives in design practice. By considering nature as a co-creator and co-designer, Co-nature’ing seeks to harness the wisdom of ecosystems in shaping human-made environments, leading to more sustainable and regenerative outcomes.

Co-nature’ing has broad implications across diverse design domains, including architecture (McHarg, 1969; Van der Ryn, 2005), urban planning (Escobar, 2018), product design (Cross, 2008; Manzini, 2010), biology (Benyus, 2002), economy (Raworth, 2017) and digital technologies. In architecture, Co-nature’ing entails designing buildings and spaces that integrate seamlessly with local ecosystems, promoting biodiversity and enhancing human well-being. Concepts such as overlay mapping and ecological analysis were operationalized by McHarg (1969) to inform land use planning decisions, transposing natural systems into the design of human environments, rooted in sustainability and resilience. A holistic approach to design was further applied to capture interconnections between human systems and the natural world, drawing on ecological literacy and collaborative decision-making processes to create regenerative built environments (Reed, 2007).

Similarly, in product design, Co-nature’ing involves sourcing materials ethically, minimizing waste, and designing products that mimic natural systems in their functionality and lifecycle. Here, the concept of biomimicry has been promoted as a design paradigm, emulating natural processes and systems in human technologies and innovations (Benyus, 2002). Expanding from this notion, nature takes the shape of a model, mentor, and measure for sustainable design. Links between sustainable design and social innovation have been built upon notably by Manzini (2010), to champion a shift towards participatory and collaborative approaches, prioritising local resources and community engagement. High emphasis is placed on the importance of reconnecting with nature and promoting resilient, decentralised systems in design practice.

Co-nature’ing draws on a multi-faceted approach featuring interdisciplinary collaboration, stakeholder engagement, and innovative design methodologies. Designers adopt a holistic mindset

[39] Coined by Américo Mateus at the Global Forum, Water & Humanity Conference, 2022 in Muscat, Oman.

that takes account of ecological, social, and cultural dimensions. Indigenous knowledge systems and biophilic design principles are viewed as a source of inspiration for fostering deeper connections between humans and their natural surroundings.

Representing a paradigmatic shift in design thinking, Co-nature'ing challenges conventional notions of human-centeredness. It offers designers, educators, and practitioners an inclusive and regenerative approach to innovation. By prioritizing the symbiotic relationship between humans and nature, Co-nature'ing offers novel guiding principles in our quest for a more harmonious coexistence with the natural world.

6. Conclusions and Recommendations for NBO Policies

This report has set out to examine the role of policy in propelling Nature-Based Organisations (NBOs), with consideration to their importance in realising the potential value of Nature-based Solutions (NBS) along with sustainable development more broadly. The task has included a broad-based "mapping" and examination of novel NBO policy domains.

The report reviews the diverse character of benefits flowing from NBS, e.g., the degree to which they can be commercialised or rather take the shape of public goods. In parallel, NBOs range from formal enterprises, so-called Nature-based Enterprises (NBEs) to informal and community-based networks and organisations. They display homogeneity in various ways, reflecting the drivers of founders and managers, which kinds of NBS thew draw upon, and so forth.

Ample observations demonstrate the great potential of green and blue economy innovation, along with opportunities for private sector development as well as for civil society initiatives and organisations. The prospective benefits span sustainable growth, job creation, environmental stewardship, resilience, social cohesion, health, and wellbeing. Yet, the multifaceted benefits of NBS are in part elusive, intangible, and hard to appropriate. Overcoming the hurdles invites collaboration between diverse actors and competencies, as well as policy backing and engagement.

Part of the challenge confronting us is rooted in the notion that sustainability comes with costly trade-offs, where social and environmental protection translates into economic sacrifice. In practice, measures taken in support of sustainability tends to inflict costs that are relatively short term and concentrated on fewer hands, compared to the environmental and social gains, which are more long term, less tangible, and more widely diffused, ultimately benefitting everyone, including future generations. The result is a fundamental imbalance, a hurdle and a lack of incentive playing out broadly in the economy and in modern societies, to take account of, and invest in, nature - including NBS. While a state of systematic "underinvestment" applies particularly to the private sector, adverse consequences apply to government as well, while the unsuspecting public loses out.

Faced with increasingly visible damage and exploitation of nature, manifested in storms, flooding, fires, droughts, etc., a chorus of demands and promises to ensure sustainability has erupted. Through the EU green deal, CSRD, other policy requirements, ESG-certification, and initiatives taken by managers, boards, courts, and individuals, corporations and the financial sector are subjected to hardening pressure to report plans and actions to this effect. Yet, serious problems persist. Measurement of impacts remains problematic and remaining issues with greenwashing, along with outright misinformation and fake new spread particularly via social media, dilute credibility and feed widespread confusion.

For those defined as NBOs, “green” behaviours and achievements define a distinct objective of its own, and sustainable use of nature is core to the product/service offerings. In effect, such organisations weave value-enhancing links between nature and the economy, communities, and society. In this, NBOs are able to combine operational efficiency with robust stakeholder relations, not merely satisfying shareholder returns (Barber et al., 2019; Zerbib, 2019; Agliardi and Agliardo, 2021; Wang et al., 2023).

A range of policies matter for the rise and performances of NBOs. This includes government regulation, subsidies, taxes, public procurement, infrastructure provision, and the removal of red tape. The present report widens the perspective, however, of what constitute relevant “policies” in support of NBOs. It concludes on the importance of capacity building and policy strategies at local and city level in support of eco-systems conducive to NBOs, leveraging the benefits of NBS and sustainability more broadly.

Regional entrepreneurial and growth dynamics drawing on sustainability are in the process of making huge imprints in various parts of the world, e.g., in Brazil (Marcon et al., 2017), China (Wang et al., 2023), India (Bhatnagar et al., 2022), and the US (Carb et al., 2022). Europe is unique in having a highly active supranational agenda catalysing and coaching widespread experimentation and learning at regional and local level how to foster value generation from NBS. Less attention is awarded in Europe, however, and less progress recorded, in regard to fulfilling the contributions of NBOs. We conclude on the need of greater efforts fill this gap. While policymaking needs to get a better handle on how to relate to business broadly - instigating a push in support of NBOs, the private sector and civil society forbearers in taking on the challenges of sustainability - takes on particular urgency.

Both the production factors and the outputs of NBO activities are priced only partially by markets. Capabilities to innovate along with a spectrum of hard and soft skills support them in framing partner relations and a vibrant customer base receptive to their output. They feature natural strive towards investor literacy, i.e., the ability to communicate with and match the requirements of financial service providers.

Yet, conditions at local and city level varies enormously, and bear strongly on the attitudes and measures pursued by public authorities operating in that space. Those entities, municipalities, counties, other local public bodies, exert a strong influence on the spatial context that is key for the rise and advance of NBOs. Their actions have a bearing on the degree to which an ecosystem featuring relevant skills, mindsets and supporting functionalities fall into place. Special efforts are required to harness value streams from NBS of public good nature.

Against this backdrop, the following are overriding recommendations of principles and domains for advancing NBO policies:

- Adopt a broad perspective what represent relevant “policies”, to the effect of encouraging, enabling, and coaching the rise of dynamic local and regional ecosystems conducive to the rise and expansion of NBOs, where the value generation of NBS feature strongly;
- Cherish a culture of diversity promoting contributions by different categories of NBOs, spanning from entrepreneurship and early-stage development to growth and the scaling and replicability of best practices, and with full appreciation of the benefits generated by green business – NBEs – as well as those flowing from informal community networks and social and solidarity-based initiatives and organisations;
- Actively support commercialisation and monetisation agendas, cherishing the role of NBEs in boasting the marketability and bankability of NBS, while doubling down on efforts to improve measurement and reward systems in support of intangibles and genuine public goods aspects of NBS;

- Move beyond a piecemeal approach, with focus on individual projects and measures, to embracing a systemic approach, coordinating across policy domains as well as opening up for productive complementarity between policy levels;
- Place emphasis on building required capacity and competences at local and city level, practicing an inclusive approach, liaison with stakeholders, making use of Healthy corridors to combine NBS benefits, and coping with risks and downsides in regard to unwanted distribution effects.

The report further maps out five selected unorthodox domains for strengthened NBO policy, with local – notably urban - policy institutions in a pole position. These frame novel means and tools at hand for supporting dynamic ecosystems development conducive to NBO contributions support of value generation from NBS and sustainability:

- Pursue novel strategies for citizen co-creation with strong emphasis on inclusion, while taking advantage of NBO-instigated capabilities and innovation.
- Make use of digital enablers, drawing on NBOs in their framing and applying them in synergy with NBO contributions.
- Differentiate strategies with consideration to NBO life cycles, including green entrepreneurship, as well as shaping opportunities for replicating and scaling best practices.
- Mobilise enhanced demand along with local engagement, including in deprived areas and for disadvantaged groups.
- Promote diverse financial solutions, including with a view to breeding NBOs of various kinds and in support of widening and leveraging revenue streams in support of sustainability.

In the case of replication and scaling of best practice NBOs, advances may hinge on attaining uptake by mainstream citizens, beyond a narrow segment of first-movers, possibly accompanied by an upgrading of supportive infrastructure or add-on service provision. In URBiNAT's experimental policy intervention by way of catalysing and facilitating a diffusion process, the quality of the matchmaking process, and the means of connecting with and engaging CoIs, came to the forefront.

Measures conducive to the scaling and replicability of NBEs offer a potential direct link to leveraging the underlying NBS. The precise connection will vary, however, reflecting the specific business model in each case. In general terms, NBEs would appear more likely to boost NBS assets that are prone to commercialisation. NBOs applying a social economy model would be relatively more likely to boost public goods aspects. Having said that, URBiNAT's journey features diversity and pluralism in such respects as well. While not enough time has passed to allow for robust results, early indications point to the most convincing advances towards replication and scaling for NBEs drawing on participatory and social & solidarity NBS.

An active policy stance is required for additional reasons. Notwithstanding the potential benefits, enhanced private sector engagement and investment in NBS, a push for commercialisation or other means to monetises revenues, tends to result in a bias against benefits that offer less opportunities in this regard, such as biodiversity and social inclusion. As indicated, a coherent NBO policy must embrace a holistic approach, along with the capabilities to juggle diverse objectives, actor categories, and kinds of impacts.

Achieving relevance and broad-based social buy-in requires encouraging and co-creating constructive participatory processes, entailing NBS and the revitalisation of nature. There is a need of governance models capable of embracing synergistic combinations of top-down and bottom-up

initiatives. Measurement and evaluation should be drawn upon to inform and underpin policy learning, hand-in-hand with community engagement, co-creation, and increased demand for sustainability by citizens.

The introduction of green infrastructure may similarly result in unwanted losses for low-income groups and cause social disruption. Examples abound in the form of spiralling property prices in communities nearby. While such outcomes reflect an uptick in economic prospects. social issues may arise and translate into problematic stakeholder relations. In the absence of a policy countering such adverse distribution effects, social cohesion and long-term stability are likely to suffer. Further, in disadvantaged areas, strong emphasis on inclusion needs to be accompanied by avenues to foster/nurture an entrepreneurial culture, highlighting success stories, and heed opportunities for replication and scaling of best practices. Encouraging and enabling successful engagement of citizens by social and solidarity-based NBOs meanwhile can help support disadvantaged groups.

Part of the predicament in deprived neighbourhoods has to do with entrepreneurs and NBO's distance to policymakers as well as a 'weaker voice' along with a deficit in influence as well as trust. While this sort of situation is more or less universally applicable, solutions need to be crafted with consideration to local conditions. Applying the concept of Healthy corridors, URBiNAT has highlighted the importance of careful local diagnostic, as a basis for synchronizing parallel NBS-based initiatives.

In conclusion, the present report has covered new ground in exploring the policy implications of the issues and opportunities that surround value creation by NBOs, in support of NBS and sustainability. It has drawn upon and synthesised observations and lessons covering multiple topics. Further research and empirical investigation is warranted in many respects. An improved understanding of the motivations, determinants, and contributions of sustainable business as well as community development matter greatly for working out supportive policy frameworks. Meanwhile, resolving the fundamental issues at hand calls for further upgraded project initiatives and learning-by-doing on the ground, engaging relevant stakeholders. Such advances need to proceed in tandem with, concerted efforts to transition towards a nature-positive economy.

References

Abou-Chadi, T. and Kayser, M.A. (2017). “It’s not easy being green: why voters punish parties for environmental policies during economic downturns”, *Elect Stud* 45, pp. 201–7 https://www.sciencedirect.com/science/article/abs/pii/S0261379416302293?via%3Dihub

Acemoglu, D., Akcigit, U., Hanley, D., Kerr, W. (2016). ”Transition to clean technology”, Journal of Political Economy 124(1), pp. 52–104 https://doi.org/10.1086/684511

Adams, R., Jeanrenaud, S., Bessant, J., Denyer, D., and Overy, P. (2016). “Sustainability-oriented innovation: a systematic review”, *International Journal of Management Reviews* 18(2), pp. 180–205 https://doi.org/10.1111/ijmr.12068

Agliardi, E., Agliardi, R. (2021). “Corporate Green Bonds: Understanding the Greenium in a Two-Factor Structural Model”, *Environ Resour Econ*. 80(2), pp. 257-278 doi: 10.1007/s10640-021-00585-7

Aklin, M. and Mildenberger, M. (2020). Prisoners of the wrong dilemma: why distributive conflict, not collective action, characterizes the politics of climate change”, *Glob Environ Polit* 20(4), pp. 4–27 https://doi.org/10.1162/glepa00578

Albino, V., Berardi, U., and Dangelico, R. M. (2015). “Smart cities: Definitions, dimensions, performance, and initiatives”, *Journal of urban technology* 22(1), pp. 3–21.

Ambec, S., and Lanoie, P. (2008). “Does it pay to be green? A systematic overview”, *Academy of Management Perspectives 22*(4), pp. 45–62 https://doi.org/10.5465/AMP.2008.35590353

Anand, A., Argade, P., Barkemeyer, R. and Salignac, F. (2021). “Trends and patterns in sustainable entrepreneurship research: A bibliometric review and research agenda,” *Journal of Business Venturing* 36 (3).

Anderson, A. and Robinson, D. T. (2024). Climate Polarization and Green Investment, NBER Working Paper w32131, February
SSRN: https://ssrn.com/abstract=4722972 or http://dx.doi.org/10.2139/ssrn.4722972

Anderson, A.R. (1998). ”Cultivating the Garden of Eden: environmental entrepreneuring”, *Journal of Organizational Change Management* 11(2), pp. 135-44.

Andersson I., Andersson, T., and Björner, E. (2023). Business Cases for Replication and Scaling in URBiNAT Follower Cities, IKED, Malmö.

Andersson, I., Andersson, T., Björner, E. (2020). On the Establishment of URBiNAT’s Community of Practice (CoP).

Andersson I, Andersson, T., Björner, E, and Hilding-Hamann, K.-E. (2021). Portfolio of Purposes, Methods, Content and Tools: Forming Digital Enablers of NBS, IKED, Malmö.

Andersson I., Björner, E., and Prisca Ohler, L. (2022*a*). Business Cases for the Most Marketable and Bankable NBS Solutions in URBiNAT Frontrunner Cities*,* IKED, Malmö.

Andersson, I., Moniz, G.C., Hilding-Hamann, K-E., Matéus, A., and Nunes, N, (2022*c*). “Inclusive Urban Regeneration with Citizens and Stakeholders: From Living Labs to the URBiNAT CoP**”,** in **“**Nature-

based Solutions for Sustainable Urban Planning, Greening Cities, Shaping Cities", doi: 10.1007/978-3-030-89525-9_5

Andersson, I. et. al. (2024). *Guidelines for co-creation and co-governance of nature-based solutions: Insights form EU-funded projects,* EU Commission, Brussels https://op.europa.eu/en/publication-detail/-/publication/dd7b9f43-9a33-11ee-b164-01aa75ed71a1

Andersson, T., Andersson I., and Mackenzie, T. (2022*b*). Towards Implementing Digital Enablers in URBiNAT Cities: Preparations and Guidelines, IKED, Malmö.

Andersson, T. and Cardinali, M. (2023). "Impetus and Policy Implications: Nature-based Solutions (NBS), Human Health, and Wellbeing", presented at the 7th WHO and UNEP Ministerial Conference on Environment and Health, July 6th, Budapest**.**

Andersson, T., Hansson, E., Schwaag-Serger, S., and Sörvik, J. (2004). *The Cluster Policies Whitebook*, IKED, Malmö, 2004.

Applebaum, A. (2018). *Twilight of Democracy: The Seductive Lure of Authoritarianism*, Amazon.

Austin J., Stevenson H., and Wei–Skillern, J. (2006). "Social and commercial entrepreneurship: Same, different, or both?", *Entrepreneurship Theory and Practice* 30(1), pp. 1–22.

Autio, M., Heiskanen, E., and Heinonen, V. (2009). "Narratives of 'green' consumers – the antihero, the environmental hero and the anarchist", *Journal of Consumer Behaviour* 8(1), pp. 40–53.

Ball, C. and Kittler, M. (2019). "Removing environmental market failure through support mechanisms: insights from green start-ups in the British, French and German energy sectors", *Small Business Economics 52*(4), pp. 831–44 https://doi.org/10.1007/s11187-017-9937-8

Balland, P.A., Boschma, R., Crespo, J., and Rigby, D. (2019). "Smart specialization policy in the European Union: relatedness, knowledge complexity and regional diversification", *Regional Studies* 53(9), pp. 1252-68, doi: 10.1080/00343404.2018.1437900

Bandura, A. (1977). "Self-efficacy: Toward a unifying theory of behavioral change", *Psychological Review 84*(2), pp. 191–215.

Barber, B. M., Morse, A., and Yasuda, A. (2019). Impact Investing, December https://ssrn.com/abstract=2705556 or http://dx.doi.org/10.2139/ssrn.2705556

Barbieri, N., Perruchas, F., and Consoli, D. (2020). "Specialization, Diversification, and Environmental Technology Life Cycle", *Economic Geography* 96(2), pp.161-86, doi: 10.1080/00130095.2020.1721279

Barbieri, N., Consoli, D., Napolitano, L., Perruchas, F., and Pugliese, E. (2023*a*). "Regional Technological Capabilities and Green Opportunities in Europe", *Journal of Technology Transfers* 48(2), pp. 749-78.

Barbieri, N., Marzucchi, A., and Rizzo, U. (2023b). "Green Technologies, Interdependencies, and Policy", *Journal of Environmenetal Management* 118 p. 102791 https://www.sciencedirect.com/science/article/abs/pii/S0095069623000098?via%3Dihub

Barney, J. B. (2018). “Why resource-based theory’s model of profit appropriation must incorporate a stakeholder perspective”, *Strategic Management Journal 39*(13), pp. 3305–25.

Bergset, L. (2015). “The rationality and irrationality of financing green start-ups”, *Administrative Sciences 5*(4), pp. 260–85 https://doi.org/10.3390/admsci5040260

Bergset, L. and Fichter, K. (2015). “Green start-ups–a new typology for sustainable entrepreneurship and innovation research“, *Journal of Innovation Management* 3(3), pp. 118–44.

Bertram, C., et al. (2024). “A Matchmaking Platform Unleashing the Potential of Renewable Energy Communities”, Empowered the Europeaeum Scholars Programme, University of Copenhagen, Copenhagen.

Benyus, J. (2002). *Biomimicry*, Harper Collins ebooks.

Bhatnagar, M., Taneja, S., and Özen, E. (2022). ”A wave of green start-ups in India—The study of green finance as a support system for sustainable entrepreneurship, *Journal of Green Finance* 4(2), pp. 253-73, doi: 10.3934/GF.2022012

Björner, E. and Andersson, I. (2024). “Business models and value-creation of nature-based organisations”. E-book URBiNAT.

Black, S., Liu, A., Parry, I., and Vernon, N. (2023). “IMF Fossil Fuel Subsidies Data: 2023 Update,” Working paper, IMF, Washington.

Bornstein D. (2004). *How to change the world: Social entrepreneurs and the power of new ideas*, Oxford University Press, Oxford.

Brabham, D. (2009). Crowdsourcing the public participation process for planning projects, *Planning Theory* 8(3), pp. 242–62.

Branislav, R., Ilic, M., and Zivković, Z. (2012). “Green marketing and sustainable development - experiences from republic of Serbia”, *Journal of economic development, environment and people* 1 (3), pp. 74–87. doi: 10.26458/jedep.v1i3.29

Brears, R. C. (2022). *Financing Nature-based Solutions, Exploring Public, Private, and Blended Models and Case Studies*, Pelgrave Macmillan https://doi.org/10.1007/978-3-030-93325-8

Brorström, S., Argento, D., Grossi, G., Thomasson, A., and Almqvist, R. (2018). “Translating sustainable and smart city strategies into performance measurement systems”, *Public Policy & management* 38(3), pp. 193-202.

Bulkeley, H. (2020*), Nature-based Solutions Towards Sustainable Communities Analysis of EU-funded projects*, European Commission, Brussels.

Büschgens, T., Bausch, A., and Balkin, D. B. (2013). ”Organizational culture and innovation: A meta-analytic review”, *Journal of Product Innovation Management* 30(4), pp. 763–81, doi:10.1111/jpim.2013.30.issue-4

Böckel, A., Hörisch, J., and Tenner, I. (2021). ”A systematic literature review of crowdfunding and sustainability: highlighting what really matters”, *Management review quarterly* 71, pp. 433-53.

Cairns, J. (2003). “Integrating top-down/bottom-up sustainability strategies: an ethical Challenge”, *Ethics in Science and Environmental Politics* 3, pp. 1-6.

Caitana, B. (2024). Roadmap for social and solidarity initiatives and business cases for inclusive urban regeneration, (ed.), Centre for Social Studies (CES), University of Coimbra, Coimbra.

Calheiros, C. and Stefanakis, A. (2021). "Green Roofs Towards Circular and Resilient Cities", Circular Economy and Sustainability 1(1-2) https://doi.org/10.1007/s43615-021-00033-0

Calzada, I. and Cobo, C. (2015). “Unplugging: Deconstructing the Smart City”, *Journal of Urban Technology* 22(1), pp. 23-43.

Campbell, J.L. (2004). *Institutional change and globalization*, Princeton University Press, Princeton.

Carayannis, E. and Campbell, D. (2009), ““Mode 3” and “Quadruple Helix”: Toward a 21st Century Fractal Innovation Ecosystem”, *International Journal of Technology Management* 46 (3/4), pp. 201-34.

Cardinali, M., Dumitru, A., Vandewostijne, S., and Wendling, S. (2021). Evaluating the impact of Nature-based Solutions: A Summary for Policy Makers, TU Delft, Amsterdam.

Cardinali, M. (2024). Research Report of NBS Health Effects and Impacts on Wellbeing, (ed.), Institute for Design Strategies, OWL University of Applied Sciences and Arts, Detmold.

Carson, R. (1962). *Silent Spring*, Houghton Mifflin Harcourt, Boston.

Christaller, W. (1933). *Central Places in Southern Germany,* Fischer Verlag, Jena.

Coleman, J. (1988), “Social Capital in the Creation of Human Capital,” *American Journal of Sociology* 94, pp. 95-120.

Connecting Nature (n.d.). Connecting Nature Enterprise Platform https://www.naturebasedenterprise.eu/page/the-platform

Corb, L., Henderson, K., Wagner, A., and Wang-Thomas, S. (2022). Climate Tech Competitiveness: Can the US Raise its Game?, McKinsey https://www.mckinsey.com/industries/public-sector/our-insights/climate-tech-competitiveness-can-the-united-states-raise-its-game

Croci, E. and Lucchitta, B. (2021). *Nature-Based Solutions for More Sustainable Cities – A Framework Approach for Planning and Evaluation (eds.),* Emerald Publishing Limited, Bingley.

Cross, N. (2008). *Engineering Design Methods – Strategies for Product Design*, Wiley.

Crutzen, P. and Stoermer, E. (2000). The “Anthropocene”, IGBP Newsletter 41, pp. 17-18.

Cugurullo, F. (2018). “The origin of the Smart City imaginary: from the dawn of modernity to the eclipse of reason”, in: Lindner, C. and Meissner, M. (eds.), *The Routledge Companion to Urban Imaginaries*, Routledge, London.

Dahmén, E. (1950). *Entrepreneurial Activity and the Development of Swedish Industry 1919-1939*, American Economic Association Translation Series, Homewood.

Day, L.L. (2000). “Choosing a house: the relationship between dwelling type, perception of privacy and residential satisfaction”, *J. Plan Educ. Res.* 19, pp. 265–75.

de Vries, J. R., van Bommel, S., and Peters, K. (2018). ”Trust at a Distance—Trust in Online Communication in Environmental and Global Health Research Projects”, *Sustainability* 10(11), 4005 https://doi.org/10.3390/su10114005

Dean, T. J. and McMullen, J. S. (2007). “Toward a theory of sustainable entrepreneurship: Reducing environmental degradation through entrepreneurial action”, *Journal of Business Venturing 22*(1), pp. 50–76.

Decker, R. A., Haltiwanger, J., Jarmin, R. S., and Miranda, J. (2020). ”Changing business dynamism and productivity: Shocks versus responsiveness*”, American Economic Review* 110(12), pp. 3952–90.

Defourny, J. and Nyssens, M. (2014). “The EMES approach of social enterprise in a comparative perspective”, in: Defourny, J., Hulgård, L., and Pestoff, V. (eds.), *Social enterprise and the third sector: Changing European landscapes in a comparative perspective*, Routledge, London, pp. 42–65.

Deloitte (2018). Using Public-Private Partnerships to Advance Smart Cities, Funding and Financing Smart Cities Series, Part 2, London https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Public-Sector/gx-ps-public-private-partnerships-smart-cities-funding-finance.pdf

Demirel, P., Li, Q. C., Rentocchini, F., and Tamvada, J. P. (2019). “Born to be green: new insights into the economics and management of green entrepreneurship”, *Small Business Economics 52*(4), pp. 759–71 https://doi.org/10.1007/s11187-017-9933-z

Demirel, P. and Parris, S. (2015). “Access to finance for innovators in the UK’s environmental sector”, *Technology Analysis & Strategic Management 27*(7), pp. 782–808 https://doi.org/10.1080/09537325.2015.1019849.

Desa, G. (2012). “Resource mobilization in international social entrepreneurship: bricolage as a mechanism of institutional transformation”, *Entrepreneurship Theory and Practice 36*(4), pp. 727–51 https://doi.org/10.1111/j.1540-6520.2010.00430.x

Digital Europe (2019). Digitalisation as key for a sustainable Europe – our call to action for the EU’s strategic agenda 2019-2024 https://www.digitaleurope.org/wp/wpcontent/uploads/2019/06/Narrative_Sustainability_0620_WEB.pdf

Dillon, P. and Baram, M.S. (1993). ‘Forces shaping the development of product stewardship in the private sector’, in: Fisher, K. and Schot, J. (eds.), *Environmental Strategies for Industry: International Perspectives on Research Needs and Policy Implications*, Island Press, Washington, DC, pp. 329–42.

Drobner, C. (2022). "Motivated Beliefs and Anticipation of Uncertainty Resolution," *American Economic Review: Insights* 4(1), pp. 89-105.

Dubina, I. N. and Carayannis, E. G. (2016). *Creativity, innovation, and entrepreneurship across cultures*, Springer, New York.

Dyllick, T. and Muff, K. (2014). “The Business Sustainability Typology, *Sustainability* e.journal, https://ssrn.com/abstract=2368735 or http://dx.doi.org/10.2139/ssrn.2368735

Dyllick, T. and Muff, K. (2016). ”Clarifying the meaning of sustainable business: introducing a typology from business-as-usual to true business sustainability”, *Organization and Environment 29*(2), pp. 156–74 https://doi.org/10.1177/1086026615575176

Egan, P. J. and Megan, M. (2017). "Climate Change: Us Public Opinion", *Annual Review of Political Science* 20(1), pp. 209-27.

Elelman, R. and Feldman, D. L. (2018). “The future of citizen engagement in cities—The council of citizen engagement in sustainable urban strategies (ConCensus)”, *Futures* 101, August, pp. 80-91.

Egusquiza, A., Cortese, M., and Perfido, D. (2019). “Mapping of innovative governance models to overcome barriers for nature based urban regeneration**”,** IOP Conf. Ser., *Earth Environ*. Sci. 323 012081

Escobar, A. (2018). *Designs for the Pluriverse: Radical Interdependence, Autonomy, and the Making of Worlds*, Duke University Press, Durham.

Ezuma, R. and Matthew, N. (2022). “The perspectives of stakeholders on the effectiveness of green financing schemes in Malaysia”, *Journal of Green Finance* 4(4), pp. 450-73 doi: 10.3934/GF.2022022

Falco, E. and Kleinhans, R. (2018). “Digital Participatory Platforms for Co-Production in Urban Development: A Systematic Review”, *International Journal of E-Planning Research* 7(3), July-September.

Anderies, J.M. and Folke, C. (2024). “Connecting human behaviour, meaning and nature”, *Philosophical Transactions of the Royal Society B Biological Sciences* 379(1903)
doi: 10.1098/rstb.2022.0314

Font, X. and McCabe, S. (2017). “Sustainability and marketing in tourism: Its contexts, paradoxes, approaches, challenges and potential“, *Journal of sustainable tourism 25*(7), pp. 869-83.

Foray, D. (2016). “On the Policy Space of Smart Specialization Strategies,” *European Planning Studies 24*, pp. 1428–37

Foray, D., Eichler, M., and Keller, M. (2021). “Smart specialization strategies—insights gained from a unique European policy experiment on innovation and industrial policy design”, *Rev Evol Polit Econ* 2, pp. 83–103 https://doi.org/10.1007/s43253-020-00026-z

Frantzeskaki, N. (2019). “Seven lessons for planning nature-based solutions in cities”. *Environ. Sci. Policy 93*, pp. 101–11.

Freeman, C. (1987). *Technology Policy and Economic Performance: Lessons from Japan*, Pinter, London.

Gabrys, J. (2014). “Programming Environments: Environmentality and Citizen Sensing in the Smart City, *Environmental Science, Political Science, Computer Science, Environment and Planning D: Society and Space* 32(1), pp. 30–48.

Garrod, B. and Chadwick, P. (1996). “Environmental management and business strategy: Towards a new strategic paradigm”, *Futures* 28(1), February, pp 37-50.

Gast, J., Gundolf, K., and Cesinger, B. (2017). “Doing business in a green way: a systematic review of the ecological sustainability entrepreneurship literature and future research directions”, *J Clean Prod* (147), pp. 44–56.

Gaynor, G. H. (2013). "Innovation: top down or bottom up," in *IEEE Engineering Management Review* 41(3), pp. 5-6, Third Quarter 1109/EMR.2013.2274676.

Geissel, B. and Newton, K. (2012). *Evaluating Democratic Innovations – Curing the Democratic Malaise?* (eds.), Routledge, Abingdon.

Gillenwater, M. (2012). *What is additionality? Part 1: A long standing problem* (Discussion Paper No. 001). Silver Spring, MD: GHG Management Institute

Ginsburgh, V., Perelman, S. and Pestieau, P. (2020). "Populism and Social Polarization in European Democracies," Working Papers ECARES 2020-27, ULB -- Universite Libre de Bruxelles.

Goldstein, E., Neimark, B., Garvey, B., and Pheps, J. (2023). “Unlocking “lock-in” and path dependency: A review across disciplines and socio-environmental contexts”, *World Development* 61, January, pp. 1-15.

Goodland, R., Daly, H., Serafy, S., and Droste, B. (1992). *Environmentally Sustainable Economic Development: Building on Brundtland*, UNESCO, Paris.

Greenfield, A. (2013). *Against the smart city (The city is here for you to use)*, Kindle Edition.

Greenwood, M. (2007). “Stakeholder engagement: Beyond the myth of corporate responsibility”, *Journal of Business Ethics 74*(4), 315–27.

Grossi, G. and Pianezzi, D. (2017), “Smart cities: Utopia or neoliberal ideology?”, *Cities* 69, pp. 79–85.

GSMA (2017). Embracing the Technical Revolution, Policies for Building the Digital Economy, February, London.

Guerrero, A. M., Ö. Bodin, R. R. J. McAllister, and K. A. Wilson. (2015). “Achieving social-ecological fit through bottom-up collaborative governance: an empirical investigation”, *Ecology and Society* 20(4):41 http://dx.doi.org/10.5751/ES-08035-200441

Gupta, A. K. (2011). “The relational perspective and east meets west: A commentary”, *Academy of Management Perspectives 25*(3), pp. 19–27.

Haltiwanger, J. (2022). “Entrepreneurship in the twenty-first century”, *Small Business Economics*, pp. 1–14.

Healy, S. (1999). Extended peer communities and the ascendance of post-normal politics, *Futures* 31, pp. 655-69.

Henrekson, M. (2024). Moonshot and the New Industrial Policy: Questioning the Mission Economy https://www.researchgate.net/publication/377936681

Hermwille, L., Obergassel, W., and Arens, C. (2015). "The transformative potential of emissions trading", *Carbon Management* 6, pp. 261–72.

Herrington, M. and Coduras. A. (2019). The national entrepreneurship framework conditions in sub-Saharan Africa: A comparative study of GEM data/National Expert Surveys for South Africa, Angola, Mozambique and Madagascar, *Journal of Global Entrepreneurship Research* 9(1), 60.

Homsy, G. C., Liu, Z., and Warner, M. E. (2019). "Multilevel Governance: Framing the Integration of Top-Down and Bottom-Up Policymaking", *International Journal of Public Administration* 42(7).

Hu, Z. (2023). Who is concerned about climate change when forests are burning? Evidence from Swedish forest fires, Working Paper, Department of Forest Economics at the Swedish University of Agricultural Science and Center for Environmental and Resource Economics (CERE), Umeå University.

Hymer, S. H. (1960). The International Operations of National Firms: A Study of Direct Foreign Investment, PhD dissertation, M.I.T., Cambridge,

Hölscher, K., Frantzeskaki, N., McPhearson, T., and Loorbach, D. (2019). "Tales of transforming cities: Transformative climate governance capacities in New York City, U.S. and Rotterdam, Netherlands", *Journal of Environmental Management* 231, pp. 843–57.

Hörisch, J. (2015). "Crowdfunding for environmental ventures: an empirical analysis of the influence of environmental orientation on the success of crowdfunding initiatives", *Journal of Cleaner Production* 107, pp. 636-645.

Irwin, A. and Hooper, P.D. (1992). 'Clean technology, successful innovation and the greening of industry", *Business Strategy and the Environment* 1(2), pp. 1–12.

Ismagilova, E., Hughes, L., Rana, N.P., et al. (2020). "Security, Privacy and Risks Within Smart Cities: Literature Review and Development of a Smart City Interaction Framework", *Information System Frontiers,* July https://doi.org/10.1007/s10796-020-10044-1

Jaakkola, N. and van der Ploeg, F. (2019). "Non-cooperative and cooperative climate policies with anticipated breakthrough technology", *J Environ Econ Man*ag 97, pp. 42–66 https://doi.org/10.1016/j.jeem.2018.04.001

Jaffe, A.B. and Palmer, K. (1997). "Environmental regulation and innovation: A panel data study", *Review of Economics and Statistics* 79(4), pp. 610–19.

Jones, C. J. (2021). Designing, Bloomsbury Visual Arts.

Joss, S. (2018). "Future cities: asserting public governance", Palgrave Communications 4(1), 36.

Kabisch, N., Frantzeskaki, N., and Hansen, R. (2022). ”Principles for urban nature-based solutions”, *Ambio* 51, pp. 1388–401 https://doi.org/10.1007/s13280-021-01685-w

Kabisch, N., Strohbach, M., Haase, D., and Kronenberg, J. (2016). “Urban green space availability in European cities”, *Ecological Indicators* 70, pp. 586–96.

Karvonen, A. (2018). “The city of permanent experiments?,” in: Turnheim, B., Kivimaa, P., and Berkhout, F., (eds.), *Innovating Climate Governance: Moving Beyond Experiments*, Cambridge University Press, Cambridge, pp. 201–15.

Kitchin, R., et al. (2017). Smart cities, urban technocrats, epistemic communities and advocacy coalitions, The Programmable City Working Paper 26, Prepared for ‘A New Technocracy’ workshop, University of Amsterdam, March 20-21.

Kleinhans, R., Falco, E., and Babelon, I. (2022). “Conditions for networked co-production through digital participatory platforms in urban planning”, *European Planning Studies 30*(4), pp. 769-88.

Kline, S.J. and Rosenberg, N. (1986). “An Overview of Innovation”, in: Landau, R. and Rosenberg, N. (eds.), *The Positive Sum Strategy: Harnessing Technology for Economic Growth,* National Academy Press, Washington DC, 275-304.

Kollmuss, A., Schneider, L., and Zhezherin, V. (2015). Has joint implementation reduced GHG emissions? Lessons learned for the design of carbon market mechanisms, SEI Working Paper No. 2015-07, Stockholm Environment Institute, Stockholm.

Komiya, R. and Irie, K. (1990), “The U.S. – Japan Trade Problem: An Economic Analysis from a Japanese Viewpoint”, in: Yamamura, K. (ed.), “*Japan’s Economic Structure: Should it Change?*, Society for Japanese Studies, Seattle, pp. 65 – 114.

Kooijman, E.D.; McQuaid, S.; Rhodes, ML.; Collier M.J., and Pilla, F. (2021). “Innovating with nature: from nature-based solutions to nature-based enterprise”, Network Nature https://www.mdpi.com/2071-1050/13/3/1263

Koplow, D. and Steenblik, R. (2022). *Protecting Nature by Reforming Environmentally Harmful Subsidies and produced by subsidies experts, the Role of Business*, Earth Track, Cambridge.

Kraus, S., Burtscher, J., Vallaster, C., and Angerer, M. (2018). “Sustainable entrepreneurship orientation: A reflection on status-quo research on factors facilitating responsible managerial practices,” *Sustainability* 10(2), February, pp. 1-21.

Kukurba, M., Waszkiewicz, A. E., Salwin, M., and Kraslawski, A. (2021). “Co-created values in crowdfunding for sustainable development of enterprises”, *Sustainability* 13(16), 8767.

Kurznack, L., Schoenmaker, D., and Schramade, W. (2021). “A model of long-term value creation”, *Journal of Sustainable Finance & Investment*, pp. 1–19 https://doi.org/10.1080/20430795.2021.1920231

Laville, J.-L. (2014). “The social and solidarity economy: A theoretical and plural framework”, in: Defourny, J., Hulgård, L. and Pestoff, V. (eds.), *Social enterprise and the third sector: Changing European landscapes in a comparative perspective*, Routledge, London, pp. 102-13.

Lee, J.H, Hancock, M.G., and Hu M.C. (2014). “Towards an effective framework for building smart cities: Lessons from Seoul and San Francisco”, *Technical Forecasting and Social Change* 89, pp. 80-99.

Lee, N. and Cowling, M. (2013). “Place, sorting effects and barriers to enterprise in deprived areas: Different problems or different firms?”, *International Small Business Journal 31*(8), pp. 914-37.

Lehner, O.M. (2013). “Crowdfunding Social Ventures: A Model and Research Agenda”, *Venture Cap* 15, pp. 289–311.

Lemos, M. C. and Agrawal, A. (2006). “Environmental Governance", *Annual Review of Environment and Resources* 31, November https://ssrn.com/abstract=1081963

Lerner, J. (1998). " The Government as venture capitalist: The long-Run impact of the Sbir program", *Business, Economics, Economics of Innovation eJournal*, September, doi:10.2139/ssrn.4746 Corpus ID: 155077759

Leyden, D. P., Link, A. N., and Siegel, D. S. (2014). “A theoretical analysis of the role of social networks in entrepreneurship”, *Research Policy* 43(7), pp. 1157–63.

Lim, C. and Maglio, P. (2018). “Data-driven understanding of smart service systems through text mining”, *Service Science* 10(2), pp. 154-80.

Lo, A. (2017). *Adaptive Markets: Financial Evolution at the Speed of Thought*. Princeton University Press, Princeton.

Loorbach, D. and Wijsman, K. (2013). “Business transition management: exploring a new role for business in sustainability transitions”, Journal of Cleaner Production 45, April, pp. 20-2.

Lundvall, B.-Å. (1992). *National Innovation Systems: Towards a Theory of Innovation and Interactive Learning* (ed.), Pinter, London.

Lydenberg, S. (2012). On Materiality and sustainability: the value of disclosure in the capital markets, Initiative for Responsible Investment, Harvard University, Cambridge, September.

Maas J., van Dillen, S.M, Verheij R.A., and Groenewegen P. (2009). “Social contacts as a possible mechanism behind the relation between green space and health”, *Health Place* 15, pp. 586–95.

Maes, J. and Jacobs, S. (2017). “Nature-based solutions for Europe’s sustainable development”, *Conservation Letters* 10, pp. 121-4.

Maher, M. and Andersson, T. (2000). “Corporate Governance: Effects on Firm Performance and Economic Growth”, in: McCahery, J., Moerland, P., Raaijmakers, T., and Renneboog, L., (eds.), *Convergence and Diversity of Corporate Governance Regimes and Capital Markets*, pp. 386-420, Oxford University Press, Oxford.

Mair J. and Marti, I. (2009). “Entrepreneurship in and around institutional voids: A case study from Bangladesh”, *Journal of Business Venturing* 24(5), pp. 419–35.

Manzini, E. (2010). “Small, Local, Open and Connected: Design Research Topics in the Age of Networks and Sustainability,” *Journal of Design Strategies* 4(1), Spring.

Marcon, A., de Medeiros, J. F., and Ribeiro, J. L. D. (2017). “Innovation and environmentally sustainable economy: Identifying the best practices developed by multinationals in Brazil”, *Journal of Cleaner Production 160*, pp. 83-97.

Markard, J., Raven, R., and Truffer, B. (2012). “Sustainability transitions: An emerging field of research and its prospects”, *Research Policy* 41(6), pp. 955–67.

Marshall, A. (1890), *Principles of Economics*, Macmillan, London.

Mayer, C. (1996), “Corporate governance, competition and performance”, OECD Economic Studies, 27, pp. 7-34.

Mayer, C. (2018). *Prosperity: Better Business Makes the Greater Good*, Oxford University Press, Oxford.

McCann, P. (2015). *The Regional and Urban Policy of the European Union: Cohesion, Results, Orientation and Smart Specialisation*, Edward Elgar, Cheltenham.

Mccann, P. and Soete, L. (2020). “Place-based innovation for sustainability, Publications Office of the European Union. *Luxembourg*, doi:https://doi.org/10.2760/250023 (online), JRC121271

McHarg I. L. and American Museum of Natural History (1969). *Design with nature* ([1st edition]), Natural History Press.

McQuaid, S., Kooijman, E., Rizzi, D., Andersson, T., and Schanté (2022). *The Vital Role of Nature-Based Solutions in a Nature-Positive Economy*, Independent Expert Report, European Commission, 2022 https://op.europa.eu/en/web/eu-law-and-publications/publication-detail/-/publication/85aeb571-c69c-11ec-b6f4-01aa75ed71a1

McQuaid, S., Kooijman, E.D., Rhodes, M.L., and Cannon, S. (2021*a*). Innovating with Nature: Factors influencing the success of Nature-Based Enterprises, *Sustainability* 13, 12488 https://doi.org/10.3390/su132212488

McQuaid, S., Rhodes, M.L., Andersson, T., Croci, E., Feichtinger-Hofer., M., Grosjean., M., Lueck, A. E., Kooijman, E., Lucchitta, B., Rizzi, D., Reil, A., and Schante, J. (2021*b*). *From Nature-Based Solutions to the Nature-Based Economy - Delivering the Green Deal for Europe*, Draft White Paper for Consultation, EC Task Force III on Nature Based Solutions, European Commission https://zenodo.org/records/5055605

Mees, H.L.P., Driessen, P.P.J., and Runhaar, H.A.C. (2015). ““Cool” governance of a “hot” climate issue: Public and private responsibilities for the protection of vulnerable citizens against extreme heat”, *Reg. Environ. Chang.* 15, pp. 1065–79.

Meijer, A. and Bolívar, M. P. R. (2016). “Governing the smart city: a review of the literature on smart urban governance”, *International Review of Administrative Sciences* 82(2), pp. 392–408.

Michaelowa, A., Hermwille, L., Obergassel, W., and Butzengeiger, S. (2019). “Additionality revisited: guarding the integrity of market mechanisms under the Paris Agreement, *Climate Policy* 19(10), pp. 1211-24, DOI: 10.1080/14693062.2019.1628695
https://www.tandfonline.com/doi/full/10.1080/14693062.2019.1628695

Millward, A. and Sabir, S. (2011). “Benefits of a forested urban park: What is the value of Allan Gardens to the city of Toronto, Canada?,” *Landscape and urban planning*, *100*(3), pp. 177-88.

Min, K.B., Kim, H.J., and Min, J.Y. (2017). ”Parks and green areas and the risk for depression and suicidal indicators”, *Int J Public Health* 62(6), July, pp- 647-56, doi: 10.1007/s00038-017-0958-5. Epub 2017 Mar 24. PMID: 28337512.

Mitchard, E., Carstairs, H., Cosenza, R., Saatchi, S., Funk, S., Quintano, P., Brade, T., McNicol, I., Meir, P., Collins, M., and Nowak, E. (2024). “Serious errors impair an assessment of forest carbon projects: A rebuttal of West et al. (2023)”, Cornell University https://arxiv.org/abs/2312.06793

Moisander, J. (2000). “Group Identity, Personal Ethics, and Sustainable Development: suggesting new directions for social marketing research, in: Jochem, E., Sathaye, J. A., and Bouille. D. (ed), *Society, Behaviour, and Climate Change Mitigation*”, Kluwer Academic Publishers, Dordrecht.

Moisander, J. (2007). "Motivational complexity of green consumerism*," International Journal of Consumer Studies* 31(4), pp. 404-9 https:// doi.org/10.1111/j.1470- 6431.2007.00586

Moniz, G.C. and Lameiras, J.M. (2024). Roadmap for the Co-creation of Urban Plans, URBiNAT.

Montiel, I. and Delgado-Ceballos J. (2014). “Defining and measuring corporate sustainability: Are we there yet?”, *Organization & Environment* 27, pp. 113-39.

Morgan K. and Marques P. (2019). “The public animateur: mission-led innovation and the ‘smart state’ in Europe”, *Cambridge Journal of Regions, Economy and Society*, March.

Mosannenzadeh, F., Bisello, A., Vaccaro, R., D'Alonzo, V., Hunter, G. W., and Vettorato, D. (2017). ”Smart energy city development: A story told by urban planners”, *Cities* 64, pp. 54-65.

Mouraviev, N. and Avramenko, A. (2020). *Entrepreneurship for deprived communities: Developing opportunities, capabilities and enterprise culture*, Emerald Group Publishing.

Muff, K. and Dyllick, T. (2014). An Organizational Roadmap of Business Sustainability, April, SSRN: https://ssrn.com/abstract=2442211 or http://dx.doi.org/10.2139/ssrn.2442211

Myers, T. A., Nisbet, M. C., Maibach, E. W., and Leiserowitz, A. A. (2012). “A public health frame arouses hopeful emotions about climate change”, *Climatic Change* 113(3-4), pp. 1105-12.

Møller, M. and Olafsson, A. (2018). “The Use of E-Tools to Engage Citizens in Urban Green Infrastructure Governance: Where Do We Stand and Where Are We Going?”, *Sustainability* 10(10), 3513 https://doi.org/10.3390/su10103513

Möllers, T. J. (2022). “European Green Deal: Greenwashing and the Forgotten Good Corporate Citizen as an Investor”, Columbia Centre of European Studies, European Legal Studies Center Columbia University School of Law 28(2).

Nam, T. and Pardo, T.A. (2011). “Smart city as urban innovation: Focusing on management, policy, and context, in: *Proceedings of the 5th International Conference on Theory and Practice of Electronic Governance*, ICEGOV '11, pp. 185–94.

Narassimhan, E., Gallagher, K., Koester, S., and Rivera Alejo, J. (2018). “Carbon pricing in practice: A review of existing emissions trading systems“, *Climate Policy* 18, pp. 967–91.

Nesshöver, C., Assmuth, T., Irvine, K., Rusch, G., Waylen, K., Delbaere, B., Haase, D., Jones-Walters, L., Keune, H., Kovacs, E., Krauze, K., Külvik, M., Rey, F., van Dijk J., Vistad, O., Wilkinson, M., and Wittmer, H. (2017). “The science, policy and practice of nature-based solutions: an interdisciplinary perspective”, *Science of the Total Environment* 579, Elsevier B.V, pp. 1215-27.

Nicholls, A. and Pharoah, C. (2008). The Landscape of Social Investment: A Holistic Topology of Opportunities and Challenges, Said Business School, Skoll Centre for Social Entrepreneurship, Oxford.

Nilsson ME, Berglund B. (2006). “Soundscape quality in suburban green areas and city parks”, *Acta Acustica United Acustica* 92, pp. 903–11.

Nisbet, M. C. (2009). “Communicating climate change: Why frames matter for public engagement”, *Environment: Science and Policy for Sustainable Development* 51(2), pp. 12-23.

OECD (2004). Public private partnerships for innovation, DSTI/STP/TIP(2004)3, Paris.

OECD (2023*a*). *Policy Guide on Legal Frameworks for the Social and Solidarity Economy*, Local Economic and Employment Development (LEED), OECD Publishing, Paris https://doi.org/10.1787/9c228f62-en.

OECD (2023*b*). *Job Creation and Local Economic Development, : Bridging the Great Green Divide*, OECD Publishing, Paris, https://doi.org/10.1787/21db61c1-en.

O'Keefe, D. J., and Jensen, J. D. (2006). ”The relative persuasiveness of gain-framed and loss-framed messages for encouraging disease prevention behaviors: A meta-analytic review”, *Journal of Health Communication* 11(7), pp. 711-31.

Olson, M. (1971). *The Logic of Collective Action*, Harvard Economic Press, Cambridge

Paterson, M. (2021). “Climate change and international political economy: between collapse and transformation”, *Review of International Political Economy* 28(2), pp. 394-405, doi: 10.1080/09692290.2020.18308

Pearce, D. (1989). *Blueprint for a Green Economy*, Earthscan, London.

Peixoto, T. and Steinberg, T. (2019). *“Citizen Engagement: Digital Technologies Create New Risks and Value*, World Bank, Washington.

Peixoto, T. and Fox, J. (2016). “When Does ICT-Enabled Citizen Voice Lead to Government Responsiveness?”, Background paper, *World Development Report, Digital Dividends*, World Bank Washington

https://openknowledge.worldbank.org/bitstream/handle/10986/23650/WDR16-BP-When-Does-ICT-Enabled-Citizen-Voice-Peixoto-Fox.pdf?sequence=1&isAllowed=y

Poojaa. G. and Krishnamoorthy, B. (2021). “Corporate social responsibility in the time of COVID-19 pandemic: An exploratory study of developing country corporates*, Corporate Governance and Sustainability Review* 5(3), pp. 73–80 https://ssrn.com/abstract=3939676

Porter, M. E. (1990), *The competitive advantage of nations,* Free Press, New York.

Puffer S.M., McCarthy D.J., and Boisot M. (2010). “Entrepreneurship in Russia and China: The impact of formal institutional voids, *Entrepreneurship Theory and Practice* 34, pp. 441–67.

Raymond, C.M., Frantzeskaki, N., Kabisch, N., Berry, P., Breil, M., Nita, M., Geneletti, D., and Calfapietra, C. (2017). “A framework for assessing and implementing the co-benefits of nature-based solutions in urban areas”, *Environ. Sci. Policy* 77, pp. 15-24, 10.1016/j.envsci.2017.07.008

Raworth, K. (2017). *Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist*, Random House Business, ISBN-13: 978-1603586740

Reed, B. (2007). “Shifting from 'sustainability' to regeneration”, *Building Research & Information* (35)6, pp. 674-80.

Renn, O. and Schweizer, P-J. (2009). “Inclusive risk governance: Concepts and application to environmental policy making”, *Environ. Policy Gov.* 19, pp. 174–85 https://www.researchgate.net/publication/227811910_Inclusive_risk_governance_Concepts_and_application_to_environmental_policy_making

Rogers, E. M. (1962). *Diffusion of innovations*, Free Press, New York.

Romer, P. (1986). "Increasing Returns and Long-Run Growth", *Journal of Political Economy* 94(5), pp. 1002-37.

Sadik-Khan, J. and Solomonow, S. (2017). *Streetfight: Handbook for an urban revolution*, Penguin, New York.

Said, O. and Tolba, A. (2021). “Accurate performance prediction of IoT communication systems for smart cities: An efficient deep learning based solution”, *Sustainable Cities and Society* 69, February.

Saikawa, E. (2013). “Policy diffusion of emission standards: is there a race to the top”, *World Politics* 65(1), pp. 1–33 https://doi.org/10.1017/S0043887112000238Econ

Schaltegger, S. and Wagner, M. (2011). “Sustainable entrepreneurship and sustainability innovation: categories and interactions”, *Business Strategy and the Environment 20*(4), pp. 222-37 https://doi.org/10.1002/bse.682

Schein, E. (2004). *Organizational culture and leadership* (3rd ed.). San Francisco, United states: Jossey-Bass.

Schoenmaker, D. and Schramade, W. (2019). *Principles of Sustainable Finance*, Oxford University Press, Oxford.

Schultz, P. W. (2014). "Strategies for promoting proenvironmental behavior: Lots of tools but few instructions", *European Psychologist* 19(2), pp. 107-17.

Seddon, N., Chausson, A., Berry, P., Girardin, C., Smith, A., and Turner, B. (2020). "Understanding the value and limits of nature-based solutions to climate change and other global challenges" https://doi.org/10.1098/rstb.2019.0120

Shaffers, H., Komninos, N., Pallot, M., Trousse, B., Nilsson, M., and Oliveira, A. (2011). "Smart cities and the future internet: Towards cooperation frameworks for open innovation", *The future internet assembly*, Springer, Berlin, pp. 431-46.

Shieh, C. (2011). "Management innovation, corporation core competence and corporate culture: the impact of relatedness", *Applied Economics Letters* 18(12), pp. 1121-4 https://doi.org/10.1080/13504851.2010.526567

Shipley, R. and Utz, S. (2012). "Making it count: A review of the value and techniques for public consultation", *Journal of Planning Literature* 27(1), pp. 22–42.

Solow., R. (1992). Al Almost Practical Step Toward Sustainability, *Resources for the Future*, Washington.

Song, Y., Dana, L. P., and Berger, R. (2021). "The entrepreneurial process and online social networks: forecasting survival rate", *Small Business Economics* 56(3), pp. 1171-90.

Stern, N. (2008). "The Economics of Climate Change", *The American Economic Review* 98(2), Papers and Proceedings of the One Hundred Twentieth Annual Meeting of the American Economic Association, May, pp. 1-37.

Sugiyama, T., Leslie, E., Giles-Corti, B., and Owen, N. (2008). "Associations of neighbourhood greenness with physical and mental health: Do walking, social coherence and local social interaction explain the relationships?", *J. Epidemiol. Community Health* 62, e9.

Szymczyk, M. and Kamiński, B. (2014). Dynamics Of Innovation Diffusion With Two Step Decision Process", *Foundations of Computing and Decision Sciences* 39(1), pp. 39-53 https://doi.org/10.2478/fcds-2014-0004

Tang, Z., Brody, S. D., Quinn, C., Chang, L., and Wei, T. (2010). "Moving from agenda to action: evaluating local climate change action plans", *Journal of Environmental Planning and Management 53*(1), pp. 41–6 https://doi.org/10.1080/09640560903399772

Tarui, N. and Polasky, S. (2005). "Environmental Regulation with Technology Adoption, Learning and Strategic Behavior", *Journal of Environmental Economics and Management* SSRN: https://ssrn.com/abstract=791026

Teyhen, D.S. et al. (2014). "Key Enablers to Facilitate Healthy Behavior Change: Workshop Summary", *Journal of Orthopaedic & Sports Physical Therapy* 44(5), pp. 378-87.

Thaler, R. H. (2015). *Misbehaving: The Making of Behavioural Economics*, WW Norton & Company, New York.

Trischler, J., Pervan, S., and Scott, R. (2017). "Exploring the “black box” of customer co-creation processes", *Journal of Services Marketing 31(3),* pp. 265-80.

Trojanek, R., Gluszak, M., and Tanas, J. (2018). "The effect of urban green spaces on house prices in Warsaw", *International Journal of Strategic Property Management 22*(5), pp.358-71.

Turner, F. (1980). *Beyond Geography: The Western Spirit Against the Wilderness*, Viking Press, New York.

UNCTAD (2024). Entrepreneurs riding the way of circularity – the New Frontier in Entrepreneurship, Issue No. 3, UNCTAD/DIAE/2023/6.

URBACT (2019). “Citizen Participation & Citizen Engagement, the construction of a dialogue in the Urban Environment” https://urbact.eu/citizen-participation-citizen-engagement-construction-dialogue-urban-environment

URBiNAT (2022). Milestone 7: Market Potential of NBS and Structuring the Impact of Nature-based Enterprises, https://urbinat.eu/milestone-7-market-potential-of-nbs/

URBiNAT (n.d.) URBiNAT NBS Catalogue. https://urbinat.eu/nbs-catalogue/

van der Jagt, A., Kiss, B., Hirose, S., and Takahashi, W. (2021). “Nature-Based Solutions or Debacles? The Politics of Reflexive Governance for Sustainable and Just Cities”, *Front. Sustain. Cities* 2, 583833, doi: 10.3389/frsc.2020.583833

Van der Ryn, S. (2005). Design for Life: the Architecture of Sim van der Ryn (1st ed.), G. Smith.

Vanolo, A. (2014). “Smartmentality: The Smart City as Disciplinary Strategy”, *Urban Studies* 51(5), April, pp. 883–98.

Vasilescu, M.D., Dimian, G.C., and Gradinaru, G.I. (2022). “Green entrepreneurship in challenging times: A quantitative approach for European countries”. *Economic Research-Ekonomiska Istraživanja 36*(1), 1828–47 https://doi.org/10.1080/1331677X.2022.2093767

Walker, M. (2013). “Internal and external influences on the capacity for innovation in local government”, in: Osborne S.P. and Brown L. (eds.), *Handbook of innovation in public Services*, Edward Elgar, pp. 496-513.

Wamsler, C., Alkan-Olsson, J., Björn, H., Falck, H., Hanson, H., Oskarsson, T., Simonsson, E., and Zelmerlow, F. (2020). “Beyond participation: When citizen engagement leads to undesirable outcomes for nature-based solutions and climate change adaptation”, *Clim. Chang.* 158, pp. 235–54.

Wang, Y., Liu, J., Yang, X., Shi M, and Ran, R. (2023). “The mechanism of green finance's impact on enterprises' sustainable green innovation”, *Journal of Green Finance* 5(3), pp. 452-78, doi: 10.3934/GF.2023018

Webster, C. W. R. and Leleux, C. (2018). “Smart governance: Opportunities for technologically-mediated citizen co-production”, *Information Polity 23*(1), pp. 95-110.

Wei, X., Ren, H., Ullah, S., and Bozkurt, C. (2023). “Does environmental entrepreneurship play a role in sustainable green development? Evidence from emerging Asian economies”, *Economic Research-Ekonomska Istraživanja 36*(1), pp. 73–85. https://doi.org/10.1080/1331677X.2022.2067887

Wendling, S. and Dumitru, A. (2021). *Evaluating the Impact of Nature-based Solutions, A Handbook for Practitioners*, Directorate-General for Research and Innovation, European Commission, Luxembourg.

West, T. A. P. , Wunder, S., Sills, E. O., Björner, J., Rifai, S. W., Neidermeier, A. N., Frey, G. P., and Kontoleon, A. (2023). “Action needed to make carbon offsets from forest conservation work for climate change mitigation”, *Science* 381, pp. 873–7.

Wolfram, M. (2016). “Conceptualizing urban transformative capacity: A framework for research and policy”, *Cities* 51, pp. 121–30 https://doi.org/10.1016/j.cities.2015.11.011

Worker, J. and Palmer, N. (2020). “A Guide to Assessing the Political Economy of Domestic Climate Change Governance,” Working Paper, World Resources Institute, Washington, DC, doi.org/10.46830/wriwp.18.00047

WWF (2024). WWF Bankable Nature Solutions Case Studies, April https://wwfint.awsassets.panda.org/downloads/wwf-bankable-nature-solutions-case-studies---april-2024.pdf

Xie, Z., Qu, L., Lin, R., and Guo, Q. (2022). ”Relationships between fluctuations of environmental regulation, technological innovation, and economic growth: a multinational perspective”, *Journal of Enterprise Information Management* 35, pp. 1267–87 https://www.emerald.com/insight/content/doi/10.1108/JEIM-02-2021-0104/full/html

Young, W., Hwang, K., McDonald, S., and Oates, C. J. (2010). "Sustainable consumption: Green consumer behaviour when purchasing products", *Sustainable Development* 18(1), pp. 20-31 https:// doi.org/10.1002/sd.394

Zerbib, O.D. (2019). “The effect of pro-environmental preferences on bond prices: evidence from green bonds”, *J Bank Finance* 98, pp. 39–60, doi: 10.1016/j.jbankfin.2018.10.012.

Zhang, M. (2023). “Trade and the government underfunding of environmental innovation”, *J Environ Stud Sci* 13, pp. 575–86 https://doi.org/10.1007/s13412-023-00847-4

Zingraff-Hamed, A.; Hüesker, F.; Lupp, G.; Begg, C.; Huang, J.; Oen, A.; Vojinovic, Z.; Kuhlicke, C., Pauleit, S. (2020). ”Stakeholder Mapping to Co-Create Nature-Based Solutions: Who Is on Board?” *Sustainability 12*, 8625.

Appendix 1: Overview of best practice NBEs

"Best practice NBEs" refers to strongly performing Nature-based Enterprises (NBEs) which represent candidates for scaling and replicability. A pool of such entities, identified in URBiNAT's frontrunner cities (Porto, Nantes, Sofia), has been examined with regard to their business models, target groups, links to NBS, and so forth. Opportunities for matchmaking with URBiNAT follower cities were subsequently tested out in an experimental process.

For the ventures reviewed in detail, Table A1 summarises the type of NBE, the kind of NBS connected with, main output items, and what NBS functionality appears to benefit in the case of each NBE, referred to as a "valuation boost". For further analysis of the specific cases and factors characterising their scaling and/or replicability, see Andersson et al. (2023).

Table A1: Summary information for selected Best-Practice NBEs, URBiNAT

Name of NBE	Type of NBE	Kind of NBS	Main output items	NBS functionality valuation boost
Porto				
Noocity Urban Ecology	For-profit SME	Technological	Food, plants	Urban space, quality increase
Good Food Hubs	Project	Territorial	Sustainable food	Health, social capital
Cidade Mais	Non-for profit	Participatory	Festival	Inclusion, social and cultural capital
Green Roofs Association	NGO	Technological	Green infrastructure, green roofs	Urban space, quality increase
Porto Innovation Hub	Municipal organisation	Participatory	Innovation	Geen and social entrepreneurship
Futuro project	Municipal	Participatory/ Territorial	Tree-planting and maintenance	Native urban forests, biodiversity
Nantes				
Le Kiosque Paysan	For profit SME	Technological	Food & logistics	Local culture, logistics

La Cocotte Solidaire	Hybrid model	Participatory	Food	Social and cultural capital, nutrition
Phytolab	For profit SME	Territorial	Biomimicry	Biodiversity, urban space quality
Moneko	Non-for profit	Participatory	Local currency	Local supply and demand system boost
Compostri	For profit SME	Territorial	Landscaping	Ecofood quality, circularity
Le Solilab	Non-for profit	Participatory	Incubator	Social capital, entrepreneurship
Les Connexions	Non-for profit	Participatory & technological	Circular economy	Social capital, culture, reuse
Sofia				
Shit and Blossoms	For-profit SME	Technological	Compost toilet	Sanitation, water
Mr. Green Walls	For-profit SME	Territorial	Vertical gardens	Urban space, quality increase, built environment
Food, not Bombs	Voluntary based initiative	Participatory	Food education and supply	Nutritional value of food, inclusion, peace
Bread House Network	Non-for profit	Social & Solidarity	Community bread making for homeless people, workshops	Social capital, nutrition, inclusion

Source: Adapted from Andersson et al. (2023)