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Transformative Economies

From the Circular Economy to the Green New Deal

FeltrinelliCamp 2020

edited by
Anna Pettinaroli

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The Text

The imperative to review the predominant economic models has never been more important than it is now. It is essential to take this moment of disruption caused by the Coronavirus pandemic as an opportunity to rebuild our economic system by revising our development models. We need to identify new actions and strategies that can drive and speed up the transition towards new economic models, new roles for sustainable development, and new models of solidarity and inclusiveness.

FeltrinelliCamp 2020's ultimate goal was to highlight the conditions that enable the advance of an ecological transition sustainable for all, economically, socially and for the territory's development, whilst still remaining sensitive to issues of community well-being and environmental justice.

Such as the previous edition, FeltrinelliCamp 2020 welcomed several dozen of carefully selected researchers, young scholars, practitioners and activists from many parts of the world for a two-day intensive workshop. This volume collects the outcome of this work.

Edited by Anna Pettinaroli, it contains the reports produced by the work of the seven thematic tables and, in addition, texts by Claudio Zara, Maria Savona and Eugenio Caverzasi.

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FeltrinelliCamp 2020

Preface

The third edition of FeltrinelliCamp, which was previously scheduled for the last weekend of February 2020, finally took place on October 3rd and 4th, after having being postponed due to the Coronavirus pandemic. As in the previous editions, this year the FeltrinelliCamp welcomed about seventy carefully selected researchers, young scholars, activists and practitioners from different parts of the world for a two-days intensive workshop. This preface aims to outline the rationale and organization behind the conception of FeltrinelliCamp.

Fondazione Feltrinelli strongly believes in the importance of this initiative that brings together theory and practice, researchers and policy-makers, academics and operators. This belief is further reinforced by the strong nexus between last year's FeltrinelliCamp and its 2020 edition. In 2019 it was titled "Rethinking Capitalism: from globalization to humanization" and it dealt with the ties between globalization and sustainability, not just environmental but also social and economic. The objective of this last 2020 edition was to pursue this

journey by focusing on those economic models that, especially given the crisis generated by the pandemic, allow us to promote a sustainable ecological transition for everyone. A sustainable transition that is both economic and social, and where community well-being and environmental justice take centrepiece in the territorial development. In such context, State and Public Administrations' roles become of fundamental importance to ensure these goals are achieved at a large-scale level

The topics under discussion were the same as those proposed in February, but with the awareness that the pandemic has left an inexpungible mark and that the new 'normal' requires us to review habits and priorities. The topics remained unchanged, but it is undeniable they have acquired a new sense of urgency. The imperative to review the predominant economic models in order to combine environmental justice with social justice has never been more of paramount importance. In addition, it must include a review of development paradigms. This process should thus act as an inspirational guideline for all projects and policies for post-crisis reconstruction.

Without wishing to diminish the devastating effects of the current economic and social crisis, it is essential to take this moment of instability and disruption as an opportunity to rebuild our economic system by revising our development models. COVID-19 is offering new arguments for why we should be supporting and enforcing the idea that we need to identify new actions and strategies that can drive and speed up the transition towards new economic models, new roles for sustainable development, and new models of solidarity and inclusiveness.

International agencies, global actors, European, national and local institutions play an important role in driving the required economical and ecological transformation and in activating the needed economic resources. However, local communities and empowered citizens also

have a relevant role to play, by experimenting innovative actions and pioneering initiatives aimed at promoting equity, inclusiveness and resilience within their local realities. Interesting experiences and fresh ideas have been mushrooming around the world in recent years. They include creative community actions, social innovation initiatives, solidarity networks, innovation labs, and they all offer concrete solutions to social problems, promote economic sustainable activities and contribute to the construction or reconstruction of the social economical fabric by promoting civic agency and participation.

In order to manage the post-crisis reconstruction and react proactively, it is fundamental that the State, and more generally the public sector as the custodian of collective interests, assumes specific responsibilities to face the social and economic scenarios that we are presented with, not least the one resulting from the COVID-19 pandemic. Europe has identified a central strategy to govern the transition towards new interpretations of de-industrialisation and new roads for progress and economic models through the European Green Deal. The Green Deal, interpreted as against the characteristics of communities and territories, will need to redraw new balances with market forces, promoting dialogue between society's many sectors as well as redefine relations between the urban centre and the suburbs. Decarbonisation, understood as a package of policies and useful practices for reducing carbon emissions in to the atmosphere caused by human activity, should operate as a catalyzer for territorial development. After more than ten years of economic crisis, increased inequality and a decline in the quality of public services, territories and communities are increasingly vulnerable to external factors such as pandemics and the effects of climate change, and increasingly less resilient, as is our socio-economic system. This period of reflection and transition should encompass the rights, obligations and experiences of all social actors, clearly identifying political strategies for innovation and

resilience of the socio-economic system, to foster an active dialogue between its components: public institutions, business and the general public. These considerations should include system drivers such as the technological revolution and infrastructural intervention within the territories, as well as processes of innovation and sustainability for industrial and investment policies, aimed at mending relations between the territories and their communities, starting from practices and movements enlivening the transition at the base.

FeltrinelliCamp 2020's ultimate goal was to highlight the conditions that enable the advance of an ecological transition sustainable for all, economically, socially and for the territory's development, whilst still remaining sensitive to issues of community well-being and environmental justice. Thus, this year's title was "Transformative Economies: from the Circular Economy to the Green New Deal", underlining the need for a complete new approach to the new economies and to the policies needed to support them. The pandemic must not nullify the efforts of several sustainability policies that have enjoyed substantial investments over the last decades; it must not precisely because these policies have had tremendous influence on the movement of people, goods and basic commodities, as well as on tourism, consumer habits and choices. The exchange and movement of people and goods has decreased drastically bringing positive results in the reduction of CO_2 emissions. Hence, drawing from the lessons learnt in adapting to a pandemic crisis, public institutions must push towards proposing and initiating policies for new infrastructures and supply chains that are sustainable, by investing in these "new economies", or transformative economies, that fall from the short chain to the circular economy, from digital innovation to a zero kilometer-based approach.

Thanks to the 2020 edition of FeltrinelliCamp, we had the opportunity to reflect about these issues for a whole weekend, through a mix of platforms that included public lectures, held by Italian and interna-

tional keynote speakers, sessions of seven working groups, that were the centre of the exchange of research and professional experiences. The seven working groups were structured on the basis of four macro-themes used to interpret the new economies and the policies to be implemented to support them:

- *Topic 1: Economy and Financial Instruments*: debate about the financial instruments and how they should be employed to respond to the economic crisis, now exasperated by the pandemic, to reinforce development opportunities for the new transition economies.
- *Topic 2: Education, Jobs and Employment*: debate about the job market needs to respond to the new economies, and about the requisite strategies, roles and instruments that should be adopted by the training and education world.
- *Topic 3: Cities and Territories*: debate about the possibility for the new economies to be truly transformative for territories, acting as a driving force and catalyzer for innovation and about their possibility in operating as instruments towards a reduction of social and territorial inequalities.
- *Topic 4: Resources*: debate about circular processes where all waste can be recycled to produce goods or services, about the policies required to trigger and enable sustainability along these lines and about the way we can generate impacts that are positive not only for the environment but also for its communities.

The objective of the two-days activities of the working group was to conceptualize potential solutions to the crucial problems affecting our economic models, in order to combine environmental justice with social justice, as strongly emphasized during the lively debate between Alexandra Geese, politician of the Alliance 90/The Greens, Kirsten

Dulop, CEO of Climate-Kic, and Elly Schlein, vice-president of Emilia Romagna.

This volume is a direct result of this important work and it retraces the main topics that emerged during the two-days activities. Following the introduction from Claudio Zara, which sets a financial approach to the theme of circular economy, different participants are given space to explore and reflect on the discussions. Eugenio Caverzasi, an economist from the University of Insubria, illustrates several key issues in the relationship between green transition and finance, through a critical reading of the concept of Green Bonds. Maria Savona, Professor of Innovation and Evolutionary Economics at the University of Sussex, introduces the theme of the use of digital technologies and data governance during times of crisis, bringing the case of the Covid-19 Contact Tracing Applications. After these two contributions, the volume collects the reports of the seven working groups, reiterating their works and their final proposal, through the debates that emerged from their different experiences, ideas and backgrounds. And this is precisely the key-element of success in every edition of FeltrinelliCamp: the capacity to bring together people with different personal and professional experiences, bridging the gaps of age, culture, worldviews and offer them the opportunity to enjoy an intellectual exercise, by sharing their own experiences and learning from each other.

The reports summarizing the activities of the seven working groups gathered in this book point to the fundamental issues mentioned in this preface and to many more, raising policy recommendations to deal with the challenges which had emerged from the brainstorming. Together with the papers compiled by the keynote figures which took part to the last research season of the Fondazione Feltrinelli, they draw – this is our aspiration – a coherent and comprehensive agenda up to meet the challenges of this moment of discontinuity. An agenda that necessarily comes from multidisciplinary backgrounds: because the

green transformation will be unfeasible unless the engagement of all components of society. But it is even deeper than that, as Alain Caillé, Professor of Sociology to the University of Paris Nanterre, has risen up during his intervention to the FeltrinelliCamp: what we also need is a thoroughly different approach in our social relations, an approach that recognizes the need for conviviality inscribed in human nature. Is conviviality, and the connected new economic thinking based on the commons, stronger in human nature than utilitarianism? Our bet, quoting Massimiliano Tarantino's closing remarks, is that this is the case, and that this can be the real engine of the transformative economies that we need.

Circular Economy and Finance: Opportunities for the Financial Services Industry

The transition toward a circular economy foresees to offer an array of opportunities to banks and other financial actors

Claudio Zara – Università Bocconi, Dept. of Finance and GREEN Research Centre

1. Circular economy: some considerations

Some 50 years ago, the Club of Rome – a think tank of scientists initiated by Aurelio Peccei – raised the issue of economic growth, exploitation of natural resources and demographic trends, preconceiving the existence of peremptory limits to the sustainability of the linear model of development (*take, make, use and dispose)* that has distinguished the global economy for more that 250 years, since the first industrial revolution (Meadows Donella H. and Others, 1972). Already 20 years later, and more heavily in recent years (Turner Graham, 2014), the predictions of the Club of Rome where confirmed by the joint analysis of macroeconomics variables considered in the study. At the same time, the United Nations begun to ponder over the impact of the linear economic paradigm on the Planet. The linear economy entails negative externalities that affect the entire natural capital, including most evident consequences of air pollution – in terms of CO_2 emissions – and

climate change, as well as issues such as land and water consumption. Several metrics of natural resources exploitation, such as the *ecological footprint* of economy (Wackernagel, Mathis and Rees William, 1996), highlight how the yearly consumption of resources and the generation of negative externalities is growing and is well beyond the ability and speed of the environment to regenerate.[1]

The notion of Circular Economy (CE) originates from brainwork and research on these themes, and finds its first formal conceptualization in the work of Pearce and Turner in 1989. In the current definition,[2] CE is based on three fundamental pillars: *Preserve and Restore*, *Optimize and Regenerate*, *Minimize*; which, in a nutshell, are based on the following guidelines. Encourage the use of biological materials that are regenerative by their nature, also in order to manage properly the stock of materials which are not regenerative (*Preserve and Restore*). Increase the efficiency and resilience of economic systems by maximizing the potential inherent in products, components and materials, being either biological or technical (*Optimize and Regenerate*). Converge on "pure" production and consumption cycles that reduce, to the point of eliminating, negative externalities (*Minimize*).[3]

Sustainability and environmental impact constitute the bedrock of CE's criticality and, consequently, of the convenience for economic actors to be actively engaged in the transition from the linear eco-

1 For the years 2018 and 2019, the *global overshoot day* was July 29th, with consumption of regenerative capacity equal to 1.72 times that of the Planet. In 2020 the global overshoot day fell on August 22nd due to the effects of Covid-19 pandemic. For Italy, in 2020 the overshoot day was May 14th, equal to consumption of 2.6 planets yearly capacity (source: Global Footprint Network, Earth Overshoot Day website, visited on Nov. 4th 2020).

2 For a current interpretation of the concept of CE refer to the contribute of EMF "*What is Circular Economy*" in Zara Claudio and Pogutz Stefano (Editors), (2018), Dossier "Verso l'Economia Circolare", Economia & Management, n. 5/6 2018, p. 13-15, EGEA, Milano.

3 It seems appropriate to underline that the concept of CE goes far beyond the theme of recycling. The effective and efficient development of waste management represents the first stage of the transition to a circular paradigm which has, among its objectives, to generate an economy that does not produce waste (*zero waste goal*).

nomic paradigm to the circular one. The transition requires significant rethinking and redesign of enterprises' value chains and business models, and entails consequences on economic-financial profiles of industries and companies. More in details, it is possible to focus on three main features of the transition that play a paramount role in shaping the economic visage of invested industries and businesses: *Re-thinking, Risk Hedging and Innovation*. Changing the economy in a circular way asks for re-thinking the activities in a systemic way. The guideline of re-thinking points out a key difference between the circular mindset and corporate social responsibility (CSR). CE relies on the ability and willingness of re-design products, processes and operations to make them consistent with its principles instead of pursuing the goal of mitigating the negative effects of the linear paradigm as CSR aims. In order to bring CE in action, re-design must be coupled with a systemic approach which involves all the relevant stakeholders for the business, such as suppliers and customers. For example, the circling pure principle implies that all the inputs in the manufacturing process must be circular; if suppliers do not follow and implement the change, it is not possible for the promoter, such as an assembler at the end of the process, to reach the goal (*Re-thinking*).[4] The linear paradigm is more and more constrained by several factors, such as legal – policy makers are oriented to move the costs of negative externalities from the Society to the originators –, market – the volatility of prices for many raw materials has considerably raised in the last 20 years –, business – in many industries customers ask for products that are compliant with the sustainability principles – and operational – for example, let's consider the spillover risk when dangerous inputs

4 In driving its circular transformation, Enel has introduced as a key lever the Circular Procurement Project which has the goal of purchasing goods, works or services by reducing environmental impacts and the production of waste during their life cycle (source: Enel website, visited on Nov. 4th, 2020).

are used in the manufacturing process –. When a company replaces the linear practices, that are related to the negative effects spreading from the previous factors, with the corresponding circular ones, it also hedges against these kinds of risk. As a consequence, CE can change the company's risk profile and helps to become more stable against several sources of volatility (*Risk Hedging*). The transition toward a CE implies a significant content of innovation. A first strand of innovation refers to technology; for example, without digitalization, connectivity and data sharing it would not be possible to activate the circular business model "Product as a Service" (PaS) which allows to increase the load factor of product usage. Innovation does not pertain only technology but it also extends to the field of management. Many circular business models, such as resource recovery and product life extension, need to monitor the product during its life cycle and take back at the end. This implies to introduce new activities that do not exist in a linear economy, namely reverse logistic for organizing and handling the product flow from the market to the company, and change of the revenue model, from the sale of the ownership to the sale of the usage, in order to be sure to retain the product when necessary (*Innovation*).

The transformation of the asset side of industries and companies in a circular way has important consequences also on their liability side. In fact, circular companies may have different and new financial needs, for example revenue financing when PaS business model has been adopted, and a changing profile of the capital structure, for example debt with longer maturity and more structured finance.

2. The impact of the circular paradigm on the 3Rs of finance

The transition to the circular economy deeply transforms the real economy,[5] which constitutes the major part of the demand for financial products and services, therefore implying meaningful consequences for the financial industry. The shift might necessarily and increasingly change the risk-return profiles of assets held by financiers and investors. This pull effect from the demand side will affect the financial business along three fundamental areas: *Risk*, *Revenues* (and Returns), *Reputation*. These three variables can be labelled as "*The 3Rs of Finance*".

2.1 Risk

The dependency of transformative economies on the sources of supply of virgin raw materials constitutes one factor of intrinsic volatility, as these materials might become scarce in relation to the demand, are often subject to extremely competitive commercial conditions and/or localized in socio-politically instable areas.[6] By *decoupling* economic growth from the use of virgin raw materials, CE reduces enterprises' exposure to growing trends in prices and their volatility.[7] Finite resources and materials are replaced with renewable, regenerative and, at least, second-hand ones, managing the stocks of finite resources in a way that entails the limits for their exploration. Consequently, CE facilitates the reduction of both systematic and idiosyncratic risks, as it limits the exposure to volatility of the entire economic system. Furthermore, by focusing on regenerating natural systems and opti-

5 According to the EU, 60% of Union GDP is directly involved in the shift of economic paradigm (reported from EMF, *Toward the Circular Economy,* Vol. 1, 2013).

6 Corporations compete over virgin raw materials close to depletion, with SMEs usually surrender against large multinational companies.

7 Refer to Lacy Peter and Others, (2014), *Circular Advantage*, Accenture Strategy.

mizing the use of products and materials, the transition to a CE would have a fundamental impact for the protection of natural capital (water, land, ...) and environment, which are put under severe scrutiny by the action of policy makers.

Circular companies, thanks to the adoption of "different" – from the business as usual – business models, diversify practices and are able to actively hedge against the risk embedded in a linear economy. The intrinsic higher efficiency of a circular economy drives a comprehensive process of stabilization of the economy, ultimately making it more resilient and sustainable in the long run. Despite some practices in circular business models – such as continuous revenues and assets retention – might lever specific risk, the net balance is foreseen being of risk reduction.

Finally, the progressive internalization of negative externalities driven by policy makers must be considered.[8] Regulators aim to move the costs of negative externalities from the Society to enterprises and economic actors that produce them. As a consequence, originators become more and more exposed to the legal factor and consequently boost their specific risk. The transition to a CE offers solutions to reduce companies' negative externalities and their specific risk.[9]

2.2 RevenueE

For existing companies, a radical change in the economic paradigm opens a period of relevant investments to accomplish the transition. This is even more true when the adoption of the paradigm is tied to the development of technologies that require significant investments

8 The internalization of negative externalities is pushed both by policy makers (e.g. the European directives on plastic packaging and product responsibility) and an increasingly sustainability-sensible demand side that directs its purchasing behavior according to the so-called "informed consumption".

9 Ramkumar Shyham *et al.* (2018), *Linear Risks*, Working Paper. Circle Economy, PGGM, KPMG, ERBD, WBCSD.

in innovation inside companies, such as digitalization, connectivity, and bio-materials among others. Consequently, the demand spreading from corporates to finance their investments will necessarily increase. This is a unique opportunity for countries, like Italy, that experienced a sharp decline in the request for private loans in the corporate market, starting from the economic crisis of 2008-09, and that have not yet reached the pre-crisis level.[10] At the same time, CE might be a great driver of expansion for debt and equity markets alike, with potential effects on additional segments of the financial industry.

Within the asset management industry, the so-called sustainable asset classes have now gained a role and visibility of absolute importance. The 2,350 UN PRI signatories have AUM for a total value of US $ 86,000 billion (source PRI, 2019). In terms of dynamics, the data reported in the most recent two-year US SIF report, referring to 2018, highlight a growth in sustainable asset classes of 38% in the period 2016-2018, for a corresponding value equal to US $ 12,000 billion.[11] A similar growth trend can also found in the European market. In terms of definition and assessment, the adoption of the SDGs in capital markets, which took place in October 2017, represented an important advance to provide investors with a common lexicon that allows them to progress from a classification logic tout court, such as that achievable with the application of the ESG framework, to a system for measuring the impacts that being sustainable allows to obtain. Since investments, especially those in the medium and long term, must necessarily be based on robust economic activity, the main attention of financial investors should focus on those objectives that are most connected to the sphere of the economy and business. Evidence of this link be-

10 Banca di Italia, Base dati statistica, [BSIB0600] Prestiti per settore di attività economica (consistenze).

11 Source: US SIF, 2018 Report on US Sustainable, Responsible and Impact Investing Trends.

tween SDGs and economy can be found with reference to objectives 8 (Decent work and economic growth), 9 (Industry, innovation and infrastructure), 12 (Responsible production and consumption) and 13 (Climate change). The fundamental analysis of the contents of these objectives highlights that their actual pursuit necessarily requires a change of economic paradigm, transforming the linear model into a circular one.

In the retail market, the introduction of new products and services will drive the demand for consumption-specific financial instruments, such as mortgages for purchases of circular real estate and personal lending for smart vehicles.

2.3 Reputation

After being perceived as the cause of the outburst of the financial crisis, CE offers Finance a relevant chance to reconnect with the real economy by supporting the transition and contributing in enhancing social wellbeing. Repositioning the financial system in the society is quite important, particularly for certain players such as retail banks, that need to preserve high level of reputation and trust among their clients. Furthermore, large segments of demand are developing preferences and consumption behaviors that account for sustainability and environmental impact. These clients – that include both unbanked millennials and already served customers – are ready to assign a premium to products and services that generate a positive impact on society: this phenomenon will expand to financial products and represent an opportunity for banks, for whom becoming a "circular bank" might represent a winning positioning and a gain in reputation, at least among those segments of customers. The circular paradigm can also play a relevant social role in enabling the recovery of economic activities that, in the past, were cancelled or transferred from geographical areas, such as cities, due to the unbalance between

negative externalities that they provoked and social and environmental requests. Allowing the reconnection of areas and communities to economic activities, CE is the bedrock of shared value initiatives that combine together economic needs from communities with value creation for financial investors.

The 3Rs operate across many areas of banking and financial businesses. Understanding their relation with CE will promote the internal re-design of finance with the aim of generating economic and sustainable value for shareholders and stakeholders in the long term.

3. Seven Reasons to Support the Transition

The impact of CE adoption on the 3Rs generate seven strong reasons for banks and financial actors to undertake a proactive role in supporting the transition to the circular economy rather than a wait-and-see strategy.

1. Enhanced stability through decupling, the right management of the natural capital, resilience and hedging the legal factor *generate a de-risking effect* which can be ascribed at both a lower connection with the *systematic risk* and a positive effect on the *overall risk level* of the invested asset (Risk variable) (Zara, Iannuzzi and Shyham, 2020), Financial portfolios will benefit from overall de-risking – as for banks' loan portfolios, which are highly correlated with business cycles. The de-risking of financial assets, namely the asset side of investors and lenders, contributes to a higher stability of the financial system and, presumably, more stable returns for financial actors among which banks, other lenders and long-term investors. Additionally, it allows to reduce the speculative component of financial activities. Consequently, through de-risking, CE provides financial

actors with the opportunity to create a superior risk-adjusted performance for their shareholders at no cost.

2. CE sets the base for *regenerating and rebuilding financial actors' loan portfolios* (Risk variable). In fact, linear risks are doomed to sharpen in following years due to approaching breaking points of sustainability: the immediate consequence will be the increase in specific risk and the loss of value of linear assets, that progressively become non-performing. A relevant example is given by oil and other fossil fuels: this traditional golden asset is losing attractiveness, on one side because of tightening policy constraints to their use, on the other because of shrinking final demand – at least in advanced economies. Promoting the transition toward circular assets allows financiers to handle linear risks by planning the divesture of stranded assets before they become non-performing exposures (NPE) while rebuilding portfolios with circular assets that are intrinsically more stable and resilient.
3. Developing circular business models and operations originate new so-called *sustainable asset classes* (Risk and Revenue variables). Relevant examples are green bonds emissions – that experienced significant growth over the last five years –, and the set-up of a dedicated platform (LGX) promoted by the Luxemburg Stock Exchange.[12] Sustainable asset classes – of which CE will be great driver of extension and expansion – present three features that make them particularly attractive to institutional investors with long-term perspective such as pensions funds, insurances and asset managers pursuing a value investing approach. The first one concerns the ability to generate stable returns in the long-run. The second one concerns the risk-return

12 For more detailed analysis refer to Dax Matthias, (2020), The *Green Bonds and ESG Chartbook,* Unicredit, Munich.

profile and the ability to build large diversified portfolios more efficiently. The third one relates to the internal hedging realized against operative risks that, again, favor higher performance stability.[13] Consequently, CE allows to meet the growing demand for these asset classes[14] from a wide range of investors.

4. Starting in 2008-09, Italy has experienced strong contraction in request for private loans from companies.[15] Investments required to start and develop the transition toward CE imply a need for outside capital that might pull *recovery in the Corporate & Investment Banking market* (Revenue variable). The demand side includes not only existing companies that will begin the transformation or that are already in the process, but also new innovative enterprises dedicated to the circular economy. The phenomenon of start-ups and scale-ups is also a relevant driver for developing equity investment markets – especially Venture Capital and Private Equity – and for originating a pool of new circular assets.
5. In addition to the Corporate market, CE can play a significant role in *Retail Banking* (Revenue variable). As a matter of fact, the sensibility and preference of consumers for responsible purchase and consumption is growing both among millennials yet to be banked and already served segments of the popula-

13 Despite it is beyond the scope of the present work, it is worth mentioning that scientific literature is nurturing a debate on the comparison between performances of assets labelled as sustainable – such as ESG – compliant and linear ones.

14 The attitude of large international asset managers is well expressed by the well-known letter of BlackRock CEO Larry Fink, that signals to invested companies the relevance of sustainability in their decision making for their ability to generate value in the long term. Referring to the Italian landscape, it is of interest the choice of Decalia AM to launch an investment vehicle dedicated to public stocks issued by circular companies and the forthcoming private equity fund Circular Value Fund promoted by Green Capital/GAM.

15 One example of the contraction of demand in C&IB is given by statistic on non-financial companies' assets held by the banking system (refer to note 14).

tion. Such targets of consumers will be sensible to the offer of financial products related to sustainability themes.

6. On top of creating additional businesses and revenue streams, offering products and services aligned with concepts of sustainability and positive impact allows financial institutions to enlarge *the capital of trust and reputation*, a fundamental pillar of financial systems deeply impaired by the financial crisis. (Reputation variable). CE is an important chance for the financial system to reconnect with real economy and recover its historical role of fostering economic growth and social wellbeing.
7. Finally, undertaking a proactive and committed attitude in supporting the transition allows the financial system to play a key role in implementing *EU Commission policy* (Reputation variable),[16] which perceives circular and green economy as a key driver of competitiveness for the European economy. The alignment of objectives between policy makers and financial actors put the latter in the position to suggest to authorities and regulators the benefits for the financial ecosystem entailed by the CE and how to facilitate their achievement. For example, in terms of credit risk, the reduction of linear assets in portfolios should be motivated by risk metrics able to capture the enhanced stability of circular assets that improve both provisions estimate and allocation of regulatory capital (Zara and Shyham, 2020). The existence of less risky and more resilient circular loan portfolios will be a favorable argument to mitigate the goal of non-financial companies to disintermediate their liability side, allowing banks to continue their corporate lending activity in accordance with their target returns and risk appetite.

16 In this regard, refer to *Circular Economy Action Plan* by the European Commission and to the initiatives included: http://ec.europa.eu/environment/circular-economy/index_en-htm.

4. Seize the Opportunity

CE is not yet a "ready to print" chance for the FS Industry. The effective possibility to transform the opportunities offered by the transition in reality depends on the ability to solve and overcome a bunch of obstacles which actually affect the Industry. These obstacles refer to the fields of: - *information disclosure from issuers*, pertaining the so-called "non-financial reporting"; - *the lack of a taxonomy* of definitions which clearly explain what is CE and state circular assets; - *the need of metrics* which are quantitative and material and allow to measure the degree of circularity for companies and projects; - the demand for *evidence from the empirical research* on the risk-return profile of the circular asset classes in order to proof both the de-risking effect and the possibility to generate superior risk-adjusted performances in relation to those featuring linear asset classes; - inside the Industry, players should start to adopt managerial practices necessary to *drive changes* in products –for example, CE asks for more structured finance – and processes – for example, the inclusion of linear risks in the credit risk assessment process – in order to better match the demand needs and being able to properly include the benefits of the transition in the investment selection and decision process of investors and financers. Finally, there is a last challenge in the landscape of the CE-Finance relationship: *does CE lie in the field of innovation/technology financing?* If yes, and CE must be coupled with innovation for sure, the financial system will have to improve its willingness to invest in and develop skills for screening and monitoring the financing of innovation. In fact, this activity is normally assumed to be critical for the financial system due to both the presence of information asymmetry and the need to match a risk profile which is very often higher than the risk appetite that characterizes many financial actors.

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Green Bonds for a Greener Society or Greener Portfolios?

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For years alarms on pollution and on the impacts of CO2 on our atmosphere went completely unheard. The green-house effect and global warming have been looked at, at most, as remote phenomena affecting generic "future generations". While the alarm is still far from receiving the needed attention both at social and political level, things are nonetheless (slowly) changing. Fridays for future, with the iconic Greta Thunberg, are a symbolic part of a wider awakening on the issue. Ecological awareness is rising. And how could it not? While Cassandra's Curse seems to strike scientists - since when they warn us that our own existence as humankind is concretely at risk due the calamitous consequences of the rise of temperatures, their voices too often go unheard - the increasing frequency of catastrophic climatic phenomena can hardly be ignored. Ices are melting and the sea level rises, while droughts are forcing people to relocate. More and more vast fires are burning down forests, but also homes and farms. Hurri-

canes are becoming stronger and more destructive.[17] If we want, as we need, to revert this trend, dramatic changes in our relationship with the environment are required.

In this scenario, what is the role of financial markets? Can they play a role at all? Can financial institutions be one of the key actors in this quest? Can any financial instrument represent an effective tool or even provide us with a solution in the quest for sustainability?

In this article we will try to develop some reflections on these issues and sketch some possible answers to these questions, centering our analysis around the case of Green Bonds (GBs).

In the remaining of this article we will get into the details of this financial instrument and we will try to understand (i) what they are, (ii) where do they come from, (iii) their diffusion, (iv) what the use of the proceeds and their expected effects on the environment are; (v) finally, starting from their features as financial instruments, we will offer critical perspective in the attempt of assessing whether those expectations are entirely well placed.

What Green Bonds are. Broadly speaking GBs are a special kind of debt securities with a 'use of proceeds' clause: they must be used to finance projects that are environmentally friendly. In practice, purchasing a GB, you lend money to a company which commits to spend what borrowed in something "*green*" and to repay you the money you lent plus an interest rate, in order to compensate you for departing form you money.

Their origins. As regards their origin, the paternity of the idea is disputed between the European Investment Banks and the World Bank. The former in 2007 issued a financial instrument labelled Climate Awareness Bond, which differentiated from most current GBs not only for the name but also because it was an Equity-linked notes.

17 https://yaleclimateconnections.org/2019/07/how-climate-change-is-making-hurricanes-more-dangerous/.

That is to say a kind of security whose returns depends on the appreciation of the underlying equity, while GBs are normally fixed coupon instruments. The latter, the World Bank was the first in 2008 to issue a fixed-income security named GB. Without taking a side in the dispute we will focus on this latter, as it is more interesting for our analysis.

In 2006 a group of Scandinavian pension funds expressed the desire to include in their portfolios financial instruments which could be beneficial for the environment. This request was prompted by the fact that in those years the discussion on the existence of a link between human activities, in particular pollution, and global warming were becoming more and more mainstream. It may be helpful in order to contextualize this tale to recall the publication by the Intergovernmental Panel on Climate Change (IPCC) of the "Climate Change 2007 synthesis report" (IPCC, 2008). This was the fourth report of the international organization, which was established within the United Nations, in particular the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) to provide the world with objective scientific research on climate change, its links with human behaviors, and its possible impacts on human kinds. The main conclusion of the publication was that the existence of anthropogenic causes for global warming, was not only likely, but ought to be considered as almost certain: *"There is very high confidence that the net effect of human activities since 1750 has been one of warming*" (*ibidem,* p. 5); or, going more specifically: "*Human influences have:*

- *very likely contributed to sea level rise during the latter half of the 20th century*
- *likely contributed to changes in wind patterns, affecting extra-tropical storm tracks and temperature patterns*
- *likely increased temperatures of extreme hot nights, cold nights and cold days*

- *more likely than not increased risk of heat waves, area affected by drought since the 1970s and frequency of heavy precipitation events." (ibidem, p.6).*

The report went on depicting the implications of global warming under different scenarios - taking into account the implementation or not of climate policies – and providing policy advices (which, sadly, went largely unheard). In 2007 the IPCC, received together with the former president of the United States Al Gore, the peace Nobel, for its "efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change" (The Norwegian Nobel Committee, 2007).

Reverting to the aforementioned Scandinavian investors, their demand for green financial products was at first unsatisfied. The financial markets did not offer such an instrument. In facts, its creation implied a complete change of perspective with respect to what had been always done. Until that moment environmental consciousness applied to financial investing translated into a negative stance: highly polluting companies being excluded from portfolios. A green financial instrument requires a *positive* perspective let's fund who has a virtuous approach to the environment. The Scandinavian financial investors therefore turned to the Swedish financial Holding SEB (Skandinaviska Enskilda Banken), which in turn contacted a bigger and fitter institution: the World Bank. Their jointed effort led to the issuance of the first GBs and $390 million, in Swedish Corona, were collected.

Their diffusion. After a little more than a decade the amount of GBs issued almost reached $250 billion.[18] The rise of this product has in facts been spectacular and continuous. After only 5 years from their

18 The source of the data is the "The Green Bond and ESG Chartbook April 2020", Matthias Dax, Credit Analyst Sub-Sovereigns & Agencies, ESG (UniCredit Bank, Munich), original source being: Climate Bonds Initiative

first appearance on the financial markets (here considered to be in 2008) the value of GBs Issuance overcame $10 billion, after five more years, in 2018, the amount was just slightly below $175 billion. However due to the hypertrophic dimension of the financial markets, GBs represent approximately only 3.5 % of total bonds in the market (Ehlers et al. 2020).

But who are the suppliers of these bonds? As we saw the first issuer was the World Banks and International organization still account for an important share (17% of all GB issued until 2019). States became active in this market, sovereign GBs account for 14% of total issuance; agencies (e.g. Agence Française de Developpement; Dutch State Treasury Agency) account for 13%. Not surprisingly, the private sectors now play a big role in the market and financial and non-financial corporations represent 20%, the former often in the role of dealers. Beside a 1% uncategorized, the remaining bond, 14%, are Asset Backed Securities (ABS). Without going too much into technical details, it may be worth it to understand what ABS are and what characterized a Green ABS. The process of securitization is commonly described and the transformation of assets from illiquid to liquid. In practice, taking the example of a banks issuing a mortgage (an illiquid asset, as it is a long term loan that the banking sector traditionally kept in its balance sheet), the transformation occurs when the mortgage is sold by banks to the financial markets and then divided into tranches, which are then combined into more sophisticated financial assets (Mortgage Backed Securities, MBS, in our example). The tranches have different seniorities In practice, the borrower pays an interest which are collected from the banks but transferred to the issuer of the ABS () and ultimately after having been partitioned, to the different investors who purchased the ABS. ABS, in particular MBS, became infamous after the subprime (2008) financial markets, as they played a crucial role in overstretching the mortgage markets eventually leading to the

crisis. For a theoretical assessment of the role of securitization see Caverzasi et al. (2019).[19] A Green ABS is simply based on the securitization of one of the following three assets: (i) Mortgages to green buildings; (ii) Car loans to electric vehicles and hybrids; (iii) Loans to green small-to-medium enterprises (SMEs). Even though other assets may soon be used as (Leases from solar and wind assets and loans for energy efficiency upgrades or to battery and storage projects).

With respect to the geographical diffusion of these assets, Europe holds the lion share: more than 40% of issued assets have originated in the old continent. At country level the most active is France, followed by Germany, Netherland and Sweden. North America and East Asia, both issued a quarter of all GBs each, the rest of the world accounts for the remaining share.

The use of the proceeds. As mentioned above, the money collected issuing GBs ought to be used to finance project which are environmentally friendly. The key areas of investment are energy (33%), building (25%), transport (17%), water (13%), waste (5%) and land use (4%). Due to the multitude of projects, it is not that easy to assess what exactly is financed within those industries. Some example may be the construction of wind farms or solar panels, the renovation of building improving their energy efficiency, but also the installation in hospitals of new and more eco-friendly beds or the aforementioned mortgages to purchases electric vehicles. In facts the quantity and variety of projects is almost infinite.

Expected Results. Both medias and technical reports produced within the financial sector[20] tend to be rather optimistic about the im-

19 "Shadow banking and the financial side of financialisation," Cambridge Journal of Economics, Oxford University Press, vol. 43(4), pages 1029-1051.

20 For instance the International Finance Corporation in its Green Bond Impact Report 2020 lists the praiseworthy results in terms of reduction in CO_2 emissions Financial Year 2020 https://www.ifc.org/wps/wcm/connect/5a9405c4-cfeb-42d2-889e-3a6c6eb48a26/IFC+FY20+Green+Bond+Impact+Report_FINAL.pdf?MOD=AJPERES&CVID=nj.Zu6o.

pact of these instruments. In the most positive point of views green bons may be more than a game changer in the battle against CO2 emission and could *"save the planet"*[21]. The enthusiasm, at first, appears to be well motivated. Money is flowing into "environmentally friendly" projects. This label is however rather generic. In order to better understand what it means, and to be able to assess the impact of these instruments, we may refer to the taxonomy developed by in 2015 by the Centre of International Climate Research Organization (CICERO)[22]. Three shades of Green were identified. *Dark green* investments are those characterized by a long-term vision of a low-carbon future. In practice the realization of something which could characterize a green society, as wind energy. *Medium green* projects are those which represent a step toward a low-carbon future, but which will not be there once the transition toward a green society is complete, e.g. Hybrid buses. *Light green* is the color of those projects which improve current situation but do not represent an evolution toward a green society, as ameliorating the efficiency of fossil fuel infrastructures. Then *Brown* investments are simply non environmentally friendly investments, in terms of an evolution toward a green society they represent no step forward, e.g. new infrastructures for coal. GBs ought to be focused exclusively on the former three and, one would wish, with a strong preference for the Dark and Medium green. Unfortunately, that was not often the case.

A critical perspective. In this final session, we will identify two sets of criticalities of the GBs. On the one hand the *structural problems*, which largely depend on the current way in these instruments are organized. On the other hand, what we could dub as *intrinsic problems,* which pertain to the nature of this instrument.

21 See for example the article by Bloomber "Bonds to save the planet". https://www.bloomberg.com/news/articles/2019-04-23/bonds-to-save-the-planet.

22 https://www.cicero.oslo.no/en/posts/single/cicero-shades-of-green.

Starting from the former group, as described above, these instruments are rather new. Only recently, decent levels of standardization are being met, which are necessary to ensure a use of the funds collected in line with the color Green which should be the distinctive characteristics of these bonds. There are three main ways to ensure that money was used correctly. First, *in-house* that is audit processes within the firms that use the funds. Second, *private certification,* which are just like what is normally done by rating agency to certify a debtor's ability to repay its debt. Moody's is in facts an important player also in the game of GB certification. Other key players are the Climate Bonds Initiative and Vigeo Eris by Paris Bas. Third *public sector certification,* both at national and supranational level. A particular important and well-structured initiative is the soon to come E.U. GB Standard[23]. Among other things, it aims to better define the characteristics of environmentally friendly projects. "i. *Contribute substantially to at least one of the six environmental objectives of the EU Taxonomy Regulation: 1. Climate change mitigation; 2. Climate change adaptation; 3. Sustainable use and protection of water and marine resources; 4. Transition to a circular economy; 5. Pollution prevention and control; 6. Protection and restoration of biodiversity and ecosystems. ii. Not significantly harm any of these objectives; iii. Comply with minimum safeguards; iv. Comply with Technical Screening Criteria (TSC)"* (E.C. 2020, p.14). Unlike other existing regulations, as the one used in the China,[24] which are often conflicting, living space for numerous problems, the E.U. project, at the moment, appears to have a more comprehensive perspective. While the inadequacy of in-house audit is self-evident, it may be important to underline how also private certification has failed spectacularly as in

23 Technical Expert Group on sustainable finance (TEG) "Usability Guide Teg Proposal for an Eu Green Bond Standard" March 2020.

24 See Zhang, H., 2020. `Regulating Green Bonds in The People's Republic Of China: Definitional Divergence nnd Implications For Policy Making', Asian Development Bank. ADBI Working Paper Series. No. 1072 January 2020

the case of the *sub-prime* crisis. The problem is more complex though, as, even if working correctly, a certification can, at best, assess the respect of a regulation. Therefore, if rules are inadequate, certification is pointless. In the case of GB up to now, blurred definitions, absent or incomplete and conflicting regulations left indeed space for frauds and unfair behaviours by firms. A study by the investment advisor society Inside Investment has found that 17% of analysed GBs did not respect any standard, in other words the proceeds were not used coherently with any of the shades of green aforementioned and that only 33% were fully coherent with the requirements to be classified as GBs.[25] In facts, it is not always so straightforward to define whether a project is really environmentally friendly. An infamous example is represented by the Jirau Dam, whose construction was financed by CDF Suez also issuing GBs. The construction of a new dam, which is a source of hydroelectric energy, may very well appear as a virtuous example, however the project included also the destruction of a vast area of forest with its priceless biodiversity. This shows the importance of well-conceived regulation. Otherwise, GBs might end up fuelling perverse dynamics and financing *brown* projects. Few words of caution may here be important. This is not only a matter of inappropriately absorbing funds which may otherwise be directed toward more deserving projects. This is a matter of delaying the transition to a greener society, as slightly improving highly polluting practices translates into postponing their substitution with eco-friendly alternatives.

A closely related issue is *Green Washing*. That is to say companies with a neat environmentally unsustainable profile issue some (legit) GB in order to improve their perceived image. GB, in these cases, are nothing more than a fig-leaf with the perverse effect of setting free the

25 https://www.insightinvestment.com/united-states/perspectives/beware-impact-washing/.

involved companies from taking full responsibility of their misbehaviors.

Moving to the second set of issues, the *intrinsic problems*, it may be important to recall how these instruments were born. They do not emerge from a demand of money by "green enterprises", rather they were conceived to satisfy the desire of some investors to have greener portfolios. What should be clearly kept in mind is that GBs are financial assets. And as such they primarily need to satisfy investors. Few data may help us understanding their characteristics as financial instruments. Over 90% of GBs are investment grade issuances (i.e. AAA & AA or A & BBB ratings)[26]. Yields are on average lower than those of comparable conventional bonds (it is still debated in empirical studies[27]). This may be due to (i) limited supply with respect to a high demand, (ii) to the fact that GB are backed by the whole portfolio of the issuers and therefore their riskiness is not related to the specific project; (iii) costs (labelling, verification, and reports. Finally, GB proved to be safer that standard bonds during crisis. In light of these features, what are the characteristics for investor in issuing and purchasing these assets? The key incentive is the same: enhancing the green profile of both issuers and investors, the latter furthermore can do so by buying safe assets, which, especially after quantitative easing are not abundant in the financial markets. It may not be clear yet to the reader what is the problem with GB being primarily financial assets. Proper environmental considerations are not a driver in the decision of the

26 Tiftik, Emre, Khadija Mahmood, and Celso Nozema. 2019. Sustainable Finance in Focus: Green Bonds Take Root. Institute of International Finance. https://www.iif.com/Portals/0/Files/SF_green_bond_issuance%20vf.pdf.

27 See, Larcker, David F., and Edward M. Watts. 2019. "Where's the Greenium?" ID 3333847. Stanford: Rock Center for Corporate Governance at Stanford University. https://www.gsb.stanford.edu/gsb-cmis/gsb-cmis-download-auth/474556 but also Zerbib, Olivier David. 2019. "The Effect of Pro-Environmental Preferences on Bond Prices: Evidence from Green Bonds." Journal of Banking & Finance 98: 39–60.doi: 10.1016/j.jbankfin.2018.10.012]

two sides of these market. The environment has a second (at best) role in this story! Indeed, GB do not appear to be unlocking new sources of capital for green investment or making green investments financially viable when they otherwise would not be. That is to say: they have changed nothing in terms of projects implemented. The very same projects would have been equally realized even if GB did not exist, they would only be financed in other, more conventional ways.[28] A further indication is offered by a study from the Bank for International Settlement,[29] which shows that there is no evidence of GB improving the with the overall carbon emission of the borrower.

Conclusions. The key point we would like to make with this article is not merely that GB have problems, indeed at least the first set of criticalities identified (*structural*) will, at-least in part, most likely be corrected. Nor we want to say that GB are pointless. Albeit our critical perspective, we are well aware that GBs as fast-rising financial assets have at least the major merit of mainstreaming, or, better, spreading to wealth owners, sustainability considerations. The key message we want to convey is that if we really want to face the dramatic challenges represented by global warming we should focus elsewhere. Financial markets, whatever the instruments, are totally unfit for this scope. They can at very best be complements. Financial markets are indeed characterized by short-termism, they want returns and they want them now. A green transition requires patient finance and considerations on the profitability of the investment should simply not be the issue. On top of that, financial markets present major cycles, especially in developing markets[30]. A green transition requires stable

28 Aaron Maltais & Björn Nykvist (2020): Understanding the role of green bonds in advancing sustainability, Journal of Sustainable Finance & Investment, doi: 10.1080/20430795.2020.1724864.

29 https://www.bis.org/publ/qtrpdf/r_qt2009c.pdf.

30 Bortz, P, Gabriel & Toftum, N., 2020. "Climate Change and Green Finance in Emerging Market Economies: The Open Economy Dimension," MPRA Paper 101722, University Library of Munich, Germany.

financing. Moreover, the amount required is enormously higher than what GB are able to provide with now.[31] Even though securitization may provide with a terrific boost, it may come at the cost of destabilizing effects, as happened in the *sub-prime* crisis, and further problems for developing countries[32].

In order for our society to really implement a green transition States and Supranational institutions are needed. We need legislations, we need an active role of governments and we need a comprehensive involvement of our society. In the words of one of the leading figures in the field of Economics of Innovation *"To battle climate change, we can transform today's fears of uncertain outcomes into a mission to be accomplished [..] This will require visionary leadership, patient strategic finance, a grassroots movement and bottom-up innovation. It must be economy wide, and occur at all levels: local, regional, national and international, federal and city level. Only by having a wide stakeholder governance of green transitions can we enable growth that is both sustainable and inclusive"* (Mazzucato and McPherson, 2018).

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The Use of Digital Technologies at Times of Crisis: Learning from the "Saga" of the Covid-19 Contact Tracing Apps

Maria Savona[33,34]

Introduction

Digital transformations are affecting societies and economies at large. One of the characteristics of digital technologies is their being ubiquitous in terms of applications, to the extent that they have been considered as a new generation of General Purpose Technologies (GPT) (Breshnan and Trajtenberg, 1995; Trajtenberg, 2018).

The Covid-19 pandemics has unveiled a very interesting case of digital technologies' application, which has fast forwarded the need to regulate - or at least to openly debate - some of the technical, legal and ethical issues arising from their use and diffusion. This is the case of the Covid-19 Contact Tracing Applications.

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34 This brief note is an extract of Savona (2020) and is also based on Savona (2019)

In a context of any disease outbreak, provided that people rely on their tested/diagnosed rather than self-reported status, a *digital contact tracing application* is supposed to be more effective than a *manual contact tracing procedure*, as it immediately identifies and informs all the contacted and potentially infected people in real time, and has the potential to reduce the R. Also, a digital application would alert all those contacts that are unknown to the potential spreader, rather than relying on their memory of encounters, contact and self-reporting. The automation of the contract tracing procedure and the digitalisation of the information in this case are ideally what technical change is supposed to achieve: providing solutions to address pressing societal challenges.

In a recent note (Savona 2020) we have considered the case – perhaps more appropriately the saga – of the development and use of the Covid-19 Contact Tracing Apps, followed the debate around these and drawn a few lessons in terms of data governance that we synthesize here.[35]

The Deployment of Contact Tracing Apps: The East-West Divide

At exceptional times of public health emergency such as the current one, Taiwan, South Korea and Singapore, among other East Asian countries, have managed to limit the spread of the first wave contagion better than other countries. Besides immediate and strict lockdowns, they have resorted to the digital tracking of individuals with symptoms, identifying and isolating their contacts, and ensured the golden mix of high rate of *testing*, contact *tracing*, and immediate *isolation/*

35 There is not yet a proper academic literature on this specific case, but several contributions in the grey literature, blogs and public debates that have informed some reflection on the use of technology at times of crisis.

treatment. Most likely due to the experience of earlier outbreaks, these countries have done better than others with sluggish reactions and substantive unpreparedness, such as the US and the UK.

For instance, Lanier and Weyl (2020) have been the first to acknowledge the Taiwanese strategy and described the *proto-model* of the Taiwanese contact tracing app. This consisted of a platform developed in cooperation among the digital minister, a group of local entrepreneurs and the *g0v movement*, and used voluntarily by citizens to share their symptoms and locations, promptly verified by the local health centres and collated in a centralised repository of individual health records. The Taiwanese population has shown a shared sense of relevant public purpose, and a substantial degree of trust in the government, which Audrey Tang, the young and industrious digital minister of Taiwan, certainly enjoys. This was on the 20th of March, a pre-history in the development of the debate, considering the unprecedented pace at which the pandemics has forced the mobilisation of governments in response to the geography of contagion.

Now, the use of digital technology as a tracing tool is likely to raise as many challenges as it overcomes, around personal data collection and storage, user consent, and surveillance, particularly in the context of health data. It is concerning for a democracy, ideally characterised by a safe space for public scrutiny and monitoring of the government's accountability, than hiding behind false dilemmas such as "public health versus privacy" at times of emergency. Emergencies have gloomy historical precedents of exceptional public interventions, reduced space for public debates, a lingering sense of threat that impinge on thoroughly scrutinised actions, that favour emotional responses.

The fast unravelling of the contact tracing saga in the European countries since mid-March 2020 has provided some ground for a first-hand reflection on the wider issue of data governance, for social scientists interested in the economic and social impact of digital technology.

Some preliminary surveys across the EU and US have shown concerning evidence, that, if further corroborated, shows a neat tendency of citizens to trust Google and Apple as the main platforms that run the apps, more than governments when it comes to data collection and use (see below). Not only should we reflect on the state of the art of public's awareness of what is – at least in principle – a *public value* against a *private interest*, but predict with a reasonable degree of accuracy what are the consequences of the public confiding their trust in a large tech more than in their own government, when one compares the degrees to which they are respectively accountable to societies. All this despite the recent history of private surveillance and massive power and equity value concentration, well documented in several academic and grey literature, and that was discussed in Savona (2019).

Striking the Right Balance between Techno-Determinists and Techno-Phobic: Technical, Legal and Ethical Issues

Transparency and accountability are the main keywords to use here, if trust is a key ingredient in the whole saga, and one that is desperately needed in the post-Covid19 reconstruction. The development of digital tools to tackle emergencies should be a clear and transparent process. More specifically, the main points to consider, and summarised in Savona (2020), are of technical, legal and ethical nature.

Technically, the public should be in a position to understand what are the technical features, effectiveness and the (hopefully limited) purpose of any digital tool they (hopefully voluntarily) decide to adopt. Understanding what 'privacy by design' means and what are the side-effects of a centralised protocol, or a back-end central data repository is crucial.

In a nutshell, a *decentralised* protocol allows individual data to be left in the devices, whilst a *centralised* solution collects data in a cen-

tral repository, such as a public health authority. The technical specification of the DP3T protocol (Troncoso et al., 2020) would ensure all the GDPR principles of data minimisation, purpose limitation, storage limitation, integrity and confidentiality, lawfulness, fairness and transparency and accountability and accuracy.[36] A decentralised solution is technically (though perhaps not politically) preferred to a centralised one in terms of privacy-preserving. However, it should be noted that, even if the app does not record personal data such as name and email address, it is still linked to a phone or an IP address, which are indeed personal data in GDPR terms. Experts have therefore not ruled out the possibility to link the data collected by the app to some personal information, hence re-identification (data are pseudo-anonymous rather than fully anonymous, making public trust crucial for its adoption). Conversely, a centralised solution might facilitate data collection and analysis, for instance for (compatible secondary) research purpose.

Similarly, it is on data scientists, privacy engineers, and internet law experts to divulge the importance of *interoperability*, not only in the context of contact tracing apps, but within the system of digital platforms. Technical literacy is a fundamental ingredient to ensure that people make informed choices, and ultimately to ensure a minimal adoption rate to make the tool effective in containing the outbreak.

There is in fact convergence in considering that enforcing interoperability across several relevant dimensions within the digital platform system, and particularly on large tech might help achieving a trustworthy environment, particularly at times of emergency, when trust is key. I wonder whether this is an unprecedented opportunity at a critical moment, for competition and trust laws to be enforced once the app is fully relying on Google and Apple's operation systems.

36 It is worth recalling that these are fundamental principles of data protection under GDPR (and mirrored in the future UK GDPR after Brexit). These are also those considered in the Guidelines 04/2020 of the EDPB mentioned below.

Legally, as being discussed within the European institutions, the deployment of digital tools should be safeguarded on the basis of human rights, rather than privacy rights only. This means that an informed public debate at the parliamentary level, primary legislation, and independent oversight bodies, are needed. Clarity and transparency on the regulation of the 'compatible purposes for secondary use' of personal health data are crucial ingredients towards public trust building. Indeed, data for research purposes can be of *primary use* (data directly collected for the purpose of scientific studies) or of *secondary use* (data that consists of further processing of data initially collected for another purpose).

Arguably, data collected by public health institutions in the context of Covid-19 symptoms and contact tracing are of this second type, if subsequently allowed to be re-used for research purposes as it seems. At the same time, one would expect that a transparent communication on the (limited) purposes of citizens' health data use is likely to be an important leverage to build up trust and increase likelihood of adoption. This is what the European Data Protection Board (EDPB) considers as "compatible purposes for secondary use" (EDPB, 2020), that are those of public research to mitigate Covid-19, compatible with the purpose of tracing symptoms and the contacts of the symptomatic and positive individual. High transparency is needed in this context, which implies a clear regulation of the secondary use for research purposes.

From the *ethical perspective*, it is important to predict first, and regulate accordingly, the potential side effects of digital exclusion and potential discrimination from the use of digital tools for tracking, tracing and certificating immunity. Low income, vulnerable citizens might not be in the position to access information, increase their awareness and develop agency over their personal health (and location) data. None of the digital solutions considered here should end up discriminating

or further polarising inequalities, for instance in labour markets or in society at large.

Google And Apple: the Main Actors in The Saga, after All?

Google and Apple are currently supporting the decentralised solution to contact tracing apps developed in the DP3T protocol. Technically, they do not access any personal data, as this data remains in adopters' devices. G&A allow the adoption of health-related apps on a global scale, as smart phones are pretty much all running either on Androids or iOS systems. As such, G&A's involvement has gone not only pretty much unquestioned, but rather welcome as a humble step in support of privacy and public health.

First, to ensure adoption and installation of health-related apps, G&A did not have much choice but supporting a decentralised solution. This can easily be seen as a welcome, salvific intervention and yet be close to what the literature has called a *"symbolic", rather than a "substantive" corporate social responsibility* (CSR), where a *substantive* CSR is supposed to genuinely supporting the common good, while the *symbolic* is a self-serving façade, towards improving (or re-establishing in some case) reputation, but actually aiming to enhance profits.

Second, once installed, and having a quasi-monopoly of operating systems, G&A and all their third-party upstream and downstream satellite companies are *de facto* sitting on an immense, additional, pot of highly valuable data. In fact, even in the case of a decentralised solution, it is not difficult to navigate towards re-identification. If we factor in that one of their main value extraction gains is data feedback loop, it is not surprising that they embrace such a solution to enter a new trove of data. Rather than further speculating, this is just a note of caution and a plea on being aware of potential risks and open the public debate on this too.

Third, the involvement of G&A should be regulated at the international level. In this context, self-endowing with an ethical self-regulatory body, in the vein of what Facebook has been recently doing (Vaidhyanathan, 2020) boils down to ethical washing, and by no means can replace the enforcement of international law.

Conclusion

The Covid-19 pandemics has hit some sectors and workers worse; exacerbated the pre-existing polarisation of the labour markets; accelerated the involution trends of GVC trade. It has forced governments to face the policy conundrum of having to contain a deadly pandemics while trying not to plunge the world in the worst depression ever. It has forced the civil society to debate more openly about the consequences of digitalisation, when it promises to solve public health emergencies, but creates threats of more surveillance.

This brief note has raised questions and provided some evidence to attempt answers on how to learn what are the ingredient of a healthy data governance when the use of digital technologies have to be managed at times of emergency, as in the case of the deployment of the digital Covid-19 contact tracing apps.

The fast unravelling of the Covid-19 contact tracing apps saga since mid-March 2020 has provided some ground for a first-hand reflection on the wider issue of data governance, for social scientists interested in the economic and social impact of digital technology (Savona, 2020). A balanced view is all the more needed at times of emergency, to avoid both an irreversible, detrimental disruption of public trust, and a misleading, simplistic framing of the debate around a trade-off between public health and privacy.

Taiwan might be a first mover in the direction of creating an healthy data governance, based on a complex institutional architecture to reg-

ulate and manage an effective government response, though trust in public institutions seems to be a necessary (albeit most likely not sufficient) condition for this to be successful. A Euro-centric, certainly fundamental, institutional safeguard of privacy seems not to fully paralleled by the actual level of trust that citizens have in their governments. We should be asking why this is the case. This crisis seems to be an unprecedented occasion to learn more also in this area.

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ECONOMY AND FINANCIAL INSTRUMENTS

Working Group 1: Business Models Supporting the Transition

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General Framework

Our current economic system is showing its inability to support the needs of a growing population and to tackle the environmental problems the entire world is facing. The economic actors have a crucial role as their wide margin of intervention would be essential to start a substantial turnaround in the system.

The two-days camp revolved around the concept of "transformative economies". The emergence of persistent sustainability problems in such sectors as energy, water and food has led to renewed interest in the ways in which society can combine economic and social development with the reduction of its pressure on the environment (Avelino et al. 2015). Transitions research has emerged in recent years as an exciting new approach to sustainable development that seeks to contribute by researching transformative change at the systems level, conceptualized as 'sustainability transitions' (Grin et al. 2010). There is an increasing attention for the relation between sustainability transitions and economic developments, including, for instance, the economic crisis (Van den Bergh, 2013) and green growth (Geels, 2013; Van der Ploeg, 2013). Meanwhile a parallel development, arising to a significant extent in a civil society context, has involved critiques of

current economic and institutional arrangements and the emergence of initiatives aiming to promote alternative 'new economic' arrangements (such as e.g. complementary currencies, Seyfgang & Longhurst 2013). These initiatives are arguably providing experiments, learning and impetus for nascent sustainability transitions. Indeed, there now exists a vast, diverse and growing number of networks and initiatives across the world, many of which have the explicit ambition to contribute to transformative change towards more sustainable, resilient and just societies (Avelino et al. 2015). Many of these networks and initiatives have a specific vision on the economy, and many of them relate to alternative visions of one or more 'new economies' (e.g. 'Sharing Economy', 'Gift Economy', 'Social Impact Economy', 'Green Economy', 'Solidarity Economy'). These visions seem to converge in some general change ambition whilst also bringing forth quite different alternative economies (Avelino et al. 2015). These economies are praised for their potential to mark a transition towards a more sustainable approach to resources and wellbeing.

During our discussion, we focused on a set of case studies that emphasized the wealth of innovative practices of businesses in the sector. After reviewing some key types of transformative economies, we chose to focus on Feltrinelli Camp 2020's core topic: i.e. the circular economy (CE). CE is defined by the Ellen MacArthur Foundation as "*an industrial economy that is restorative or regenerative by intention and design*" (2013, 14). In our discussion, our unit of analysis is represented by firms, as main economic factors that may lead the transition from linear to circular economy. We recognize that a growing number of firms have embraced CE principles, by implementing circular business models (CBM). According to the conceptualization by Linder and Williander (2017, 183), a CBM is "*a business model in which the conceptual logic of value creation is based on utilizing the economic value retained in products after use in the production of new offerings*". The

literature does not provide a concise and univocal conceptualization of CBM (Ferasso et al., 2020), rather, studies highlight key traits that distinguish this business model: it is characterized by an approach to resources, which consist in narrowing, slowing and closing the resource loops (Bocken et al., 2016; Pieroni et al., 2019; Rosa et al., 2019), with the final goal of a "zero waste" economy. For instance, Lacy and Rutqvist (2015) describe five circular business models: circular supply-chain, resource recovering, product life-extension, sharing platforms and product-as-a-service (PSS).

In legal terms, as a general framework, several vehicles would be available to CE-oriented entrepreneurs. Above all, they could resort to standard corporate forms, whose governance and financial aspects are now set forth in detail under all major legal systems. In addition to standard corporations, it could be worth to mention three special types of legal entities which - on the ground of their socially oriented attitude - seem to be particularly suitable to foster CBMs: cooperatives, not-for-profit organizations (also known as third-sector entities) and benefit corporations (BCs). In our discussion, we have focused on BCs, recently introduced under Italian law, which has borrowed and adapted this model from the relevant legislation in force in the United States.

Critical Issues and Opportunities

Our working group identified some of the main critical issues associated with the implementation of CBMs, as well as the positive outcomes and opportunities stemming from it. With respect to the critical issues, firstly it seems that much of the attention in the discourses around CE is paid towards the optimization of material flows, while other intertwined issues of uttermost importance - such as the human development - are somehow overlooked. Moreover, business

arguments regarding CE are still at their infancy, therefore the advantages for industries are yet to be fully investigated and this causes a slowdown in the implementation of CE principles (Lieder and Rashid, 2016). Questions also arise regarding finding the proper measures to quantify the impact of the implemented circular activities/actions. From a financial perspective, shifting from linear to circular practices requires several incentives (e.g. changing production plants, integration and traceability of material). Finally, it is important to recognize that the CE implementation requires a significant shift in managerial mindset, which in the long run can only be achieved through a shift of the topic of sustainability towards the core of teaching activities in educational institutions.

Despite these difficulties, the growth of CBM represents a paradigmatic economic change. Circular economy makes economic sense (appeals to companies from a financial perspective) and it appears as a model that could better overcome pending issues such as resource shortages and commodity price shocks. For instance, industrial production plants consume water for their utilities production (e.g. steam, cooling medium, demineralized water and so on). A polluted water stream is then generated throughout the process and released to the ocean, with or without treatment. Recycling the polluted water in order to consume less fresh water and to lower their liquid effluents.

The growth of CBM also helps in tackling CO2 emissions. All plants based on hydrocarbons as a source of energy emit CO2 and need to meet the emission's limit based on the free allocations, otherwise they have to buy extra CO2 allocation. To prevent CO2 emissions and to promote the circular economy in the carbon recycled loop, industries could invest in CO2 capture units from air or from their emissions. Innovation and technology have launched to the world new processes that allow the capture of CO2 and its conversion into fuels. By investing in this type of circular practices, an industrial company will need

less CO2 allocation and, as a result, the amount of CO2 released to the atmosphere will lower.

Speaking about gas, we identify one last opportunity for industrial plants, it is about Nitrogen. This gas is mainly used in the industry for inerting equipment and a large quantity is needed. Most of the companies buy Nitrogen from external suppliers and compress it locally. If we invite companies to implement a gas separation unit like a PSA (Pressure Swing Adsorption), we could have purified Nitrogen for the plant and purified Oxygen as well for other purposes (mainly combustion reactions). This opportunity will allow industrials to produce their own raw materials.

Significant advantages can stem from the CE implementation also at the social level. For instance, the creation of industrial symbiosis at the local level has the potential to enhance the local communities and to create social inclusion by offering jobs to underprivileged individuals. In this sense, a good example for a project that is providing benefits for underprivileged individuals, especially women, is "Progetto Quid", developed by Cooperative Quid, located in Veneto region. The business model of Progetto Quid is upcycling, which aims to extend material flows, by making valuable products from discarded materials. This fashion brand sources the execs fabric produced by high-end fashion brands and uses it to create new fashion garments that sell in their physical and online stores. Production relies mainly on women in harsh circumstances, providing them not only a stable source of income, but a new skill they can build upon and benefit from long term.

These opportunities are largely recognized by policymakers since the last decade, from the enactment of the Chinese Circular Economy Promotion Law (2009) to the recent European Circular Economy Package (EU Commission 2015), such policies represents one of the main strategic tools of post-pandemic recovery plans (EU Circular Economy Action Plan 2020). Nevertheless, much still needs to be done to foster

the implementation of circular practices on a larger scale and regional and local policies play a key role in this sense, e.g. they can encourage green investments, promote educational activities and so on.

Proposal. An Empowered Incubator

By considering as primary actor the firm as a social and a legal entity, we conceived a framework, that we called "empowered incubator". Here firms belonging to different industries can take advantage of privileged regulatory conditions and can share their knowledge to freely collaborate with other firms and together experience novel circular practices.

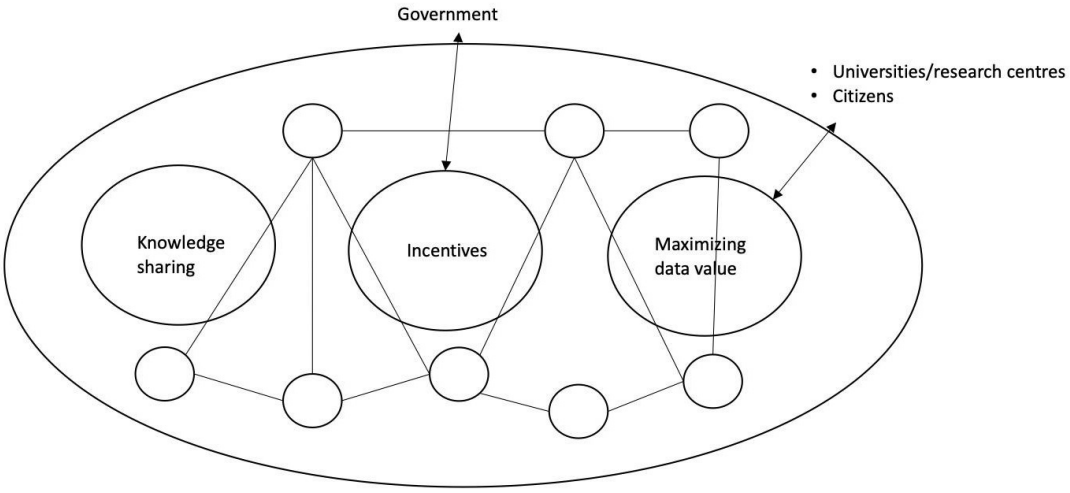

Figure 1. Empowered incubator. Source: own elaboration. As illustrated in the picture, our empowered incubator consists of a series of "bubbles" where every small circle represents a firm (i.e. startups and small Italian companies) and where specific rules - different from the traditional ones - are applied.

For our empowered incubator, we identified three key elements:

1. **Knowledge sharing.** This is essential to overcome the attitude of "silos working" and to foster the collaboration between stakeholders and competitors, which may belong to different fields. The overcoming of legal barriers would create an environment to build trust and reverse logistics, with positive out-

comes for all the players. The participants in the group evaluated different possibilities to implement a legal framework for knowledge sharing. The final choice was a safe harbor, basically a guarantee that specific forms of behavior will be deemed not to violate specific rules. The safe harbor could be extended to specific regulations in the field of IP, privacy, employment and corporate laws.

2. **Incentives** - such as tax cuts and facilitated financing (i.e. through for example substantial investments coming from the recovery fund, green bonds and dedicated crowdfunding activities). One of the elements that came out as a core issue among all the members of the group was the necessity of including incentives. Without them, it is highly unlikely that firms will decide to share their know-how and capabilities with other members of the group.
3. **Maximization of data value** - the incubator is provided with a digital infrastructure and a clearing house for participating companies to exchange goods and services. This will allow to track transactions as well as to measure inputs and outputs to the overall system. It will also be possible to involve citizens into the system, also through fundraising (see proposal by Table 2) or as customers or stakeholders of CBM firms. It is important to stress that the control of input and output won't be extended to the control of the process. This would reassure companies that only specific parts of the know-how (mainly IP-protected) will be shared.

Target. The target is mainly represented by startups and small companies, because they are those that would benefit the most from the connection with other actors interested in circularity. Moreover, these types of firms would not probably be too concerned regarding the adoption of a disruptive framework, which requires know-how sha-

ring and data analysis evaluation from external providers.

Conclusion. We consider our empowered incubator like an experiment for creating an expandable ecosystem, a micro-context to address complexity, develop synergies among actors and overcome the challenges and needs of a constantly evolving society.

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Working Group 2: Financial Instruments and Technologies

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General framework

World economy is under stress and we are in the middle of the deepest recession in memory, even more severe than the "Great Depression" (1929-1930) and for sure worse than the "Great Recession" (2007-2009). In fact, as recently highlighted by the UN, the Covid-19 pandemic is not just a health crisis, as it is affecting societies and economies at their core, increasing poverty and inequalities at a global scale (United Nations, 2020). This will strike companies and business dynamism, resulting in a sharp surge of bankruptcies and business failures in the forthcoming months.

But global economy was already under threat from another phenomenon: climate change. Indeed, its ripple effects are likely to be a defining challenge of the 21st-century economy, resulting in pervasive socio-economic consequences for almost all the countries across the world. However, it will also impact several aspects of life not necessarily related to economic activity, such as health and well-being, people's capabilities and environmental quality (OECD, 2015).

Thus, the combination of Covid-19 pandemic and climate change will require an unprecedent collaboration between public and private sector, to shift the way of producing goods to other methods which

are able to guarantee and drive the development by pursuing sustainability and positive society-wide benefits. Governments worldwide can prepare for the future by investing in innovation for long-term (and more sustainable) growth, also preserving the SDGs set in the UN 2030 Agenda.

In this scenario, the contribution of both technological change and innovative financial instruments will be fundamental. The former has important consequences for individuals and businesses, but also for employment, wages and workplace organization (Goos et al., 2019); the latter can attract funding from public and private investors in areas of strong interest, but which are perceived as risky by investors: examples include sectors with high economic growth or innovative business activities.

Given these premises, the participants to the working groups started the discussion by focusing on a concrete case study regarding one of the most dramatic topics in the circular economy: "*How to recycle electronic devices?*" In fact, the current take-make-waste extractive industrial model is no longer sustainable, requiring a shift to a more circular model, where reuse and recycling prevail over raw materials and extractive ways of working.

However, in order to be successful in the long term, such initiatives need to be profitable: this last point constitutes one of the main barriers to change, although several researchers pointed out how companies can identify strategies able to create at the same time economic and environmental value, helping to maximise the contribution to sustainability rather than to economic capital efficiency alone (e.g. Figge and Hahn, 2012).

Besides profitability, this particular case study allowed us to move to a wider perspective, highlighting another critical point of the discussion, which constitutes the core of the working groups: "*How to finance the transition to more sustainable business models?*"

Several financial instruments to raise funds already exist, each one characterized by peculiar advantages and disadvantages. Crowdfunding is one of the most accessible and successful ways of collecting money for a project, and the crowdfunding market is expected to witness a growth at a CAGR of almost 6% from 2020 to 2024[37]. Moreover, as a consequence of the sudden outbreak of the Covid-19, several non-profit organizations are providing financial support through crowdfunding campaigns. Of course, there are also several risks connected to this practice, such as the early failure of the project or the lack of guaranteed returns.

Another financial instrument is microfinance, which is particular useful to target both individuals and small businesses who lack access to conventional banking and related service, and to give them the opportunity to become self-sufficient. Moreover, it became the norm also in the richest countries, as in the case of the French initiative "Project Banlieus", a large-scale project aimed at creating jobs and social contact in underprivileged neighbourhoods of Paris (BNP Paribas, 2008).

Technological innovations play a key role in spreading all those financial instruments, starting from the crowdfunding platforms and ending with the well know blockchain, which allows to eliminate delays in traditional finance processes, while increasing transparency and reducing reliance on intermediaries (KPMG, 2019). Even sever central banks around the world are now considering their own respective digital currencies, based on the blockchain, the technology that also underpins cryptocurrencies such as Bitcoin.

However, there is not a financial instrument which prevails over the others, as it depends on the typology of the project, the context in which it has to be developed and the complexity of all the actors involved.

37 Statista (2020).

Critical issues and opportunities

Once defined the general framework, the participants to the working group focused on their personal experiences in order to highlight critical issues for the inspiration of further discussions:

- it often exists a lack of networking between all the actors involved, combined with the scarcity of infrastructures (specifically true for the reuse of technological raw materials, but easily applied to other contexts, such as the construction industry);
- it raises the importance of a cultural shift, not only among citizens but also in term of the way of producing goods, with the aim of rethinking both the consumption and the production value chains;
- it is fundamental to combine the transition to new economic models with a system of incentives bound to all the stakeholders, from the consumers to the enterprises;
- to support this paradigm shift it is important to collect the adequate amount of money. As already mentioned before, several financial instruments already exist, so it is not necessary to create something new but, on the contrary, to select the most suitable ones depending on the project.

Subsequently, given these four points, the discussants listed three main potential constraints to the new transition economies and needs to be addressed as soon as possible.

Constraints

- Governments (but only if they are reluctant to do their parts in ensuring that the activities that have led to the destruction of the environment are reduced). In this case, public initiatives, such as “Fridays for future” that began in August 2018, can put

pressure on politicians against the lack of action. Even though everyone is responsible for his/her decisions and behaviours, it will be impossible to solve the existing crisis without strong government decision-making and regulations.

- The information gap between citizens and science. Although the awareness among the population has been increasing in the last few years, the scientific method and facts are not always enough to win over the sceptics, and there are still several people who are suspicious of the findings of science.
- Financial education: if money is not a constraint, it is important to teach how to manage money and how to invest it. In this direction, designing tools that will help consumers understand themselves and the biases that are likely affect their decision may contribute to a better self-control and greater actions (OECD, 2019).

Needs

- Citizens engagement. Transition theories confirm that circular behaviour requires awareness; in fact, in a unique participative approach, the city and residents will therefore test advanced technological solutions together, through online and offline activities.
- Focus on municipalities. In fact, municipalities play a crucial role in the transformation towards a more circular economy, as they can take action by supporting locally rooted transitions with small and medium-sized companies and by creating incentives for companies to develop their business models and investments in a more circular direction (EIT Climate-KIC, 2019).
- Creating values and new revenues schemes for companies. To be successful, the transition must be profitable in the long run:

> in fact, businesses of all sizes play a crucial role in the fight against climate change, as the adoptions of more sustainable practices will help to mitigate global warming, but without forgetting the economic returns of such investments.

Thus, it raises the importance of developing a sort of "ecosystem" which includes both companies and consumers/citizens, supervised by a strong engagement by a public actor (not necessary the Government), guided by the same spirit of unity which led to the establishment of the United Nations after the World War II. Moreover, such ecosystem should be at the same time "multilayers", as it is fundamental to engage with the local communities by involving directly the citizens and businesses in the development of projects.

To sum up, "local communities", "engagement", "awareness" can be considered the keywords of the working group's discussion, which inspired the following proposal.

Proposal

The proposal is based on the project of "Antwerp Circular South" (UIA, 2020), which has been developed in the city of Antwerp (Belgium) with the aim of looking for circular solutions for its waste/materials, water and energy streams. "Circular South" offers unique opportunities to guide a growing new community in co-creating their own local circular economy, providing an example of development of an "ecosystem" which is able to involve all the stakeholders of an area, be it a town, a region or a nation as a whole.

The key element which caught the eye during the discussion is the importance of the technological innovation. In fact, circular behaviours will be automatically rewarded by an online token, through a blockchain-based reward and exchange system: this strategy has the

virtue of increasing the awareness and encouraging more sustainable habits among the involved citizens.

Of course, this typology of project is more feasible in scaled-down settings, as in the case of a town; however, "*the flap of the butterfly's wings can cause the tornado*". Thus, the implementation of a wide range of local initiatives is a part of the initial conditions of an inter-connected complex web which is able to increase both the awareness and the efforts.

The city of Milano, or one of its districts, looks a suitable candidate for a project aimed at reducing the waste production per capita and/or to increase the recycling rate. Although the recycling rate is higher in the northern regions of Italy[38], there is room for further improvement; furthermore, a large and well-known city as Milano can constitute a sort of leading case study for the rest of the country.

First of all, this project requires funds to be developed. Among of the existing financial instruments, crowdfunding can be considered the most appropriate tool to collect money in a "bottom-up" logic, as it allows a direct involvement of the citizens, who will be the recipients of the project itself, also during the design phases.

Furthermore, it is important to combine the crowdfunding with adequate economic incentive for donors (crowdfunding rewards based). We identified two potential typologies of donors: citizens and local businesses (shops, enterprises and so on). For the former, blockchain allows to deploy and issue digital tokens ("Milano eco-tokens") as a reward for the participation to the crowdfunding. Given the fact that we are running out of time and there are only 11 years left to prevent irreversible damage from climate change (United Nations, 2019), the incentive mechanism through tokens should be connected to the passing of time: the sooner people donate, the higher the reward. For

38 The "North East" area is that with the higher recycling rate (68%), followed by "North West" (64%), "Center" (51%) and "South and Islands" (47%) (Ecocerved, 2019).

local business the participation to the crowdfunding will help to improve the reputation and to enlarge the network: both these positive externalities may result in an increase in the number of customers, especially among those who share the same values. Just to mention an example, shops which contributed to the crowdfunding may display stickers in their windows, showing their support to the project.

Lastly, to mitigate the risk connected to crowdfunding, such as an early failure or the lack of a guaranteed return, this financial instrument should be developed in partnership with bank groups (a sort "joint crowdfunding"), an approach which has been getting growing attention. In fact, entrepreneurs often collect money in order to improve their financial position and to obtain a bank loan: that means banks and crowdfunding platforms have a mutual interest in working together (BNP Paribas, 2018).

Once the project is ready to start, citizens who are able to either reduce the waste production per capita or increase the recycling rate will receive further "Milano eco-tokens" in proportion to the improvements that have been made.

The technology, and especially the blockchain, will help to develop a dedicated wallet: only the person who has the private key for that address can access the respective tokens, so this person can, therefore, be regarded as the owner or custodian of that token. Moreover, a dedicated app on the smartphone will display to each citizen data related the progress achieved on a monthly basis.

All the collected tokens can be spent, for example, on sustainability solutions, such as bike sharing and electric vehicles, or converted into discounts for monthly seasonal tickets of subway and trains, thus generating a virtuous cycle. In fact, the European Green Deal seeks a 90% reduction in EU's greenhouse gas emissions by 2050, and transport currently accounts for a quarter of them (European Commission, 2019).

In conclusion, the key points which should go beyond the boundaries of this project are:

- a "bottom-up" way of collecting money at local basis, also by involving the citizens in the design phases: crowdfunding looks the most adequate financial instrument, especially if combined with banks group to mitigate the risks for donors;
- the role of technology, which is fundamental to support and enhance this typology of projects. Moreover, cryptographic tokens on the blockchain have lower issuance and management costs involved.

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EDUCATION, JOB AND EMPLOYMENT

Working Group 3: The Role of Education in Creating New Models of Economy

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General framework

The challenge was to reflect on how the current role of education can be reframed in light of today's overarching political, social and economic trends in order to identify and establish new models of economy. Special emphasis was put on identifying the central societal issues that would be necessary to address in order to fulfil such a role, and on assessing whether a re-skilling and up-skilling of the society could be a meaningful leverage to tackle the need of a new economic paradigm to face the current crisis.

During the two days, we focused and discussed on three main societal issues: the education system and its purpose, the set of skills one can develop within the current educational framework and how these match with the new economic model(s?) our society should actually achieve and what kind of tools, values and methodologies should be introduced in order to shift the paradigm.

In brief, the discussion revolved around the need to conceive a new paradigm that would enhance students' ability to develop those skills needed to redefine an economical model that moves away from the

linear paradigm and promotes new relationships between the actors revolving around the education systems.

All of the issues discussed, and the proposed solution, highlight, on the one hand, the importance of rethinking our way of assigning a central role to education; on the other, more concretely, the necessity to ensure cooperation of all relevant stakeholders, in as many types of activities as possible.

Although the discussion focused mainly on younger generations, on those young people in the age of middle/high school and university, in a time of transition as the one we are living, our economic system need to face a whole professional reconversion for the workforce of many sectors. Access and diffusion of a new combination of knowledge, skills and values will thus be intended in the form of lifelong education (Field, 2006).

Driving from an initial discussion on main issues revolving around the working group members' experience, four main clusters of interests were identified:

1. Address mismatch between education systems, organizations and agencies and the connected risk of "wasting" potential professional well being (Flisi et al., 2014) and talent (Brown & Hesketh, 2004). There's an imperative need to anticipate not only mitigate the effects of mismatch. In this sense we focused on the possibility to overcome the idea that the education system is merely a provider of resources and need to be more and more "tuned" to market needs in order to avoid "waste". A more radical view, a real shift of paradigm, would consider education as a place where to forge new ideas and co-create new visions of the world, enhancing the potential hidden in "useless learning" (Tuckett, 2014) and accepting to deal with tensions related to mainstream expectations.

2. How to share values, ideas, and mindset, how to make them more accessible by proposing new paradigm and new behaviors, awareness, inquiring minds - how might we rethink the design of the educative experiences in order to ease alternative paradigms?
3. How might we tackle changes in education in a more interdisciplinary and transdisciplinary way, with a long-term vision? How to create alternatives in development systems and how can we thrive only by going beyond the usual growth concept?

4. There's not only a matter of tools but also a "meta-problem" on how to shape learning processes in order to avoid losing the depth of research and quality of the outcomes and considering the potential gap between being creative and standardize learning processes to make them accessible.

Critical issues and opportunities

1. New common understanding

How might we build meaning and a common understanding around circular economy in practice for a larger section of population. How to integrate a new way to conceive the circular economy into the educational system at different levels?

How can we engage people in the transition toward a circular approach - understanding the type of skills required to transform one's professional profile accordingly to the surrounding transition, giving the evidence that everyone is, not only able, but asked to contribute and be involved in the shift toward a new paradigm? There's the need to reframe the awareness of ourselves in the system.

2. Methodologies

A second opportunity space concerns the ways we integrate methodologies and ways to convey a new set of contents and a common understanding of circular systems in a coherent way? How to improve the accessibility to information, tools and attitudes at all levels?

On the one hand, there's the need of creating learning experiences that engage different interlocutors (institution, companies and citizens) and that allow to develop those soft skills identified as crucial for the transition toward a new economic model. These are skills that are not linked to a particular discipline, but whose development is linked to a way of learning and operating in close connection with the surrounding reality.

A school open to the evolution of knowledge and methods is able to grasp and welcome change, allowing its community to modernize the school service in synergy with the needs of the territory.

On the other hand, spaces where young entrepreneurs willing to create sustainable businesses have access to different figure able to mentor and to support them with best practices.

Particular attention in the discussion has been given to the tension between the need to develop employability (for a fulfilling life) and risk of having all the learning processes colonized by this instrumental way of thinking (a Taylorist approach of conceiving the didactics, see Biesta, 2004).

3. Contexts

Create spaces, learning contexts, where the contents are in a framework able to change the paradigm and connect to a larger perspective and view of the system (Bateson, 1972).

Firstly, there are entire sectors that are being wiped out, entire industries that will need to change structure and paradigm regarding

how they operate and are interconnected to the rest of the economy and society. Education plays a crucial role in creating the opportunities and environment to reimagine new possible scenarios. There is the need to change the learning experiences in terms of design principles to achieve good practices in education for Sustainable Development.

Secondly, there are many subjects that are being taught without contextualizing where the students will or could then work (pedagogy for people studying liberal arts that will one day teach themselves, or design and project management for civil servants). Students will then find themselves alone in translating what they've learned into other contexts and at the risk of failing the "boundary crossing" challenge (Tuomi-Gröhn & Engeström, 2003).

Finally, there's an issue of inclusion of people by showing to them that their skills and experiences are relevant, by updating/ upgrading their existing training and experiences, especially for elderly people, for whom inclusion can become a challenge.

An example of ad hoc intervention is Sharper (Researchers Night), a festival of science which includes scientific showcases. Can be adapted to include companies and industries as well, to showcase their achievements in circular/ green economy. And it can connect universities and research centers with industries, and communicate and show to broader public how circular economy works.

Proposal

Eco-Training living lab

To tackle the above-mentioned issues, our proposal is a long-term program, a multi-stakeholder lab with the aim of developing action to tackle skill mismatch with baseline structure of a territorial consortium, gathering actors from the academia and "traditional" education

player, company representatives, entrepreneurs, actors from the third sector (NGOs, Foundations and associations) and employment agencies.

Moving as a consortium with a territorial base, the configuration aims at having a privileged observatory on trends insisting in a peculiar area, associated to societal and market needs and circular economy opportunities in order to orientate and influence educational programs and re-skilling programs toward those jobs that will be needed in a circular based economy.

The peculiarity of the suggested lab is its scalability, given the possibility to establish at a territorial level, and with those actors that populate a specific area an initiative that is rooted in terms of vision and methodological approach in a global and dynamic environment.

1. **Societal need:** Tackling the skill mismatch in a proactive way (not in an adaptive way: not trying to push people where the jobs are existing today) but trying to lead employability of the next generation in order to meet new models of economy, by building resilience to possible shocks (pandemics, climate change, migration).
2. **Actors:** Universities, Incubators, Accelerators, private companies, green businesses, public and private job centers
3. **Activity lines**
    - Guidance actions
    - Services of career design and orientation programs on green jobs
    - Capacity building, creating new job profiles and those paths needed to bring to the market the new business models
    - Addressing a workforce that need an up-skilling or a re-skilling program to reconvert its professional profile

4. **Targets**
    - young students
    - unemployed, disoriented
    - employed, people trying to change job
    - entrepreneurs, trying to shape/transform their company
5. **Methodology:** design-driven methodology based on multi stakeholders' contributions, a "systemic knowledge" coming from the corporate world, from research and academia and younger generations itself (finding their perspectives being in the formal and traditional high school system. All this completed with hands-on training provided by experts from different sectors.
6. **Outcomes and performance indicators:** number of people that start or transform a job into a green job – green employability rate which could measure the conversion index between the amount of job seekers, or students looking for the first employment or workers who need to reconvert and the type of jobs they finally do.

Fundamental next phases in the design of this initiative would focus on identifying a plan of activities for each one of the territorial areas and the identification of the funds needed to deliver the services.

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Working Group 4: Sustainability-Related Jobs and New Skills

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General framework

The current scenario: short-term shocks and long-terms trends

As Ursula Von Der Leyen effectively stated in presenting the major proposal of her mandate, there cannot be a green deal without a just transition. The concept of "just transition" has always been at the heart of great industrial revolutions in the past and constitutes the driving force behind the birth of modern welfare systems. Without guaranteeing the conditions for social stability – through rights, sustainable working conditions and social protection – it is impossible to maintain the economic and political stability of a state.[39]

In order to accelerate the pace of this transition, labour markets, professionals and educational systems need to be oriented towards jobs and skills of the future. This need is not justified "o nl y" by the incumbent shift of economic models and business operations towards greener outlooks. As a matter of fact, today entire industries have been blown out by the pandemic COVID-19 and are kept in artificial life by

39 IAI, L. Bergamaschi, There is no Green Deal without a Just Transition, December 2019.

public subventions. The experience of the lock-down and social distancing brought to surface intrinsic vulnerabilities and obsolescence of some of the models our economies and societies currently rely on. Some types of business such as those in the Tourism or Retail sectors that depend on in-person contact or travel, have sustained greater damage and need to reshape themselves in order to survive. New analysis conducted by the IMF has estimated that 97.3 million individuals, or roughly 15% of OECD countries' workforce, are classified as being at high risk of being furloughed or made redundant in the current context[40].

Comprehending these short-term shocks and long-term trends, there is indeed a renewed urgency to implement proactive initiatives to ease the transition of workers into more sustainable and future-oriented job opportunities, in order to accelerate an inclusive green transition. Above all it is now essential to take adequate measures to consolidate resilient citizenship, built upon key features such as economic growth and job creation, together with education, skills match, lifelong learning, diversity, equality and inclusion.

Emerging and declining skill sets

Over centuries, technological, social and political transformations have shaped economies and the capacity of individuals to make a living. The first and second Industrial Revolution, for example, gave rise to new machines, new ways of work and new demand for skill sets that could harness the power of new resources and production systems such as steam, coal and factory production. This transformation has consequently given rise to new professions and new ways of working that eventually paved the way to greater prosperity despite initial job displacement among individuals.

40 OECD Data: Harmonised unemployment rate (HUR), January-June 2020, 2020a, (link).

In the 21st century, the twin forces of technology and globalisation have brought profound transformations to labour markets in the near term[41]. Across countries and supply chains, several studies have evidenced rising demand for employment in nonroutine analytics jobs accompanied by significant automation of routine manual jobs[42], indicating that millions of jobs were displaced from humans to machines over the last decade[43]. The past two years have seen an exponential acceleration in the adoption of new technologies, such as cloud computing, Big Data and e-commerce, following an established trend. These new technologies are set to drive future growth across industries, as well as to increase the demand for new job functions and skill sets. At the same time this technological adoption will impact workers' jobs by displacing some tasks from humas to machines and will have a positive or negative disruptive effect depending on a worker's occupation and skill set.

Critical issues and opportunities

Market and societal needs

As the transition to circular business models will be dramatically driven by digitalization, the above-mentioned scenario is equally relevant for the general issue of "future jobs" and also for the specific one of "green jobs". Platform businesses are a clear example of how digital transformation offers new perspectives for developing circular business models, i.e. sharing economy in urban transportation, energy communities, online platforms for second-life products retail.

41 Baldwin, R., The Globotics Upheaval: Globalisation, Robotics and the Future of Work, Oxford University Press, 2019.
42 Word Economic Forum, The Future of Jobs Report 2018, 2018.
43 Ding, L. and J. Saenz Molina, Forced Automation by COVID-19? Early Trends from Current Population Survey Data, Federal Reserve Bank of Philadelphia, September 2020.

From the debate carried on by Working Group n°4, afterwards "The Group" companies and market participants today have mainly three needs to respond to, in order to engage in a green and just transition.

The first one derives indeed from the Fourth Industrial Revolution and the potential of climate change mitigation that 4IR Technologies may encompass. The major exemplification of this first point comes from the energy industry, which will not only be impacted upstream by technology (i.e. for what concerns energy production and transport), but could implement disruptive innovations downstream as well (i.e. in distribution and consumption). It is in fact thanks to technology that today we commonly use terms as "*prosumers*" [44]. As described before the potential of technology can empower or threaten human labour, and for this reason the need for technology implementation comes along with the consolidation of relevant complementary skills.

The second identified market-specific need relates to the concept of planetary boundaries[45]. To cope with a world of finite resources, economic models have the imperative to decouple growth from the depletion of resources. This entails a two-folded set of initiatives: on one side companies need to reduce the impact and the carbon footprint of their existing operations; on the other side, companies have the opportunity to embrace new business models including nature-based solutions and regenerative practices (for instance, regenerative agriculture), to achieve a greater resilience and independence from resources scarcity.

The third systemic need consists in providing a fertile environment for partnerships, involving private players, public institutions and community representatives. This third fundamental element is derived from the acknowledgment that dialogue with stakeholders and coop-

44 A consumer who becomes involved with designing, customizing and producing products and services for their own needs.

45 Rockström, J., W. Steffen, K. Noone, Å. Persson, et.al. 2009. Planetary boundaries: exploring the safe operating space for humanity. *Ecology and Society* 14(2): 32.

eration is key for "anything" (a company, an initiative, a movement, an organization) to call itself "sustainable". Nothing is sustainable "by definition": only engaged stakeholders are entitled with the right to judge if something is impacting them in a positive or negative way, hence is "sustainable" or "not sustainable".

Contraints and opportunities

On top of this three-fold market conditions, the Group focused on enlightening what is the societal side of those needs and mutually agreed that the key elements to be addressed are education, capacity building and access to employment.

A great deal of citizens is nowadays aware of its need for sustainability-related education and circular economy literacy. Not surprisingly, the greater scream for action came from schoolkids and people who are most in touch with the educational and schooling systems (i.e. Fridays for Future).

However, the ownership of this transition does not reside in younger generations alone, the whole society is engaged and is going to be somehow impacted by it, especially if considering effects on labour. Indeed, a distinction must be made: one thing is the education a society can provide, embedding its core values and its primary wealth of knowledge; other things are the capabilities and skills that individuals are able to perform in a given professional field. The former refers to formal educational systems while the responsibility for the latter is shared by companies, the "demand" of skills, and informal educational bodies, such as training centres.

Assuming this, the main identified opportunity for individuals, youngsters and elders, is to be equipped with key ABC literacy of which challenges the world is facing today in terms of planetary boundaries and resources scarcity, and how a transition from linear to

circular economic patterns is not only needed, but will most surely be enforced by regulation, in less than twenty years.

In the light of this thoughts, the relevant constraint that the Group agreed on is, as usual, time. Just like growing a brain, consolidating cultural values and assert any intellectual standing usually take decades, in the same way building knowledge and stimulate awareness on this topic, like any other given topic, will take time. It has taken time already.

Proposal

Eco-Living Lab Academy

The Group spent two days brainstorming about these three main issues: the education that formal schooling systems provide to children and to young adults; the skills that citizens consolidate thanks to school and to their personal and professional experiences and then leverage in the job market; and finally the employment opportunities those citizens today have access to, and how will they evolve in the near future.

The reflection about education and employment, and about how those opportunities could habilitate and/or accelerate the transition towards new, circular economic patterns, is not an exclusive matter of concern of younger generations. Indeed, it also fundamentally engages the current adult workforce across different economic sectors, that will be profoundly revolutionized in the next decade. After acknowledging this, the Group stopped thinking of "education, skills and employment" and started reshaping these concepts in RE-education, RE-skilling and RE-employment.

The proposal elaborated by the Group consists in the creation of an academy, the Eco-living Lab Academy (ELLA). This entity is meant to be a multi-stakeholders consortium, articulated in territorial and re-

gional bodies, gathering representatives from five different segments of society: Universities and the Academia, entrepreneurs and industrial players, third-sector entities such as foundations, NGOs and civic associations, high-schools and employment agencies.

The idea behind putting together this variety of actors has a precise goal: fill-in the gaps. Brainstorming around sustainability-related jobs and the creation of new skills, together with the consideration of what companies need today in order to be driven towards transition, and what society urgently ask for in order to live a just transition, means constantly be facing gaps to fill-in. Whether we talk about skills-gaps or mismatches in the workforce or in people looking for their first job. Whether we consider gaps in the demand of employment meeting the supply of employment. Whether we struggle with educational gaps and cultural gaps, when dealing with concepts and dynamics such as "the circular economy" or "the gig economy" or simply the digitalization, which are totally unfamiliar to a large part of the world population. Whether we think about gaps in the integration of schooling systems and the corporate world. And so on and so forth. The Group understood that providing a transgenerational - public and private - multi-stakeholder baseline to the Academy, could at least partially cope with the complex spider net of gaps that need to be filled-in today.

The mission of the Eco-Living Lab Academy is to garrison the trends insisting in a given territory in terms of societal and market needs and circular economy related opportunities, in order to orientate educational programs, re-skilling/up-skilling programs and placement activities towards one direction: the achievement of circular economic systems. The general term of "circular economy related opportunities" is meant to include: training and educational opportunities, job opportunities, entrepreneurship opportunities, corporate innovation opportunities, co-creation opportunities, community-based opportunities.

The value proposition of the Eco-Living Lab Academy is built on three branches of activities. The first one addresses students and young generations and aims to provide guidance and orientation about green jobs and the educational opportunities to land there. The second one focuses on company needs in terms of skills' demand and focus on capacity building and knowledge transfer. This second branch is meant to stimulate a market demand for green jobs and their relevant skills, building a bridge between companies who need to upskill/reskill their workforce, companies with recruitment specific needs and citizens looking for employment opportunities. The third one addresses workers in need of professional reconversion.

The strengths of the Eco-Living Lab Academy are embedded in its methodology, which combines a multi-stakeholder knowledge with hands-on capabilities, and is easily scalable across different regions and Countries.

CITIES AND TERRITORIES

Working Group 5: Transformative Economies and Urban and Territorial Regeneration Strategy

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General Framework

Over the last decades, our economic system has been centred on an industrial approach governed by the rule "take-make-waste", leading to high levels of primary resource consumption and pollution, against all principles of efficiency and sustainability. Cities cover only 2% of the world surface, but they are responsible for roughly three-fourths of raw material consumption and CO2 emissions. Cities are not self-sufficient, but instead the terminal point of global production systems which take resources from all over the world.

World population will reach 10 billion by 2050, with an increase in the urban population of 2.6 billion people[46]. This will require a massive built-up of urban infrastructure, which is a key driver of emissions across multiple sectors. Per capita needs of food, energy and resources, which were already remarkable, have grown at an even higher rate than the demographic index. The demand for natural resources has

46 United Nations, Department of Economic and Social Affairs, Population Division (2014). World Urbanization Prospects: The 2014 Revision, Highlights (ST/ESA/SER.A/352).

surpassed the availability of the Earth, with the 2019 "Overshoot day" happening in July 29[47], leading to resource scarcity and increment in raw materials market prices[48].

On the other side, the linear metabolism of cities also generated a climate crisis, with projections produced by the scientific community showing how by 2100 global temperatures might increase by 4 to 6 ℃[49]. The change in temperature is resulting in calamities and extremely uncomfortable summer temperatures (heat waves) affecting especially the most fragile populations around the globe.

The Covid-19 crisis is making the road to sustainability more difficult. In Italy, the crisis had a negative impact on 9 out of 17 targets of the 2030 Agenda: poverty, food, health, education, gender equality, employment, innovation, social inequality, partnership worsen, while data on the circular economy, air quality and crime improved[50]. The fall for nine Objectives (1, 2, 3, 4, 5, 8, 9, 10, 17), is met by an improvement for three (12, 13, 16)[51]. It was not possible to assess the effect of the crisis on the remaining five, including goal 11 on resilient and inclusive cities.

Making cities more resilient, circular, just, and inclusive is no longer a luxury but a necessity. Many cities are rethinking their energy systems, their food systems, their transport infrastructures and their provision of foundational services. The choices that cities will make

47 https://www.overshootday.org/

48 Richard Dobbs et al. Resource revolution: Tracking global commodity markets. McKinsey Global Institute, 2013.

49 World Energy Outlook 2011. Paris, IEA, International Energy Agency, 2011.

50 This is what stands out from the 2020 report of Asvis on "Italy and the Sustainable Development Goals" presented on October 08 during the final event of the Festival of Sustainable Development at the Ministry of Foreign Affairs.

51 SDG Goals: 1 Poverty, 2 Zero Hunger, 3 Good Health and wellbeing, 4 Quality Education, 5 Gender Equality, 6 Clean Water and Sanitation, 7 Affordable and clean Energy, 8 Decent work and economic growth, 9 Industry, innovation and infrastructure, 10 Reduced Inequalities, 11 Sustainable cities and Communities, 12 Responsible consumption and production, 13 Climate Action, 14 Life Below water, 15 Life on Land, 16 Peace, justice and strong institutions, 17 Partnerships for the goals.

today about the way they work will lock in the economic and climate benefits - or costs - for decades to come. This is not just a matter of improvements in spatial planning or sustainable transport, but about a deeper transformation. The economic model on which cities are based needs to be radically changed.

Here Transformative Economies can be a viable approach to development which can inform sustainable urban policies. Transformative Economies are a new economic paradigm emerging from the convergence of various actors including citizens movements, NGOs, socially-minded businesses and progressive municipalities. Transformative economies go beyond mainstream understandings of sustainability, which conceive social justice, economic development and environment sustainability as separated goals to be balanced. Instead, it starts from the assumption that a fair distribution of wealth within planetary boundaries is the goal of economic development.

The transformation of cities needs to be undertaken progressively. Furthermore it requires a holistic approach, advancing innovation on several fronts simultaneously. Here a top-down approach can still be relevant but is no longer sufficient. It needs to be coupled with bottom-up interventions co-designed and co-produced with citizens, businesses and community organisations. These actors need to be put in the position of developing a sense of belonging and ownership towards the city, which leads them to act for the common good. This is key to unlock change at scale.

Beyond economic and technical questions, this also poses political questions: who participates in and drives the development of the city? Who is the urban economy for? How to create a truly democratic urban governance?

Critical Challenges

Cities are facing several critical sustainability challenges. In this section, we present some of those that emerged from the discussions during the workshops.

1. Social inequalities and fragmentation

Socio-economic inequalities are on the rise everywhere in the world and at different scales, and especially in cities, where inequalities tend to be more marked. Many aspects need to be taken into account: income, but also housing and urban quality more in general. Cities need to be less fragmented and offer all citizens a quality urban environment with access to natural environments, active-travel infrastructures, quality public spaces and aggregation centres. This is particularly important in the face of the Covid-19 pandemic, which is dramatically showing us the consequences of social isolation and lack of social relations.

2. Natural and man-made disasters

Natural and man-made disasters are increasingly threatening the stability of our cities and living spaces. Cities are put under extreme pressure by climate change, and the COVID-19 pandemic showed to what extent an external event can be disruptive, jeopardising social and economic systems in place, especially for the most vulnerable segments of the society, as well as putting the global value chains in crisis.

3. Governance disconnection and fragmentation

Our cities have complex problems, which require technical expertise and local knowledge to be solved across different scales. We need to do policy with communities and not to communities to avoid conflicts,

lock-ins and to generate powerful solutions. A new governance paradigm is hence needed that overcomes:

- Conflicts between administrative levels of government (national, regional and municipal).
- Conflicts between agencies at the same level (e.g. between different national governments) to face transboundary and transnational challenges (e.g sustainable mobility, management of natural systems or climate change mitigation).
- The gap between government and citizens.

4. Unsustainability of the housing sector

At present, the housing sector represents a very dysfunctional sector both in terms of production and in terms of consumption. The construction sector is recognised as one of the most polluting worldwide: "*The buildings and construction sector accounted for 36% of final energy use and 39% of energy and process-related carbon dioxide (CO2) emissions in 2018, 11% of which resulted from manufacturing building materials*"[52], while at the same time being responsible for 30-50% of primary resource consumption in the EU and 40,5% generation of urban solid waste in Italy[53].

In Italy and many other countries, the building stock is outdated and keeps consuming a lot of energy while construction practices do not take into account environmental sustainability as much as they should. On a global scale, the scenario is worsened by the demographic increase and an intensification of the urbanisation phenomenon that will bring 70% of the world population to live in urban areas with a consequent need for new urbanisation.

52 2019. *2019 Global Status Report For Buildings And Construction.* [ebook] Available at: https://wedocs.unep.org/bitstream/handle/20.500.11822/30950/2019GSR.pdf [Accessed October, 12, 2020].

53 ISPRA 2016

From the consumption side, the housing sector is problematic as quality housing is increasingly inaccessible. Metropolitan cities like Milan are witnessing a sharp housing crisis where rents are increasing much faster than incomes. Despite a long-lasting economic crisis and the presence of unresolved problems with job creation, rents' prices are significantly growing, reducing the capacity of people to save money, to invest in new activities and creating constant anxiety and uncertainty. More than 50% of the monthly income of citizens is spent on rents and mortgages, creating deep inequalities around a foundational good.

5. Knowledge gap

The transition towards a sustainable urbanism requires a new knowledge and new skills which are more systemic, imaginative, empirically based, transdisciplinary, inclusive and action-oriented. At present, we do not have this knowledge capacity, and we need to build it quickly to reframe policies that enable the transition at interconnected scales.

First, we need good, reliable and independent knowledge on key social and environmental matters. Our world is complex and uncertain. There a massive challangs ahed of cities, ranging from climate change to global migrations from the increasingly poor and unlivable 'global south'. A better understanding of natural and social phenomenon, both in the short-term and in the long-term, is key to have a balanced vision of the costs and benefits of transition measures.

The second challenge is about dissemination and sharing. Knowledge of key social and environmental trends remains far from citizens, especially from the ones who need information the most: climate change is mostly affecting vulnerable people and communities, increasing the gap between marginalised and wealthy citizens. Information about climate change risks and the possible measures to face these challenges are not always accessible by these communities.

Thirdly, we need a dialogue between science and local knowledge to design good policies. Technocratic approaches are still prevailing in transition policy. However, local communities assign a specific value to their natural and social resources, their places, their culture and possess valuable knowledge. Top-down processes might neglect these elements. Thus, we need cities that are capable of creating inclusive decision-making processes in order to co-create policies and development plans.

Proposal

Over the next years, cities need to realise the goals of environmental regeneration, climate adaptation and social cohesion. The background to these goals is provided by the 2030 Agenda, the Paris Agreement and the Green New Deal. This requires a major reorganisation of the development model of cities, which can be achieved only with coordinated actions and a new policy framework.

As discussed in the previus section, we are aware of the barriers for transition. Nonetheless we think that is important to start think about solutions which can become the catalyst of change. Below 2 specific action-driven proposals which address 2 key areas where we think an urgent urban transition is needed.

1. Fair and green living infrastructure

The first proposal addresses the creation of what we call a fair and green living infrastructure. By that, we mean a stock of houses which is accessible in terms of price (both rents and mortgages) for all citizens, built with sustainable materials, powered with green energy sources and connected to active-travel infrastructures and public transport so to make cars an option and not a necessity. Here our policy proposal

is a new regulatory framework, which we think could improve the housing economy both in terms of production and consumption.

In terms of production, we propose regulations that reflect the deep ecological crisis we are. Here we need to be ambitious and go even beyond 'passive housing', that only considers operational energy without including the impacts of the grey energy embodied in building components. We need a life-cycle and integrated approach that looks at the whole life-cycle of housing and its relation to the broader city. Hence we propose that all new housing developments - and the regeneration of existing housing stock - should be required to:

- Be realised according to design for disassembly, in order to prolong the life-cycle of building components beyond single uses and avoid the critical energy consumed within destruction and rebuilding process.
- Should be built with green materials, minimising resource use and be able to store natural resources such as rainwater.
- Should be powered with green energy sources and built-in ways that consume less energy, so that eventually surplus energy is redistributed to the grid.
- Should introduce Nature-based solutions (e.g. New Yorks' green roofs policy[54])
- Should be connected to public transport systems and active travel systems.
- Should prioritise urban voids and underused buildings over new land.
- Should be organised within neighbourhoods where basic services are in walkable proximity.

54 https://www.urbangreencouncil.org/content/projects/nycs-sustainable-roof-laws.

Furthermore, in terms of consumption, we need regulations and business models that ensure quality housing to all and not just a few. Quality and appropriate housing should become again a social right and not an optional good which only high-income households can afford. Here we propose to:

- Build new quality public housing as in Berlin or Barcelona with clear targets of reaching 30-40% of the overall housing stock.
- Reintroduce rent control as in New York or Berlin in parts of the private housing markets so that rents do not surpass 30% of household income.
- Tax unused and underused properties so they are reintroduced back into the market.

2. Transition knowledge infrastructure

As highlighted in the previous section of this document, another key challenge for the transition of cities towards economic, social and environmental sustainability is about addressing what we called the knowledge gap. Here we need to recognise the value of local knowledge and bottom-up initiatives. Furthermore, we need to make better use of science and digital innovation to inform the design, monitoring and evaluation of urban policies. Ultimately we need to build a new 'transition culture' which is oriented towards action.

In part, this is a question of connecting and making really accessible what is already there. Cities aggregate already many hubs of transition knowledge in the form of living labs, makerspaces, Universities and community spaces. Furthermore, a significant set of instruments for bottom-up transition already exist, e.g. incentives for housing retrofitting or for green and social enterprises. However, only a few know these possibilities exist, and this is arguably one of the reasons why change is not reaching the critical mass required.

Hence, our proposal for addressing the knowledge gap is to establish what we call a Transition Centre in every neighbourhood. By that we mean physical spaces - like community centres - that provide citizens with a) data and information on urban challenges and b) access to the instruments and fundings available to address those challenges. As such, these centres would create a distributed knowledge infrastructure, where people can understand how their cities work - and more importantly not work - in terms of social cohesion and environmental sustainability. At the same, these centres would provide information, skills, and tools for taking action, while facilitating the networking of people and projects focusing on transition. We believe that this kind of distributed and bottom-up knowledge infrastructure would be strategic in promoting the transition culture needed to quickly transform our cities in more socially just, environmentally sustainable and politically conscious places.

RESOURCES

Working Group 6: Natural Resources Conservation and Social Impact

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General framework. Valuing nature in an urban transformation framework

The impact of human activities on global ecosystems and on the climate in the last century has been as strong as ever in the history of mankind, so that scientists have coined the term Anthropocene to define the current geological era. The combustion of fossil fuels and the depletion of natural resources have caused climate change and all its devastating non-linear effects, as well as air and water pollution, soil sealing and radical biodiversity losses. These intertwined and complex issues are getting extremely threatening not only for the environment, but also for the wellbeing and the survival of the human species. The burden of the environmental crisis is not equally distributed and contributes to increment local and global inequalities, raising fundamental issues of justice.

Against this context, the way in which we attribute value to nature (and to the essential resources and services it provides) is a crucial issue. The hegemonic neoliberal ideology has always neglected the value of non-marketed natural processes, downgraded to externalities, side-effects of the economic activity. A sort of blind trust in technical

and technological progress has consolidated the idea that natural resources are substitutable or limitlessly replicable through innovation. The abstraction of economic activities from the material and natural limits has made environmentally and socially catastrophic practices economically convenient in the short-medium term, thus legitimising and standardising them. Illimited examples could be made. In the next paragraph we will focus namely on the food system.

It is only in recent years that attempts to recognise and demonstrate the value of nature and natural resources have been made at different scales and institutional levels. Let us consider the assessment of ecosystem services. From the idea of ecosystem function – referred to a set of ecological processes operating within an ecological system (Gómez-Baggethun et al., 2010) – it is possible to assess some of the benefits (provisioning, regulating, recreational, supporting) that nature provide to humans, and categorise them as services. Thus, a consistent part of ecosystem services science is about monetising ecosystem services, in order to internalise nature in the economic discourse. Global and local attempts to attribute a monetary value to natural resources have been proliferating in the last decades to foster biodiversity and nature conservation. The market and the payment (in form of incentives or taxes) for ecosystem services, for instance, are tools that, by internalising the environmental costs, aim to reduce the impact of economic actors on the environment.

However, the internalisation of environmental costs and the consequent commodification of natural resources are rather controversial processes. First, because ecological processes are extremely complex and non-linear and therefore hardly convertible to a sole unit of measure (Norgaard, 2010). Second, because the market exchanges are often asymmetrical in terms of power and distribution. Poor people, if in dire need of basic necessities, are often willing to bear larger risk in exchange of money (Martinez-Alier, 2002). Third, because there ex-

ist multiple criteria to value nature (e.g., religious, moral attachment, need for provisioning services…), which are not fully commensurable and reducible to a sole unit of measure (Martinez-Alier, Munda, & O'Neill, 1998).

This brief report intends to frame the issue of natural resources valorisation in the food system under an urban transformation perspective. With the expression urban transformation, we refer to a fundamental, multidimensional, non-linear change of societal relationship to nature in order to reach sustainability goals (Kabisch et al., 2018).

Our proposal thus encompasses profound changes in the ways in which nature is valued not only from an economic and technical perspective, but also in a social and anthropological sense: we look, for instance, at citizens' relationship to food and re-used bioresources, beyond the widespread ideas of consumers and food waste. The heterogeneity of our research group - that comprises social scientists, as well as engineers and biologists – challenge also traditional scientific practices, putting forward transdisciplinary, issue-based and policy-oriented research.

We acknowledge that the transformation is a political issue. Political in the broadest sense. That means that it encompasses local policies and innovative participatory projects, as well as a wider supralocal and systemic political vision, which is aware of the magnitude and of the cost of the changes and is able to provide all the citizens with adequate social protection.

Critical issues and opportunities. Restoring a meaningful food system

The current linear system is based on the assumption that once primary natural resources are used and disposed, they automatically become waste. This definition describes something no longer useful,

missing out the amount of value that still remains. Instead, it is better to refer to that as a *byproduct* which is something that keeps particular characteristics and value.

Starting from the perspective of *byproducts*, a second aspect to keep in mind is its disposal. A circular design approach, which focuses on the use, together with the end-of-life, is a key element to transform our current production model. Innovation must have a systemic and global approach, working on a continuum cycle of materials disposal, collection and re-use (or otherwise upcycling/recycling).

Furthermore, innovation must focus on both technical and social aspects, as the first cannot be leverage of change and transformation if the latter are not considered. By framing natural resources as something valuable in social terms, we give to transformation a boost consistently with the paradigm introduced by Kate Raworth known as "doughnut economics" (Raworth, 2017), an economic production paradigm combining the awareness of planetary boundaries with the complementary concept of social boundaries. A human-centred design is then fundamental as a strong basis of our discourse, as the transformation can be truly accepted and adopted only if everyone is actively involved in it. A global and multi-stakeholders approach is what is needed now, and a regenerative education system, in its broader sense, will be one of the main tools to make transformative economies happen.

To educate, we also need data to feed information. The environmental and social costs of production are not internalized into prices as they are not considered and evaluated as relevant information. This missing element is a real issue which is linked to the fact that our economy is not built on reciprocity. Economics should consider exchanges of value based on mutual giving relationships between and within environments – in a social and natural sense – to truly understand its impact. Consequences as degradation of soil, water, air as

well as social insecurity, injustice or gentrification have to be taken into account when assessing the value of a product or service, and consequently the price. Prices must embed the concrete ability of a product/service to fulfill specific (relevant) needs and the quality of how such a function is performed.

Focusing on food, that means going deeper in understanding the social implication of having a healthy, fair and sustainable system which can actively respond to human and societal needs. Indeed, today for each dollar spent on food production, two dollars of negative externalities are created in terms of environmental, health and economics costs (Ellen MacArthur Foundation, 2019).

These externalities are related to production methods, transports and disposal. Agriculture uses 70% of freshwater (World Bank, 2020) and produces 10.3% of EU CO2 emissions (European Commission, 2020), although this percentage does not take into account the emissions related to logistics, energy and chemicals. Moreover, 40% of food is grown within 20 km from urban centres (Ellen MacArthur Foundation) but 98% of fresh agriculture products are transported at least 50 km away from the production point (WWF, 2019). As a matter of fact, 1.3 billion tons of agricultural products have been delivered on wheeled transportation in 2017 (EUROSTAT, 2020), causing grave consequences in terms of greenhouse gases emissions.

At the same time, 88 million tons of food waste are generated in the EU every year, resulting in 149 billion euros of costs. Only in Italy, 5 million tons per year of food are wasted, whose 72% comes from home and industrial processing (EU Food2030, 2015). This picture looks even worse if we consider that 20% of total deaths and almost 16 millions of people in 2017 have died due to bad nutrition habits (European Commission, 2020). Two out of ten Europeans are obese, and half of the total are overweight, while 33 million Europeans cannot access a quality meal every second day (European Commission, 2020).

A systematic response to those challenges is not only beneficial for the environment but fundamental for human wellbeing, equity and social justice. The way we design our food system has consequences not only on resources but also on social cohesion. Understanding natural resources as ecosystem services goes beyond pure monetization. It means to recognize reciprocity and then build a relationship based on mutual exchanges between eco-systems which can be understood as social and natural. Proximity should be social and geographical, connecting actors, resources and territories in synergies to work for the same goal: an inclusive and resilient society.

Proposal

Our proposal consists in the design of a pilot project and, at the same time, in the implementation of local policies and supralocal legislative frameworks which may foster the scaling up of the initiative and enable a systemic transformation.

The aim of the project is to foster connections between rural, peri urban and urban territories, creating an innovative food chain, radically reforming the production, distribution and the consumption sides. The idea is to create social and territorial linkages between different territorial realities by working on natural resources and on the way we conceive and value them, especially with respect to agents and places which will make use of it.

In our ideal project, a network of local public markets provides the local hubs where urban demand meets the nearby rural offer. Shared public data about individual and HORECA consumptions help in planning the production and then reduce the waste. Food waste is not thrown away, but it is then used for implementing local biogas plants and to obtain high value products from organic waste.

Considering that from 1 ton of organic waste we can obtain around 100 m3 of bio-methane, 500 million m3 of bio-methane could be produced every year from the Italian food waste (5 million tons). Bio-Liquefied Natural Gas (BioLNG) fuels are much cleaner than petrodiesel and can be easily used in freight transport vehicles. The conversion to BioLNG fuels would count for a 70% cut of CO2 equivalent emissions in the heavy transport sector. The project, in fact, intends not only to reduce waste and transport costs, but also to render freight mobility more sustainable valorising biowaste (Gustafsson & Svensson, 2020).

The social participation and acceptance of the project is favoured by the institution of environmental labelling schemes on food products, based on Life Cycle Assessment (LCA). Consumers can thus become more aware of what is behind food and have the opportunity to make well-informed choices towards less impactful options.

Furthermore, the project intends to regenerate former marginal areas, by introducing economic and productive activities (i.e., energy and agricultural production), but also by implementing ecotourism initiatives built on the valorisation of local knowledge and products. In particular, the development of rural communities network, aimed at sustainability goals, may regenerate and increase economic opportunities of the territories, as well as speed up the transition to a more sustainable and consciousness tourism.

In order to sustain this process of transformation and to make it possible, we put forward the following policy proposals:

- "*pay-as-you-throw*" scheme: undifferentiated/unrecycled (food) waste is a cost as it produces a negative externality and then it has to be perceived by the producer as an upfront cost. These schemes should be implemented consistently throughout the national territory, avoiding fragmentation and misalignment across regions or municipalities.

- Economic incentives for the collection of liquid food waste.
- Phase-out diesel and gasoline trucks in favour of BioLNG-powered ones.
- LCA and ecolabel for food. Incentivise producers to develop LCA and ecolabels with VAT reduction.

These policies sustain the process of regionalisation of the food system. However, such transformative projects cannot be isolated from the existing socio-economic context. In fact, the project, if implemented, will have an impact on the urban morphological structure, on many traditional economic sectors, with the loss of some categories of jobs (e.g., large retailers' employees), on differential access to food, and on some consolidated cultural practices (e.g., the consumption of food out of season).

Thus, to overcome these challenges and enable a systemic transformation, beyond the single project, some broader policy recommendations are formulated:

- Establish the constitutional right to sustainable, healthy and affordable food. Food is a common good.
- Implement a progressive carbon tax to finance public investments.
- Boost the social protection and welfare system, namely for those who lose their jobs and are penalised by the new transformative system.
- Promote strong public investments on infrastructures (e.g., biogas plants) and industrial policies. Promote private investments for innovative projects and production systems by providing a strict and severe taxonomy of what exactly is a sustainable economic activity.
- Strong public limitation to polluting emissions and reinforcement of public environmental standards.

National and supranational institutions are the actors involved in the above mentioned interventions. The EU has the legislative tools to promote this political vision. The right to food, for instance, may be stated in the European Pillar of Social Rights, while investments regulation should be translated in the upcoming Taxonomy, which will provide a regulative branch to initiatives like the Just Transition Fund.

To summarise, the valuation of natural resources is a complex process that involves human and societal relationship to nature. The change of consolidated economic dynamics and widespread cultural practices is as necessary as problematic. A strong political commitment is necessary at diverse institutional levels. The food system, which is something very concrete that concerns each one of us, may be a good field where the transformation begins.

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Working Group 7: Circular Economy. Policies for Reducing Waste and Generate Social Impact

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General framework

Our table's title underlines our focus on the wide concept of circular economy applied to waste policies and the related creation of social impact.

A circular economy is a model of sustainable growth that aims to decouple economic growth from the use of natural resources and raw materials challenging the linear take-make-dispose industrial model. The goal is to lead a transition towards a systemic shift that builds long-term resilience, generates economic opportunities and new businesses, and creates environmental and social benefits. In fact, circular economy may be considered as an *umbrella term* that embraces a variety of economic, socioeconomic and environmental related theories and practices whose common principles are to design out waste and pollution, to keep products and by-products in use and to regenerate natural systems.

To reach circularity the transition must affect the whole production chain, from the upstream use of products with a low environmental impact to the end of products life cycle.

Our round table focused on this final stage discussing waste management and analyzing the concept of *end-of-waste* which specifies

when certain waste ceases to be waste or by-product and obtains the status of a product - or a secondary raw material.

The reasoning behind this report is based on personal and heterogeneous experiences which led us to embrace the shared thought that circular economy should be an integration tool between all sectors to help understanding which policies can give the opportunity to use sustainable materials and create a sustainable and circular system.

Diagnosis

Assuming that the transition towards a circular economy touches all the stages of the production chain, we have identified three areas of interest:

1. productive area: how to recover and recycle materials and create savings in the different productive activities (e.g. industrial field, construction sector and agricultural field) and how producers can improve their products to reduce the amount of waste from the source;
2. consumption area: how consumers can contribute to the reduction and improvement of waste streams;
3. procedural area: understand what rules must be implemented at the legislative level and which incentives must be given to favor circular economy activities.

The three areas outline our emphasis on both waste and policies.

Waste reduction has a social impact because it improves our daily life, trivially removes waste from the streets and eliminates issues related to air healthiness and therefore health in general.

It has an environmental impact since it gives back to the city and the citizens the space that is dedicated to waste and reduces greenhouse gases. From an economic point of view, waste reduction has the

potential to create new professional figures and therefore new jobs and profits.

We firmly believe that all economic actors must be taken into account to achieve a substantial reduction in waste disposal and a related increase in recovered materials, but, in order to accomplish this goal, we need the support of common guidelines dictated by clear and precise policies.

Critical issues and opportunities

Societal needs

Our economy needs the reconversion of old production processes into new circular processes to obtain the optimization of urban spaces. Focusing on the consumer side, it is fundamental to make the citizens understand that recycling and reducing waste is something that cannot be postponed, that we – as a community – must act now because there is no more room for pollution and waste. We believe that the individual awareness of the consequences of everyone's actions is the basis for creating a common mission. To raise awareness among citizens targeted information and educational programs are needed together with sensitization and transformation of daily life needs.

One immediate impact on society can be determined by the creation of new jobs – the new *green or eco-jobs* – which improve the use of energies and raw materials, limit greenhouse gas emissions, reduce to minimum waste and pollution, protect and restore ecosystems and support adaptation to the effects of climate change. Within the transformation it is fundamental to create a balance between destruction and creation of jobs to obtain a proactive impact on society.

Waste regulations are the key instrument to impose, to both companies and citizens, a conscious and sustainable disposal.

Major constraints

From our discussion it emerged that waste reduction policies have to face some constraints:

- legal constraint: the complexity of terminology and definitions related to waste (both at European and national level). This problem limits and hinders the application of the end-of-waste concept to waste and by-products.
- administrative and bureaucratic obstacles: there are physiological and pathological bounds at the structural and territorial level because of regulations linked to urban structure that hinder the implementation of innovative procedures. As an example, we discussed about recycled concrete: it takes long times to have evidence on the efficiency and effectiveness of new technologies; the legislator expects to know the impact and the result of a certain sustainable maneuver. In other words, at the legislative level there are problems of binding timing.
- economic constraint: the transition towards sustainability is seen, from the producers' side (especially in Italy with a market characterized by SMEs), in a short-term perspective thus creating conflicts of interest and fear for less immediate profits.

Opportunities and expected outcome

To overcome the aforementioned limits, we believe that there must be a shift from a logic of accumulation to a logic of redistribution. The answer is the achievement of a transformative and generative economics supported by a rethinking of economic processes, streamlining and homogeneity of legislation and economic incentives in favor of sustainable policies.

With our proposal, we place emphasis on the implementation of integrated cycles, i.e. facilitate the exchange of products and by-prod-

ucts and create a stronger intersection between sectors in the name of the end-of-waste principle.

Policy design

Following this diagnosis, we puzzled on how to overcome current areas of under-utilisation for what concerns circular economies. Since the complex nature of the policy challenges in this field, we realized that a single policy instrument would not be sufficient. Hence, in designing the policy we adopted a conjuctural logic, combining different policy tools in order to create an integrated policy that can address simultaneously legal, administrative and economic challenges. The joint use of these policy instruments would address some of the mentioned constraints, allowing economic operators to improve their prospects of creating sustainable circular systems.

We opted for a market-based approach, as our intent is to incentivize circular economies in order to bring together the demand and supply for industrial waste and byproducts. However, rather than providing direct financial incentives to those engaging in circular economies, this policy intends a) to remove the bureaucratic and legal obstacles linked to these activities, b) to improve the spread of information and crucial data, c) to improve the services available to entrepreneurs that want to implement circular economy within their business models. The "ideal" target of the policy would be a "want-to-be" entrepreneur who would be facilitated in creating a business based on circular economy by the adjustments we are proposing.

Improving the current legislation: the necessary condition

The first element to let the policy work can be deemed as a "necessary condition". For an entrepreneur that wants to create integrated cycles, it is in fact necessary to be able to operate with different economic

sectors. For instance, a by-product of agriculture could be used as an input in the construction industry. For this to happen, there must be a homogeneous law across the various sectors. This is not the case for what concerns the law on circular economy in Italy: while a general law is present, some of the implementing laws concerning the various economic sectors are still missing. This legislative fragmentation prevents the adoption of integrated cycles: for this reason, it is paramount to complete the legislative architecture so to have, at least in principle, the possibility of using waste and byproducts as industrial inputs across all the economic sectors.

The second legal hurdle we considered concerns the interpretation of the law, i.e. the jurisprudence. According to the lawyers in our team, the law on circular economy in Italy is often hard to be interpreted. This opens to legal disputes that, in general, have the potential to hinder economic activity. The complexity of legal definitions can be explained when considering the complexity of its subject. Hence, "simplifying" the law would not necessarily lead to the achievement of a unanimous interpretation of the law itself. The solution that emerged from our discussion is that of centralizing the interpretation of the sectoral laws that are related to circular economy. In our opinion, the most suitable actor for the implementation of this centralization would be the ARPAs, namely environmental agencies that operate in Italy at the regional level and which already engage in this type of interpretation. We would propose to make this type of activity systematic, but not legally binding.

Enabling condition: circular economy consultants

One of the biggest challenges for what concerns circular economy is how the information flow. There are many research centers and Universities that focus their studies on how waste and byproducts can be used to achieve circularity. This information, however, is often hard

to access. In some cases, it is hidden behind paywalls; in other cases, it requires a level of knowledge that requires special training. In other words, a business that wants to acquire this type of information needs professionals that are trained in the circular economy field. To do so and to enable them to work with the information produced by university research, specific university courses and specific university degrees are needed. This measure would improve the circulation of information and data exchange.

Enabling condition: a national registry on waste and byproducts

The final measure is fostered, once again, by improving information between the economic actors. One of the challenges faced by circular economy entrepreneurs is that of not having, a general picture of the availability of waste and by-products in their territory. Without having this information, creating circular economies that make the most of the end-of-waste concept can often be either incidental or be the result of costly market analyses. This situation could change if the national registers on waste and by-products are implemented. In this way, the supply of industrial waste and by-products and their demand may meet: entrepreneurs interested in selling their industrial waste and by-products could simply sign up on national registers, declaring on one hand what type of industrial waste they seek and on the other how much they produce each year. These registers could be consulted by both entrepreneurs and circular economy specialists to have a clear glance about the presence of integrated cycles supported by their national territory. A second positive externality of the registers would be the creation of a focal point for regional and national legislators: the registers would, in fact, provide a direct measure of the relevance of circular economy, by showing directly to the collectivity the potential of this market. There are private companies that absolve this function, but they do so at a local level; to fully develop an integrated system,

it would be better to conduct this type of activities at the national level. Such upgrade may allow and facilitate cross-regional exchanges, which are often hampered by the burden of legislative fragmentation at the regional level. In Italy, incidentally, there is a similar registry managed by the *Camere di Commercio*. However, this instrument is not easily accessible and its main purpose is not focused on promoting circular economies. By this reorganization, waste and by-products registers could become useful policy instruments for the practical implementation of the *end-of-waste* concept within a circular economy, and circular businesses could be helped with the transition towards more sustainable activities without significant fiscal expenses.

Curatorship

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