Sustability and Circular economy

Blockchain solutions

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1. Introduction

The ultimate goal of the circular economy is to achieve decoupling economic growth from the depletion of natural resources by creating positive value loops with each use or reuse of the material or product before final destruction. It is inspired by the functioning of natural ecosystems, and their expertise acquired throughout evolution to combine the efficiency of the use of resources, the creation of economic value, cooperation, the well-being of individuals and protection of biodiversity.

It emphasizes innovative public policies new modes of design, production, consumption, the extension of the useful life of the products, the use rather than the possession of the good, the reuse and the recycling of the components. The circular economy is an alternative to the paradigm of the so-called linear economy: The circular economy is presented as a more sustainable path. It targets the sober and efficient management of resources.The general principle is to move from a classic model of linear economy which is expensive in resources to a circular model which makes better use of resources and recovers waste to loop them back into a new production cycle. = less withdrawals in nature and less polluting discharges.

However, a truly circular economy is not just a system of trade and production

aimed at increasing the efficiency of the use of resources. It constitutes a global alternative vision meaningful, ambitious, mobilizing and which offers the opportunity for populations to regain a certain level of control over their environment at the local level.

Among these many meaningful assets, we present the advantage of being compatible with the 3 pillars of the sustainable development model:

Macroeconomic:

The potential of the circular economy is a minimum net saving of 380 billion dollars per year in raw materials in Europe to which is added the creation of positive value, based on relocated consumption, support for industrial and agricultural activity on territories and the development of new channels dedicated to repair, reuse and recycling. (A. KALT- 2012).

Each percentage point decrease in the use of primary resources in Europe is equivalent to approximately € 23 billion in savings for companies with the potential for job creation of between 100 and 200,000 jobs.

Microeconomic:

The model is soluble in a regulated market economy, through the multitude

initiatives that activate it and the free creation of the innovative business models it promotes (eco design, functional economy, collaborative economy, sharing).

Social:

By establishing close contact between actors in the territories, by their mobilization on

themes of respect for the environment (rational consumption, waste management, societal responsibility requirement), through employment sources that cannot be relocated

in the fields of the green economy strongly anchored in the Social and Solidarity Economy ESS.

Environmental:

The drop in the level of waste thanks to the effects of sustainability and the dynamics of local loopback positively and interactively leads to a series of reactions: reduction of resource extraction, rational use of local resources, revitalization of local agriculture, reduction of pollution, resilience of communities who find a multitude of resources locally.

2. Interactions between growth and the environment

The various assumptions made about the nature of the interface between economic activity and the environment play an important role in studying the relationship between growth and environmental degradation. The first meaning goes from the environment to the economic system characterizing natural resources (exhaustible or renewable), either for productive use or as an amenity value. The second meaning goes from the economic system to the environment which releases pollutants and acts on the quality of the environment. In order to study the interactions between economic growth and the environment, it is useful to examine them. fundamental characteristics of the dynamics, economic and ecological, and to specify their links. Economic activity is conceived as a system in which rational agents interact in search of their private interests. Able to be represented by a general equilibrium model, this system determines the aggregate order, aggregate demand, and market structure under which the production and allocation of resources are ... fixed. This system therefore determines the rate of exploitation of natural resources and the level of pollution generated. Environmental degradation is in this sense intrinsically linked to economic activity; although investment creates new capital goods and consequently offers new opportunities for economic growth, the exploitation of a resource or the pollution associated with it causes a deterioration in the quality of the environment. Such a deterioration constitutes a loss in the well-being and / or in the productivity of the factors of production. We can quickly conclude that there is a contradiction between growth and the quality of the environment. However, such an assertion must be qualified as long as possible changes in the productive sphere are taken into account. In fact, our way of producing has known and is undergoing recurrent and fundamental changes which have manifested themselves in the adoption of new

production technologies that are less dependent on natural resources or less polluting. These mutations can be assimilated to “borderline technologies” to use the terminology of Nordhaus (1973). Like electric, solar or nuclear energy, a “borderline technology” would be able to solve the environmental problems associated with forms of fossil fuels. It is often accepted that the issue of natural resources is relatively different from that associated with pollution. While the exploitation of natural resources constitutes a physical limit to economic growth, pollution is generally conceived of as

a anthropogenic limit with regard to the loss of well-being or productivity that it generates. In this presentation, we are only interested in pollution as a phenomenon of degradation of natural environments which originates in economic activity. are aware of the fact that their behavior can be at the origin of polluting emissions. However, each agent seeks his interest private and does not take into account the social consequences of pollution. It is thus defined as an external effect which acts on the well-being or on the productivity of individuals. The theory of external effects therefore provides an adequate analytical framework to study the optimal behavior of a polluting economy.

3. Pollution as an economic phenomenon

As the main source of pollution is economic activity, it is necessary to take it into account in the economic analysis. Public economics is the preferred discipline of economic theory for analyzing the phenomenon of pollution. The concept of reference, in this context, is that of "external effect".

According to Pigou (1920), there is an external effet or an externality in all cases where the well-being of a consumer or the production possibilities of a firm are directly affected by the actions of another agent without let the market intervene. An externality can be positive, if it improves the well-being of the agent concerned, or negative if it deteriorates its well-being (which is the case with pollution). environment imposed itself as a sub-discipline of public economics, dealing with these problems and proposing a range of economic measures to reduce the costs associated with them. Environmental economics was generally confined to the instruments of microeconomic analysis in a framework of partial equilibrium. The problems of depletion or scarcity of certain natural resources were the subject of a separate discipline. the economics of natural resources. Since the 1970s, environmental degradation and its links with economic growth have attracted the attention of many economists. Economists have introduced environmental concerns into the model general equilibrium dynamic which forms the microeconomic basis of optimal growth models. Environmental macroeconomics thus arose from the meeting between traditional environmental economics and growth theory. The optimal growth model has been modified by introducing environmental degradation as a negative external effect. However, this model considers macroeconomic variables in the form of aggregates (production, consumption, investment, etc.) whereas pollution is a disaggregated phenomenon which groups together several forms of pollutants with multiple origins and impacts. Thus, it would be futile to establish a pollution aggregate grouping together all forms of pollution. For this reason, most authors use a hypothetical indicator of the quality of the environment that intervenes as an argument in the utility function or in the production function.

Forms of pollution

Pollution can take the form of a flow or a stock of pollutants. When viewed as a flow (in the case of unwanted noise or certain toxic and non-persistent volatile organic compounds), the quality of the environment can improve rapidly when the sources of polluting emissions are reduced.

On the other hand, when it comes to pollution stock (accumulation of SO2 or CO2), the quality of the environment is gradually affected by the effects of pollution, insofar as it deteriorates its regeneration capacities.

Note that taking into account the pollution accumulation process calls for a complex modeling of the bio-physical phenomenon of environmental degradation. This modeling can only be specific to each type of pollutant. In the literature on growth models with a pollution stock, we most often retain simplified linear forms separating the process of creating pollution from that of natural regeneration. Gradus and Smulders (1996) show, in the case of 'an endogenous growth model with linear production technology, that the deterioration of the well-being of agents resulting directly from pollutant flows or from a pollution stock, does not in any way modify the qualitative conclusions of the model. In this paper, we consider that the quality of the environment deteriorates due to pollution flows which are fatal products of productive activity. We are also considering the possibility of reducing these pollutant flows through an economic decontamination activity.

4. Blockchain and circular economy

The blockchain is a ledger of public accounts that can store transaction records or any other data. It does not belong to anyone and a copy is stored on many personal computers around the world. Anyone can use it and help run the network, eliminating the need for middlemen and allowing users to interact with each other, peer to peer (P2P). Blockchain technology can also reduce transaction costs and increase the efficiency of the service processed (money transaction, signing of a contract, sale of goods, etc.) by automating it. By being inherently public and owned by all, this type of network is virtually impossible to dismantle or tamper with.

Once a data record is made (a money exchange for example), it cannot be changed and remains in the ledger forever. A new data record can only be added after it has been validated by multiple computers. This makes the data reliable without resorting to a third party. The ledger is secured by advanced cryptography which aims to anonymize users' personal data (contact details, personal information, type of device used, etc.) which makes it difficult to handle.

Initially, this technology can make it possible to optimize resources by automating and facilitating transactions and therefore flows, but also by integrating new players.

If we take the example of the electricity market, a complex sector with many players (producers, distributors, consumers ...), we can consider that it is fertile ground for blockchain. Indeed, it offers the possibility of eliminating intermediaries by making the system less expensive and more efficient. In combination with smart meters, the blockchain system can be used to transmit payment transactions, record these transactions safe from manipulation and control the flow and storage of electricity, thus managing payment through deployed smart contracts. within the blockchain. In addition, "peer-to-peer" exchanges - a technology allowing the direct exchange of data between computers connected to

the Internet, without going through a central server - are becoming possible. Local energy producers, like households that also produce electricity, can therefore sell their energy directly to their neighbors without an intermediary. Thus, the flow of electricity can be directed more efficiently to consumers over short distances, reducing energy transmission losses and the need for storage.

There are already examples of interesting solutions dedicated to the energy market. SunContract for example is a blockchain-based peer-to-peer energy trading platform for solar power and other renewables.

A blockchain-based platform could therefore enable institutions, businesses and individuals to achieve better productivity by investing directly in renewable energy production facilities.

It could also increase energy exchanges and reduce waste with the aim of facilitating the transition to a system of sustainable electricity consumption, as proposed by the German “energy transition” which aims to cover 60% of electricity consumption. national energy by renewable energies by 2050.

The goal of blockchain technology is also to create new opportunities. In particular, companies can use it to change current uses in order to have more sustainable habits. Today, we are seeing more and more products appear as a service, we pay a yearly subscription according to our consumption.

Companies can therefore offer products as a service using sensors to understand their use. Users pay a subscription based on their consumption while businesses retain ownership of the product. This is a mutually beneficial partnership: companies receive a continuous source of revenue and are incentivized to design their products for a longer period of time, while consumers pay only for what they need. The use of products is therefore optimized, which reduces waste and environmental impact, especially when we know that on average, in France, a car is used 7h12 per week, which corresponds to 5% of the time. .

Besides the electricity market, the sharing economy can also become a big beneficiary of blockchain technology. For example, companies like Uber or Airbnb can become useless, because the blockchain system allows two entrepreneurs or intermediaries (P-2-P) to interact directly. In the case of decentralized carpooling, the advantage is that the drivers have the possibility to work independently of a central institution like Uber, while the users benefit from reduced prices. The first decentralized carpooling start-ups, such as ArcadeCity or Lazooz, are working on the development of applications.

More and more people want to buy ethically produced products, but this information is often difficult to verify. A product passes through many hands before it arrives at the store. It's very easy for companies to lie about how their products are made, the materials and chemicals they use, where they dump their waste, or how they treat their employees.

Blockchain can be used to track products from manufacturer to shelf and help prevent waste, inefficiency, fraud and unethical practices by making supply chains more transparent. They can also help consumers be better informed about how each product has been manufactured and shipped so they can make greener choices.

If we were to track food, for example, it would allow shoppers to buy local produce knowing that it is actually grown locally. It would also reduce carbon emissions due to the fact that food does not have to travel long distances. Lock chains can ensure that a fish sold at a fish market is from an artisanal fisherman or verify that a bag of coffee has been purchased at a fair price for the producer.

For example, the startup Provenance intends to design a system capable of tracking in real time all the materials used, including qualitative and quantitative aspects, throughout the supply chain. They seek to obtain a digital passport for any product, which allows consumers and producers to follow the entire production process. Thus, it becomes possible to obtain digital certifications, such as emission quotas or proof of origin. Guarantee the validity of certificates and empower consumers to choose their purchases.

5. Conclusion

The circular economy is therefore emerging as a necessary paradigm shift to preserve resources and guarantee the future of our societies. However, while the transition to the circular economy is a collective imperative, its achievement will also be based on individual initiatives to transform companies' economic models.

I would like to present to you the solution to improve the situation in the field of circular economy.

We can see that new technology like blockchain can solve the pollution problem. Blockchain can be an important support in our circular economy. On the one hand, the circular economy provides the framework for offering alternatives to traditional economic systems. On the other hand, the blockchain offers solutions to facilitate certain key circularity principles such as the optimization of resources or their pooling. Nonetheless, although it can theoretically serve a more circular economy, its functioning and its heavy dependence on energy and technological resources seems to go against the principles of sobriety necessary for natural ecosystems.

At the same time, the blockchain facilitates the transition to a circular economy, and a circular economy would allow the blockchain to be more virtuous.

It therefore seems interesting to combine the two subjects, already popular with certain organizations, in order to develop business models and the management of resources - tangible or intangible.

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