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WHITE PAPER

THE FUTURE OF RECYCLED PLASTIC

An open platform for plastic
lifecycle awareness, monetization
and sustainable innovation



PLASTIC*twist*

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Summary

The PlasticTwist platform is a project promoting the circular economy paradigm by supporting innovative proposals. Specifically, it aims to design, deploy, and validate an open platform which will “twist” plastic reuse practices. Boosting citizens awareness on plastic pollution, stimulating circular economy practices and sustainable innovation, PlasticTwist seeks to promote a new plastics economy vision. From the citizen point of view, PlasticTwist offers the following innovations:

- A change of paradigm in the way plastic is used and consumed
- A monetary tool to promote local and circular economy
- An asset helping them to get traction so that they can be the actors of the change they want.

Thus, to achieve such objectives, PlasticTwist offers different experiences to its users, such as the Marketplace, the Monetization, the Gamification, and the Crowdsourcing tools. In order to apply PlasticTwist in real-life events, three different locations were selected as test

environments, and are testing the pilot project: Greece, Switzerland and the Netherlands. Although recycling reality in each of these countries is very different, plastic waste is still seen as a major challenge. Furthermore, each of the pilots aspires to empower the civil society - particularly citizens - in this challenge, by creating awareness on the topic and providing appropriate tools. The pilots seek to increase all stakeholders (citizens communities, inventors, innovators, and entrepreneurs) involvement and engagement in the project, with emphasis on the social gains and sustainability potential. The blockchain is already operational and under beta-testing by our pilots, and we are seeking to widen its use in the society.

It's expected that PlasticTwist will largely impact citizens and grass-rooted groups co-creation, innovative and trusted collaboration, and knowledge transfer, while also increasing the awareness between the stakeholders. In consequence, PlasticTwist believes that plastics will become a valuable asset, as an effect to its increasing re-entrance in the circular economy and the novel technological approach.

A European Commission H2020 project

The European Commission has addressed the transition to a circular economy as an important and pressing topic. In consequence, the Commission has made an H2020 call for projects addressing this issue. The lack of models and blueprints has been recognized as a problem for promoting a circular economy. The creation of such tools is needed to produce collective intelligence in key sustainability areas, leveraging on open data, knowledge networks, open hardware and Internet of Things. Thus, the challenge here is to demonstrate that the existing or emerging innovative combinations of network technologies enable a new Digital Social Innovation that will better cope with the emerging sustainability challenges, achieving mass adoption and a measurable global impact. This project received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 780121.

Motivation

Plastic is everywhere in our modern life; it is unthinkable to project a world today without plastic. The properties that make plastic useful and versatile – such as its low cost, lightweight and durability – are also making it hard to dispose of and such waste may linger on for thousands of years. It's well documented that plastic waste poses a tremendous threat to our environment, from overflowing landfills to the ever-growing ocean gyres. Its consequences range from damaging fragile ecosystems to affecting the food chain.

From a European perspective, the situation isn't very different from the rest of the world. Based on information from 2015, the European Parliament has shared that less than 33% of the plastic waste produced in Europe is recycled (European Parliament, 2018 ; European Commission, 2018). Given that 25 million metric tons of plastic waste are generated every year in Europe (European Parliament , 2018; European Commission, 2018), this means that 17.5 million tons of plastic wastes are sent to the landfills! All this plastic that could have been re-used or recycled can also end in our oceans.

One of the main victims of the ocean's plastic pollution is wildlife. Examples of animals tangled in plastics bags or abandoned fishing equipment are well known, and more evidence has been found of the effects of plastic debris in wildlife diet (Tropical Conservation Fund, no date; Parker, 2016). Furthermore, given that small plastics breaks down into tiny particles - the so-called microplastic – these microplastics are consumed by marine wildlife, which ends up at the end in the human diet (World Wide Fund for Nature, 2019). Recent research has found that humans are indirectly eating around one credit card of plastic a week (World Wide Fund for Nature, 2019). Furthermore, these micro plastics

have ended up forming the so-called plastic soup in the ocean – also known as the Pacific Garbage Patch - which is around the size of an island (Lui, 2018).

Given the broad adoption and impact of plastic in society, the importance for various areas, such as the health and food industry, tackling the plastic waste challenge requires global collaboration and calls for innovation. Due to the huge impact that plastic waste has on the social well-being, economy and environment, a new paradigm has emerged as a response: the Plastics Economy movement (World Economic Forum, 2016). This new paradigm is better explained and explored in the recent "The New Plastics Economy: Rethinking the future of plastics" and "The New Plastics Economy: Catalyzing action" reports by the World Economic Forum and the Ellen MacArthur Foundation (World Economic Forum, Ellen MacArthur Foundation and McKinsey & Company, 2016; Ellen MacArthur Foundation and New Plastics Economy, 2017). Both documents explain the vision of a global economy in which plastic, rather than being a waste, becomes an asset, which can inspire and mobilize innovative solutions. This new plastic economy vision has gained wide acceptance and momentum, as shown by Gartner's report (Gartner, May 2016).

In line with this same paradigm, the European Union has adopted the circular economy paradigm as one of its main challenges. In fact, in 2018 the "European Strategy for Plastics in a Circular Economy" was adopted, and the "Strategy on Plastics in a Circular Economy" roadmap was published in 2017 (European Commission, 2017). The objective of the roadmap is to make plastics a priority for circular economy innovation plans.



Subsequently, the European Union has encouraged the creation of innovative projects promoting the circular economy paradigm. That's how PlasticTwist project was born, as a project built on the collective and digital social innovation (DSI) principles (European Union, 2015). PlasticTwist seeks to disrupt current plastics waste practices with an open platform which will empower citizens, inventors, communities, markets, and innovators. The proposed platform also contributes to raising awareness on the subject, incentivizing communities to participate and share plastic waste and digitally monetizing plastics. As a result, plastic doesn't turn into waste but rather re-enters into the economy, while also raising its monetary and aesthetic value. What makes PlasticTwist so interesting and innovative, is that the project considers plastics waste as an asset, which can be capitalized by a trusted and incentivized monetization model in a grass-rooted creativity and invention capacity.

Paradigm Shift and User Revaluation

Accordingly, to achieve this goal, PlasticTwist has defined as its main objective to increase awareness about plastic waste, by promoting plastic reuse and reducing plastic waste.

In this new paradigm, the citizen is not a simple consumer anymore. Instead, they play an active role in the elaboration of new economic policies in which they are involved. As such, plastic revaluation becomes a civil issue, rather than a politician one. Innovations can spawn from any concerned citizen, and depending on the success of this idea, can be generalized and applied everywhere. Hence, citizen-centered economy allows a complete paradigm shift, going from

top-down strategy to bottom-up innovation. Bottom-up innovation is usually more appreciated, as the citizens are the ones who know their own needs. They are the most capable people when they need to solve their own problem. Moreover, bottom-up innovation fosters parallel experimentation, where many people can suggest ideas, and the more fit will naturally emerge from the pool of suggestions. Hence, the PlasticToken is not only "yet another eco-friendly project". On the contrary, this new currency aims to shift the classical economic model to an innovative one, bottom-up innovation-led, circular economy, in which citizens will be the main actors of the future policies. In order to reach this goal, our strategy focuses in creating a platform that will raise plastic recycle and reuse rates, while also facilitating the citizen involvement in the circular economy. PlasticTwist addresses three specific challenges, namely:

- **Increase the reuse and recycling rate.** Plastics recycling and reuse rates are alarmingly low, with only 14%-18% of plastic packaging is recycled globally (OECD, 2018).
- **Low quality and single-use plastics.** Plastic as a material is not valueless; it is only perceived as such.¹ Advancements in circular design and Makerspaces as places to develop new concepts for reuse are useful bases for reevaluating plastic.
- **Prevention of plastics leakage.** Plastic waste has a significant impact on the environment and food chain. According to Forbes, the oceans are infested with over 5 trillion pieces of plastic, plastic packaging being one of the key contributors of such waste (McCarthy, 2017).

¹ A Makerspace is a collaborative work space for creating, making, learning, exploring and sharing ideas either using traditional crafts or technology

Circular Economy for the citizen

The idea of a circular economy is a novel approach different from the current linear and buy-and-consume paradigm. The idea itself is a mixture of various school of thoughts (Ellen MacArthur Foundation, 2017), that seeks to “‘design out’ waste” (European Commission, 2014) on the product, through its whole life rather than just at the end of it.

Circular economy contributes to citizen empowerment, as it turns them from a simple consumer, at the end of the product lifecycle, to an essential actor allowing products to re-enter the market. Hence, the user’s opinion about future policies must be considered, as they play a role equal to the one of other actors of the supply chain. Moreover, motivated users can league together and form associations to carry their voice more easily to the other actors.

Assume, for instance, that a citizen wants to promote the local economy. Local shops often struggle to find new consumers as they are not necessarily aware of the brand, and consumers may prefer to shop on larger markets. However, by trading with existing local shops in a circular economy, one will give two boosts to the local shop. The first one by establishing an exchange agreement in which the citizen supplies the shop, and the second by reinforcing the possibility that the citizen will buy from the shop (as they already interact with them). Hence, a twofold advantage of the circular economy for citizen empowerment.

PlasticTwist Idea and vision

The reason why the PlasticToken has been designed is to give new powers to the citizens and help them build the eco-friendly economy they desire. PlasticTokens will act as a means that foster citizen innovation, changing their view on plastic waste and the economy surrounding them. For this to happen, PlasticToken will empower citizens and with these new powers, the citizen will have an incentive to think and act more responsibly than before. Primarily, they will do so by tackling the three challenges PlasticTwist is addressing: increase reuse, limit single-use, and reduce plastic waste and leakage.

The three challenges have driven PlasticTwist creation and design. One key lesson that has been learnt from previous initiatives is the necessity to incentive the participation of users and monetize waste. It is vital to keep stakeholders engaged with the project. As such, PlasticTwist uses novel technology to accomplish both goals. PlasticTwist has been, particularly, designed with a gamification approach and utilizes crowdsourcing mechanism (as shown in Fig. 1). The

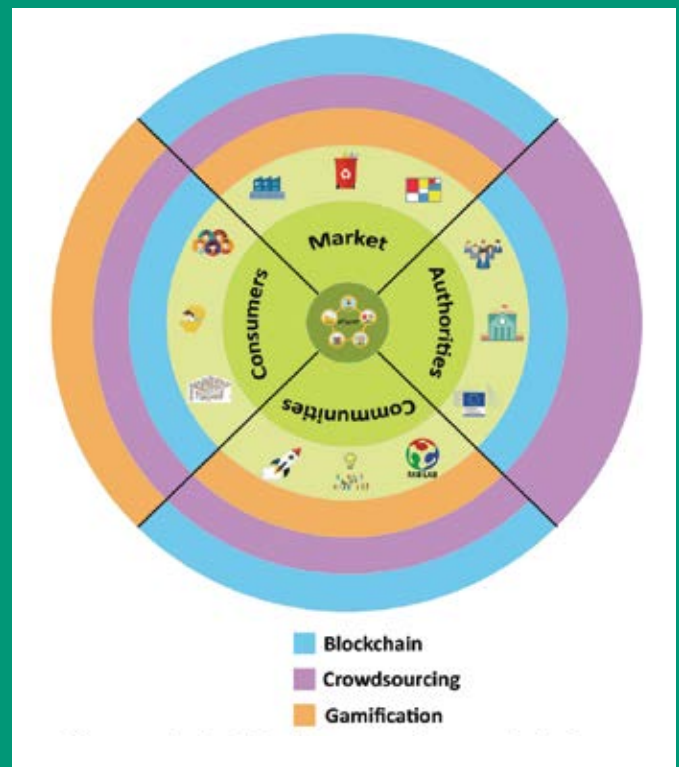


Figure 1 Plastic Twist novelty and vision

gamification approach allows users to have an entertaining and valuable experience, in which rewards are given based on their actions. Ergo, the platform will enable users to familiarize with the technology and incentivize them to use it.

THE TEAM & THE PILOTS



PLASTIC*twist*

Meeting the Pilots

As PlasticTwist aims to tackle a challenge that involves the whole society, 3 pilots have been selected in 3 countries for testing the product: the Netherlands, Switzerland, and Greece. These three countries were selected because they cover a wide range of demands, cultural norms, and economic states with respect to plastics as an asset paradigm shift. Also, in each of these societies, there is a plastic waste crisis, either it being a low recycling rate or a high amount of plastic waste production. On the other hand, the pilots were selected based on their objectives and how they can relate to PlasticTwist. Each of them will exploit PlasticTwist features to carry out their plans.

In the following section, we introduce you briefly to every pilot and project, so you can know them better, what they are doing and what they aspire to achieve. To know more about each pilot, you can check the PlasticTwist website: <https://ptwist.eu/>

Swiss pilot

Why Switzerland?

Switzerland produces 700 kilograms per capita of plastic waste, placing it almost at the top of Europe. At the same time, apart from recycling plastic bottles, they do not have a common plastic recycling system and Switzerland is still in the process of conceptualizing a common plastic collection and recycling system.

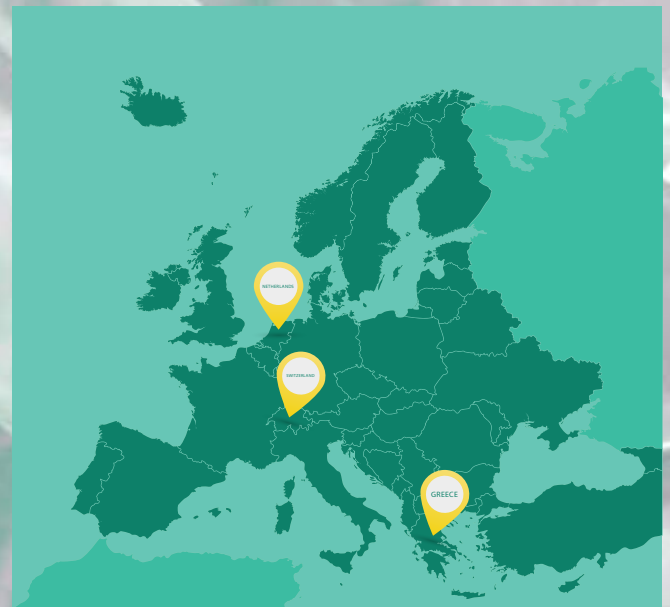
What does the pilot aim for?

The Swiss pilot aims at prototyping a recycling ecosystem that can serve as a role model and inspiration for politicians and citizens alike. The pilot partner of PlasticTwist in Switzerland is the Future Laboratory CreaLab (further called CreaLab) at Lucerne University of Applied Sciences and Arts (HSLU) with its Fablab Lucern.

The Partner's role:

In February 2011, CreaLab set up and opened the first Fablab in Switzerland. In the project, the Fablab Lucerne acts as a nucleus and testbed for developing a citizen-driven local ecosystem that uses the PlasticTwist platform for plastics-as-an-asset activities. It is particularly suitable for this role, as it needs plastic fibers as its basic material for 3D printing activities, and due to the local network of

3D printing enthusiasts – citizens, entrepreneurs and companies alike – who use the facility for their purposes. It will activate the community to participate in both the recycling and the production activities. Furthermore, it has a strong focus on educating the local community on how to use digital production technologies. It can easily add the collection and transformation of plastic material into raw material for 3D printing.



Dutch pilot

Why the Netherlands?

The Netherlands has one of the highest plastic recycling rates within Europe, while at the same time, it produces a waste per capita of around 550 Kg a year (70 Kg more than the EU average). Currently there are few systems in place within the Netherlands to keep plastics out of the streets.

What does the pilot aim for?

The Dutch Pilot aims at making locally valuable and visible products out of these waste streams; engaging local public in the process of recycling, rethinking, and making. As the throughput of plastic is highest at large corporates or institutions, the Dutch pilot will focus on improving institutionalized procurement and waste management systems. PlasticTwist considers the project can make the maximum impact in terms of reduction and recycling plastics in this type of organizations.

Greek pilot

Why Greece:

According to different data sources, plastic is the predominant marine litter in all the studies of beach stranded, submerged and floating debris around Greece. According to the data acquired by the nationwide Clean Up the Med campaigns (2006-2007, 2009-2013), plastic is the most common litter material in the 209 Greek beaches examined, accounting for almost half (within a range of 37-63% of trash depending on the beach) of the total litter items.

What does the pilot aim for?

The partner in Greece will make use of the popularity of the Clean Up the Med campaign in order to inform, communicate and disseminate the PlasticTwist platform. It will also educate about best practices regarding sea plastic reuse, the different types of plastic and contact potential actors that might want to participate in the PlasticTwist project. The Partner's role. The pilot partner of PlasticTwist in Greece is the Mediterranean SOS Network (further called MedSOS). MedSOS is a non-profit, non-governmental organization (NGO) active since 1990, dedicated to protecting the environment and promoting sustainable development at national and Euro-Mediterranean level. The organization works in a wide range of environmental issue, including management of marine, coastal and inland water resources. Since 1995 (initially in collaboration with LEGAMBIENTE from Italy), MedSOS is the national coordinator of the large-scale campaign CleanUp the Med, which consists of clean ups, with the participation of more than 18.000 volunteers/year.

THE FUTURE OF RECYCLED PLASTIC



Advisory Committee



DENISA KERA

is a philosopher and designer who uses prototypes and prototyping in the context of STS (Science, Technology, and Society) research. Prototypes express the entrepreneurial, educational, participatory, and activist aspirations and promises of the emergent technologies.



PETER TROXLER

is doing research at the intersection of business, society and technology. He is equally intrigued by the challenges of investigating models that explain and applying these models that explain and applying these models to both companies as permanent and project as temporary organisations



LUDOVIC CÉLÉRIER

is a young French entrepreneur from Paris. He starts his career in IT and Digital Strategy consulting. He co-founded several Start-ups in Smart_City and Smart-Building in particular in new uses like coworking, and local community tools.

THE PLASTIC TWIST ADVISORY COMMITTEE (AS)

is made up of representatives of user groups, communities, industry, innovators, ICT experts, and specialists in the domain of plastics waste. Its main role is to:

- Offer feedback on the quality and adequateness of the project activities and outcomes
- Provide recommendations for future work based upon key results of the project
- Give input with regards to user and market needs and feedback with regards to the exploitation strategy and activities;
- Observe additional added value that may be created throughout the implementation of the project



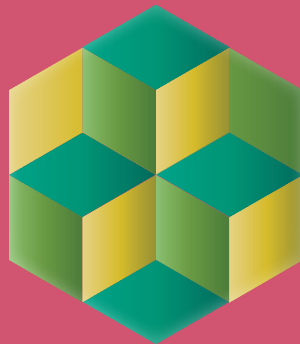
INVESTING



LEARNING



REUSING
PLASTICS



PLASTIC
TOKENS

PLASTIC*tokens*

Our use case examples

How can I earn Plastic Tokens?

Inspired in the values of the circular economy and PlasticTwist ideology, the platform does not allow someone to obtain Plastic Tokens in exchange of Euros or any other currency. On the contrary, users will be able to obtain Plastic Tokens by participating within its ecosystem. For instance, a user can register in the PlasticTwist platform and advertise their plastics for reuse in the marketplace feature. Once the offer is registered, the user (henceforth the advertiser) can add further details about the plastic composition, the colour, the quality, among others. Once an interested buyer has concluded the transaction with the advertiser, the user's wallet is automatically credited with the agreed amount Plastic Tokens.

Consequently, Plastic Tokens can be earned by anyone in the PlasticTwist ecosystem, if the actor commits to plastic reuse, plastic recycling, and education about plastic waste.

On the PlasticTwist platform, people can become engaged in projects, offer and obtain objects and offer expertise to projects.

The main drive and attraction of the platform are how people with interest in the new plastic economy exchange and interact or how with projects with a circular plastic economic structure define, develop and disseminate a business proposal concerning the sustainable and complex value of plastic:

People who have a project and want to use the PlasticTwist ecosystem will be encouraged to define said project via a Life Cycle Assessment methodology, to earn its corresponding plastic token value. In order to fill in their assessment, people can make use of PlasticTwist crowdsourcing tools, so that they can learn about the current trends and demands in the plastic environment. Of course, they can also come up with their own ideas.

The diverse evaluation process on the platform synchronizes projects to create a value proposition for the sustainable development of a future circular plastic economy. The dimensions of the evaluation

are the basis of the understanding of a new circular plastic economy defined by the combination of the people, innovation, material, transport and impact criteria. In order to avoid biases, algorithms have been developed to give the user an idea of the amount of tokens they will receive for a project. These rules have been developed by the consortium and will be the same for everyone, thus guaranteeing an equal treatment for each project.

Once the project has been defined and submitted, a peer-review process engaging experts and the members of the platform will validate it. Each project will be evaluated and receive a number of Plastic Tokens with which it can operate on the platform. If the project manager chooses to, they can share the tokens with all the people engaged in its project.

Hence, innovative projects will be given a significant boost via our platform, facilitating their exchanges with other actors thanks to the Plastic Tokens they have received.

There are other ways of obtaining Plastic Tokens, more aimed at individuals rather than projects. These rewards are automated and will encourage users to use the platform for themselves.

- **Investing in PlasticTwist crowdfunding:** for each backer, Plastic Tokens will be given, as a thank you for the support.
- **Recycling plastic:** by bringing plastic to be recycled by interested partners on the PlasticTwist platform, people will be awarded tokens. Thus, people actively participating in reducing plastic waste will be rewarded.
- **Learning and getting involved in our events:** the gamification app educates users about plastic waste. Hence, as a reward for learning, they will be awarded tokens. Similarly, volunteers to events (beach clean-ups, participatory workshops, etc.) will be thanked for participating in the PlasticTwist ecosystem.

Regardless of how the user earned the Plastic Tokens, they can be used across the platform as digital currency. As stated before, Plastic Tokens cannot be converted to Euros or other currencies; they are intended to be used as a currency for plastic reuse and nothing else.

Some of the PlasticTwist features where PlasticTokens can be used are:

- **The Wallet.** Users will have a wallet available as a smartphone app, called the PlasticWallet. This wallet was designed intuitively making it easy to use and understand, while still offering a variety of services. Any user should be able to use the application without any major inconvenience. For example, the PlasticTwist wallet allows the user to consult their account, check their balance, transfer PlasticTokens to other accounts, among other features. Systems of invoices are natively included in the app, making its use intuitive and efficient.

In other words, the PlasticWallet is a digital equivalent of a debit card and a bank account combined.

- **The Marketplace** is where users can buy and sell their reused plastics assets. Two modes are available on the platform, namely a classical mode, in which a user pays the asked price, and the asset is then delivered. The other mode, à la ebay, is a bidding contest in which the asset will be sold to the highest bidder.

Growing the value of the PlasticToken with Projects

On the PlasticTwist platform people can become engaged in projects, offer and obtain objects and offer expertise to projects.

The main drive and attraction of the platform is how people with interest in the new plastic economy exchange and interact or how with projects with a circular plastic economic structure define, develop and disseminate a business proposal in relation to the sustainable and complex value of plastic:

People who have a project and want to use the PlasticTwist ecosystem will be encouraged define it via a Life Cycle Assessment earn its plastic token value.

The diverse evaluation process on the platform synchronises projects to create a value proposal for the sustainable development of a future circular plastic economy. The dimensions of the evaluation are the basis of the understanding of a new circular plastic economy defined by the combination of the following dimensions people, innovation, material, transport, and impact.

The evaluation of the projects on the platform is confirmed in a peer-review process engaging experts and the members of the platform. Each project will be evaluated and receive a number of Plastic Tokens with which it can operate on the platform. If it chooses to it can share the tokens with all the people engaged in its project.



From left to right and top to bottom, the login page, the balance (home) page with a history of recent transfers, the contacts page, the QR code used for adding a contact or receiving a payment, and the validation of the transfer.

PlasticTwist platform

How to use its features

PlasticTwist Crowdsourcing tool - Analytics

The PlasticTwist Crowdsourcing tool captures the public perception of plastic to give an insight of current trends through data analytics. Contrary to what its name might suggest, this tool is not related to the fundraising nor PlasticTokens. It basically collects information about the plastic thematic from different sources, thus carrying out a “crowdsourcing” debate. It also allows users to find inspiration on innovative plastic reuse ideas and practices. The tool is available through the following link.

<https://crowdsourcing.plastictwist.com>

The key objective of the Crowdsourcing tool is to better understand user's behavior on public media platforms about plastic recycling and reuse. To be more specific, PlasticTwist analyzes what type of content users are sharing about plastic waste (and other related topics), what are they saying about this, the latest trends and seek for new and innovative ideas. For doing this, PlasticTwist Crowdsourcing tools will search for terms/phrases that are related to plastic waste or plastic reuse and recycling.

MarketPlace

Another important PlasticTwist feature is the marketplace. Differently from the crowdsourcing tool, the MarketPlace is focused in the economic aspect of plastic waste; it is the place where anyone can buy, sell and auction recycled plastic products. The inscription is automatically made after registering into PlasticTwist, and everyone is free to use the platform as a buyer, or seller, without restrictions.

Let us consider a typical use case of the marketplace: Alice logs into the marketplace and looks at items offered on the platform. She notices a recycled plastic basket that she likes and decides

to buy it. She simply clicks on the “buy” button and now is the owner of a new basket. Later, Alice notices she still has Tokens on her wallet, decides to participate in an auction for a unique artistic sculpture, made of repurposed plastic bottles. She auctions her remaining tokens and logs out. Sadly, a better auction is made by another user. When Alice logs in after that, she sees a notification of bidding failure, and the tokens she bid have been returned to her.

The idea behind the marketplace is to simulate a real-life market for plastic waste. The marketplace aims explicitly at reintroducing value to plastic waste and transform it into an asset. As already described, the currency for exchange inside the MarketPlace is the PlasticTokens. How are PlasticTokens created?

Blockchain technology

What is it and why we use it

PlasticTwist needs to use a technology that is secure, transparent and allows users to exchange the currency for its implementation. In other words, it was necessary to create a specific cryptocurrency.

Before explaining why PlasticTwist is using cryptocurrencies and blockchain, it is essential to understand what blockchain is. Blockchain, in straightforward words, is a distributed database, where different nodes record information in “blocks”. In other words, every actor in a network has a copy of the information that is recorded in “blocks”, and thus it is kept securely. It is a novelty technology, that has been gaining more adepts in recent years. How is the information kept safe if everyone in the system has access? Let's clarify a few concepts before answering that question. Firstly, every “block” is linked to the previous block; every new block that is created with information, comes along with the ID or identifier of the previous block, this ID is based on the information that is inside that specific block, meaning that if the information is

somehow changed, so does the ID. Secondly, to create a new block, the actors or nodes involved in the blockchain must agree on the new piece of information; this is what is usually called a consensus algorithm. How it works is beyond the scope of this paper, but it is done in such a way that it is almost impossible for a malicious actor to create a fake piece of information (more on that soon).

Moreover, and because every actor in the network has a complete database copy, the information is transparent to everyone to check what is happening.

Given these blockchain technology properties, the system can accomplish specific characteristics. To be precise:

- It is nearly impossible to alter the information of a previous block. If such an unlikely event happens, the rest of the network will immediately notice it, because they have a copy of such block and may also compare the ID of the blocks they have with the one that has been modified.
- To create a new block, that has truthful information, every actor must agree on this (the consensus algorithm). Using sophisticated cryptographic techniques, this is implemented in a way that a malicious actor can't include false information. This process is depending on the policy of each blockchain system how the algorithm works and how many actors need to agree to create a new block.

Due to all the blockchain benefits, PlasticTwist decided to adopt the blockchain technology and create its own cryptocurrency, the PlasticToken. Bitcoin and Ethereum are currently the most popular cryptocurrencies; nonetheless, other platforms can be used, particularly for private companies. Hyperledger is a platform that allows the creation of blockchain for a wide range of applications. It also allows for more flexibility when building a system and uses smart contracts, one of its most prominent characteristics.

Which leads us to, what is a smart contract?

Why choose Hyperledger over other platforms? Firstly, one of the biggest criticisms to Bitcoin is the

amounts of energy it consumes. Bitcoin uses a high amount of energy, because its consensus algorithm - known as Proof of work – requires the usage of high computation resources, as a form to prevent malicious activity². Also, Bitcoin lacks the flexibility that Hyperledger has to offer, particularly about smart contracts creation and management. Smart contracts are a piece of code that allows for transactions to happen, under certain conditions and with certain rules. It is a sort of software, that takes input and then executes some actions. The appealing aspect of smart contracts is that all the transactions are automatically enforced when a smart contract is in place. Furthermore, once the contract is written on the blockchain, it cannot be revoked, thus increasing trust that everything will be executed as specified.

Consequently, when building the PlasticTokens, PlasticTwist took into consideration the impact that the cryptocurrency could have on the environment, after all, one of the central values of PlasticTwist is sustainability and flexibility to build a reliable, secure and transparent technology. Thus, after carefully analyzing the PlasticTwist requirements and what the project was aiming for, the best platform that could offer all these aspects was the

AN OPEN PLATFORM FOR PLASTIC LIFECYCLE AWARENESS, MONETIZATION & SUSTAINABLE INNOVATION

² If you wish to learn more about the proof-of-work and other Bitcoin terms, you can visit the website <https://bitcoin.org>

Permissioned ledger, user registration & cryptocurrency

Hyperledger Fabric relies on what is called a public permissioned blockchain (also called consortium blockchain). Most of the well-known cryptocurrencies using blockchain, such as Bitcoin, are what it is called a permissionless blockchain. A permissionless blockchain is a network where anyone can join, that is decentralized with no user management. However, in a permissioned blockchain, only invited or allowed actors are permitted to participate. Furthermore, there is usually a centralized entity – that carries out user management – and defines the rules of behavior of the actors in the blockchain. In short, a permissioned ledger is a more controlled environment than a permissionless ledger.

Given the nature of PlasticTwist, the project requires a permissioned blockchain rather than a permissionless platform. Thus, the PlasticTokens are built on top of Hyperledger Fabric, which provides certain advantages over permissionless blockchains, such as:

- **Knowledge of the participants:** All the members are registered and known into the network, allowing PlasticTwist to track the behavior in order to detect malicious activities.
- **Privacy by purposes:** The network allows to configure the user rights, maintaining a certain level of privacy according to the business rules of the ecosystem.
- **Consensus by democracy:** The consensus can be reached by the members' voting instead of proving honesty by spending computational resources (energy consumption) like in Proof of Work from Bitcoin

PlasticTwist cryptocurrency has been implemented on a permissioned blockchain, which is accepted by all members of the PlasticTwist ecosystem. For managing the transactions on the blockchain, PlasticTwist relies on a blockchain standard: ERC20. This standard defines how the interfaces are made between the user and the blockchain. As

ERC20 tokens are widely deployed, many wallets natively offer compatibility for ERC20 currencies, thus making it easier for someone to code their own wallets for PlasticTwist, fostering innovation and ensuring as much liberty of choice for the user as possible.

Security and traceability

PlasticTwist recognizes that a major concern of the users might be the security of the transaction carried out. By design, all the exchanges that happen through PlasticTwist are public; therefore, both sender and receiver's addresses are disclosed, as well as transaction amounts. By consequence, any seller has direct confirmation of a transaction: as soon as the transaction is written on the blockchain, the transaction is irreversible, because a blockchain is immutable. The public transaction also allows a user to monitor their own transactions. For instance, they can investigate how much they spend by day by querying the blockchain.

Crowdfunding campaign

The PlasticTwist platform has already been built, and it is up and running. However, in order to officially launch this amazing idea, we need funding to start; this is where you become the main actor of this whole dream!

To officially launch PlasticTwist, we need to collect 50 000 euros! We know our fundraising goal is ambitious, but we are confident we can achieve it. Moreover, we are going to tell you how you can help us start PlasticTwist.

Most digital crowdfunding campaigns usually have a built prototype of their product. Others have a design of the product, and they build the product once they have received the funding. The PlasticTwist product has already been built, and backers can already enjoy some of the features once they have backed the project.

How is that possible? PlasticTwist will not follow a conventional digital crowdfunding campaign, where the backers pledge money for building or supporting the product. The PlasticTwist crowdfunding campaign is different. When backers pledge money to the project, they will receive a defined amount of PlasticTokens based on their contribution (as it already has been explained). Afterwards, the backer will be prompted to use its newly gained PlasticTokens to make a bid for different plastic waste projects that will be competing for resources in the MarketPlace. PlasticTwist has selected several environmentally-focused projects to participate in our platform. These projects will be competing for money pledged for PlasticTwist. Therefore, the PlasticToken – in this first phase – will act as a voting token for the project competition.

However, if the 50 000 euros goal is not achieved, PlasticTwist will return the money to the backers. That's why it is so important to receive enough funding backup; otherwise, PlasticTwist will not be able to be fulfilled. The crowdfunding will start during January and will end in April.

We invite you to join our platform and back us up, so we can all start fighting plastic waste together!

Contact

For more information or inquiries, please contact our team on:

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To become a partner or invest in the currency please email

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PLASTICtwist

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HOCHSCHULE
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NUROGAMES



be|almerys
Healthcare delivery
management

BLUE
CITY
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a way to innovation





PLASTICTWIST

The team

Partner	Name	Role
 <p>ARISTOTLE UNIVERSITY OF THESSALONIKI</p>	Prof. Athena Vakali	Project coordinator, technical coordinator.
	Dr. Vasileios Psomiadis	Project manager, ICT Researcher, Civil engineer
	Ilias Dimitriadis	Crowdsourcing tool, data science researcher
	George Vlahavas	Software engineer, ICT researcher
	Assoc. Prof. Georgios Andreadis	Internal Administration, mechanical engineer
	Dr. Konstantinos Karasavvas	Blockchain expert, technical advisor
	Manon van Leeuwen	Quality manager, Innovation manager, Dissemination officer
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	Julie Harboe	Senior researcher, innovation and transdisciplinarity
	Urs Gaudenz	Innovation engineer
	Chris Obrist	FabLab Manager, Designer
	Sabine Biesheuvel	Dutch Pilot
	Nienke Binnendijk	Dutch Pilot
	Emma van der Leest	Dutch Pilot
 <p>CECI N'EST PAS UNE HOLDING</p>	Jonas R.J Martens	Director, Engineer, Business Development, Coordinator

The team

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	Mirko Koscina	Blockchain and Crypto
	Pierre Cluchet	Blockchain Technology
	Laura Bernal	Marketeur
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	Ana M. Martínez Cardonez	Marine and environmental scientist
	Antidia Citores	Law and lobbying coordinator
	Christina Garoufalia	Project consultant
	Leyla Arsan	Innovation consultant
	Aslıhan Kağnıcı	Project consultant
	Erdem Gülgener	Innovation consultant
	Jens Piesk	Gamification expert
	Yash Shekhawat	Gamification manager
	Andrew Pomazanskyi	Gamification manager



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