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Davidová, Marie, Sharma, Shanu, McMeel, Dermott and Loizides, Fernando

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CO-DE|GT BETA

The 21st Century Economy App for CrossSpecies CoLiving

Marie Davidová, Shanu Sharma, Dermott McMeel, Fernando Loizides

This work-in-progress paper is referring to the CO-DE|GT mobile application, that is being developed in Synergetic Landscapes unit of the Master of Architectural Design at the Welsh School of Architecture in collaboration with the School for Computer Science and Informatics at Cardiff University, UK, the School of Architecture and Planning Bhopal, India and the Auckland University of Technology, New Zealand. This app is searching for a synergy across an urban ecosystem. It intends to generate a sustainable, scalable token economy, where humans and non-humans play equal roles, earning, trading and being paid for goods and services to test such potentials for future economies underpinned by blockchain. This work diverges from dominant economic models that do not recognise the performance of and the limits to material extraction from the ecosystem. As a result of such misconception, we are facing mass extinction, that necessarily leads to the collapse of such economic systems. Therefore, this work applies systemic approach to urban environment performance for the future Post-Anthropocene communities and economies.

Keywords: systemic approach to architectural performance; mobile application; urban ecosystem; token economy; post-anthropocene

Introduction

Spotswood et al. in their review point out that several species benefit more from urban than other environments. Although some don't, this may be attributed to suboptimal adaptations necessary for their survival (Spotswood et al., 2021). This situation needs to be reflected by architects and urban designers that engage with the urban environment and its connectivity, habitats, and edible landscapes. However, such parameters are related to larger complex socio-technical and economic systems. The recent independent review on the economics of biodiversity ordered by the British Government written by Dasgupta points to the clear dependency of economy and ecosystem (Dasgupta, 2021). For example, we clearly cannot harvest vegetables without plants and pollinators or wood building materials without trees and forests. This needs to be reflected in our economic models that should integrate *other than human* creatures. In the 21st century, a coffee machine can have a blockchain wallet and process decision making (Cathlow, Garrett, Jones, & Skinner, 2017) or a river can obtain a legal personhood, being acted by Maori people on its behalf (Hutchison, 2014). The two years of annual Synergetic Landscapes unit is relating several dependencies within an urban complexity, such as the human and non-human communities, circular economy, token economy, material techniques, natural materials and biocorridors for edible and habitable landscape for all (Davidová, 2020c). At its initial stage, there started to be a discussion on how such cross-species edible and habitable landscapes can be tokenised within blockchain (Davidová & McMeel, 2020). In its second year, these relations are being integrated in a CO-DE|GT mobile application prototype through gamification for the Grangetown community of Cardiff, Wales, UK. The work is integrated within a larger Grangetown focused Community Gateway project (McVicar, 2020) managed by Cardiff University. Today, the area is home to generations of Welsh and Welsh Somali, Bangladeshi, African/Caribbean, Pakistani, Indian, European, British and multi-ethnic Welsh-language communities, constituting Wales' most ethnically diverse electoral ward. Containing super-output areas ranked within the 10% most deprived areas overall in the Welsh Index of Multiple Deprivation, Grangetown addresses key challenges in areas of poverty and health through well-established Church, Mosque, Temple, public sector, third sector and voluntary networks (Cardiff Research Centre, 2011; McVicar, 2020; Welsh Government, 2014).

Methodology

The work is grounded in the Systemic Approach to Architectural Performance methodology that is combining codesign through gigamapping (see Figure 1 and Figure 2) and prototyping (see Figure 3); and such relations with larger complex systems (Davidová, 2020a) (see Figure 2). It is part of Systems Oriented Design (Sevaldson, 2018) that is integrated into a Real Life CoDesign Laboratory. Real Life CoDesign Laboratory is a non-reductionist laboratory, where the prototypes and events are applied and tested through real life performance and interaction in the living environment and its agents (Davidová, Pánek, & Pánková, 2018). The methodology deals with and synergises the 'prototypical urban interventions' (Doherty, 2005) through physical object prototypes and their DIY recipes (see Figure 4), the virtual prototypes such as apps (see Figure 7) and public events that promote the prototypes for their DIY reproduction (Davidová & Zímová, 2018).

This paper focuses mainly on the process of developing the city-gaming mobile application CO-DE|GT that aims to encourage community participation in replicating DIY recipes of prototyping using a token-based blockchain model. To understand and translate the complexity of the living system of Grangetown community towards active participation of stakeholders for collective wellbeing using gamified experience, we conducted a 5-day online workshop within the student groups (9 students). The workshop firstly, provided a theoretical overview entangled interdependencies of local interaction and the global behaviour. Secondly, provided hands-on tasks of observing, understanding, and addressing the complex entanglements of the community stakeholders. We designed a simple framework for systemic inquiry of the micro entanglements between networks of stakeholders (humans and non-humans) in the existing community and later proposing an intervention to encourage active participation in the community.



Figure 1: The WIP prototyping gigamap (Synergetic Landscapes Unit, 2021)



Figure 2: The larger systems relating prototyping WIP gigamap (Synergetic Landscapes Unit, 2021)



Figure 3: Vermicomposting - A lens to Biocentrism prototype with visualised future scenario (Alghunaim, 2021)

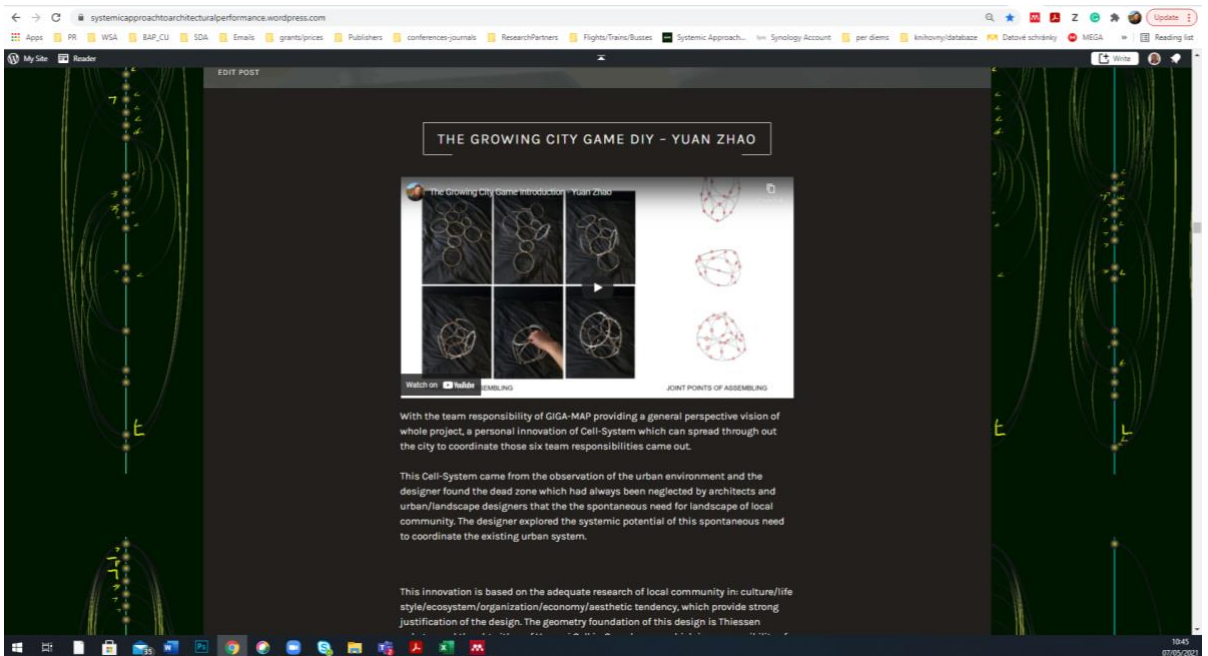


Figure 4: DIY recipe (Zhao, 2020) on SAAP blog (Davidová, 2020d)

Day 1 framework was divided into 2 simple tasks of defining local problems that one wants to address: Observing, Collecting, and Organising insights about the significant issues of various locations of the Grangetown community (see Figure 5). Later, each group was asked to identify two most important stakeholders/actor human and non-human stakeholders that are of primary importance to address the concern.

Figure 5

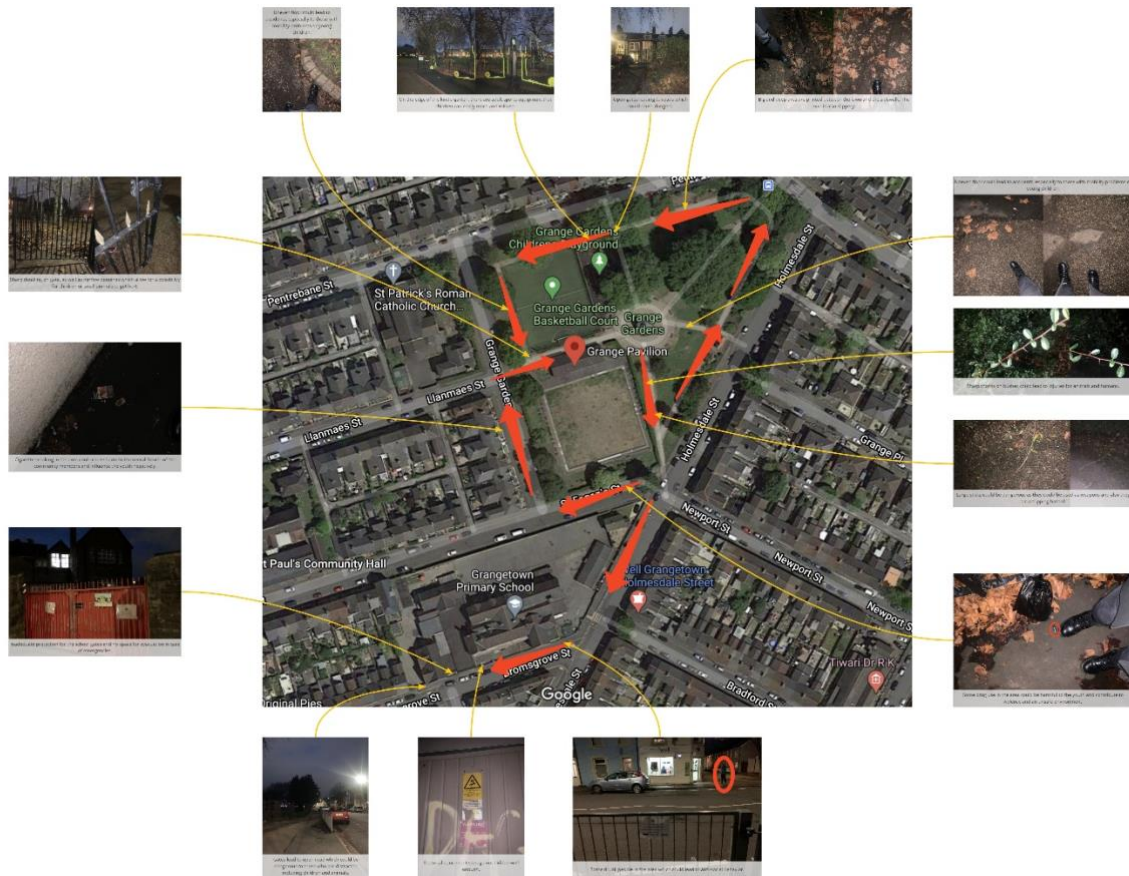


Figure 5: Spatial mapping stakeholders and their issues in Grangetown community of Cardiff (Rules of Entangled complexity workshop by Sharma 2020)

The next task was to map the dynamic interdependence and interactions of stakeholders. In this task group members explained the different nature of interdependency between human and non-human stakeholders such as shared resources, shared artefacts, shared environment, types of interaction and so on. Each group was asked to reiterate and refine the work for the next two days on the Miro board. Finally on the last day of the workshop, we introduced Game Design Canvas (see Figure 6). The canvas gave directions to think collectively about the micro details of the stakeholder interdependency into the game mechanics. The canvas is divided into five layers of detailing as follows:

- First layer defining the goal of the game: explaining the purpose of synergised actions of human and non-humans. Further in the layer participants were asked to explain explicitly the goals of human and non-humans.
- The second layer onwards canvas is designed to map the duality i.e., positive, and negative implications of human and non-human interdependencies and synergised co-existence. Participants explained the advantages and disadvantages of non-human from Humans and vice versa.
- The third layers focused the collective attentions of the group to ideate upon simple actions of human that may create positive Impact on non-human stakeholders and vice versa. Likewise, this layer of the canvas proposes to collectively ideate on actions of human that may create negative Impact on non-human stakeholders and vice versa.

- Fourth layer proposes to ideate for shared resources such as shared artefacts, built space, shared environment, shared natural resources etc that can be optimised to create a positive impact on human and non-humans. Similarly, ideate upon the shared resources that can create negative impact on human and nonhuman wellbeing.

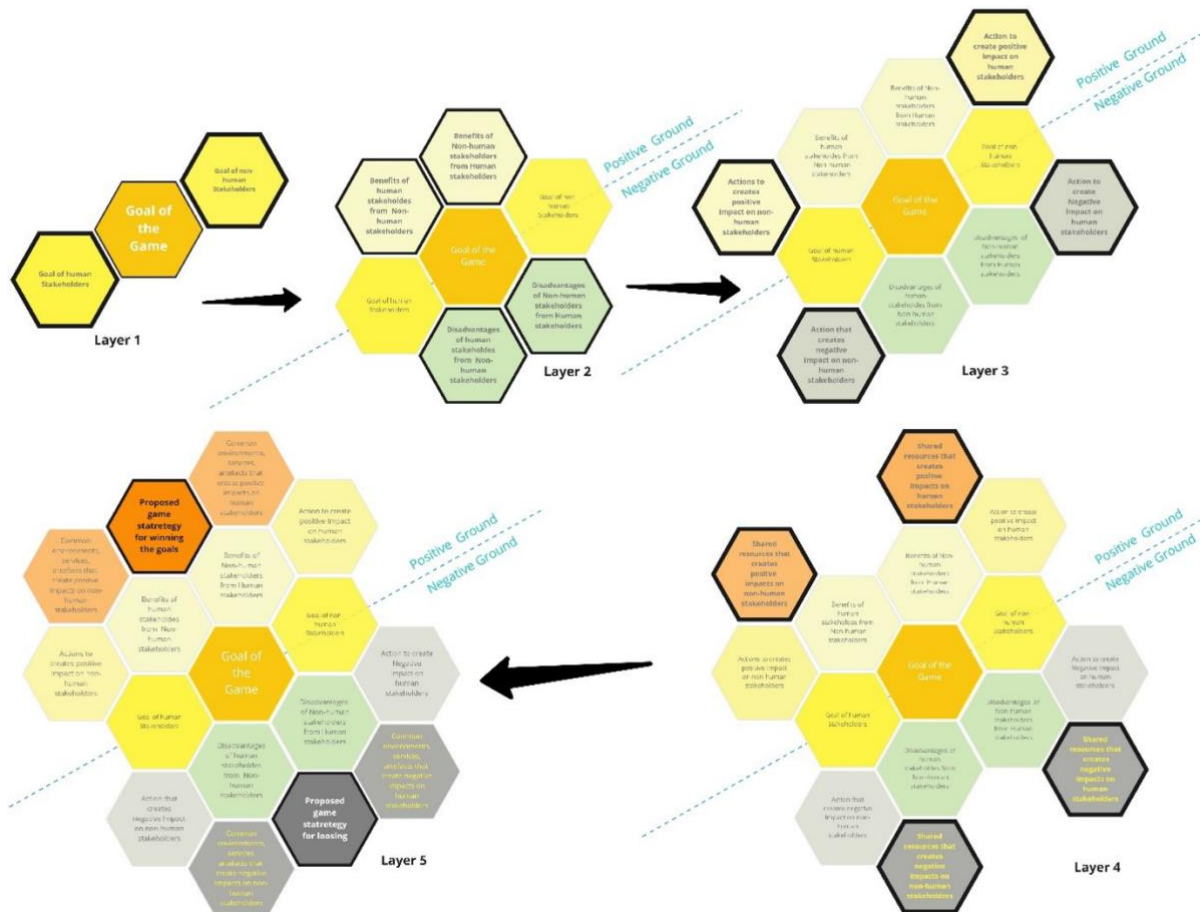


Figure 6: Layer-wise representation of Game Design Canvas (Sharma, 2020)

Based on all the previous information of the canvas this layer inquires about the conditions of winning and losing the game. This is a crucial decision for designers that can provide a collective vision towards the tangible outcome of collective actions of human and non-humans. This is further expanded to propose various levels with explicit winning and losing conditions of the game where initial level may sensitize the people about the issues of collective wellbeing Grangetown community. The tasks of the initial level may encourage people to know about the context well. Advanced levels of the game to encourage people to interact and perform simple actions of reproducing DIY Recipes in the real world to create a positive impact. In the further advanced levels, the game must promote active participation of the players to perform higher lever tasks at individual level as well as the community level. The WIP application has been tested on community stakeholders that were wondering in neighbourhood, the larger variety, the better. The total number is about thirty. Based on their responses, the app has been constantly updated.

The CO-DE|GT Mobile App

The CO-DE|GT application's (Synergetic Landscapes, 2021) aim is to lower the disbalance across different disadvantaged human and non-human stakeholders. It enables submission of—and volunteering in—different tasks that are assigned tokens as a payment. To gain tokens, one first completes certain tasks. Once someone 'earns' tokens and they are deposited in their wallet, they can assign or create tasks for others. When others compete those tasks, they are paid from the assignee's wallet. At the app's starting point, only the Synergetic Landscape unit's members have tokens. They are assigning tasks for people to reproduce their designed prototypes (i.e. bat or bug hotels, etc) for expanding cross-species habitable and edible landscapes. These

prototypes are to be built from natural materials that can be found in the location. Therefore, to join the system does not require any initial investment (Davidová, 2020b). Whilst giving the tasks, the related members of the cross-species community are rewarded. Therefore, for planting a tree, one must pay the pollinators. This way, the pollinators gain their tokens, and they might be buying their habitats. Since the pollinators cannot use the app, they are acted on their behalf by the community members. Thus, the application is questioning the traditional winning and losing concept of traditional games through layering multiple systems and cross-relating their systemic relations.

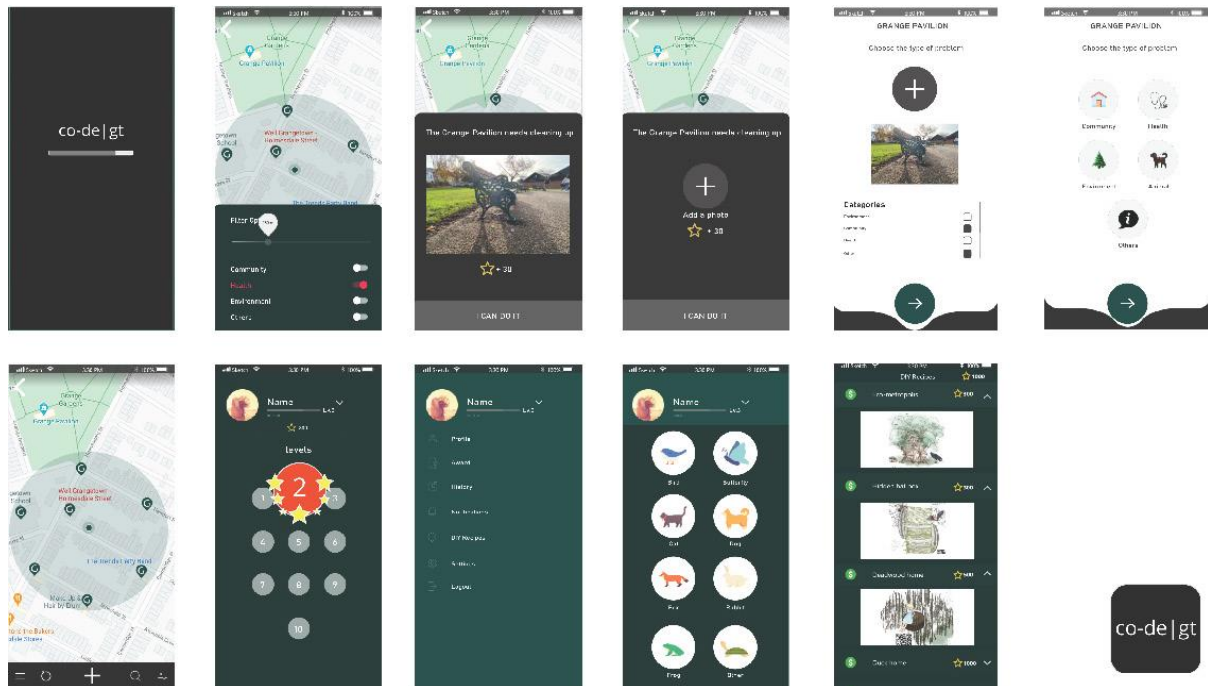


Figure 7: CO-DE|GT mobile application interface design (Synergetic Landscapes Unit, 2021)

This unit mainly developed within the COVID 19 pandemic, when direct analogue social interaction was very limited. Therefore, more attention was paid to online interaction through social media, video channel, blogging, etc. The app has been tested through two online events, the Cardiff University Sustainability Week (Raye & Davidová, 2021) and the UN World Creativity and Innovation Day (Davidová, 2021). At this moment, the application has been and is being tested on the Grangetown community. We have been organising public picnics using QR codes to introduce the public to the mobile phone application, as most of Wales is being soon vaccinated. A poster with the app's QR code is presented in Grangetown Pavilion that has been opened to public as part of the Community Gateway project.

The app should in the future differentiate several species (see Figure 7). For being the initial stage, we selected only the categories of land, water, sky and underground creatures and the types of tasks in the categories of community, health, environment, animal and other. The users can upload their tasks to the map location with these categories, assigning tokens for completing the task and assigning tokens to other species that relate to the task. This covers a timeframe for completing the task. The application is starting with the DIY edible and habitable prototypes recipes that are located on the first authors blog (Davidová, 2020d). In future, anyone would be able to upload their recipes for their tasks. The application should be able to place DIY videos from YouTube and other video channels and blogs. Different community members will be able to act on behalf of other creatures and extend their habitats and edible landscapes for their tokens by assigning tasks to community members.

From a technical perspective, the app is being developed using an HTML base progressive web application (PWA) approach in order to allow for operating system agnostic capabilities and adaptive design approach. This allows the solution to be accessed via a web browser, but once saved to the home screen of a mobile device (Phone or Tablet/iOS or Android) and accessed via this link, all browser-based UI elements are hidden and the application behaves as if a native mobile application. Simply access the website once, save to the home screen. We utilise HTML, HTML5, JavaScript C# and the Google Maps API (embedded in a .Net container). The database subsystem is utilising Microsoft SQL Server Express.

Discussion and Conclusions

The potential for blockchain to impact the built environment has been explored elsewhere (McMeel & Sims, 2020). Including specifically potential for a radical reconfiguration of the relationship between people and other agents with which we share the environment, such as animals, buildings and plants (Davidová & McMeel, 2020). The World Economic Forum has recognised that blockchain, crypto-currency and the ‘token economy’ provide a means for 21st century communities and distributed organisation to reclaim power and enact their values in a way not possible through 20th century centralised banking, industrial and commerce models (World Economic Forum, 2018). This project is expanding further on this work in two areas: (1) In relation to community or ‘complimentary’ currencies (Amato & Fantacci, 2020). (2) Potential for a crypto-currency to circulate only within a limited community.

A complimentary currency is an unofficial currency that circulates in parallel with a national currency. It is usually set up by private citizens or advocacy groups and used only within a limited geographic area. The Bangla-Peso from Kenya and the Fureai Kippu from Japan are well established examples (Hayashi, 2012; Kimenyi & David Muthaka, 2013). Blockchain offers the potential to take these concepts into the digital age. Digital currencies also offer the potential to circulate only within specific limits. Unlike existing complimentary currencies, this research has shown the potential for a new type of community currency that has no geographical limits but is limited by people’s value. For example, the Plastic Bank uses these technologies to stimulate a specific economy limited to monetizing waste plastics and redirecting them into a recycling system (Katz, 2019).

We argue this can apply across the species, things, and whatever intelligent systems (including AI) within such communities. The work here explores how *other than human* agents can be integrated in our economic models, strengthening clear dependences and copperforming better through interactions. To expand on such copformance, we need to adapt our cities for coliving with others (Davidová & Zimová, 2018). This project is trying to achieve this through free DIY recipes, approaching communities of makers that are recently questioning the building market (Aravena, 2016) and hopefully soon the building industry. Boeva and Troxler point out at the making needs to abandon the market/state duopoly of the first and second industrial revolution, the market economy based on the assumption of unlimited growth, and the fair functioning of the free market (Boeva & Troxler, 2020). This project is testing how making could be integrated in the community based Post-Anthropocene economy and industry for 21st century that may hopefully become fully Non-Anthropocentric in the future.

This research explores how the features of contemporary digital currency can be combined with concepts of complimentary currencies to stimulate an economy of value; an economy of products and services that repopulate the urban environment with wild-life habitats that will result into a more balanced ecosystem.

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