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# Re-Imagining Commoning Infrastructures and Economies

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**Abstract** | Today's sensing and computing capacity create new potentials for material commons, commons that are not merely digital and which need to be transported between sites of production and sites of use. The management of material commons, for example, distributed cooperative power production or food rescue operations, has logistic and on a larger scale economic implications. Today we lack obvious recipes for translating new technological affordances into design principles that allow for the injection of the values of commoning into the infrastructures organizing the commons. This paper investigates the kind of imaginaries in combination with situated design exploration that is relatable to everyday life but at the same time trigger relevant discussions about underlying infrastructural and economic layers. The paper outlines an example for a participatory design research format that builds on infrastructural and economic design fiction and playfully engages with everyday urban life.

**Keywords: material commons, economic design fiction, infrastructure, calculation problem, playful imaginaries**

# 1. Introduction

Commoning, the practice of negotiating, managing and maintaining accessible resources for the common good, is enjoying a recent revival in debates and practices pursuing self-determined alternatives to the inequalities, contradictions, and threats of contemporary neo-liberal and capitalistic societies (Savic, 2020). While Elinor Ostrom's work mainly addressed natural commons (such as land use) which successfully can be governed in small-scale cooperation (Commons 1.0); commons 2.0 has developed over the past decades to cover the immaterial commons of knowledge and code, like Wikipedia or GNU licenses, where reputational mechanisms generate cooperation in the production and maintenance of public goods at a larger scale (Cila et al., 2020, p. 2). Technology not only enabled the emergence of digital commons but today's distributed and networked sensing in combination with computing capacity also creates new potentials for material commons. Material commons here refer to commons that are not merely digital and which's management involves logistics, such as power production or rescued food. New technological potentials pertain to the managing and distributing of material commons and implicate questions about open, negotiable platforms, infrastructures and alternative economies.

Infrastructural services of The Big Five tech companies set today's technological standards which determine economic models, options for user interaction and even societal institutions (van Dijck at al., 2018, p. 48). Although co-operatives and open-source projects constitute enclaves of anti-capitalism within capitalism (Davies, 2018, p. 23) and the internal organization of large companies such as Walmart or Amazon provide proof for successful planning based operations (Phillips and Rozworski, 2019), from a concrete design perspective it largely seems to be an overwhelming project to challenge these economic and infrastructural conditions with the creation of open, negotiable, commoning-minded ones. Creating alternative imaginaries can provide designers, technologists, founders with the confidence that there is a choice as to what systems they contribute to (Webb, 2020). In the last decades, the tools of fictional narratives or design fiction have emerged in combination with participatory approaches to create such imaginaries in design. In recent years more specific frameworks, such as economic design fiction (Davis 2018), have emerged along with calls for business model fictions, engineering feasibility study fictions, interop protocol specification fictions, investment return fictions (Webb, 2020).

This paper focuses on design fiction as a participatory tool for playful design explorations of infrastructures of material commons. More specifically, it explores techno-social preconditions of planning based/algorithm-driven economies as a backdrop for commoning. It outlines the role of fiction in creating such imaginaries and introduces a playful workshop format as an entry point for the creation of such imaginaries. Doing so it builds on former work of the Thinking Toys for Commoning project about toys and play in the speculative investigation of commoning based urban futures (Savic et al., 2020) and borrows from economic design fiction templates (Kerspern ,2018).

## 2. Economic design fiction to situated play

“There was no way out. She had to keep eating this stuff. Four days and they were still delivering.” (Richardson ,2019, p. 72) This is the beginning of a fiction about a city in the near future in which Deliveroo subsumed not only gastronomy under the extremely synchronised and optimized logistics business of fulfilling food orders, but gradually passed on the time pressure to customers through ‘synchronization’. If customers failed to synchronize their daily routines with the delivery service, i.e. be at home when the delivery arrived, the company forcibly compensated for its loss with penalty deliveries, for example several servings of bean tacos for days. Customers would pay back by picking up the cost for waste disposal. This is one of several fictions from the book “How to Run a City Like Amazon, and Other Fables” (Graham et al., 2019), which aims to prompt critical thought about neoliberal urbanism and digital networked technologies by pushing the logic of business models and technologies to an extreme. Also, the stories illustrate the inherent interwovenness of data-driven technologies with respective business models and underlying modes of valorization and economic transactions.

Following through current trends of platform economies into future societies (i.e. extrapolating) overwhelmingly results in a dystopian outlook. From the perspective of designing responsible technologies based on privacy, agency, mutualism and equality, Webb emphasises the role of fiction that lay out a vision worth choosing:

> “Dystopia is the extrapolation of the same old, same old. But utopia is a non-extrapolation, it requires a discontinuity. It requires all these different tribes [of marketers, retailers, supply chain experts, risk assessors, the MBAs, policy-makers and so on,] to choose to do something different, at great risk to their careers and livelihoods. If they’re going to do that, they all need to be shown that something different first, and shown how it’ll work.” (Webb, 2020).

Besides design fiction, Webb calls for business model fictions, engineering feasibility study fictions, interop protocol specification fictions, investment return fictions (Webb, 2020). An example of a fiction that critically investigates the affordance of distributed ledger technologies for commoning based economies is presented by Cila et al (2020). To explore the design principles that translate the affordances into concrete guidelines for the creation of blockchain-based systems to manage an artificial material commons, the authors employ the fictional narrative of a distributed power grid in which production, use and transactions are managed by distributed ledger technology (Cila et al., 2020). Through evoking the use cases in the narrative the authors are able to identify design dilemmas in three areas - tracking, managing, negotiating - from which the third contains what we call human vs. algorithmic governance dilemma: how many decisions are communities happy to delegate to automatized systems vs. how many ongoing negotiations they would like to keep.

Commoning imaginaries are often entangled with post-growth economic scenarios, which also imply a new scarcity of several resources compared with today, which makes economic design fiction a helpful approach. It is another form of design fiction exploring alternative

economic systems by mainly deriving from new abundance or scarcity scenarios (Kerspern, 2018, p. 246). It furthermore investigates systemic shifts by fostering the discussion about questions such as How can we go there? How can we head in this preferable direction? Is it really a preferable situation? To whom? (Kerspern, 2018, p. 245).

Economic systems dynamics unfold on larger levels that are not necessarily tangible on the level of people's everyday life. To introduce the human scale into new economic perspectives, Kerspern proposes three design fiction principles, namely everydayness, ambiguity and discussion (Kerspern, 2018, pp. 244–45). Everydayness, the first, refers to the strategy to make speculation relatable by creating artefacts that easily embed into the everyday experiences of stakeholders. As such, it establishes the scale of intervention with the artefact, even when the design fiction addresses larger and perplexing notions. Ambiguity, the second, refers to envisaging alternative perspectives, tackling controversial themes, and developing provoking narratives for production and consumption; uncanny products or services invite embracing strange future setups (the new normal). Injecting material manifestations of future fictions into discussions, the third, with groups beyond expert communities, economic design fiction helps uncover fears, hopes and concerns about systemic shifts.

> “By building economic design fictions, one has to make choices by adopting different perspectives from the views experienced on a daily basis. It is not about rehearsing what could possibly happen, but, in some way, it is still close to role-playing – meaning acting by impersonating someone else for a moment and in a particular possible future. [...] This is also what it means to find the human scale.” (Kerspern, 2018, p. 260).

One of the most discussed alternatives to market economies are planning or planned economies. The theoretical debates here are quite old and are centred around the so-called calculation problem. In the 20th century, the calculation problem evolved around sufficient computing power and the availability of sufficient information about demand (if demand is not signalled and calculated by pricing). Currently available sensing and computing power, in theory, have the affordance to organise commoning of material commons on scale:

> “Our contemporary ‘big data’ era, in which billions of us provide digital feedback constantly via our smartphones, shopping, online searches, swipe cards, social media use, and so on, would appear in principle to offer the most promising technical basis yet for a non-market solution to the problem of calculation.” (Davies, 2018, p. 19)

Michal Rozworski and Leight Philipps in their monograph “People's Republic of Walmart” (2019) point out how Amazon provides the best examples of planning-based organizations. Amazon’s success to a huge extent is backed by logistics, and its core function is the computation and calculation of the prices of products others produced.

The challenge our contribution focuses on is: Where are sensing and negotiation needed most? Where is the use-value the highest for consumption or as a resource to produce or create something? As sensing and computing do not seem to be the real bottleneck here,

the challenge of identifying the appropriate planning and organization mechanisms that translate into commoning-minded design principles shifts into focus. In the next section we propose an economic design fiction based playful exploration to address the above challenges.

# 3. Case: Playing Food Rescue

*Food Rescue* is a hybrid - video call and street-based - game addressing the challenge of local situative use-value: the sensing and automation in connection to determining and assessing use-value. The game's fiction describes a near-future world in which due to changes in regulations, food rescuing and commoning become more widespread. Slightly following the blueprint for economic design the game builds on fiction of a new scarcity combined with a context hostile to scalability. The fiction puts the players in the midst of the development process of an algorithmic logistic distribution system for rescued food and the teaching of its respective machine learning algorithm.

## 3.1. The fiction

In 2025 regulators cut the production and import of food with a high impact on climate and biodiversity by 50%. Food safety regulations still oblige shops to dispose of food after the 'sell by date'. Due to the heightened demand for certain food products, the city has seen a surge of cooled rescue bins cropping up at supermarket backdoors, releasing a vast amount of food ready for rescue. However, the brief time window until expiration, legal risk due to stringent regulatory requirements and bad scalability due to diverse local circumstances deter commercial enterprises from entering the space. As a result, many community food rescue initiatives are emerging. One of them is the *AI-Drop Food Coop*. They are piloting an AI-driven planning technology that orchestrates the pick-up and drop-off of rescued food, finds people, households or businesses for whom rescued food is most valuable and teaches the AI where to drop rescued food.

## 3.2. Playful exploration

*Rescuer*, *AI*, and *Commoners* start in a video call. Depending on the number of participants players are divided into groups: a minimum of two *Commoners*, and a minimum of 2 *Rescuers*, and 2-4 *AI* players for each *Rescuer*. For example for 16 participants: 4 *Commoners*, 3 *Rescuers* and 3 *AI* players for each *Rescuer*. *Rescuers* will join the video call on their phones so they can roam the streets during the exercise/play, *AI* and *Commoners* stay at their desktops indoors. After becoming acquainted with the rules, each *Rescuer* and their respective *AI* players are assigned to breakout rooms (3 according to the above example; *Commoners* can join any room, as at this point they are only observing the events). When the exercise/play starts, *Rescuers* go out into the streets while *AI* players follow their moves in the respective 'breakout room' according to the rules explained further below. In the

street, *Rescuers* do fictional pick-ups and drop-offs of rescued food by sending 'video flashes' to their *AI* players. By default the *Rescuers* cameras are off while they are on the street; a video flash is a three-second video about a place, object or person, that *Rescuers* send to the *AI*. For a video flash of a pick-up, *Rescuers* have to point their camera to a shop (or anything shop like). However, *Rescuers* are free to decide where rescued food can best be used and point their cameras at buildings, corners, people accordingly. For about ten minutes *Rescuers* do pick-ups and drop-offs which *AI* players observe on the screen in the breakout room of the video call. *AI* players try to figure out the *Rescuer's* thinking or rationale behind the drop-offs (pattern recognition/ learning). After ten minutes the *Rescuers* send their thinking or rationale behind the drop-offs to the *Commoners* in a private message. The *AI* players also send their guess on the *Rescuer's* rationale to the *Commoners*. The *Commoner's* task is now to decide, which *AI* group's guess was closer to their *Rescuer's* rationale. Optionally this round can be repeated one or two times to improve the 'pattern recognition/ learning'.

### 3.3. Game rules

- **The Rescuer**: When you encounter a shop in the street, you do a pick-up of rescued food by sending a video flash (of 3 seconds) of the shop. Think about where (businesses, persons, households, corners etc.) and why you will drop rescued food. Find a place to drop the rescued food by sending a video flash of the corner, door, facade, person, etc. You must drop the food within 50 steps from pick-up or it will be wasted. After you have dropped the rescue food, you can do your next pick-up on encountering the next shop. On your way back: send one sentence about where or why + your group number to the *Commoners*.
- **AI players**: Track your rescuer's pick-ups and drop-offs. Formulate a theory with your *AI* group about where and why the rescuer drops rescued food. Send one sentence about the theory of where and why the rescuer dropped food + your group number to the *Commoners*.
- **The Commoners**: Select one delegate who will receive private messages. After receiving the messages from the *Rescuers* and the respective *AI* players, discuss with all *Commoners* which *AI* got the closest match to the rationale of their *Rescuers*.

## 4. Preliminary Reflections

Earlier versions of this playful exploration were played in settings other than the explicit exploration and discussion of sensing and negotiating mechanisms of commoning infrastructures. In one of the sessions, the rescuers have chosen a synagogue as a drop-off with the rationale that religious institutions might run soup kitchens. A corner with a

cardboard box and other signs that homeless persons might spend the night there was chosen. The AI players were rather good at guessing the Rescuers' rationale. Further learnings are expected from upcoming sessions with relevant groups of players, which allow time for more explicitly discussing the questions of commoning. At this point, we propose that the playful exploration affords everydayness, as it is embedded in specific urban contexts that Rescuers have to engage and which delivers visual data snippets to the AI players. The playful exploration creates a situation of ambiguity on several levels, as it proposes the use of a predictive algorithm - mostly known from predictive policing and anticipatory shipping of online retailers - for a commoning minded distribution of rescued food. This has the potential to open up a critical discussion about which mechanisms of the infrastructural and economic setup are permissible and which are to be dismissed in the context of commoning and point at further aspects that need to be scrutinized for the development of adequate design principles. The exercise/play also generates a discussion about the perception and recognition of the value of certain resources in specific situations. And consequently, what kind of existing or still to develop sensing capabilities could provide sufficient data for the calculations and computation of their distribution.

Some of the triggered discussions might address how commoners interface with the algorithm. For example, the conditions under which aspiring commoners are willing to provide data for better calculations. Other discussion points already penetrate the infrastructural layers, such as: Who teaches the machine? What are the protocols for the triggers and frequency of adjustments? Infrastructure shapes people’s direct relationships both with each other and with their environment: it defines who and what is connected, which people and goods should circulate easily but also who should stay put and be left out (Rodgers and O'Neil, 2012 and Larkin, 2013, pp. 329-330). As technologies make accessible new resources, and their management is a constantly topical issue, technologies shape the conditions of the commons (Muilu, 2020).

In their analysis of the platform society van Dijck et al propose: “While it is certainly possible to organize these relations differently, this is by no means a simple task. As we will argue, it takes much more than bottom-up commons-based initiatives, however innovative and technologically sophisticated they might be. To bring substantive change to the workings of platform society, the infrastructural core of the ecosystem - the way it operates and is being operated - should become open to negotiation and allow other societal actors to influence its underpinning mechanisms." (van Dijck et al., 2018, p. 48). By designing such explorations like the Food Rescue, the full-blown alternative citywide infrastructure or a global economy obviously is to a large part conveyed by narrative. However, the stakes of finding ways to let people engage in tangible ways with these layers lie in reaching further to the core of platforms, infrastructures, economic systems.

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