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Organizing the sharing economy through experiments:

Framing and taming as onto-epistemological work

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Organizing the sharing economy through experiments: Framing and taming as onto-epistemological work

Prior work on performativity has illustrated how theories intervene in economic organizing. We expand this body of research by studying how concepts, and particularly those that are loosely defined and/or not widely understood, provoke their own realities through experiments. We examine how different experimental set-ups allow these concepts to be seized by a multitude of actors all wishing to instantiate worlds in their own interests, and how they potentially open up multiple competing realities as a result. We follow the concept of Mobility-as-a-Service as it mobilizes various experiments across public and private realms in Stockholm and Dublin, and we analyse how specific types of experiments co-produce epistemic and ontological work. Our results illustrate how different experimental designs can be conducive in taming and/or framing ambiguous concepts through interconnected processes of such onto-epistemological work. This highlights the distributed and relational but also the ‘provocative’ facets of performing ambiguous concepts through experiments. We discuss the consequences of these insights for how we think about scaling from experiments to broader socio-economic realities.

Keywords: Performativity, experiments, ambiguity, Mobility-as-a-Service, epistemic work, ontological work.

Introduction

Scholars interested in performativity have demonstrated that enactments of conceptual ideas can contribute to shaping organizational orders (e.g. Beunza & Ferraro, 2019; D’Adderio & Pollock, 2014; Mason & Araujo, 2020). While performativity studies often assume an inherent precision in the concepts or theories that perform, some scholars have pointed out that even the purest theoretical forms require careful ‘market work’ (Cochoy & Dubuisson-Quellier, 2013) to become contextualized in practice (Cabantous, Gond, & Johnson-Cramer, 2010). Gond, Cabantous, Harding and Learmonth (2016) highlighted a dearth of insights into how multiple representations of a theory may compete in their instantiations of reality or, in Callon’s (2007) words, enter ‘performance struggles’. An important development in this area has indicated that concepts and theoretical constructs may become embedded in experiments to perform their social realities (Cartel, Boxenbaum, & Aggeri, 2019; Carton, 2020; Marti & Gond, 2018).

In this paper, we build on and expand this body of research by studying how concepts, and particularly those ‘ambiguous’ ones that admit multiple courses of action (Giroux, 2006), may provoke and intervene in economic processes through experiments. We examine how different experimental set-ups allow such concepts to be seized by a multitude of actors all wishing to instantiate worlds in their own interests. In the performativity literature, experiments are often seen as ‘trials of explicitness’ where what is assumed to exist is in fact provoked into existence through the experiment (Muniesa, 2014; Muniesa & Linhardt, 2011). In this reading, experiments inevitably ‘do things to the economy’ (Guala, 2007, p. 130) by bringing actors and objects into being and assembling them in a particular manner. At the same time, they also always create further ambiguities, which can be seized upon by different ‘performateurs’ (Beunza & Ferraro,

2019), leading to more experimentation. Consumer research tools such as focus groups or test markets are good examples of the performativity of experiments. They aim to observe specific consumer behaviour, yet ‘literally create’ the very behaviours studied, and they leave wide-open spaces for marketers to conjure up particular realities (Muniesa, 2014, p. 11). Studying competing experiments thus opens a window into concepts’ inherent relationality (D’Adderio, Glaser, & Pollock, 2019), that is how they simultaneously motivate and channel collective action, and the many different ways in which these relationships may be drawn together. Experiments also draw our attention to the issue of the power to perform (see also Bowden, Gond, Nyberg, & Wright, 2021).

We study an emerging concept within the sharing economy: Mobility-as-a-Service or MaaS. Broadly speaking, MaaS encompasses the idea of combining different modes of urban transportation – including public transport, taxis, bike-sharing, car-sharing, ride-sharing, car rental – as part of a single, seamless offering that is made available to users via subscription-based smartphone applications. However, this loose definition hides many disagreements, misunderstandings, a multitude of involved actors, and various alliances, turf wars, and land grabs. Yet, despite - or perhaps because of - these uncertainties, the concept has given rise to a multitude of small- and larger-scale pilots in cities across the globe. Relying on in-depth case studies in Sweden and Ireland, we study how the implementation of MaaS prompts diverging experiments and how these experiments in turn both tame and proliferate conceptual ambiguity. *Epistemic work*, in our analysis, denotes the ongoing and multiple efforts to frame and reframe the concept based on definitional negotiations (cf. Knorr Cetina & Preda, 2001). *Ontological work*, in turn, signals the socio-material choreographing required to provoke conceptual translations to shape reality – in our case literally ‘creating’ an entity called Mobility-as-

a-Service by drawing together public and private partners, pieces of software, public transport infrastructures, business models, and urban designs.

Our data illustrate how epistemic and ontological work are interwoven through different and often competing experimental designs, which have the potential to reshape economic arrangements. Yet such organizational framing is unlikely to achieve a full taming of ambiguous concepts, which remain full of potentiality to support diverging interpretations, doubts, and criticisms, and which consequently may set in motion further experimental iterations. Drawing our empirical and conceptual interests together, we propose that this continuing proliferation of worlds and worldviews through onto-epistemological work may complicate attempts at scaling from experimental set-ups to broader socio-economic realities. We also reflect on the scope for political manoeuvring opened up when actors perform a world through a concept that does not provide a specific blueprint to collectively guide this work.

We claim conceptual as well as practical implications for our insights. Our research adds to the performativity literature by shifting its focus to the generative consequences of different experimental configurations and the onto-epistemological work involved in each. In addition, we reflect on the difficulties of ‘scaling up’ from experimental set-ups that this generativity may entail, thus complicating previous accounts of concepts that conquer the world in a relatively linear (though admittedly rarely uncontested) manner. Our insights extend beyond the empirical setting of the sharing economy to many other arenas ripe with definitional uncertainties (Chimenti, 2020). In particular, this study illuminates the consequences of experimenting with new economic concepts in established industries such as transportation, and how their disruptive effects may foster

collective paralysis despite widespread involvement. This also anticipates the likely power struggles when scaling ‘up’ or ‘down’ between contexts.

Our article proceeds as follows. The next section briefly introduces the relational view of the performativity of theories and brings it in touch with the performativity of economic experiments. We then use this conceptual foundation to flesh out an analysis of MaaS developments in Sweden as a series of *in vivo* experiments and compare this to the case of Ireland, which reveals a more tightly controlled *in vitro* (or laboratory) approach. Our discussion evaluates how experimental set-ups intersect with the two intertwined processes that emerged from our data - epistemic and ontological work - and highlight how ambiguous concepts contribute to the ruptures of well-established economic arrangements. We close by working through the consequences of this multiplicity for the ‘after-life’ of economic experiments.

Performing ambiguous concepts

The ‘performative turn’ in the social sciences has resonated across a number of disciplines and drawn from a variety of origins (Gond et al., 2016). Generally, following an Austinian tradition, performativity studies in management pay attention to how concepts have practical bearings on the world they describe. From this viewpoint, concepts act to represent and intervene in a reality (Hacking, 1983). To say that concepts, theories, or formulas are performative does however not mean that they automatically become self-fulfilling (Ferraro, Pfeffer, & Sutton, 2005; Marti & Gond, 2018). Instead, performative processes require thoughtful investments for the theory to become embedded in ‘the contextual features which support[ed] its realization’ (D’Adderio et al., 2019, p. 3). Garud, Gehman, and Tharchen (2018) caution that performativity rarely leads to a settled

state of affairs: a world that is constituted through performing can as easily be ‘de-constituted’ when actors seize upon the overflows created in the process and propose alternatives. They view performativity as an ‘onto-epistemological position’ where agency or action can only ever be explained – and indeed challenged – when seen relationally as part of a broader socio-material assemblage (see also Garud & Gehman, 2019). This relational view of performativity has triggered a fruitful line of inquiry in organization studies, which signals that the performativity of concepts opens up ‘constructive possibilities’ rather than linear pathways from theory to reality (Marti & Gond, 2018). Some of these inquiries have also started to reflect on the use of tests and experiments in the process of actualizing the worlds envisaged by theories, a reflection that had been anticipated in the sociology of translation (Callon, 1986).

For example, Mason and Araujo (2020) illustrate how the performative struggles of a policy model produced multiple reformulations in the English National Health System. These reconceptualizations were distributed across a multitude of actors at different scales and relied on the ‘cobbling together’ of various elements of theories through a process of trial and error. Through these iterations, the policy model over time created its own ‘felicity conditions’ – though not always as expected. Cabantous et al. (2010, p. 1552) show how analysts trying to instantiate rational choice theory engage through iterative contextualization work that heavily relies ‘on the collective mobilization of social actors, theory and material artefacts’. Carton (2020) demonstrates the performativity of a management theory - the Blue Ocean Strategy – through experimental framing and reframing of actor assemblages and gradually enrolling an ever-broadening reality into the theory’s reach. Rather than diffusing spontaneously as if through an invisible hand, the strategy was deliberately used by professors and business people to

design calculative spaces that materialized certain aspects of it, which in turn helped the theory ‘to become “true” in more contexts’ over time (Carton, 2020, p. 1435).

Such ‘reality shifts’ may also be indirectly performed. Previous research shows that changes to particular ‘boundary conditions’ (Marti & Gond, 2018) may contribute to mobilizing (collective) action. This includes the endorsement of powerful initial backers and the implementation of metrological devices that render organizational directions visible. The political work that is involved in these efforts of framing is emphasized by Beunza and Ferraro (2019) in the field of responsible investment, who also engage with the important question of the resistances related to performative failures. How such resistances can lead to shifts in epistemic authority and power is demonstrated in Bowden et al.’s (2021) study of a local council’s endeavour to implement a flood prevention plan in the context of the climate crisis.

These studies indicate that, in the process of relating a concept and its world, experiments and the spaces in which they are enacted play a central role (see also Cartel et al., 2019). In the experimental process, a concept’s ambiguities can be seized upon by different actors to gain performative power. Though we agree with Cabantous et al. (2010) that all concepts have a certain amount of interpretive flexibility, we argue that the more conceptual openness a theory or concept entails, the wider the generative possibilities for the concept to provoke different assemblages and the greater the likelihood that it will lead to performative power plays. Importantly, in keeping with Giroux’s (2006) definition, ambiguity allows for multiplicity in meaning *and* in courses of action, thus paving the way for epistemic as well as ontological generativity. An explicit focus on experimental set-ups may allow us to elicit in greater detail how a concept not only alters but also multiplies its possible realities.

Performing through experiments

The performative perspective on experiments (e.g. Callon, 2009; Grandclément & Gaglio, 2011; Guala, 2007; Muniesa & Callon, 2007) traces its pedigree back to the sociology of translation, which studied how scientists used experimental setups to frame a problem and to ‘interest’ and ‘enrol’ other human or nonhuman actors – a process that is rarely without dissidents, controversies, and ‘unpredictable displacements’ (Callon, 1986). More recently, this program has opened up to include insights into how economic orders are ‘explicated’ or ‘provoked’ through experiments (Callon, 2007; Muniesa, 2014). Experimenters, from this perspective, ‘perform in a quite basic sense: [they] bring things into being by assembling them in a particular manner.’ (Muniesa & Callon, 2007, p.184). Importantly, while experiments may ostensibly be positioned to resolve ambiguity, they can in fact serve to maintain and proliferate it. As Muniesa (2014, p. 129) states, ‘facing trials of explicitness means exposure to error and contradiction, to consequences and externalities, and hence to further criticism, objection, and contestation.’ Where the sociology of translation focused on the ‘domestication’ of other actors through experimental designs, in the performativity of economic experiments it is this generative capacity that is of primary interest. In this context, a central question is whether experiments are ‘too performative to fail’ (Marres & McGoey, 2012, p.6) – meaning that every experiment will be generative regardless of its outcome. Failures allow experiments to ‘profit from their own inefficiencies’ (ibid., p. 25) by simultaneously articulating the flaws of the arrangements put to the test and implying that these can be resolved through further experiments. If experiments are seen as trials of explicitness, something will invariably be explicated by the experiment, and actors will gain or lose capacities to act as a matter of course.

Muniesa and Callon (2007) distinguish between two experimental ideal types, namely *in vitro* and *in vivo*, with a third type (the ‘platform’) representing a middle ground. The two ideal type configurations largely differ in the degree of control, the nature of manipulations that can be imposed on the object of experimentation, and the sites in which the experiment takes place. With regard to the latter, *in vitro* experiments are set in laboratories broadly conceived, that is relatively confined environments that maintain a deliberate distance between the ‘world of ideas’ and ‘the world out there’ (Latour, 1987; see also Cartel et al., 2019). *In vivo* experiments, on the other hand, are situated ‘in the wild’ and thus subject to various overflows – unexpected consequences or side-effects not previously taken into account (Callon, 2009). *In vitro* experiments serve to configure ideas in the laboratory interior through a process of deliberate reduction, as ‘objects are purified in order to make them fit for manipulation and production of controlled information’ (Muniesa & Callon, 2007, p.170). By contrast, *in vivo*, literally ‘in a living thing’, underscores the openness of the experimental site. As opposed to laboratory conditions, where membership is tightly controlled (Cartel et al., 2019), the number of actors involved in *in vivo* experiments is essentially uncontrollable, because overflows may invite previously invisible or dismissed actors (Callon, 2009).

The performativity of experiments provides a complementary understanding to more institutional or linguistic readings in organization studies of how ideas are translated across organizational contexts (e.g. Nielsen, Mathiassen, & Newell, 2021). It encourages us to pay particular heed to how translations may lead to proliferations, procrastinations, and failures, and how these are made productive, thereby also directing attention to the political aspects of experimental configurations. A constructive approach for our study, then, is to advance performativity research by studying how concepts – here, Mobility-

as-a-Service – may be woven into, controlled, or reinforced through different experimental designs.

Methodology

To study how a concept provokes realities through experiments, we explore the case of Mobility-as-a-Service or MaaS. The number of actors involved, the variety of concerns spread across public and private realms, the disagreements around its definition and implementation, and the complex convergence of a mature industry with digital platforms make it an exemplary case to study how concepts provoke collective experimentation.

We followed this concept in two different cases: the cities of Stockholm and Dublin. Swedish authorities were among the first to experiment with MaaS initiatives. This allowed us to follow the case over a number of years and a multitude of projects (Langley, 1999). In Dublin, public and private actors began much later to make sense of the concept via workshops and early pilots. Though both cities pronounced their pursuit to become ‘smart and sustainable’, we realized quickly that the evolution of MaaS in Dublin contrasted much of the developments we identified in Stockholm, allowing us to compare the practical and political consequences of performing ‘the same’ concept across different socio-material contexts.

To familiarize ourselves with MaaS, in 2016 we began to investigate the digitalization of urban transport through consultancy reports, opinion leaders, and the public press. The first author then started empirical investigations in Sweden by attending local conferences around the sharing economy and transportation. As many conference participants had ample experience in transportation, we followed these actors to navigate through the

multi-faceted and often invisible network of concerned actors (Latour, 2005). We followed the same strategy for the Irish case, where we saw actors much more hesitant to engage with MaaS.

Interviews. This strategy resulted in a broad range of interviews with participants ranging from incumbents and start-ups to consultants, conference organizers, transport providers, researchers, and engineers (see Table 1). We conducted 23 semi-structured interviews in English and Swedish with informants in person or on Skype across the two regions (12 in Sweden and 11 in Dublin), complemented by numerous informal conversations at conferences and workshops and some follow-up conversations with informants by email. We chose our informants based on (1) role and tenure in their organizations; (2) direct involvement in MaaS initiatives; and (3) variation across types of organization to capture the breadth of stakeholders involved. While the interview protocol was adapted to the positions and particular interests of research participants, indicative questions touched upon the following themes: How would you describe MaaS in your own words? What other concepts do people use when talking about mobility ecosystems? Could you explain the regional ecosystem to us and how it's currently changing? What's your organization's role in it? What does your organization do to make MaaS a reality? What have you learned from the projects you were involved in so far? Can you see MaaS scaling in this region? Why or why not? Interviews soon unveiled the extensive conflicts and uncertainties informants faced in understanding and implementing MaaS, which is invaluable information that is often black-boxed in official reports and documents.

Participant observation. To contextualize the interviews, between 2017 and 2020 we attended some of the most significant MaaS-related transport events in the two regions.

This was complemented with participation in specialized conferences, roundtables, and discussions, which in turn opened up the opportunity to approach important actors for interviews. For example, a conference organized by the Transport Planning Society in Ireland in November 2018 enabled us to interview the CEO of the Finnish MaaS platform Whim, a frontrunner in MaaS. Observations and informal conversations at conferences and workshops were captured using a smartphone and notebooks. The first author also engaged with Sweden's largest shared-mobility think tank for six months in Fall 2019. This multi-stakeholder network comprised high-ranking executives of the wider mobility industries, including representatives of airports, engineering bureaus, automobile manufacturers, shared-mobility platforms, and various units of the Swedish government. Discussions at the monthly meetings largely revolved around how specific actors may construct MaaS models by tapping into their existing capabilities or technical infrastructures. During this fieldwork, the first author was offered the opportunity to conduct research with a MaaS project manager from the Stockholm city council on an exploratory survey of professionals within the MaaS landscape in Sweden. This knowledge exchange was a great additional source of insights into how public bodies try to interpret and manage MaaS in collaboration with private actors (Mounfort & Geiger, 2020).

Documentary data. We collected a database of documents, including policy documents, position papers, government inquiries, invitations to tender, print media, white papers, and social media. An important source of data was firms' marketing material, powerpoint presentations, and briefing documents. The total text corpus we examined included well over 2,500 pages of data in both English and Swedish.

[INSERT TABLE 1 ABOUT HERE]

Analytical process

Given the multiple sources and types of data, analysis unfolded in iterative stages. Our conceptual toolbox at the outset consisted of the performativity of theories literature, which had driven our initial research question and design. We knew from our early exploration that MaaS was a relatively open and contested concept, but we did not have a priori ideas as to how ambiguous the concept was or how this ambiguity impacted the concept's performative effects.

Stage 1- processual organization. We first engaged in a chronological and processual organization of our case data, mainly following the 'visual mapping' of Langley's (1999) seven process analysis strategies. We categorized MaaS initiatives and actors by year, purpose, and funding structure between 2013 and 2020 in Sweden and between 2017 and 2020 in Dublin, as illustrated in a simplified manner in Figure 1. We tagged each initiative according to the stakeholders and type of initiative involved, to follow the actors visually, and connected events with narrative vignettes from interviews, field notes, and media articles (Gehman, Treviño, & Garud, 2013). This processual organization quickly yielded two insights: one, that the concept of MaaS had never been fully settled; and two, that the differences between Stockholm and Dublin, even when considering the different timeframes observed, merited further investigation. At this point, we focussed ongoing fieldwork and analysis on the struggles of participants in both sites as they attempted to advance their own interpretations and versions of MaaS. We systematically analysed our narrative vignettes and noted what tensions and effects emerged when initiatives clashed with others' understandings of or assumptions about MaaS.

Stage 2 - thematic categorization. In the second stage, our analysis zoomed in on each case separately before comparing emergent insights across cases. Conceptually guided by

the notion of ‘performance struggles’ (Callon, 2007), we systematically traced for each case what associations existed between definitions, actors, and initiatives, how actors were enrolled into different pilots and conceptions of MaaS, how these interlinked, and how definitions and coalitions achieved temporary stability through pilots. Our thematic categorization as per Table 2 emerged from this analysis. Emergent differences between our two cases prompted further cross-case analysis, which yielded Figure 2.

Stage 3 – higher-order abstraction. We abstracted from our thematic categories into higher-order themes through joint analysis of our data. At this point, we reviewed our stage 1 (process descriptions) and stage 2 (categorizations) analyses in parallel. We paid particular attention to the interplay and consequences of experimental set-ups and the connections between the two types of work that emerged from the data - ‘epistemic work’ and ‘ontological work’. We traced how the two types of work were co-produced through the different experimental setups of lab and field experiments. Similarities and divergences between our cases helped crystallize the resulting conceptual framework.

[INSERT TABLE 2 AND FIGURES 1 AND 2 HERE]

Performing ambiguous concepts

In this section, we briefly present the early epistemic work associated with MaaS at the transnational level. We then delve into the development of MaaS in Stockholm as constituted by *in vivo* experiments, illustrating how their openness also led to considerable instability and multiple unsynchronized developments. This is compared to the case of Dublin’s MaaS evolution as an *in vitro* experiment, which rigorously contained the networks of involved actors but has since been unable to expand these networks organically. We subsequently consider how each realization provokes its own set of challenges by reflecting on the differences between framing and taming conceptual

ambiguities. We note that while our presentation contrasts both developments as clear cases of *in vivo* versus *in vitro* experiments, these ideal types often share features and overlap in reality.

Provoking initial epistemic work

In the summer of 2014, the City of Helsinki hosted the European Congress for Intelligent Transportation System. As part of the opening ceremony, the Minister of Transport screened an animated film raising the question ‘could mobility be viewed as a service?’ What was at the time a speculative question soon spawned multiple attempts to conceptually and practically frame ‘Mobility-as-a-Service’ or MaaS (Sochor, Arby, Karlsson, & Sarasini, 2018). In these early transnational conversations, the concept and central properties of MaaS - also known as ‘integrated mobility’ or ‘combined mobility’ - visibly defied any consensus. For some, MaaS connoted a digital platform combining public transport, ride-sharing, bike-sharing, taxi, carpooling, and other modes of transport into a single mobile application. For others, MaaS merely represented an app visualizing different means of transport. And yet others conceived of MaaS as a synonym for ‘shared mobility’, which in turn is a loosely defined term derived from the lexicon of the sharing economy (Mulley, 2017). There was moreover little agreement on what precisely the all-important ‘service’ in Mobility-as-a-Service should stand for, for instance whether, and how, MaaS operators should offer planning, booking, and payment services; or whether they should simply act as mobility mediators and cascade responsibilities to transport providers (observation notes, February 2019).

One consequence of this conceptual bewilderment across Europe was the establishment of several networks through which stakeholders met to conceptualize MaaS and support

local implementation efforts. Most prominently, in 2015 public transport providers, shared mobility platforms, tech firms, and local authorities founded the European MaaS Alliance – a multi-stakeholder network dedicated to coordinating a common MaaS approach across Europe. While the Alliance set out with an explicit aspiration to seek ‘harmonized standards’ through workshops and discussion forums, it soon realized that any theoretical specification had to go hand in hand with practical experimentation: ‘to unlock the full potential of MaaS, further experiments and studies are still needed in order to identify the most suitable business models for MaaS deployment’ (White Paper, 2017). To facilitate this, the Alliance created a MaaS Readiness Level index to guide local authorities in their practical translations of the MaaS concept. While the EU saw harmonizing benefits in providing a ‘checklist for the local authorities’, it also conceded that ‘in many cities the MaaS concept is very new and therefore the level of knowledge varies a lot.’ (Aaltonen, 2017, p. 4).

Defining MaaS and making it a reality was thus from an early stage a process of mutual constitution: for MaaS to become collectively established as a new standard in urban mobility, defining it and experimenting with it had to proceed in parallel. The transnational definitional efforts helped to provoke regional and local actors to translate MaaS into their specific settings. We will turn to two of these local translations next.

Proliferating *in vivo* experiments in Sweden

The Swedish approach to implementing MaaS, presented in this section, was characterized by multiple pilots and testbeds that created constant movement in terms of which actors were involved and who was in charge, which we interpret as a series of *in vivo* experiments. In these pilots, the exact composition of participants and the goals they

pursued were never stable, hardly known ex ante, and not fully controllable either, with new features and participants entering the scene continuously.

Provoking participation

You see all these new actors coming in and trying to be part of MaaS in any way possible without knowing how to actually make this happen as a collective. So, it's a rather messy environment. Open, but messy. (UbiGo, interview April 2019).

This statement not only illustrates the proliferation of MaaS initiatives across Sweden; it also echoes the divergence of interests spurred by the open environments through which MaaS was developed. This was evident from the very first Swedish MaaS pilot UbiGo launched in November 2013, which involved about 200 individuals in 70 households over a duration of six months. As a manager explained to us, as part of a wider project funded by the Swedish Innovation Agency Vinnova, a local network of private and public actors designed this 'early MaaS experiment' as a transition into more sustainable urban transport. The idea was to launch a 'broker of everyday travel' by offering a digital one-stop-shop for various means of traditional and shared mobility transports, colloquially referred to as 'Netflix for transportation'.

Even though it was officially deemed a success, UbiGo was discontinued upon completion, for several reasons related to its open design, as we gleaned from our interviewees. First, the heterogeneity of participants eager to join UbiGo resulted in a blurring of responsibilities as the knowledge required for a larger-scale implementation remained dispersed. Second, a clear definition for MaaS driving the experiment was non-existent, which added uncertainties over legal and practical boundaries (Kompis Report,

2020). Third, while public transport was estimated to comprise 80% of all MaaS journeys and thus constituted the most important cog in the MaaS wheel, its subsidization created a misalignment between private and public incentives:

UbiGo are working very, very closely with the City to develop this platform. And in reality that means of course we have to work with lots of people who are not involved in the project and are not funded by the project that have different agendas. (Stockholm City, interview April 2018)

Overall, there was a strong sense among our respondents that the pilot, while inclusive, had failed to knit together a tight enough assemblage of actors to broaden out the experiment, and it had not managed to resolve any of the uncertainties associated with MaaS at the time.

Provoking organizational reframing

The performative work among UbiGo participants took place within a context of already established market orders, and it was in these settings that UbiGo reverberated most powerfully. Faced with the possibility of further MaaS experiments that may be outside their control, large public transport actors tried to leverage their central position to shape a collective direction for MaaS – knowing that this would prove a difficult undertaking:

When we think about how we want traffic flows in the city to be, we always have to think about these other actors. So, we have both, the regional and the national level and we also have the private companies that are in the city of Stockholm and in the region. [...] You can see an alignment of goals across all the different levels, but when it comes to how to do things, to achieve the goals, then it goes wildly apart. (Stockholm City, interview April 2018)

This divergence opened up questions of authority and control over the emergent assemblages, which were of vital importance for incumbents such as Samtrafiken. Jointly owned by 35 powerful shareholders – ranging from local transport authorities to train and bus operators – the organization represents the largest Swedish public-private transport network. Stirred by the UbiGo pilot, Samtrafiken investigated which kind of agency it could have in future MaaS developments. This investigation resulted in a White Paper entitled ‘The Swedish Mobility Program’, which, as the CEO proudly (if somewhat prematurely) declared, ‘is no longer white and will serve as blueprint for our next step’. Yet, this blueprint involved rallying together a highly heterogenous set of stakeholders, all of whom had claimed a stake in the evolution of Swedish MaaS. This, in turn, produced internal tensions over the future role of Samtrafiken as a central transport actor: ‘But then the board decided they were not sure there was a business case for them in this constellation’ (interview, Samtrafiken). For this incumbent, expanding the network to control MaaS had become a Janus-faced undertaking; while enrolling stakeholders would help in maintaining a position of power, the potential of failing in these corraling effects triggered very concrete identity struggles: ‘Samtrafiken ended up in some type of identity crisis. Like, what’s our role going to be?’ (Samtrafiken, interview April 2018).

After a period of organizational soul searching, Samtrafiken decided to dismiss their ambitious White Paper leadership strategy and only focus on supplying the technical infrastructure for future MaaS experiments: ‘Our board and our owners want us instead to focus on the tech by making data available and producing standards’. Yet, even this much narrower performative scope necessitated further epistemic work. As ‘MaaS is not just another app’, Samtrafiken concluded that a relational understanding of the concept was critical to its practical implementation. This resulted in a series of ‘collaborative

meetings’ in the form of workshops to ‘create conditions for knowledge exchange, discussions, networking and the opportunity to push ongoing projects forward’.

Provoking spaces for negotiation

As Figure 1 illustrates, Samtrafiken was not alone in attempting to seize MaaS for its purposes; prompted by the early UbiGo experience, testbeds and pilots soon mushroomed all over Sweden. To channel the dispersal of energy, responsibilities, and incentives in the operationalization of MaaS in this maze of experiments, an aggregate observation of initiatives was required, ideally directed by some disinterested arbiter. In 2017 the Swedish government launched a collaborative program for MaaS called Next Generation Travel and Transport, or Kompis. With a remit to establish normative guidelines for public and private MaaS actors, Kompis aimed to take stock of existing experiments and draw up a common MaaS framework via concrete milestones that allowed the government ‘to establish conditions for collective action’ (Kompis, interview March 2019).

A detailed action plan, referred to as ‘Roadmap’, was developed for the period 2018 to 2028, focusing on issues as broad as legislation, technology, and policy development (Appendix 1). As part of this roadmap, Kompis established a service that systematically gathered and rendered visible information on ongoing MaaS experiments in Sweden. These efforts in mapping and monitoring stakeholders were complemented with regular ‘Kompis MeetUps’. These events were well-frequented by MaaS actors across Sweden and served both as platforms for knowledge exchange and as pitching-floor to raise funds and find collaborators for further local pilots. While it did not stem the mushrooming but rather facilitated an ever-expanding MaaS landscape, Kompis MeetUps provided a

platform in which experimental setups and outcomes could be compared and discussed. As we will argue below, it thus created a marketplace for MaaS experiments. Shifting MaaS actors from an ‘egosystem’ to an ‘ecosystem’ mentality, as one interviewee put it, these meetings helped practitioners understand that performing ambiguous concepts required them to confront potential clashes of interest, understandings, and initiatives among multiple actors. The loose coordination of actor assemblages provided by Kompis through these meetings in fact gave UbiGo an opening to fund a second experiment in the spring of 2019. A new legal entity was launched, UbiGo Innovation AB, which involved different transport providers in a characteristically multi-participative *in vivo* setup:

I think that’s the big fear and the big challenge of UbiGo and other MaaS platforms to convince these mobility providers that they actually generate more money [when working together]. But then you need to convince *every* mobility provider (Kompis, interview March 2019)

To summarize, in the Swedish case open experimentation by dispersed public and private actors led to a proliferation of pilots and initiatives and a jostling for prime positions among incumbents and other actors. While this revealed the significant degrees of freedom afforded by the MaaS concept for participants to perform their own realities, these very degrees of freedom reverberated into the actor organizations themselves. Between the first pilot and its multiple spawn, it became clear that if only lightly framed, experimenting with MaaS and its multiple incarnations failed to align a critical mass of actors for scaling up from these small-scale experiments. While continuing with the open *in vivo* approach to making MaaS a reality, stakeholders seemed to slowly realize that incomplete negotiations around what Callon (2009, p. 539) called ‘the rules of the game’ resulted in multiple parallel realizations of the game. Epistemic and ontological work was

loosely drawn together into an organizational space – a market of sorts - to facilitate collective learning. Even then, the latest struggles of the second large UbiGo pilot, manifesting at the time of writing, bear witness that an open market approach via *in vivo* experimentation is a rather protracted road to performing ambiguous concepts.

Taming ambiguity through an Irish *in vitro* experiment

Lagging a couple of years behind other localities, the city of Dublin probed its own peculiar version of MaaS, as the October 2018 European Transport Conference in Dublin highlighted. Here, in a panel of city representatives from different countries discussing MaaS initiatives across Europe, an urban planner from the Dublin City Council introduced their ‘unconventional MaaS idea’, which significantly contrasted with the Swedish approach: the realization of MaaS as a highly controlled ‘inside job’ – or, in our reading, as an *in vitro* experiment.

Provoking bounded involvement

While the Swedish ‘market of experiments’ allowed a wide range of stakeholders to join in the action, from the outset Irish public actors voiced a significant level of nervousness about engaging in any experimentation with MaaS:

You see the thing is, as a public body responsible for public procurement, it’s difficult for us to move quickly. It’s difficult for us to be really innovative, because being really innovative like this comes at a risk. And we’re accountable to the general public for how we spend taxpayers’ money. We have to be careful about how we use public funds, we can’t get to try and invest in new ride-sharing (National Transport Authority, interview January 2019)

This nervousness was understandable, as Dublin's socio-material conditions were not exactly felicitous for realizing MaaS. For one, Dublin's public transport had not been designed to be combined with other modes of transport, making it practically difficult to jump between different modes of mobility. The transport system is very fragmented and smartphone technology had been largely neglected. In addition, the medieval layout of the city had led to a traditional neglect of public transport, making Dublin 'not the archetypal city to implement MaaS in', as one industry expert explained (Interview, ARUP, November 2018). Thus, with most larger actors cautiously holding back on experimenting with MaaS, the sense across actors was that any such experiment would be at a relatively modest scale to start with: 'What we want to do is to create a model that can be shared with private sector companies or larger sister organisations' (DCC urban planner, interview October 2018).

Dublin City Council (DCC) finally led this charge by experimenting with an *internal* MaaS platform exclusively designed for council employees:

I'm thinking of [this] as a mini-MaaS experiment in Dublin, where we are looking to get a pilot into our basement. [...] It's not nationwide, it's not city-wide, it's just for Dublin City Council. (DCC urban planner, interview October 2018)

This MaaS miniature was a derivative of a more ambitious project called 'Smart Dublin', an initiative launched in 2016 to solve urban congestion. As part of Smart Dublin, the City Council sought to establish a so-called Smart Mobility Hub by integrating staff and council vehicles and tapping into their idle capacity during working hours. To pilot the Smart Mobility Hub a pre-commercial procurement process was launched in 2018. The DCC issued a highly detailed invitation to tender to control experimental conditions,

including the specific scope, an outline of desired outcomes, and a detailed tendering process (see Appendix 2). MaaS as a concept and a future reality was thus from the outset seen as an object to be ‘tamed’, as was the scope of participation it opened up. While the Council had no concrete vision as to how MaaS could be scaled beyond this lab experiment, the tender stipulated several additional parameters to safeguard a tight degree of control across (future) test sites. This included specific assessment criteria reviewed by ‘a selected panel of experts’, formalized application processes such as the preformulated Tenderer Statements, and a clear timeline for each new round of investment. Thus, rather than planning to open up the lab to the field, the tender document conveyed a sense that the DCC were going to try to extend the lab into the field by keeping the pilot’s boundary conditions intact for as long as possible.

Choreographing for control

It would be inaccurate to claim that the DCC was oblivious to the world beyond the lab. Yet, while the Swedish case exemplifies experiments as spatially and organizationally distributed ‘in the world’, the Irish case demonstrates the choreographing of experimental spaces to carefully admit glimpses of that world.

For instance, the Civic Offices in Dublin city could only host 280 parking spaces, meaning that hundreds of public parking spaces were used by the approximately 1,500 staff members during a regular working day. As a result, the experiment had to be planned across some neighbouring areas:

In order to really prove what they [the tenderer] wanted to do, they really needed to have a life demo kind of session. They couldn’t just do it all on paper, it couldn’t just be a theoretical study. So we had to find places to put

them all, so that they could demonstrate that what they wanted to offer was actually working. (DCC urban planner B, interview August 2019)

As the project unfolded, it became increasingly clear to participants that more and more contingencies had to be taken into account, many of which were material in nature. Thus, despite the tight initial boundedness of the experiment, it became less ‘pure’ as time went on:

There are huge obstacles, and we don’t even know all of them. ...If you are in a concrete basement, you don’t have any connectivity. So, you can’t unlock the car or the bike. And we’re like ‘oh that’s really important’. (DCC urban planner A, interview October 2018)

In addition, some of the (carefully selected) partner organizations had an eye on the bigger prize of the world beyond the lab and thus pushed to introduce some real-life conditions:

DCC employees are insured through our own insurance company but we have to make sure that there are no leaks in the insurance. So, we actually got a lot of advice from our own internal insurance providers as to what can happen. And they are really interested because they see the market changing very, very quickly, they want to learn as well. (DCC urban planner A, interview October 2018)

Rather than risking an ever-expanding distance to the world ‘out there’, the DCC thus decided to weave in some minimal conditions necessary for a future transition from lab to field. With this, epistemological concerns became more prominent again. Yet, compared to the Swedish trajectory, epistemic challenges were harder to work into an experiment that had drawn clear lines in the sand between the lab and the outside.

Foregoing association

The secluded lab existence of the *in vitro* experiment and the resulting absence of knowledge exchange had consequences beyond the lab itself. In fact, this absence was palpable in the Irish MaaS conferences we witnessed, such as a workshop on MaaS governance in January 2019. While the attending organizations covered a wide range of decision-makers, the distribution of responsibilities and the overall purpose of MaaS in Ireland lingered as an open discussion point. In fact, the conference made apparent that a full six years after it had become prominent across major European cities and a year into the DCC's efforts, MaaS remained an aspirational concept in Ireland. In contrast with the lively debates we witnessed at Kompis MeetUps, it seemed that for Irish public transport authorities, preventing conceptual and operational ambiguities linked to diverging actor interests remained paramount, which largely inhibited productive epistemic frictions. Consequently, this and other conferences failed to provoke any larger-scale collective action. The fact that the DCC's quasi-laboratory experiment seemed largely unknown to other actors highlighted that its tight boundedness had forfeited valuable opportunities to leverage potential synergies with other initiatives. For instance, when probed in our interview, little to no learning was evident from the DCC's efforts for another MaaS pilot currently planned by the National Transport Authority in Dublin, aiming to extend an existing transport card's functions towards a more 'MaaS-like system' (NTA, interview January 2019). Seemingly oblivious to the DCC's pilot, this national body has been unable as of now to synchronize its efforts with those of local authorities. With its stealth mode, the DCC arguably had not only missed an opportunity to gain agency in provoking an Irish MaaS beyond its narrow lab setting, but it had also deprived others of the chance to learn from, question, and contest the experiment and its results.

To sum up, in an openly competing market of experiments actors might quarrel over definitions and privileged positions – but at least they quarrel. By contrast, *in vitro* experimentation allowed Dublin’s local authority to purify the conditions ex-ante through boundary drawing mechanisms that helped create and (largely) keep the distance between the realm of the quasi-laboratory and the world outside. The case of Dublin too hints at emerging epistemic tensions among actors, but these tensions primarily revolved around how much ‘real life’ should be admitted into the laboratory. Where scaling from *in vivo* experiments in Stockholm was complicated by the sheer number of actors and their diverse performances, in Dublin’s tightly choreographed setting the big uncertainty was how the pilot would overcome its self-imposed distance to really existing market contexts, and how would it open up its boundaries to competing conceptions and assemblages.

Discussion

This study explores how ambiguous concepts spawn economic realities through experimentation. Our empirical analysis provides a starting point for this theoretical ambition by investigating the performativity of one concept across different sets of actors with diverging experimental approaches. Specifically, we suggest that a concept’s initial openness provokes experimental practices that produce effects in two interlinked directions: epistemic effects, triggering discussions and coalitions that aim to frame concepts and the (power) relations they entail; and world-building or ontological effects, allowing actors to put flesh on conceptual bones through building concrete socio-material assemblages. Importantly, epistemic efforts will influence ontological ones as much as the latter will reverberate on the former: testing concepts in the world will change both the world and the concept; and the more testing in diverse settings is done the more likely

is it that worlds and concept multiply. The experiments we study in this paper offer an opportunity to theorize how *in vivo* and *in vitro* experiments mediate this ontological work and how they may influence the future trajectory of the concept beyond the experimental set-up. Figure 3 illustrates the conceptual argument we lay out in this Section.

[INSERT FIGURE 3 ABOUT HERE]

Taming versus framing ambiguity

We use the terms ‘epistemic work’ (Knorr Cetina & Preda, 2001) for the framing of ambiguous concepts. Judging from our data, actors’ engagement in epistemic work stems from their desire to participate in, control, and benefit from the reorganizing of economic exchange during the introduction of new ideas or concepts. Simply put: if there’s a conceptual up-and-comer that may upend one’s business model, it pays to steer its definition. This includes monitoring how other actors translate a concept into performance indicators, regulations, or organizational coalitions. The initial conceptual ambiguities around MaaS gave rise to several spaces of collective sensemaking. These in turn served as a seeding ground for subsequent localized experimentation, manifested in ‘ontological work’ - actors building MaaS experiments through forming networks, setting goals, conceiving demonstration devices, engaging technology and cityscapes, etc.

Importantly, epistemic work does not cease once ontological work starts. On the contrary, we observed an ongoing utilization of local spaces where groups gathered to discuss concerns around the experimental framings and what they meant for the concept itself – admittedly more so in Sweden than in Ireland. These spaces may lead to greater transparency by exposing frictions between different versions of the concept and their

realizations (Callon, Lascoumes, & Barthe, 2009; Mason, Friesl, & Ford, 2019). More realistically, they also serve vested interests by endogenizing agency in the co-shaping of definitions and networks. We found that the MaaS conferences and symposiums organized in both locations adjourned any agreements on common conceptualizations. Instead, participants used these spaces to lobby for their interpretations of the concept in a performative power play: the proliferation of MaaS definitions and sub-labels acted as signalling posts of how each network attempted to shape future economic realities for their own benefit.

Although in both cases ontological and epistemological work were intertwined, we found significant differences in how this intertwining happened in our *in vivo* versus *in vitro* settings, as Figure 3 illustrates. *In vivo* experiments perpetuate conceptual ambiguity by simultaneously motivating dispersed collective action and prolonging doubt among participants as to what their role beyond these experiments might be. Without an agreed-upon definition of MaaS, in the Swedish context we see the proliferation not just of definitions but also of a range of socio-material devices – maps, plans, projects, platforms, etc. – which organize the experiments’ production and circulation. We also see an emergence of spaces for negotiating this diversity. Such a decentred approach to experimentation gives rise to a fair amount of performative ‘misfires’, to speak with Callon (2010), but organizes them at least loosely by framing a market-like space for confrontation and performance struggles.

At the same time, our findings indicate that where multiple interpretations participate in a market for experiments, there may be too much multiplicity, for too long. In fact, in the Swedish case distributed onto-epistemological work has more than once resulted in

situations of ‘collective inertia’ (Huxham & Vangen, 2000) where the MaaS world could not be seen for all the experimental trees. On a more positive note, the relative visibility of successes and failures in a market of *in vivo* experiments may lead to eventual stabilization and greater ease of moving beyond experimental setups, as we will explain below. Clearly, collective onto-epistemological work has to result in stable enough rules of the game if they are to lead to an actual game.

By contrast, in *in vitro* experiments, conceptual ambiguity is temporarily tamed. Where *in vivo* experiments allow power constellations to form through trial and error (and a good dose of strategic posturing, as in the case of Samtrafiken), the *in vitro* experiment is more openly hierarchical. Onto-epistemological work can here be considered as anticipatory, in that definitions *and* outcomes are shaped by a preventatively stabilized socio-material environment, including which actors are involved, procedures to guide collective action, and predefined measuring devices, down to the number of car parking spaces ‘enrolled’. Even though the messy contests and confrontations that would occur ‘in the wild’ are suppressed in the lab environment, it is not devoid of onto-epistemological work. Each decision, such as the question over what insurance package to consider, is both ontological (which MaaS world are we trying to build) and epistemic (how does this concept map onto the world). In other words, even in the purest experiment the ‘world out there’ keeps breaching the lab’s boundaries. And while the *in vitro* approach allows to perform a particular reality in stealth mode, the ‘always perilous return into the big world’ (Callon et al., 2009, p. 48) will invariably require new circuits of onto-epistemological work – and may after all provoke the multiplicity that was so carefully kept at bay in the lab. It is thus possible, as Voß and Simons (2018) have indicated, that the most beneficial experimental setups include both *in vitro* and *in vivo* spaces – the lab

and the field - in a performative ‘ping pong’ that allows just the right balance of control and contestation for ambiguous concepts to become productive rather than wildly generative.

Economic experiments and after

What does it mean for an experiment to become productive? Classic works in the sociology of translation and some lineages of performativity theory have at times been accused of creating an illusion of linearity by portraying how concepts and their spokespersons extend to enrol an ever-broadening reality, a reality in which misfires and dissidents appear as mere boundary conditions (Asdal, Brenna & Moser, 2007; D’Adderio et al., 2019; though see Callon, 2007). By focusing on the performativity of experimental setups around ambiguous concepts, we emphasize their ‘provocative’ nature (Muniesa et al., 2014). By considering the onto-epistemic work done as part of these experiments, we are also attentive to the question of what follows on from these ‘provocations’. This reflection is vital to understanding how current experiments with alternative economic orderings – the sharing economy, cryptocurrencies, or urban commons – may influence broader socio-economic contexts. To recall, our own empirical context of MaaS stems from a desire to drastically alleviate city traffic congestion and air quality, yet like so many other sharing economy concepts it has so far fallen short of decisive economic and social impact. In a sense, MaaS has failed to scale. Extrapolating from our insights and other works on the performativity of economic concepts to the question of what it takes to make these experiments count ‘in the wild’ opens up interesting new research vistas for organization studies, for instance on moments of scale-change; on collective governance; and on concrete world-building in socio-material choreographic.

First, analysing how ontological and epistemic work interact in different experimental set-ups allows researchers to attend closely to how power is constituted in them, particularly how actors seize and maintain ‘epistemic authority’ as a relational performance (Voß & Simons, 2018; Bourgoin, Bencherki, & Faraj, 2020). Our concept of onto-epistemological work signals that epistemic authority endows actors with the ‘power to perform’ ontologically. In our case, for instance, the all-important question of what ‘service’ the concept of Mobility-as-a-Service involves implied an answer to who the central node in the MaaS network might be and how other mobility providers and their technologies may be arranged around them. Bowden et al. (2021) have recently demonstrated that performing theories often requires a ‘scaling down’ of global concepts into local contexts, as in their case of localizing ‘climate change’ to a local flood prevention plan. In these moments of scale-change epistemic authority becomes particularly vulnerable. Our findings suggest a similar vulnerability in the moment of ‘scaling up’. In both of these ‘translational’ moments, associations so carefully knotted together in the experiments may become displaced and disrupted, and renewed definitional turf wars may erupt. In our Swedish case, scaling MaaS beyond the experiments to national or even regional level would require to finally settle for a guiding definition of the concept as well as an actor coalition that could ‘hold together’ when magnified to a larger scale. In the case of Dublin, it would mean facing the power contestations that were so carefully kept at bay by the DCC and resolving the many material and practical constraints that were also kept external to the experiment. Retaining epistemic authority when moving up (or down) these experimental scales means continuously remaking ontological associations, as an inability to do so leaves

interpretive room for other actors to seize their own authority – and subsequently mould reality to their own advantage.

At the same time, such epistemic openings may also provide room for dissenting or lesser-heard voices to make their concerns heard. This point relates to the second broad insight our research provides, on the ‘civilizing’ or collective governance of economic experimentation. Callon (2009) refers to the notion of ‘civilizing’ in arguing that experiments benefit from plurality and openness of participation. ‘Civilizing’ is the opposite of controlling – it is, as Callon points out, precisely by opening up the networks of entanglements and tending to the overflows this creates that civilizing can be achieved, not by cutting these entanglements. Our study showed that experiments can function as important catalysts to draw concerned actors into the onto-epistemological work involved in the performativity of concepts. The broader the range of actors gaining agency by participation, the stronger the feedback loop between the concept and its ever-widening circles of reality (Marti & Gond, 2017). At the same time, as we saw in the Swedish case, if it is too distributed, collective governance can flip into collective paralysis – too many eager cooks spoiling the performative broth, so to speak. The larger question, then, becomes one of how collective governance can be safeguarded both within and beyond the experiment all while preventing premature closure or the unilateral seizing of epistemic authority: in other words, how can we leverage experiments to open up economic organizing to a truly collective dimension? How can we preserve and perhaps even amplify multiple voices when these experiments move from lab to market? Reflecting on the ‘civilizing’ dimension of collective experimentation may also move us to consider our own (academically performing) voices to add to the multivocal assemblies we witness when we follow economic experiments. When making the link between

performativity and experimentation, Callon (2007) referred to Gibson-Graham's (2003) collectivist 'alternative economies', which mostly flourish in smaller (experimental) niches sheltered from harsher economic currents. He reminds social scientists of their own ability to perform in and beyond such spaces through their writing: 'Our work, together with the actors, is to multiply possible worlds through collective experimentations and performances.' (Callon, 207, 352). Such writing, we may add, might also serve to represent, amplify, and preserve multiple voices in the building of these multiple worlds *qua* experiments.

Finally, while there is now a solid body of knowledge on linguistic performativity - or how concepts conquer mostly ideational worlds – our study encourages further insights into the more material aspects of onto-epistemological work or the very concrete world-building that economic experiments may entail. Future research should focally consider the ontological resistances that new economic concepts may encounter when set free into the world, for instance when urban 'shared mobility' experiments encounter established large-scale infrastructures. As we mentioned above, Dublin may never see a full MaaS rollout as envisaged on a whiteboard in a conference room, simply because of the spatial and other infrastructural resistances that would-be MaaS mobilizers encounter there. Clearly, it is not enough to simply 'think up' a new economic reality without considering broader ontological givens and their attachments – experiments in autonomous driving outside well-confined desert spaces currently bear ample witness to this fact (Tennant & Stilgoe, 2021). The complexity of regulatory, geographical, and historical contingencies and the attachments they entail likely increases as experiments start occupying greater terrain. Experiments may serve to render visible these often invisible attachments, but they may also help anticipate new ontological givens in ever-shifting economic

constellations. While research is inclined to study how concepts conquer the world, maybe a reverse perspective – how the world conquers certain concepts – would tune our collective gaze more carefully to the many real-world attachments that economic experiments will have to accommodate when rolled out ‘in the wild’.

Conclusions

Our research traces the ongoing onto-epistemological work that the introduction of new economic concepts provoke, highlighting experiments as highly generative organizational arrangements. What these new performances will provoke cannot be fully known in advance, requires constant adjustment, and varies across situations. Yet, as we have shown, to think economic experiments ‘onto-epistemologically’ helps to better understand their organizing effects, in particular how they provoke new constellations across actor groups, artifacts, and practices to bring about a controlled multiplicity of organizing. We hope that future research can further investigate the mechanisms and conditions of onto-epistemological organizing through experimentation, particularly in situations where ambiguity is both the result and the resource of collective action.

Where the performative turn in organisation studies has often emphasised the technical nature of calculative agencies (e.g. D’Adderio & Pollock 2014), our research paves the way for a richer theorization of how organizational experiments may help address the smaller and grander challenges that the materialization of new economic concepts entails. We hope our study may also function as a call to researchers to follow and support the ‘civilised’ governance of economic experimentation - that is, to consider how experimental knowledge might extend into participatory organizational arrangements, multi-stakeholder forums, and hybrid organizing. This may also allow us to better attend

to the roles of diverse publics and their concerns in performing alternative economies (Geiger & Gross, 2018). In this context, we readily acknowledge the conceptual and practical limitations of our study. Focusing on how concepts are performed comes with the specific methodological challenge of identifying and pursuing the various forms and agencies they provoke. On this count, there is clear scope for methodological innovation in ‘following the experiment’ in a world characterised by plasticity and relationality, firmly putting the emergent and relational character of concepts at the center of our collective analytical lens.

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Tables and Figures

Table 1 – Data source and use

Data Source	Type of data	Use in the analysis
Archival data (Total no of documents: 90 in Sweden, 35 in Ireland)	<i>In Sweden:</i> Policy documents, position papers government inquiries, popular press <i>In Ireland:</i> Invitation to tender, white papers, form documents, popular press	<ul style="list-style-type: none"> - Build background knowledge of actors and how they communicate their ideas to stakeholders, e.g. potential customers, government, etc. - Follow how MaaS interpretations translate into firm documents and public policies - Produce chronological timelines and maps to visualise authority structures and interorganizational dependencies.
Observations (Total amount of observation: 39 h in Sweden, 9 h in Ireland)	<p>Participant observation:</p> <p><i>In Sweden:</i></p> <ul style="list-style-type: none"> - UbiGo kick-off event, April 2019 - Ernst and Young mobility think tank series, fall 2019 - Sharing economy workshop, Lund university, June 2017 <p><i>In Ireland:</i></p> <ul style="list-style-type: none"> - MaaS governance workshop, January 2019 <p>Conference participation:</p> <p><i>In Sweden:</i></p> <ul style="list-style-type: none"> - Samtrafiken member meeting, March 2018 - Samtrafiken Data Forum, March 2018 - Volvo Annual Mobility Meeting, February 2019 - Kompis MeetUp, March 2018, February 2019, November 2019 <p><i>In Ireland:</i></p> <ul style="list-style-type: none"> - European Transport Conference, October 2018 - MaaS workshop organized by Transport Planning Society (UK), November 2018 	<ul style="list-style-type: none"> - Identify and follow key actors. - Understand how actors collectively interpret shared mobility and related concepts. Follow how particular voices are silenced or amplified at events. - Note how actors compare and defend their versions of and future plans with MaaS to those of others.

Interviews (23 in total, ranging from 30 to 85 minutes)	<i>Informants in Sweden:</i> UbiGo, Samtrafiken, Kompis, City of Stockholm, DriveNow, Volvo <i>Informants in Ireland:</i> National Transport Authority, Dublin City Council, Aecom, University College Dublin, Arup, Whim	- Probe particular issues, identify how actors go about epistemic and ontological work, identify power constellations, note uncertainties related to MaaS - Deepen and verify observational and archival data, especially in cases of apparent discrepancies.
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Table 2 - Thematic analysis

Narrative Vignettes	Narrative Themes	Theoretical categorization
A. "What we need is a 15foot box that stipulates a unified toolbox/concept and then the actual evolution of it can be different on a regional level."	Debating multiple meanings	Provoking spaces for negotiation
B. "We need to be careful today, because MaaS can be understood as a brand, a concept or a business model"		
C. "We first need to find a common definition of MaaS, otherwise these fancy technologies will not be used properly"	Contesting definitions	
D. "MaaS is not car sharing or ride sharing alone, it's a combination of shared mobility and public transport"		
E. Kompis aims "to identify and conduct pilots within the policy and regulations domain"	Monitoring and funding pilots	Provoking bounded involvement
F. "Coordinating and developing the Roadmap for MaaS in Sweden"		
G. "I'm happy about these workshops, they help to find like-minded peers"	Active networking	Provoking participation
H. "Workshops are like a marketplace for MaaS"		
I. It's not easy to align all the mobility agendas on one platform"	Open enrolment of participants	Provoking organizational reframing
J. "We constantly seek new services to join"		
K. "MaaS pilots are funded by incumbents, public actors, venture capitalists etc."	Multiple experimental sites	
L. "Aim is to establish an open MaaS marketplace across Sweden"		
M. "After phase 1, there will be a professional assessment committee to examine the prototypes"	Controlling environment	Choreographing for control
N. "the integration of available travel options within a controlled and trusted environment of a staff car park."		
O. "The idea is to build a model first and then scale and reach out to other stakeholders"	Cutting the network	Foregoing association
P. "Suppliers will be selected by an open competition process and retain the intellectual property generated from the project"		

Figure 1 – Experiments in Stockholm and Dublin (2013-2020)

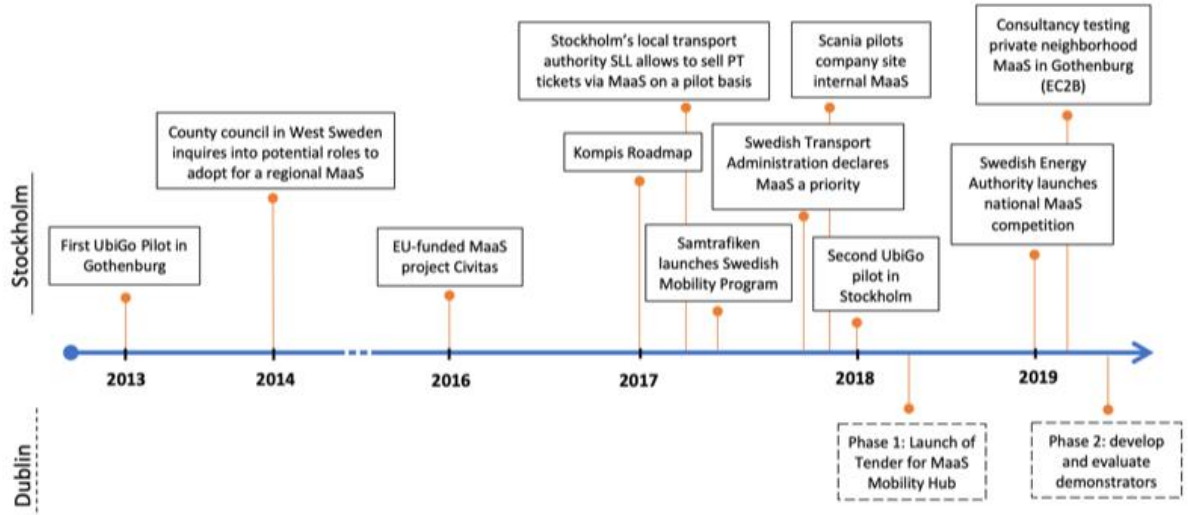


Figure 2 - Practical outcomes of different experimental designs

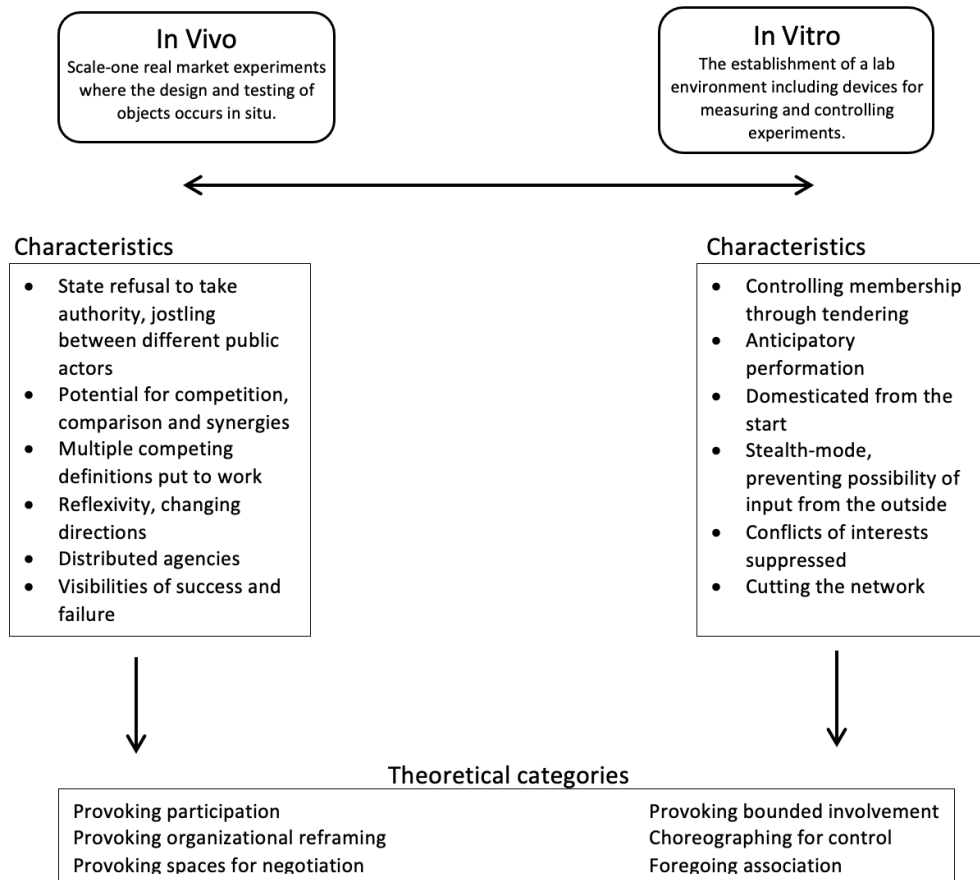
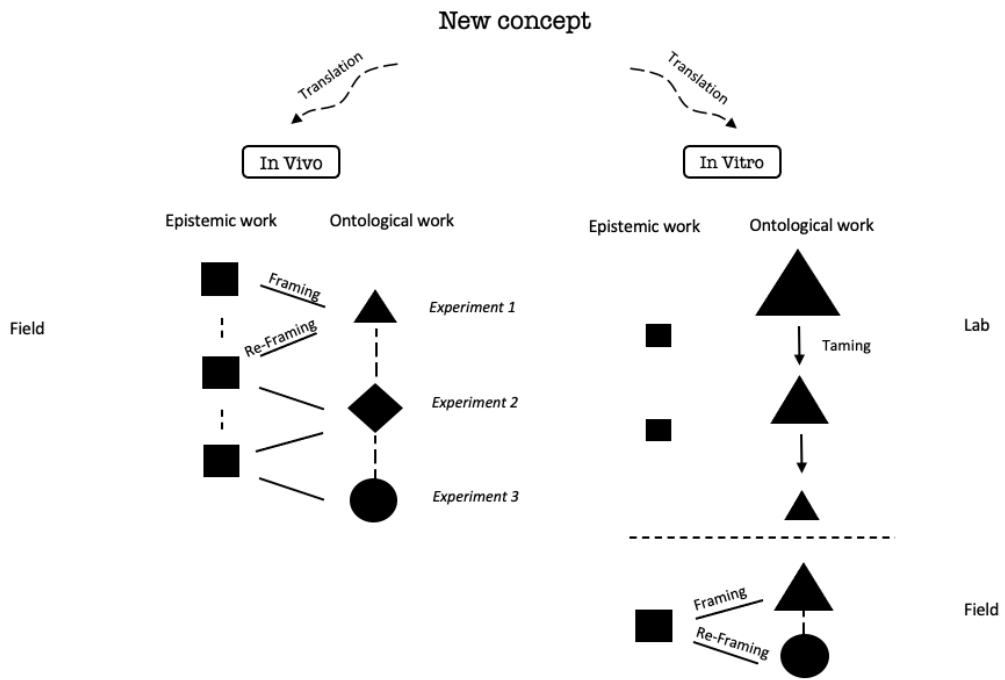


Figure 3 – Onto-epistemological work in experiments



Appendix

Appendix 1 - The Kompis Roadmap. Source: Kompis.se

ROADMAP - COMBINED MOBILITY AS A SERVICE IN SWEDEN

	Lay the foundations	Establishment	Change
1. Business & tickets	1a. Make RPTA's offering available 1b. Develop & adapt RPTA's offering 1c. Pooling efforts open data RPTA	Standard for roaming between services Investigate additional needs in order to support development	Mobility as an occupational benefit is the norm
2. Legislation & policy	2a. Investigation of subsidies and occupational benefits 2b. Demonstration under altered policy conditions	Overview of legislation for sharing services Overview of tax legislation & occupational benefits	Legislation is adapted to promote sharing economy & mobility services
3. Pilot & implementation	3a. Implementations in metropolitan regions 3b. Pilot projects in metropolitan regions 3c. Pilot projects in sparsely populated regions	Implementation of CM outside the metropolitan areas Pilots with integration in relation to policies	Pilots with autonomous vehicles
4. Impact & consequence	4a. Analyses of travellers and their preferences 4b. Development of framework and methods for impact analysis	Impact analyses	Shared travel is the norm
0. Co-ordination & co-operation	0a. Project management 0b. Collaboration meetings		
	2018	2020	2023
	2028		

Appendix 2- DCC tender document criteria

Key aggregate MaaS criteria	Data points
Ability to tap into idle capacity of cars	Replacing/reducing the current level of single occupancy vehicles; lowering the necessity for car ownership
Measuring footprint	Analysis and visualisation of the x% reduction in CO ² emissions
Incentivization	Opportunity to “gamify” behaviour through a prize or reward based solution.
Scaling	Opportunity to scale out the successful solution within large Dublin based employers

Author biographies

Gianluca Chimenti is a postdoctoral researcher at the Stockholm School of Economics, Sweden. As a German native, Gianluca believes in the Humboldtian model of higher education, which features a freedom of study for students as well as a sense of social responsibility. His research, like his teaching, reflects a passionate interest in combining insights from marketing and economic geography to better understand the organizing of markets, particularly in ambiguous and controversial environments. His ongoing research focuses on the spatial dependencies of marketization in the so-called ‘gig economy’.

Susi Geiger is a Professor of Marketing & Market Studies at University College Dublin and the Principal Investigator of the ERC Consolidator Project MISFIRES (grant no. 771217). Her research investigates how markets are organized in the context of social justice and public good concerns. She has published numerous journal articles on these issues, including in *Organization Studies*, *Research Policy*, *Economy & Society*, and *Business & Society*, and edited the volumes *Concerned Markets* (Elgar, 2014) and *Healthcare Activism: Markets, Morals, and the Collective Good* (Oxford University Press, 2021).