Sociotechnical Fictions: The Performative Agencies of Fiction in Technological Development

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Abstract

This paper coins and develops the notion of 'sociotechnical fiction': a type of fiction distinct from literary or cinematic forms, which operates within the technosciences to materialise non-existent, imaginary entities through the production of new technological assemblages. Adopting a performative approach to actor-network theory, the research explores how these fictions mediate the continuum between matter and imagination, and between present and future, through a comparative analysis of related concepts such as future visions, promises, expectations, imaginaries, metaphors, and anticipatory practices. 'Sociotechnical fictions' are thus defined as mediated forms of imagination that address the inherent uncertainty of future-oriented technological projects. Often unrecognised as fiction, they are deeply entangled with rational and instrumental practices, connecting the anticipatory dimension of technology with its legitimacy. The paper outlines the epistemic, aesthetic, affective, and normative agencies of sociotechnical fiction and illustrates them through cases including the metaverse, algorithmic counterfactuals, the cloud, artificial intelligence, Theranos, and WeWork.

Keywords: Sociotechnical Fictions, Performativity, Futures, Uncertainty, Technological emergence

Introduction

A central focus of Science and Technology Studies (STS) is to understand the social production of facts as a fundamental building block of modernity. Fiction, often perceived as the opposite—or the reverse side—of fact, occupies an equally central place in our epistemic scaffolding. The contraposition of fact-fiction is one of the key Western dichotomies, alongside subject-object, nature-culture, and meaning-matter.

Another central interest in constructivist STS is how science and technology come into being (Latour and Woolgar, 2013[1979]; Haraway, 2013, 2017; Knorr-Cetina, 2007). In this regard, STS scholarship has produced a rich repertoire of concepts exploring the relationship between the imaginary and the real, the future and the present such as technological metaphors (Wyatt, 2016), expectations (Borup et al., 2006), imaginaries (Jasanoff and Kim, 2015), and promises (van Lente and Rip, 2012).

Framed within this academic debate, this paper investigates how a specific kind of fiction performs meaningful and differential agency in the emergence and stabilisation of technology.

Accordingly, it conceptualises the notion of soci-otechnical fiction, an understanding of fiction distinct from the literary and cinematographic forms which performs within the technosciences to shape non-existent, imaginary entities.

To demonstrate the relevance of sociotech-nical fictions, this research adopts a performa-tive approach to actor-network theory (ANT). Through a literature review, a comparative analysis of several STS concepts, and the analysis of several cases, it explores how fiction is a force that actively shapes reality. The study begins by examining performative approaches to fiction in literary studies, then investigates how the social and political sciences explore the role of fiction in articulating social life, meaning, and normativity within democratic states, law, and the economy. Subsequently, the paper examines how construc-tivist STS has observed the relationship between science and fiction. Finally, it explores various STS concepts that investigate the symbolic and material phenomena in technological futures (Brown et al., 2016) and anticipatory practices (Alvial-Palavicino and Konrad, 2019) with the aim of explaining how fiction performs within and alongside these processes.

Based on this analysis, sociotechnical fictions are defined as mediated forms of imagination that operate within the processes of technolog-ical emergence and stabilisation. They are collec-tively agreed upon and are part of the necessary uncertainty involved in emerging, future-oriented technological projects. Yet, they often go unrec-ognised as such, and therefore are entangled with and complementary to rational practices, playing an active role in instrumental actions. Precisely because of this, sociotechnical fictions can connect the anticipatory and promissory agency of technology with its legitimacy, invoking imaginary entities into reality and facilitating the emergence of new technologies. By making the unseen visible, sociotechnical fictions become foundational elements of technological innova-tion, offering definition to new entanglements. Due to their performative agencies, these fictions are managed through anticipatory practices such as scenarios and prototypes, creating pathways for action and perception.

The agencies of such fictions, situated within technology-driven capitalism, can be summarised into four key qualities. At the epistemic level, soci-otechnical fictions render emerging, imaginary entities intelligible, thereby resolving ambigui-ties and creating consensus—a prerequisite for establishing new epistemic and technical regimes aligned with defined outcomes. As a result, they alleviate uncertainty, synchronise imaginaries and expectations (Borup et al., 2006), and foster credibility for emerging futures. Their aesthetic qualities enable them to challenge the bounda-ries of what is possible or taken for granted, stimu-lating novelty, sparking curiosity, and capturing attention. Consequently, they become a source of creativity, invention, and innovation (Beckert, 2016). At the affective and embodied level, these fictions engage with uncertainty (Komporozos-Athanasiou, 2022) and anticipation (Adams et al., 2009; Poli, 2017), and thus intertwine with emotions such as excitement, anxiety, fear, and frustration. The interplay of these agencies makes sociotechnical fictions a normative phenomena: by framing expectations they create paths to be followed by the actors involved, framing behaviour and orienting decisions based on what is considered feasible, necessary, profitable, desirable, or obsolete. To illustrate these agencies, this paper examines the metaverse and algo-rithmic counterfactuals as examples.

Complementarily, sociotechnical fictions play a role in re-enchanting expert and non-expert actors by transforming the unknown into the known. They can be instrumental in advancing emerging research by attracting attention and resources; however, they also carry the potential to become epistemically toxic, undermining the legitimacy of an industrial sector or research area. Examples of this include artificial intel-ligence, as well as the start-ups Theranos and WeWork. Finally, this paper explores the politics of sociotechnical fictions, highlighting how their agencies are unevenly distributed among actors, and producing certain technological realities over others.

Fiction – a performative approach

To understand how fiction is a thing that makes things in technology emergence and stabilisation, the idea of performativity is key. Introduced by Austin (1975), this concept notices how language not only describes the world but also participates in its production. This framework was further elaborated by Butler (1990), who, based on Foucault's (1966) notion of discourse as a system of thought or knowledge, explains how gender, a discursive entity, is performative in the construction of social identities and bodies. Barad (2003: 819) follows this lineage to enrich performativity by acknowledging that discursive practices are "specific material (re)configurations of the world through which local determinations of boundaries, properties, and meanings are differentially enacted". Along these lines, McKenzie et al., (2007), explains how economic theories can produce the world they describe by shaping mental frameworks and practices that operate in the reality they seek to describe.

Framing the performative theory into Actor-Network Theory (ANT) (Callon, 1986; Latour, 1991) allows this research to explore the distributed agencies of fiction in relation to both material and discursive agents and the assemblages in which it participates. To draw the performative contours of fiction, the notion of quasi-object (Latour, 1991) helps to situate sociotechnical fictions, similar to money or maps, that are neither objective or subjective, and that are passed between actors within the network.

Grounded in the ANT perspective, the conceptual sections of this paper summarise a literature review aimed at understanding how the performativity of fiction has been addressed by literary theory, STS, political sciences and economic sociology. Its main objective is to understand such agencies in technology emergence and stabilisation. Consequently, this paper acknowledges that technology is a field and an industry that applies scientific knowledge for practical purposes. Addressing technosciences (Law and Mol, 2001) as an interdisciplinary field that is interested in the fluid interdependence of knowledge and material production, this paper uses the notions of science, technology and technoscience in the following pages.

Fiction, a thing that makes things

Etymologically, the term fiction is derived from the Old French invention or fabrication and from the Latin word for feigning. It's also linked to the action of shaping, giving form or devising. It comes from the subject 'fictor', meaning moulder or sculptor, and was originally linked to "to knead, form out of clay", which is also related to "artificial, not natural" and to "deception and falsehood".

In its classical sense, fiction denotes a non-existent state of affairs but also incorporates a performative sense, insofar as it points to the fact of making something, of giving form to something that is imagined. Imagination is a cognitive capacity to think or feel beyond the limits of the immediate reality, and fiction relies on it to exist.

Fiction as a literary genre has emerged mostly through novels. The events that fiction describes are not true, but neither are they false. They enable a "second reality" (Esposito, 2017) that runs parallel to the real world, where characters and stories transmit a set of experiences that the reader incorporates in its life and might use them as learnings. For example, the way we recall certain memories, we experience love or project futures are traversed by models found in fiction (Iser, 1994).

Fiction converges different realities (the imaginary, literary and material), where the not-real enters, through our perception and interpretation, into the real. In this regard, 'fiction-ability' (Iser 1994) is a fundamental anthropological quality where fictional representations "bring together what exists as 'facts' and imagined things, transposing the imaginary in a concrete shape" (Iser, 1994: 122 [translated by Beckert (2016)]). Fiction differs from other forms of imagination such as daydreams, projections or phantasms "through which the imaginary enters our experience directly" (Beckert, 2016: 67) because they are mediated through literature, cinema or theatre, among others, and therefore they are not only mere mental entities. Fiction, according to Iser, is able to create credibility as it combines the real and nonreal in a coherent and defined environment. This capacity allows fiction to be presented as if it were real.

Fiction is then a hybrid entity that is part of the real. And nevertheless, it has been banished from the modern truth-producing apparatus. The fiction that fiction is not part of reason has had to be steadfastly maintained to sustain the architecture of our modern epistemic apparatus. As Latour (2013) explains, fiction has occupied a central position akin to that of the 'work of art', while at the same time being denied a relationship with two central building blocks: objectivity and reason. It's probably because of the dichotomy between imagination and "objective, hard truths" that it has been a slippery task to validate the presence of fiction in the production of what is considered rational and truthful knowledge. Hence, fiction is relegated to the same place as art: it is admired and, at the same time, regarded as something reprehensible. This article adds to the effort to claim the agencies of fiction in the production of sociotechnical reality.

In a nutshell, fiction can be defined as a mediated form of imagination. It gives shape to non-existing entities while, at the same time, is also made out of real elements. Being mediated through novels or movies, among others, fiction sheds light to the unseen and unknown and therefore creates interferences in the real with something that is not. However, fiction is not an absolute but a gradient: some things are more fictional than others. An example of this is the Duff beer, a product existing in the TV series 'The Simpsons' that can be found in real life supermarkets. This beer is just as real as the others, and nevertheless, there is a fictional quantity on it that makes it substantially different from the rest. This irruption of fiction within reality creates a perceptive reaction that is usually linked to surprise.

This brief list of the things that fiction does sets a first ground to conceptualise sociotechnical fictions as a theoretical instrument to explore how technology brings the imaginary and non-real into reality.

Fiction in the institution of social life

Understanding how fiction has been analysed from a sociological or legal perspective will be useful to later explain how it performs in technological change. For example, contrary to the Weberian idea of modern disenchantment presented in 1919, and to the traditional idea of fiction as something detached from reality, social epistemologist Knorr-Cetina (1994) claims that 'fictionality' is a pervasive and meaningful routine aspect of social life. Therefore, she asserts, fiction is an adequate notion for analysing and developing theories about modern institutions and scientific procedure, even more considering that the waning of religious intensity is compensated by the emergence of alternative mythologies that engage in conventional means of classification and relationship. Accordingly, she describes "operative fictions" as imaginative works and re-enchantment operations "sustained by the development of modern institutions, entangled in their practices, those which come into play when these institutions fulfil their goals and engage in instrumental action" (Knorr-Cetina, 1994: 6).

In these non-literary contexts, however, fictionality is not immediately apparent in its existence or significance. In a similar way, political theorist Yaron Ezrahi (2012) explains how democratic systems rely on 'necessary fictions': fictional constructs that are neither true nor false and that are necessary in the construction of human institutions. Necessary fictions such as citizen, migrant, money, justice, human rights, and equality perform in the construction of social reality as they are collectively agreed upon and reinforced through socialisation, education, and coercion, becoming embedded in our language and thought processes and operating as guiding principles for political discussion and interaction, as well as social experience. Consequently, such fictions, always a matter of struggle, operate as bonds that temporarily stabilise the tensions of past inertia and future visions in the political production of the world.

Along these lines, fiction's agency also performs in law. Legal fictions (Moglen, 1990) are constructs that are created by courts or lawmakers to serve a practical purpose in legal proceedings, even if they do not necessarily reflect the factual reality of a situation. Legal fictions are usually used to resolve ambiguities or inconsistencies in the law or to achieve a particular legal outcome. For example, the legal fiction of corporate personhood treats a company as a legal entity that has certain rights and responsibilities, even though it

is not a natural person. This fiction allows corporations to enter into contracts, own property, and sue or be sued in court.

From an institutional and legal perspective, fiction's agency offers the symbolic means to create abstract entities such as citizen, state or corporate personhood that offers definition and viscosity to social relations. Such fictions, even though are subjected to negotiations, are performed and temporarily stabilised by institutions as if they were real, and therefore experienced and enacted as such. As we will see, these agencies are also performative in technology development through imaginaries, promissory statements, metaphors, and hype, among others.

Another key agency of fiction in the institution of social life are fictional expectations. The fundamental work economic sociologist Beckert (2016) explains how economic investment is always projected to an indeterminate future. These visions of the future, articulated by desired or undesired outcomes, influence how economic actors make their decisions. Then, economic investment operates as a projection into the future that implies uncertainty, and yet this uncertainty cannot be completely dispelled using instrumental reason. In this epistemic vacuum traversed by uncertainty, fictional expectations play a structural role in economics.

Beckert understands the concept of the 'fictional' in economics as contingent imaginaries that fuel non-rational expectations, given that the future they project is unforeseeable. Through this notion, and in opposition to traditional disciplinary views of economics, Beckert demonstrates that economic decision-making is not a rational process. Moreover, and also from a performative sensitivity, he explains how fictional expectations (Beckert, 2016: 10–11) synchronise visions of the future that inform behaviour and decision-making, making the future happen in a similar way sociologist Robert K. Merton (1968) described self-fulfilling prophecies. As a consequence, in the face of uncertainty, they help coordinate economic actors' decisions for investment and innovation. By doing this, fictional expectations contribute to the necessary dynamism of capitalism. Also, and given that fictional expectations articulate future visions, they operate as a creative and innovative force within the economy.

Fiction and fact in the production of objective knowledge

Generally, when fiction is put in relation to science, the first obvious relation is science fiction. Science fiction is a genre that operates in areas such as literature and cinema that are external to science and technology, even though it is a source of creativity for technologists and a literary reflection about the "widespread cultural hopes and fears about new technoscientific formations as they emerge at specific historical moments" (Yaszek, 2008: 385). However, this research is interested in the kind of fiction noticed by Knorr-Cetina. The one that exists, often unrecognised as such, within the contours of science and technology instead of influencing 'from outside', as science fiction does.

The critique of the neopositivist philosophy of the Vienna Circle (Uebel, 2022) defending scientific, logical empiricism as a form of "pure reasoning", has been in the centre of constructivist STS for at least fifty years. Laboratory Life already explained in 1979 how scientific facts are not discovered in their natural state by objective observation but rather brought into existence through the process of scientific inquiry, playing a fundamental role in the construction of the "material external world".

From this perspective, science is a system capable of producing factuality —where some objects and statements are more 'factical' (or fictional) than others. In their seminal work, science sociologists Bruno Latour and Steve Woolgar (2013: 261) already noticed that fiction is part of the "whole scientific process of fact production but none of its stages in particular". To address this hybrid position Latour (1996) proposes the notion of scientifiction, ignoring that this term was precisely the original one for science fiction, coined by Hugo Gernsback in 1929 (Luckhurst, 2006). Latour's scientifiction describes a genre capable of erasing the modern separation of culture and technology while merging the literary codes of " the novel, the bureaucratic dossier, and the sociological commentary" (Latour, 1996: VIII). Through scientifiction, Latour remarks

how different and possible scientific worlds are in conflictual co-production. Along the same line, Haraway (2013, 2016) explored the reductive and dichotomic distinction between science fiction and science fact through the notion of Speculative Fabulation. This idea acknowledges the complex entanglements of science, faces its political nature without denying its value, while at the same time recognising it as a form of storytelling and a worlding practice.

Continuing with the aim of blurring the fact-fiction dichotomy, Latour (2013) proposes the notion of 'beings of fiction' as a distinct modern mode of existence, endowed with a particular "weight" in contemporary reality. Paradoxically, acknowledging these beings allows us to undertake a materialist inquiry, as they draw attention to what is "fabricated, consistent, real" (Latour, 2013: 238) by focusing on the provisional realities that constitute it.

An example of fictional beings are scientific hypotheses, which are partly fictional and partly real. Although hypotheses inhabit the realm of research, they are crafted from the same substance as fictional beings: imagination. The key difference lies in the fact that scientific hypotheses are restrained by objectivity, whereas literary narratives allow fictional beings to exist in a more untamed state.

As shown before, fiction's agency connects the real with the imaginary, and by doing this, it helps things find their own way to reality. Consequently, they are able to produce a dislocation in the state of things by participating in the generation of things never seen before. In a similar way than Latour, Knorr-Cetina (1994) states that fiction can be meaningfully observed in the most technical areas, where participants and observers place the greatest emphasis on reality and rationality.

To understand how fiction operates in the process of scientific discovery (a context where the unknown is brought into the known), Knorr-Cetina follows a high-energy physics team in their workspaces observes that scientists use fictional metaphors and analogies, "imaginative terminological repertoires [that] reclassify technical objects and distinctions [that] constitute a symbolic universe superimposed upon the technical universe" (Knorr-Cetina, 1994: 10). An

example can be found in scientists addressing machines as if they were alive, getting older, ill, or dead. Just like fictions in democratic institutionality and law, these categories articulate and bridge meaning, matter, knowledge and social action.

Likewise, she describes "social simulations" as shared fictional systems that create new "epistemic regimes of self-observation and self-understanding in an institution that deals with the real" (Knorr-Cetina, 1994: 17). Since they generate coherence in front of the unknown, they become necessary for "fictionally operating systems of knowing", closed systems "which operate entirely within their own medium and machinery of world construction" (Knorr-Cetina, 1994: 15). In these systems, new forms of knowledge that are highly fictitious are mobilised in order to make the emerging knowledge intelligible, but will only make sense within their own technical and symbolic environment. To illustrate how these kinds of fictional systems operate in science, Knorr-Cetina brings a beautiful example. Subatomic particles are phantasmatic entities, only perceptible through a very complex socio-technical apparatus. To find these sought-after entities, scientists had to produce a system of symbolic representations and measurements that were initially fictitious until they could create the scientific infrastructure to transform them into something different, factual.

Fiction, in this case, literally brings something not yet considered real into observable reality, challenging and amplifying the very boundaries of scientific knowledge. In this regard, it operates as an instrument of cultural imagination that temporally re-enchants scientists and engineers perspectives. Consequently, by understanding fiction as an agent in scientific inquiry we can understand with greater granularity the continuity between the allegedly enchanted, magic understanding of the world, and the supposedly rational, technical, and instrumental approaches to it.

To keep with our inquiry on sociotechnical fictions, the next section will explore how fiction performs key agencies in sociotechnical futures.

Fiction in the sociotechnical entanglement with futures

Investigating the agencies of fiction in contemporary technological emergence and stabilisation needs to mind the context where they perform. One of the main forces driving contemporary capitalism is technology (Feenberg, 2020; Suarez-Villa, 2012; Srnicek, 2017; Zuboff, 2019). This, at the same time, is boosted by the modern mandate of progress, that assumes that technological innovation "cannot or should not be stopped" (van Lente, 2016: 52), which together grounds and stimulates financial investment based on promises of the increase of future productivity and added value.

Technology engages the future both in its cultural, economic, political and environmental (Brown et al., 2016: Beckert, 2016) and includes states, companies, citizens, regulators, investors, engineers, researchers and a myriad of human and non-human actors. Futures are not facts, but rather individual and collective cognitive constructs. They are always uncertain, and they are performative given that orient horizons to pursue or avoid, and therefore articulate social action.

As Beckert (2016) explains, economic decision-making is constantly dealing with future uncertainties that cannot be dispelled through rational procedures. In this context, fictional expectations articulate the epistemic void that cannot be managed by instrumental rationality. Just like economical investment, technological innovation is future-oriented, and therefore inevitably deals with uncertainty.

Future visions and fictions are similar. They are both results of the imagination that are partly composed of what exists. However, future visions need the agency of fiction to crystallise. Iser (1994) explains how fiction-ability is an anthropological quality that transposes the imaginary in a concrete shape. In this regard, fiction's agency is necessary to produce imaginary alterations in present (real) trajectories that create more or less defined images of what is yet to come, or said otherwise, future visions.

Technological innovation is always driven by visions of the future. As illustrated by the case of subatomic particles described by Knorr-Cetina (1994), fiction plays a crucial role in the process of innovation and discovery by providing definition, intelligibility, and credibility to knowledge and circumstances that do not yet exist. Similarly, as stated by Latour (2013), fiction is a force capable of transcending the causal chains that produce objectivity, thereby operating as a source of creativity. Thus, technological development, as a practice that deals with uncertainty, is articulated by fictions in at least two ways: through future visions that are essential for shaping shared horizons, and through the creation of new concepts, techniques, and procedures. By bridging the imaginary and the real, fictions give shape to what does not yet exist, and consequently play a key role in defining potential new technologies. This is a necessary precursor to articulating social action in order to bring this future technology into material reality. This inherent entanglement between fiction, future visions, creativity, uncertainty, and technological innovation is what makes this specific kind of fiction a sociotechnical one.

A useful concept for deepening the investigation of sociotechnical fictions in relation to the future is anticipation. In STS, the idea of anticipation has three main meanings. First, it refers to all forward-looking attitudes based on a realistic assessment of actual conditions (Poli, 2017). Second, it encompasses the myriad strategic techniques and anticipatory instruments utilised in future studies (Poli, 2024). Third, it refers to an affective state that involves a lived condition, embodying future uncertainty in the present through the act of waiting (Adams et al., 2009: 247). The somatic responses to this state range from anxiety to excitement and inform decision-making processes such as anticipatory behaviour (Poli, 2017: 1).

Given their agential qualities, sociotechnical fictions require careful handling to connect the envisioning of desirable technological futures with the capacity to realise them. Indeed, the early phases of invention must bridge the gap between what already exists and what is both possible and desirable. In these processes, promissory statements activate the leap towards the future. A promise is a form of enunciation that demands action and therefore operates as requierement to be fulfilled (van Lente and Rip, 2012). Techno-

logical promises (van Lente 1993) are mediated through scripts that imaginatively organise resources and actors to make the future happen. Sparked by technological opportunities, promises mobilise the agencies of fiction by providing definition to the future and to possible techniques and situations. In this way, promises rely on sociotechnical fictions to depict the potential of a technology, fuel expectations, synchronise visions, and create a path to be followed by actors such as technologists, companies, and governments, who make decisions based on what is considered feasible, necessary, profitable, desirable, or obsolete.

Through promissory statements, sociotechnical fictions travel along a network of actors, convincing investors, and attracting engineers and partners (Geels and Smit, 2016), until they engage scripts that are enacted in technical choices, negotiating and organising possible and impossible futures. When promises (and the fictions that animate them) successfully gain acceptance within relevant communities, such as technologists, companies, and governments, they participate in a cycle of promise-requirement (Van Lente, 2016), where technical communities translate future scenarios into concrete technologies. Throughout this process, sociotechnical fictions help to create desired scenarios that mobilise resources, enabling investors and institutions to establish protected spaces for technical development.

Sociotechnical fictions also connect the imaginary with the real through metaphors, a constitutive element both in scientific production (Knorr-Cetina, 1994; Maasen and Weingart, 2013) and technological invention and innovation. Metaphors are bridges between two meanings (Lakoff and Johnson, 1980) that are mobilised as re-descriptions of the world. Since created and disseminated from specific contexts, they carry assumptions, create frameworks of relations and therefore operate as normative agents (Wyatt, 2016). As shown by Knorr-Cetina (1994), they are often fictional categories that help guide techno-scientific work and therefore help the imaginary become real or true. This same performative agency engages broader contexts given that metaphors help create intelligibility for complexity

and novelty, like for example in communicating technoscientific discoveries and innovations.

Indeed, technological metaphors such as 'smart' (Forlano, 2021), 'distributed' (Reijers, and Coeckelbergh, 2018), 'cloud', 'generative' or 'hallucination' (Salvagno et al., 2023) synthesise meanings, create new meanings to define reality and "participate in the creation of (...) path-building, order-making and ideology building" (Faustino, 2019). When they become embedded in discourse, actors become less reflexive (Wyatt, 2016: 111). Also, as they operate as symbolic rails guiding behaviour, they become inscribed in technology.

Likewise, sociotechnical fictions are disseminated and accelerated through hype. Beyond a simplistic model for technological change (Dedehayir and Steinert, 2016), hype implies a hypertrophy of expectations accelerated by market dynamics. Constituted by all the elements described in this subsection, hype "suggests a temporal dynamic of attention and confidence in projected technological change – an increase followed by a decrease" (Bareis et al., 2023: 11). Marked by hyperbole, hype fosters momentum by creating the illusion of a unique window of opportunity that quickly closes, which intensifies the affective dimension of anticipatory reaction related to fear and hope. Given this dynamic, hype can be misleading and misguide decision-making, eroding the legitimacy of the actors involved, and creating economic losses (and gains) in the actors involved.

Finally, sociotechnical fictions animate meso and macro imaginaries (Jasanoff and Kim, 2015), shared visions of the (desirable and undesirable) future that are attainable through science and technology. Imaginaries are invigorated by fiction's performative agencies, driven by persuasive and often hyperbolic visions. Yet, these visions are simultaneously "constrained by the very present conditions of scientific work" (Marcus, 1995: 4). They coordinate expectations, perceptions, and behaviours within long-term coalitions, acquiring legitimacy through the support of institutions. For imaginaries to solidify, they must be validated by "public demonstrations of verifiable truths" (Jasanoff and Kim, 2015: 11) to create widespread consensus and credibility, thereby fostering commitments to specific forms of reality

(McNeil et al., 2017). As will be shown later, sociotechnical fictions are tamed within large-scale imaginaries, although they remain available to give shape to new entities.

By reading metaphors, promises, hype and imaginaries through sociotechnical fictions we can understand how the imaginary is brought into technological being through discourses, knowledge and the market. Likewise, we can also find an entry point to the affective, embodied intensity of anticipation: technological futures imply uncertainty, which is translated to a somatic response ranging from desire to fear. In this regard, paying attention to the sense of urgency produced by the hyper-accelerated logics of the market helps us understand how sociotechnical fictions influence the social experience of technology emergence and stabilisation.

Useful fictions in anticipatory practices

The agencies of sociotechnical fictions engage both symbolic and material processes at the intersection of uncertainty, the future, and technology. If successfully managed, actors can mobilise knowledge, desire, behaviour, money, and matter to produce stable (albeit temporarily) technological assemblages. Consequently, technological actors have developed a myriad of techniques to mobilise 'useful fictions' (Rip and Kulve, 2008) in order to navigate technological uncertainty and futures, confront the actors involved in negotiating their visions and narratives of the future, and elaborate their networks.

Anticipatory practices (Alvial-Palavicino and Konrad, 2019) consist of explicit procedures such as calculation, modelling, and forecasting techniques that mobilise expectations and promises, while also encompassing implicit and informal engagements with visions of the future embedded in proposals, prototypes, or standards. Both formal and informal anticipatory practices instrumentalise sociotechnical "useful" fictions.

Scenario Building, for example, is a prospective method that mobilises fiction to imagine and represent possible futures, thereby informing decision-making. Scenarios, understood as both designed processes and outcomes, speculate on what technical and scientific knowledge could achieve in different contexts. In this way, they create stories, use cases, and hypothetical situations that guide the actions of various agents involved in technological innovation. In this regard, sociotechnical scenarios (Rip and Kulve, 2008: 50) address the "doubly fictional character of emerging technologies" in that, first, we do not know what new technologies will be capable of, and second, their impacts remain uncertain. Hence, scenarios mobilise sociotechnical fictions with the strategic aim of addressing uncertainty while modulating sociotechnical change.

By addressing technological uncertainty and futures, sociotechnical fictions are also mobilised through material and visual practices such as prototyping. Prototypes (Houde and Hill, 1997) are fictional, ontologically fragile objects. They materialise future visions and share properties with imaginaries and metaphors, as they occupy a hybrid position between what is imaginary and what is real. Due to this condition, prototypes can create situations where actors perform as if the future were real. Thus, they embody and activate fiction's agencies by creating departures from the present and invoking alternative technical or interactive possibilities into the present. Prototypes materialise imaginary visions, encapsulate potential stories and scripts, and function as boundary objects (Star and Griesemer, 1989) by linking different actors and scales. In this regard, Design Fiction (Bleecker, 2009) converges sociotechnical scenarios, fiction, and prototypes to materialise possible entanglements and imaginations, thereby informing strategic decision-making.

These examples illustrate how sociotechnical fictions are instrumentalised as a resource to bring technological innovations into being by making visible what is not yet apparent, organising information and matter to create consensus, and potentially linking promises with technical requirements. Scenarios, prototypes, and design fiction demonstrate how "useful fictions" can, when adopted, shape the behaviour of communities such as technologists, funders, or policymakers, and become encoded in agenda-setting processes that influence the symbolic and material production of new technological regimes.

Sociotechnical Fictions

To trace the performative agencies of sociotechnical fictions, this paper has shown how fiction has been philosophically understood as a category that navigates between truth and fabrication (Esposito, 2017; Iser, 1994). Sociologically, scholars such as Knorr-Cetina (1994) and Latour (Latour and Woolgar, 2013[1979]; Latour, 2013) have demonstrated how fiction is deeply embedded in scientific knowledge production, albeit often unacknowledged. Ezrahi (2012), in turn, highlighted its role in political institutions through the notion of 'necessary fictions.' Meanwhile, literary studies have conceptualised fiction as an epistemic practice that renders the unseen intelligible and real.

Sociotechnical fiction integrates these perspectives but focuses specifically on fiction as a performative force within technological emergence and stabilisation. Unlike literary fiction, which often remains external to science and technology, sociotechnical fictions are embedded within them. This happens due to the fact that this kind of fiction animates the imaginary, unknown and yet-to-come through metaphors, visions, imaginaries, promises, as well as anticipatory practices and design techniques like scenarios and prototypes.

Once explained how the notion of sociotechnical fiction enriches the STS repertoire to address how technology comes to matter, it can be defined. Sociotechnical fictions are mediated forms of imagination that operate within the processes of technological emergence and stabilisation. They are collectively agreed upon and address the inherent uncertainty in emerging, future-oriented technological projects. Although they are not generally recognised as such, sociotechnical fictions are intertwined with and complement rational practices, participating in instrumental actions. Because of this, they connect the anticipatory and promissory aspects of technology with its legitimacy, enabling imaginary concepts to be invoked into reality and facilitating the emergence of new technological assemblages.

Just as fiction is integral to modern institutions such as the state, law, and economy, sociotechnical fiction is crucial to science and technology.

Given their connection to the unknown and the imaginary, sociotechnical fictions thrive in contexts of uncertainty. They thrive on the demand for new possibilities, facilitating novel entanglements while simultaneously challenging existing ones.

To understand how sociotechnical fictions are things that make things, its performative agencies can be summarised in four deeply intertwined qualities: epistemic, aesthetic, affective and normative. At the epistemic level, since they are easier to create and mobilise than facts, such fictions assist expert technoscientific communities in resolving ambiguities, inconsistencies, and in creating consensus—a crucial precondition to establishing new epistemic and technical regimes based on defined outcomes. They provide frameworks of intelligibility and agreement by temporarily stabilising visions, metaphors, and promises, particularly those related to the future. In this way, they contribute to creating a sense of reality for entities that are, at least in part, imaginary. Consequently, they mitigate uncertainty, align imaginaries and expectations, and enhance the credibility of emerging futures.

For example, the idea of the Metaverse (Cheng, 2023), originated in the 1992 science-fiction novel *Snow Crash, represented* a universal, immersive 3D virtual world that was accessible through virtual reality. This fictional concept, explored extensively in literature, cinema, and video games, became a sociotechnical fiction when it was mobilised by the industry to generate promissory "as-ifs"—abstract rehearsals that opened new possibilities and altered the present by invoking the future within it by engaging a myriad of actors—including investors, media outlets, governments, and artists— that leveraged on it to seek technological transformation and profit. By making the unseen visible, these fictions provide definition to emergent concepts, techniques, and procedures (such as subatomic particles or smart technologies), thereby becoming fundamental building blocks during the more than 30 years of emergence of metaverse technologies.

Aesthetics refer to 'sensory knowledge' (Baumgarten, 1750–1758) or, more traditionally, to the 'judges of taste' (Kant, 2000[1790]). Sociotechnical fictions act as agents that go beyond the chains

of reference that produce objective knowledge (Latour, 2013). They possess the capacity to travel "far away" and serve as "launch pads", enabling information to transcend the logics of causal reality and foster new articulations. In doing so, they challenge the boundaries of what is generally taken for granted. As a result, they engage the sensible, aesthetic experience by introducing novelty and surprise—sparking curiosity and inspiring creativity and invention (Beckert, 2016). This aesthetic agency plays a key role in attracting attention and enabling the circulation of new technological projects by engaging with visions, imaginaries, and hype.

Continuing with the example of the Metaverse, when Meta launched its new VR immersive platform at the end of 2021, this concept became a buzzword. Buzzwords (Bensaude-Vincent, 2014) are hyperbolic metaphors characterised by their vague semantics, often used for promotional purposes. By mobilising appealing perceptions related to desire, such fictions circulate widely and rapidly, generate significant attention, contribute to building consensus, and set enticing goals and agendas, while stimulating expectations and creating noise. Without the aesthetic domain, it is hard to explain how the sociotechnical fiction of the Metaverse (and its images and narratives) was mobilised to appeal to investors, media and the general public.

Often, it is challenging to separate the aesthetic agencies of sociotechnical fictions from their affective ones. The fictional buzzword of the Metaverse, mobilised by powerful actors, created a hype cycle. This can be explained of course through economic reasons, but without affects, economic decision making hardly happens. Hence, the interest raised by Meta was related to the affective and embodied aspects of anticipation in the face of uncertainty, contributing to the emotional spectrum that includes excitement, anxiety, fear, and frustration. Fueled by hype – fear of missing out due to the illusion of a closing window of opportunity– , the aesthetic and affective qualities of the Metaverse mobilised the desires of actors such as governments, investors, and engineers, who created technologies, texts, and images to capitalise on this emerging technological opportunity.

The combination of epistemic, aesthetic and affective agencies can participate in the re-enchantment of the human actors involved in technological development, connecting the objective realm with the esoteric, metaphysical and symbolic one. By reinforcing certain imaginaries, sociotechnical fictions facilitate the relationship between imagination, knowledge, bodies and matter, enmeshing humans and non-humans entanglements that allow to bridge ontological differences and 'become-with' (Knorr-Cetina. 1994).

The metaverse is a notable example of sociotechnical fiction because, as of 2025, it has not yet fulfilled the grand promises made by influential figures such as Mark Zuckerberg. The inability of the metaverse to stabilise highlights how sociotechnical fictions create systems of make-believe (Roßmann, 2021), where non-existent entities are performed "as if" they existed. This involves assuming, for instance, the feasibility, desirability, or usefulness of a particular technology, or taking for granted that the material arrangements will behave as expected.

Finally, sociotechnical fictions perform normatively: by framing expectations they create paths to be followed by the actors involved, framing behaviour and orienting decisions (Borup et al., 2006) based on what is considered feasible, necessary, profitable, desirable, or obsolete. The metaverse, in its capacity to inspire more or less defined visions of the future, engages promises that mobilise attention, coordinate individual and collective action and channel economic, technical, educational and regulatory forces in order to make (mostly techno-capitalist) desired futures come true through the deployment of the metaverse.

Sociotechnical fictions are often hyperbolic. Connected to metaphors, promises, visions and imaginaries, they circulate rapidly thanks to their ability to connect with the new through ambiguous categories subjected to interpretative flexibility. In this regard, the word 'metaverse' operates as a necessary fiction (Ezrahi, 2012) among the actors involved. It is a construct that is neither true nor false but is accepted by the community of practice, creating temporal legitimacy, and articulating the construction of an emerging industry.

Table 1. The performative agencies of sociotechnical fictions.

Performative Capacity	Description	Key Effects
Epistemic	Render imaginary or emerging entities intelligible by resolving ambiguities and fostering consensus. Temporarily stabilise visions, metaphors, and promises.	- Mitigate uncertainty - Align imaginaries and expectations - Enhance credibility of emerging futures - Establish epistemic and technical regimes - Attract attention and resources
Aesthetic	Enable imagination and ideas to "travel far" from objective knowledge and causal reality and therefore challenge what is taken for granted. Hence, they foster new articulations and engage the sensible experience.	- Stimulate novelty and creativity - Spark curiosity and surprise - Capture attention - Fuel hype and technological buzzwords
Affective	Engage actors in the emotional and anticipatory experience of futures amidst uncertainty. Intertwine with embodied experience ranging from desire to fear.	- Generate excitement, anxiety, fear, frustration - Re-enchant the experience connecting connecting the objective realm with the esoteric, metaphysical and symbolic one
Normative	Frame expectations and coordinate action by defining what is feasible, necessary, desirable, or obsolete. Orient decisions and behaviour within techno-capitalist regimes	- Create paths for action and technology development - Stabilise new sociotechnical regimes

In contrast to "pop" sociotechnical fictions, the case of algorithmic counterfactuals illustrates how the agencies of fiction perform in more technical domains. A study by computer scientists Athanasios Vlontzos, Bernhard Kainz, and Ciarán M. Gilligan-Lee (2023) demonstrates how digital twin simulations enhance automated decision-making and personalised recommendations. They achieve this by comparing mathematical models based on real data with similar models that incorporate slight variations. Through this process, they juxtapose 'real simulations' (i.e., recommendations based on a person's historical data) with fictional simulations (i.e., scenarios where the person is exposed to a genre they have never listened to before) to explore alternative probabilities and improve the recommendation system.

In this case the agencies of sociotechnical fictions are explicitly mobilised to create algorithmic "as-ifs," enhancing the creative capacity of the model and refining its decision-making abilities. Here, the epistemic, aesthetic, and behavioural agencies of fiction—typically applied to humans—are used instrumentally with algorithms. For example, the concept of re-enchantment, understood as a non-rational form of knowledge, can be applied to predictive models that integrate information that is "alternative to reality" into their data sets, thereby enriching their results.

Sociotechnical fictions in technological emergence and stabilisation

As we have seen, sociotechnical fictions perform different kinds of agency in relation to different actors and stages. Thus, such fictions are not absolute, but operate with varying intensities at different moments. For example, by creating a

virtual sense of feasibility, sociotechnical fictions are necessary to open up new courses of action to be followed. Consequently, fictions are especially intense (more fictional) in the early stages of technological invention. Like expectations, they align more closely with research communication, marketing, and journalism than with the "coalface research" (Borup et al. 2006: 292), where techno-scientific inquiry is focused on addressing more situated challenges.

Sociotechnical fictions participate in the emergence as well as the stabilisation of technological systems. When connected with felicity conditions (Austin, 1975), such as the desirability and possibility of a new technology, fiction prompts influential actors to extend what they carry. These actors, then, mobilise resources to endow fiction with legitimacy and feasibility. When a relevant promise appears, fiction increases its capacity to produce intelligibility, attract attention, and spark curiosity. It helps to create novelty and desired visions, as it connects to the imperative of progress and the mandate of innovation.

Likewise, such fictions contribute to technological stability by engaging in a process of technical requirements (van Lente, 2016). As an agent involved in the becoming of things, sociotechnical fictions can be connected to demonstrations of verifiable truth (Jasanoff and Kim, 2015) through scientific methods, public presentations, etc. (such as Meta's Metaverse use cases) until objectivity creates the conditions to transform imaginations into technical realities. An example of this is the presentations streamed by Meta, where interaction among different users in different spaces can be observed in real time.

This journey to stability is also co-produced by the exercise of financial, economic, and institutional power, which structures and assimilates fictions within imaginaries at meso and macro scales over long periods of time. Once stabilised in imaginaries (Jasanoff and Kim, 2015; McNeil et al., 2017), fiction performs with constant latency but lower intensity, reducing its ability to create radical departures from reality. Hence, it becomes naturalised through socialisation, education, and coercion, eventually becoming part of everyday language through categories and metaphors.

However, the performative agencies of fiction do not entirely fade away. They remain active and available, ready to explore the unknown again, while adding symbolic viscosity (Knorr-Cetina, 1994; Ezrahi, 2012) to the relationships between humans, institutions, ecosystems, and technical instruments.

Leaving behind the metaverse, an example of a stabilised sociotechnical fiction can be found in the concept of the 'cloud,' that functions as a necessary fiction (Ezrahi, 2012). This metaphor creates bonds that temporarily stabilise the tensions between past and future in the techno-scientific production of the world. It articulates "fictionally operating systems of knowing" (Knorr-Cetina, 1994: 8) among experts and researchers, while simultaneously obscuring a highly polluting and extractive infrastructure. Despite the fact that it has been more than two decades since Amazon Web Services launched its first cloud system, the metaphor of the 'cloud' continues to perform the agencies of fiction, mobilising future visions and resources for the creation of new products and investments.

Artificial Intelligence: The different intensities of sociotechnical fictions

As demonstrated through the examples of scenarios, prototypes, and the metaverse, the agencies of sociotechnical fictions can be instrumental. An example of how these agencies are managed (and sometimes rejected) in the context of AI can be found in Vassilis Galanos (2023) research. His study reveals how expectations, discourses, and metaphors related to AI have varied at different historical moments among both experts and non-experts. For instance, non-experts—such as journalists, philosophers, and citizens—tend to engage more with highly fictional promises and expectations.

The interplay between technical research and sociotechnical fictions is illuminating. When a concept like AI is hyped, it can face rejection from the research community. For instance, during the so-called first AI Winter (1974-1980), the term 'AI' fell out of favour in grant applications, while techniques remained unchanged, and terms like "knowledge-based expert systems" gained prominence. Conversely, the agencies of sociotechnical

fiction can operate differently. After two decades of rejection, the AI buzzword regained relevance post-2010, leading to a rebranding of research fields such as neural networks and machine learning. Here we see how sociotechnical fictions are reactivated to spark creativity, curiosity and desire, performing in researchers, investors and media.

However, the engagement of the techno-scientific community with such fictions can be problematic. Computer scientists Lipton and Steinhardt (2018) have highlighted how machine learning research increasingly engages with hype, which has negatively impacted the quality of work and undermined its public perception. Here, following with Galanos' research, we see how such fictions, when performing in highly technical environments can become epistemically toxic.

Hence, sociotechnical fictions can be instrumental, rejected, or even undermine scientific quality. In moderate intensities, they are useful for attracting attention, disseminating new knowledge, and appealing to funders and talented researchers, all of which contribute to the further development of technologies. Conversely, scientists and engineers tend to be more cautious, given their familiarity with technoscientific limitations. At higher intensities, sociotechnical fictions can negatively impact public perception of a particular research area, pressure research teams to meet market trends, and misguide decision-making by prioritising hype and overpromising.

Theranos & WeWork: When fiction does not hold

At times, however, sociotechnical fictions fail to create the requisite entanglements for stability. Like future visions and metaphors (Davidson, 1978; Faustino, 2019), these fictions may struggle to gain a foothold in the material realm. As mediators with the imaginary, fictions can occasionally lead to arbitrary, contingent, or excessively hyperbolic articulations, rendering them incapable of producing the desired objectivity. The success of sociotechnical fictions hinges on whether actors engage with them and agree to propagate their message. When this engagement does not occur, it signifies that the non-existent entity fiction

seeks to bring into being has not found the necessary allies to do so.

In this context, numerous cases exemplify situations where sociotechnical fictions fail to endure. Two recent examples, shaped by the perverse dynamics of technology-driven capitalism, hype, and the greed inherent in the shareholder economy (Fligstein and Shin, 2007), are the blood testing start-up Theranos and the coworking company WeWork. In the case of Theranos, the start-up failed to meet investor expectations, ultimately revealing that the CEO, now convicted of fraud and conspiracy, had fabricated processes that the technology was claimed to perform. WeWork, on the other hand, faced a failed Initial Public Offering (IPO), "besieged with criticism over its governance, business model, and ability to turn a profit" (Brown, 2019). These cases show how the agencies of fiction, when managed irresponsibly (or in bad faith) and accelerated by hype and limitless economic ambition, can lead to misleading decisions that harm the reputation of an entire industry.

Beyond such high-profile cases, sociotechnical fictions are tamed throughout different phases of technological emergence and stabilisation. For instance, "prototypes, simulations, models, and data [as well as viability and Initial Public Offerings reports] have a 'veto right' to enforce and contest imagined futures" (Roßmann, 2021: 72). Indeed, in both technosciences and economics, fictional metaphors and expectations collapse when promissory stories cease to be believable, and frustration emerges when future visions encounter decisive technical limitations or economic, social, and institutional barriers.

The Politics of sociotechnical fictions

Feenberg (2002: 15) asserts that "technology [is an] ambivalent process of development suspended between different possibilities." This reflects the ongoing political struggle to determine which futures will prevail, while others are marginalised (Brown et al., 2016: 4). In this negotiation space, sociotechnical fictions insert what does not yet exist into the realm of the real, embodying something that someone desires to make tangible. By doing so, such fictions have the potential to produce significant changes in how we understand,

perceive, and intervene in reality through science and technology. And however, just as the ability to produce and establish facts is unevenly distributed, so too is the capacity to generate, disseminate, stabilise, and confront sociotechnical fictions.

An example of this inequality can be observed in the popularity of billionaire-driven escapist future visions, such as Martian colonisation and corporate transhumanism, which are often associated with figures like Elon Musk or Ray Kurzweil (2005). These grandiose visions tend to overshadow other promissory possibilities, such as those depicting feasible alternatives to capitalism, like the degrowth movement advocated by a growing number of scholars (Kallis et al., 2018). These just futures struggle to gain traction in comparison to the more sensational, market-driven fictions of technological utopias.

In this context, sociotechnical fictions are not merely about imagining new possibilities; they are about shaping which futures are pursued, funded, and ultimately realised. As these fictions help to give form and intelligibility to emerging visions, they embody their creators' ideological interests and normative assumptions about how the world should be. These frameworks inform and stimulate trajectories of instrumental action that can eventually script material technologies, presenting the futures they project as inevitable. In doing so, they articulate specific hegemonic regimes that obstruct emerging alternatives capable of challenging their power (Berardi, 2017).

As explained, fictions are mobilised through anticipatory practices like scenarios and prototypes, as well as other forecasting techniques, business models, and management procedures. Through these devices aimed at parametrizing the future to manage risk and uncertainty, sociotechnical fictions are carefully crafted to invoke future possibilities. By this means, the scientific and technological aura of the future is strategically activated in the present to avoid and foster certain chains of events. The use of these anticipatory practices, however, is also unevenly distributed due to different access to funding, qualified professionals, and time.

Traversed by dynamics of power, the fictions invoked by these instruments will often reproduce existing inequalities (Bear, 2020) and create differentials where "some [actors] see opportunities where others do not; perceived risks are prohibitive to some and acceptable to others" (Beckert, 2016: 183). Of course, this is decisive in defining desired outcomes, engaging regimes of hopes and fears, and influencing decision-making. An example of how sociotechnical fictions relate fear and anxiety in the acceleration of technology-driven capitalism can be found in narratives commonly linked to automation technologies (Goffey, 2019) and labour. In this regard, the idea of 'fauxomization' (Taylor, 2018) explains how the threat future of labour automation, articulated by sociotechnical fictions, performs as an intimidation agent in labour rights negotiations.

However, the performative agency of fictions is not one-sided. Prefigurative politics (Boggs, 1977), describe how radical political movements experiment with forms of social organisation within their groups before seeking structural change in conventional politics, engaging in "future-oriented construction of political alternatives, or of attempts to reflect political goals or values in social movement processes" (Yates, 2020: 1). In this respect, fiction can also be mobilised to create intelligibility for desired and politically progressive scenarios, producing alternative "as-ifs". To do so, its power as a vehicle for affirmative re-enchantment is key to exciting affirmative imaginaries towards radically different regimes. Here, fiction's agency can perform in communities of practice technological democratisation (Barandiaran et al., 2024), while also be involved in exercises for challenging, destabilising, or resisting the totalitarian instrumentality of technohegemonic futures.

As seen, sociotechnical fictions's agencies can also be performed in order to help give birth to more just alternatives, as well as denounce possible undesirable futures. In this process, their epistemic, aesthetic, affective and behavioural qualities are decisive to orient social change towards more just and democratic directions.

How to investigate sociotechnical fictions

Sociotechnical fictions identify a very specific kind of agency in technological emergence and stabilisation. They can be empirically addressed through repositories of promissory visions and instruments

of imagination like scientific papers, patents, technopolitical manifestos, Venture Capital portfolios, technological trend and forecasting reports, corporate documents describing strategic plans, think tank recommendations, state guidelines for technology development, social movement actions, mass media content, interviews to CEOs and technologists, marketing and PR material, and other contexts where technoscientific statements are made. Also in prototypes, scenarios, simulations, mock-ups, or texts surrounding mathematical models.

These specific kinds of fiction can be identified through qualitative methods like discourse analysis, participant observation and interviews or quantitative analysis focusing on databases, texts or speeches. Following metaphors like 'next generation', 'disruption', 'smart', 'hallucination', 'distributed', 'quantum' and prefixes like 'nano-', 'green-', or 'neuro-', among others, will be of help to trace the trajectories of fiction and the assemblages they participate in. Also, hyped phenomena are rich entry points.

Likewise, and as concept and a sensitivity in close dialogue with Speculative Research (Wilkie et al., 2017) sociotechnical fictions can be addressed through experimental and inventive methods (Lury and Wakeford, 2012). Novel methodological approaches close to artistic and design research, for example deploying scenarios or collaborative futures (Belsunces, 2017; Belsunces et al., 2020) will be of help to grasp such far-reaching and abstract agents.

How sociotechnical fictions contribute to STS research

This article contributes to STS research by coining and developing a new concept for exploring how the imaginary is brought into the real through technology. It aims to trace how imagination, social action, and matter associate and create connections that bring technological entities into existence. By focusing on spaces of technological development, promises, discourses, technical objects, epistemic and material practices, narratives, and anticipatory practices, this concept can help to identify, in greater detail, the fictional (both non-rational, creative, and anticipatory) elements of technoscientific discovery, development,

and communication, while establishing a new entry point for understanding our technological relationship with uncertainty and the future. Indeed, by tracing sociotechnical fictions, we can discern who invokes imaginary realities and how these potentialities are mobilised.

In relation to the existing repertoire, sociotechnical fictions can trace the process that spans from technological emergence to stabilisation. Moreover, by recognising their epistemic, aesthetic, affective, and behavioural qualities, they provide research entry points into phenomena that connect subjective experience with meso-level policies and macro, long-term imaginaries.

Likewise, paying attention to fiction's agencies can shed light on the continuum between the sacred and enchanted, and the instrumental and rational. More particularly, sociotechnical fictions can help investigate the production of symbolic fabric and esoteric auras in technoscientific development while at the same time operating as a tool to understand how it is mobilised by markets and governments, underlying power dynamics. Also, as building blocks of anticipatory practices, sociotechnical fictions can be useful to better understand how the managerial instrumentalisation of the future nudges actors to intervene into what is yet to come.

Therefore the concept presented in this paper is useful to understand with greater granularity hype cycles, and how different visions are disseminated and stabilised. The ANT and performative approach helps to this endeavour, since it contributes to understanding how different forms of departure from actual reality are conducted to transform it. Then, the notion of sociotechnical fictions equips STS and potentially regulators and policymakers to address promissory statements, technologies and hype cycles that can deepen the inequalities and can be harmful for democratic systems and intensify neoliberal and technocratic regimes.

Conclusion

This paper coins and develops the notion of sociotechnical fiction, a specific kind of fiction that performs within technological emergence and stabilisation, and tht contributes to give shape

to non-existing and imaginary entities through technosciences.

To explore this notion, this research employs a performative approach to ANT to analyse how fiction is a thing that makes things in social life, meaning, and normativity in democratic states, the law, and the economy. Subsequently, it examines how STS approaches the relationship between science and fiction, investigates key STS concepts related to technological futures, uncertainty, and anticipatory practices that mobilise "useful fictions" to with strategic objectives.

Based on the analysis of the performative capacities of fiction carried on previous sections, sociotechnical fictions are defined as mediated forms of imagination that operate within technological emergence and stabilisation. They are integral to the inherent uncertainty of emerging, future-oriented technological projects, yet they are often not recognised as such. Entangled with and complementary to rational practices, sociotechnical fictions connect the anticipatory and promissory agency of technology with its legitimacy to bring imaginary entities into reality, thereby facilitating the creation of new things. By making the unseen visible, they become a foundational element of technological innovation, offering definition to emergent entities.

The agencies of sociotechnical fictions are encapsulated in four key qualities. At the epistemic level, they create intelligibility for imagined, emerging entities, thereby resolving ambiguities and inconsistencies and fostering consensus. In doing so, they temporarily stabilise visions, metaphors, and promises. As a result, they mitigate uncertainty, synchronise imaginaries and expectations, and bolster credibility for emerging futures. At the aesthetic level, such fictions allow imagination and practices to "travel far" from objectivity, introducing new information. Consequently, they stimulate novelty, spark curiosity, and evoke surprise and attention, becoming a source of creativity, invention, and innovation.

Similarly, the horizons expanded by sociotechnical fictions engage the affective and embodied condition of anticipation in the face of uncertainty, contributing to the production of an emotional

spectrum that encompasses excitement, anxiety, fear, and frustration. This combination of performative agencies are normative, shaping both individual and collective behaviour: by framing shared expectations, fictions help coordinate decision-making not only within technological communities but also among investors, regulators, media outlets, and citizens.

In this regard, sociotechnical fictions perform differently throughout the process of technological emergence and stabilisation. By opening new visions and avenues of action, they are instrumental in attracting attention and resources for new projects. However, when connected to the overpromising of hype, they can become epistemically toxic and undermine the legitimacy of certain research areas and industries. In this context, when they participate in the stabilisation of sociotechnical regimes, fictions engage long-term imaginaries and remain available to give shape to new, imaginary entities.

Finally, sociotechnical fictions take part in defining what is possible and feasible, and therefore are matters of political struggle. The capacity to distribute, leverage, and institute sociotechnical fictions is unevenly distributed. Likewise, such fictions are always created by someone, and consequently, they carry their ideological positions. Hence, sociotechnical fictions tend to disseminate and reproduce political agendas. In this regard they can also be mobilised to bring alternative, just, and democratic imaginary possibilities into reality.

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