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ORIGINAL ARTICLES

# An Alternative Approach to Science and Technology Parks

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## Abstract

Science and technology parks (STPs) are fundamental elements of the knowledge economy infrastructure. They are clusters of research and development, innovation and technology transfer. However, they often tend to endorse specific trajectories for technological and business development, such as the production of high technology and the proliferation of profit-maximising businesses. In response to an intense environmental and socio-economic crisis, this article explores how STPs could facilitate a postdigital science and technology development, reaping the benefits of open-source technology and social entrepreneurship. The article aims to outline an alternative approach to designing and operating STPs through an exploratory case study from Greece. By embracing a postdigital and commons-oriented approach, STPs could promote technology and business diversity, which might help address environmental degradation and wealth inequality.

**Keywords** Science and technology parks · Commons · Postdigital · Open-source technologies · Social and solidarity economy

## Introduction

Science and technology parks (STPs) are often considered to be fundamental, even traditional (Frischmann 2012) infrastructure elements bolstering the knowledge economy. They aspire to realise local collaborations and enhance regional innovative and economic performances (Albahari et al. 2017; Laspia et al. 2021). To fulfil these aspirations, STPs tend to promote the production of high technology and profit-maximisation business models. However, it is important to reconsider environmental and socio-economic consequences caused by high-tech development, the so-called digital revolution, and profit-maximisation business activities (Kallis et al. 2018; Kostakis and Tsiouris 2024).

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In response to the high-tech and profit-maximising fixation of the conventional STP paradigm, I draw inspiration from postdigital theory and the commons. Postdigital theory posits that the digital is no longer novel, as high-tech disruptions have become commonplace, and recognises the need to look further than analogue–digital dichotomy (Jandrić et al. 2018; Macgilchrist 2021; Jandrić 2023a). Digital technology has taken a specific form in people's minds and the postdigital brings the opportunity to break the norms and provoke change. The essence of postdigital ideas does not lie in a linguistic shift but a cultural one (Sinclair and Hayes 2019). An STP that persists in a digital revolution will more likely continue to have similar results. A postdigital STP approach challenges the norms and could create new pathways, friendlier to both humans and the environment. At the same time, the commons showcase a more inclusive and sustainable way of organising our societies, an alternative proposition that harnesses a global wealth of knowledge to localise and democratise production (Kostakis and Tsiouris 2024).

High-tech development is burdened by plenty of problematic processes. The use, production, disposal, and even recycling of high-tech artefacts is often an energy-consuming, toxic-generating, and labour-intensive process marked by inhumane and precarious conditions (Lange et al. 2020; Sovacool et al. 2020). Further, high-tech advancements are often proven environmentally and economically unsustainable by products' short lifespan and planned obsolescence in an attempt to achieve exponential economic growth (Kostakis et al. 2018). Although in many cases high-tech increases efficiency, it can also result in rebound effects that end up neutralising its positive impact in terms of socio-environmental sustainability (Kallis et al. 2018). Similarly, for-profit-maximisation business activities regularly ignore environmental boundaries and exploit socio-economic inequalities, creating wealth and comfort for the few at the cost of the many (Kallis et al. 2018; Kostakis and Tsiouris 2024).

In contrast, there is a multitude of potentially more collaborative and inclusive business- and technology-development models that are inspired by, and correlated with, the commons. Examples include the open cooperativism movement (Pazaitis et al. 2017), the platform cooperativism movement (Scholz and Schneider 2016), and the open-source movement (Kostakis et al. 2018). The commons are social systems where a shared resource is collectively managed by the community or group of stakeholders that produces, maintains, and protects that resource (Bauwens and Jandrić 2021). Movements and initiatives organised around the commons aim not to maximise profits but to maximise public value through sharing the acquired knowledge openly (Pazaitis and Drechsler 2020). The profit motive is not absent, but it is relegated to the periphery (Benkler 2011). Humans are activated by a rich motivational diversity, which may include the incentive to satisfy a particular need or the pleasure of creativity, sharing and learning (Benkler 2006; Weber 2004).

This article provides a constructive critique of the established views and practices around STPs. It offers an alternative approach for establishing more pluralistic STPs, which could serve as hubs towards a more sustainable technology and economy. To realise these goals, I use an exploratory case study from the Region of Epirus in Greece that tentatively frames two commons-oriented emerging phenomena, open-source technologies and the social and solidarity economy, within the planned-to-be built local STP.

The article proceeds with a review of the characteristics and challenges of conventional STPs regarding technology, business, and governance. Then, I underline potentialities of an alternative technological and business approach and an exploratory case study where a citizens' initiative advocating for an alternative STP is introduced. Next, I discuss the case study in conjunction with postdigital theory and the commons. The article lists some benefits that STPs could reap by pursuing a more pluralistic approach amidst a profound environmental and socio-economic crisis.

## Conventional STP Approach

Literature around STPs is extensive yet characterised by a sense of ambiguity (Lecluyse et al. 2019). The latter becomes apparent already by the lack of a concise, universal definition of an STP. According to one definition, STPs function as regional clusters of organisations such as universities, research institutions, and other private and public entities, where human, material (machines, tools, and infrastructure) and immaterial (knowledge) resources are accumulated in one physical location with the purpose of creating positive social and economic impact through innovation and technology transfer (Xie et al. 2018).

STPs share a core of similar elements, which are the spatial specificity, the R&D and innovation orientation, the knowledge and technology transfer between stakeholders, and the proximity—in terms of distance and involvement—to a university or other higher education institutes (Hobbs et al. 2017). Commonly, STPs bring together and host organisations that specialise in a specific field of science and technology, i.e., the biotechnology parks in India (Vaidyanathan 2008) or the Wuhan Donghu High-Tech Zone on information technology and electronics (Xie et al. 2018). The proximity to entities with a similar specialisation seems beneficial for companies on several levels, from enabling collaborations to the more direct exchange of knowledge and access to state-of-the-art developments in the field (Xie et al. 2018).

STPs in 'advanced' economies are almost always formed by an alliance between scientists and private investors, whilst in emerging economies, STPs are mostly a government-planned project to spark high-tech innovation within an area as part of a regional development plan (Lau and Lo 2015). In both cases, public-funding is ubiquitous as the government sets up financial institutions to compensate for the lack of investment support start-ups or other tenant companies could be facing (Vásquez-Urriago et al. 2016). The level of private sector involvement and its impact on the performance of STPs remains a subject of debate. Although some authors argue more private sector involvement benefits STPs (Chen et al. 2006; Sofouli and Vonortas 2007), there is no conclusive evidence that this is indeed the case (Albahari et al. 2022; Lecluyse et al. 2019).

Collaboration of universities and STPs has often presented positive spillovers on the development of the regional and local economy, by raising the level of performance in the universities and increasing employment opportunities in the region (Link 2016; Mora-Valentín et al. 2018). Technology development and transfer may

instigate a relationship between universities and companies that proves to be mutually beneficial. Universities can attain R&D funding and secure their intellectual property interests and rights, whilst gaining a reputation for their innovation potential and using licensing revenues to finance further research in the institution. Conversely, companies can potentially significantly reduce R&D costs and capitalise on the produced technologies (Steruska et al. 2019).

Companies' participation in an STP is incentivised by favourable rent prices and locations, and technical services that are easily accessible on-site (Ng et al. 2022; Steruska et al. 2019). The spatial proximity enables a dense networking activity facilitating the creation of informal, diverse relationships between stakeholders, which in many instances leads to successful synergies (Poonjan and Tanner 2020). Location, local context, and pre-existing competencies in terms of governance structure and innovation culture in the region usually have a significant effect on the development of an STP. That is because, on the one hand, universities and research institutions tend to dictate, to a large extent, the kind of technology companies are able to commercialise and, on the other hand, national or local governments are in charge of innovation promoting policies (Ng et al. 2022; Poonjan and Tanner 2020; Vásquez-Urriago et al. 2016).

High-tech is perceived as a prerequisite for STPs, whilst other technological approaches seem to remain unexplored. Most funding for STP development arrives from public sources but the impact on local stakeholders and society has been far from what was initially anticipated; some authors even consider STPs as high-tech fantasies (Bakouros et al. 2002; Massey and Wield 2003). Regional socio-economic problems involve many more parameters than the mere implantation of a high-tech cluster can solve. At the same time, the high-tech approach coupled with private-sector involvement has shown to increase the development gap between regions (Massey and Wield 2003; Vedovello 1997). Conventional STPs have achieved mixed results in fulfilling their purpose of positively transforming the social and economic status of a region (Albahari et al. 2022; Hobbs et al. 2017). I argue that there are alternative technological and business approaches that have indicated nodes of success in spurring innovation and enhancing sustainability and could translate favourably within an STP context.

## A Postdigital and Commons-Oriented Approach

STPs have been prevalent around the globe for more than half a century with their total number being in the hundreds (Sandoval Hamón et al. 2022). However, so far they have shown mixed results in fulfilling their presumed goals to the initially expected level (Albahari et al. 2022; Lecluyse et al. 2019). This opens room for experimentation, in this article, with a postdigital and commons-oriented approach. The postdigital, much like the commons, represents both a disruption and an extension of the digital revolution and brings forward a grand challenge across science, education, arts, and other areas of human interest (Jandrić et al. 2018; Macgilchrist 2021). In this case, the disruption represents a tipping point where the old notion, i.e., the digital, is arguably no longer sufficient and a new notion emerges moving

forward, i.e., the postdigital. Similarly, it may be time for STPs to steer away from their conventional digital approach and explore a postdigital one.

Fixating on high-tech production, STPs often remain stagnated. Beyond grave environmental consequences and inhumane working conditions (e.g., mining in Africa and precarious labour in Asia), artificial monopolies and planned obsolescence (e.g., Monsanto's seed monopoly or Apple's support policy on its devices and services), high-tech is usually locked behind patents and proprietary licences (Boldrin and Levine 2013; Pazaitis et al. 2021). In contrast, a commons-oriented open-source approach allows users to study the technology, use it, reproduce it, develop it, and adapt it to their needs (Weber 2004). Closed technology restricts those freedoms and minimises the agency of the users.

An exemplary case of the benefits of open over closed technologies is 3D printing. Since the FDM patent expired, knowledge has been open to everyone, and thousands of people have experimented with it innovatively, accelerating the rate of development around it (Priavolou et al. 2022). A similar situation occurred 220 years ago, with the steam engine that catalysed the Industrial Revolution (Nuvolari et al. 2011). When closed technology became open, innovation around technology increased exponentially. The patent system is outdated and does not seem to spur innovation but rather interrupt it (Pazaitis et al. 2021). Conversely, the aforementioned examples showcase how innovation can be amplified by being managed as a shared resource, i.e. a commons.

High-tech is not by definition socially and environmentally unsustainable. However, when produced 'within silos' being profit-incentivised, it has a detrimental effect on societies and the environment (Kostakis and Roos 2018; Lange et al. 2020). Open-source technological products can also be high-tech but are mostly produced in a way that may mitigate some of high-tech's challenges. Humans regain some control over technology; a significant part of production can be localised; and an optimal synthesis can be achieved between the efficiency and seamlessness of high-tech and the frugality and resilience of low-tech (Kostakis et al. 2023a).

The latter intersects with a postdigital perspective in which the digital element makes part of a comprehensive totality, prompting a more critical stance to understanding technology and its practical applications (Fawns 2019). Technology is an object but also includes processes and knowledge produced around the object. Opposing the deterministic digital perspective, technology is not neutral but socially defined. It is highly influenced by the decisions of manufacturers, designers and anyone else—directly or indirectly—involved (Kostakis and Tsiouris 2024). Postdigital theory illuminates the complex relationship between humans and technology. It highlights the imperative for humanity to ponder the profound ramifications of its continuously more intricate interaction with digital technologies—an urge to comprehend and scrutinise the human-technology connections (Jandrić et al. 2018; Green 2021; Jandrić 2023a).

The open-source paradigm has already been integrated into global organisations. A report commissioned by the Ford Foundation (Eghbal 2016) concludes that almost all software 'used by Fortune 500 companies and governments is based on FOSS: from Apache, the most popular web server, to GNU/Linux, on which the top-500 supercomputers run, to WordPress, the most popular content management

system, to OpenSSL, the most popular encryption protocol to secure transactions' (Pazaitis and Kostakis 2022). In the realm of hardware, there is a bloom of initiatives worldwide that produce OSH (Blind et al. 2021). For example, in a small country like Greece, one can find open-source initiatives that produce various technologies such as agricultural machinery,[1] robotic and bionic devices,[2] small-scale wind turbines,[3] and satellites.[4] We have come to the point that open-source technology is gradually recognised as a possible alternative not only by the likes of The Economist and Forbes but also by huge consulting companies such as Deloitte and PricewaterhouseCoopers (Pazaitis and Kostakis 2022). This should serve as a warning that the commons could and have been co-opted as capital and remind communities to take care of and protect their commons (Bauwens and Jandrić 2021).

Open-source technologies go beyond the technical and generate positive spillovers in the business and governance sphere. The latter effect derives from the non-negligible tendencies of the commons-oriented approach, which is pervaded by the elements of transparency, inclusion and sustainability (Priavolou et al. 2022). Open-source boosts innovation, empowers communities through collaboration, and amplifies local economic and social impact (Robra et al. 2023). Therefore, open-source technologies are incremental for the social and solidarity economy (Gagliardi et al. 2020). The economy is dominated by profit-driven corporations that exploit human labour by doing business as usual, whether that is in subcontracted sweatshop factories and warehouses, in typical companies, or in 'agile' teams and user groups (Pazaitis and Kostakis 2022).

In contrast, commons-inspired initiatives such as social enterprises and open cooperatives are often more resilient than those aimed at maximising profits; benefit the local communities; and tend to operate in a more democratic way (Esteves et al. 2021). Some even foresee that a social and solidarity economy could become the vehicle to achieve the Sustainable Development Goals set by the UN (Esteves et al. 2021; Gagliardi et al. 2020). Social enterprises, and more so open cooperatives, adopt multi-stakeholder democratic governance models, enable their community to mutualise resources and organise around social and environmental global issues (Pazaitis et al. 2017). STPs are incubators of innovation and technology development. Therefore, aspiring STP designers, directors, and other stakeholders should explore those possibilities.

## The Case of the OpenTechPark-Citizens for Open-Tech

This article employs an exploratory case study to tentatively frame an alternative approach to STPs (Yin 2009). The latter builds on the conjunction of two emerging collaborative movements: open-source technologies, and the social

[1] See https://www.tzoumakers.gr/english/. Accessed 20 June 2024.
[2] See https://openbionics.org/. Accessed 20 June 2024.
[3] See https://neaguinea.org/. Accessed 20 June 2024.
[4] See https://libre.space/. Accessed 20 June 2024.

and solidarity economy. The case study involves a grassroots initiative from the Region of Epirus in Greece. The initiative, called OpenTechPark-Citizens for Open-Tech (COT), is critical of conventional STPs and goes on to provide a set of proposals for an alternative STP. The critique and the proposals are informed by a year-and-a-half-long public deliberation, in which various stakeholders and experts have participated. The set of proposals has been co-configured through a series of iterative cycles of participant feedback.

I adopt a participatory approach to case study research, where case participants become contributing researchers and, hence, experts who can contribute to understanding the underlying processes (Reilly 2010). This article is developed subjectively mainly through personal observations and interpretations and proceeds to suggest a normative STP framework. I aim to further theorise it within the postdigital theory and the commons through my subjective interactions and experiences as a member of the COT initiative.

The case study takes place in Epirus, where the regional government decided to contribute tens of millions of euros and acres of public land to create a high-tech park in the regional capital, Ioannina. Specifically, the submitted budget was 49 million euros, from which 20 million would be covered by the Recovery and Resilience Facility. The remaining 29 million would be covered half by loan and half by rent advancements from companies. The decision to create a high-tech park was taken without any public deliberation on whether the city needs a technology park, and if so, what kind of technology park should that be.

In early 2021, the P2P Lab, a local social enterprise that studies technology and its impact on society and the environment, noticed the regional government's plans. Reflecting on my own positionality (Hayes 2023), I am a core member of the P2P Lab as well as a participant in the later-formed COT initiative. Initially, as a collective of researchers and activists, we published an open letter advocating for an open-tech park seeing that an STP built with public funding and on public land should enable sharing, collaboration, and local socio-economic impact. Soon after, an online consultation for an alternative technology park was held. The consultation, in which 217 scientists and citizens participated, began on the mailing list of the P2P Lab and produced a set of policy proposals for a different STP. It should be clarified that all participants in the consultation were familiar with, and their work relates in some capacity with, the two main concepts that permeate the proposals, i.e., open-source technologies and the social and solidarity economy. To a degree, this influenced the tendency of the proposals towards these concepts.

Subsequently, the under-formulation grassroots initiative issued an invitation (via relevant mailing lists, the P2P Lab's social media, and a press release that was published by most local media) to an open online—due to COVID-19 restrictions—meeting to discuss the first iteration of proposals. The Governor of Epirus formally denied this invitation and dismissed the goals of the initiative through an exchange of registered letters via regular mail. During the online meeting that led to a second iteration of the proposals, it was unanimously agreed that two of the members—myself being one—would be tasked to represent the initiative and convey its proposals in person to more local stakeholders. Moreover, a website (opentechpark.org)

would be created to document the initiative's progress. The website is bilingual and is regularly updated with relevant developments.

In the following two months, the initiative's members met and discussed with individuals and local organisations, such as the Head of the Chamber of Commerce, the Mayor of Ioannina City, social enterprises, social movement groups, and other Epirus-based networks. Moreover, argumentation of the COT initiative was communicated to the leaders of two opposition parties of the Greek parliament and the Minister of Digital Governance. A think tank, affiliated with one of the two opposition parties, organised a public event in Athens in which the goals of the COT initiative were discussed in person with almost 100 participants (members of the parliament included). Another open online event followed on the topic, which was co-organised with the Athens-based Open Technologies Alliance[5] (GFOSS). The above-described activities aimed at the expansion of the initiative's network and the collection of further feedback.

A continuous public deliberation took place indirectly and asynchronously through a mailing list that was created for the coordination of the COT initiative. After having publicly documented the process stage by stage, the initiative reformulated eight proposals which were then submitted via mail to the Region of Epirus. The letter was followed by a request to discuss the proposals in the Regional Council of the Region of Epirus, as well as in the Municipal Council of the Municipality of Ioannina. The proposals were also shared with the deputies of the Region of Epirus.

The COT initiative suggests that public infrastructures should facilitate the sharing of knowledge. The list of proposals[6] regarding the high-tech park that was submitted to the Region of Epirus by the COT initiative is, as follows:

1. To establish a public co-working space. This way, freelancers and students will use this space, facilitating collaborations and knowledge exchange. The park could also attract people who work remotely in technology and look for places to settle temporarily (digital nomads).
2. To establish a makerspace. All citizens will be able to access it, but priority will be given to businesses housed in the park, to schools and the local university. Connecting the communal makerspace to the local economy (e.g., agricultural production, livestock, and wineries) may provide solutions for primary production in terms of automation, control and digital switching solutions. Knowledge is produced locally and creates value for the region.
3. To integrate direct democratic processes for the administration of the co-working space and the makerspace by the citizens and the entities that are active there.
4. To provide benefits (e.g., rental discount) to park-based businesses that produce open technology (e.g., FOSS and/or OSH) and/or have integrated circular economy elements in their organisation. If the company can demonstrate the impact

[5] See https://gfoss.eu/. Accessed 20 June 2024.

[6] Details of specific local context, such as names of local organisations, were omitted to facilitate the reader and prevent confusion.

of its open product or service in the Region of Epirus, benefits would be even greater.
5. To provide benefits to social and solidarity economy entities that deal more widely with technology. Such companies have cooperative/participatory structures, and thus significant impact on the local economy.
6. To be open and easily accessible to the local community. In the design phase, needs of people with disabilities (e.g., ergonomic office design, area access, and toilets) as well as general diversity (race, gender) should be taken into serious account.
7. To encourage development and operation of clean energy communities to increase the energy autonomy of Epirus.
8. To promote interaction and cooperation between the public and private sectors. A good starting point may be to organise training seminars for farmers and producers/designers throughout Epirus.

The proposals were discussed during a Regional Council that took place online on 25 May 2022 with the participation of some of the initiative's members. In November 2022, the Recovery and Resilience Facility formally approved part of the funding needed for the construction of the park. The COT initiative's actions resulted in the Region of Epirus including most of its proposals in the master plan that was submitted to the respective ministries. Thus, one of the STP's buildings shall be dedicated to entities that produce open-source technologies and promote the social and solidarity economy. Although the inclusion of the initiative's proposals is a positive outcome, the next steps of design and implementation will be critical. At the time of this writing, the plan for the local STP has not come to fruition.

As a participant in the COT initiative, I recognise potential academic contributions from this exploratory case. The initiative has managed to contour a more inclusive and socio-environmentally sustainable STP based on the diffusion of open-source technologies and the promotion of the social and solidarity economy. I do not aim to provide a definite objective masterplan of how STPs should operate. Instead, I build on this case to suggest a normative, more pluralistic approach, which connects with postdigital theory and the commons.

## Discussion

STPs have traditionally aspired to a high-tech path (Massey and Wield 2003) that provides advanced, sophisticated solutions but often also causes grave problems (Sovacool 2019). In most cases, it creates artificial abundance for the few and scarcity for the many—whilst even the privileged few have limited agency (Boldrin and Levine 2013). To an extent, these consequences could be addressed by the support and adoption of open-source technologies whilst aiming for an optimal middle ground between high-tech and low-tech (Kostakis et al. 2023a). One could consider it as a postdigital notion that transcends dichotomies such as online and offline, virtual and real, digital and analogue, and technical and natural (Macgilchrist 2021; Jandrić 2023a).

The COT initiative advocates for what Gorz (1968) would call a 'non-reformist reform'. Answering the question whether systemic change will emerge through reform or revolution, Gorz proposed that through non-reformist reforms, social movements could achieve immediate gains and actively prepare for a wider battle, eventually culminating in more radical transformations. The COT initiative is a social movement calling for a non-reformist reform in STPs. There is a wealth of knowledge, experience, and good practice produced within the postdigital and commons realm that could affect a sustainable, non-exploitative, non-reducible knowledge economy (Green 2021). As an integral infrastructure element of the knowledge economy, STPs should explore the benefits of this wealth. Having said that, a non-reformist reform of STPs will not come without the organisational and political challenges inherent to such institutions.

A commons-oriented open-source approach enhances co-creation and inclusion in the production of technology and accelerates innovation through sharing, showcased by the multiple successful projects ranging from agriculture to space technologies (Giotitsas 2019; Robra et al. 2023). In line with the values of openness and collaboration in the production of technology are the proposals of the COT initiative to include, in the local STP, co-working spaces; a community makerspace; and offer benefits to entities that produce open-source technologies. In accordance with the COT initiative's proposals, including an open community makerspace and a co-working area could be beneficial for an STP as they could function as a point of convergence for students, researchers, communities, and organisations. They could serve as places to meet, exchange knowledge and experience, and develop informal or formal relationships. Fostering an environment where people from different fields and backgrounds come together to create has shown to enhance innovation (Farritor 2017). Both relevant proposals are derivatives of the commons-oriented approach that the initiative, and me in this article, adopt. Makerspaces can serve as hubs of innovation, vehicles for needs-driven transformation (Niaros et al. 2017) and local economic development (van Holm 2017), all of which correlate strongly with the targets of an STP for increased local impact.

Although postdigital dynamics between technology, the makers, and the growth-oriented knowledge economy are complex, collective initiatives have managed to foster non-hierarchical patterns that encourage creativity, collaboration, and knowledge sharing towards successful innovations (Green 2021). Human relationships and praxis are vital for social innovation as it is aimed at avoiding ecological overshoots and socio-economic shortfalls whilst navigating paths towards a more just economy through the creation of collaborations, shared aspirations and infrastructure (Goodyear 2022). The strive for productive and purposeful human-technology relationships occurs simultaneously at a micro-level and a macro-level (Jandrić 2023b). Infrastructures such as STPs include both these levels and influencing them can contribute to radical change.

As STPs are set in a specific spatial context, they aspire to have a positive economic and social impact locally, e.g., attract companies and create professional opportunities for the locals, develop technological solutions for the region, and enhance the local innovation culture (Lau and Lo 2015; Ratinho and Henriques 2010). In more than half a century of existence, STPs have achieved some

positive outcomes locally. There have been cases, however, that the development of STPs contributed to the mitigation of inequalities between, and within, regions by providing increased agency to private-interest initiatives and by staying confined in the high-tech pathway (Bakouros et al. 2002; Massey and Wield 2003; Vedovello 1997). The most prominent example is that of Silicon Valley which aspires to offer avant-garde efficient solutions, promising digital and other 'revolutions' sparked by big data and algorithms (see Jandrić 2024). There is an imminent problematisation over the actual social, and material influence of the digital, which contradicts the common fallacy that the digital is something without tangible consequences. Postdigital aims to 'hold the digital accountable' by looking beyond the promises of maximising efficiency and establishing a critical comprehension of implications of digital technologies on our society (Jandrić et al. 2018).

Whilst not dismissing the impact of conventional STPs, there are challenges that need to be addressed. For example, the COT initiative, keeping in perspective that the local STP will be primarily publicly funded, has proposed the enhancement of public–private sector collaboration through the STP's administration, the inclusion of diverse social groups in the different phases of the project, and the promotion of non-profit renewable energy communities in an effort to limit the issue of energy poverty in the region. Enabling communities to innovate and fulfil their needs in a spirit of collaboration, solidarity, and democratisation of technology has revealed glimpses into more sustainable and inclusive futures (Kostakis et al. 2023a, b). These arguments are deeply intertwined with a postdigital infrastructure where the social, digital, material, and all in-between aspects are embraced (Goodyear 2022).

STPs' focus on maximising profits and efficiency has been counterproductive (Chen et al. 2006; Laspia et al. 2021). STPs are multi-stakeholder entities with a strong public sector presence. There may lie an opportunity for STPs to adopt and promote the social and solidarity economy, which is characterised by more democratic governance models and a more social and political orientation (Gagliardi et al. 2020; Robra et al. 2023). Social cooperatives are intrinsically gravitating towards the common good and work on addressing global challenges, even if they operate on a local scale (Pazaitis and Drechsler 2020; Priavolou et al. 2022).

There are three main levels of resource allocation: the state, which represents regulatory planning, as in the capitalist system; the market, which regulates the allocation of capital; and the emergence of mutual coordination or 'stigmergy', which creates a friendly environment for open-source commoning. At the moment, we are experiencing an ecological, socio-economic crisis but also a crisis of democracy caused by the failure of the state and the market. That creates a pathway for a more sustainable response through the commons (Bauwens and Jandrić 2021). According to Bauwens and Jandrić (2021), the answer lies in the emergence of a public-commons cooperation pool that would legitimise products and services produced by communities and place them into existing systems. This idea goes hand in hand with Gorz's (1968) non-reformist reform. The COT initiative's approach to STPs could disrupt the existing system and legitimise postdigital theory and the commons by transferring them to an institutional level, managing publicly funded infrastructure as a commons.

## Conclusion

This article tentatively synthesises good practices in technology, organisation, and business and provokes discussion around postdigital and commons-oriented infrastructure. It draws experience and knowledge from successful commons-inspired examples from the open-source movement and identifies multiple benefits for an alternative STP that adopts these approaches. The case of the COT initiative has been an opportunity to open the debate and construct some untapped potentialities regarding STPs. An exploratory case makes it hard to provide in-depth and robust findings. Nevertheless, it could be worthwhile for STPs to be more pluralistic and open, recognising the limits and inefficiency of the conventional approach and gathering the seeds from promising alternatives.

Postdigital theory disrupts dichotomies and reaches beyond the digital, shedding light on aspects that are explicitly or implicitly ignored. Respectively, the COT initiative disrupts conventional STP approaches. Not all disruptive movements correlate. In this case, however, postdigital theory and the initiative's alternative approach to STPs have a prevalent connection. They both explore and embed human relationships in technology, obviously with their imperfections but with an important and undervalued contribution. Following Sinclair and Hayes (2019), the *post*digital (com-*post*) is a fertile ground for sharing, collaborating, and producing science and technology that is socially and environmentally sustainable. Thus, the article opens a postdigital dialogue (Jandrić et al. 2019) between postdigital and STPs.

This article positions postdigital theory within the context of an STP. Postdigital theory has extensively discussed creative labour, digital learning, even universities. STPs bring together all these previously explored aspects, along with many others, which makes them an interesting experimental testbed for postdigital theory. The presented study is based upon an exploratory case study within the Western (Greek) context and should be expanded to and tested in other contexts. Therefore, the article's most important implication is opening a dialogue on exploring postdigital approaches in such an institution, enriching both postdigital theory and praxis of a multi-stakeholder complex institution like an STP. Based on a lot of recent good work related to studies of postdigital futures (e.g., Forsler et al. 2024), future research may inquire what a postdigital and commons-oriented STP would look like: should it be spatially centralised or distributed, should it concentrate on a specific field of science or opt for a more extensive variety, and so on.

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## Declarations

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