



Research Fellow 

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A Confident Friend: Realising the
Potential of CCE in Enhancing
(Political) Imagination in the New
Space Sector

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Main argument

This project was about exploring the potential of the cultural and creative economies (CCE) to shift current day practice in the New Space industry to guard against reproducing harmful power structures. The New Space industry is accelerating in its development, and decisions made now will have far-reaching impacts in the future. This research explored how the CCE can be a critical partner in navigating and avoiding future challenges and crises in this burgeoning field.

The results of this research point to the possibility of strengthening the CCE by diversifying audiences for its work. Art is usually pointed to as something which can inspire different ways of thinking about the world – but most theorising focuses on the outputs of art: the works themselves.

This research looks more at the artistic process, in particular, the ways in which those in the CCE:

1. utilise creative skills and mindsets to come up with new ideas
2. create emotional spaces for people to explore ideas at new scales and depths
3. provoke, disrupt and interrupt hegemonic thought-processes

For the New Space sector, the potential of these 3 elements is staggering, especially given the strength of the Lab to Market ‘norm’, the sense of lack of agency that those who are building new innovations have, and the hunger (when given a taste) for more engagement with creative methods for thought.

My research found that the CCE could act as a ‘confident friend’ to the New Space sector.

It feels perhaps a bit disconcerting, this idea of artists selling their process to those in industry – and for some I can imagine this would feel very counter to any kind of anti-capitalist practice – however, for me, I see in the New Space industry a sector which has many brilliant people within it so very keen to not cause harm, and excited by the prospect of being able to do just that. If artists can provide this as a service of sorts, alongside their artistic practice (and perhaps in place of the ‘day job’ which often is required to pay for said practice), maybe there’s scope for this work to feel like a real form of artistic output as opposed to simply a means to an end.

After all, creating / designing / facilitating / making a space for divergent and truly innovative emancipatory thinking – well, surely that’s a form of art if there ever was one?

Research motivation & background

The ‘New Space’ sector’s lack of imagination

‘New Space’ is a catch-all term for the increasing commercialisation of the outer space industry. There are many different opportunities in looking to the skies – from providing internet and global connectivity and capturing crucial imagery of the Earth, to manufacturing pharmaceuticals in zero-gravity environments and sourcing solar energy using satellites. There’s then, of course, an entire Global ecosystem made up of launchpad operators, rocket manufacturers, satellite builders, software processing companies, fuel inventors and so on. It’s a growing sector, which draws to it some of the most talented engineers, ambitious businesspeople, and plucky investors.

There’s a real opportunity for the New Space sector to provide equitable, sustainable, life-enriching solutions to many problems here on Earth, but as with any and every industry which has had a capitalistic motor at its core, much harm can be done in the name of ‘making the world a better place’.

The imagination plays an outsized role in the outer space social world. From sci-fi adventures and educational scientism, to mission-orientated political campaigns and the visions of those at the forefront of the space industry; imagination is the engine which creates momentum in space-based fields. Outer space activity needs to be imagined by various social actors in order to be brought into being, in lieu of – for the most part, yet – lived experience beyond our planet.

The role and impact of visions, imaginaries and anticipation in institutionalising social ideas about the future has been well documented across sociology (van Lente 2012), anthropology (Anderson 1983, Appadurai 2001), economics (Shiller 2019), political science (Taylor 2003; Beckert, 2016) and beyond. In the so-called ‘New Space’ sector, corporate and entrepreneurial visions merge with outer space imaginaries, creating and shaping motivational marketing, hiring, sales, investment and lobbying messaging.

Some examples of perhaps what could be termed the ‘limited imagination’ of the space sector would be references to ‘colonising Mars’, ‘the new frontier’ and ‘beyond Earth’ – ideas which are rooted in ugly histories, detrimental expansion and a lack of faith in and/or respect for what the Earth is able to provide (and could continue to provide if we don’t simply give up on caring for it).

The limited ‘Lab to Market’ imagination

It’s not just the lack of imagination in terms of how the space sector talks about itself and its activities – there’s also a lack of creativity in terms of how the science

and technology is brought into reality through the so-called 'Lab to Market' process. This is essentially the 'standard' way new science moves from academic institutions through regulation, investment, commercialisation, testing, scaling up and marketing to the 'real world' of products and services available for people to buy, use, sell and speculate upon.

The very idea of Lab to Market suggests that new space technologies can only originate in a lab, and can only be made real through the capital markets. The process of regulation relies on current day laws and law-making practices. Money to fund the work is very often sourced from controversial highly capitalistic sources (i.e. more interested in monetary return than social impact) in exchange for equity and management control. Blueprints, knowledge and technical know-how is hidden from the public through intellectual property protection (despite very often the original ideas having been publicly-funded in academic institutions) – meaning that only certain people can benefit from invention, and most usually through huge financial gain and ultimately control of the future.

Those in the industry claim it's the only way to do things – that it's already so hard to get their technologies out into the world that they must follow the Lab to Market framework if they are ever to see their ideas come into fruition. But this process relies on the existence of a market - one which has enough players, enough money and enough speculation to justify investment in ideas at an early stage. They are betting on value later on down the line, via the instrument of the market. So space entrepreneurs and scientists adapt their strategies and their plans and their visions to make their 'thing' investable through this market lens. The problem though is what has to be sacrificed in order to be investable - ownership (and therefore, control) has to be given to people whose main (sometimes only) motivation is profit-making, and so decisions are made at the cost of other motivations, such as fair wages, environmental protection, geopolitical equity, societal fairness...the list goes on.

The power of the Lab to Market 'norm' prevents exploration of other means of 'making the thing real'. What about businesses that are built as cooperatives, causing less harm to employees? What about intellectual property that is instead in the commons, causing less harm through improved access to information?

Despite the space industry often inventing ideas, products, software, hardware and social concepts (e.g. lunar society design) that do not yet exist, and may not exist for decades, they use current day limited capitalistic methods which cement current day power structures without any concern for how those power structures and processes will impact the society their inventions will ultimately be operating in. There's no consideration of how alternative methods of bringing innovation to the real world could even help create a different model for a more just future.

Instead, today's space entrepreneurs and early investors are the oil barons of the future.

New Space ick

Of course, all of this makes me feel a bit 'icky' – there's a sense of there being so much positive potential in the space sector, for individuals and humanity as a whole, but cloaked in these often bombastic, colonial, progress-at-all-costs narratives and visuals it quickly brings on a sense of frustration and missed opportunity for 'what might have been'. The lack of consideration of 'other ways' of bringing science and technology to the people just feels like a hugely uncreative (maybe even verging on lazy) approach to seemingly make the world better.

In short, I feel a sense of unrequited hope – that I am putting my hope in the sector to be something truly innovative and useful and bringing about an equitable, sustainable, expansive future; but that the defeatist reluctance of those in the industry to consider alternative ideas and structures feels like they are not holding up their side of the hope bargain. They want the world to believe in them; but it's like they don't really believe in the world.

In short, the current-day space sector:

1. Is highly scientifically imaginative, but with little political imagination
2. Reinforces harmful long-term power structures in an 'ends justifying' financialized process
3. Uses the strength of the 'Lab to Market' narrative as an infrastructural excuse to not consider alternatives

If the New Space sector is to avoid replicating the harms of industrialisation, colonisation and commercialisation of the past, a different kind of imagination – and practice – is required.

So what to do?

Some would argue that the problem is not lack of imagination around who gets to own your company, but rather a lack of choice around how to fund scientific development in today's world.

Perhaps – though we know from so many examples throughout history that there are other ways of doing things that doesn't rely on capital markets.

Mark Fisher famously described the "widespread sense that not only is capitalism the only viable political and economic system...it is now impossible to imagine a coherent alternative to it" (Fisher, 2009). It could be argued that a lack of imagination is one of the most potent blockers of social and cultural change. Suhail Malik's

‘surfeit futurity’ goes one step further: social issues are not as a result of a lack of imagination and futurity but rather an excessive amount of a particular kind, based on “a future present that is unknown but configured qua the risk of the present future” (Malik, 2021). We are ‘risk creatures’ (Reed, 2022) then – stopping ourselves from creating the future we think we should have due to the imagined and material barriers of modern capitalism.

Prefigurative politics “aims to challenge and transcend the culture and structures of contemporary capitalism...by embodying a different type of society within the old one” (Monticelli, 2021). I believe that a different way is possible for the New Space sector, but change means forming of a new zeitgeist which surrounds a sustainable, equitable, positively-expansive politics of innovation development.

As such, this research looks at what a prefigurative politics of New Space might look like, and how to encourage the sector’s political imagination to go one ‘giant leap’ further in the bid to change the world through space technologies.

Looking to CCE to prefigure the politics

In order to build on this, there were 3 key questions I had to consider:

1. What approach to ‘politics building’ will bring out more inclusive, sustainable, equitable results from the space sector?

How to build a plurality of ideas and politics as opposed to one unifying or singular ‘way of doing things’ to allow for diversity of ideas, adaptable structures and differences in cultures, technologies and national policies? How to consider the idea of transitioning a sector versus transforming a sector, and whether the former is simply technocratic as opposed to emancipatory? What does the political economy of ‘bringing about new politics’ look like, and how can that possibly negatively interfere with the very outcomes we might aim for?

2. How do the values in these politics translate to real-world structures and processes those in the space industry can follow when developing innovation?

How to manage pragmatism in the bid to go from vision to reality? Are those in the industry already better poised to come up with the solutions which can be activated now? How to get those people out of their current modes of thinking and imagine realistic alternatives? How to ensure comfort in exploring new ideas, giving of agency so they feel empowered to actually build new things as opposed to simply imagine? How to criticise effectively (i.e. without alienating those who are the targets of the criticism)?

3. How do we bring about the change today, as opposed to working towards a never-arriving future, despite the 'confines' of the existing capitalist Lab to Market structure being the current-day norm in the industry

How to get people to come together with this possibly quite alien and 'not-business-as-usual' goal in mind, in amongst their already busy lives? How to shift the culture and zeitgeist of the industry as a whole? How to make change desirable, easy and doable even for those who are not the ones envisioning the change in the process (in other words, how to get everyone else to follow)? How to reframe seemingly 'radical' ideas into what can be considered the 'norm' in New Space?

By exploring creative practices designed to enhance imagination – such as science fiction literature, futurism practice, moral imagining, speculative design, and others – I explored the role the cultural and creative economies (CCE) can play in the New Space sector moving forward.

In sum, my research looked to answer the following questions:

1. What creative methods can be used in the New Space industry to encourage, broaden and challenge current modes of imagination?
2. What considerations need to be made when engaging with sectors such as New Space on reimagining their innovation development processes?
3. What role can the CCE have in shaping the New Space sector?

Methodology

The project was undertaken through two stages:

1. Review of current practices

CCE: I undertook a broad review of creative and cultural imagination practices which have aims such as activism, education, ‘changing minds’, disrupting status quo and prompting realisations. This was also informed by my PhD research on corporate futurism, where I have investigated various different methods such as speculative design, foresight methodologies, moral imagination and so on alongside my focus on futurism specifically (which is variously practiced as a creative method).

New Space sector: I undertook a review focused on the imagination, creative and strategy practices currently undertaken in the context of the New Space industry – by startups, industry innovation teams, academic groups, policymakers and other New Space networks and groups. The purpose was to explore current practices around idea generation and political visioning and unearth (real and imagined) opportunities and challenges in redesigning systems which reproduce power dynamics (e.g. regarding IP strategy, VC term sheets, company ownership structures etc).

2. Workshop in partnership with SpaceScotland

SpaceScotland partnership: I partnered with SpaceScotland for the workshop element of the project. SpaceScotland, according to their website, is an “industry-led initiative that originated in late 2016...formalised in 2021 as a not-for-profit company to actively support Scotland’s ‘end-to-end’ space ecosystem and value chain”.

This came about after I discussed my CIRCE project with my University of Edinburgh colleague Dr Matjaz Vidmar (Mat) – a researcher who is already well-known in the Scottish space ecosystem, both due to being very active across industry, government and academic groups, but also due to his 2020 paper “New Space and Innovation Policy: Scotland’s Emerging “Space Glen”” (Vidmar, 2020). Mat told me about some recent research work he had been commissioned by SpaceScotland to undertake titled “Future-proofing the development of the unique skills needs of the Scottish space sector”. As part of this research, Mat was to run a workshop with stakeholders across the ecosystem, and we decided to merge our workshops together in order for my workshop to have a strong topic focus, and for Mat’s to have creative methods at the core.

Participants: There were 9 participants in the workshop, with myself and Mat as the two facilitators. With the focus being on skills, we had a rough split in

participant background: half being from industry (e.g. Clyde Space, a Glasgow Aerospace company) and half being from skills-focused organisations (e.g. Scottish Enterprise, Scotland's national economic development agency).

Workshop design: The workshop was designed to have 2 sections, with a break in between, with each section comprising of a CCE-inspired exercise and then an evaluation and translation of the exercise into existing sector frameworks. The idea behind the design was to ultimately have the participants explore what a Scottish space ecosystem could look like, but instead of starting with this question and (most likely) engaging in similar conversations about skills which are already happening in the sector, we used the creative methods to disrupt the 'usual' responses and the 'regular' ways of exploring challenges, to hopefully result in more imaginative responses to what the ecosystem could look like.

The workshop was scheduled as below, across a 3-hour afternoon slot:

- 1pm – Arrival
- 1pm-1:30pm – Introductions, ethics & lunch
- **SECTION 1**
- 1:30pm-2pm – Utopian Devices Exercise
- 2pm-2:30pm – Mapping the Devices & discussion
- 2:30pm-2:45pm – Break
- **SECTION 2**
- 2:45pm-3:15pm – Future Real-World Fruition exercise
- 3:15-3:45pm – Scottish Space Skills Ecosystem Design
- 3:45pm-4pm – Feedback / Evaluation and AOB
- 4pm – Close

Section 1 detail

The first section of the workshop had the purpose of making the participants feel comfortable together as a group, open to exploring unconventional ideas and methods, and creative in their ideation.

To begin with, we ate lunch together and exchanged small talk, while myself and Mat took the participants through a short introductory presentation about the workshop, the SpaceScotland aims and my research aims. We used this as time for priming the participants on the broad issues SpaceScotland is focused on with respect to skills (by outlining the results of some previous research) so that everyone was starting from the same level of understanding of the topic.

We then proceeded to use a food-based exercise, where the participants were paired up and asked to design and create a 'utopian device' – something they envisioned being created by the Scottish space sector in the future – in the form of a smoothie.

There were several ingredients laid out (fruit, chocolate, milks, juices, etc) and the participants were to consider what 'ingredients' were to go into their utopian device in order to make it come about. They were to write the recipe down, and then after the time was up, explain their device and its constituent ingredients to the group while filling up a blender's receptacle, and then – in light-hearted ceremony – blended the smoothie up and passed it around for all to try. We'd discuss the flavours and their taste – mostly through laughter – and related this discussion back to what the ingredients represented.

Once all the pairs' smoothies had been sampled and discussed, the utopian devices were mapped along a timeline to create a 'journey' for the Scottish space sector – in terms of which devices would come first and how they would build on top of one another – and we discussed the commonalities and differences in approaches that the pairs all took.

Section 2 detail

After a break, we moved onto the second section of the workshop which had the purpose of encouraging the participants to imagine the journey that it would take to create the utopian devices – including the challenges and opportunities – and then culminating in them designing what the Scottish space ecosystem should look like.

This section started with the 'Future Real-World Fruition' exercise which essentially was an exploration of the path the ecosystem would have to take to make the utopian devices a reality over time. For this, we used a game-design exercise, where we asked the participants to dream up collectively a board game which would illustrate the journey of going from the present day, through each of the devices creation – the idea being that the ending of the game would be when the most far-future device was completed. The participants designed a 'Snakes and Ladders'-esque game (see results for full exploration), where the snakes were the various different kinds of obstacles, and the ladders were the new ideas and programmes which would accelerate the ecosystem along the journey.

Following the game design exercise, the workshop culminated in the participants creating a 'Scottish Space Skills Ecosystem Design' where, through discussion and collaborative annotation of a shared A1 sheet of paper, the elements of the ecosystem (keeping the focus on skills) were written down, edited, elaborated upon, and debated.

The workshop ended with a short discussion and summary of the afternoon's most pertinent ideas, some feedback about the process and a discussion of what the participants wanted as next steps from SpaceScotland.

Data captured at the workshop: There were 3 goals in terms of what insights I specifically wanted to gather during the workshop: to capture the content of the produced work; to capture how the creative methods played out in practice; and to capture participant feedback on their experience of the workshop. I did this using ethnographic observation (taking reflective notes during the workshop so that they were freshly captured, and taking photographs of the workshop outputs and process). We also captured feedback after the workshop using a short qualitative survey that was sent out to the participants 2 days later.

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Reflection and analysis across 2 stages

In the first stage of the project, I collated concrete examples of how different creative practices can fit into and inform the culture, desires and day-to-day reality of the New Space startup field. I used this research to inform the workshop design.

I reflected on the impact of the workshop on the participants, both through ethnographic observation, as well as by engaging with the participants throughout to get their feedback, and then tied those reflections back into my insights from the first stage to come up with my recommendations regarding the role of CCE in the New Space sector.

Project evolution

SpaceScotland collaboration: Initially I had conceived of the research being undertaken by myself as an individual independent CIRCE researcher, however as I was investigating the best approaches to introducing new and perhaps jarring methods in business spaces, I found that asserting credibility, expertise and trust was vitally important to get people on board, especially when pressed for time.

I therefore sought out a partnership with a trusted space sector body, and being based in both Glasgow and Edinburgh, I decided to partner with SpaceScotland as a key delivery partner for the research. This meant that not only would I be able to source my participants through the organisation, but that my expertise and project aims could be presented as clearly aligned with the goals of SpaceScotland. It also meant that I could more easily access more senior members of the Scottish space industry without spending research time seeking contact details and finding applicable time in diaries – this was managed by the partner.

Removal of formal interviews: Another evolution of the project concerned my data collection methods. I had originally planned on undertaking interviews before organising the workshops, to gather data on the current ideation and imagination methods used in the space industry. I was finding though that, being a summer

project, it was challenging to get enough participants that would make this part worthwhile, and the people who were keen to chat I felt would benefit more by being part of the workshops (however if I interviewed them, I would be priming them too fully for their participation in the workshops to be effectively reflective of the day-to-day experience of the sector).

I was also finding that my desk research (section 1 of my research methods) was providing very fruitful insights and so I decided to better pair this with my PhD investigation outputs, and utilise this instead of interviews. This not only saved time, but it allowed me to engage with more various literatures and build on the already existing work undertaken in the academic sphere.

Method-focused workshops to topic-based: I had planned to do three workshops, each focusing on a different creative intervention, across different pools of participants. However, when I decided to partner with SpaceScotland, I had to ensure that the workshops were also delivering against their own research questions and priorities. SpaceScotland have a particular focus on skills at the moment, and so it was agreed that instead of centring the workshops on the interventions, they would be advertised as more topic-based.

This was not only a decision based on partner demands – my desk-based research was making it clear to me that I had to ensure I was meeting participants where they were, and focusing clearly on questions they themselves wanted answered, as opposed to prioritising what I perceived as the key outcomes of the workshop. This was a vital shift which I believe not only hugely helped with recruitment of participants but also ensured that the participants were far more engaged right from the off.

My approach to research

Ethics: I designed consent forms based on my PhD ethics process undertaken at the University of Edinburgh, and gave participants these ahead of the workshop. They were asked to fill in their forms and/or ask questions during the time allocated for lunch before the workshop commenced. It is vital in my research that I am very clear with participants exactly how they are participating and what role they play, as well as what they are providing me with and how it will be used.

My participants agreed that:

- They understood that their participation was voluntary and were free to withdraw at any time, without giving any reason.
- All names and other material likely to identify individuals was to be anonymised.
- The material was to be retained in secure storage for use in future academic research.

- The material could be used in future publications, both print and online.
- The materials produced during the workshop (i.e., drawings, photographs of objects created, or any other written and/or spoken statements) could be used for project dissemination and analysis.

Thinking with my participants: It is very important to me in my work to not act exploitatively with research participants. They are giving up time and contributing ideas, and it's important to me to treat them as co-thinkers in my processes and (if they desire) to be credited with new ideas. I also am very keen to ensure that the process of partaking in my research is a thought-enriching experience for participants, and so I ensure that I am working with them on problems they too are aware of, so that they feel they are also learning and developing alongside myself. The focus on skills alongside SpaceScotland helped make this workshop not just a data-gathering exercise for my CIRCE research, but an opportunity for participants to network with others in the industry also interested in this topic, as well as a dedicated space and segment of time to dive deep into the issue away from their usual desk space.

Results

I have split this results section into 3 parts:

1. My findings from my literature review
2. My findings from my workshop
3. My recommendations

Part 1: Literature review findings

I structured my investigation into existing literature around the 3 initial questions I asked at the beginning of my research:

1. What approach to ‘politics building’ will bring out more inclusive, sustainable, equitable results from the space sector?
2. How do the values in these politics translate to real-world structures and processes those in the space industry can follow when developing innovation?
3. How do we bring about the change today, as opposed to working towards a never-arriving future, despite the ‘confines’ of the existing capitalist Lab to Market structure being the current-day norm in the industry

To answer these questions, I was drawn to literature surrounding alternative ways ‘making the world a better place’, specifically with respect to private organisations working with advanced technologies. This meant reading works across fields such as Future Studies, Management and Organization Studies, Responsible Research and Innovation, Radical Geography, Science & Technology Studies and Economic Sociology.

My findings were as follows:

- 1. It is important to be upfront about the difference between transformative change and transitional change – and be explicit about power when designing exercises to make progress in bounded spaces.**

By ‘bounded spaces’ I’m particularly referring to being in environments in which profit-goals play a limiting role in imagination and innovation processes. A 2023 paper responded “to a need for methods that support the creation of imaginative transformation pathways while attending to the roles that power dynamics and shifts play in transformations” (Rutting et al, 2022).

The research explored a so-called ‘Disruptive Seeds’ method which took inspiration from Future Studies as well as the literature on power in Social and Political Science. The method “focuses on niche practices that actively challenge unsustainable

incumbent actors and institutions”, which aligned with the aforementioned challenge of limited imagination in the sector. The findings from the paper – which was focused on climate change interventions specifically – stated that “a scenario approach that allows for explicit exploration of power shifts in transformations can help formulation of more ambitious and transformational policies” (Rutting et al, 2022).

I took from this the need to go beyond technologies, skills and industry-known issues when exploring ideas about the future, with a strong incorporation of broader power shifts across society. In order to do this in practice, it is key to encourage thinking that is outside the usual ‘day to day’, where broader societal power structures don’t tend to feature – this is where the potential of CCE is high; both in breaking participants out of standard modes of thinking, as well as highlighting societal power structures.

2. It is important to centre values in any kind of imagination exercise, while being pragmatic about the role values have in corporate incentive structures.

The question of pragmatism is a recurring one in the corporate futurism space – there’s a compromise made when imagining the future through the confines of market capitalism, especially when it comes to impact and values. There’s a current-day reality to the incentive structures present in the private sector, so there is much literature on how to ensure value – for both the companies as well as broader society – when undertaking futures and imagination exercises.

A foundational Future Studies paper on corporate foresight reviewed 20 case studies and 120 interviews to explore value of futurism in these spaces, and what can be done to ensure best pragmatic outcomes regarding value creation. It found that the four success criteria were: “(1) foresighters committed to creating value, (2) participation of internal stakeholders, (3) analysis that follows a systemic logic, and (4) methods and processes that are tailored to companies’ needs” (Rohrbeck, 2012).

This pragmatic approach to systems change and company foresight activities therefore inspired a very pragmatic approach to my methodology.

3. It is important to ensure you ‘meet the participants where they are’ and thus find ways to make uncomfortable ideas more satiable and relatable.

One of my key findings for my PhD research on corporate futurism (Milne, forthcoming) is the need for practitioners to ‘meet the participants where they are’ if they want to effectively engage with values-driven imagination activities. I therefore wanted to seek out creative practices which would be able to break

participants out of their current modes of thinking, but in ways which felt familiar. On the flip-side, what really makes these exercises sing is not only to make people feel at ease, but to ‘make the familiar strange’ – i.e. get the participants to look at their well-known world through the eyes of someone new to it, in order to spot the faults in the system.

One particularly fruitful discussion about this topic of the much-loved sociological maxim ‘making the familiar strange’ and the methods that successfully act in this space, came from chatting to fellow CIRCE Fellow Ieva Miltina at the first Berlin conference of the fellowship. Her work on food-based facilitation methods shows that there are three ways food-related techniques can yield social change:

1. Food as a tangible tool, and it’s sensory qualities that are used within activity
2. The power of food to bring people together
3. Knowledge around food and interconnections of it with most other parts of our lives that is being used to highlight a particular topic
(Miltina et al, 2023)

This inspired the design of the smoothie-making exercise, something that I had not tried before and was curious to see how food could open up the participants both in terms of joy as well as seeing their world with fresh eyes.

Part 2: Workshop findings

After conducting my literature review, I decided on the questions I wanted to specifically focus on for my workshop, to ensure I was designing something that would ultimately tie back to the focus of the CIRCE project.

My questions for the workshop were thus:

1. What creative methods can be used in the New Space industry to encourage, broaden and challenge current modes of imagination?
2. What considerations need to be made when engaging with sectors such as New Space on reimagining their innovation development processes?
3. What role can the CCE have in shaping the New Space sector?

My findings were as follows:

- 1. What creative methods can be used in the New Space industry to encourage, broaden and challenge current modes of imagination?**

In short, I found that it is the creative methods which are centred in providing comfort and fun around possibly uncomfortable ideas, as well as those which give the participants permission to go outside their usual day jobs with joy and wonder.

The smoothie-making exercise initially caught the participants off-guard – they were not expecting this to be the opener for a relatively formal workshop on the topic of space sector skills, hosted by SpaceScotland at the University of Edinburgh. I felt though that this exercise gave them permission to have fun with it, and their feedback was that it certainly forced them out of their comfort zones and broke the ice, making space for more ‘out there’ ideas and discussion – in short, no one could be wrong about what ingredient they put in a smoothie, after all.

The game-design exercise was particularly effective at getting participants to see the world they know very well in a new light – by having them consider their ecosystem building like a journey, with pitfalls and boosts in a games context, they were able to more explicitly name challenges and opportunities without stopping themselves from suggesting them due to known constraints.

2. What considerations need to be made when engaging with sectors such as New Space on reimagining their innovation development processes?

It was clear that we needed more time in the workshop, and I think this was mainly due to the time we indulged in getting the participants comfortable and primed on the topics. However, it was also clear that asking participants for a full day commitment would be challenging, so it’s clear that imagination methods need to be more focused – perhaps just one creative exercise which acts as both a comforter as well as a challenger. The food exercise and the game exercise, I believe, could do both of these things if they had been conceived in this manner ahead of time.

The workshop also showed me the sheer desire within the industry to do things differently, and the excitement and ‘doer’ attitudes which were unearthed particularly by the end of the workshop – it was clear that the entrepreneurial spirit which is very tied to the New Space sector wasn’t difficult to bring out, even despite the arguably ‘out there’ ideas which were being shared by the end. This showed me that it is more than possible to make change from within, if those in the sector – with the knowledge, the contacts, the energy and the willpower – are given the permission and the opportunity to explore new ideas in the ‘comfort’ of a formal gathering.

3. What role can the CCE have in shaping the New Space sector?

In short, the role that the CCE can have is that of the confident friend: the stakeholder which ‘believes’ in those in the industry, and – with a little push and a little, sometimes tough, encouragement – can help bring out the potential from within. This means focusing specifically on imagination practices and how to break out comfortably. This also means introducing sometimes seemingly ‘radical’ ideas in creative ways that give those in the room ‘permission’ to explore them without

stopping themselves getting started. This means entering the space with more optimism around value change as opposed to fierce critique – it means going in with the intention and belief that change can be made. This also means, perhaps paradoxically given how powerful many private sector actors are in society, giving agency to those in the sector – in other words, helping them believe that they really can change things and that they don't have to stick to norms (in the New Space sector's case – they don't need to conform to 'Lab to Market' principles etc).

Part 3: What are best practice examples for the future promotion of the CCE?

This project looked at the potential of CCE engagement in the New Space sector through the lens of considering how the CCE could be better utilised, promoted and uplifted in Europe. For this specific case study, some best practices which could be considered are:

1. CCE partnerships with credible organisations in the science and technology innovation field

I learnt from my collaboration with SpaceScotland that it was key to ensure trust and also to give those in the industry 'permission' to engage in a new process, as they knew it was being endorsed by a body with power and influence in the sector. There are many such organisations in science and technology, and those in the CCE looking to expand their promotion and work would do well to seek out those key partners and find ones willing to both engage with new ideas as well as support their communities / members in also taking part.

2. Be aware of what is keeping audiences up at night

Introducing new CCE practices in spaces where they are not currently undertaken means having to do a lot of translating and selling of what might be seen as – at best – unconventional, and – at worst – threatening concepts. It's key that those in the CCE looking to engage with other audiences make the effort to dive into their world beyond 'what's wrong with it as a whole' and also consider the individual incentive structures and difficulties that prevent the ability to imagine differently. This can sometimes feel like getting too close to that which you are critiquing, but my research and experience has shown that not only is a lack of deep understanding of the emotional truth a bad way to make friends, it also is missing key levers which ultimately inform how an industry does and doesn't work. Start from where they are, not from where you think they should be politically.

3. Consider the practical suitability of CCE methods and adapt

I started this project with grand plans about how I was going to run these workshops, how much time I was going to ask of people, and how many people I'd be

able to get in the same room at the same time. What I learnt over the course of pulling together the work was that if I wanted to test these methods – especially given I really was testing the methods, not USING the methods alone – I had to accept that what I was initially asking of people was simply too much. I think artistic people are keen to go ‘all out’ in their initiatives – and they absolutely should be encouraged and supported to do so – but I think sometimes ego can get in the way of movement. For me, I had to continuously remind myself of the role I was playing, what I was materially asking of people, and what the usual day-to-day life of the New Space sector looks like, and take smaller steps with a bit more grace. I feel that a sense of pragmatism is not only required in terms of adapting the design of workshops in spaces where people have had little artistic experience, but also in terms of what is expected to come out of each interaction. Bit by bit is still something.

Relationship with CIRCE and its aims

How can policy support the CCE and strengthen its impact in Europe?

Many innovation projects, particularly those which are funded by bodies such as the European Commission, must have some kind of ethics process embedded right from the start – whether that’s the inclusion of an ethics board, the hiring of an ethicist onto the team, or engaging in an ethics-by-design workshop as part of the bid.

I could see something similar with respect to artistic engagement in imagination formation and provocation. Perhaps funders or policy-makers could encourage, or even require, grant applicants to engage in CCE processes. Or perhaps there could be funder-provided training and workshops, where artists are hired by central bodies to engage with innovators without putting the companies in the position of having to cut costs to afford said sessions.

There could also be these kind of requirements or guidelines at various other touchpoints beyond at the funding stage – perhaps as part of scientific conferences, or perhaps by creating collaborations with artist residencies, or engaging universities at the research stage. There are many ‘entry points’ to the New Space sector where the CCE could play a role, and policy-makers could set the tone and start to shift the zeitgeist by making it a part of their own programmes first.

There is one trap that is often fallen into, which policy-makers should be clear-eyed around and ensure they do not encourage a lesser form of engagement: the CCE is often brought on during science and technology projects as part of the ‘impact’ or ‘knowledge exchange’ part of the work. Whilst there is great work being done in ‘using the CCE to communicate science’, this project focuses much more on the engagement being a part of the strategic design of projects – and this message alone is a key important point which policy-makers could even simply help communicate to the science and technology field: the idea that CCE is not just there for marketing and entertainment, but also for strategy, for ideation and for holding the industry to account.

How can creative innovation flourish in the best possible way in Europe?

What I hope I have made clear throughout this project is that CCE input into the New Space sector makes the industry better. Creative innovation is that which actively engages with imagination limitations and barriers and isn’t content to do work the same way as it always has been done, or succumb to imagined constraints. CCE engagement with New Space isn’t just about reducing the harm of the industry, it’s also about coming up with new solutions which perhaps couldn’t have been conceived before. CCE engagement with science and technology innovation development is the very definition of creative innovation – they should not be seen

as different or separate processes. That's not the reality of how much development in science and technology is done today, however, so beginning with a project of bringing CCE into the strategy and ideation elements of science and technology innovation projects is a step towards both a sense of flourishing as well as a sense of reconciliation around what's considered 'creative' in the first place.

What role can the CCE play in the crises of today and tomorrow in Europe?

The New Space sector – and the science and technology sector more broadly – needs the CCE more than ever. Sometimes people in the sector know this and don't know where to look, sometimes it's not a consideration at all – one role of the CCE is reaching out and helping make the connections that ARE being sought. The CCE can therefore play a more active role – should it choose to – in creating partnerships, standing by its potential in imagination provocation, and in helping build the science and technology of tomorrow.

The crises of today are so often linked to the science and technology industry in terms of where people look for answers; what people outside those industries sometimes fail to understand is that there are many people within science and technology looking outside their worlds for solutions too – they are sometimes just not easy to find. Yes, these industries could do more to reach beyond their borders too, but I'm here to assure those in CCE who have any doubt that it's not from a lack of wanting to engage that those in science and technology operate separately from CCE, it's often from a lack of confidence and knowledge. CCE could be that confident friend for those industries feeling the pressure to solve the worlds' biggest problems.

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