Createch
In the UK

Sustainability Policy Linkages & Company Activity

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Executive summary

Previous research by University for the Creative Arts (UCA) has highlighted the current and future importance of the Creative Industries (CI) to the economy of the UK as a whole and regionally (see 2020 and 2021 reports on www.cfsd.org.uk/research). One new and fast changing sub-sector emerging is Createch. Several definitions exist, but broadly the term refers to businesses offering products, services, and technologies in the spaces where 'creativity meets technology'. Until now, relatively little was known about Createch companies in relation to the challenges and opportunities related to sustainability.

This study presents a new and tighter definition of Createch compared to previous work, where the emphasis is on growth potential and the value in technology intellectual property and assets. Tightening the definition has the benefit of making it clearer to investors and policy makers where and what support is required, and which benefits will flow in return.

Using this definition, the research aims to:

1. Better understand what Createch companies are doing to support net zero, circular economy and related sustainability targets post COP26
2. Identify the challenges and opportunities that net zero, circular economy and related targets present for Createch companies; and
3. Develop a practical tool for Createch (and potentially other parts of the Creative Industries) to use in assessing the opportunities that net zero, circular economy and related sustainability targets offer.

The research took place in two phases during the first six months of 2022. The first phase focuses on clarifying the latest UK government policies and commitments for net zero and the Circular Economy post COP26 and completing a survey to gather sustainability data from UK Createch companies. The second phase involved structured interviews with business leaders, experts and practitioners backed up with additional research to better understand the role of Createch leaders in aligning with net zero and circularity. The second phase also examined the role of regional bodies such as Local Enterprise Partnerships (LEPs).

This study also introduces the ZBIA Sustainability Maturity Profile (Zero, Basic, Intermediate, Advanced), a quantitative approach to scoring maturity level. ZBIA is a method that qualitatively and quantitively aims to assess awareness and understanding of sustainability within organisations.

Key findings

- Of 1900 businesses broadly identified as Createch in the UK, there are circa 550 companies that match the tighter definition. These are classified as Core Createch and form the basis of the findings

- The remainder are mostly companies in the wider technology business ecosystem (Createch Adjacent and others)
- Createch business and organisations ("Createchs") are found in all UK regions, typically in clusters. London accounts for 54% of the businesses identified, with the South East and South West as the next largest concentrations
- Createchs define sustainability primarily in terms of climate change and environmental impact
- Over 70% of the companies surveyed are at Zero or Basic levels of sustainability maturity (see Table below)

	Maturity Level			
	Z	B	I	A
No of Responses	26	25	11	7
Proportion (%)	38%	36%	16%	10%

- Fashion aligned Createch companies score higher than others, reflecting the focus on sustainability surrounding fashion more generally
- TV and Film companies also score higher than others, possibly reflecting that major commissioning companies (such as the BBC) have made ALBERT certification[1] mandatory.
- In contrast, Createchs that identify as software development companies score lower than other Createchs. This is concerning due to the growing role of technologies such as AI, blockchain and metaverses that involve significant computation and hence energy consumption
- Founders and CEOs acknowledge that they have concerns over the future impact of technologies that underpin their business models. For example, 72% of survey respondents identified blockchain as having a major negative sustainability impact, or being a key concern for the future
- In the survey 77% of Createchs say that sustainability is core to their strategy and mission. However, only 5% have a sustainability policy on their web site
- When asked about documented plans, measurement and reporting, the survey reveals significant gaps (see Table overleaf, showing percentages and number of responses underneath)

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[1]Albert Sustainable Production Certification (ALBERT) is awarded to TV and film productions if they meet a set of criteria based on leadership engagement with sustainability, taking steps to reduce the carbon footprint and minimise use of materials and waste generation.

| Assertion	Disagree	Partially Disagree	Partially Agree	Agree	N/A
Sustainability is core to our strategy and mission	7%	15%	30%	47%	0%
	5	11	21	33	0
Technology is essential to delivering our sustainability plans	13%	10%	30%	42%	4%
	9	7	21	30	3
There is clear responsibility for sustainability	20%	14%	17%	48%	0%
	14	10	12	34	0
We have set measurable goals for sustainability	24%	21%	30%	20%	4%
	17	15	21	14	3
We have documented environmental and societal plans	40%	10%	27%	19%	4%
	28	7	19	13	3
We report on progress towards our sustainability goals	39%	13%	21%	16%	11%
	27	9	15	11	8

- 77% of survey respondents replied that UK government environmental targets are relevant to them, but this has not translated into measurement and documented action plans to achieve those targets
- Also, despite 77% of those surveyed stating that environmental targets are relevant to them, Createch leaders do not see the specific linkages between their businesses and UK strategies, policies, and laws such as the 2008 Climate Act (and revisions), the 2021 Environment Act. More work is needed by policy makers to communicate the implications to Createch founders, CEOs and leaders
- Collaboration on R&D, innovation and technology transfer is important for Createch. UK Universities, InnovateUK, the Digital Catapult and the Creative Clusters Programme are the most cited sources of funding and collaboration. However, over half the respondents reported that they were not involved in any formal collaborations
- 25% of those surveyed said they are looking for external validation and certification through schemes such as B Corporation. This validation is seen as important for communicating sustainability credentials as a response to pressure from employees and customers. Despite the desire for formal recognition of their sustainability credentials, 85% of the survey respondents said that they did not use any of the commonly recognised sustainability standards such as the ISO14000 family (Environmental Management Systems)
- Sustainability is seen as more of an opportunity than a problem, with Createch leaders mentioning changing demographics (such as GenZ) as an important factor
- The main barriers to improving sustainability maturity are stated as the availability of the right skill mix and investor attitudes to sustainability (prioritising short term returns over sustainability)
- Interviewees stressed the importance of their local business ecosystems to their success (not just technology services companies, but lawyers, accountants, banks, start-up incubators, specialist studios, demonstration facilities, labs and Universities). One reason for this local focus is the complexity of the novel partnerships and networks required by Createch companies compared to more traditional businesses

- When it comes to business support for Createch, however, the regional and local picture seems to be more fragmented, and national-regional policy linkages are weak. Part of the challenge is that Createch is not directly mentioned in the Strategic Economic Plans and Local Industrial Strategies developed by Local Enterprise Partnerships (LEPs) in England even when the Creative Industries are prioritised.

Recommendations

The report presents 15 recommendations covering definitions, sustainability maturity and national policy linkages, sustainability certifications, measurement, and reporting, working with technology at the cutting edge, and regional and local policy:

1. Adopt Core Createch (as opposed to existing definitions of Createch that are less specific) as a working definition for policy discussions regarding Createch and economic growth
2. Invest in further research to understand the extent and nature of the Createch adjacent business ecosystem
3. Engage with The Department for Digital, Culture, Media and Sport (DCMS) and the Creative Industries Policy & Evidence Centre (PEC) to communicate the value of the Core Createch operating model as input to future strategic skills reviews for the Creative Industries (see Figure below)
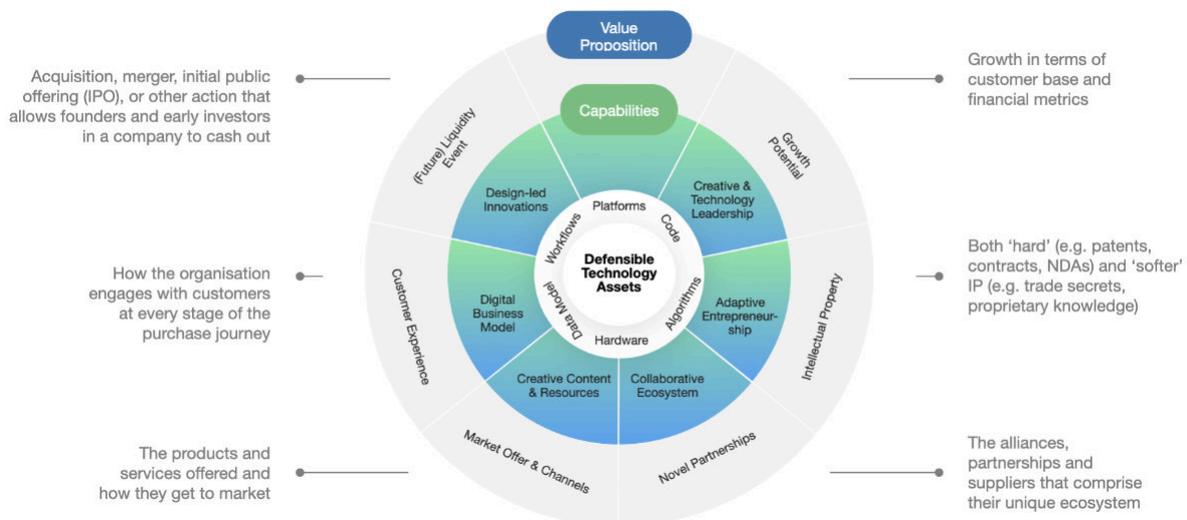
4. Develop a tool to help Createch companies assess their maturity and decide on actions to improve their maturity score
5. Develop an actionable business checklist for Createchs and a clear, communication campaign regarding the breadth of UK sustainability strategies, policies and laws that are relevant to Createch
6. Invest in research to better quantify the impact of Createch on Greenhouse Gas (GHG) emissions and UK net zero targets
7. Establish a forum for Createch companies to discuss sustainability issues and their relevance to Createch companies. For the more advanced businesses this forum could discuss their certification, measurement, and reporting challenges and needs.

8. Invest in research to better quantify the impact of Createch on GHG emissions and the UK net zero targets, and visa versa

9. Communicate the need for an early-stage business or 'Lite' certification programme to all relevant parties, and covering sustainability essentials such as policies, plans, roles and responsibilities and measurement

10. Develop a competency framework for a skillset tailored to Createch needs[2]. This can be used by Higher Education Institutions to ensure that they are supplying the right people for the marketplace.

11. Create a forum to allow Createch founders to voice their opinions to government on the sustainability impact of their product roadmaps and technology choices.

12. Create or adapt a Technology Risk Level (TRL) scale for Createch companies that incorporates sustainability concepts.

13. Increase awareness and education for LEPs regarding the growth potential of Createch

14. Review all Local Industrial Plans from LEPs to ensure that Createch is included where appropriate; and

15. Further research on regional and local support in Northern Ireland, Scotland, and Wales.

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[2]Drawing on the 'creative technologist' skillset found in large media and technology businesses that is currently more focused on integrating the work of multiple departments or large teams encompassing creative design, emerging technology, customer experience, and business models.

Contents

Acknowledgements and disclaimer

1. Introduction

Createch[3] is potentially a powerful new growth engine for the Creative Industries and hence the UK economy. The [Creative Industries Foresight 2030 update](#) published in April 2021[4] discussed how £1bn of Venture Capital investment flowed into UK Createch in 2020 alone, and how Createch is likely to continue with double-digit growth to deliver a Gross Value-Add (GVA) of over £225bn by 2030.

The UK has made ambitious international commitments in respect of climate change and the United Nations Sustainable Development Goals (and recent agreements at COP26) and so it is important to understand the relationship between Createch and the policies, strategies and laws that support those commitments in areas such as net zero and the circular economy.

Often, there is an underlying assumption that Createch companies, as with many in the service industries, are not a substantial contributor to climate change or the broader issues connected to sustainability. However, Createch businesses can be massive consumers of computing power, have extensive facilities and employees that travel nationally and internationally. Like other segments of the Creative Industries, they can communicate and encourage (or discourage) sustainable attitudes and lifestyles through their services and products. Also, some of the Createch streaming platform companies have grown from local start-ups to global Unicorn in the matter of a few years, bringing significant consumer device activity with them.

However, the term Createch is new and multiple definitions exist. Hence, to research the links between sustainability and Createch requires clarity over what is, and isn't, Createch.

Createch overview

In 2019 the Creative Industries Council were the first to offer a formal definition of Createch / CreaTech / createch[5] as businesses harnessing the interaction of creativity and technology or "where creativity meets technology. It brings together creative skills and emerging technologies to create new ways of engaging audiences and to inspire business growth and investment."

In this context, the most commonly used technologies include:

- Artificial Intelligence (AI) and various forms of advanced analytics
- 3D scanning and capture of people and things
- Computer modelling of 3D objects to create avatars or digital goods

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[3]The Creative Industries Council define Createch as "the intersection of creative and tech industries."
[4]A foresight report on Creative Industries in 2030 by The Centre for Sustainable Design®, Business School for the Creative Industries, University for the Creative Arts (UCA), with a particular focus on Sustainability & Industry 4.0. The report fully updates the report published in 2021.
[5]Spelling variations persist to this day, but Createch is the preferred spelling for this report.

- Virtual Reality (VR), Augmented Reality (AR), Extended Reality (XR)
- Blockchains; and
- Metaverses.

Other definitions have followed the original, such as this one from Tech Nation in 2021[6]:

> "Creative technology (CreaTech) is used to describe new tech that seeks to improve and automate the delivery and use of creative services. CreaTech is utilised to support both companies and consumers better manage their operations and processes by applying specialised software and algorithms that are used on computers, smartphones, consoles and other Internet of Things devices."

As awareness of Createch has improved, key supporters (such as Janet Hull OBE[7]) have refined the definition by introducing a layer of segmentation based on an end-user viewpoint (Immersive Entertainment, Transformative Experiences, Seamless Service, Personalised Tools) or an industry segmentation model[8] (Pureplay CreaTech, Applied CreaTech etc).

As with all sectors where emerging technology is important, research and development (R&D) is essential, and the Policy & Evidence Centre (PEC) have introduced a further definition from that point of view[9]: "createch R&D as the production of knowledge to deliver technological innovation in artistic, creative and cultural domains."

For government reporting of economic estimates, DCMS and The Office for National Statistics (ONS) do not have a formal definition of Createch. Instead, they include Createch in a broader set of businesses defined by their Standard Industrial Classification (SIC) codes. However, since there are no Createch-specific codes, the codes used include many adjacent businesses in software publishing and software development.

Overall, current definitions tend to look at Createch through outcomes (experiences, products, and services), or a technology classification lens rather than, say, taking an investor or founder perspective.

Attaching the suffix "tech" (for example, Fintech or Edtech) usually signifies the existence of venture capital (VC) backed start-ups that challenge or disrupt market incumbents. The 2021 Tech Nation report mentioned above also revealed that the UK is in the top three destinations for VC investment in Createch. The level of investment rose 22% in 2020 compared to 2019, but geography is a major influence. For example, the median VC investment made into Createch companies in the South West from 2015 to 2020 was the highest in the UK, and initiatives such as MyWorld1[10] in the West of England are bringing R&D at scale to Createchs in that region. Anchor institutions in the media, such as the BBC in

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[6]Tech Nation report commission by the Creative Industries Council - THE CREATECH REPORT 2021: Mapping the intersection of technology and creativity. Part 1 Investment.
[7]Chair, CIC CreaTech & Director of Marketing Strategy, IPA
[8]CreaTech Ones to Watch 2021 https://www.thecreativeindustries.co.uk/ones-to-watch/2021
[9]An analysis of Createch R&D business activity in the UK, Juan Mateos-Garcia, September 2021 https://pec.ac.uk/research-reports/createch-activity-in-the-uk
[10]Described as "the engine that will drive the creative technology industry in the West of England" and backed by major media companies and UK Research and Innovation

Bristol and Channel 4 in Leeds, are also important regionally in terms of commissioning programming and purchasing Createch products and services, as well as sources of capital-intensive facilities (such as studios), talent and expertise.

More generally, however, little is known about the role of Createch in levelling up the UK economy, although this is starting to change (for example with the recent publication of the Place Matters report from the Creative Industries Council).

However, many of the well-publicised Createch examples in the UK are not start-ups. Instead, they are arts and cultural organisations where public funding sources such as Creative England, InnovateUK and the Digital Catapult have been essential for the establishment of specialised facilities or a once-off performance exploiting technology in novel ways. One example is dream.online from the Royal Shakespeare Company which made extensive use of the EPIC Unreal Engine[11] to create virtual sets and which was funded by Innovate UK through the Industrial Strategy Challenge Fund.

Clearly there is scope for additional refinement of definitions.

Createch and sustainability

There are many sustainability initiatives that organisations in the Creative Industries can engage with (see Figure 1, overleaf). Generally, these are organised based on established sub-Sectors within the Creative Industries (such as advertising and fashion). However, none are directly aimed at Createch. In practice this means there are few forums where Createch founders and leaders can meet to understand government targets and legislation, acquire sustainability skills and knowledge, learn how to quantify their impact, and connect with like-minded others.

A key issue for Createchs is choosing between the proliferation of initiatives in terms of relevance, legitimacy in the eyes of customers and so forth. There is no ratings service for these initiatives, so founders have to rely on word of mouth and an investment of time in research.

 As with the challenges of defining Createch, "sustainability" brings its own problems. For information and communication technology intensive service businesses the link to Scope 2 emissions and net zero is intuitively obvious, but the connection is less clear for the important aspects of sustainability such as the circular economy and biodiversity gain. Also, which sub-sectors in the Creative Industries a Createch business is aligned with may make a difference. For example, a business offering an augmented reality (AR) clothing platform to fashion brands is likely to be pressured to follow the sustainability policies of the brand, and these can be quite comprehensive as sustainability is a hot topic. On the other hand, a Createch company offering a peer-to-peer music streaming platform is unlikely to feel the

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[11]A 3D computer graphics game engine developed by Epic Games, now used extensively in TV and film.

	Creative Industries Sub Sectors															
Initiative	**Advertising**	**Architecture**	**Arts & Culture**	**Crafts**	**Design**	**Events & Attractions**	**Fashion**	**Games**	**Immersive Entertainment**	**Marketing**	**Music**	**Performing Arts**	**Publishing**	**Streaming**	**TV & Films**	**Visual Arts**
2020 Circular Fashion System Commitment https://www2.globalfashionagenda.com/commitment/					*		*									
ALBERT https://wearealbert.org					*					*					*	
AdNetZero https://adassoc.org.uk/ad-net-zero/	*									*						
Better Cotton Initiative https://bettercotton.org					*		*									
BREEAM https://www.breeam.com		*	*			*						*			*	
Carbon Disclosure Project https://www.cdp.net/en	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Carbon Trading and Offsets (Various)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Connect4Climate https://www.connect4climate.org							*				*				*	
Creative Industries Pact for Sustainable Action https://creativeindustriespact.com	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Fashion for Good https://fashionforgood.com							*									
Fashion Industry Charter for Climate Action https://unfccc.int/climate-action/sectoral-engagement/global-climate-action-in-fashion/about-the-fashion-industry-charter-for-climate-action							*									
Global Reporting Initiative https://www.globalreporting.org	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Gold Standard https://www.goldstandard.org	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Higg Index https://apparelcoalition.org/the-higg-index/							*									
Institute of Positive Fashion (BFC) https://www.britishfashioncouncil.co.uk/Institute-of-Positive-Fashion							*									
Julie's Bicycle / Creative Green https://juliesbicycle.com/creativegreen-certification/		*				*						*				
LEED https://www.usgbc.org/leed/v41		*	*									*				
Living Future https://living-future.org		*														
Make Fashion Circular (Ellen MacArthur) https://ellenmacarthurfoundation.org/topics/fashion/overview					*		*									
Music Climate Pact https://www.musicclimatepact.com						*					*					
Net Zero Carbon Events Initiative https://netzerocarbonevents.org						*						*				
Purpose Disruptors https://www.purposedisruptors.org	*									*						
Responsible Materials Assurance Process (RMAP) https://www.responsiblemineralsinitiative.org/responsible-minerals-assurance-process/				*	*											
Science Based Targets Initiative https://www.wri.org/initiatives/science-based-targets	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
SME Climate Commitment https://smeclimatehub.org/sme-climate-commitment/	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Sustainable Apparel Coalition https://apparelcoalition.org					*		*									
Terra Carta https://www.sustainable-markets.org/terra-carta/	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Textile Recycling Association https://www.textile-recycling.org.uk					*		*									
Theatre Green Book https://theatregreenbook.com			*									*				
The Circular Economy Action Agenda for Textiles https://pacecircular.org/action-agenda/textiles					*		*									
UN Alliance for Sustainable Fashion https://unfashionalliance.org					*		*									
UN Global Compact https://www.unglobalcompact.org	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
UN Playing for the Planet Initiative / UKIE Green Games Initiative https://ukie.org.uk/sustainability								*								
WRAP (incl. Textiles 2030) https://wrap.org.uk/taking-action/textiles-initiatives/textiles-2030					*		*									

Figure 1 Sustainability initiatives in the Creative Industries.

same external pressure, but they are emerging. In both these cases, of course, the Createch companies need to know how to respond, and that requires a degree of sustainability maturity.

A cursory glance at the website of Createch companies reveals that a proportion could be described as "purpose driven" (the purpose often stemming from the founder's passions), and the purpose varies from a narrow focus on helping one segment of society to full alignment to the UN Sustainable Development Goals (SDG). There are clearly differences in purpose and hence focus of sustainability activities for Createchs, rather than a common vision.

Some Createch companies manufacture products (for example, robotic equipment for immersive events). For the core environmental aspects of sustainability, these organisations can easily draw upon the definitions and standards that are in common use in other manufacturing sectors. An example is the ISO 14000 series of standards that promote effective environmental management systems in organisations. There is also some evidence that a small number of non-manufacturing Createch organisations have also adopted these standards.

The sustainability focus is on climate change and hence energy consumption and net zero. Perhaps not surprisingly, there is little discussion of the circular economy in the context of Createchs. The majority of Createchs are service businesses and so consume few (if any) materials) and hence don't generate much physical waste beyond consumables. There can be, however, waste electronic and electrical equipment generated at the 'end of (1st) life' in relation to technology used to create and deliver services (for example, servers) and content (such as speakers, projectors, lighting, and automation of sets).

Where Createchs produce a physical product (such as a headset, a robot or musical instrument) then they have the same challenges as any other manufacturer in terms of resource efficiency, packaging, and end of life activities. However, when it comes to the circular economy, standards such as BS8001 (circular economy) have had little traction with Createchs despite offering general frameworks to help organisations adopt circular economy principles. This could reflect the adoption rate for the standard, but it could be a further signifier the circular economy itself is poorly understood by Createchs.

In broad terms, Createch companies face many of the same sustainability challenges in their value chain as other technology businesses: minimising their energy consumption, and "importing/exporting" environmental and societal impacts from offshoring coding and data centres being the most obvious. Mature, traditional technology companies can afford to develop end-to-end visibility of their value chains and put in place comprehensive reporting. It is less clear how this can work for a Createch start-up, particularly as business models and technology may be in a state of constant flux as the winning formula is sought, and resources are constrained.

It is challenging to identify how sustainable many of the key information and communication technologies (ICT) involved in Createch are. In general, the ICT industry suffers from a lack of common standards and inconsistent measurement and reporting for sustainability. The situation is made more complex by the global nature of the ICT industry which presents data transparency problems and there are claims about use of renewables that cannot easily be verified.

Specific technologies bring their own challenges. For example, artificial intelligence (AI) applications are trained using very large datasets, complex algorithms, and high-performance servers. This is energy intensive, and the data centre involved may well use a mix of fossil fuels, renewables and carbon offsetting that varies day to day, based on weather conditions or decisions made by the energy supplier. Blockchains (for non-fungible tokens, NFTs) use what are known as "confirmation protocols" to confirm transactions and these protocols have different carbon footprints. One called "Proof of Stake" (POS) is considered to have a lower carbon footprint than the "Proof of Work" protocol that is still widely used by blockchains. However, there are no systematic studies of energy consumption in POS networks and any study is likely to be challenging as these networks are permissionless (anyone can access) and decentralised, so no-one knows how big they are, what machines are involved, or what energy mix is involved. In both the AI and blockchain cases an additional complication comes when cloud services are used as one company's computing workloads may be shared with others.

AI and blockchain are just two obvious areas where there is limited or conflicting evidence over the carbon footprint of computation, or how much that footprint is reduced or negated by using renewables, carbon credits or offsetting.

So far, also little is known about the likely sustainability impact of metaverses.

Audience and consumer devices add a further layer of difficulty in establishing carbon footprints. Immersive experiences involving virtual reality (VR), mixed reality (MR), extended reality (XR), and AR rely on physical devices (headsets, consoles, mobiles) that have their own sustainability issues.

Finally, Createch organisations can communicate sustainability messages to their customers and end-users, but there is little evidence that this is being done in an organised manner. Given that some Createch companies can quickly scale to millions of customers, the choices they make can multiply their impact for better or worse. Some have a clear vision and strategy backed-up by policies and plans, but this is not universal.

2. Research aims and objectives

The authors have already explored some aspects of Createch in previous UCA reports in 2020 and 2021[12] on the future of the UK Creative Industries, but as has already been shown Createch is a new area and, as already highlighted, there are several important gaps in terms of robust definitions, linkages of company activity to sustainability and so forth.

This latest research focuses entirely on Createch, and three connected policy areas:

1. **Sustainability**: As a major employer and contributor to GDP, the Creative Industries have an important role in the UK reaching net zero as the country "builds back better" post pandemic. Createch shows how digital may transform the entire Sector, but key technologies such as streaming, blockchains and AI can have unintended, negative impacts. Hence, hence there is a need to better understand these impacts and actions by Createch companies to ensure that UK net zero and related sustainability targets are met

2. **Circular economy**: The UK Government Circular Economy Package policy statement (2020) states that "the transition to a more circular economy requires changes throughout value chains, including product design, new business and market models, novel ways of turning waste into a resource and changes to consumer behaviour". Createch companies that make a product or technology, or re-sell products or technologies in secondary marketplaces (such as for clothing) have an obvious fit, yet there is scarce information on the circular economy opportunities and challenges for Createch where the market offer is an experience (such as immersive entertainment) or a service (such as an avatar design service); and

3. **Levelling up**: Createch companies can be found throughout the UK and tend to co-locate with other businesses in the Creative Industries as there are multiple benefits from access to local creative and technical value chains and local institutional linkages. These clusters[13] receive business support from both central government and regional organisations (for example from LEPs, the Arts and Humanities Research Council Clusters Programme and a variety of creative hubs). This support is an important lever for innovation and development, but the prioritisation given to sustainability is unclear.

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[12] Creative Industries Foresight 2030 (April 2020) and Update: Creative Industries Foresight 2030 (April 2021), both by Martin Charter & Trevor Davis available at https://cfsd.org.uk/research/.
[13] There is some ongoing confusion over what is meant by a "cluster" and PEC in particular have published multiple reports seeking to identify them and clarify their scope.

Hence, this research aims to:

- Better understand what Createch companies are doing to support net zero, circular economy and related sustainability targets post COP26
- Identify the challenges and opportunities that net zero, circular economy and related targets present for Createch companies; and
- Develop a practical tool for Createch (and potentially other parts of the Creative Industries) to use in assessing the opportunities that net zero, circular economy and related sustainability targets offer.

The outputs are intended to inform government policies, Createch company policies, curriculum design for business schools, etc.

Approach
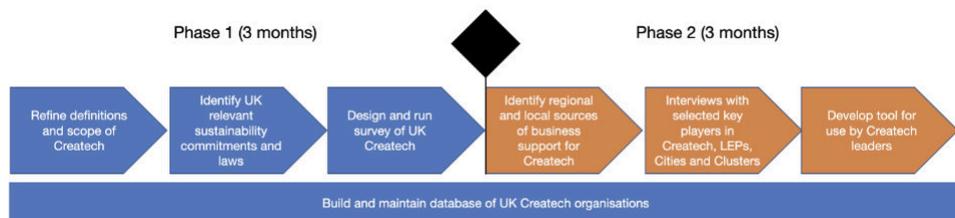
Figure 2 Approach taken to the project (Jan-Jun 2022)

Figure 2 shows the approach taken, with Phase 1 and 2 completed during the first six months of 2022.

The first phase focused on research to refine the working definition to be used in the project, clarifying the latest UK government policies and commitments for net zero and the Circular Economy post COP26, and organising a survey to gather sustainability data from UK Createch companies.

The survey was designed to gather basic information about UK Createch companies and to close gaps in understanding regarding sustainability maturity. The survey questions cover:

- Basic demographics and company information, Createch classifications, alignment to other Creative Industry sub-sectors, alignment with Creative Clusters, regional hubs and similar
- Sustainability mission, strategy, and plans
- Organisational responsibility for sustainability (for example decarbonisation plans, environmental management measures)
- Role of technology in delivering on environmental and social plans
- Challenges with technology in this context (for example skills, knowledge etc)
- Measuring and reporting (for example against the UN SDGs, net zero), and involvement in formal initiatives such as the Global Reporting Initiative (GRI)
- Internal and external forces driving sustainability
- Investor views on sustainability

- Customer views on sustainability
- Industry alliances, initiatives, and certifications
- Financial incentives (such as grants and R&D credits)
- Sustainability in the value chain, including import and export of environmental and social impacts
- Use of carbon credits and offsets
- Awareness of UK government policy, laws, and targets
- Perceived relevance of current policies, strategies, and laws.
- Expectations of UK policymakers (central, regional, and local); and
- Awareness and use of standards

The second phase uses structured interviews with Createch founders and leaders, representatives of regional business support organisations, and additional research to:

- Profile Createch founders and leaders
- Better understand the role of Createch leaders in sustainability maturity and fostering a climate for creativity and innovation aligned with net zero and circularity; and
- Examine the role of regional bodies such as Local Enterprise Partnerships (LEPs) and their local Growth Hubs, and Creative Clusters (for example StoryFutures).

Interview questions for founders cover areas such as:

"When setting up the business / organisation, what role did sustainability play? What has been your role as a leader in promoting sustainability? Who else has been influential in shaping your thinking? Where do you get your sustainability knowledge from?"

For interviews with regional bodies such as LEPs, the questions cover areas such as:

"How does the LEP prioritise investment opportunities for the Creative Industries/ Createch? What role does sustainability have when identifying and prioritising those investments? How much does sustainability feature in decisions to make inward investment targeting Createch organisations in the region?"

The outputs of both phases fed into development of a practical tool grounded in the needs of Createch businesses.

A key enabler of both phases is the creation of a custom dataset of Createch companies at different stages from early investment to scale-up. This dataset is derived from desk research, the Creative Industries Council Ones to Watch publications, and commercial sources such as Crunchbase (https://www.crunchbase.com). Importantly, the dataset identified the businesses to engage with via the survey, and interviews. Figure 3 shows the schema for the database developed for this purpose.
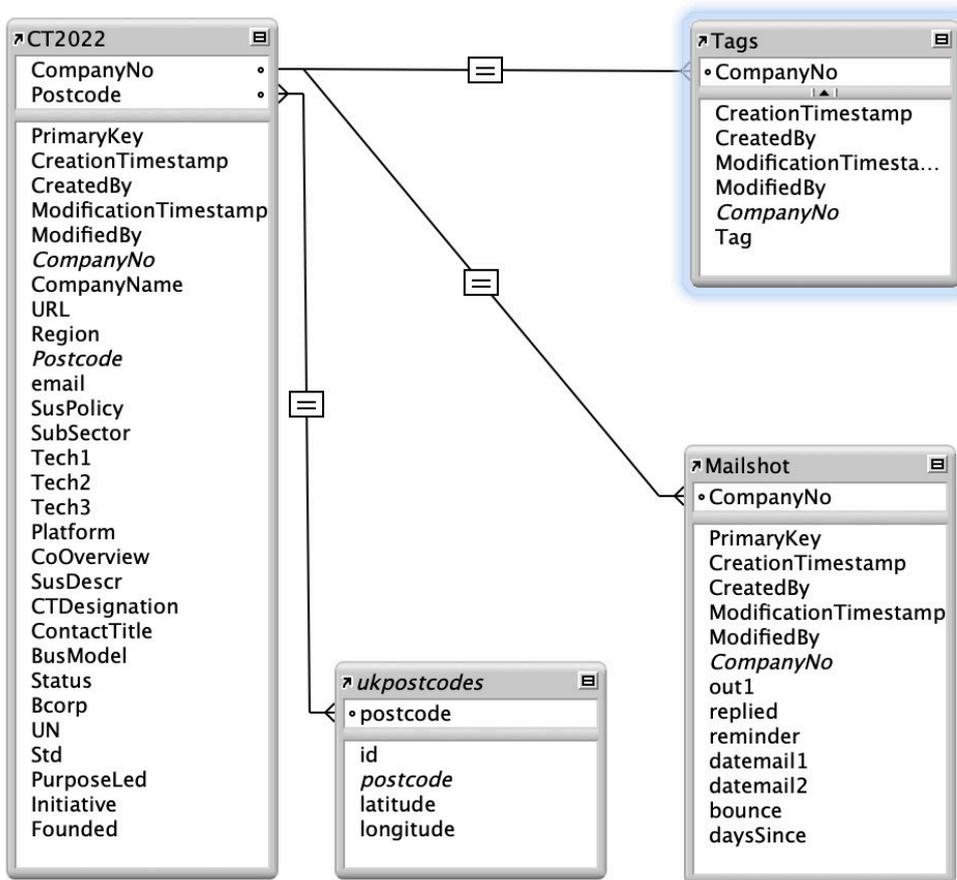
Figure 3 Schema for the database developed to capture information on UK Createch, and to drive the mailing list for the survey in Phase 1. Annex A contains a more detailed description of the tables and fields.

3. Policy and standards context

The UK is a signatory to the non-binding Paris Agreement (COP21), and the 2030 Agenda for Sustainable Development at the United Nations Sustainable Development Summit in 2015 (also known as the UN SDGs). The UN SDGs have permeated sustainability thinking, broadening the debate away from just climate change. Some Createch companies use the SDGs to communicate their mission. For example, Bristol Braille Technology CIC, a digital braille publishing innovator, align with Goal 4 ("ensure inclusive and equitable quality education and promote lifelong learning opportunities for all").

Ahead of The Conference of the Parties (COP) 26, On 12th December 2020, the UK communicated its new Nationally Determined Contribution (NDC) under the Paris Agreement to the United Nations Framework Convention on Climate Change (UNFCCC). The initial NDC committed the UK to reducing economy-wide greenhouse gas emissions by at least 68% by 2030, compared to 1990 levels. In the sixth UK carbon budget (June 2021) the figure of 78% by 2035 compared to 1990 levels was enshrined in law. Net zero greenhouse gas emissions by 2050 remains the long-term goal.

Perhaps more than any other goals, these ambitious figures have direct implications for Createch and other technology-dependent organisations as they drive much policy and law-making concerning decarbonisation.

Debates in Parliament

One indication of the broader context is the number of debates held in Parliament relating to sustainability. Table 1 shows the number of debates held since 2017 (as of March 2022).

Table 1 Number of debates in UK Parliament since 2017. Source: Hansard.

Keywords	Number
Net zero	3794
Biodiversity	2115
Right to repair	483
Single use plastics	469
Circular economy	277
Energy intensive industries	234
Extended producer responsibility (EPR)	132
Decarbonisation	111
Textile waste	10
Industry 4.0	10
Createch	3
Lifecycle analysis	2

Net zero emissions leads, with biodiversity second, and both are now grounded in government strategies, policies, and laws. In the last two years the circular economy has attracted greater attention. In Circular Economy and Elimination of Waste Volume 809 (debated on Monday 18 January 2021), Baroness Boycott asked "Her Majesty's Government what steps they are taking to encourage (1) a circular economy, and (2) the elimination of waste" and "will the Government produce a proper circular economy action plan, as the EU has done, and lay out how it can be put on to the statue book?" To date, this does not appear to have been actioned.

Createch has not been widely debated to date, but this may now change. In Creative Sector Volume 815 (debated on Thursday 4 November 2021), Lord Aberdare asked "What plans are there to scale up the creative cluster approach? Will the Minister look at updating research and development definitions to enable more R&D funding for the creative sector, as countries such as France, Germany, Italy and South Korea have done? We have fintech and edtech; we also need createch."

EIIs and CCAs

To increase the share of electricity generated from renewable and low carbon sources, the government has introduced the concept of UK Energy Intensive Industries (EIIs). These are large product manufacturers that pass a 20% electricity intensity test (their electricity costs for the whole legal entity being at least 20% of their Gross Value Added over a reference period set by the government). There is a recognition that they may be at a competitive disadvantage from increases in retail electricity prices that flow from pursuit of net zero. Hence, they can claim exemption from levies and other obligations. No Createch companies are eligible[14].

Similarly, there are voluntary Climate Change Agreements (CCAs) made between UK industry and the Environment Agency to reduce energy use and carbon dioxide (CO_2) emissions. In return, operators receive a discount on the Climate Change Levy (CCL), a tax added to electricity and fuel bills. The Environment Agency administers the CCA scheme on behalf of the whole of the UK. Practically, this scheme is managed through a series of umbrella agreements between a sector association and the Environment Agency. Currently there are 53 agreements, of which two are relevant to Createch: the Climate change umbrella agreements for a) the data centre sector, and b) the textiles sector.

UK legislation

There is a substantial body of relevant UK wide sustainability legislation, and legislation specific to the devolved governments. However, the Creative Industries aren't highlighted as a sector of concern, and there is no mention of Createch at all.

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[14]In practice, only specific industries defined by their 4-digit NACE Code benefit cement, ceramics, chemicals, food and drink, glass, oil refining, and pulp and paper.

The most relevant UK wide documents are the 2008 Climate Act (and revisions), the 2021 Environment Act, and the associated carbon budgets aligned with the UN Framework. These are all enacted in law and are binding.

The government's Net Zero Strategy (October 2021) restates the commitment to reach net zero emissions by 2050 and sets forth policies and proposals for meeting the UK's fourth and fifth carbon budgets and keeps the UK on track for carbon budget six[15], while setting out a vision for a decarbonised economy in 2050.

Public procurement can be a powerful way to enable change. Government Public Procurement Note (PPN) 06/21 05/06/2021 states that prospective suppliers bidding for government contracts above £5 million a year will need to have committed to the government's target of net zero by 2050 and have published a carbon reduction plan. Firms which fail to do so will be excluded from bidding for contracts. The £5 million starting position means that Createch companies are unlikely to affected.

For the circular economy, there are UK wide and devolved government policy papers and strategies (the most recent being the July 2020 Circular Economy Package policy statement[16] and the March 2021 'A strategy to make the circular economy in Wales a reality'[17]) and strategies, dating back several years. Progress to the statute book appears to be focused on upgrading current environmental and waste laws, and is slow (for example, Scotland issued 'Making Things Last: a circular economy strategy for Scotland' in February 2016).

Impact of EU Exit

Together with European Commission (EC) Directives such as the Ecodesign Directive focused on energy-related products (and Sustainable Products Initiative (SPI) expansion of scope), and enhanced Extended Producer Responsibility (EPR) schemes, The EU Green Deal and Circular Economy Action Plan 2020 are possibly the most far-sighted sustainability plan in the world. Advisory bodies such as the EC Circular Economy Finance Support Platform bring together the private and public expertise to identify how to fund transition to a circular economy[18]. However, the focus is on so-called High Impact Sectors (analogous to the UK EIIs) and, except for fashion-related design activities, does not include the Creative Industries and Createch.

Many recent UK laws are derived from EU Directives have been revoked under BREXIT, although there is some evidence that DEFRA (and devolved equivalents) are trying to keep environment legislation aligned where this is consistent with UK government policies (for example Schedules 4-10 in the Environment Act). However, these departments do not have any activities associated with the Creative Industries directly.

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[15]The carbon budget for the 2033-2037 budgetary period is 965,000,000 tonnes of carbon dioxide equivalent.
[16]A statement issued jointly by the Department for Environment, Food and Rural Affairs (Defra), the Department of Agriculture, Environment and Rural Affairs (DAERA), the Welsh Government and the Scottish Government. This statement commits the UK "to moving towards a more circular economy which will see us keeping resources in use as long as possible, extracting maximum value from them, minimizing waste and promoting resource efficiency."
[17]Building on the 'Well-being of Future Generations (Wales) Act 2015' which enacts the broadest scope of sustainability in UK legislation, closely aligned to concepts of sustainable development and the UN SDGs.
[18]For a more global picture of circular economy initiatives, please refer to The G20: Accelerating the Transition to a Global Circular Economy by Martin Charter and Ichin Cheng (https://cfsd.org.uk/wp-content/uploads/2021/10/Martin-Charter-Ichin-Cheng.pdf)

Legacy of COP26

The UK hosted COP 26 in Glasgow, from 31 October to 13 November 2021. The president of the conference was UK cabinet minister Alok Sharma.

Broadly, COP26 updated 2030 NDCs for all countries (UK having already done this1[9]) and brought forth new commitments in terms of phasing out coal, deforestation, methane, shifting to zero emission vehicles, sustainable agriculture etc.

Consumption behaviour at all levels in society was brought into greater focus at COP26. As well as tackling behaviour change, proposed actions to address consumption emissions (including emissions embedded in imports) included encouraging action on supply chains and voluntary offsetting, revisions to product standards, new carbon border adjustment mechanisms, and new trade levers. The role of the Creative Industries in communicating change, and nudging behaviour, was raised at several points in COP26 sessions.

Offsetting is commonly used by service businesses. A new Net Zero Standard published by the Science Based Targets initiative (SBTi[20]) substantially reduces the allowed offsetting and increases the focus on scope 3 emissions in long-term targets. This may have implications for Createch companies as much of their GHG emissions and cost reduction opportunities can lie outside of their own operations (for example, outsourced IT and remote workers, or amongst customers and users of their products and technologies).

New business alliances committing to net zero, aiming to set net zero investment standards or create low-carbon markets were announced or formalised at COP26. Several of the highest profile businesses at COP26 were business-to-business (B2B) customers or clients of Createch companies (such as Unilever, one of the largest buyers of advertising). By the end of COP26 the Race to Zero campaign had over 5,000 businesses committed to reaching Net Zero GHG emissions by, or before 2050, supported by early action and regular reporting. Around half of these were UK businesses, and some are in the Creative Industries.

The final day was dedicated to culture (and hence the Creative Industries). More than any previous COPs, COP26 attracted significant interest (and presence) from the UK Creative Industries. For example, as part of their 'Creative Conversations for COP26' initiative, Robert Gordon University in Aberdeen held a five-day symposium entitled 'Sustainability in the Creative and Cultural Industries Symposium.' This event did cover some aspects of Createch and sustainability (such as virtual fitting of garments).

Another example is Purpose Disruptors, the network of advertising professionals backing change in the sector to tackle climate change, who were invited to share their 'Advertised

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[19]However, the Climate Change Committee (https://www.theccc.org.uk/publication/cop26-key-outcomes-and-next-steps-for-the-uk/) stated that "the UK should focus its efforts on strengthening delivery rather than increasing its headline target, and seek ways to supplement current plans, including by taking more action to tackle its consumption emissions."
[20]BTi defines and promotes best practice in science-based target setting "aligned with the Paris Agreement, and promoting a global net-zero energy system."

Emission' report in the Blue Zone. The Zone is important as this is UN-managed space which hosts the negotiations.

More generally, an encouraging sign is recruitment of more specialist, technical sustainability resources in the UK Creative Industries. A recent example is the BBC recruiting a Net Zero Energy Manager and a Scope 3 Sustainability Manager reporting to a new Director of Sustainability.

A major lesson from COP26 is that rolling out net zero strategies must lead to emissions falling in all sectors beyond recent progress dominated by so-called energy intensive or high impact sectors.

Standards

The Creative Industries are not well served by standards. Across all sectors, the key, national and international sustainability standards are:

- BS8001 Circular Economy (ISO/TC 323 is developing international standards for Circular Economy)
- ISO14000 Environmental Management
- ISO14040 Life Cycle Assessment
- ISO 20400 Sustainable Procurement
- ISO26000 Social Responsibility

These apply to Createch companies, as well as other sectors that manufacture products or technologies, but none of these are written with the Creative Industries service providers in mind. However, there are some service providers (for example advertising agencies) that have successfully adopted ISO14000.

Perhaps more directly applicable to the Creative Industries are standards such as those from B Lab, who also certify companies as B Corporations. There are a few B Corporations in the Creative Industries, and in major brands that buy creative services and content. This may be due to the fact that preparation for assessment is a significant commitment of time and effort.

Also seen within the Creative Industries are reporting standards such as Global Reporting Initiative (GRI), and The Task Force on Climate-related Financial Disclosures (TCFD)[22]. These can clearly be applied to Createch. A potential barrier to adoption of these standards for smaller businesses is choosing between them (they are proliferating) and the administration needed to capture the data and report on it.

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[21]See https://www.bcorporation.net/en-us/standards/development-and-governance/
[22]This standard guides companies on disclosing climate-related financial risks to investors, lenders, insurers, and other stakeholders.

DEFINITION
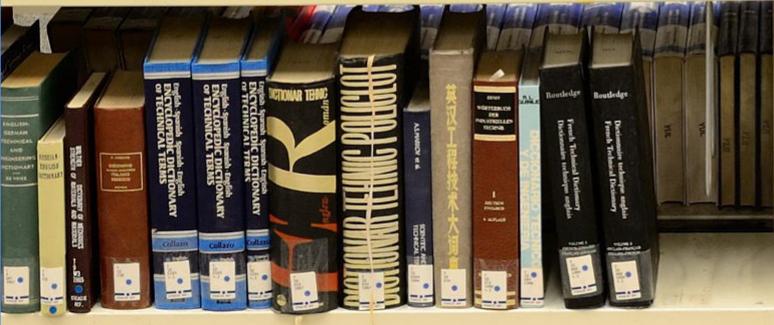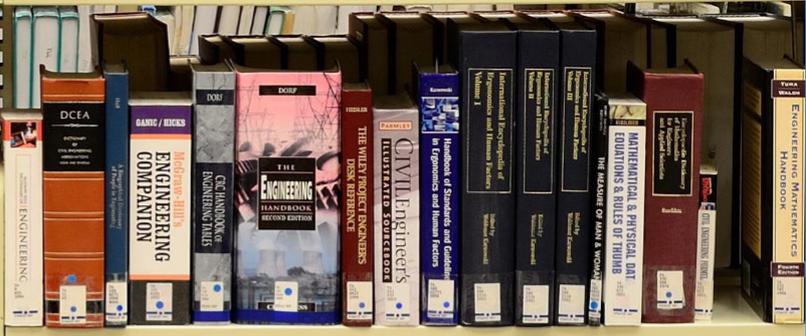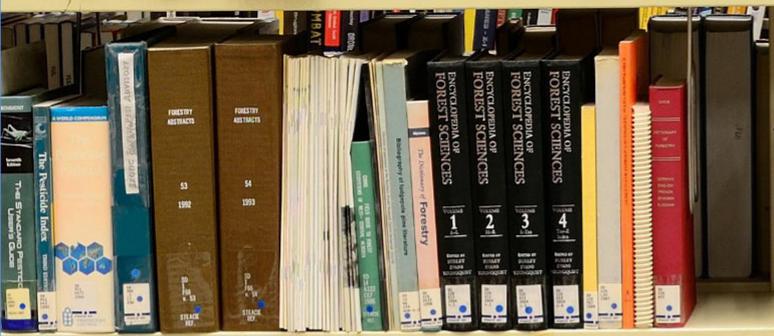
4. Refining the definition of Createch

As already noted, the understanding of what is and isn't Createch is evolving. To ensure that this research is built on sound foundations, the authors propose a narrower definition of Createch, based on learnings from Fintech and an initial analysis of 25 UK organisations labelled as Createch[23].

Learning from Fintech

As with Createch, the abbreviations FinTech and Fintech are used interchangeably at present. In this section, Fintech is preferred except where referring to a publication that uses the alternative.

One definition is "companies that use technology to provide financial services to customers either directly or through partnerships with traditional financial institutions."[24] Other definitions are:

- From the ISO TC68 FinTech Technical Advisory Group (TAG) that describes Fintech as follows: "FinTech covers digital innovations and technology-enabled business model innovations in the financial sector. FinTech aims to increase customer benefits in terms of usability, efficiency, transparency, and automation."
- From the World Economic Forum (WEF): "Fintech, the abbreviation for financial technology, is a broad category that refers to the innovative use of technology in the design and delivery of financial services and products."
- The term "FinTech" denotes companies or representatives of companies that combine financial services with modern, innovative technologies (Dorfleitner et al., 2017)
- The Financial Stability Board defines FinTech as a "technology-enabled innovation in financial services that could result in new business models, applications, processes or products with an associated material effect on the provision of financial services" (Financial Stability Board, 2017

Interestingly, Fintech is not seen as homogenous: there are recognised niches, such as Insurtech, Digital Currencies, Digital Banks, and Regtech[25], and those niches change constantly. However, the definitions do share common characteristics:

- They are part of the financial services sector as competitors or complementary to incumbents. Experienced management teams from within the sector allow them to better navigate financial institutions, regulators etc
- They are entrepreneurial responses to consumer / customer preferences for digital service delivery, and are growth oriented (customer acquisition is a priority)

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[23]This initial analysis used publicly available sources, primarily CIC publications on Ones to Watch, and the web sites of Tech Nation and the Digital Catapult.
[24]Source: Mercer.
[25]Regulatory technology.

- They have some core intellectual property (IP), usually a software solution or platform. They can defend this through legal protections, trade secrecy or strategic partnerships
- They are not capital intensive compared to traditional institutions (but do need equity investment); and
- After an initial period of operating losses and need for an input of capital, there is a "payoff" for founders and investors as profitability improves, or an exit event occurs (known as a liquidity event)

The importance of technology assets

Createch companies are often notable for their content (for example, the visual styling of avatars for companies that are part of the gaming ecosystem). However, as mentioned above, technology assets are central to being a 'tech company. Technology assets can dramatically affect competitive positioning and valuation by investors. From an examination of well-publicised Createch companies, their core capability is entirely dependent on technology they have developed themselves or on a unique exploitation of someone else's (such as creating an immersive AR experience using white label software[26]). Without technology there is no Createch. Or, as one founder put it:

> "*There are levels of Createch, but the value proposition is always centred on technology. In some cases, they create and own novel technology assets; the asset is 'innovative'. Otherwise, they orchestrate and adapt existing technologies in new ways.*"

Few successful Createch businesses appear to be based on a single piece of technical IP. Instead, their success is based on a unique combination of the business model and the ways in which customers engage with the product or service, processes, technology, and information. For some organisations this means investment in R&D and management of the technology risks associated with that.

The strongest position is where a Createch company has developed hardware or software that is highly defensible by means of trade secrets, non-disclosure agreements (NDAs), copyrights and patents. Trademarks, design marks, and employment contracts provide less defence against appropriation.

A key concept within the technology world is that of architecture: this ensures that all the technology components work together, and that the required business integration is supported. Architectural choices can make or break technology companies. Figure 4 provides an idealised architectural view of a Createch business from a technology perspective.

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[26]White label software is unbranded software developed by a third party and usually offered as Software as a Service (SaaS) under a regular subscription. The white label provider develops and maintains the software. The company using it applies their own branding, supplies content, and customises the functionality within the limits of their subscription agreement.

This diagram highlights the variety of opportunities for innovation available to founders in pursuit of their creative concepts. It also highlights the potential complexity of Createch businesses and explains why so many have joint founders: one from a creative background and the other from a technology background.
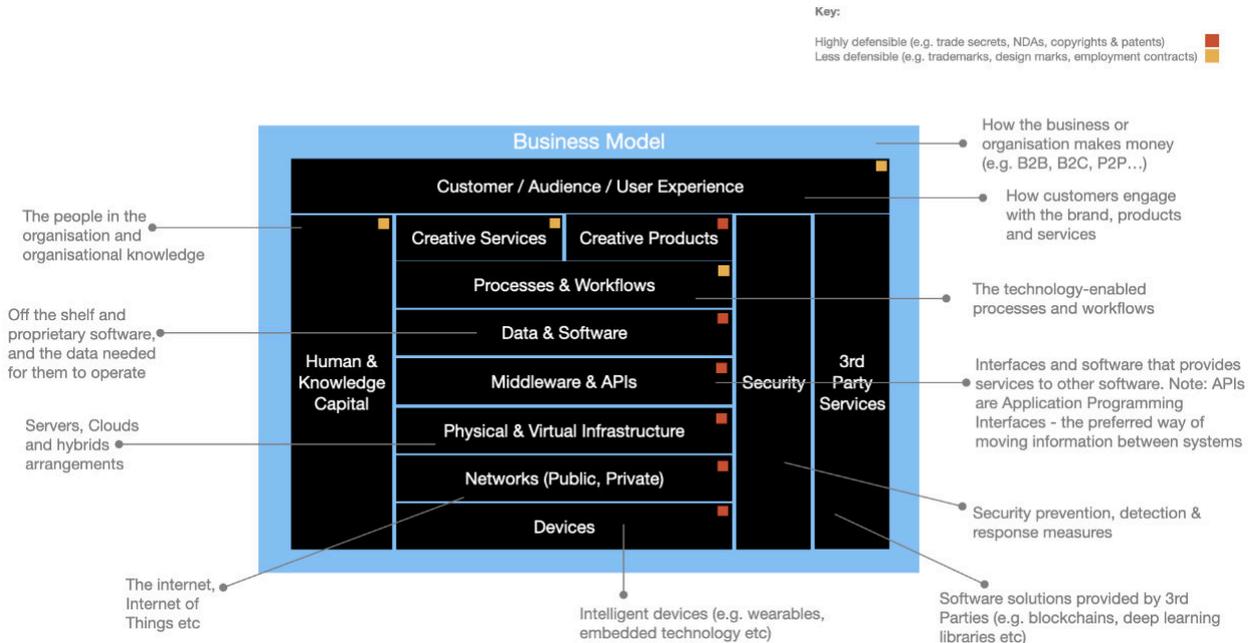
Figure 4 Architectural view of a Createch business and technology assets.

Alignment with other sub-sectors

Referring back to Fintechs, they are described as a part of the financial services sector as competitors or complementary to incumbents. The implication is that Createch should be similar. In other words, they:

- Are part of the Creative Industries as defined in the UK by Digital Media Culture and Sport (DCMS) and the Office or National Statistics (ONS). In practice, this means some are aligned with arts and culture (for example, providing digital gallery capabilities to public museums)
- They compete with, or complement, existing business and organisations in the sub-sectors of the Creative Industries (for example, advertising, fashion, the visual arts, gaming, TV, and film). Again, there is a strong alignment with other parts of the sector; and
- Go to market channels may be direct or though market incumbents. An example might be a Createch using Netflix as a channel to market. This point is also important as it indicates a lower risk route to scale.

Of course, the DCMS and ONS definitions themselves are subject to some discussion, but they are all we have currently to work with.

In some instances, the alignment with a Creative Industries sub-sector is so strong, and the technology elements more like tools of the trade (rather than the basis of the value proposition), that the business should really part of that vertical and not Createch. For example, many UK animation and VFX studios work with VR. Many theatre companies are exploring AR in their productions. Game design studios exploit many advanced technologies. But does this mean they are Createch?

Conversely, some organisations identified as Createch do not fully align with the sector. In some cases, they may have started out as Createch but found greater commercial opportunity elsewhere. For example, Online Music Exams is in the Createch Ones to Watch 2021 edition. This business offers a digital platform to help people take music examinations. This does have an alignment with music, but an investor would treat this as EdTech.

Some Createch businesses appear as if they belong in a totally different sector: an example is InFashion Technologies which to all intents and purposes is an ecommerce fashion retailer. What makes them 'Createch adjacent' is their proprietary fashion curation platform and an image consultancy knowledge framework based on their own R&D. This is an important distinction as most ecommerce sites simply offer a web portal based on customised off-the-shelf software that enables online shopping, marketplaces, and auctions.

Proposed definition and model

Based on the points above, the working definition Createch used in this research is:

1. A growth-oriented business or organisation that is in either the Cultural Sector or Creative Industries (as defined by DCMS) that designs or delivers creative experiences, products, or services; and
2. Has technology assets that are central to the value proposition to investors, customers, and users. It is insufficient for a business to have creative talent producing content using off the shelf tools; there must be technology innovation or adaption; and
3. Employs a business or operating model (processes and/or automation) that could only be efficiently and effectively delivered with digital technologies, such as those under the Industry 4.0 umbrella.

A further refinement is to exclude one-off projects unless they are registered at Companies House, suggesting that there is at least an intent to create a more permanent business or organisation. While projects and other temporary organisations (such as arts installations) may provide valuable innovation, or prove a concept, they are transitory.

An area of ambiguity is where agencies, studios and arts collectives are concerned. In this case criterion two above is a useful filter.

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[27] https://www.onlinemusicexams.org
[28] https://yourstruly.fashion

Another important distinction in defining Createch is the comparison with large streaming media and communications companies such as Netflix (one of the so-called FAANGs - Facebook, Amazon, Apple, Netflix, and Google). These businesses share some characteristics of Createch, but their role in the broader value chain is as B2B customers of Createch. They typically act as buyers of content and technology from Createch, commissioning work much as the BBC and Sky do.

It is interesting to note that Netflix's stock market listing is in the "Consumer Discretionary" sector along with retailers and food service companies such as McDonalds. This is because Netflix did not start as a Createch. Instead, it was a mail order home-video sales and rental start-up competing with Blockbuster. Over time, it has grown into a B2C subscription media streaming platform that commissions, produces and distributes TV and film content. Of course, a streaming Createch start-up could develop into the next Netflix, but it is likely that policymakers, investors and stock markets would treat it as part of a different sector.

Based on the refined definition outlined here, a decision-tree has been used to qualify potential Createch companies in or out of the research (see Figure 5). Table 2 illustrates the filtering process in practice.

For a definition of a value proposition see https://www.investopedia.com/terms/v/valueproposition.asp

For definition of a trade secret see https://en.wikipedia.org/wiki/Trade_secret

Is this a project or once off event?

YES → Exclude

NO → **Experiences, Products or Services in the Cultural or CI Sector?**

Note: DCMS definition used for scope of the sector

YES → **Is this an agency, studio or collective?**

YES → **Value proposition based on their own technology IP?**
- YES → Include
- NO → Include if trade secrets involved (i.e. more than skills)

NO → **Value proposition based on proprietary technology IP?**

Note: this proprietary technology can be their own IP or that of others (e.g. licensed from via an alliance or partnership)
- YES → Include
- NO → Exclude

NO → **B2B or B2C customers in the arts, culture or creative industries?**

YES → **Value proposition based on own technology IP?**
- YES → Include
- NO → Exclude

NO → **Marketplace / platform for creative content?**
- YES → Maybe
- NO → Exclude

Figure 5 Decision tree used to filter Createch companies.

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Table 2 Filtering potential Createch businesses and organisations for inclusion in this research.

Examples	Include	Exclude
A creative agency or studio with great skills, but only creates content for clients using off the shelf technology		Yes
An agency or studio that has patents for AR technology that it uses in its service	Yes	
A games publisher offering VR titles (for example for Occulus Quest 2)		Yes
A game start-up that uses proprietary AI to make Unreal meta humans[29] more realistic as non-player characters	Yes	
A company that develops software plug-ins for 3D CAD systems used for multiple sectors such as fashion, aerospace, and engineering	Ambiguous	
A start-up that provides AI-enabled business process automation to film and TV studios	Yes	
A training company that uses VR to deliver learning content to children		Yes
A theatre company that creates short-run live performance that include XR sequences created by external agencies for them as a client		Yes
A standard ecommerce business selling pre-loved fashion		Yes
An ecommerce business that has developed proprietary algorithms to assemble sustainable outfits for consumers	Yes	
An artist's collective that makes use of AR, VR etc to create their art		Yes
An app developer offering a 3D modelling platform for creating virtual clothing for gamers	Yes	

[29]Unreal meta humans are avatars created for use with the Unreal gaming engine.
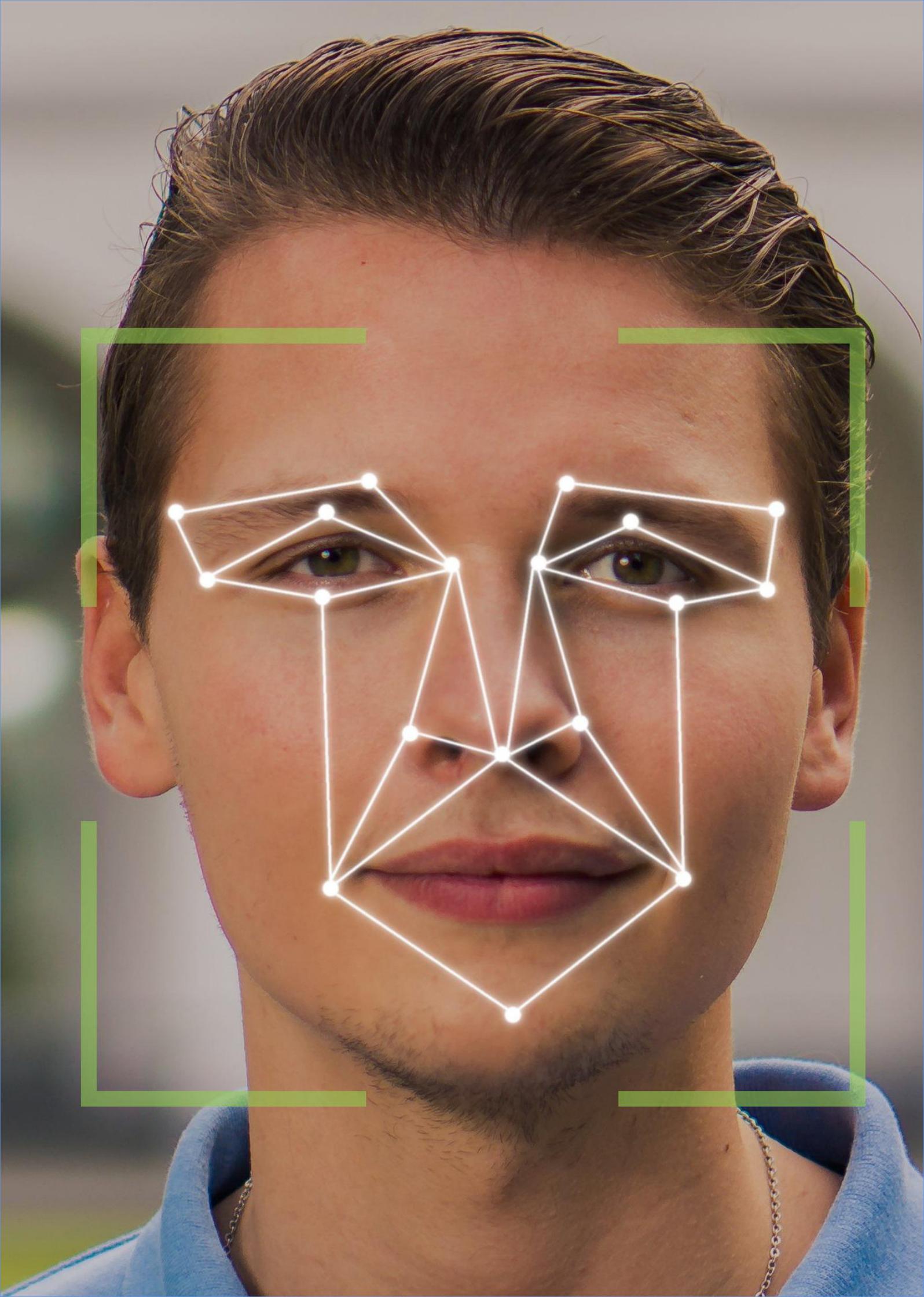
5. Findings from the scan of UK Createch

The criteria established in Section 4 formed the basis of queries of internet search engines and specialist business information data sources (primarily Crunchbase and Companies House). Multiple searches are required to ensure that more established businesses and not-for profit Createch (such as Community Interest Companies) are identified.

Subsequently the criteria were used in parallel with text analytics to filter the results. The aim being to identify a 'core' set of Createch companies against the refined definition.

Size and structure of the Createch sub-sector

Initial searches yielded 1900 results. Of which 29% (550) appear to be a high match to the refined definition for UK Createch businesses and these are defined as Core Createch (see Figure 6).
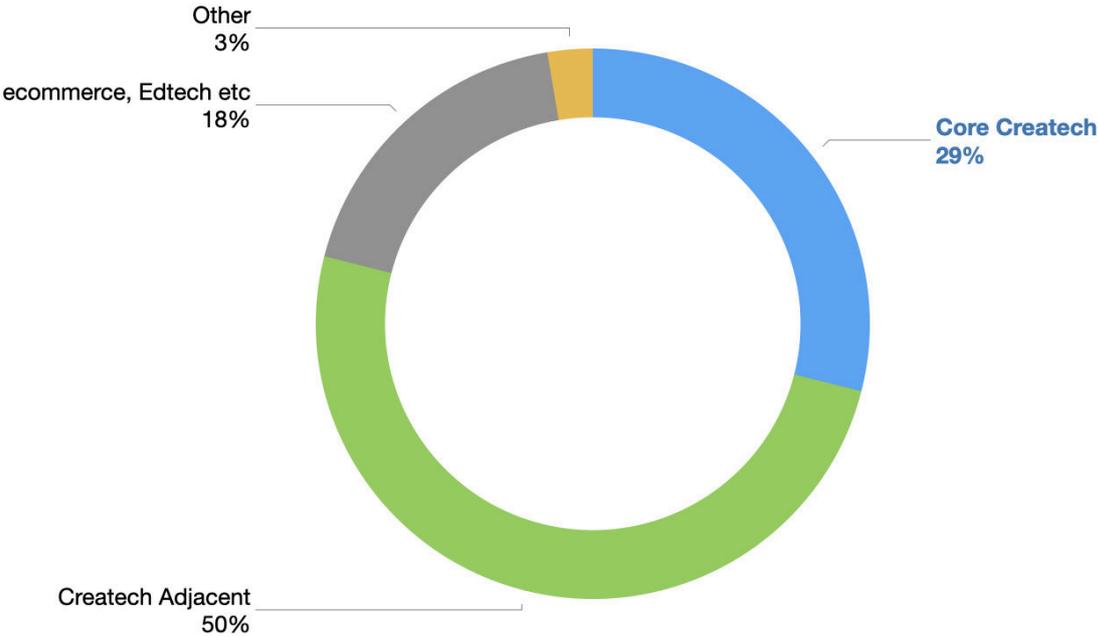
Figure 6 Results of searches for UK Createch.

50% of the results returned are classified as 'Createch Adjacent'. Although these do not meet the refined definition, they may be part of the wider ecosystem (either as service providers or as a source of talent). Examination of a sample of these results shows they are a combination of:

- Well-known creative and media agencies creating immersive and interactive content for brands (such agencies that are part of WPP and Havas)
- Pure-play technology companies (for example hardware providers, Software as a Service (SaaS) customer relationship management, content management, cloud hosting,

software development, web hosting, and network maintenance). Examples include IBM iX, Accenture Song, Google Cloud; and

- Niche creative content providers (such as artist collectives).

In some cases, the Createch connection is weak as these businesses feed into multiple sectors.

The remainder are a mix of ecommerce, eSport, Edtech and similar that have the word Createch somewhere in their description (for example, they were featured at a conference), but do not qualify against the refined definition. At some point in their history (as noted previously) they may have been Createch, or there is some level of spill over in knowledge and talent (such as the founder being a Createch entrepreneur).

i. Comparison to other data sources

Direct comparisons are difficult and there is only one comparable study available, and that is the important PEC study of UK Createch R&D activity mentioned earlier. This identified 2800 businesses. The difference is accounted for is in the definitions used. For example, PEC have included companies in areas such as computing, creative content, and creative services that this research definition excludes (or may be categorised as Createch Adjacent).

ii. Building the dataset for research

Challenges with information availability meant that only around 265 of the 550 Core Createch companies identified could be fully profiled for this research.

A limitation of studying this fast-moving part of the Creative Industries is that online records can become outdated in months. In practice, some companies in the searches had gone out of business, others had been acquired by non-UK companies or moved out of the UK, and some had moved out of Createch. Also, a surprisingly high number had one-page online presences with scant detail: the assumption here is that these are placeholders to collect contact details and re-direct investors and other interested parties without giving too much competitive information away.

Basic demographics for Core Createchs in the dataset

iv. Year founded and stage of evolution

The mean year of founding for the 265 Core Createchs is 2015. Three companies pre-date 2000, with the earliest being prior to 1980 (see Figure 7).
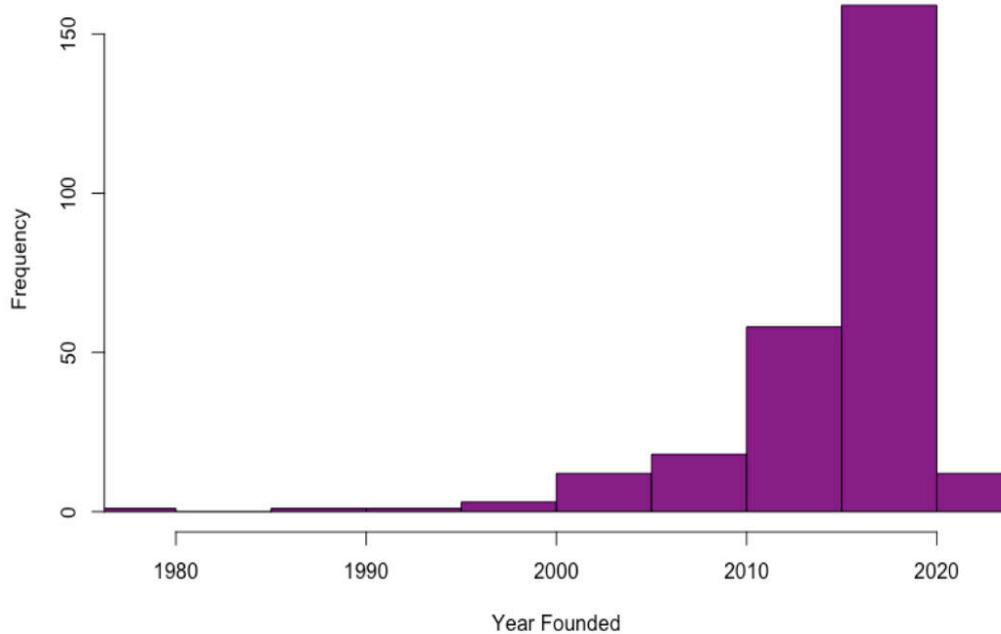
Figure 7 Histogram of founding year (n=265).

The skew to younger businesses is likely to be influenced by using Crunchbase, which tends to lean towards start-ups. In the dataset constructed and used for the research the split between start-ups and more developed businesses is as follows:

- 50% of the dataset are start-ups (new business or organisation, experimenting with technology, substantial growth prospects, fundraising, searching for market fit)

- 25% are scale-ups (products or services proven to be attractive in the market, operating for at least 3 years, with at least 10 employees, proven Return on Investment, external investment remains key); and

- 25% are established businesses (a strong record of profitability and positive cash flows, with no need for external investment to support growth. Alternatively, a business post initial public offering (IPO), or one that has been subject to a management buy-out or trade sale)

v. Location

Table 3 and Figure 8 (overleaf) show the distribution across the UK regions. Note that a small number could not be allocated to a specific region due to ambiguous information about registered address, and these are shown as "unknown".

Table 3 Distribution across the UK.

Region	Proportion (%)
London	54%
South East	12%
South West	11%
Scotland	6%
Yorkshire and The Humber	4%
East of England	3%
North West	3%
Wales	2%
Northern Ireland	2%
East Midlands	1%
North East	1%
West Midlands	1%
Unknown	1%

Figure 8 Distribution of UK Createch.

Createch businesses are widespread across all UK regions, with 54% (143) in Greater London, with the highest concentration in Central and East London.

The South East and the South West also show concentrations of Createch and this appears to be influenced by established Creative Industries Clusters (such as gaming in Guildford) and anchor institutions such as the BBC in Bristol.

This analysis does show that there is extensive scope for levelling-up in Createch.

i. Business models

B2B business models account for over half the dataset, with a third having multiple business models, usually B2B and B2C combined (see Table 4). Reading the profiles of companies with mixed models suggests that this is a response to competitive challenges and difficulties with scaling B2C models. There are multiple examples also of companies that started as B2C and then moved to B2B: this may have been triggered by investor pressures or market conditions.

Although Peer to Peer (P2P) is in the minority, it does appear to be growing (particularly in those Createch businesses creating marketplaces or social networks). An example is Avanatta Ltd which is a social network that enables P2P collaboration between friends and followers to create films.

Table 4 Breakdown of business models in dataset.

Business Model	Proportion (%)
B2B	59%
Multiple	33%
B2C	7%
P2P	1%
Other	1%

Significantly, 70% of the companies in the dataset describe their market offering as a 'platform'. The term can be used in different ways, but here it should be interpreted as a technology-enabled business model creating value by leveraging network effects (usually facilitating interactions between people, groups or companies).

Since platform business models typically comprise two sides (supply and demand), using technology to create frictionless interactions between those two sides is a key success factor. The main attraction of platforms is their ability to scale very quickly.

ii. Technology usage

Technology is crucial to Createch, so which technologies are being used?
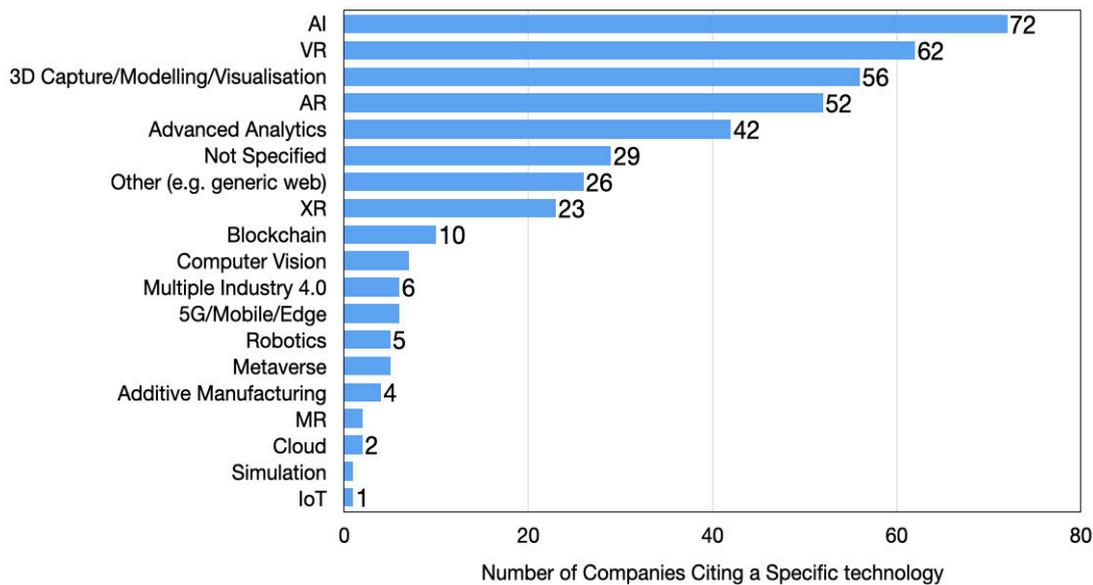
Figure 9 Number of technologies mentioned in company profiles. Note that the dataset used for this research records up to three primary technologies mentions per company, and 411 unique technology references were made.

AI leads the list, with companies frequently citing AI in conjunction with other technologies. Immersive technologies (VR, AR) and enablers (3D capture) also rank high on the list.

Perhaps reflecting the immaturity of the marketplace, the metaverse and blockchain rank low on the list.

Hardware related technologies also rank lower (additive manufacturing, robotics and IoT). The dataset contains relatively few manufacturing Createch companies, perhaps reflecting difficulties in securing finance to build up supply chains for hardware products.

Given the dominance of platform businesses, the low rank for cloud is surprising but likely reflects it being viewed as an infrastructure technology, rather than as part of the value proposition.

iii. Sustainability

Only 15 of the companies in the dataset have a sustainability policy on their web site, with a further five mentioning sustainability in some context. Four explicitly state that they are supporting the UN SDGs. Again, this low set of numbers may reflect immaturity of the companies in the dataset (although 50% are scale-ups or established).

In comparison, 43 of the companies claim to be purpose led. Overwhelmingly the purpose stated is 'social' rather than environmental. For example, VR Revival Ltd[30] help underrepresented adults in mental health using "Self-Compassion VR". Or The Gritty Talent

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[30]https://www.vrrevival.co.uk

Group's app[31] that was "designed, built and launched during lockdown to tackle the urgent diversity and inclusion challenge faced by the UK's TV and Film industry."

Multiple company profiles mention their awareness of the sustainability issues associated with AI, blockchain and the metaverse. However, beyond providing indicative carbon calculations, there is no indication of how these are to be addressed.

Although tangential to sustainability, one company highlighted the importance of ethical AI, citing the Content Authenticity Initiative which was started by Adobe in 2019.

Only two companies in the dataset mention standards (in both cases ISO14000). Both are amongst the longest established in the sample, and both are engaged with design of physical as well as digital products.

Four companies in the dataset mention that they use offsetting; none mention carbon credits.

Three of the companies in the dataset are B Corporations. An example is Blue Zoo Productions Ltd[32] whose in-house R&D has led to bespoke technology for virtual puppeteering using VR and gaming engines. This is the world's first major animation studio to achieve the certification[33].

Although a small number, this is higher than was expected at the start of the research (there are only around 5000 Certified B Corporations worldwide, and 700 in the UK according to B Labs).

Assessing participation in sustainability initiatives proved difficult as few companies include this information in their public profiles. There are isolated mentions of ALBERT, AdNetZero, Fashion for Good, and various Ellen MacArthur Foundation programmes, but this low count may be a limit of data collection rather than reality.

Conclusions about Createch and sustainability from the industry scan

There are limitations in how much can be derived from public profiles of companies, but the snapshot provided by the dataset suggests that sustainability may not be a high-profile concern for Createch currently, or that it is not considered important enough to foreground on company web sites, discuss in blogs or news articles. Understanding this situation better is, in part, the role of the survey in Phase 1.

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[31] https://www.thecreativeindustries.co.uk/ones-to-watch-2021/gritty-talent-group
[32] https://blue-zoo.co.uk
[33] Source: https://www.televisual.com/news/blue-zoo-gets-b-corp-status/

Createch Segment	Description	No. of Organisations	(%)
Production and production support for immersive experiences	B2B content-creation agencies and studios that have invested in software development and physical infrastructure for creating immersive experiences (such as motion capture, 3D scanning)	56	15%
Enablers of smarter video, metaverse and game content	B2B businesses that offer tools that improve video-creation workflows and digital asset creation, typically for entertainment, advertising and game production	38	10%
Data platforms for creators and their customers	B2B businesses that offer products and services based on Big Data, AI and other forms of advanced analytics. Includes those that are SaaS	28	8%
Intelligent music platforms for creators and consumers	Businesses that provide artists and creators with tools to make and music and merchandise, and to engage with fans	24	7%
Web3 authenticated platforms for designers	Primarily art and fashion businesses offering end-to-end traceability (such as NFTs using blockchain)	24	7%
Tools and infrastructure for interactive video content	Businesses that provide artists and creators with tools to make and distribute interactive video content	21	6%
Digital platforms and middleware for all creators	Businesses offering low-code, no-code online platforms and tools for artists and creators across all sub Sectors of the Creative Industries	20	5%
Technology-oriented artists and design studios	Dedicated content creation businesses that differentiate themselves through immersive technologies they have developed themselves	20	5%
Products and platforms for digital storytellers	Businesses that offer artists and creators sophisticated tools for story creation and publishing (typically using AR, VR etc, but includes some hardware offerings such as robotics)	19	5%
Designers of digital and interconnected cultural objects	Businesses focused on creation of digital-first art and robots for location-based entertainment, digital fashion, avatars for gaming and advertising	14	4%

Table 5 Core Createch segments identified using text analytics.

Further refining the understanding of Core Createch

If Createch follows the pattern laid down by Fintech, then Core Createch should have distinct segments. Using the text descriptions of each company in the dataset and text analytics[34] ten distinct segments are observable (see Table 5). Segment titles have been chosen to bring the role of technology to the fore, providing an alternative perspective to the structure of UK Createch.

For comparison, the CIC performed a detailed profiling exercise on their 100 Ones To Watch 2021 list and they also developed an updated segmentation model for Createch (for example pure play Createch, where creativity meets tech, and where tech meets creativity). The Createch segmentation presented in this UCA research has similarities with a subset of the CIC categories where technology is central to the definitions.

Examination of each of the segments in this research suggests that Createch should be drawing more sustainability lessons from the information and communication technology (ICT) sector, but it is unclear as to whether this is happening. One reason may be a lack of

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[34]Unsupervised machine learning was used, with Latent Dirichlet Allocation (LDA) employed to create groupings. LDA is a probabilistic method that finds the mixture of words that is associated with a topic or grouping, while also determining the mixture of topics that describes each document (in this case, the description of the company).

resources with the appropriate knowledge or not being part of networks that are aligned with ICT such as the British Computer Society Green IT specialist group. Certainly, a founder with a creative background is unlikely to be aware of such networks, while a Createch Chief Technical Offer (CTO) may well be. Another issue is that Createchs appear to operate in silos and do not network with other companies in Createch for sustainability information unless they are part of a physical or virtual cluster with effective networking services and knowledge sharing.

This segmentation should be taken as an indication of where future research could focus, rather than being definitive, but it does help to structure questions for founders and other leaders in Createch.

6. Key survey findings

The survey comprised 33 questions, including a formal request for permission to use the results without attribution.

The survey was run from early February until April 2022. All companies identified in the Core Createch dataset were emailed, and additional requests for participation went out on twitter and LinkedIn. In addition, the CIC, the Digital Catapult, Creative Clusters, LEPs/Growth Hubs, PEC, and the Welsh Government used their channels to invite participation.

83 people responded and completed at least part of the survey (in reporting the survey results the number of responses for a specific question or group of questions is given as "n=").

Introducing ZBIA

A key innovation in this survey is the Zero, Basic, Intermediate, Advanced or ZBIA maturity profile.

This was first proposed by Professor Charter in 2001 as a qualitative assessment of sustainability maturity within organisations[35]. With the availability of the survey data, it has been possible to make this a quantitative evaluation and develop an algorithm based on answers to 10 of the questions.

The algorithm returns a numeric ZBIA score which in turn determines the maturity categorisation based on the quartiles or deciles derived from the sample.

Table 6 (overleaf) provides a simplified overview of how the algorithm allocates companies to a maturity stage.

It is important to note that the algorithm is derived from this survey dataset and so reflects the demographics of the companies that responded, and application in other domains should be approached with caution, especially the quartile boundaries between the different maturity stages.

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[35]Charter, M., & Tischner, U. (2001). Sustainable Solutions: Developing Products and Services for the Future. Greenleaf.

Table 6 ZBIA Maturity profile.

Boundaries based on sample derived from survey results	Maturity Profile			
	Z	**B**	**I**	**A**
	Below lower quartile	Lower quartile to upper quartile	Upper quartile to upper decile	Upper decile
Key characteristics				
Policies?	No policy	Policy	Policy	Policy
Responsibility?	No one responsible	Someone responsible	Someone responsible	Someone responsible
Documented Approach?	No documentation	No documentation	Documentation	Documentation
External Pressure?	No perceived external pressure	Little perceived external pressure	Much perceived pressure	Much perceived pressure
Engagement with Regulation?	Doesn't see relevance of regulations	Sees relevance of regulations	Sees relevance of regulations	Sees relevance of regulations
Measurement and Reporting?	None	Limited	Measuring progress	Measuring and reporting progress
Engagement with Initiatives?	None	Starting to engage	Engaged with industry initiatives	Engaged with multiple industry initiatives & B Corp' ambition
Use of Standards?	No	No	Starting to work with standards	Using multiple standards
Offsetting and Carbon Credits?	No	No	Uses offsets	Uses credits & offsets

About the respondents

In comparison to the industry dataset described previously, the survey responses contain a higher proportion of start-ups (see Table 7), but the median year of founding is the same as in the industry scan performed to establish the Createch dataset for this research (2015).

Overall, the two samples are consistent and can be assumed to be representative of the Core Createch population.

Table 7 Breakdown of survey responses by stage of business evolution (n=71).

Stage of Evolution	Proportion (%)
Start-up (new business or organisation, experimenting with technology, substantial growth prospects, fundraising, searching for market fit)	58%
Scale-up (products or services proven to be attractive in the market, operating for at least 3 years, with at least 10 employees, proven Return on Investment, external investment remains key)	20%
Established: a strong record of profitability and positive cash flows, with no need for external investment to support growth. If your business is post initial public offering (IPO), or has been subject to a management buy-out or trade sale	14%
None of the above (collectives and not for profits)	8%

In terms of business model, the survey responses contained more B2C organisations than found in the industry scan (24% compared to 7%), and this may be because the survey contains a higher proportion of organisations aligning with one of arts and culture, the performing arts or fashion which tend to be B2C themselves (see Table 8).

Table 8 Alignment with other sub-sectors (n=71). Multiple responses are allowed.

Sub-Sector Alignment	No. of Responses	Proportion (%)
Immersive Entertainment	18	25%
Software Development	17	24%
Advertising	15	21%
Arts & Culture (incl. Museums and Galleries)	15	21%
Design	15	21%
Fashion	15	21%
TV & Film	15	21%
Performing Arts	14	20%
Games	13	18%
Music	13	18%
Visual Arts	13	18%
Other (brands, education, health, manufacturing, audio, haptics)	12	17%
Marketing	11	15%
Streaming	8	11%
Events and Attractions	7	10%
Publishing	6	8%
Architecture	3	4%
Crafts	2	3%

The self-identification with software development appears to validate earlier statements about how central technology is to these businesses (more than simply an enabler).

In terms of regional distribution, the pattern is similar to the industry scan (see Figure 10), but the proportion in London is lower (40% as opposed to 54%). Again, the South East and South West are number two and three in the ranking.
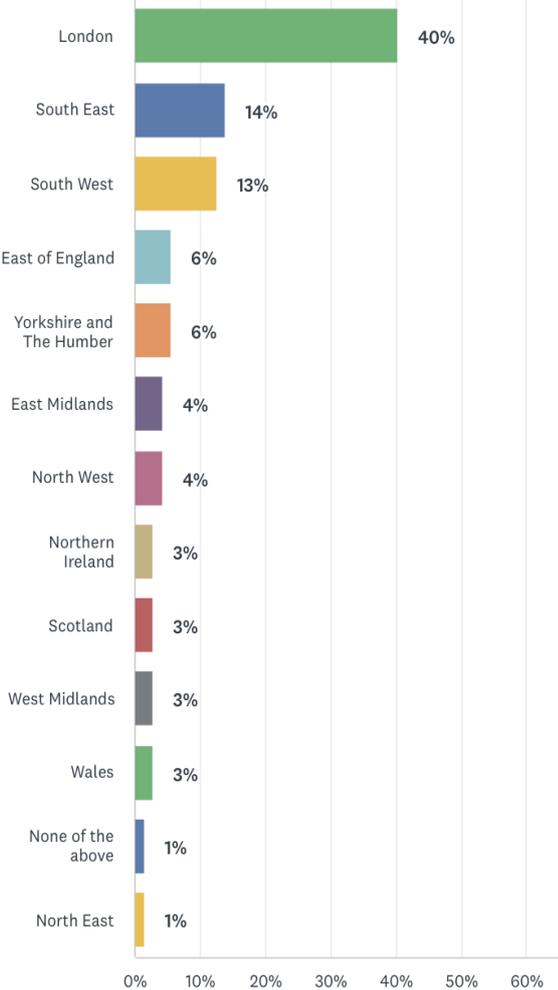

*Figure 10 Distribution of survey respondents across the UK (n=72).*

vi. Conclusion on comparison with industry dataset

There are some differences of emphasis but, overall, the survey demographics do appear to be sufficiently representative of the industry dataset to be treated as a snapshot of the current state of UK Createch and sustainability.

Createch views on sustainability

See Figure 15. In response to a question asking respondents to identify which sustainability definitions come to mind, the highest ranking are climate change, environmental sustainability, and net zero. Concepts such as the circular economy come halfway down the list (50% selected that option), and the "triple bottom line" came last.

Net zero (and associated decarbonisation) is likely to have an impact on all Createch companies, hence it is reassuring that, in response to a subsequent question on the relevance of UK and international policies and laws, the UK Net Zero Strategy, 2021, was ranked first.

There is some influence of sub-sector alignment, with fashion aligned businesses ranking the circular economy, waste reduction, resource efficiency and reducing consumption higher.
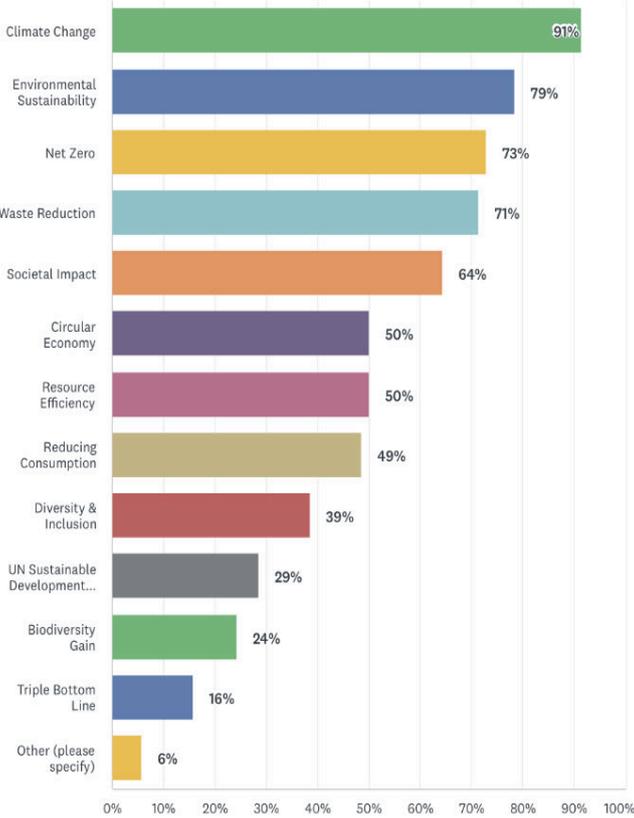
Figure 11 When you think of Sustainability, which of the following come to mind (please tick all that are applicable? (n=70).

Societal impact is on the top five, and this is reflected in some of the comments made under the free-text responses (for example, "societal and environmental capacity for future resilience").

Createch maturity profile

69 of the respondents provided sufficient information for a calculation of maturity score (see Table 9 and Figure 12, overleaf).

The histogram is bi-modal, with the two modes centred on the Z and the boundary between B and I scores. Only 7 companies were scored as A, and a subset selected for founder interviews to understand what sets them apart.

Table 9 Breakdown of survey responses by ZBIA maturity level (n=69).

|	Maturity Level			
	Z	B	I	A
No of Responses	26	25	11	7
Proportion (%)	38%	36%	16%	10%
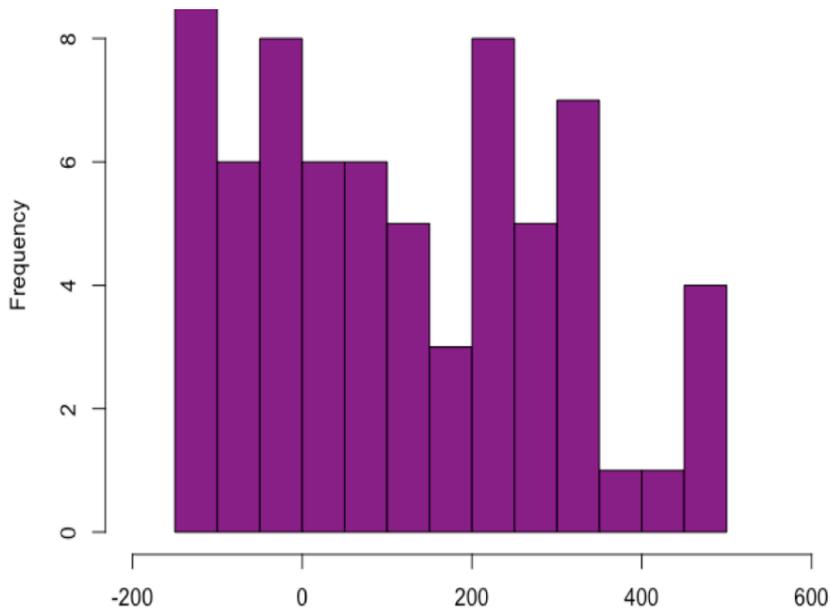
Figure 12 Histogram of ZBIA scores (n=69).

vii. Impact of sub-sector alignment on maturity

Statistical tests have revealed only three sub-sector alignments influence ZBIA score (fashion, software development, and TV and film).

As shown in the box and whisker plots[36] in Figure 12 (overleaf), the average score for those identifying fashion is significantly higher than the rest of the survey (at the 95% confidence level). Nearly a third of the fashion aligned businesses were classified as maturity level A, and none were rated Z).

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[36]Box and whisker plots display the median (the central horizontal line), lower and upper quartiles (the edges of the boxes), and lower and upper extremes of a set of data (the 'whiskers').
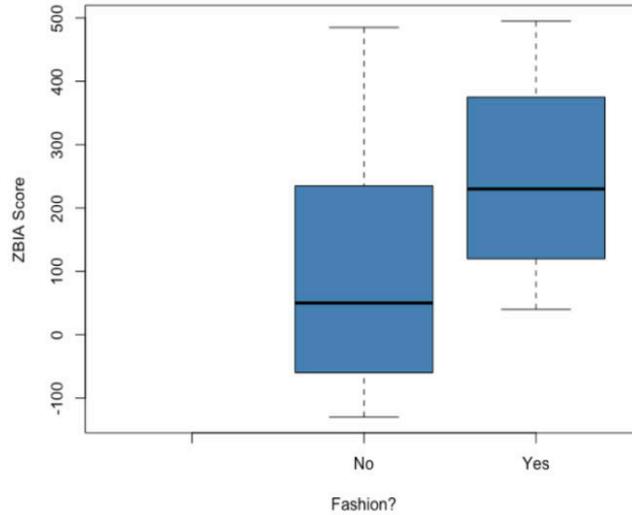
Figure 13 Box and whisker plots showing the difference between fashion (n=14) and other sub-sector alignments (n=55).

Given the intense focus on textile waste and other negative aspects of fashion's sustainability impact, perhaps this is not a surprising finding.

In contrast, those identifying as software development are significantly lower scoring on average (see Figure 13). 56% of these businesses are rated Z compared to 32% for the rest of the survey. This finding is important because of software being at the heart of Createch businesses.

TV and film is the third area where a statistically significant difference is found, although this is less pronounced (90% confidence level). Half the companies with this alignment are rated B (compared to a third for the rest of the sample). This may be explained by the success of initiatives such as Albert in the production side of TV (and to a lesser extent film).
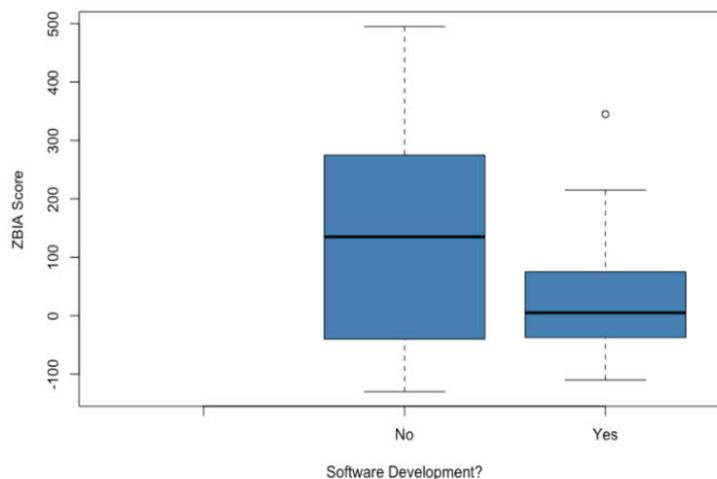

Figure 14 Box and whisker plots showing the difference between software development (n=16) and other sub-sector alignments (n=53).

viii. The role of internal and external pressure

The survey questionnaire contains questions designed to identify how important sustainability is to the people and organisations they interact with (see Figure 15, presented in rank order with employees as number one).
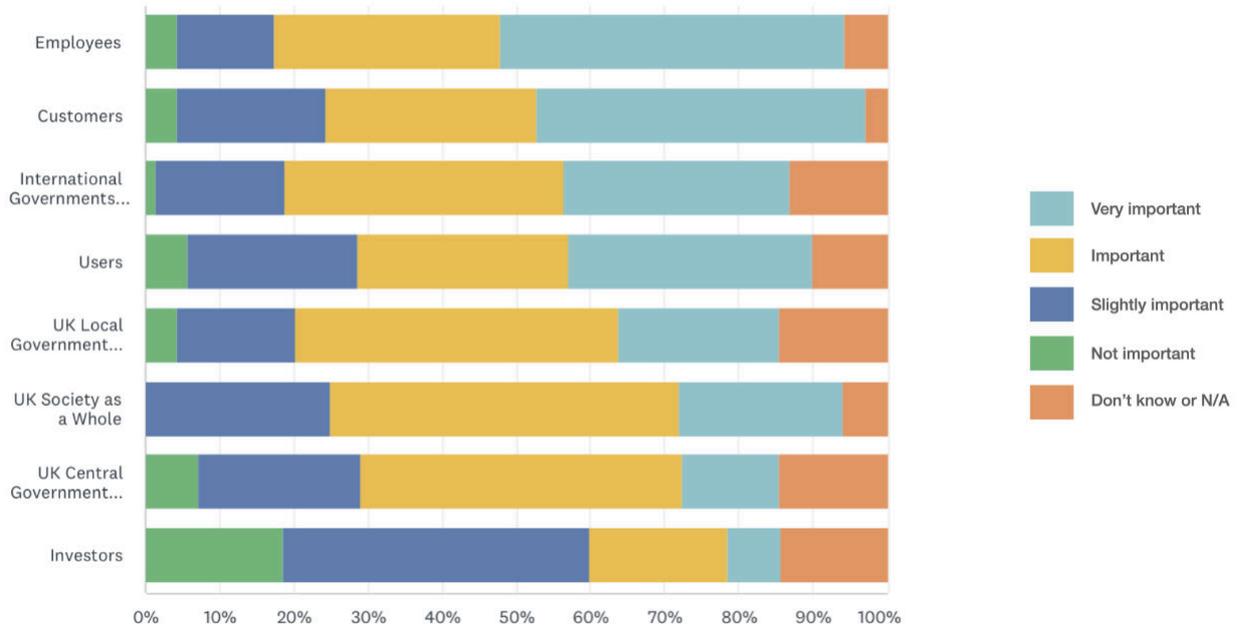

Figure 15 Think about the people and organisations you interact with. How important is Sustainability to them? (n=70).

Nearly 80% of the respondents said that employees view sustainability as important or very important. Using 'very important' responses to split the survey data shows that internal pressure leads to a significantly higher maturity score on average.

Next, in terms of external pressures, for customers the number of important or very important responses is just over 70%. However, only 25% said that investors view sustainability as important or very important. Given the entrepreneurial, start-up nature of so many of the companies in Createch, this is an important finding.

Again, using the 'very important' responses to partition the survey reveals progressively higher ZBIA scores as external pressure rises (and this is statistically significant). Hence, external pressure is also a driver of higher maturity (but ranked lower than internal pressures). See Figure 16 (overleaf).
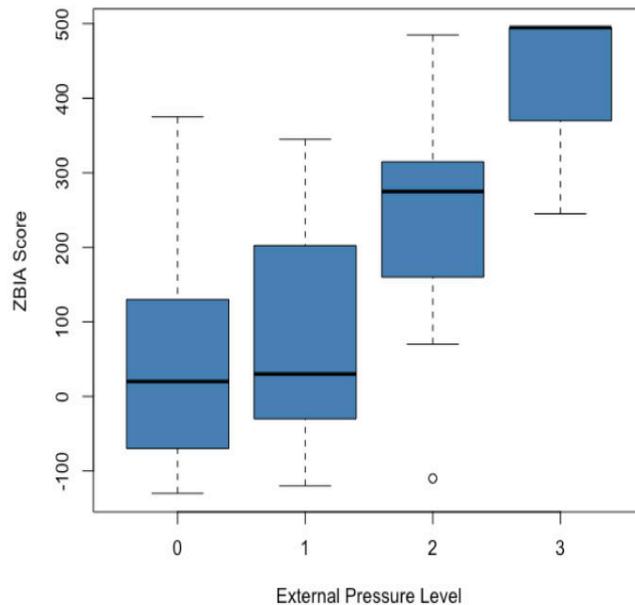
Figure 16 Impact of external pressure on maturity score. The pressure levels shown are the number of times respondents answer that an external source of pressure is very important (n=69).

Createch approach to sustainability

Respondents were asked to think of their business or organisation and agree or disagree with the statements in Table 10 (shown in final rank order). Close to 80% agreed at least in part that sustainability is core to their mission and over 70% agreed or partially agreed that technology is essential in delivering their sustainability plans.

Table 10 Thinking of your business or organisation, how do you respond to the following statements? (n=70).

Assertion	Disagree	Partially Disagree	Partially Agree	Agree	N/A
Sustainability is core to our strategy and mission	7%	15%	30%	47%	0%
	5	11	21	33	0
Technology is essential to delivering our sustainability plans	13%	10%	30%	42%	4%
	9	7	21	30	3
There is clear responsibility for sustainability	20%	14%	17%	48%	0%
	14	10	12	34	0
We have set measurable goals for sustainability	24%	21%	30%	20%	4%
	17	15	21	14	3
We have documented environmental and societal plans	40%	10%	27%	19%	4%
	28	7	19	13	3
We report on progress towards our sustainability goals	39%	13%	21%	16%	11%
	27	9	15	11	8

However, documentation, measurement and reporting ranked lower, with documentation having the highest proportion disagreeing outright. It is one thing to have ambitions and a vision, but another to follow those through with written strategies, action plans and targets. These can be difficult areas any small business.

If sustainability is core to mission, then surely there will be documented policies. However, in response to a specific question on policies, 60% of the companies stated that they did not have such policies.

Where there is internal pressure for sustainability, 53% of respondents said they have a written policy as opposed to 29% when there is no internal pressure. Similarly, where there is external pressure, 50% said they had documentation compared to 29% when there is no external pressure. Hence, whether a company has a policy or not, does seem to be influenced in much the same way by both internal and external pressures (see Tables 11 and 12).

Table 11 Influence of internal pressure on policy choices (n=70).

Internal Pressure?	Policy?	
	No	Yes
No	71%	29%
Yes	47%	53%

Table 12 Influence of external pressure on policy choices (n=70).

External Pressure?	Policy?	
	No	Yes
No	71%	29%
Yes	50%	50%

Responsibility for sustainability

65% said that they agreed or partially agreed that responsibility for sustainability is clear. This does seem to be substantiated by 78% being able to identify a specific job role responsible (see Table 13 overleaf).

Unsurprisingly, only one Createch has a dedicated ESG role (Environmental Social Governance), the remainder relying primarily on the CEO and founders who no doubt have to balance sustainability with the pressures of growing their business and keeping investors happy (the latter being the least interested in sustainability based on this survey).

| Responsibility	Count	Proportion (%)
CEO by themselves or jointly with other roles such as CTO or COO)	15	29%
No-one or Everyone	11	22%
Founders	5	10%
Other	5	10%
Board or Management Team	3	6%
Director	3	6%
Managing Director	3	6%
Product Director or Manager	3	6%
CFO and COO	1	2%
COO	1	2%
ESG Lead	1	2%

Visibility and reporting

As noted earlier, measurement and reporting appear to be a weaker area for the survey respondents. The survey probes this in several ways through questions on:

- End-to-end visibility and reporting
- Reporting to customers and investors
- Lifecycle measurement of experience, products, and services
- Provision of lifecycle reports to 3rd parties; and
- Understanding of the impact of embedded carbon

Figure 17 summarises the first four of those question areas. As can be seen, over half claim that they have no end-to-end visibility of their sustainability in their business, and 80% do not report on sustainability metrics externally (for example, through an annual report).
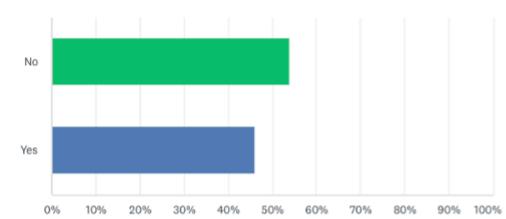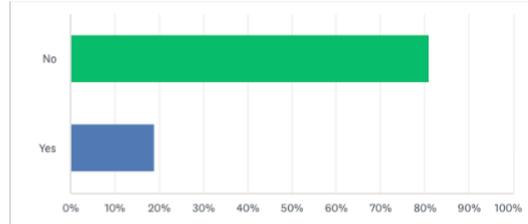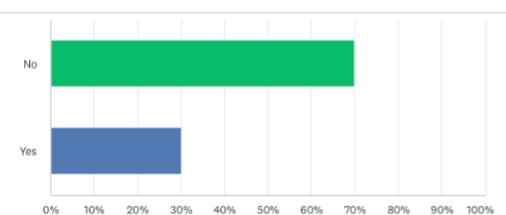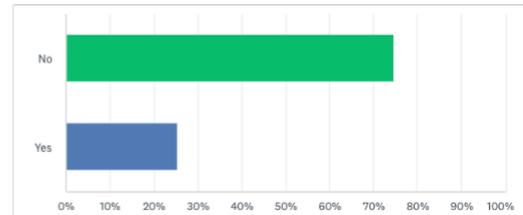

Figure 17 Responses to questions concerning measurement and reporting of sustainability (n=63).

The fact that over 40% do have end-to-end visibility and some level of reporting is encouraging (the reporting is most likely for internal use only based on the other answers). It is unclear what is being measured, however.

When questioned about the lifecycle of their individual product/service offerings, again, only around 30% say they can measure lifecycle impacts and only a quarter offer lifecycle reports. Again, it is unclear exactly what is being calculated, to what standard (if any) and in how much detail. Possibly these are once-off reports at the request of specific customers.

The Creative Industries as a whole use international sources of talent and resources. The most common form is contract and outsourced information and communication technology services: hosting, cloud, coding and similar. These involve embedded or embodied emissions of carbon dioxide (and other GHGs) from that offshore work, and so are a form of 'emission import.'

Over half the respondents replied that they imported goods and services into the UK and, of those importers, nearly 60% were aware of the likely issues. However, only 8% (three companies) can quantify this.

Since Createch is more technology intensive than other sub-sectors, hence using energy and producing GHGs, this is clearly an important gap.

Offsetting and carbon credits

12 of the respondents are using offsetting, and only one carbon credits.

Offsetting is one of the tactics Createch companies can employ to assist in heading for net zero or net positive when there are no direct GHG reduction options available or when a business wishes to accelerate their GHG reduction plans. However, offsetting does have its critics, and there are ongoing concerns about greenwashing and the extent to which such schemes genuinely reduce impact. Recently, an Integrity Council for the Voluntary Carbon Market was established, and this issued a set of standards in April 2022[37] which should improve matters.

This reputation issue may explain why only one in five are using offsetting. Survey responses suggest that Createch companies most commonly participate in energy and travel specific offsetting schemes, but a few respondents participate in the broader Ecologi scheme[38].

From the verbatim comments in the survey, some Createch companies rely on their third-party service providers to do the offsetting. It is unclear how much those claims can be substantiated.

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[37]https://www.prnewswire.co.uk/news-releases/integrity-council-announces-timetable-for-new-voluntary-carbon-market-standards-877477718.html
[38]This combines goal setting with carbon offsetting and a fund for climate projects. See https://ecologi.com/about

Carbon credits (tradable certificates that give the bearer the right to emit a certain amount of carbon dioxide) can also be used to offset carbon emissions (or an equivalent amount of GHG). Only one of the respondents is using carbon credits, but carbon credits tend to be more suited to larger organisations in high energy sectors. Again, there are also reputational issues that may put more purpose-driven businesses off them[39], hence the fact that only one respondent stated they are using such schemes.

Networking and publicly funded support

Access to appropriate specialist knowledge, support and funding is important. The survey asks questions about participation in initiatives, the role of Creative Clusters, and grants related to sustainability and technology.

Industry initiatives are one way to access knowledge, peer support and tools. A third of the respondents replied that they participated in one or more industry initiatives for sustainability, with the top five being (in rank order):

1. Albert
2. Institute of Positive Fashion
3. Music Climate Pact
4. Net Carbon Events Initiative
5. Textile Recycling Association scheme

Cross-sector initiatives that emphasise measurement and reporting (such as the Science Based Targets Initiative) have zero responses. Again, this highlights measurement as a gap.

The fact that two thirds do not participate suggest there is a lack of awareness of these schemes or how to participate (one respondent said, "never heard of them!") or that there are barriers to participation (for start-ups, resources are likely to be a concern).
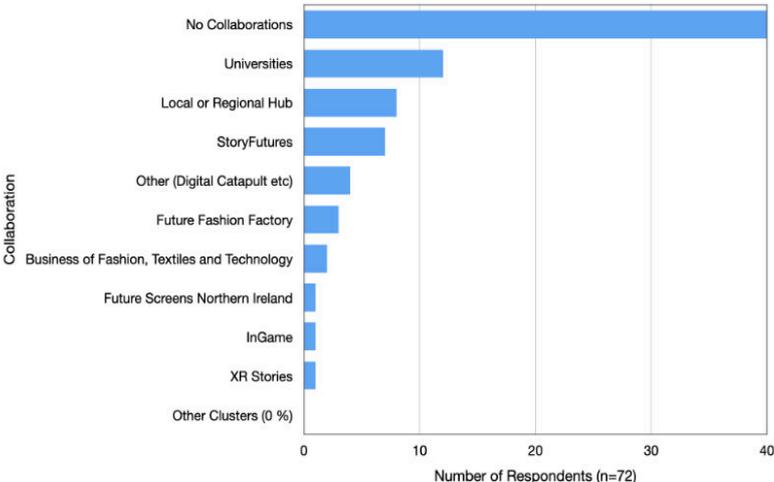
Figure 18 Breakdown by collaboration (n=72). Multiple responses are permitted.

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[39]In the past few years there have been multiple headlines concerning the quality or validity of these schemes, and the Financial Conduct Authority (FCA) has issued a warning about trading scams.

Collaboration on R&D, innovation and technology transfer is an important aspect of any technology business. Over half the respondents reported that they were not involved in any formal collaborations (see Figure 18). Where there are collaborations, it is universities and local/regional creative hubs that are ranked highest.

Comments on these collaborations reveals the importance of InnovateUK as a funding partner together with universities (although some complain about the difficulty in application process or low success rate with Smart Grants). Also, geography plays a part: Createch companies tend to collaborate with organisations near to them.

Collaboration with the established Creative Clusters Programme[40] (launched in 2018) could be expected to be influential in supporting recent Createch start-ups with expertise and funding in a wide range of emerging technology areas such as smart devices, AI, gaming, XR, and informatics. Figure 18 shows the breakdown by Cluster. The relatively low numbers may reflect the relative newness of the programme, but there may also be a geographic affect again as the individual Clusters are spread around the country.

As mentioned, InnovateUK features in several comments throughout the survey as an important funding source. Figure 19 shows the responses to a specific question on grants (multiple responses are permitted).
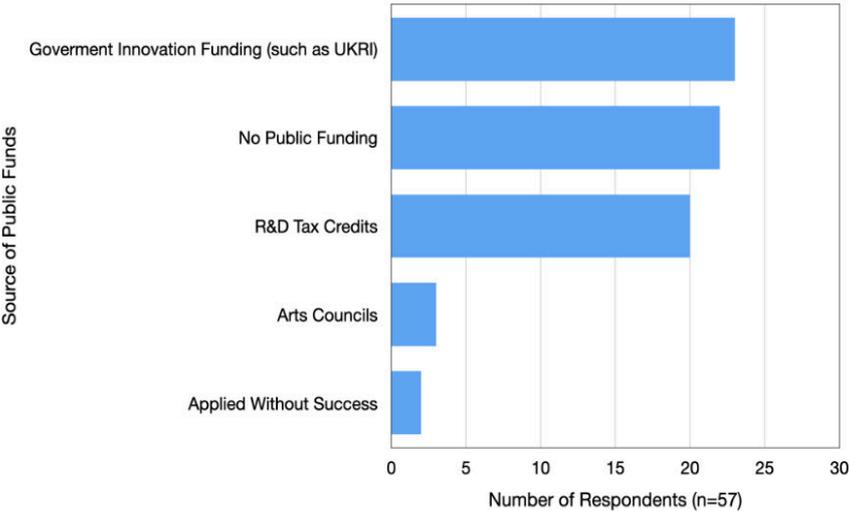
Figure 19 Source of public funding (n=57).

Clearly, UKRI (including InnovateUK) and R&D Tax Credits are important for Createch, but it is unclear how much sustainability is a deciding factor in grant applications (even though such questions are common), and the current Research and Development tax relief for small and medium-sized enterprises does not require any sustainability credentials.

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[40] https://creativeindustriesclusters.com

However, a third have not received any public funding, either because they have access to other funds or have been unsuccessful (two companies explicitly stated that they had been unsuccessful, but there is no additional information on those who simply replied no public funding).

Standards for sustainability

85% of the respondents said that they did not use any of the commonly recognised sustainability standards such as the ISO14000 family (Environmental management Systems) or BS8001 (Circular Economy).

15% (four respondents), stated that they are using combinations of ISO14000, BS8001 and/or ISO10404 (Life Cycle Assessment). Two are aligned with architecture and two with fashion.

One of those aligned with architecture is also using ISO20400 Sustainable Procurement and ISO26000 Social Responsibility. This may be a requirement of working with the construction industry where that combination has become standard practice.

In the comments, two companies stated that they are using Publicly Available Specification (PAS) 2050 to for assessing their life cycle GHG emissions: both are aligned with the design sub-sector.

Two fashion aligned companies said that they were using the EN45555 standard (general methods for assessing the recyclability and recoverability of energy-related products) to calculate recyclability. This is a rare example in this research of knowledge transfer from another sector, and it is possible that one of the technology-oriented founders may have brought that knowledge with them.

Overall, however, as was found in the industry scan, use of standards is uncommon.

Perception of UK and international government strategies, policies, and laws

Table 14 Perceived relevance of UK policy areas (n=61). Multiple responses are permitted.

Policy Area and Associated Targets	Proportion of Respondents Seeing Some or Significant Relevance (%)
Environmental targets	77%
Decarbonisation	62%
Resource efficiency	55%
Managing waste	53%
Producer responsibility	44%
Waste enforcement and regulation	30%
Biodiversity gains	30%
Biodiversity objectives and reporting	29%
Regulation of chemicals	16%

Table 14 breaks down the perceptions of key UK sustainability policy areas. Given the Createch definition of sustainability being primarily climate and environment centric the highest ranked are expected.

What is interesting for Createch is how the decarbonation percentages are spread: 18% said that this was significantly relevant, 44% said that it was slightly relevant, and 31% said it was of little relevance. This last point is highly surprising for any industry involved with technology and suggests a basic disconnect between policy and Createch on possibly the most important area (net zero). This may be a failing in communicating policy, but it is also likely to be a consequence of having such a large proportion of Z and B rated businesses in the survey.

The linkage to policy was approached in a more specific fashion in further question.

Figure 20 International agreements, government strategies, and policies, and specific UK Acts of Parliament presented to people completing the survey.

To elicit a greater understanding of respondents' understanding, respondents were presented with over 20 international agreements, government strategies, and policies, and specific UK Acts of Parliament (see Figure 20). Respondents were required to identify those that were most relevant to their business (multiple responses being allowed).

27% stated that none applied them. This shows a fundamental lack awareness of public policy that does directly affect Createch.

Where businesses saw relevance:

- Nearly 50% recognise the relevance of the UK Net Zero Strategy and over 40% the relevance of the UK Climate Change Act; and
- 27% see the relevance of COP26 and 29% the Environment Act.

The 'none apply' and Net Zero Strategy figure appear to confirm the earlier observation that awareness and understanding of this policy area needs to be increased (a finding that was also reported in previous UCA reports on the future of the Creative Industries as a whole).

Almost all the EU originated strategies, Directives and regulations were selected by at least one respondent (only the Industrial Emissions Directive, the Circular Electronics Initiative, and the Water Reuse Regulation were not selected):

- Seven companies selected the EU Strategy for Textiles, and unsurprisingly these are fashion aligned
- Five design Createchs selected the EU Right to Repair initiative; and
- Three Createchs selected the EU Ecodesign Directive

Given that there is no precise replacement for these in the UK at present, there is a potential policy and communication gap.

In comments, local planning laws were highlighted as relevant by architectural Createchs.

7. Discussion

The Createch industry scan and survey raise several important questions about technology and sustainability. These major points are discussed further in this section, enriched by comments and themes that emerged from twenty interviews, and additional information from the survey.

16 interviews were completed with founders, CEOs or other leadership team members of Createch businesses ranging from an immersive live events business founded in the early 2000s, to a fashion rental platform just starting up. They are a slice through the range of Core Createch businesses identified in the industry scan.

In addition, to explore the regional and local challenges, three interviews were with decision-makers involved with LEPs, Creative Clusters and local creative hubs.

One further interview was with a venture capitalist focused on the Creative Industries in the UK and internationally.

The Createch definition

Are definitions important? Multiple interviewees said that ambiguity in the Createch label can be problematic, especially for investors. One said:

"Being on a list of Createch companies is great PR, but investors don't really understand what this means."

Several founders described the difficulties explaining their value proposition as a Createch to investors or how their business might fit into their portfolios. They would rather say they were in Edtech or were a technology company. This appears to be partly an awareness and education issue for investors, but it is also because the exiting use of the Createch label is likely too broad, including everything from arts institutions to student projects. There is also a more general issue related to the investor perceptions of Creative Industries as a "cottage industry" and therefore inherently small-scale.

A similar issue came up in the interviews with local and regional decision-makers: there is uncertainty as to what Createch is, and whether it fits with their understanding of a growth sector. This is important as it might exclude Createch from inclusion in strategic economic development plans, and access financial and non-financial sources of support (such as training schemes or University research programmes).

Pursuing investment from third parties, especially venture funds, means demonstrating a growth potential, and so any definition of Createch that includes organisations that are not growth-oriented may confuse funders.l. All the Createch interviewees said that external investors have an expectation of high growth (typically customer acquisition) from their businesses, and some clearly saw themselves capable of the type of hyper-growth associated

with producing Unicorns. However, the survey highlighted that investors ranked lowest in terms of how important sustainability is to them, so there is a built in tension between this drive for growth and sustainability.

Most of the Createch leaders interviewed think that technology intellectual property is an essential part of what makes them a Createch. Not just in terms of competitive advantage and company valuation but, in the words of one founder as:

> "*Shiny objects that attract creatives and technologists alike*."

In other words, technology is central to attracting the best talent to Createch irrespective of whether a business is technology or creativity led.

The journey to sustainability maturity

The data shows that some Createch start-ups are already quite mature when it comes to sustainability. How have they achieved that when some of the more established businesses have not?

It is noticeable in the profile of several founders, that their interest in sustainability is personal and they brought this into their business right from the start. One said, "*I started thinking about sustainability twenty years ago*", another said "*sustainability was at the core of the business from day one*", and another said, "*cost reduction for customer is the main driver, but sustainability has always been there.*"

In three of the interviews, the triggering events for a shift in mindset regarding sustainability were from the arts and culture, not from science. In one case the trigger was their business being in crisis and having to reinvent itself with better alignment to changing views on sustainability in society.

Most described their businesses as being "*purpose-driven*" and for those that have a B2C business model, the importance of consumer pressure to do better is apparent[41]. For example, one of the fashion Createch founders talked about the GenZ consumer focus on sustainability and their expectations over transparency. Another said that the generation entering the job market today are "*very awake and passionate about sustainability and want a creative career for good.*"

High maturity scores also appear to correlate with high levels of motivation to educate oneself about sustainability and to keep current. Although a couple of the founders had pursued formal Masters degrees in sustainability, most founders said that informal self-education about sustainability was the only option open to them as there is "*no support from the establishment*" to quote one CEO. This may be mostly an information gap (a lack of

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[41]See https://www.mckinsey.com/industries/consumer-packaged-goods/our-insights/how-to-prepare-for-a-sustainable-future-along-the-value-chain.

awareness of what is available), or education and training not being structured into the bite-sized courses more suited to busy entrepreneurs, but it does also suggest another policy gap. Progression to higher maturity isn't just about motivation: it requires a specialist knowledge, a degree of formality in documenting policies, definition of roles and responsibilities, and establishing measurement and reporting processes. All challenging for any small business.

From the Createch interviews it does appear that some respondents to the survey have a liberal view of what 'documentation' means. For example, a single page of sustainability bullet points on the web site is all there is (and this is a clear reflection of the reality for the Z or B scoring businesses). However, some do have robust policies, role descriptions and plans, and a surprisingly high number are measuring and reporting their carbon footprint and other sustainability metrics (although there is some scepticism about the validity of some of these tools).

Given that resources are tight in small business and start-ups, external support appears to be the deciding factor in achieving high levels of maturity. Although incubators, accelerators and national innovation schemes were commonly cited for commercial support (such as StoryFutures, CreativeXR, Digital Catapult), it is regional and local support (especially from publicly-funded green schemes) that is the common success factor for sustainability.

Some of the specific examples given are:

- The Loop programme in Bristol providing low-cost support for six months
- Bristol Green Capital Partnership
- The Lambeth Net Zero Accelerator
- Somerset Business Agency providing information on setting up sustainable businesses
- Specialist sustainability support from a local organisation that InnovateUK suggested
- Mentoring support that included sustainability as part of the London Mayoral Entrepreneurs Award
- Buckinghamshire Business First providing sustainability support
- Regional Small Business Saturday events, with sustainability themes

The reason given for this is that these sources of support are mostly in-person, often delivered by people with specific knowledge of the challenges of smaller businesses rather than corporates.

A criticism of the Creative Industry initiatives in Figure 1 is that they are viewed as dominated by, and more suited to larger businesses, and not set up to support start-up and scale-ups. Albert appears to be an exception, possibly because participation is mandatory to be a supplier to major TV companies such as Sky and the BBC, and there is an active network of support for smaller players.

As well as publicly funded sources for guidance, some founders have used specialist consultancies to help formalise their sustainability policies and practices. For example, for

the smallest businesses (fewer than 25 employees), Small 99[42] was mentioned as a source of guidance by one of the founders interviewed.

When it comes to measurement and reporting, the sophistication of some of the most mature Createchs is apparent as they go beyond simple carbon calculations:

- Online tools that link to bank accounts and convert purchases (for example for travel) to a carbon footprint (such as yayzy[43])
- Sphera ESG[44] software for sustainability and operational risk management
- A custom footprint measurement and offsetting approach using the Sustainable Travel International business online offset facilities[45]

However, it is noticeable that metrics beyond carbon and GHGs veer towards qualitative statements, and that lifecycle calculations are almost always once off exercises, usually with a local University assisting.

Certification ambition

The survey returned a finding that up to 25% of Createchs are seeking B Corporation status in the future, and about 30% are currently undecided (from the industry scan, there were three B Corporations). What does this really mean?

The interviews indicate that most founders and CEOs understand that B Corporation status is difficult to achieve: as one said "*it is on the to do list, but we are time and resource constrained.*"

The motivation behind the headline numbers is interesting. Createch leaders appear to be looking for external validation and certification, more than choosing B Corporation in particular. This validation is seen as important for communicating sustainability credentials externally as a response to pressure for more sustainability. This can be seen from the survey data (see Table 15).

Table 15 Impact of external pressure on B Corporation ambition (n=70).

External Pressure	B Corporation Ambition		
	No	Not Sure	Yes
No	56%	26%	18%
Yes	31%	36%	33%

As a response to market and societal forces, other certifications may well be equally (or more) relevant. Planet Mark[46] was mentioned twice as a lower cost (time and money) route

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[42] https://small99.co.uk/our-mission/
[43] https://www.yayzy.com
[44] https://sphera.com/about-us/
[45] https://sustainabletravel.org/our-work/carbon-offsets/businesses/
[46] https://www.planetmark.com/certification/what-we-do/business-certification/

to certification than B Corporation, and a certification process more suited to companies in the Creative Industries.

From the interviews, B Corporation seems to have more traction with consumer-facing (B2C) businesses than B2B. This may simply reflect the name awareness B Corporation status has achieved from major consumer brands such as Patagonia.

One interviewee mentioned that their investors looked favourably upon B Corporation status as a vote of confidence in the management team but would not want them to be distracted from growing the business if there was a trade-off.

Another way of becoming 'certified' is by using standards such as ISO14000 and seeking certification from an accredited body. None of the interviewees had gone this route (although a few survey respondents and companies in the industry scan had), and one said they would only consider it *"if a customer insisted"* as the costs would be prohibitive". Some interviewees did see these national and international standards as valuable guides but had little sense of how much work would be involved in getting certified.

Opportunities and challenges

Survey respondents were asked to what extent sustainability was seen an opportunity for them (on a percentage scale, where 50% or more means 'opportunity'). The average of the scores was 70%, with 80% rating sustainability as an opportunity (see Figure 21). Even taking any influence from halo effects into account, the response was positive.
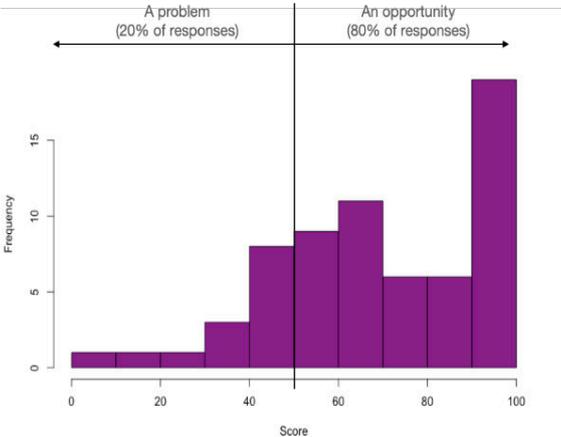
Figure 21 Sustainability as an opportunity or a problem (n=65).

This positive perspective was also evident in interviews, with several interviewees stressing that UK and other societies are changing, and sustainability is likely to remain a hot topic for many years (or grow). All the founders and CEOs said that this presents them with business opportunities that Createch companies should be able to exploit, although it is unclear as to how well positioned to pursue these opportunities companies are given the lack of documented strategies and plans.

The role of technology in creating new sustainability opportunities for Createch businesses was raised in the interviews. Interviewees mentioned benefits in terms of substituting digital goods for physical ones (for example in digital fashion) and new ways to work internationally without travel (such as digital location shoots).

As well as market benefits such as attracting new customers, the survey findings reveal other benefits, such as attracting the best employees (see Figure 22).
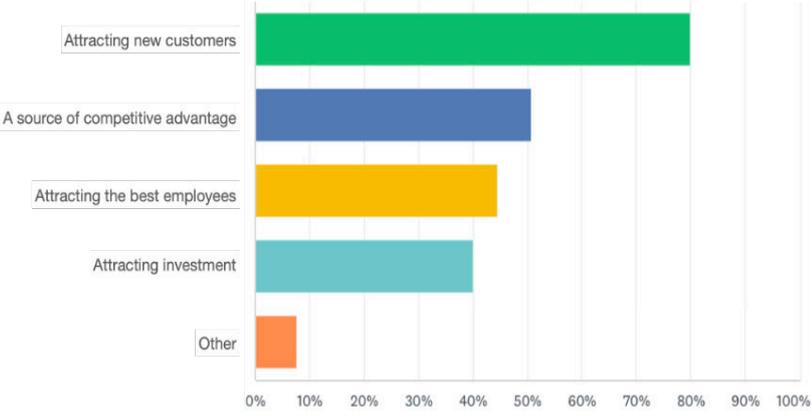

Figure 22 Think of how technology can support Sustainability. What opportunities does this create for your business or organisation? (n=65)

The combination of technology and sustainability presents barriers as well as opportunities. All the interviewees stated that availability of the right skills was the main barrier. For business owners this is a barrier, but for the LEP interviewed it is an opportunity as it fits with their focus on green skills (including digital) and their strategic development prospectus for education providers locally.

For those with external investors, this skill barrier was closely followed by the challenge of delivering on sustainability goals while satisfying investors' desire for growth and financial returns. It was noted by two interviewees that even when investors are 'green funds', the emphasis is always on delivering the financial results.

This last point about balancing sustainability ambitions with stakeholder objectives is particularly acute for the early-stage start-ups. Resources may be extremely tight: the entire business may be two co-founders and some part time administrative help. However, even one of the largest businesses interviewed made a similar point.

Another major barrier quoted is keeping up with the latest thinking on sustainability and understanding statutory requirements for sustainability. For some at the lower levels of maturity, even accessing basic information to increase awareness was seen as a barrier. Resource constraint is part of the problem, but interviewees consistently said that finding information (particularly UK government information) was difficult, with confusing online sources and no help lines. This point about access to in-person help from people who understand the Creative Industries was also raised in earlier UCA reports on the future of the Creative Industries in the UK.

Technology concerns

Some of the key technologies that Createchs are investing in are already being flagged as sources of concern, mostly in terms of their energy consumption and carbon footprints. In the survey, participants were asked to identify which technologies were of greatest concern to them in the context of sustainability (see Table 16 for the top 10).

Technology	Percentage of Concerned Respondents (Major Impact or Key Concern)
Blockchain	72%
AI	59%
Metaverse	56%
Cloud computing and storage	53%
VR	46%
Simulation	43%
XR	41%
Robotics	38%
AR	38%
5G	35%

Table 16 Level of concern regarding sustainability impact of different technologies.

Interviewees offered mixed views on the significance of these concerns and quoted the difficulty they had verifying claims from suppliers. Specifically, some cited the lack of transparency from their technology service providers and vendors. Others said they had low confidence in estimates of the energy consumption and impact of key technologies such as AI and blockchain. Others speculated that as renewables increasingly dominate energy generation globally the GHG problems would go away.

The way technologies are implemented was also recognised as important in terms of energy consumption and GHG emissions. For example, although blockchain takes the number one spot in relation to current technology concerns regarding energy consumption, one founder said that this was simply a technical problem related to the dominant design of algorithms and protocols and this will be resolved in time as newer designs come along. Again, this is difficult to verify, and further highlights that measurement systems for the environmental impact of these emerging technologies are not yet robust (a challenge shared with even some of the more established technologies, such as streaming).

The metaverse (or metaverses) at number three is interesting and is likely driven more by perception than available information. Estimates of the size and scope of the metaverse marketplace vary widely and understanding of the devices and infrastructure requirements changes rapidly. Given that metaverses are likely to act as important large-scale enablers for digital art, digital fashion, and new forms of immersive entertainment, this is an area that policy makers need to quickly establish measurement systems for and watch closely.

Perhaps surprising to see in this list is cloud. The most advanced cloud data centres are designed around carbon free energy (biomass and renewables) and circular design for the hardware, and boast significant reductions in footprint compared to alternatives such as on-premise[47] servers. The interviews did not provide any answers, but this may be another example of where vendor claims aren't believed. Given that cloud infrastructure is likely to continue to dominate the Createch world, this is an important area for future research.

Open Source software can offer greater transparency in many cases and, as one founder commented, "*Open Source increasingly has sustainability as a key theme. Such as reducing GPU usage in the cloud and the move to the edge.*"[48]

Finally, keeping up with technology trends was also mentioned as an important barrier: "*navigating digital choices is difficult as there are so many noisy vendors and fads.*"

Createch leaders' expectations of policy makers

There is a thread running through the interviews regarding policy makers in the UK that is summed-up by one participant in the research: "*there is a need for smaller, more creative/ value-driven/adventurous firms to be taken more seriously.*" In different words, founders and CEOs express the view that the growth potential of Createch is often discussed, but that policy makers' do not treat Createch in the same way as Fintech and others. This consequently affects attitudes to support and funding. Overcoming this barrier may require creating a dedicated body to present a unified front and represent the interests of these businesses.

The most common request in interviews and the survey comments is for government policy makers to provide better business support to understand legislation; as one survey respondent put it "*we are a small business and finding support is hopeless.*" For sustainability, the critical support Createch founders and CEOs seek is more publicly funded investment in provision of in-person support from specialist advisors, rather than a web site or tool. The main reason for this is, as one respondent put it, "at the moment it all sounds complex", and others mentioned the unique nature of Createch businesses.

Of course, government financial incentives are viewed as important too, particularly since private investors are still seen to de-prioritise sustainability over growth. One respondent wrote that there needs to be "*tax incentives to move to net zero faster*", another that policy makers need to "*ensure the framework is in place to support the Creative Industries to find finance, resources, and support*" and another interviewee said that the government needs "*to match funding and support to sustainability targets.*" More generally there seems to be a belief that incentives (not just tax breaks) tailored to for hitting certain levels of sustainability would be helpful.

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[47]https://www.accenture.com/gb-en/insights/strategy/green-behind-cloud
[48]GPU = Graphical Processing Unit (specialised computer chip designed for rapid mathematical calculations, such as required for image manipulation, commonly used in high performance computing of any sort). The word "edge" in computing describes a distributed computing paradigm where computation takes place close to data sources such as users' phones or an Internet of Things device.

Action by policy makers to address skill and knowledge gaps are also mentioned frequently. For example, policy makers should "*enable, support and promote home-grown talent and capability to serve and deliver sustainability/Createch solutions nationally and internationally.*" There is also a recognition that policy makers can set policies to encourage "*knowledge exchange between academic research institutions and industry*" and that technology transfer from academia to start-ups could be improved.

The need to "level up' is reflected in comments concerning regional and local variations in digital infrastructure, training provision, availability of business support and funding. Several founders had moved the location of their operations at least once because of low bandwidth or skill shortages.

Few of the survey respondents or interviewees mention the policy needs for the circular economy (the survey showed that awareness of the circular economy amongst Createch respondents ranking near the bottom of the list of sustainability definitions). Primarily it is only those founders and CEOs involved with live events and physical products (such as textiles, fashion rental and design of devices and equipment) that highlight policy needs for the circular economy. These leaders see a need for government policy makers to take the lead in nudging both public and business attitudes to consumption, reuse, waste, and resource efficiency. They also ask for more public finance to support collaborative R&D to find new materials and processes ("InnovateUK is very important"). These leaders also highlight the challenges they face in moving physical items around the UK and across borders and ask for "*support for the infrastructure of the circular economy*", specifically the reverse logistics elements.

8. Conclusions and recommendations

Definitions

This study builds on previous studies of the Creative Industries and other sectors (such as Fintech) to present a tighter Core Createch definition. Tightening the definition has the following benefits:

- **For investors**, the definition makes the value propositions that Createch businesses offer, clearer; and
- **For policy makers**, the definition further clarifies where and what policy support is required, and which benefits will flow in return for the UK economy.

This refined definition addresses the key shared goal for investors and policy makers: growth of Createch businesses.

In the case of early-stage investors (such as venture funds), liquidity events such as Initial Public Offerings (IPO) are one of the most prized outcomes for any '-tech' in their portfolio. The Core Createch definition seeks to characterise those businesses most likely to choose a transition from a private to a public company, and to pursue Unicorn status.

This definition also brings to the fore the importance of intellectual property and defensible technology assets. This is, perhaps, the strongest counter to the perception of Createch as somehow lacking in substance and staying power, or wholly dependent on creative talent that could walk away at any moment. This also emphasises the importance of R&D, especially University and industry collaborations, to deliver software and hardware innovations.

This new definition lends itself to a clearer understanding of an idealised operating model for a Core Createch (see Figure 23).
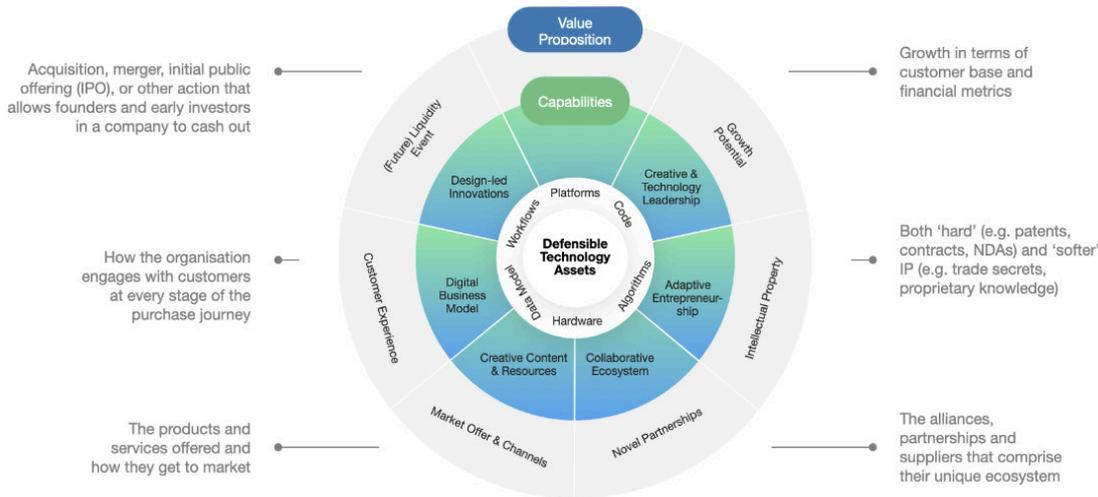

Figure 23 Idealised Core Createch operating model.

This model has been influenced by insights from the founder and CEO interviews. These suggest that looking at Createch as being either creative-led or technology-led is misleading, as interviewees did not accept this binary distinction. In comparison to a purely technology or creative business, this operating model shows how a blend of entrepreneurial creative and technology capabilities is complemented by collaborative design and digital capabilities to deliver a unique value proposition. In turn, this suggests areas where skills and knowledge need to be nurtured through national policy.

Note that the phrase "adaptive entrepreneurship " is used here to capture something unique about Createch founders: they flex and adapt as new technology develops and as they better understand the interaction of their customers with their experiences, services and products. Sustainability isn't the only journey these businesses have embarked on.

> **Recommendation**: Adopt Core Createch (as opposed to existing definitions of Createch that are less specific) as a working definition for policy discussions regarding Createch and economic growth.
> **Recommendation**: Invest in further research to understand the extent and nature of the Createch Adjacent business ecosystem.
> **Recommendation**: Engage with DCMS and the Creative Industries Policy & Evidence Centre to discuss the value of the Core Createch operating model as input to future strategic skills reviews for the Creative Industries.

Sustainability maturity and national policy linkages

With over 70% of the survey respondents at Zero or Basic maturity, and gaps in awareness of key UK government strategies, there is clearly scope for improvement. Some of this falls upon the shoulders of the leaders of Createch businesses. Some of the most mature in the sample are micro businesses that have managed to navigate the multitude of web sites, strategies, policies, and laws to produce solid strategies and plans of their own.

However, as the researchers for this study experienced, government departments also need to improve communication of the key policies, improve access to key documents, and better co-ordinate between themselves to make it easier to navigate all the relevant materials. Some of the interviewees for this survey had difficulty explaining common terminology in government documents such as Scope 1, 2 and 3 emissions, some had not noticed that the UK Carbon Budget had recently changed and that the net zero targets had moved too.

Despite the potential growth of GVA for the UK economy, Createch is all but invisible in government strategies and policies, including sustainability guidance. The absence of Createch (and the Creative Industries as a whole) in the 400 pages of the Net Zero Strategy: Build Back Greener document (October 2021) means that Createch leaders must interpret the guidance themselves, and they consistently tell us they find that difficult and have little support.

There seems to be an underlying assumption about Createch (and many other parts of the Creative Industry) that sustainability issues are mostly about energy consumption, and that will go away with time. This ignores the reality that the broader spectrum of environmental and social megatrends will be with us for some time and will require a response from businesses.

This assumption about energy consumption (and hence GHG emissions) also ignores the substantial cross-border production and ICT activity on the supply, and the network effects as these businesses scale on the demand side. For example, imagine a UK Createch streaming platform scaling to rival incumbents such as Netflix. Netflix state that their carbon footprint in 2020 was around 1 million metric tons of carbon dioxide equivalent[49], excluding the devices in consumers home around the world. These at-home devices may account for a further 6 million metric tons, depending on the energy generation mix where they are located. For comparison, Small99 estimate that all the SMEs in the UK currently account for only 26 million metric tons[50].

Again, these figures are likely based on several assumptions that are open to be challenged, but they do suggest that rapid growth of multiple Createch companies could create significant carbon footprints in the transition years to carbon neutral energy supplies[51]. Policy makers should take note of the linkages between successful Createch growth and potential undermining of government commitments to reduce emissions.

> **Recommendation**: Develop a tool to help Createch companies assess their sustainability maturity and decide on actions to improve their maturity score.
> **Recommendation**: Invest in research to better quantify the impact of Createch on GHG emissions and UK net zero targets.
> **Recommendation**: Quickly develop a business checklist and a clear, communication campaign regarding the breadth of UK sustainability strategies, policies and laws that are relevant to Createch.

Sustainability certifications, measurement, and reporting

The ambition for B Corporation status is at odds with the practical difficulties for start-ups and scale-ups. The preparatory work is non-trivial. For example, even the free impact assessment is 200 questions. Additionally, one interviewee mentioned that the mandatory B Corp legal requirement may be at odds with shareholder goals during early rounds of venture funding. But this study shows there is a clear demand for such certification either as a reflection of company values and mission, or as a response to market forces (this being particularly true for Createchs in the fashion world). Perhaps the answer is a B Corporation Lite?

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[49]https://about.netflix.com/en/news/net-zero-nature-our-climate-commitment
[50]https://small99.co.uk/net-zero/small-business-carbon-stats/. The data used is Scope 1 and 2 only, and appears to only include energy consumed within company buildings.
[51]Energy suppliers could claim that this can be negated by a faster changeover to renewables, but the lack of transparent and robust methods to calculate impacts throughout the lifecycle means that some of what might appear as a reduction in carbon emissions may be carbon trading and not a real reduction.

All certification schemes require extensive measurement and reporting of sustainability metrics. The survey shows that there is a significant issue with this area for Createchs, and where they do measure the basics (such as GHG emissions) there is little consistency in the approaches being applied or the tools employed. Some industry membership and sustainability schemes provide access to tools, but approaches vary in terms of scope, detail, and underlying assumptions. Also, most tools are based on net zero thinking, and few available to smaller businesses can offer the full ranges of environmental and social metrics.

Even choosing a tool for measurement and reporting is difficult for smaller businesses, and there is no obvious independent source of advice. Start-ups and SMEs are unlikely to have the requisite specialist knowledge in-house to choose the best tool for their needs, and analysts such as Gartner and Forrester focus on corporates and enterprise scale ESG solutions only.

> **Recommendation**: Establish a forum for Createch companies to discuss sustainability issues and their relevance to Createch companies. For the more advanced businesses this forum could discuss their certification, measurement, and reporting challenges and needs.
> **Recommendation**: Invest in research to better quantify the impact of Createch on GHG emissions and the UK net zero targets, and vice versa.
> **Recommendation**: Communicate the need for an early-stage business or 'Lite' certification programme to all relevant parties, and covering sustainability essentials such as policies, plans, roles and responsibilities and measurement.

Technology at the cutting edge

Createch companies such as The Dematerialised (whose purpose is to "*nurture the emerging digital fashion ecosystem providing viable new revenue streams and visceral experiences with a Web3 marketplace for authenticated virtual goods*") and M-XR ("*unlocking 3D realism through materials*") are at the cutting edge of AI, VR, AR and blockchain. As one interviewee said, "UK companies in this sector punch well above their weight."

High performance is more than just technology. Exploiting digital business models and emerging technology requires people who have the requisite 'soft skills'. Large technology and media companies may address this with a 'creative technologist' role (usually a developer with an understanding of creative processes) who facilitates or leads cross-functional activity at the intersection of creative design and emerging technology. These people act as integrators of technological approaches, experience designs, and business models. Larger companies have the resources to train and develop these people, but in a start-up the founders must cover off several roles (including the creative technologist one). Also, for start-ups (and SMEs) there are few places to turn for learning and development for this mix of skills (multi-disciplinary team working, facilitation, communication, emerging technologies, design-thinking, agile software development, rapid prototyping, product management etc).

Working at the cutting edge brings higher than usual technology risk and uncertainty. As noted earlier, without robust methods and transparent assumptions it is difficult calculate with confidence the sustainability impact of key technologies involved in Createch, and UK policy does not currently recognise that Createch is a growing facet of net zero conversations. Certainly, founders are aware of the potential problem, yet they feel they have no voice in policy making.

> **Recommendation**: Develop a competency framework for a skillset tailored to Createch needs. This could draw on the 'creative technologist' skillset found in large media and technology businesses (more focused on integrating the work of multiple departments or large teams. This framework can be used by Higher Education Institutions to ensure that they are supplying the right people for the marketplace.
>
> **Recommendation**: Create a forum to allow Createch founders to voice their opinions to government on the sustainability impact of their product roadmaps and technology choices.
>
> **Recommendation**: Create or adapt a Technology Risk Level (TRL) scale for Createch companies that incorporates sustainability concepts.

Regional and local policy

This study shows that Createch is widespread across the UK and tends to form clusters in much the same way that other sub-sectors from the Creative Industries do. Interviewees stressed the importance of their local business ecosystems (not just technology services companies, but lawyers, accountants, banks, start-up incubators, specialist studios, demonstration facilities, labs and Universities). One reason for this local focus is the complexity of the novel partnerships and networks required by Createch companies compared to more traditional businesses. This is more likely to require face-to-face discussions and workshops to drive effective outcomes, particularly where R&D and innovation is involved. This is echoed in papers from PEC and discussions with people involved in the Creative Clusters programme, where Createch companies located nearby are prioritised for investment, and there is frequent interaction. As an example, StoryFutures Academy is focused on the Gateway Cluster and Greater London.

Createch companies in our dataset mention the relevance of the essential support they have received from the Creative Industries Clusters Programme. However, the funding from the Industrial Strategy Challenge Fund runs to 2023, and there is no announcement yet about its continuation.

When it comes to business support for Createch, however, the regional and local picture seems to be more fragmented, and national-regional policy linkages are weak. Part of the challenge is that Createch is not directly mentioned in Strategic Economic Plans and Local Industrial Strategies even when the Creative Industries are being prioritised. As one person involved with a LEP in one of the highest concentrations of Createch in the country said, "we don't talk about Createch…there is nothing written either."

Examination of the strategies and plans available for the 38 LEPs in England suggests that Createch is being lost in the broad description of 'digital' or the Creative Industries in their entirety. One reason may be that this is still viewed as an emerging sector comprised of small players and that it is too soon to provide them with commercialisation support. However, as this study shows, that is not the case, and some Createchs are scaling quickly. Another reason is a perception that while Createchs generate revenue, they may not be significant local employers. There may be some substance to this belief, but it ignores the wider ecosystem that thrives around these businesses.

However, this should not be interpreted as Createch companies not being able to get support from LEPs as Councils and City Mayors' offices do appear to be a route to support that Createch leaders are successful with (and development of Local Industrial Strategies are led by LEPs whether there is a mayor or not).

> **Recommendation**: Awareness and education for LEPs regarding the growth potential of Createch.
> **Recommendation**: Review all Local Industrial Plans to ensure that Createch is included where appropriate.
> **Recommendation**: Further research on regional and local support in Northern Ireland, Scotland, and Wales.

The Centre for Sustainable Design®, Business School for the Creative Industries, University for the Creative Arts

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- Sustainable Innovation (understanding the policy and business implications of sustainable innovation; and working with companies to develop sustainable solutions
- Product Sustainability (understanding the organisational, management, development, and design implications of product sustainability)

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Trevor Davis & Associates Ltd

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