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### R&D in the creative industries

Bringing the 'dark matter' of the sector to light with data

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## R&D IN THE CREATIVE INDUSTRIES

Bringing the ‘dark matter’ of the sector to light with data

*Caitlin McDonald, Jennie Jordan, and Graham Hitchen*

### **Abstract**

The absence of a theoretically consistent framework for deciding what is or is not a creative industry makes for inconsistent data collection regarding their activities, which has implications for methods, analysis, and sector-related policy recommendations. To achieve insight into how best to support and to grow the creative industries, accurate data needs to be collected, analysed, and shared differently. Though prior research programmes have attempted to address improvements to data-informed policy design in the creative industries, innovation has been relatively slow to be adopted, and data regarding the creative industries is often thought of as ‘dark matter’. Based on research examining new methods for the ethical collection, storage, processing, and analysing of data in the creative industries that can support continuous learning, this chapter recommends two improvements: first, the growing body of research on novel frameworks for improving creative industries data should inform future directions for data platforms used by funding agencies and other strategic bodies. Second, interdisciplinary groups of stakeholders should collaborate on improving the creative industries data ecosystem for all.

### **Introduction**

“There is this, what I’ve sometimes referred to as, the kind of ‘dark matter’ of the [creative industries] sector, all this stuff that’s going on, this activity, but we don’t see it, we don’t understand it” (research participant 17, leader in a public sector development agency for the creative industries in Scotland).

The creative industries are often heralded as being entrepreneurial and innovative drivers of urban, regional, and national economies. Yet there are gaps in the data that is used to create policies to support them via local and central government initiatives and inconsistencies regarding how this data is collected, used, reported, and operationalised. Creating a better data-rich environment for policymakers and other stakeholders working with creative industries data would lead to improved outcomes for the sector.

This chapter discusses the current structural and ontological challenges of using data to support policy decisions in the creative industries, the data-driven methods research participants are using to understand and make decisions about the sector, and emergent technological innovations which may address some of the existing challenges of finding and comparing creative industries data. These challenges include a lack of consistency around defining the creative industries, inconsistent data collection leading to both sparse and duplicate data, onerous data collection burdens on businesses and individuals within the sector, a lack of interoperability between existing data sets, and an over-reliance on systematised econometric data at the expense of tacit procedural knowledge which is essential to innovation.

Drawing on our interviews and dialogue-building exercises with research participants, the chapter concludes with our recommendations for improving data systems, including the need to integrate both science, technology, and innovation (STI) and doing, using, and interacting (DUI) data approaches for holistic data-driven decision support for the creative industries. First, we recommend the establishment of a programme to test emergent frameworks for unified, interoperable data standards and mixed-methods approaches to evaluation. Second, interdisciplinary groups of stakeholders working in different roles in the creative industries data ecosystem should collaborate to improve the ecosystem through continuous learning, adapting, and innovating as sectoral changes arise.

### **Current data paradigms for the creative industries**

The UN's Conference on Trade and Development (UNCTAD) argued "Creative industries create employment and income, promote innovation and contribute to societies' well-being" (2022, p. iii). At the same time, it found data gaps and inconsistencies in how data is collected and classified which have implications for policy design. Although hugely successful at establishing a *de facto* world standard for the creative industries and spurring greater understanding of the creative economy within the UK and beyond (Bakhshi et al., 2013, p. 3), the creative industry categorisation is

inconsistent. Although it does reflect an underlying economic reality, it does not fully capture that reality; it excludes industries with the same

features as the great majority of those it includes, and includes others which do not share these general features, without a clear rationale for doing so.

*(ibid. p. 6)*

These gaps and inconsistencies were succinctly dubbed ‘dark matter’ in a research interview with a leader in a public sector development agency for the creative industries in Scotland, quoted previously. In this chapter, we focus on data that is collected for decision-making related to creative industries policy and funding, which includes quantitative elements (like summary industry statistics) and qualitative elements (like case studies.) This data can be a powerful resource to support better decisions, but inconsistent, missing, or wrongly focused data can be detrimental, warping the landscape in which decision-makers operate. This chapter reports on a research collaboration between CRAIC (the Creative Innovation and Research Centre at Loughborough University London),<sup>1</sup> Creative Informatics<sup>2</sup> (Edinburgh’s AHRC-funded Creative Cluster), and the Data City<sup>3</sup> (spun out from Open Data Institute Leeds to develop the UK Tech Innovation Index,<sup>4</sup> the Data City is a subscription-based online platform for businesses and public sector bodies. It uses machine learning to combine and analyse data from public and proprietary sources on innovation in the UK economy). The study asked: what are the data (adoption) barriers to innovation in the creative industries? And how can we make data collection, processing, and analysis more useful for data users, including policy makers, funders and data providers, creative businesses, and individuals?

Our research quickly identified divisions in how stakeholders creating and utilising information regarding the creative industries defined and conceptualised data. These fell into a pattern reflecting Jensen et al.’s classification of knowledge and knowledge creation methodologies into science, technology, and innovation and doing, using, and interacting (2007). STI modes are explicitly codified in formal data sets which are comparable and readily mobilised as evidence to support R&D policy. Examples include the UK government’s groupings of industries (Standard Industrial Classifications, SIC codes) and occupations (Standard Occupation Classifications, SOC codes), discussed in the section “Data Classification for the Creative Industries.” In the DUI model, Jensen et al. maintain that tacit, embodied, and procedural knowledge modes are essential to learning and knowledge exchange.

In the context of data to evaluate R&D in the creative industries, widely used STI knowledge management tools include economic data classified using SIC and SOC codes, as discussed subsequently. DUI is less widely accepted as a reliable decision-making aid among policymakers though frequently used to supplement data missing from STI models or to add qualitative depth to numerical reasoning (Jensen et al., 2007, pp. 680–681).

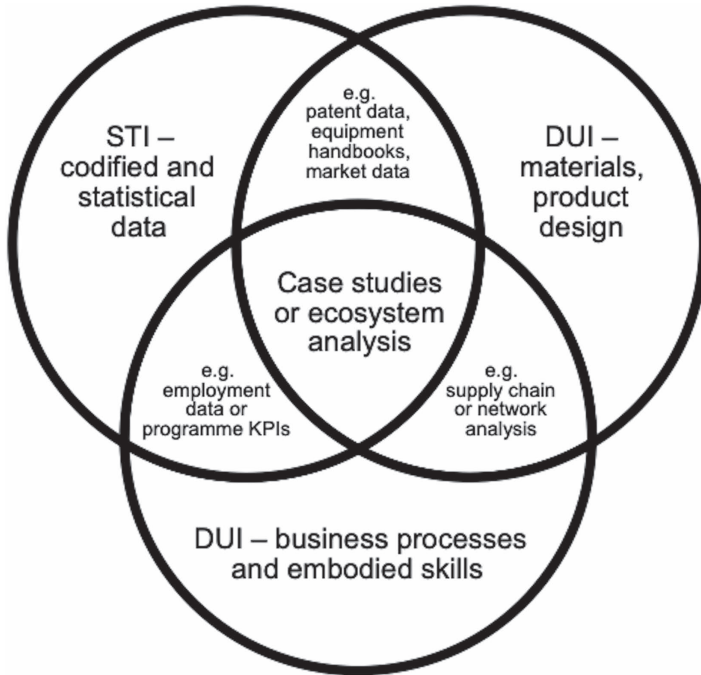


FIGURE 3.1 Interplay between knowledge creation methodologies. © Jennie Jordan, 2023, used with permission.

## Method

To understand how policymakers and other stakeholders currently navigate the data challenges enumerated previously, and how the process of data-driven decision-making for the creative industries might be improved, we conducted a three-phase research process. First, in-depth interviews were undertaken with 34 individuals who either provide, collate, or use data within the creative industries in Scotland and beyond. We asked interviewees how they defined data and innovation, how they engaged with and used data, and what problems they associated with the collection and use of data to support strategic decision-making. Research participants included policymakers and policy implementers in public bodies such as government departments, public funding bodies, and enterprise agencies; trade bodies and membership organisations working on behalf of businesses and individuals in the creative industries or subsectors like screen, games, sculpture, etc; individual creatives and creative sector businesses; academic researchers studying innovation in the creative industries; and data platform businesses like customer records management (CRM), ticketing, and audience development software services used by creative businesses and public sector bodies for monitoring, evaluation, and strategic decision-making.

Second, we ran four interactive workshops with creative practitioners, trade bodies, and policy makers, introducing them to the Data City's platform as one example of new, commercially available tools analysing industry data by using machine learning to combine and enrich data sets from multiple sources (Forth, 2021). We then held a roundtable for six data platform companies to identify commonalities and potential collaboration to improve interoperability and standard definitions for data across the creative sector.

Finally, we ran a 'policy hack day', a facilitated workshop with participants from the stakeholder groups listed previously, asking attendees: what actions can be taken to fill data gaps, to make data more transparent, and to drive innovation in creative industry ecosystems? And, of those, what can attendees take forward in their organisations? Attendees used these provocations to collaboratively identify opportunities to improve the creative industries data landscape.

### **Data classification challenges for the creative industries**

The absence of a theoretically consistent framework for deciding what is or is not a creative industry makes for inconsistent data collection methods and analysis, which impacts the ability to make informed and effective local, central, and transnational government policy. Choices about which aspects of industries are included and measured have direct consequences on the public policy interventions adopted (Galloway and Dunlop, 2007). One example of recent difficulties affecting practical policy outcomes caused by this lack of theoretically consistent framework, which particularly concerns detailed and agreed data about working practices among freelancers and micro businesses in the creative industries, were the gaps in the COVID-19 Self-Employment Income Support Scheme identified by Komorowski and Lewis (2020).

Potts and Cunningham propose four conceptual models for the creative industries: welfare, competition, growth, and innovation. The fourth of these, innovation, is particularly relevant to this chapter (2008, p. 233). Rather than treating the creative industries as a public good (as argued by Galloway and Dunlop (2007), a competitive industry the same as any other, or a special driver of growth which percolates out into other sectors, Potts and Cunningham propose that the creative industries act as a higher-order system which coordinates innovation, novelty, and change across multiple sectors:

this is the same model as proposed for the effect of science, education and technology in the national systems of innovation approach. The creative industries, in this view, originate and coordinate change in the knowledge base of the economy. In consequence they have crucial, not marginal, policy significance.

*(ibid, p. 238)*

Each of these four models has clear implications for setting public policy strategy, with material implications for funding and resourcing different policy choices. The models require vastly different types of data to inform prioritising the creative industries as a radical catalyst for change across the whole economy compared to a funded public good which cannot self-support through competitive means. In this section, we will explore what data sources policymakers currently use for strategic decision-making in relation to innovation in the creative industries, their challenges, and proposed new directions.

### **SIC and SOC: the best possible compromise?**

Probably the most significant creative industry data sources used by policymakers in the UK are the UK government statistics published by the Department for Digital, Culture, Media and Sport (DCMS, 2016). These include occupational data from the Office for National Statistics's (ONS's) annual Labour Force Survey, categorised according to Standard Occupational Classifications (SOC); Gross Value Added (GVA)<sup>5</sup> from the Annual Business Survey segmented by Standard Industrial Classifications (SIC); and data on exports taken from the ONS's trade in goods classification of product by activity statistics (DCMS, 2016, p. 5). SIC codes, used to classify the economic activity of businesses, were first introduced to the UK in 1947 as a means of harmonising data collection and comparison across government departments (Smith and James, 2017, p. 224). SOC codes, used to classify the economic activity of individuals, were first introduced in 1990 (Office for National Statistics, n.d.).

Data sources classified by SIC and SOC remain important for comparing the creative industries with other sectors, especially for bodies needing to consider the opportunity costs of programmes across multiple industries, but our research interviews with creative industries policy bodies found sample sizes are usually too small to analyse subsectors within these data sets. This is compounded by the fact that industry trade and membership bodies are often the first source of data on sectoral concerns as their members ask for help with emerging issues, such as economic precarity during forced cessation of trading during the UK's COVID-19 lockdowns and restrictions in 2020 and 2021.<sup>6</sup> Trade bodies research these issues among their members and produce advocacy documents advising policymakers on proposed courses of action. While this is an important mechanism for influencing policy direction, in research interviews policymakers expressed concerns these reports represent vested interests so lack objectivity. They are keen to ensure "that our understanding of data is not limited by the headlines. I see it as a resource that we have to mine and use very carefully" to shape and monitor "change and progression" (research participant 17, leader in a public sector development agency for the creative industries in Scotland).

The ONS itself recognises the challenges businesses and individuals face in categorising their own economic activities using SOC and SIC codes, as well as the time-consuming nature of manual classification by data specialists (Anthopolous and Wood, 2021). These classification challenges make it harder for policymakers and other strategic decision-makers to get an accurate model of economic activities across many sectors, including the creative industries. This in turn leads to challenges with devising data-informed interventions to support R&D and innovation. While most stakeholders agree SOC and SIC codes have drawbacks, inertia about them has been strong: they are still largely seen as the best possible compromise as a means for cross-industry data comparison and for comparing current to past economic sector change (research participants 3, 4, 9, 17, 20, 34). The next section will discuss attempts to devise new methods for industrial classification.

### **Innovation spillovers and how to measure them**

One classification challenge particular to the creative industries is how to account for creatives working in non-creative industry organisations and businesses as identified by Higgs and Cunningham (2008, pp. 7–30). Their creative trident model distinguished between workers with a cultural profession working in a cultural sector (e.g. an artist in an opera), workers having a cultural profession but working outside the cultural sector (e.g. a designer in car industry), and workers having a non-cultural profession and working in the cultural sector (e.g. a secretary in a film production company) (Higgs and Cunningham, 2008, p. 18). This matters because of the potential for innovation of *spillovers*, “benefits (or costs) of an activity that accrue not to the individual or business undertaking the activity but to other individuals or businesses” (Frontier Economics, 2022a, p. 3). It can be further argued that spillovers are one of the benefits of creative clusters (*ibid*, p. 6).

Working with industrial data, Bakhshi et al. found “industries with stronger links to the creative industries . . . have stronger innovation performance” (2008, p. 5), arguably a practical recognition of Potts and Cunningham’s proposed conceptual model of the creative industries as a higher-order coordination system of innovation (2008). Bakhshi et al. (2013) developed a method for measuring structural changes within the creative economy accounting for spillovers between the creative industries and other economic sectors such as manufacturing, shipping, consumer goods, and so on. Their model measures the proportion of workers in creative occupations (i.e., the first two of Higgs and Cunningham’s trident) in any given industry, which Bakhshi et al. referred to as “creative intensity” (p. 3). This can then be indexed to highlight whether creative roles are growing in any economic sector, identifying industries likely to be innovating.

This work laid the groundwork for adopting novel methods for gathering and classifying econometric data about the creative sector (Bakhshi, 2016;



Doeser and Hitchen, 2021; Mateos-Garcia, 2021; Walmsley et al., 2022). The Data City, our partners in this research, previously developed the UK Tech Innovation Index, devised to demonstrate possible replacement mechanisms for SIC and SOC codes (Forth et al., 2018). However, as mentioned, these novel data collection and classification methods are largely unknown to policymakers who continue to rely on SIC and SOC codes for decision-making. Research participant 4, working in a data analysis unit at a UK-wide creative industries public sector body, described the central importance of these classifications:

So when it comes to data collection and data crunching most [government] agencies do, the National Statistics Office [sic] are collecting that, then we are pulling out the SIC codes or the sub-sectors that are relevant to us, then collating those for the creative industries. We have these . . . economic estimates that are basically GVA [Gross Value Added] trade, etc, for these sort of macro-level statistics. That's our main data collection tool for statistics and the creative industries.

Further, Clive Gillman, director of the Creative Industries at Creative Scotland, a public agency supporting the creative industries, gave a talk describing the importance of ONS data including GVA, SIC, and SOC codes for consistent data upon which to base policy decisions across all government departments at a Life in Data Knowledge Exchange event in 2019 (Gillman, 2019, minute 14:46–33:06).

Like the lack of cohesion around the term 'creative industries', 'innovation' was another contested term in our research interviews. One interviewee said, "innovation isn't a word we use – it's a word that seems like it's from a different discipline," and "If I saw a grant advertised as an 'innovation' grant I would understand it as a science-based thing" (research participant 19, leader at a Scottish screen development agency). Conversely, another participant pointed out the term 'innovation', much like its predecessor term 'digital', gets used as a sort of window-dressing for funding applications, evaluation reports, case studies, and the like (Research participant 34, academic researcher on innovation in the creative industries and director of a government-supported innovation fund for the creative industries). This suggests people working in the creative industries are not aligning their work with economic policy outside the sector, nor with the conceptual frameworks policymakers use to make strategic directions for the sector. Another participant said, "I spend about half my life explaining to people what innovation is!" (Research participant 15, innovation lead at a data platform provider and research consultancy focusing on the creative industries). The lack of a shared understanding of the term, or common frameworks for strategic decision-making, diffuses sector activity which could be more productive and profitable.

### Data for decision-making

“[Data is] key points that help people to understand, create new knowledge or inform them if they are making decisions . . . data without a purpose is nothing that really matters, in my opinion” (Research participant 10, academic researcher on innovation in the creative industries).

Policymakers face several challenges attempting to use both STI and DUI data as a decision support tool. From both the prior literature and our research interviews, there is a need for data to support innovation in the creative industries going beyond head counts of creative businesses or workforce totals. Policymakers and strategic decision-makers need to find new mechanisms for understanding how people work across the creative industries and between creative and other economic sectors.

### Pockets of knowledge

“Innovation flows through [the] creative industries, for example, [through] the role of freelancers, as pockets of knowledge that get moved through supply chains or across networks” Research participant 9 (policy adviser for a UK-wide joint government-industry forum on the creative industries).

Tacit knowledge discussed by research interviewees included learning about the properties of unfamiliar materials and the potential of new equipment, discussed further in the “Analogue Data” section. In interviews, creative industries practitioners highlighted that their own knowledge and skills development was facilitated by finding experts to partner with or learn from (research participants 2, 5, 27). While some of these experts were sourced through an internet search, others were found through networks and core infrastructural organisations such as studio and workshop facilities and links to universities. Knowledge transfer activity like this is an example of spillovers within the creative industries.

Research participant 9 referred to these spillovers as “pockets of knowledge,” per the quote at the start of this section, further stating that describing these pockets has “not necessarily reached . . . mainstream policy articulation and it certainly isn’t falling back into creative businesses, who need to articulate and to understand what innovation looks like or is.” The importance of places for pockets of knowledge or spillover exchange is corroborated by recent research from Creative Edinburgh and Creative Informatics in their 2022 report on the creative freelancer experience (Connell et al., 2022). This research shows creatives in Edinburgh and the surrounding region particularly value membership organisations such as CodeBase<sup>7</sup> and the Melting Pot<sup>8</sup> as hubs for creating informal and formal knowledge networks among peers. Mechanisms for informal knowledge exchange arising from these membership organisations include co-working spaces and networking events, and formal methods include courses and mentorship schemes. As a project and micro business-based ecosystem which employs a high concentration of

freelancers,<sup>9</sup> this movement between organisations, with its potential to catalyse innovative spillovers, is a critical aspect of the creative economy.

### Dark matter

Despite the varied sources policymakers use for evidence-gathering, it became evident through interviews existing sources of trusted data are not sufficient for policymakers, leading to the perception of creative industries' 'dark matter' (participant 17, quoted previously). Our research identified several data platforms currently in use for strategic decision-making at the policy and individual company/organisation level within the creative industries. These platforms can be seen as a response to the gaps in the data about creative industries' economic and innovation activity available through sources like Companies House and the Office for National Statistics' Annual Business Survey. Existing widely known commercial software examples include the Audience Agency,<sup>10</sup> Spektrix,<sup>11</sup> and Data Thistle.<sup>12</sup> Another example is an internal platform developed for the South of Scotland Enterprise Agency (SoSE), a public body focused on supporting economic development within their region. This platform combines standardised data available to anyone from sources such as Companies House with custom-collected information on freelancers working in the region, gathered from surveys and customer relationship management systems maintained by the agency (South of Scotland Enterprise, 2022). While the data, dashboards, and maps in SoSE's platform are not at time of writing available to the public due to data privacy considerations, SoSE hopes to make its work available for companies and individuals to use for a better understanding of opportunities for collaboration and commercial opportunities in the market (Research participant 8).

We interviewed representatives from companies of six data platforms which had been developed for marketing, business, or programme monitoring purposes holding aggregate data on the creative and cultural sectors at national and international levels. These platforms were at various stages of engaging with policymakers to provide decision support. Recent examples included their ability to show, in close to real time, the effects of COVID-19 on the number of events being programmed across the UK, and on audience numbers for these events, for example, Spektrix's ticket sales dashboard released in November 2022 showing comparators to 2019 ticketing levels (Spektrix, 2022).

In interviews, these platforms argued for the benefits of common data standards and open data in enabling innovative applications for policymakers and others wanting data as a decision support tool. This included planning transport provision around major events like Edinburgh's seven August festivals (Data Thistle, 2020) or apps to make collating of climate or equalities data easier, more accurate and timelier. Existing common data standards such as company numbers were being analysed against a range

of econometric measures. Research participants were using them to identify geographical creative industry clusters, sectoral size, and growth, and they believed there was more which could be done if other common standards could be agreed upon, both between themselves and with government.

Other research participants, however, expressed more scepticism about statistical data, describing it as lacking nuance. It was “zeros and ones in different boxes that make our work abstract in some way. It’s an intended simplification that ends up being a reduction” (Research participant 19). Such data did not contain the DUI know-how and know-who elements of creative work intrinsic to innovation and innovation ecosystems, as discussed in the following.

### Analogue data

[To find out] who’s doing what when, you can anecdotally talk it through with your peers, and a lot can be done through lots of different groups; a lot of information is shared informally. When it gets to the outcome stage lots of organisations have newsletters, or there’s something happening that you get invited to . . . and that’s also a way in to find out opportunities you didn’t know about. . . . So that makes it quite organic, doesn’t it?

*(Research participant 5, independent artist working as a sole trader)*

Several different participants referred to DUI knowledge in related ways which we began to think of as ‘analogue data’ as one of its main defining features was its lack of quantifiability. This kind of knowing was highly significant to the independent creatives in the research yet is largely overlooked in both the innovation literature and policymaking. Unlike scientific experimentation to which it is allied, it is not always possible to generalise or replicate skills or embodied knowledge. As Jensen et al. argue, DUI-mode knowledge is acquired through practice and situated in specific context where cumulative know-how and know-who enables successful transfer of idea to product via an infrastructure of resourced and resourceful entrepreneurs, a suitably educated workforce and a stable and supportive regulatory environment (2007, p. 682).

Research on creative cluster case studies combining STI and DUI data has highlighted the highly situated nature of the creative industries within place-based networks and supply chains (e.g., Seipel et al., 2020; Doeser and Hitchen, 2021; Frontier Economics, 2022b; Pricewaterhouse Coopers LLP, 2022). Co-location of different elements of the supply chain from design to manufacture to marketing facilitate product and process innovation in response to changing market conditions (Mateos-Garcia and Bakhshi, 2016). Know-how and know-who are important in explaining the power of creative

clusters to support innovation and growth (ibid). While there are no easy solutions to collating DUI data, this study supports UNCTAD’s argument: a “Lack of harmonized definitions and methodologies and lack of data are among the key challenges to measuring the creative economy. Lack of data may lead to some creative industries and activities being overlooked by analysis, policy design and development” (UNCTAD, 2022, p. 10).

### **(Precarious) piles of knowledge**

The rest of it is kind of ad hoc and I don’t think we have a central place of gathering all of that data. Really, it tends to, for my team at least, come in quite ad hoc and gets added to our little pile of information, so we can refer to it when we’re making decisions or advising a minister on a decision.

*(Research participant 20, leader in creative industries policy in the Scottish government’s Culture Directorate)*

Another concern about the sources of data policymakers rely upon which is particularly relevant to R&D programmes: these are often based on evaluations of programmes. These sources are reporting on events, outputs and impacts sometime after the fact. This delay, when combined with the timescales needed to agree new programmes, is seen as problematic in fast-changing environments like digitally focused creative industries subsectors, including software engineering and gaming (see, for example, the Scottish Games Network case study accompanying this chapter). The ability to develop new industrial classifications at speed, reflecting the rapidly shifting nature of industrial change, is one of the challenges novel frameworks and methods this work attempts to address.

In a scoping study for DCMS, consultancies MyCake and the Audience Agency (2021) reviewed a range of economic data available on cultural sector activity, concluding the ad hoc nature of data collection for policy decisions has led to gaps in understanding how the cultural economy operates, per the interviewee quote at the start of this section. Material impacts of these gaps included undermining the government’s support for the sector during the COVID-19 pandemic. MyCake and the Audience Agency identified data sources which were not being well used, such as administrative data in annual reports and grant returns, and recommended finding ways to exploit these. To that end, data collection would have to be standardised and made available in machine-readable formats to allow for different datasets to be linked and analysed systematically. They propose using data already collected by Companies House, the Charity Commission, and Interdepartmental Business Register combined into a new cultural sector data platform “built and maintained by stakeholders from across the sector” (ibid, p. 40). This would

be supplemented by existing operational data (e.g., annual reports; statutory financial information) from companies and charitable bodies working in the sector, adding further data sources like funding, membership bodies, and so on in a phased approach as these currently fragmented sources become standardised and combinable.

While the motivation is to make data more available, robust, and dynamic, these recommendations are not unproblematic. First, almost a third of workers in the creative industries are self-employed (Easton and Beckett, 2021). This makes Companies House data on number and location of companies and data on staff costs unreliable. Panneels describes this problem as it relates to the economic crisis for creatives across the UK in the wake of COVID-19, highlighting these data points are not consistent across the whole of the creative industries (2020). Some subsectors such as craft exceed 80% working as sole traders. Data on this missing economic activity is currently collected using methods like surveys which are costly, time consuming, and collected at irregular intervals (*ibid*). In relation to innovation, it is likely to underestimate the amount invested by companies as R&D is likely to be undertaken at least in part by those freelancers.

There is a further risk of the segmentation becoming fossilised. Technology is rapidly changing patterns of production in many creative sectors, with visual effects (VFX) and virtual production (VP) for example starting to take place during filming rather than post-production. Finally, there is the ethical issue of collecting data for one purpose – grant monitoring or tax collection, for example, and then using it for other types of decision-making. See Chapter 7 for further discussion of the challenges of privacy issues and legal frameworks relevant to data collection for the creative industries.

### Mapping the creative industries jigsaw puzzle

I've taken over the remit to look after the creative industries and in doing that I need to understand, okay: who is working in the creative industries, what is it they're doing, where they're doing it, how are they doing it, who are they doing it with. And what other connections are there, and there's a multitude of areas . . . part of the wedding industry, for instance, quite a number of the creative industries are [included]. There's a whole host of touch points to try and build that picture, so I kind of look at it as a massive jigsaw puzzle of the creative industries.

*(Research participant 8, strategist at a Scottish enterprise agency)*

As we've mentioned, data on micro businesses, especially freelancers, has largely been recognised as a data blind spot for policymakers: the *dark matter* that is there, influencing the sector around it, but only visible through indirect

effects on other standard econometric mechanisms of capturing value. As well as the geographic maps available in the Data City's online platform, in our research we encountered three different interactive geographic mappings attempting to visualise the importance of freelancers within a creative cluster or local economy. There are other localised attempts to solve this problem through a geographic mapping framework; we present these three as indicative of themes we've identified elsewhere in this chapter: different stakeholders have different views of what innovation is and therefore prioritise different typologies or values of innovation. Hence in creating the data structures they use to understand innovation ecosystems, including the freelancers operating within those systems, they prioritise different data inputs. Further, choosing interactive geographic maps as a data output over other possible means for sharing data (e.g., charts, tables, summary statistics) indicates physical geographies remain an important feature for policymakers and funders even in a time of increasing digitisation in the creative industries and beyond.

The first example is Creative Informatics' work plotting individual creatives and businesses by postcode area onto an interactive map of the six local authorities which make up the City Deal region: Edinburgh City; East-, West- and Mid-Lothian; South Fife; and the Scottish Borders (Helgason and Panneels, 2021): the catchment area for Creative Informatics' creative cluster funding. Two versions of the map show the businesses using the Scottish Creative and Cultural Industries Codes (SCCI) classification codes (Creative Informatics Map (SCCI Markers), n.d.) or the DCMS creative industries definition (Creative Informatics Map (DCMS Markers), n.d.) described earlier in this chapter. Relying on a government-published data source (FAME data (Bureau van Dijk Electronic Publishing Ltd, n.d.a)) was insufficient to provide the full picture: researchers' personal knowledge of the local creative economy, and consultation with local creative businesses to correct wrong or add missing data, was required to populate the map.

The second project, Creative Economy Atlas Cymru, was created by the Welsh creative cluster Clwstwr to explore the geographical distribution and scale of the creative industries across Wales broken down by creative sector (Clwstwr, n.d.). This also relies on a government-published data source (Orbis (Bureau van Dijk Electronic Publishing Ltd, n.d.b)), with a similar mechanism of manual updates by researchers based on their personal knowledge of the local cultural economy and consultations with creative businesses within the area to add or update the map.

As described earlier, South of Scotland Enterprise (SoSE) built a data platform explorable through a discovery dashboard and map of its local creative economies. Keeping this data accurate, complete, and up to date requires a comprehensive knowledge of the local business landscape in the south of Scotland, something achieved primarily through personal relationship between SoSE and its constituents.

All three projects hold in common the use of a standard data source supplemented by extensive local knowledge networks to keep their maps current, a comprehensive yet time consuming process. All three projects also show a clear need for feedback mechanisms into these standard data sets allowing local businesses, or perhaps trusted trade bodies or advocacy organisations, to audit and repair missing and incorrect data. Both of these challenges represent problems which the novel data capture, processing and analysis methods discussed in the following attempt to address.

### Exploring the ‘dark matter’ with novel data processing methods

As outlined earlier in “Innovation Spillovers and How to Measure Them,” researchers have begun experimenting with automated forms of data capture and assessment for economic activity in the creative industries. The insights from these projects suggest routes for standardised data frameworks of machine-readable creative sector data (MyCake and The Audience Agency, 2021) and for dynamic industrial classifications (Bakhshi, 2021). Adopting these frameworks would radically change future policy, investment strategies, and economic analytical methods for the creative industries.

Increasing machine-readable data flow about the creative industries has potential to improve data-driven decision-making, but like all automation initiatives, it also creates new challenges. Examples of digital data exacerbating existing inequalities and harms in society, either intentionally or unintentionally, are extensively catalogued in both academic literature (e.g. Robinson et al., 2015; Vallor, 2016; Hicks, 2017; Lutz, 2019; Beaunoyer et al., 2020; Helsper, 2021) and in writing for non-academic audiences (e.g. O’Neil, 2017; Bowles, 2018; Chowdhury and Mulani, 2018; Williams, 2018; McDonald, 2019; Bartoletti, 2020).

There are a few examples of where systems have gone right, providing lessons which could be adapted for any new systems designed to serve the creative industries. For example, medical data is of high value for research but also highly sensitive and personal for each patient (NHS Confederation 2024, n.d.). Building on existing patient confidentiality standards in England, the Caldicott Principles (National Data Guardian, 2020), the Wellcome Institute devised a multi-year research programme delving into public attitudes towards the use of patient data in research. These yielded six core recommendations to ensure the effective use of patient data, attempting to avoid repeating prior mistakes which led to widespread public distrust (Ipsos MORI, 2016). These recommendations were fed into the development of the EU’s General Data Protection Legislation, showing a consultative process around data ethics and governance practices can lead to real-world policy results and could be tailored to the creative industries’ specific needs and concerns. Creative Informatics developed an ethics statement including a self-review checklist specifically designed for the creative industries



(Osborne et al., 2020). Further tools relevant to developing appropriate data ethics frameworks include the Open Data Institute's data ethics canvas (The Open Data Institute, 2021), the UK government's Data Ethics Framework (Central Digital and Data Office, 2020), Doteveryone's consequence scanning method (Doteveryone, n.d.), and the IEEE's work on Ethically Aligned Design (IEEE, n.d.).

The creative industries are part of a broader economic context of vast industrial change: in an increasingly digitised economy, skills required for roles and tasks are changing more rapidly than existing classification methods can capture. The appetite for an industrial classification system which uses the new technologies available to more flexibly keep up with dynamic and evolving roles is growing across the entire economy. In this context, the creative industries could act as a testing ground for experimenting with different models. The DCMS-commissioned scoping study by MyCake and the Audience Agency demonstrated policymakers are moving from recognising data problems to taking action. In other words, the time is ripe for the experiments mentioned previously, until now largely niche and unadopted, to move into the mainstream. One potential way to put these experiments into action is through real-time industrial classification.

### **The potential of real-time industrial classification**

In our research, we chose the Data City as partners because they are implementing novel methods for measuring innovation and industrial impact, moving beyond SIC and SOC codes; demonstrating in a commercial setting possible replacement mechanism for SIC and SOC codes (Forth et al., 2018), the Data City now works across multiple sectors to explore dynamic industrial classification mechanisms. It builds real time industrial classifications (RTICs) using a combination of public and commercially available data sources such as Companies House data, Innovate UK funding data, Red Flag Alert company financial information, and descriptive text scraped from company websites. For this project, the Data City built two new RTICs for comparison: one based on the DCMS definitions of the creative industries using descriptors from the SIC codes specified to be within those nine sectors and a custom *digital creative industries* classification which overlaps with but is distinct from the DCMS definitions. We used these RTICs in our research workshops mentioned earlier in the chapter to elicit the opportunities and challenges policymakers, creative practitioners, and trade bodies identified with data presented in this way.

Research participants were able to identify potential uses for the RTICs in their day-to-day decision-making processes, for example, through comparative market analysis for funding applications or annual impact reports. Participants also described challenges with the data they found through the platform, often related to how the Data City's machine learning classification

tools had categorised particular businesses based on data from Companies House and other automatically collected sources. As a result of this and other research, the Data City is now introducing more tools for registered companies and sole traders to manually correct information within their data set.

As the Data City is a subscription platform, in common with the other commercial market tools described earlier, its benefits are accessible only to those who can afford the price of the insights it provides. Paid-for platforms providing comparative economic insights are commonly used tools in commercial businesses and public sector organisations alike, but some stakeholders in the creative industries may struggle to find the budget for these data platforms, including small or early-stage businesses, third-sector organisations, and freelancers. The DCMS scoping study mentioned earlier outlining the path to a unified UK-wide data platform for all the creative industries described a system “built and maintained by stakeholders from across the sector” (MyCake and The Audience Agency, 2021), but who would constitute such a stakeholder and what material or effort costs would be involved in building, maintaining, and accessing the envisioned system are not defined within the study.

An additional area of high potential for platforms like the Data City is their ability to cluster data, showing interconnectivity between companies, supply chains, and subsectors within the creative industries and other economic sectors. While the Data City’s data is still based on registered companies which therefore excludes sole traders, if freelancers are “pockets of knowledge” who stimulate innovation through spillovers, real data allowing the hypothesis to be tested would be a highly valuable starting point. Strategic decision-makers could use this data for identifying areas of future economic opportunity and for research into how to maximise those opportunities.

### **The bridge between change and art**

“Data [i]s the bridge between change and art, and [its purpose is to make] change in the industry” (Research participant 29, executive of a UK membership organisation focused on increasing diversity in the broadcasting sector).

Participant 29 succinctly describes the function of data in a decision-making process, when used effectively: to make change. This interviewee, and others, also focused on the importance of using data to build a base of shared understanding in order to effect change.

In our research, we held two dialogue-building exercises to build that shared understanding and bring about the conditions for change: first, our data platform roundtable, a Chatham House Rule<sup>13</sup> discussion among entities which would normally perceive themselves as in competition. The platforms we brought together were able to identify ways they could collaborate to address some of the core data problems identified earlier in this chapter.

While no data set is perfect, improvements particularly around common data standards, better data capture mechanisms for freelancers, and real-time data for continuous learning will go a long way to recognising the value they add to the sector.

Second, our ‘policy hack day’ involving a range of stakeholders as enumerated at the start of the Methods section who either use, provide, or store and aggregate data about the creative industries to reflect on our early findings and discuss what they could practically do to support improvements to data-informed decision making for the creative industries. Through bringing together groups with varying perspectives, we were able not only to report back on early findings from this research but also to seed provocations for dialogue and further change: this research can provide recommendations, including self-review questions tailored to specific stakeholder groups to spark change in the creative industries data landscape (McDonald and Jordan, 2023), but it is up to the community of interested stakeholders to enact those changes.

### **Conclusions: recommendations to improve data for decision-making in the creative industries**

Throughout this chapter we have described the potential of innovation ecosystems for driving value not only in the creative sector but across the economy as a whole. The creative industries present a unique econometric data challenge due to the high proportion of freelancers in the sector and the relative paucity of means for freelancers to identify important knowledge exchange, skills, and resource development opportunities, including material support in the form of studios with physical assets and equipment. This chapter focuses on data about creative industries activity in the form of products and services, but it is worth noting there are also a paucity of mechanisms to capture indicators of intellectual property value in the sector (see Chapter 7, “Ownership and Control in Creative Technology,” for further consideration of IP and rights issues in the sector).

Crucially, especially in an industry with such a high proportion of freelancers, establishing relationships of trust which allow these network effects to take place is often reliant on the social capital of key individuals or institutions. To fully capture the value in these networks, neither a fully abstract, structured approach nor a fully qualitative, descriptive approach will work: a blend of the STI and DUI modes of knowledge creation is required. The creative clusters programme put in place the mechanisms for those knowledge exchange, skills, and resource development opportunities to exist around the UK, establishing networks providing the resources and support for *pockets of knowledge* to accelerate exchanges of skills, capabilities, and materials across the creative industries and beyond, as an innovation system for the

whole economy, as argued by Potts and Cunningham earlier. Data solutions capturing all of this value will require combining structured data sets with the individual relationships which showcase real on-the-ground evolving knowledge. Ideally this system would take the emergent properties of DUI knowledge and eventually codify them into the structured frameworks of STI knowledge, with the awareness there will always be some latency and loss between the two modes. Making this data transparent to everyone involved in its collection, processing, and analysis – removing the one-way street participants identified as a key challenge – will also enhance its value for creating better decisions, both for policymakers and creative organisations, trade bodies, and individual creative practitioners. Data transparency facilitates mechanisms for challenging established wisdom and creates the conditions to push for change. Further, developing continuous learning mechanisms through better data capture, analysis, and sharing will enable more sophisticated data analysis and improved data-informed decision-making than the current system of infrequent reporting cycles or ad-hoc surveys.

In addition to the DCMS scoping study on developing a unified, interoperable data standard described earlier, the Arts and Humanities Research Council also recognises the need for improvements. As part of the 2023 Convergent Screen Technologies And performance in Realtime (CoSTAR) investment in R&D for the Performance and Screen sectors, CoSTAR is establishing an Insight and Foresight unit which will collect and analyse data relating both to the screen industry and to wider creative technologies (UK Research and Innovation, n.d.). We therefore recommend the Insight and Foresight unit engage with the growing body of research referenced previously on developing novel frameworks for analysing creative industries data which recognises the value of both STI and DUI data, as well as monitoring new technologies and how they may be exploited for improving data collection, processing, analysis, and sharing. The work developed by CoSTAR's Insight and Foresight can act as a model upon which to build a cohesive sector-wide analysis and insight framework for the wide variety of stakeholders who provide, process, store, analyse and share creative industries' data for decision-making. We further recommend funding agencies and other international strategic bodies also work towards supporting the infrastructure necessary to capture and analyse this data, which will lead to better strategic decision-making for the creative industries worldwide.

The act of conducting data collection can itself be a form of relationship establishment, as in South of Scotland Enterprise's continuous networking calls with its constituents to discover data gaps and new knowledge. In fact, our entire project worked as a sort of mini-innovation ecosystem not as a place-based cluster but instead a knowledge- or interest-based one: what research participants told us they most valued about participating in the project, especially the research workshops and policy hack day, was the

opportunity to connect with stakeholders from a variety of backgrounds with very different perspectives on the challenges of data for the creative industries and a range of skills and knowledge to work towards solving the problem. This is doing, using, and interacting innovation in action. Through our research, we were able provide a catalyst for starting conversations on these challenges among various stakeholders who do not normally interact, conversations which will now lead to real-world impacts. In other words, echoing Potts and Cunningham's point about the creative industries as a whole, this project has originated and coordinated change in the knowledge base about this sector – exactly what a creative ecosystem should do.

## Notes

- 1 <https://craic.lboro.ac.uk/>
- 2 <https://creativeinformatics.org/>
- 3 <https://thedatacity.com/>
- 4 <https://thedatacity.com/products/uk-tech-innovation-index-2>
- 5 Gross value added (GVA) measures the contribution to the economy of each individual producer, industry or sector. It is the value of the amount of goods and services that have been produced, less the cost of all inputs and raw materials that are directly attributable to that production (<https://www.gov.uk/government/statistics/rural-productivity/rural-productivity-and-gross-value-added-gva>).
- 6 The Institute for Government usefully summarises a timeline of these restrictions in their infographic (2022).
- 7 <https://www.thisiscodebase.com/edinburgh>
- 8 <https://www.themeltingpotedinburgh.org.uk/>
- 9 Easton and Becket found 76% of creative industries companies worked with a freelancer over the 12 months to March 2020 (2021).
- 10 <https://www.theaudienceagency.org/>
- 11 <https://www.spektrix.com/>
- 12 <https://api.datathistle.com/>
- 13 The Chatham House Rule, found at <https://www.chathamhouse.org/about-us/chatham-house-rule>, was provided to participants in advance of the roundtable.

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## CASE STUDY

### **Using data to support Scotland's games sector: Brian Baglow and Scottish Games Network**

The Scottish Games Network<sup>1</sup> is an umbrella organisation which brings together relevant resources and information across the interactive entertainment sector in Scotland, and encompasses and supports the cultural, creative, academic, government, and other organisations supporting and involved in the Scottish video games sector.

Scottish Games Network founder Brian Baglow actively engaged with Creative Informatics' opportunities from the start of the programme through his independent connections and work with InGAME,<sup>2</sup> the AHRC-funded Creative Industries Clusters Programme led by Abertay University in partnership with the University of Dundee and the University of St Andrews.

Prior to establishing the network, Baglow applied to the first round of the Creative Informatics Connected Innovators strand and was awarded £10,000 of funding in September 2020 to support data-led research into Scotland's games sector. At the time, as he identified in his proposal, no reliable data available about the nature of the sector, and his Connected Innovators project sought to address this through calls for participation in surveys about the industry, as well as research using existing, but partial, datasets.

Emerging findings from Baglow's research were publicised through industry connections in the Dundee region and across Scotland, with findings showcased in a substantial feature in April 2021 in MCV/DEVELOP (MCV, 2021), a leading outlet for the UK games industry. His research found that in 2020 there were 425 companies working in the Scottish games sector, with 85 new games developers registered in 2020 alone. Edinburgh was found to be the region with the most registered games developers, followed by Glasgow, and then Dundee, which had previously been the leading area of Scotland for the games development sector.

Since Baglow's Connected Innovators project and the founding of the network, he and Scottish Games Network have been consistently raising awareness of the games sector's role in the Scottish creative industries. The data about the Scottish games ecosystem captured during his Connected Innovators project has meant that Scottish Games Network's advocacy for further development of the sector has been data-driven, building their case on both qualitative and quantitative evidence of its impact.

Following completion of the work supported by Creative Informatics, Baglow was awarded a further £20,000 by the Scottish government in April 2021 to develop this work and explore how the network might best support the sector. He was also awarded a further £50,000 from the Scottish Government Ecosystem Fund in connection with the Scottish Technology Ecosystem Review

(STER) in 2021, which supported the first ever Scottish Games Week<sup>3</sup> – a week of networking events to bring the Scottish games sector together across the country – in 2022, which returned again in October–November 2023.

In addition, the data collected by Baglow and the Scottish Games Network fed into research conducted by others. These included a project with InGAME (InGAME, 2021) that mapped the key challenges facing the Scottish games sector and programmed workshops to explore possible solutions and ways to address them. That project was shared with researchers from the Adam Smith Business School at the University of Glasgow, who produced a positioning paper (University of Glasgow et al., 2022) on ways to develop a successful and sustainable games ecosystem in Scotland. Together, these collaborations through the Scottish Games Network have created a blueprint for making the sector more connected, collaborative, and successful, both culturally and commercially.

As well as building connections through the Scottish Games Network, Baglow has actively promoted Creative Informatics opportunities to Scotland's gaming sector since the outset and has directly referred applicants and participants to the programme, supporting links between Scotland's Creative Industries Clusters Programmes.

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### Case study notes

- 1 <https://scottishgames.net>
- 2 <https://innovationforgames.com>
- 3 <https://gamesweek.scot>