Creative Accounting? Assessing the Economic Impact of the Creative Industries: An Input-Output Approach for the Cardiff City-Region

By

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Abstract

The role of the creative industries as a driver of regional economic growth has been of great interest in policy and academic spheres. This thesis evaluates the extent to which sub-regional input-output tables can capture the economic contribution of the creative industries in a way that can shape local policy. An input-output table for the Cardiff Capital Region (CCR) disaggregated to show the nine DCMS defined creative industries sub-sectors is constructed. The findings show that some sub-sectors could achieve CCR policy objectives of generating growth, GVA uplift and creating jobs. Separately, there is concern that the spatial and demographic distribution of the benefits are unlikely to benefit the areas and groups most in need. Attention is given to the extent these novel statistics could influence policy at the sub-regional scale. The findings show that the shifting definitions in the creative industries and spatial scales of political influence weaken the prospect of policy change. Additionally, the impact of the covid-19 crisis has moved policy focus from achieving growth, to managing damage.

TABLE OF CONTENTS

Chapter 1.   <u>Introduction</u>

South East Wales, despite being the geographically smallest of the three regions of Wales, is the most populous, with a population of over 1.53 million people, just under half of Wales' total. The region is characterised by its industrial past and longstanding poor economic performance despite being home to the relatively prosperous capital city, Cardiff. South East Wales has been stymied by a raft of economic and social issues; slow economic growth, low value added, low skills, a poor transport system, health inequality and poverty.

This thesis will examine how recent City Deal policy structures might work to address these economic and social issues. The research develops an input-output framework to examine the impact of increased investment in the creative industries on the economy of the Cardiff Capital Region in terms of output, GVA and jobs created. In focussing on the creative industries, the thesis also examines how relevant and flexible I-O structures are to represent and model the creative sectors and activities that are often at the heart of economic development policy attention at this novel spatial scale, the Cardiff Capital Region.

The research involves the regionalization of the unpublished Wales input-output tables for 2018 to the Cardiff Capital Region using interview, survey and secondary data. This CCR input-output table for 2018 is then disaggregated to estimate the impact of output, GVA and employment effects of the DCMS defined sub-sectors of the creative industries. Interviews with creative businesses in stakeholders provide a narrative discussion of the key issues facing the creative industries in the CCR.

1.1 Policy Platform - City Deals

Like many UK regions outside London and the South East of England, economic development in Wales has, since the 1970s, been negatively affected by globalisation and industrial collapse. A report by the IPPR in 2019 showed that the UK is more regionally unequal than comparable economies on a range of socio-economic factors (Raikes et al., 2019). In addition, the report finds the UK to be the most centrally governed country of any comparable economy. The report finds this centralisation of power and institutions in London and the South East has helped reinforce inequalities. Local authorities then lack the power and funding to make meaningful investment decisions.

In 2012 the Conservative-led coalition Government introduced eight City Deals to cover the largest cities outside London, with more following annually until 2018. The City Deals are made between local authorities and central government to transfer some investment and decision-making power from central government to newly established city-regions. This move represented a change in spatial emphasis of economic policy from regions to city-regions, a scale the HM Government (2015) referred to as the 'natural' and 'functional' scale for fostering economic development.

The political importance of addressing the regional imbalance in the UK is demonstrated by the coining of slogans by successive policymakers: George Osbourne's 'Northern Powerhouse' concept in 2014, Phillip Hammond's 'Midlands Engine' concept in 2017 and most recently, Boris Johnson's 'levelling up' agenda. City-regions are seen by the UK Government as able to adjust more quickly to changes in the economy, and able to exploit opportunities as they appear (Deas, 2014). This view suggests that the city-region provides the best conditions for agglomeration (Nathan & Overman, 2013). The central tenant here is the city as an 'engine of growth' for its hinterland geography (Vainikka, 2015). The City Deals reflect the work of the New Economic Geography and New Urbanist movements which regard the city as the appropriate scale to address the challenges of globalisation (Storper, 2013, Glaeser, 2011, Florida, 2002 & 2017). However, the city-region approach has been criticised with commentators arguing spatial 'fixes' such as the City Deals are exacerbating uneven development and spatial disparities by functioning as an effective agglomerative trickle-down model (Beel et al., 2016, Etherington & Jones, 2009, Haughton et al., 2014; Harrison & Heley, 2014; Jonas, 2012).

In South East Wales, the Cardiff Capital Region (CCR) City Deal was signed in 2016, grouping together ten local authorities; Blaenau Gwent, Bridgend, Caerphilly, Cardiff, Merthyr Tydfil, Monmouthshire, Newport, Rhondda Cynon Taf, Torfaen and The Vale of Glamorgan. The objectives of the CCR City-Deal are to create 25,000 jobs, improve GVA, improve infrastructure, increase skills, and leverage £4 billion in private sector investment with a joint investment of £1.2 billion from local authorities, the UK and the Welsh Government. The CCR has drawn criticism for its narrow definition of success and the agglomerative city-focused strategy (Beel et al., 2018).

1.2 Policy Intervention - Creative Economy

The creative industries are broadly defined as a range of economic activities concerned with exploiting or generating intellectual property. The creative industries typically include architecture, advertising, crafts, design music and performing arts, film and television, publishing and video games. However, the definition of the creative industries remains in flux, with similar terms such as

the 'creative economy' and 'cultural industries' possessing differing definitions and covering overlapping activities[1]. The CCR has recognised 'creative' as one of its six priority areas[2] and is therefore, a key area of policy intervention. The interest in the creative economy stems from its rapid growth in recent years. In the UK creative industries achieved the largest percentage increase in GVA of all sectors in the UK between 2008 and 2014[3] this appears alongside the backdrop of an otherwise sluggish increase in productivity in the UK economy (McCann, 2020). This growth is evident in Wales with Welsh Government recognising the creative industries as one of the fastest growing sectors (Welsh Government, n.d.). Wales has a historic competency in the creative industries particularly, in Television and broadcasting.

Policy intervention in the creative industries by UK Government has been focused on the notion of 'creative clusters' (HM Government 2018a & 2018b) the academic roots of which can be traced to Porter's (1990) work on business clusters; popularised in economic geography by Krugman (1991). The creative clusters theory suggests that creative industries have a tendency to agglomerate often in cities and that these clusters should be fostered to enhance their potential to deliver economic benefits across regions. The UK strategy involved an £80 million fund for the establishment of eight creative clusters across the UK. In 2018 Cardiff successfully won a bid to establish its own creative cluster, Clwstwr Creadigol. The main objective of Clwstwr is to help grow the 'screen sector' in Cardiff.

The headline figures about the creative industries suggest a rapidly growing and productivity-enhancing sector. However, information on the sector is drawn from a weak evidence base with limited data on inter-industry relationships, output, GVA and jobs created (Pratt, 2004 & Cruz & Teixeira, 2012). This shortage of evidence is particularly acute at the regional level in the UK, which does not routinely produce regional accounts, except for Scotland (Northern Ireland is embarking on this process) (Scottish Government, 2020). There are additional methodological challenges with analysing the creative industries. There are difficulties in characterising creativity both philosophically and with the reliance on 'scarce low-resolution data' available (Higgs and Cunningham (2007)

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[1] Definitional issues in the creative industries are discussed in detail in chapter 3 and chapter 6.

[2] These priority areas are: Advanced Materials, Manufacturing and Energy, Compound Semiconductors, Construction, Creative, Digital Technology and Foundational Economy

3 More recent growth rates are not available, but figures from the DCMS (2018a) show total GVA for creative industries at £267.7 billion representing 14.6% of UK GVA (DCMS, 2018b).

There are overlapping academic debates in the literature on creative clusters and city-region development regarding the nature of growth, how it is distributed, both geographically and demographically, and the ensuant negative externalities.

1.3 Research Objectives

The CCR and creative industries are both presented as potential sources of economic growth, jobs and value added; a possible antidote to the poor performing economy of South East Wales. The CCR as a policy platform and the creative industries as a policy intervention should thus be carefully evaluated to ensure these goals are being achieved. A common methodology for the evaluation of regional economies are input-output tables which provide a detailed snapshot of the inter-industry relationships within an economy. This raises three problems: Firstly, there is little economic analysis in the Cardiff Capital Region beyond routinely produced statistics. This is because data at smaller spatial scales suffer significant data quality and availability issues. For example, regional GVA statistics produced by the ONS are limited to two-digit SICs at the city-region scale, insufficient for creative industries disaggregation. Secondly, evaluating the creative industries is methodologically more demanding than traditional industrial sectors. Thirdly, the literature has revealed questions about the extent to which the City Deals and agglomerative growth strategies can deliver benefits to all (Beel et al., 2018).

This research seeks to address these issues by answering the question:

How far can input-output approaches help us understand the actual and potential contribution of creative industries at a city region scale?

In doing so the research will be guided by four research aims:

1. To reveal the economic value and character of the creative industries in the Cardiff city-region

2. To understand the extent to which creative industries fit with the CCR City Deal policy framework

3. To examine how creative industries businesses engage with Government policy at the varying spatial scales.

4. To evaluate the effectiveness of input-output tables for sub-regional creative industries analysis

1.3.1 Methodology

To answer the research question and meet the aims of this thesis, two strands of analysis are used. Firstly, qualitative interviews with creative industries stakeholders in the CCR attain a contextual understanding of the sector CCR. A secondary objective of these qualitative interviews is to provide data for I-O analysis. Secondly, a CCR input-output table with a creative industries extension is constructed. The CCR extended I-O table is built by regionalising the 2018 input-output tables for Wales using primary survey data and Flegg location quotients (FLQs) (Hermansson, 2016). The CCR table is disaggregated to include creative industries sub-sectors using a hybrid method combining survey and interview data with secondary sources.

1.3.2 Main Findings

The construction of the CCR input-output table has provided, for the first time, a platform for economic analysis at the CCR scale. Headline figures show that the CCR contributes £87.6bn output (52 per cent of Wales output) and £25.2bn GVA (39 per cent of Wales GVA). The creative industries disaggregation finds that in 2018 creative industries directly contributed £1.9bn in output, £732m in GVA and supported 11,095 FTE jobs. Impact analysis of the creative industries provides estimates of GVA, employment and income effects. It is noteworthy that the GVA per FTE estimates suggest that most creative industries sub-sectors are lower than the industrial average. This suggests that the CCR goal of achieving GVA uplift may not be achieved through a focus on creative industries.

The findings of the qualitative analysis describe the state of the creative industries in the CCR and the policy approach by the various institutions that cover the sector. The findings echo the broader literature with the creative industries in the CCR defined by rapid growth, structural change and the rise of freelance employment. Some sub-sectors of the creative industries are growing rapidly; others are negatively affected by trends in globalisation and digital disruption. In practice, some jobs within creative sub-sectors are difficult for employers to fill where other roles are oversubscribed. Freelance work has long characterised parts of the creative industries, most notably the screen sector. However, in recent years the growing share of freelance work in previously traditional sectors raises concerns about precarity and socio-economic inequality an issue exacerbated by COVID-19. The dominant policy approach in the creative industries is that of 'creative clusters'. The cluster approach focuses on pursuing creative agglomeration in line with

the CCR City Deal policy goals of generating economic growth, jobs and GVA uplift. The evidence gathered from the quantitative analysis suggests this approach could be successful in achieving some of these policy goals. However, the interviews indicated that narrow metrics of success in the policy framework risk overlooking the negative externalities of the approach.

The overarching theme of analysis in the thesis is an evaluation of the effectiveness of I-O approaches for evaluating a non-traditional sector at a sub-regional scale. The economic statistics produced were highly granular and when shown to local policy experts were considered valuable. The review of how local purchases within a particular sub-sector are is particularly useful evidence when considering the value of locally focused investment. However, the findings show that definitions of the creative industries are in flux even within policy institutions at the sub-regional scale. The unsettled definition of the sector in some ways can undermine the value of the modelling outputs. Additionally, I-O fails to capture the non-pecuniary value of the creative industries such as impact on well-being, innovation spillovers and societal benefits. Finally, there is the question of how far local policy makers can understand and act on any statistics produced.

1.3.3 PhD Contribution

The study has developed an input-output table for the Cardiff City Region that can be used for ongoing economic analysis of the CCR, a novel scale for applying input-output analysis and a relevant one in the UK context of city-regionalisation. This tool has provided valuable economic statistics that could be used to inform the CCR cabinet. is a valuable model for other city-region boards that may wish to gather similar economic intelligence. The CCR I-O represents the first sub-national table in the UK to disaggregate the creative industries sub-sectors. The statistics produced represent a detailed picture of the creative industries and their interconnectedness. The construction of the tables has allowed for methodological evaluation of input-output tables on issues of 'scope and scale' the extent to which I-O can be used at the city-region scale and on a non-traditional industry. Beyond this, the qualitative analysis has understood how creative businesses engage with this very top-down form of government policy.

1.3.4 Thesis Layout

The structure of the thesis is organised as follows: The following two chapters provide the literature and background of the CCR and the creative industries with Chapter 2 providing an overview of the creative industries literature Chapter 3 presenting the economic and policy background of the Cardiff Capital Region. Chapter 4 describes the creative industries in the area of

focus by detailing the structure of the creative industries locally and highlighting the areas of concern that surround their development.

Chapters 5 and 6 provide a review of the economic techniques used for sub-regional analysis and on the non-traditional economic sector, the creative industries. Chapter 5 reviews the techniques available for regional economic analysis; Keynesian multiplier analysis, cost-benefit analysis, social accounting matrices and computable general equilibrium modelling. Chapter 5 also details the chosen technique, input-output tables with detail on the method, applications and limitations. Chapter 6 describes how input-output tables have been used to analyse the creative industries and the methodological approaches to defining the creative industries. Chapter 7 explains the research philosophy and methodology of the study in two parts; detailing how the interviews were conducted and describing a conceptual creative industries satellite account (CSA).

The findings of the study are presented across two chapters. Chapter 8 presents a thematic analysis of the interviews linking issues facing creative industries in Wales with current economic policy. Chapter 9 presents the issues facing the construction of a CCR CSA and presents the CCR input-output tables for 2018 describing the impact of the creative industries on the economy of the CCR and how this might be affected by the coronavirus pandemic. The thesis ends with Chapter 10 which discusses the findings of the study and links the issues highlighted to the literature and concludes with an evaluation of the contribution and direction of future research.

Chapter 2.   Literature and Background: The Creative Economy

2.1 Introduction

This chapter will examine the contribution of creative industries in local economies. This will be achieved by engaging with the debates on; defining creative activity in the economy; creative clusters; creative people versus creative places; and the role of universities in the creative economy.

The interest in the creative economy stems from its rapid growth in recent years which policy makers seek to use for economic development. The growth of the creative industries (Pratt, 2009) has led to policy speculation at various levels of Government throughout the world (Pratt, 2012). In the UK, creative industries achieved the largest percentage increase in GVA of all sectors in the UK between 2008 and 2014[4] contrasting an otherwise sluggish increase in productivity in the UK economy (McCann, 2020). There is some evidence to suggest that creative industries are less at risk of automation (Bakhshi et al., 2015) and which has led to interest from policymakers seeking the best ways to support the creative industries in their country, region or city. However, two decades have passed since the coining of the term 'creative industries' and deciphering the large and often contradictory literature on building a successful creative economy creates difficulties for policymakers.

2.2 Defining the Creative Economy

Deciding what makes a particular activity creative and what makes up the 'creative economy' is understandably a complex issue. The history of such definitions can be traced back to the term coined by Adorno and Horkheimer 'the culture industry' in 1944 (Pratt, 2013). In the 70 years that have followed, the definition has gone through numerous iterations from culture industry to 'cultural industries' (Miège, 1987); in 1997 with the introduction of a New Labour government, 'creative industries' (O'Connor, 2010); used alongside the term 'creative economy' (DCMS, 2016a) (Howkins, 2001). Flew & Cunningham (2010) refer to the 'struggle for definitional coherence' as a persistent issue in the creative literature. The terms 'creative industries' and the 'creative economy' mean different things to different international organisations and national governments (see Table 2.1). 'Creative industries' is the term generally used to describe the specific industries in which creative products or output is generated and the term 'creative

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[4] More recent figures from the DCMS (2018a) show total GVA for creative industries at £267.7 billion representing 14.6% of UK GVA (DCMS, 2018b).

economy' has been used as a broader term to include all other creative output, here often referring to activities rich in cultural value but less easily quantified (see section 2.2.1).

DCMS Definitions	UNCTAD definitions
Creative Industries	**Creative Industries**
"The Creative Industries are those industries with a high intensity of Creative Occupations. It includes those in Creative and non-Creative jobs within the Creative Industries and is a subset of the Creative Economy."	The creative industries – which include advertising, architecture, arts and crafts, design, fashion, film, video, photography, music, performing arts, publishing, research & development, software, computer games, electronic publishing, and TV/radio – are the lifeblood of the creative economy. They are also considered an important source of commercial and cultural value.
Creative Economy	**Creative Economy**
"The Creative Economy includes the contribution of all those employed in the Creative Industries as well as the contribution of those who are in Creative Occupations outside the Creative Industries."	"The creative economy has no single definition. It is an evolving concept which builds on the interplay between human creativity and ideas and intellectual property, knowledge and technology. Essentially it is the knowledge-based economic activities upon which the 'creative industries' are based.
	The creative economy is the sum of all the parts of the creative industries, including trade, labour and production. Today, the creative industries are among the most dynamic sectors in the world economy providing new opportunities for developing countries to leapfrog into emerging high-growth areas of the world economy."

These differing definitions allude to one of the tensions that is found in the creative industries; culture vs commerce. Figure 2.1 (p14, UNCTAD, 2008) shows how the United Nations has characterised the complementary relationship between the creative sectors, whereby some less commercially oriented parts of the creative economy act as the foundation for other commercial parts of the creative ecosystem.
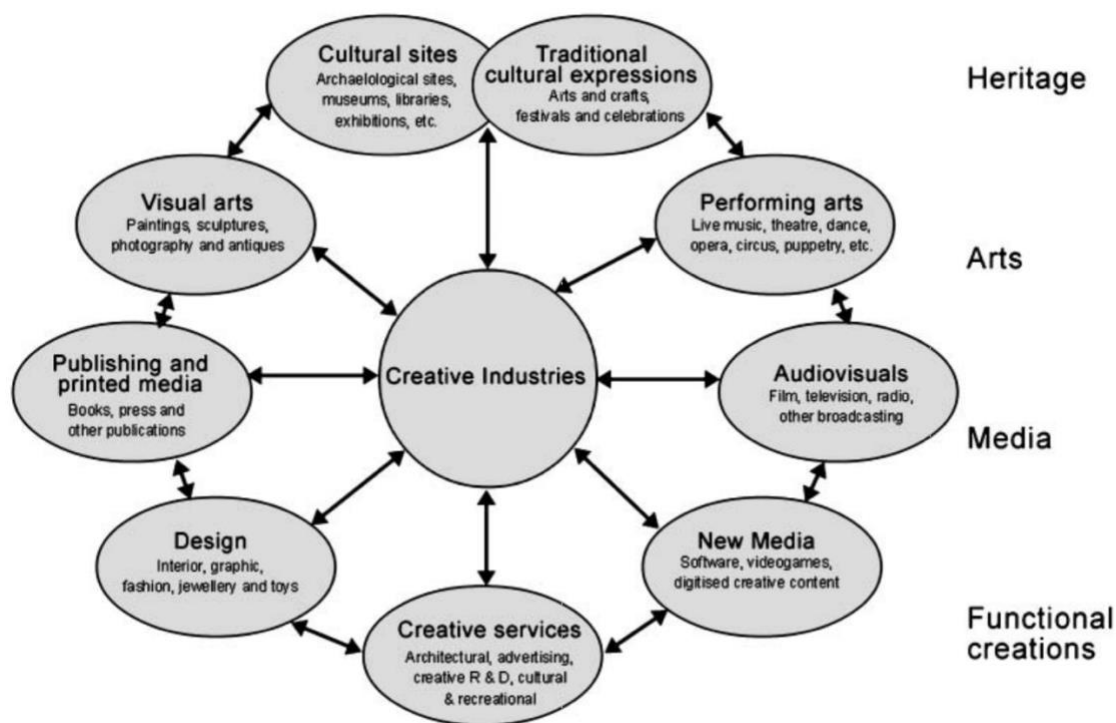
Figure 2.1 United Nations Committee on Trade, Aid, and Development model of the creative industries. Source (p14 UNCTAD, 2008)

The creative industries and creative economy definitions tend to encapsulate the creative industries in a way that subsumes the cultural sector into an economic agenda (Galloway & Dunlop, 2007). Creative activity that is more *cultural* and less commercial fits less well in an economic framework and can be defined differently. The cultural sector is defined by the DCMS (2016) as "those industries with a cultural object at the centre of the industry". The cultural sector includes built heritage, film, libraries, museums and galleries, performing and visual arts with some overlap of the creative industries sub-sectors (Appendix 9). Definitional issues in the creative industries are a key consideration for this study and pose a significant methodological challenge, this issue will be revisited in section 6.3.

2.2.1 Industry vs Culture: Valuing the Creative Industries

Linked to the definitional issues in the creative industries is the issue of accounting for value within the creative sectors. There is a tension in the creative industries between commercial output and cultural value. The creative industries as defined by the nine DCMS sub-sectors (Appendix 1) is a broad grouping that includes both commercially intensive activity and culturally intensive activity. Some areas of the creative industries are growing more rapidly and are more highly productive in GVA terms than others (see section 4.1.1). Economically productive sectors are a good candidate for public investment as the ensuant growth and jobs will benefit the local economy. However, other sub-sectors within the creative industries are less productive and provide lower value-added.

10

Creative sub-sectors with less economic growth potential tend to be those with a stronger cultural focus, and these sectors are less obvious candidates for public investment.

The arts and cultural sectors that fit within the creative industries definition provide a vast array of benefits that are less easily quantified. Arts have been found to contribute to a raft of mental health and well-being benefits (Arts Council England, 2018). Mental health issues cost the NHS in England £105.2 billion each year (HM Government, 2011). McCrone et al., (2008) estimate the average service cost those in contact with mental health services for depression was £2,085 in 2007, while the average cost of lost employment was £9,311. While it is difficult to quantify the contribution of increased arts investment might have it is clear the economic improved well-being will reduce the costs of treatment and productivity loss from missed work.

Arts have been found to promote healthy aging, improve life for dementia sufferers (Young et al., 2016), reduce loneliness and improve self-confidence and self-efficacy. Research has found that the arts can have a contribution to the criminal justice system allowing offenders to find a more positive identity (Henley, 2015). Culture contributes to a wider societal value through education, societal inclusion and citizenship (Arts Council England, 2014). The educational benefits for young people who engage with cultural activities are multifaceted. Participation in drama and library activities can improve literacy skills and emotional intelligence (Winner et al., 2013). For children participating in music activities such as learning a musical instrument is recognised to deliver wide ranging benefits from educational attainment to self-confidence (Savage & Barnard, 2019). Arts and culture have an important role in establishing creative places which in turn may attract creative workers (Florida, 2002) a mechanism discussed in more detail in section 2.5.4 .

Arts and culture have a role in acting as a testbed for innovation in the creative industries. (Metro Dynamics, 2020). Figure 2.2 shows the transmission mechanism between public investment to commercial activity (Metro Dynamics, 2020, p.8). Public investment via arts councils in cultural activities leads to experimentation generating knowledge spill overs which lead to commercial output downstream. The second step in this process can be considered to be research and development (R&D). However, official definitions of R&D exclude the arts (Bakhshi & Lomas, 2017). There is emerging evidence that creative industries do lead to innovation (see section 2.5) and therefore, the opening up definitions and metrics of R&D to accommodate the arts is a pressing area for creative policy and research.
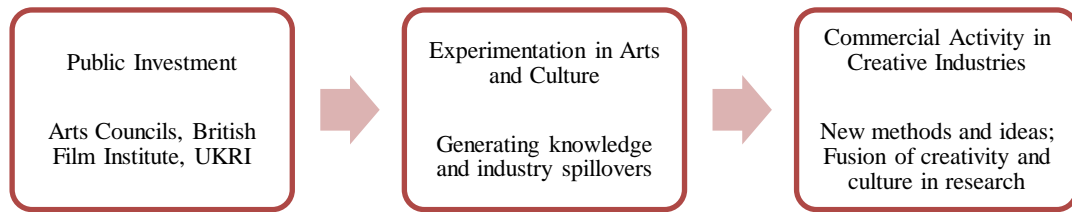
The tension in creative industries is that there are sub-sectors that can deliver economic benefits from public investment and areas that are less productive yet provide significant non-economic benefits. The problem for economic development policy, therefore, is a definitional one as investment in the broadly defined creative industries captures both high value-added high growth potential activity with less economically important activity. The methodological challenges for defining the creative industries are further detailed in section 6.3 and revisited in section 10.4.

Section 2.2 highlights that defining creative activity is an evolving and dynamic process. The definitions used differ overtime, by country and by emphasis with some definitions prioritizing culture others commercially creative activity. These definitions of creative activity encompass a large and varied degree of creative output from low value-added (in economic terms) to very high value-added. However, there is little literature on the productivity differences within the sub-sectors of the creative industries.

A valuable addition to the literature would be to evaluate the extent to which the nine DCMS defined sub-sectors are relevant to policy makers in the UK. The grouping of commercial sub-sectors like Advertising & Marketing and Architecture are likely not explicitly viewed as areas of creative industries to regional policy makers. Additionally, sub-sectors with a focus on culture for example, Museums, Galleries and libraries are not likely to be viewed as a source of growth for regional economies. This raises the question of whether this grouping of industries is relevant for policy. The literature could be expanded here with evidence on the difference in productivity of the different areas of the creative industries.

2.3 Creative Clustering in Space

Research into creative clusters stems from Michael Porter's business clusters (Porter, 1996). Clusters in this sense are defined as an agglomeration of interconnected businesses, suppliers and associated firms in a particular field, in this case the creative industries (Bagwell, 2008). The intellectual underpinning of creative clusters is that an agglomeration of businesses will lead to a benefit to the local economy in terms of increased productivity, growth and employment. There is a wide body of literature on agglomeration economics with intellectual founding accredited to 19th century economist Alfred Marshall and the notion of labour market pooling. Porter's theory of business clusters has built on this and is maintained in contemporary economic policy (Porter, 1996; Duranton & Puga, 2004; Rosenthal & Strange, 2004).

There is a great deal of literature on whether and how creative industries cluster (Lazzeretti et al., 2008; Lazzeretti et al., 2012; Boix et al., 2016). Creative industries cluster in different specialization patterns in different countries. Important determinants are found to be: historical and cultural endowments. size of place, size of the sector, productive diversity, concentration of human capital and creative class presence. It is a well-established finding that the creative industries are highly urbanized and cluster in relative few locations (Bloom et al., 2020 and Gutierrez-Posada et al., 2021) although with emerging evidence that outside of urban areas, micro clusters can be important to regional economies too (Siepel, et al., 2020).

Creative clusters appear geographically and with different industrial characteristics; In the USA; film and TV in Hollywood (De Propris & Hypponen, 2008), technology in Silicon Valley (Koepp, 2003). Creative activity in the UK is highly clustered with 53 per cent of creative industries jobs and 44 per cent of creative industries firms concentrated in five UK cities (Mateos-Garcia, et al., 2018). Despite this concentration there are numerous clusters and micro-clusters (Siepel, et al., 2020) across the UK; with games in Dundee, film & TV in Cardiff and Bristol. However, London is by far the most economically significant cluster. The dominance of London and the South East in the economy of the United Kingdom is well covered in the academic literature (more detail in Chapter 3). There is strong evidence to suggest this dominance extends to the creative industries. Figures by Mateos-Garcia, et al., (2018) show that creative employment represents 28 per cent of total employment in London, 16 per cent in the South East of England and by contrast 3 per cent in Wales[5].

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[5] There are a number of different ways creative industries employment can be calculated these methodological challenges are highlighted in chapter 6.

In a report studying the geography of creativity in the United Kingdom Mateos-Garcia & Bakhshi (2016) find that it is not just 'hip creative cities' that are benefiting from creative clusters. Mateos-Garcia & Bakshi found significant growth in cultural-sector activities across the United Kingdom. Despite this, however, regional differences have deepened. This reflects an issue highlighted in the literature that creative activities cluster more successfully in some cities than others (Scott, 2000).

London is not just dominant in terms of creative employment but, creative production and creative consumption (Oakley, et al., 2017). London has a greater concentration of publicly-funded cultural institutions, and partly as a result London is the recipient of 10 times the level of public arts funding per capita when compared to the national average (Stark, et al., 2013). The higher concentration of key arts education institutions in London is another linked factor that perpetuate this imbalance (Oakley et al., 2017). Some have argued that London has been an "escalator region" (Fielding, 1992) for social mobility. A finding that UK Government supported studies have replicated (Greaves et al., 2014; Social Mobility Commission, 2016). The culture sector has in some narratives been suggested to be "classless and meritocratic" (Oakley et al., 2017) and has been referred to by those in power as:

"One of the greatest forces for openness and social mobility" (Hancock, 2016)

Others argue that the impacts of a London-centric creative economy has been damaging to social mobility instead propagating an "elite vortex" with a "propensity towards self-recruitment" which is furthering a raft of social inequalities (Cunningham & Savage, 2015; Carey et al., 2021) (see section 2.4).

It is uncertain what factors influence the formation of creative clusters. Important elements might include; shared infrastructure and supply chain linkages, knowledge spillovers between creative businesses and commercial partners, or the transfer of tacit knowledge when creative professionals move into other sectors. The formation may also occur when through labour market pooling of creative workers in cities (Chapain et al., 2010). Labour market pooling refers to the phenomenon whereby a larger pool of workers in an area makes it easier for firms to find workers with skills relevant to their needs (Combes & Duranton, 2006). Pooling also benefits workers who are more likely to find an employer suited to their skills in a larger labour pool. The improved matching between firms and workers that occurs in labour pools was noted by Marshall in the 19th century and continues to be a potential source of agglomeration economies (Overman & Puga, 2008). The complex drivers behind these creative clusters means that the policy approach cannot focus on agglomeration alone:

"the mere existence of a creative agglomeration is not enough for the benefits from clustering to emerge. The other crucial ingredient is connectivity between

firms within a cluster, with collaborators, business partners and sources of
innovation elsewhere" (Chapain et al., 2010, p.5).

Chapain et al., (2010) argue strategies for supporting creative clusters should focus on catalysing clusters that already exist rather than building new ones, and on the establishment of hubs for creativity that can be centred around universities. Recent policy developments have taken into account both the firm and the individual in the shaping of 'creative hubs'. These hubs are generally defined as 'third spaces' (physical or virtual) for work, participation and consumption of creative activities. Shared working spaces make up a small (but rapidly growing) proportion of workspaces in the UK (Clifton et al., 2019). A report by Virani, et al., (2016) into the impact of these creative hubs finds that over last decade they have acted successfully as 'nests' for freelancers, SMEs and micro business to connect and collaborate. The impact of these hubs is felt beyond the creative industries as other sectors are more likely to use these creative inputs when they are more prevalent locally (Mateos-Garcia et al., 2018). The extent to which creative clusters benefit local economic development and productivity is a relevant topic in the creative industries literature at present (Mateos-Garcia et al., 2018).

As creative industries are becoming increasingly viewed as an important sector for economic development (Bloom et al., 2020) strategies to support the formulation and development of creative clusters are increasingly a focus of policymakers. Cluster formation is a key area of understanding for city leaders as they seek to bolster their own creative clusters and establish whether creative clusters be formed through policy intervention. Gutierrez-Posada et al., (2021) suggest that the development of new clusters is unlikely outside of major interventions:

> *"Conversely, the pattern of ever-increasing concentration, with only limited*
> *diffusion, suggests that city leaders in non-cluster locations have little chance*
> *of developing new creative industries clusters from scratch, absent major*
> *spatial interventions (such as the BBC's partial relocations to Cardiff and*
> *Salford, DCMS' planned partial move to Salford, and Channel 4's HQ2 in*
> *Leeds)." (Gutierrez-Posada et al., 2021, p. 30))*

In an evaluation of the effectiveness of 'light touch' cluster policies Nathan (2020) reviews the impact of the UK's technology cluster programme. The findings suggest that even less major policy interventions have the potential to help grow and densify already present creative clusters. Furthermore, targeted creative policy can successfully support the emergence of new creative businesses and lead to growth in creative clusters (Cruz & Teixeira, 2021). However, policies of austerity can have the opposite effect reversing growth seen in times of policy support. Therefore, meaningful intervention will require sustained policy support.

Section 2.3 details the literature behind the development and nurturing of creative clusters. Creative Clusters are in vogue for creative policymakers as the appropriate method to foster a fast-growing

creative sector that can achieve the goals of employment growth, GDP growth and *"GVA uplift"* (Cardiff Capital Region, 2019) the success metrics common in Governments' industrial strategies. The drivers behind the formation and growth of creative clusters is a lively area of academic debate. It would be useful to understand on a micro level the drivers of growth in the Cardiff city-region.

2.4 Creative Employment: Skills, Talent & Diversity

The structure of the labour market in the creative economy is an area of academic interest due to its divergence from traditional industries, with a much higher proportion of self-employed freelancers (Easton & Cauldwell-French, 2017) and businesses with motivations beyond the economic (see findings in chapter 8). The creative industries have seen increasing impacts of digital disruption with the fast pace of technological change seeing new jobs created and others becoming obsolete. This combination of factors poses unique challenges for policymakers, this section will detail some of the issues faced and the academic debate that surrounds these issues.

Creative businesses have been found to struggle to fill job vacancies in some roles requiring specific technical skills (Dass, et al., 2015). Livingstone & Hope (2011) in a report about the video game development industry found that a lack of an adequately skilled workforce was leading to the loss of competitiveness. A reason given for this skills gap was that school and university courses were not changing in pace with the technological change being seen in the sector. Consequently, affected industries have been forced to source talent from overseas a potential problem for the UK post Brexit (see section 3.4.1.2).

'Creative industries' is an aggregation of some very different sub-sectors and occupations and within this grouping there are stark differences in average earnings, with some sectors achieving significantly above average and others significantly below average (Oakley, et al., 2017). The difference is particularly pronounced amongst high tech IT occupations and artistic occupations:

> *"It is also important to note the striking variations in earnings in different areas of cultural employment. Average earnings in areas such as IT and advertising, for example, are far above the national average, whereas those working in crafts, music, and museums report earnings significantly below the national average. This wide variation echoes long-standing critiques (e.g., Campbell, 2014) of the aggregation of very different forms of occupation into "creative" industries, in particular the differences in occupational structure between IT and the more "cultural" occupations associated with performance and the arts."* (Oakley et al., 2017, p.1518)

This diverse grouping of industries explains how there can be a shortfall of skills in some sub-sectors and roles whilst there is an oversupply of graduates in others (The Guardian, 2013).

The creative industries are much more dependent on self-employed (freelance) workers than other traditional sectors (Easton & Cauldwell-French, 2017). People can become freelancers for numerous reasons. Individuals may desire creative control, flexible working patterns or their work may be too specialized for a full-time role in one company. Individuals may, however, be pushed into freelance work by redundancy or external pressures. It is well established that employment in the creative sector can be precarious. Creative workers have been labelled the 'creative precariat' where precarious employment is the norm (Bain & McLean, 2013; De Peuter, 2014; Kim, 2019). Creative industries work has been described as largely non-unionised, risk-taking, exploited and self-exploiting.

The precarious employment situation can be worsened by the informal approach to recruitment and the rapid turnaround in personnel (McRobbie, 2002; Grugulis & Stoyanova, 2012 and Lee, 2011). The issue of precarity is exacerbated by the expectation that to 'make it' in the creative industries workers will undertake unpaid internships a phenomenon that predates the term creative industries and persists in part due to the surplus of workers willing to undertake them (Becker, 1982: Faulkner, 1983 and Miège, 1989).

> *"the CCI workforce is less ethnically diverse, more male, and skewed toward those of a higher socioeconomic background than most other sectors of the economy"* (Oakley et al., 2017, p.1514)

Inequality is a key issue in the creative sector for researchers. Inequality in the creative industries is multi-faceted and can be based on geography, class, gender, age or race. Evidence has been found of a significant "class pay gap" in the acting profession (Friedman, et al., 2017). A Creative Skillset (2014) study found significant underrepresentation in media sectors of women over the age of 35. Additionally, evidence has been found of social exclusions in cultural occupations along class, race and gender lines (O'Brien et al., 2016; Carey et al., 2021). Finding freelance work is often dependent on the individual's social capital meaning those from outside the already established class and culture of the industry are disadvantaged.

The evidence of inequality clashes with the policy environment that promotes the creative industries as a diverse sector open to all:

> *"The promotion of cultural industry strategies in economic development discourse has long suggested that not only is this sector open to talent from anywhere but that such diversity is part of their life blood"* (Arts Council England, 2015)

Education has been found to play an important role in improving the social mobility of lower social classes (Bernardi & Ballarino, 2016). However, an important difference between creative industries

careers and traditional sectors is the general ambivalence towards formal qualifications. There is instead an emphasis on "learning on the job" as the gold standard credential for employability (Allen & Hollingworth, 2013 and Comunian et al., 2011). Oakley et al., (2017) refer to the 'guru' method, whereby an individual's credentials are based on those they have worked with. This has created an environment whereby people gain access and reputation through networks rather than qualifications, meaning prospective employees must navigate exclusionary social protocols and undertake unpaid internships (Frenette, 2013). Part of the difficulties in developing higher-level creative qualifications is the need for highly specialized skills which cannot be gained (in most cases) from HE courses.

Section 2.4 has highlighted that issues of skills gaps, poor working conditions and various inequalities are well documented within the creative industries literature. For this study it would be valuable to understand these issues in the CCR context (see findings section 8.2).

2.5 Creative Industries and Regional Economic Growth

The creative industries are seen by policymakers as a potential engine for regional economic growth. For example, creative industries add value directly through supply chain linkages (Bakhshi and McVittie 2009), or indirectly by adding to the stock of ideas in a city, raising innovation and productivity (Müller, Rammer et al. 2009, Pratt and Jeffcut 2009, Boix-Domenech and Soler-Marco 2017). This section will detail the literature behind the mechanisms through which the creative industries can contribute to regional economic growth.

2.5.1 Direct Economic Impact of the Creative Industries

The conceptual mechanisms through which creative industries activity leads to regional economic development are contested. There is an argument to suggest the presence of a creative cluster might lead to improves local supply chains and local knowledge spill overs (Bahkshi & McVitte, 2009). However, this form of creative agglomeration is at risk of the pitfalls of agglomeration, industrial displacement and gentrification (Atkinson, 2004 and Lees et al., 2013).

Evidence on the economic impact the presence of creative industries activity has on the broader regional economy is sparse. Bloom et al., (2020, p.48) find there to be a lack of quantitative studies in the creative industries attributed to the difficulties of classifying creative activity. Evidence on the multiplier effects of the creative industries is emerging with relatively few studies available. Lee & Clarke (2017) estimate creative industries job multipliers for UK cities between 2009-2015. The findings suggest that local economies do benefit from the growth of high-tech industries.

Positive jobs multipliers are found for high-tech jobs (each high-tech job creating 0.9 local nontradeable service jobs. The paper highlights an important caveat that low-skilled workers in the local economy will see wages fall due to the nature of jobs created.

Gutierrez-Posada et al., (2021) evaluate whether creative industries generate multipliers in the UK over the period 1997-2018. Their study finds large, positive multiplier effects of creative industries jobs. They find on average there are 1.96 additional non-tradeable jobs created over the period of study. An additional finding suggests that there is no evidence of spillovers to other tradeable activities contradicting earlier literature (Bakshi and McVitte, 2009). Gutierrez-Posada et al., (2021) call for greater understanding of the composition of cities creative industries particularly separating out commercial and cultural activities (the arts). Their study reveals no evidence of multiplier effects from the arts:

> *"We suggest that city leaders – especially outside London – will need a better understanding of the composition of a city's local creative industries, in particular the relative distributions of creative services versus the arts. We find little evidence of multiplier effects from the latter, but this is not to take away from the important non-economic effects of the arts on wider welfare."*
> (Gutierrez-Posada et al., 2021, p. 30)).

Boix et al., (2021) investigate the impact of CCIs on per capita income across 78 countries using data obtained from multiple databases and nonparametric local linear least squares. The study finds that the average effects of CCIs are positive on per capita incomes in both developed and developing countries. The findings further suggest that CCIs are a powerful tool to improve wellbeing at all geographic scales. The authors find however, that the presence of CCIs can also increase inequalities between places.

Various studies have estimated the multiplier associated with the creative industries. There is however, little examining multipliers at the sub-sector level particularly at smaller spatial scales. Additionally, recent literature suggests that CCIs promote regional economic growth and incomes but at the expense of an increase inequalities (Boix, et al., 2021). It would be valuable to generate multiplier effects for the creative industries at the sub-regional level and evaluate the consequences of changes in demand for creative sub-sectors. High quality data at this level would allow policymakers to understand the impact of local creative policy investment.

2.5.2 Universities and the Creative Economy

> *"The contribution of higher education institutions to regional development is a theme which has attracted increasing attention in recent years. Currently, it is*

expected that the knowledge institutions not only conduct education and research, but also play an active role in the development of their economic, social and cultural surroundings" (Arbo & Benneworth, 2007, p.6).

Universities have a strong influence on policy, regional economic impact and the creative economy. Historically universities have held the role of cultural production and preservation, often maintaining museums with historic artefacts and collections: for example, the Book of Kells at Trinity, Dublin or the many collections held at UCL including works from Charles Darwin, Isaac Newton and James Joyce (Comunian et al., 2015). More recently higher education institutions (HEIs) have been studied for their role in creative economy (Arts Council England, 2006; Chatterton & Goddard, 2000; Chatterton, 2000; Comunian, et al., 2015; Comunian & Faggian, 2014; Dawson & Gilmore, 2009; Goddard & Vallance, 2013; Long, 2011; Powell, 2007; Universities UK, 2010).

The role of HEIs in the creative economy is broad, HEIs are often key players in arts and culture of their local economy through facilitation of performing arts, academic research on arts and culture with evidence they have helped to develop local music scenes (Long, 2011). HEIs have a clear role in embedding human capital into a region through their process of education but also through providing a platform for knowledge transfer as 'third spaces' (Comunian, et al., 2015). The impact of HEIs is often hard to quantify. In the UK the establishment of the Research Excellence Framework (REF) has tasked HEIs with better understanding their impact including their impact on arts and culture in a more holistic manner (Martin, 2011).

Comunian, et. al (2015) explore the relationship between HEIs and the creative economy in Figure 2.3. The model details that the value of HEI has two main facets: Firstly, as a cultural and societal force and secondly, as a creator of knowledge and in turn economic impact.
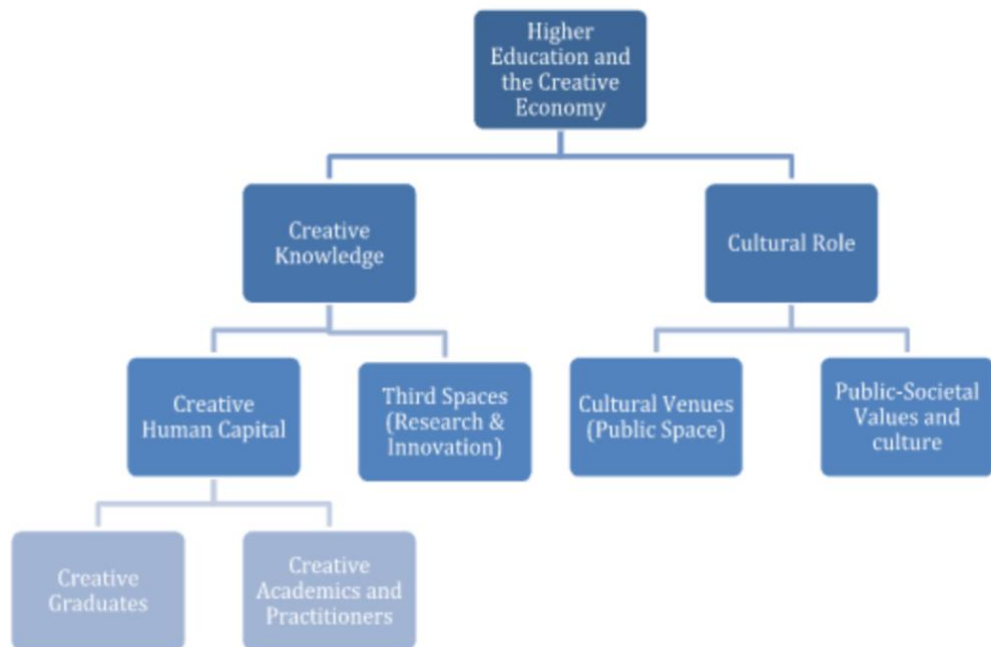
Figure 2.3 The relationship between HEIs and the creative economy (Comunian et al., 2015, p. 374)

Florida (2006) argues that HEIs have an oversold role in generating commercial economic impact and an undersold role as a powerful creative hub and the fostering of talent and tolerance which in turn improve the quality of place and therefore, attracting the creative class. This is a view reflected by Bonaccorsi, (2017) who argues that while universities are a key asset for regions in terms of research and development and innovation, they are not well placed as drivers of regional growth.

2.5.3   Creative Industries and the Transmission of Ideas

The case for fostering creative industries as an economic engine for regions is based on the sectors rapid growth but, also its links with innovation. Innovation from creative businesses is seen as a source of potential new products across different sectors (Bagwell, 2008). Bahkshi & McVitte (2009) provide important first steps into quantifying the link between creative industries and innovation. Bahkshi & McVitte (2009) use the ONS published UK input-output tables to reveal supply chain relationships in the creative industries. The inter-industry spending information is combined with innovation performance data from the UK Community Innovation Survey. They undertake econometric analysis to explore the relationships between creative linkages and innovation. The findings suggest that creative industries business can improve local supply chains and lead to innovation spillovers:

> *"We provide formal evidence for the first time that businesses with stronger
> links to the creative industries appear to be more innovative, at least in terms of
> their product innovations. This suggests that the creative industries may play a
> more important role in the UK's ecology of innovation than has previously
> been recognised." (Bahkshi & Mcvitte, 2009, p.170).*

Building on Bahkshi & Mcvitte, (2009) Innocenti & Lazzeretti, (2019) use an evolutionary economic geography approach to understand whether CCIs foster innovation and growth in the wider economy. Panel data analysis is used to investigate the role of relatedness and clustering of CCIs in wider economic growth. Employment growth in Italy is analysed over the years 2006 to 2015 finding faster growth in areas where the creative industries are more clustered in proximity and relatedness.

Keystone literature on the Creative industries has often been focussed on cities. Modern ideas that cities are integral to the transmission of ideas dates back to Jane Jacobs (Jacobs, 1969) but, has gained increased popularity with Florida's (2002a) 'The Rise of the Creative Class' and Glaesar's (2011) 'Triumph of the City'. Central to this view is that the proximity of economic activity seen in cities leads to innovation spillovers (Feldman & Audretsch, 1999). Some commentators suggested the digitisation of creative industries would lessen the importance of place, and clustering would no longer need to occur (Morgan, 2004). The trend, however, has been for more people to move to cities and for clusters like Silicon Valley to become more economically significant (Pratt, 2012). An important distinction is whilst information travels over the internet, knowledge spillovers are spatially constrained (Howells, 2002; Balland & Rigby, 2017).

2.5.4 Attracting Creative People

The previous sections have highlighted that ideas and innovation are often centred around physical places. Florida (2002a) additionally argues that attracting the footloose 'creative class' is also a key element of building an economically successful place.

This approach moves away from an industry, and firm-focused and agglomerative view of creative economies, to be replaced with a focus on attracting creative individuals working in creative occupations (Comunian & Faggian, 2014). Richard Florida's (2002a) 'The Rise of the Creative Class' defined a new socioeconomic class of worker, which is defined by the creative nature of their work. For Florida, these creative workers broadly fit into two subclasses the 'super creative core' made up of individuals whose work is entirely creative and 'creative professionals' whose work often involves creative solutions and knowledge to problems but whose work is not entirely creative.

Florida attributes certain traits to these workers that make them distinct from the general population outside of their occupation, with the archetype emerging of workers with a liberal outlook, geographically mobile, highly educated and engaged in culturally rich activities. These defining

attributes lead such workers to cluster in areas which cater to their needs; often large and socially liberal cities characterized by Florida's bohemian index (2002b). Florida links this movement of creative workers with the 'back to the city' trend observed since the 1990s in the USA (a phenomenon referred to as the 'urban renaissance' in the UK (Tallon, 2013)). Florida's basic thesis is that cities with high concentrations of creative workers will economically outperform comparable cities with lower concentrations of creative talent:

> *"Talent is associated with opportunity, diversity (low entry barriers) and quality of place. Talent in turn attracts high-technology industry. Together, talent and technology based industries generate positive regional economic outcomes in the form of higher per capita incomes"* (Florida, 2002b).

Florida argues that the main mechanism through which cities can attract creative talent is by improving quality of place for the creative class. Florida's creative class value bohemian, socially tolerant, culturally diverse, high-density neighbourhoods. The implications of this for urban planners throughout the world have been to foster the creation of such bohemian quarters. Since Florida's Creative Class theory was published a lot of work has been done to apply the theory to different geographies and develop policy prescriptions (Clifton and Cooke, 2009 and Pratt & Jeffcut, 2009).

The creative class literature has faced strong criticism for perceived flaws in the methodological approach and its implied policy recommendations. Critics have argued that Florida's definitions remain fuzzy (Markusen, 2006), highlighting the difficulties in attributing creative work based on the data available (Boschma & Fritsch, 2009). Glaeser (2005) agrees with Florida about the power of high skilled people in metropolitan areas to increase city level productivity through the generation of new ideas. However, Glaeser argues that Florida's prescription for urban planners to attract 'bohemians' by having 'cool downtown' areas is not justified with the data available instead suggesting Florida's creative indices correlate with high education levels (more in chapter 6). Some have been critical of the claim from Florida (2002a) that attracting creative talent can lead to 'positive regional economic outcomes' instead arguing that attracting the creative class has contributed to issues of gentrification and house prices rises leading to fears of social cleansing of cities and displacement of poverty (Beel et al., 2016). This critique has been recognised by Florida (2017) who describes this as the 'New Urban Crisis' and suggests the solutions to the crisis are not to abandon urbanization and clustering but to reform other aspects to make this work for the majority.

There are competing views on how to achieve increased innovation through talent attraction. Rodríguez-Pose & Lee (2020) define these as attracting 'hipsters or geeks'. One approach is to focus on attracting workers skilled in STEM activities, 'geeks' through investment in science parks

or training and attracting STEM workers (Atkinson & Mayo, 2010). The other is to focus on attracting creative workers, 'hipsters' (Florida, 2002a). Rodríguez-Pose & Lee (2020) provide evidence that the combination of both groups is important to economic success. Their evidence suggests 'geeks' have a bigger impact than 'hipsters' the greatest impact that can be achieved is a local policy mix that focuses on both and fostering collaboration between the groups. In an exploratory study Garretsen et al., (2019) examine the psychology of place in UK cities and its importance for economic geography and development. The study finds that personality traits are spatially clustered and appear to matter for economic growth. Of the 'Big Five' personality traits from (Obschonka et al., 2015) the trait 'neuroticism' has a strongly negative impact on economic output. While the trait 'conscientiousness' and traits associated with entrepreneurial culture show a positive impact. This raises interesting questions about clustering, the creative class and creative industries.

Efforts to build 'creative clusters' are often criticised for their focus on infrastructure in lieu of supporting social and economic networks (Tay, 2005). A view supported by Arbo and Benneworth (2007) who argue that examples of successful clusters such as Silicon Valley are the result of research being turned into commercial success, that business location in this case was not due to transport or infrastructure investment but, the clustering of knowledge. Pratt (2004) echoes some of the criticism of the creative clusters approach and its focus on flagship 'hard' investments (such as buildings) without 'soft' investments (networks, training). Pratt instead supports a more holistic approach viewing the creative industries as a complete production and consumption system;

> *"The paper argues that creative clusters are formally a subset of business clusters. A critique of the business clusters literature highlights its shortcomings: a focus on individual firm preferences and a lack of attention to non-economic, situated temporal and spatial variables; a lack of attention to the specificity of particular industries and their associated regulatory peculiarities; and finally, information issues associated with the operationalisation of the cluster model. The paper concludes with a discussion of an alternative approach, looking at a creative industries production system that would better meet the concerns of those seeking to govern the creative industries and creative clusters" (Pratt, 2004, p.1).*

2.6 Conclusion

This chapter has reviewed the key debates and issues in the creative industries literature. In summary, the creative industries have become increasingly important to policymakers and have seen increased attention in the academic literature for their impressive growth figures. The Porter (1996) inspired 'creative cluster' policy approach has been a particular focus area for bolstering the creative industries with the view that creative sectors thrive in localised creative hubs (Virani et al., 2016). The creative clusters debate is concerned with the mechanisms that help form and nurture

creative cluster development and lead to economic benefits. Part of this debate regards how best to and whom to attract to these creative places (Atkinson & Mayo, 2010; Florida, 2002 and Rodríguez-Pose & Lee, 2020). HEIs have been found to have several different positive impacts on local creative industries clusters and have seen an increasing role and responsibility in local creative policy implementation (Comunian et al., 2015). Finally, there is the review of the evidence of whether and how the presence of creative industries benefits regions through direct economic impact or indirectly, through other mechanisms like innovation and R&D.

The literature has revealed some challenges. There is evidence in the literature that employment in the creative industries can be precarious and is affected by socio-economic, ethnic and demographic inequalities (O'Brien et al., 2016 and Oakley et al., 2017) issues examined further in section 4.1.1.3. Furthermore, there is suggestion that a focus on developing the creative industries may concentrate activity in clusters which are often based in cities. Additionally, there are tensions in the literature about how creative activity is defined which can lead to challenges when producing economic statistics (more in section 6.3).

This chapter has revealed some gaps in the literature. Firstly, there is little literature on the productivity differences within the sub-sectors of the creative industries. This project will seek to address this gap using input-output tables. Secondly, there is question about whether a focus on creative industries might further exacerbate inequalities present in a region.

Chapter 3.   The Welsh Economic and Policy Context

3.1 Overview

In this chapter, we first detail the geographic context of the Cardiff city-region and provide an overview of the economic structure. The second section explains key features of the Welsh economy, the issues of lagging productivity and geographic inequality. The third section details the political context by addressing how regional policy has evolved in the UK to form the CCR and the scholarly debates surrounding the city-region approach. The fourth section gives some background to the policy and legislative situation in Wales.

3.2 South East Wales Economic Context

Wales is a devolved nation of the United Kingdom and shares a land border with England. Wales is governed jointly by the UK Government, the Welsh Government and the 22 local authorities. The capital of Wales, Cardiff is located in South East Wales and this is the location of the Welsh Senedd (parliament).

South East Wales is a collection of 10 local authorities: Blaenau Gwent, Bridgend, Caerphilly, Cardiff, Merthyr Tydfil, Monmouthshire, Newport, Rhondda Cynon Taf, Torfaen and The Vale of Glamorgan (Figure 3.1). South East Wales despite being the smallest of the three regions of Wales by land areas it is the most populated with a population of over 1.53 million people, just under half of the total population of Wales.

In March 2016 South East Wales as defined by the 10 local authorities saw the establishment of a new political boundary, The Cardiff Capital Region (CCR) a part of the UK Government's City & Growth Deals. The CCR will be the focus of this study.
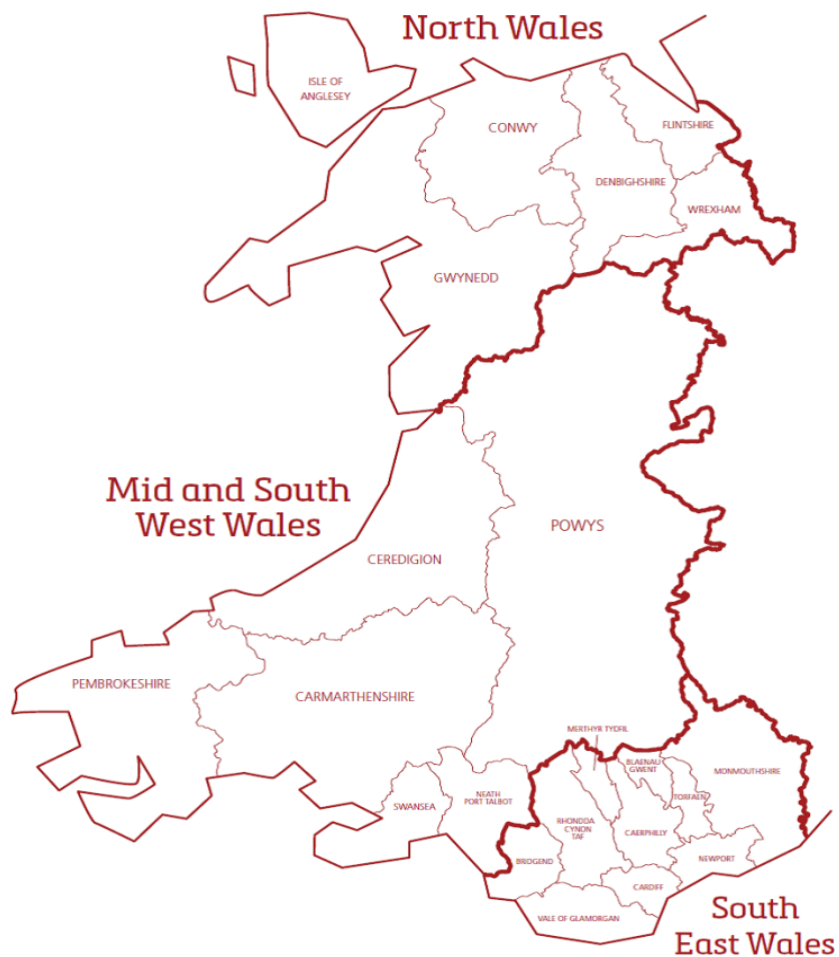
Figure 3.1 The economic regions of Wales. Source: Welsh Government

The landscape of South East Wales is dominated by the collapse of traditional heavy industries such as coal mining and steel. Figure 3.2 shows the breakdown of employment by industry. This figure shows; Firstly, South East Wales to have a higher proportion of public sector employment than both the UK and Wales. Secondly, South East Wales has a higher proportion of finance and business activities (traditionally higher income sectors) than the Wales average but fewer than the UK average.
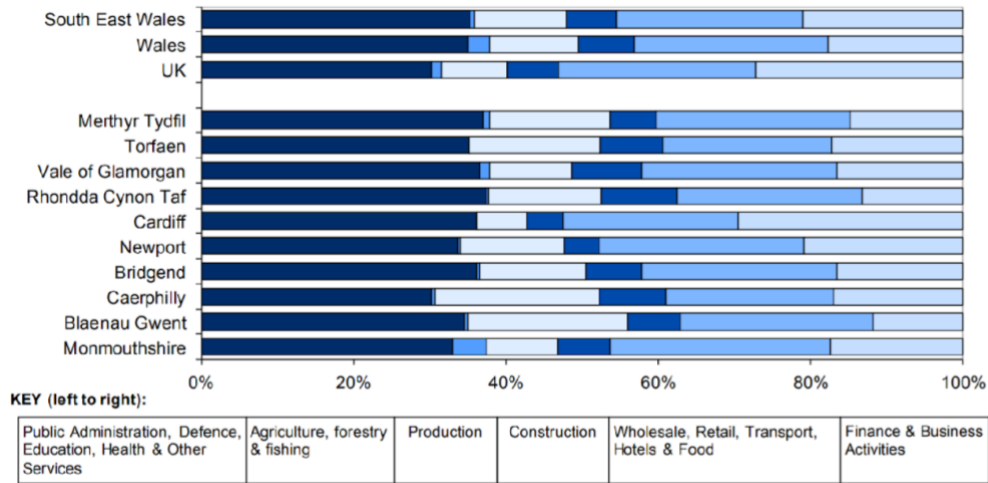
Figure 3.2 Workplace employment by industry 2016 (Welsh Government, 2018a)

> "An interesting outlier in the economy of Wales appears to be the rapidly
> growing employment share and economic output of the creative industries,
> albeit from a low base. As a result of Welsh Government support, the creative
> industries is one of our fastest growing sectors, with an annual turnover of over
> £1.9 billion. It employs over 58,000 people, 52% more than ten years ago."
> (Welsh Government, n.d.).

Figure 3.3 shows full time equivalent (FTE) employment by broad industrial group for the CCR
and the rest of Wales in 2019. This figure shows that the creative industries make up 2.6 per cent of
all FTE employment in the, CCR relatively higher than for the rest of Wales at 1.7 per cent.
Caution is required when viewing this number however, as measuring the size of the creative
industries is challenging for a number of reasons: The definition of the creative industries itself is
fuzzy, ill-defined and changeable. The sector has a large informal and freelance sector which is
often unpaid. The FTE figure for the creative industries, therefore, is likely a low estimate (see
section 10.2.1).
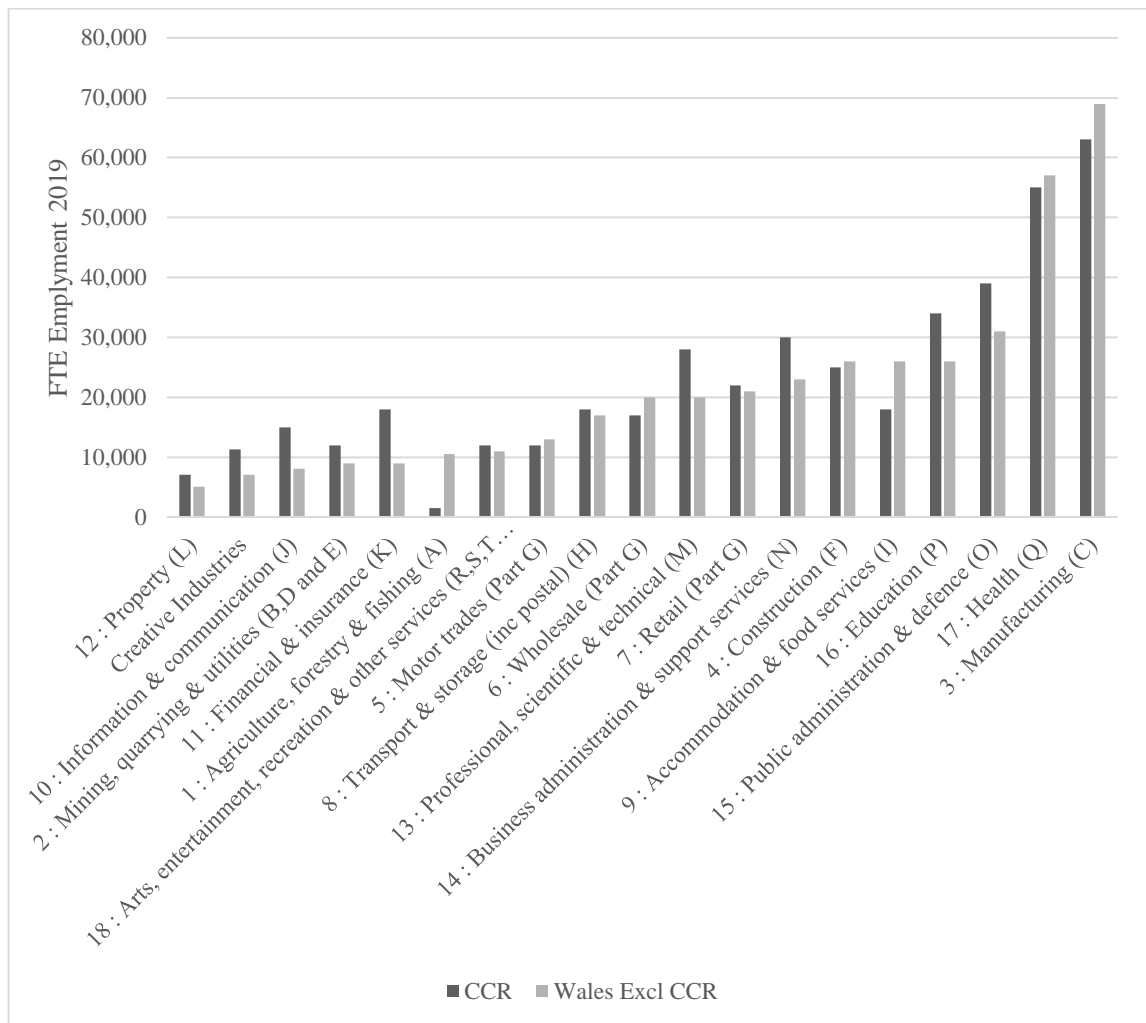
Figure 3.3 FTE employment by industrial sector for Wales and the CCR. Source ONS.

3.2.1 Productivity in Wales

A common measure of the size of an economy is gross domestic product (GDP). GDP for Wales in 2018 was £74.9 billion representing 3.5 per cent of the UK GDP, and with GDP in the CCR of £38 billion. Figure 3.4 plots GDP per head of the four nations of the UK and the CCR over the period from 1998 to 2018. This shows that Wales has a persistently low output per head when compared with the other nations of the UK, and that GDP per head in the CCR is higher than the Welsh average.
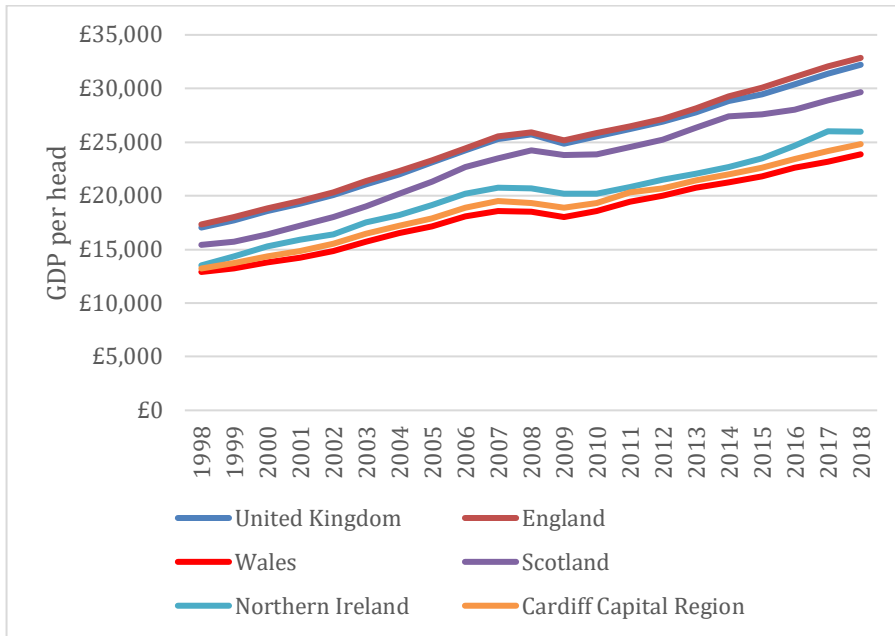
Figure 3.4 GDP per head (ONS, 2019a)

Productivity is a central economic issue in the UK, with productivity lagging behind all other G7 countries except Japan (ONS, 2018a). Increasing productivity has been a top priority for successive governments as it is associated with raising living standards int the long term. Productivity in Wales has lagged behind the rest of the UK for decades and has become a key feature of economic policy rhetoric. Productivity is typically compared across regions using Gross Value Added (GVA). GVA shows the net value of outputs less the value of intermediary inputs (ONS, 2019b). Figure 3.5 illustrates the Welsh productivity problem with Wales outperformed in GVA per head and per job filled by all other UK regions.
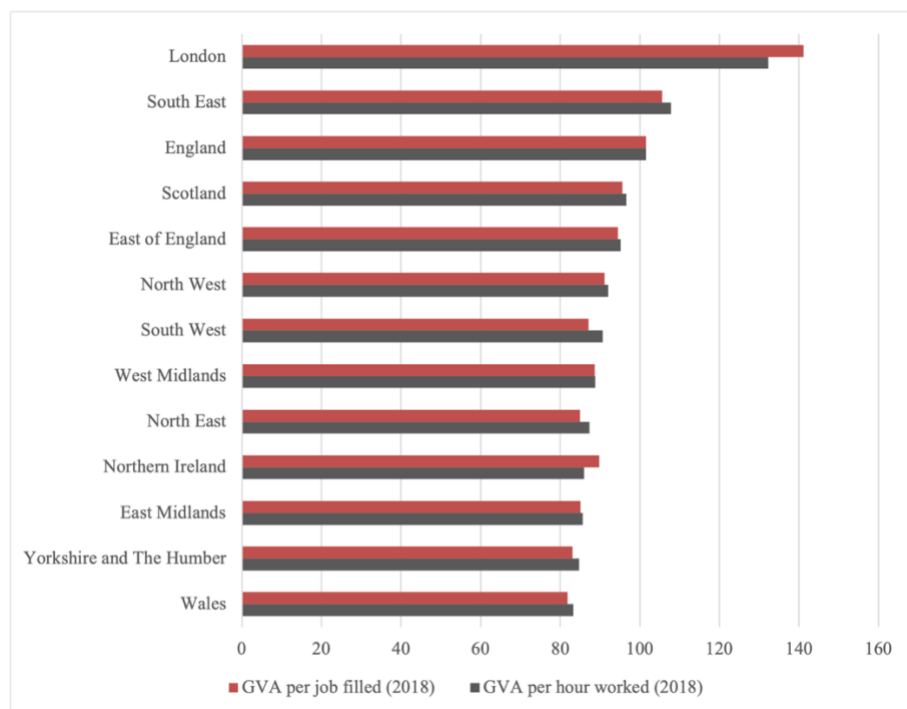
Figure 3.5 GVA per filled job and hour worked UK NUTS 1 regions. Source (ONS, 2020a)
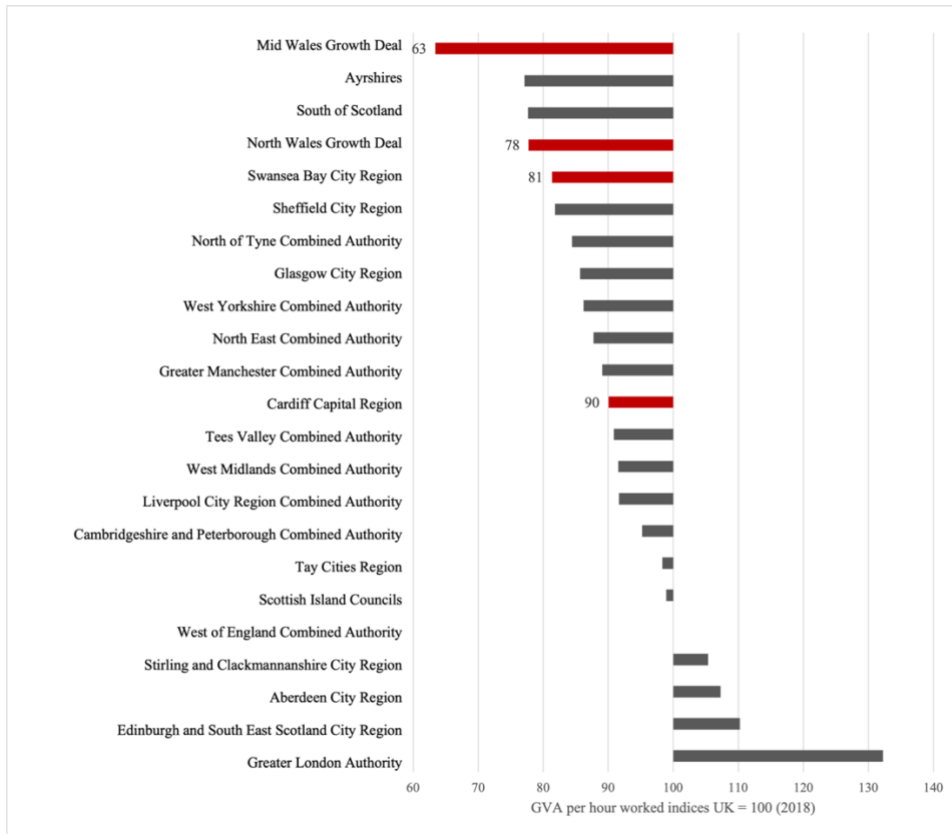
Welsh city-regions highlighted

Figure 3.6 Nominal (smoothed) GVA (B) per hour worked indices; City Regions, 2004 - 2018. Source: (ONS, 2020b)

Figure 3.6 shows the productivity issue for the CCR despite being the strongest performing city-region in Wales, the CCR still has productivity per hour worked 10 percentage points lower than the UK average.

There are two points to note however, when reviewing GVA figures for Wales; Firstly, Wales has an estimated net outflow of commuters of 50,000 per day (Welsh European Funding Office, 2020), meaning there are more people that live in Wales and work elsewhere than the reverse. Because we report workplace-based GVA rather than residence-based GVA is assigned to the workplace rather than to the household disproportionately penalising Wales. Secondly, Wales has a relatively high level of dependents such as children or elderly people than other areas of the UK which further dilutes the GVA per head figure. The issues of accounting for GVA is revisited in section 10.4.

3.2.2 Geographic Inequality in Wales

Geographic inequality within Wales and social issues are also a persistent issue. Within the CCR economic outcomes vary significantly. Figure 3.7 shows Gross Value Added (£ per head) by the 10

local authorities that make up the CCR. The graph shows that GVA per head is 38 per cent higher in Cardiff in 2018 than the CCR average with £32,310 per head to £20,036 respectively.
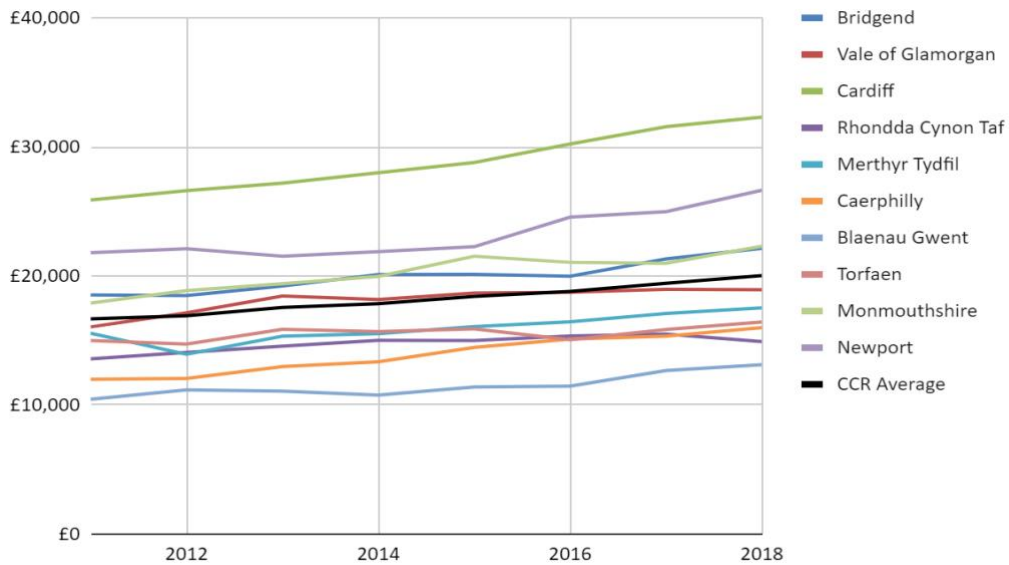
Figure 3.7 Gross Value Added (£ per head) by the 10 local authorities that make up the CCR. Source (ONS, 2018b)

The reasons for the variation in GVA within the CCR can be explained by two main factors. Firstly, sectoral makeup of employment in LAs. The highest value sectors are headquartered in the Cardiff such as finance and business activities and lower GVA activities like agriculture are more dominant outside the city (see Figure 3.2). Secondly, there is the issue of attributing GVA geographically in areas with high levels of commuting (Prothero, 2018). Cardiff has a high net inflow of commuting from other LAs in the city-region (Waite, 2015, p. 25).

South Wales has a coastal split in prosperity, with Cardiff hosting the most high-value jobs and the 'valleys' experiencing considerable poverty. Poverty in Wales is a significant and persistent problem where 1 in 4 people live in relative poverty (Welsh Government, 2018b). The issue of responsibility for poverty reduction in Wales is complex, with levers to reduce poverty split between Welsh and UK governments (Assembly for Wales, 2015). In 2016, the Welsh Government launched the Valleys Taskforce to address the persistent inequality of outcomes throughout South East Wales. In 2017 the taskforce identified three priority areas: Jobs & skills, public services and the local community.

South-East Wales faces considerable health outcome inequalities relating to geographic, demographic and social class. In Cardiff, there is a 10 to 13-year gap in life expectancy between the wards of Butetown and Lisvane less than 10 miles apart (CVIHSC, 2017). Comparing the least

and most deprived areas in Cardiff, it shows a healthy life expectancy disparity of 22 years for men and 24 years for women.

Educational attainment and skills in the Welsh population have been a persistent bugbear for policymakers. The Programme for International Student Assessment (PISA), a survey designed by the OECD, measures how countries compare pupils' academic ability in science, mathematics, and reading. Recent Pisa survey results (Welsh Government, 2016) put Wales below the other countries of the UK on all segments. The low levels of educational attainment is reflected in the adult population with poor literacy & numeracy skills and low qualifications (Sloane et al., 2005). Sloane et al., (2005) argue that the relative low skills of the Welsh population could explain the 20 per cent gap in productivity between Wales and other European countries.

3.2.2.1 The Impact of Transport and Digital Infrastructure on Productivity in Wales

Transport infrastructure is considered one of the areas vital to improving low productivity and geographic inequality in the UK (IMF, 2018). Transport in Wales has been a high policy priority for the Welsh Government, with improving transport infrastructure central to the Cardiff Capital Region City Deal and the Economic Action Plan (HM Treasury, 2016 and Welsh Government, 2017). A cornerstone project of the CCR City Deal is the South Wales Metro, a £734 million scheme to improve intra-regional connectivity (HM Treasury, 2016).

Road transport in Wales is also a concern for policymakers, with the M4 motorway connecting Wales with England a persistent source of debate. The proposed M4 relief road, a £1.4 billion road-building project, was scrapped in 2019. The benefits were argued to include agglomeration economies and increased competitiveness (Venables et al., 2014). These plans faced harsh criticism for weak evidence on the economic claims (Jones, 2017) and the issues of environmental destruction (Natural Resources Wales, 2016). The M4 relief road plans remain a policy for the Welsh Conservatives (Welsh Conservatives, 2020).

Digital Infrastructure is considered an important element of business success and increased productivity. In Wales, the rollout of fibre broadband (Superfast Cymru) has been comprehensive, with 95 per cent of premises having access to a fast broadband connection (Miller & Greenwood, 2019). It may follow that increasing the rollout of superfast broadband to rural communities would assist in a level playing field and increased productivity. However, a study by Jones & Henderson (2019) of the roll out of superfast broadband in the CCR finds that the benefits accrue disproportionately to areas of the CCR that are already more economically prosperous.

3.3 Policy Context

This section seeks to; introduce the City Deals as the latest incarnation of regional development policy, detail the CCR, the geography of focus for this study and present the academic debate that surrounds the city-region development policy.

3.3.1 UK Policy Evolution 1980 to 2020

Like many UK regions outside London and the South East of England, economic development in Wales has since the 1970s been affected by globalisation and industrial collapse. Successive UK governments have attempted to address the regional imbalance; however, over the past decade, the imbalance has increased. The growing divide between London, the South East and other regions left behind has been linked to the vote to leave the European Union in 2016 (Joseph Roundtree Foundation, 2016). This section will briefly cover the policy response to this imbalance from the 1980s until 2020.

A report by the IPPR in 2019 shows that the UK is more regionally divided than comparable economies on a range of socio-economic factors. In addition to this, the report finds the UK to be the most centrally governed country of any comparable economy, a view supported by (Booth, 2015). The report finds this centralisation has helped reinforce the inequalities found with decisions made in institutions in central London biased towards the South East. Local authorities are found to lack the power and funding to make meaningful investment decisions (Raikes et al., 2019).

There is a long history of UK Government policy efforts to address regional inequality dating back to the 1934 Special Areas Act. In more recent history, the UK has seen the regional power balance addressed in the Government policy of successive governments. The Local Government Act 1985 introduced by Thatcher's government saw the removal of the Greater London Council and metropolitan councils. These councils had considerable power and resources, which facilitated large scope projects to be developed, such as the West Midlands County Council and the construction of the national exhibition centre.

In a political response to the reduced regional power, the New Labour Government in 1997 began national and regional devolution. The UK Government devolved powers to Northern Ireland, Scotland and Wales. National devolution has broadly been considered a success (Beel et al., 2016; Pike et al., 2015 and Rallings & Thrasher, 2006) despite some discontents (Conservative Home, 2018). As part of the regional devolution, the Regional Development Agencies (RDAs) were introduced to facilitate decentralised regional economic planning. The devolution represented a

step toward more regional power; however, the RDAs had increasing political pressure to meet targets and reduce funding (Beel et al., 2016).

The 2010 Conservative-led coalition government scrapped the RDAs and, in its place, introduced the City Deals and the establishment of Local Enterprise Partnerships (LEPs) in England. The LEPs and CIty Deals represented a change in regional development policy towards sub-regions and city-regionalisation. The BIS (2010) argued that the city-region is more 'strategically relevant' scale with 'functional mechanisms for growth' (BIS, 2010). The Northern powerhouse trumpeted by George Osbourne was a plan to deliver prosperity to core cities in the north through agglomeration and city focussed 'engine of growth' economics. Teresa May's leadership continued this agenda from 2016 with a less outspoken commitment.

In 2019 Boris Johnson's Conservative Government proposed 'levelling up' of the UK regions outside of London and the South East. 'Levelling up' appears to be a central commitment of the new Government and a policy area likely to be high on the agenda for at least the remainder of this Government. A report by Davenport & Zaranko (2020) for The Institute for Fiscal Studies reviews the 'levelling up' agenda and the current state of the UK. The report echoes findings of the IPPR (2019) report that geographic inequality is a serious issue for the country:

> *"The UK is one of the most geographically unequal countries in the developed world; compared with 26 other developed countries, it ranks near the top of the league table on most measures of regional economic inequality." (Davenport & Zaranko, 2020, p.315).*

The report notes that the regional inequalities present in the UK are complex and would require a series of different policies and a long-term approach to address. Further to this, Brexit could make 'levelling up' significantly more difficult with the negative economic impacts concentrated in areas already in economically disadvantaged areas. Martin et al., (2021) suggest that if levelling up is to succeed national policymaking must evaluate the regional and sub-regional impacts of policy to ensure the differing needs of different parts of the country are met. It is not yet clear whether levelling up will mark a step change in regional economic development with little detail published.

3.3.2 The Emergence of the City-region

The introduction of the City Deals in 2010 under the coalition government established the city-region as the scale of focus for regional development. The City Deals have drawn international attention in the Netherlands (Evers et al., 2020) and Australia. The Australian Government has established eight City Deals for metropolitan areas across Australia (Australian Government, 2020). The City Deals were formulated during the aftermath of the 2008 financial crisis and informed by the UK Government's ambition to reduce the deficit and 'unlock' city-regional growth

(O'Brien & Pike, 2019). City-regions now have devolved powers to address local issues of planning, economic development, transport infrastructure and skills and training. These powers sit with combined authority boards and in some cases elected mayors (HM Government, 2017b). The City Deals are designed to incentivise coalitions of city-region stakeholders to develop strategies to foster growth, particularly through innovative ways to fund urban infrastructure (O'Brien & Pike, 2019). The City Deals are argued to give city-regions the power to act in the local interest with significant budgets (HM Treasury, 2016). Waite & Morgan (2019) argue that the fiscal powers given to city-regions are 'limited' and 'highly-conditional'.

3.3.2.1 Cardiff Capital Region City Deal

The Cardiff Capital Region City Deal is an interesting example city-region with a unique governance structure and set of economic challenges. The city-region has four levels of governance: local authority, city-region, Welsh and UK Governments. The City Deal will have a £1.2 billion investment fund over a twenty-year period with funding coming from the UK and Welsh governments the ten local authorities and from the European Regional Development Fund (HM Treasury, 2016).

The CCR City Deal aims to increase economic growth in the city-region by tackling the 'barriers to growth' in the city-region. In the City Deal document (HM Treasury, 2016) the two key issues highlighted are the lower level of GVA compared to UK core cities and transport capacity, connectivity and congestion. The headline benefits of the City Deal are announced to be the expected 25,000 jobs created, 5 per cent GVA uplift and £4 billion of investment leveraged from the private sector (HM Treasury, 2016). The investment decisions have not been fully announced however, over half of the investment has been earmarked for the development of the South Wales Metro (£734 million) and £38.5 million has been allocated for a compound semiconductor industry cluster. Detail of the projects are shown in Table 3.1. Future investments from the CCR are required to meet the 'Investment Fund Assurance Framework' criteria which are based on 'best practice' from the Welsh & UK governments. These investments will then be impact assessed using 'gateway assessments'. The gateway assessments are conducted every five years and are described in the CCR City Deal as an independent assessment to ascertain whether the City Deal has 'met key objectives and contributed to national growth' (HM Treasury, 2016).

Table 3.1 Cardiff Capital Region City Deal Investments.

Investment Area	Funding	Solution
Transport Infrastructure	£734 million for the SW Metro	Development of South Wales Metro system
		Establishment of Regional Transport Authority
Jobs & Skills	Not Yet Announced	Establishment of a Skills and Employment Board
Public sector innovation	£10 million Challenge Fund	Funding for public sector bodies targeting societal challenges
Housing Development & Regeneration	Not Yet Announced	New Partnership
Enterprise & Business Growth	Not Yet Announced	Establishment of the Cardiff Capital Region Regional Business Organisation
Improving the Digital Network & Innovation	£50 million announced for Catapult Centre	Establish a new 'Catapult Centre' in Wales
		Support for R&D companies

3.3.3 City-regions as 'Engines of Growth' for their Hinterland Economies

The changing political scale of regional economic development from regions to city-regions is associated with the cities as 'engines of growth' approach (Vainikka, 2015). The 'engine of growth' approach to economic development involves investment in a central core city which will act as an engine of prosperity for the city's hinterland. The logic here is that investment in a city will have a proportionately greater impact on productivity and output for the economy than would be possible if investment was spread through the region. The city-region approach is summarised by Beel et al., (2018):

> *"The CCR City-Deal, like other settlements, focuses its primary concern on strategies for generating economic growth within the city region and for the most part this aims to bolster the opportunities for agglomerative growth within the metropolitan centre of Cardiff. Despite traversing into other areas, which are related to more social concerns such as skills and unemployment, the focus and success will largely be measured against GVA growth." (Beel et al., 2018, p.316)*

Agglomeration economies are the process whereby an increased density and population of an area can increase productivity. This strategy is central in the Welsh Conservatives' plan for urban

renewal (Welsh Conservatives, 2018), which cite the City Deals as a lever to progress this strategy. The city-region viewpoint is linked with New Urbanism and its supporters such as Ed Glaeser, who argues that density increases creativity as 'ideas spread more easily in denser places' (Glaeser, 2011). Richard Florida would argue that cities should seek to become denser, urbanised and connected, viewing the drivers of success for cities as clustering and competition (Florida, 2002). Florida (2017) considers the UK City Deals and the election of 'metro mayors' as a step towards solving what he sees as 'the New Urban Crisis':

> *"These elections represent the next concrete steps towards new and more localized systems of governance around the city region" (Florida, 2017, p.226)*

Despite support for the City Deals, Florida (2017) acknowledges that concentrating economic talent with an engine of growth model fuels inequality. He describes this as the 'New Urban Crisis' and suggests the solutions to the crisis are not to abandon urbanisation and clustering but to reform other aspects to make this work for the majority.

There are harsh critics of the 'engine of growth' approach. Some are critical of the underlying economic philosophy of new urbanism with its basis in mainstream neoclassical economics, which finds the city (much like the firm or individual) decontextualised (Engelen et al., 2017). Others critique the transmission of economic benefit from the city of focus to the often-rural hinterland (Haughton et al., 2014; Harrison & Heley, 2014 and Jonas, 2012). Waite & Morgan (2019) refer to the 'engine of growth' and city-focused investment as 'Metrophilia', a phenomenon that involves the 'uncritical embrace' of such narratives of regional policy. They argue, available empirical evidence challenges the view that championing the city will lead to higher productivity and growth.

Beel et al., (2016) criticise the City Deals arguing the City Deal board takes some power away from the local authorities, which may lead to the furthering of market-led consensual interests at the cost of local communities. The Bevan Foundation (2017) has been critical of the Cardiff Capital Region City Deal, particularly regarding the deal's transparency.

The City Deal gateway assessments, the process by which the central government determines the performance of the city-region, also have their critics. These assessments conducted every five years review the investment decisions made by city-region boards. The CCR assessments are focused on growth, GVA uplift and jobs created. The assessments have been criticised for their narrow definition of success, with the Bevan Foundation arguing they are not a good measure of broader prosperity. The focus of the gateway assessments on growth is creating political tensions between the competing objectives of the UK and devolved nations' Government. Waite et al.,

(2018) note that the UK Governments core criteria for the success of the City Deals related to growth are yet to be set out for 'inclusive growth', a key focus of Scottish Government policy[6].

Improving GVA in a region is correlated with house prices rising, which can be damaging for communities that do not benefit from new higher-value jobs (Watt, 2008). Evidence of this can be seen in the rapidly gentrifying areas of other 'successful cities' in the UK; Bristol, Brighton & London (Clarke, 2016). The notion of improving economic growth (GDP) is also increasingly under question with the rise in popularity of alternative metrics of progress. Alternatives such as; steady-state (Steady State Manchester, 2017), degrowth (Koch et al., 2017), Doughnut Economics (Raworth, 2017), and indeed the ground-breaking legislation introduced in Wales in 2015, the Future Generations Act.

Analysis of the City Deals by Etherington & Jones (2009; 2016) has found in the Sheffield city-region that the policies targeting these inequalities ex-post have failed to control uneven development. Johnes (2018) echoes the concerns of those critical of the city-region approach in the Welsh context:

> *"The biggest challenge is to reconcile the City Region approach (which sits so centrally within Welsh economic policy) with the need to develop inclusive economies. So much emphasis has been put on City Regions as 'engines of growth' that their contributions towards wellbeing have been simply assumed by their adherents. However, as the paper acknowledges, equity was the last thing on the minds of their intellectual begetters (Osborne's Treasury) and there is little evidence as yet beyond rhetoric of the Welsh City Regions becoming more equitable."* (Johnes, 2018).

3.4 Mapping Creative Policy

To understand the policy environment in Wales it is important to understand which institutions control which policy levers. The Welsh Government has devolved powers from the UK Government on various policy areas with others reserved by the UK Government (see Table 3.2). This section will consider the powers and priorities of various policy institutions relevant to the creative industries in the CCR.

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[6] In March 2021 an Inclusive Growth Deal was signed for five local authorities across the England and Scotland boarder with explicit mention of 'Inclusive Growth Impact Assessments. https://www.borderlandsgrowth.com/Portals/0/Borderlands%20Inclusive%20Growth%20Deal%20Deal%20 Document%202021%20-%20Signed.pdf?ver=2021-03-17-183958-067

Table 3.2 Devolved powers in Wales. Source: Civil Service (n.d.).

Policy Area	Wales
Agriculture forestry and fisheries	
Arts, culture and sport	
Education and training	Devolved
Health and social care	
Local Government	
Taxation*	
Transport	
Broadcasting	
Constitution	
Defence	Reserved
Foreign Affairs	
Immigration	
Justice and Policing	
Social security	
Trade Policy	

There are some areas of taxation that are devolved following the Wales Act 2014 and others that are reserved.

Multiple policy areas are indirectly linked to the creative industries and have relevance to the issues facing the sector. Education and training are an important policy area of focus in the creative literature in part due to the skills gaps present in some sub-sectors of the creative industries (see section 2.4). Education and training are a devolved policy area and therefore, Wales can respond directly to the challenges facing its sector. Immigration and trade policy equally have significant bearings on addressing skills gaps and barriers to export growth related to the UK's exit from the EU (see section 3.4.1.2). These powers are reserved to the UK Government and therefore, outwith the control of Welsh Government policy. Two policy areas that impact the creative industries directly are 'broadcasting' and 'arts, culture and sport'.

In the policy area 'broadcasting', the powers are reserved to the UK Government. The reservation of these powers means that the UK Government has the sole responsibility over changes to the license fee structure. Broadcasting represents a significant part of the Film and TV ecosystem in the CCR with the BBC one of the largest employers in the sector. The erosion of budgets for public sector broadcasters will have significant impacts on the cluster in the CCR and is beyond the

powers of the CCR or Welsh Government to act upon. The changing of the funding structure and the movement towards commerciality in recent years has consequences for more culturally focused less profitable content such as Welsh language programming. Broadcasting plays an important role in Welsh Government goals such as to have one million Welsh speakers by 2050:

> *"In terms of broadcasting and the Welsh language, we continued to stress the importance of the Welsh language provision of S4C and Radio Cymru to the UK Government and Ofcom, as well as to the BBC. In the review of S4C commissioned by the UK Government, we welcomed the emphasis on S4C's importance in achieving the Welsh Government's aim of reaching one million speakers."(Welsh Government, 2019a, p. 31)*

There have been recent calls for greater devolution of broadcasting responsibilities to the Senedd and Welsh Government including the requirement for a greater proportion of content to be produced in Wales (Welsh Parliament, 2021).

The 'arts, culture and sport' policy area at the UK level is the responsibility of the Department for Culture, Media and Sport (DCMS). In Wales, the powers for this area are devolved. However, for the mutual benefit of the DCMS and the Assembly government there is a concordat establishing an agreed framework for co-operation[7]. The responsibilities of the DCMS and the Assembly Government in the policy area are carried out through other sponsored non-departmental public bodies (Appendix 8: Creative Policy Bodies UK and Wales).

The creative industries have been seen as an important area for UK government policy particularly for their ability to drive growth and productivity. Creative industries can be found in policy in the UK industrial strategy[8]:

> *"The creative industries are at the heart of the UK's competitive advantage, and - in the face of technological transformation at home and new possibilities globally - represent a major strategic opportunity. Already booming, the creative industries are fast growing, and high exporting"* (HM Government, 2018).

Key aspects of the UK's strategy for the creative sector are summarized in five points (HM Government, 2018): increase exports, sustain growth, boost jobs, narrow the gap between London and the rest of the UK and be more representative of society. There is recognition in the HM Government (2018) of the rapid growth of the creative sector, the export intensity of the sector and

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[7] Concordat between Department for Culture Media and Sport and Welsh Assembly Government https://gov.wales/sites/default/files/publications/2018-09/concordat-with-culture-media-and-sport.pdf

[8] Since the time of writing the UK Government has axed the UK industrial strategy in favour of a 'Growth Strategy' https://www.gov.uk/government/publications/build-back-better-our-plan-for-growth.

the benefits in terms of 'soft power'. The government seeks to increase and sustain this growth in terms of output, jobs and productivity uplift. Additionally, there is recognition of the issues that face the sector. Such as, the dominance of London and the South East and the failure of the sector to be more representative of the UK.

At the UK Government level, the £80 million creative industries clusters programme was established with funding from the Arts and Humanities Research Council (AHRC) as part of the UK's industrial strategy (HM Government, 2017). Alongside the Creative Industries Policy & Evidence Centre (PEC) was established to provide research and policy recommendations for the benefit of the sector. Established in 2018, the creative clusters programme provides AHRC funding over five years in a partnership model between universities and creative businesses focused on 'generating growth' through research and innovation. Nine clusters have been established across the UK

> *"This five year programme aims to drive growth further, both regionally and nationally..*
>
> *..The clusters draw from some of the UK's best performing and world renowned creative companies, from the screen industries and digital storytelling to fashion and video games. It brings businesses, organisations and Britain's world-class universities together to ensure the Creative Industries continue to flourish."* (Creative Industries Cluster Programme, n.d.)).

Creative Industries policy approach in Wales is closely related to the UK Government strategy with one of the creative clusters based in Wales, Clwstwr Creadigol (see section 7.5.4). The devolved Welsh Government's economic strategy sits alongside this with 'Economic Action Plan' Prosperity for All (Welsh Government, 2017). Key areas of policy focus in the EAP include goals to see the GVA gap between England and Wales narrowed with an economic contract for firms that wish to receive investment from Welsh Government required to have 'growth potential' including through GVA. While there is little mention of creative industries in the economic action plan there is highly visible policy at the Wales level from Creative Wales an independent body linked to Welsh Government[9]. Creative Wales includes the requirement that businesses that seek financial support will also have to demonstrate growth and productivity uplift potential:

> *"Where businesses are seeking direct financial support from Creative Wales they will be required to commit to an Economic Contract aimed at stimulating growth, increasing productivity and making Wales fairer and more competitive"* (Welsh Government, 2020).

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[9] Creative Wales: https://www.wales.com/creative-wales

Creative Wales states addressing skills shortages through education and training as one if its priorities for the screen sector. Twelve projects have so far been supported to assist in the development of 'the right skills': One such project included the development of a new national film and television hub. A programme with Sgil Cymru, Stepping Up saw 20 people upskilled in Film & TV sectors. A production apprenticeship scheme Criw was piloted in South Wales to provide applicants experience with on-set roles. Creative Wales have stated that the development of a skills strategy will be an important next step which will seek to, with the help of partners in FE and HE, identify and address skills shortages. There are links throughout Creative Wales skills projects to the Welsh curriculum and to ensure that there are links to Welsh Government policy agendas such as the *Young Persons Guarantee*[10].

The Arts Council of Wales is another important actor in Wales with goals that overlap with Welsh Government and Creative Wales, however, with a focus on the less commercial aspects of the creative industries. The Arts Council of Wales has set out five goals to be achieved by 2023 (Arts Council of Wales, 2018). These include commitments to 'nurture and develop creative talent'. The approach taken to achieve this has two main strands. The first includes a focus on ingraining creativity into the lives of all young people with the acknowledgement that creative talent starts at an early age. The second, focuses on improving resilience in the sector by improving earning for artists by 10 per cent in real terms by 2023. Improving earnings for artists includes enhancing the export potential of arts outputs and securing post-Brexit funding to support European collaborations. .

Below Welsh Government level there are policy institutions at the city-region and local authority levels. The Cardiff Capital Region board tasked with increasing growth in the CCR In the Cardiff Capital Region Industrial and Economic Plan (Cardiff Capital Region, 2019) (see section 3.3.2.1). There is just one mention of the creative economy in the CCR economic planning documents, but in 2021, a successful £50 million bid saw the establishment of Media Cymru. Media Cymru is led by Cardiff University and seeks to drive economic growth and generate an additional £236 million in GVA by 2026.

Despite the relatively low visibility of creative industries in policy, there has been significant activity in supporting the sector. The Welsh Government creative industries development strategy

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[10] The Young Persons Guarantee commits to giving everyone under the age of 25 the opportunity to be in education, training or work.

has focused on the 'screen sector' with investment aiming to bring high-value film and TV to Wales through financial incentives and infrastructure spending with recent Welsh Government investments detailed in Table 3.3.

Table 3.3 Welsh Government investment in the screen sector (National Assembly for Wales, 2019).

	Funding Amount	**Impact**
Media Investment Budget	*£30 million. commercial funding (loans and grants) for TV and film productions*	*Conditional on at least 50% of the production is shot in Wales, and 35% of the below the line production budget must be spent on "Welsh Production Expenditure"*
Wales Screen Fund: 2015-2020	*£9.5 million.* *These projects have achieved over £75m spend on Welsh Goods and services*	*21 productions have been awarded funding*
Infrastructure Investment	Unspecified value of funding for film & television studios	*Wolf Studios Wales in Cardiff Bay; Pinewood Studio Wales in Wentloog; Bay Studios in Swansea and Dragon Studios near Bridgend."*

Local councils hold many 'levers' for policy change in the creative economy (see Table 3.4). A report by Local Government Association (2020) describes the levers available to councils as falling into four categories: key policies & strategies, assets & infrastructure, local capacity building and investment & funding. Examples of local government policy to support the creative industries could include using licensing to shape vibrant places in the night-time economy. Policy objectives at the local authority level often don't explicitly target the creative industries. However, local authorities do have explicit targets for economic development targeted around job creation and economic growth.

International bodies such as the EU and UNESCO also have a role in supporting the UKs cultural institutions either through direct financial value or wider benefits. Examples of direct financial benefits from international bodies include; arts organisations in Wales received an estimated £18 million in funding from the European Structural & Investment Funds, Welsh screen industries projects received £24 million of EU funding (NAfW, 2018).

Table 3.4 Policy levers available to the different layers of governance in Wales

Level of Governance	Policy levers
International bodies	European Structural & Investment Funds
	Erasmus
	UNESCO
UK Government	The Department for Culture, Media and Sport (DCMS)
	Non-departmental sponsored bodies
	UK Industrial Strategy: Creative Sector Deal
	Creative Industries Clusters Programme
Welsh Government	Sponsored bodies
	Creative Wales
Cardiff Capital Region Board	£1.2 billion fund with the power to invest in local priorities that will deliver on the economic objectives outlined.
	Improving local skills and innovation
	The devolution of some business rate income and additional flexibilities around financing.
Local Authority	Assets and infrastructure
	Planning
	Licensing
	Local capacity building

3.4.1 Economic Development Policy in Wales

The policy approach to address Wales's lagging performance over the last several decades has had limited success. In the 1970s, efforts to bring in foreign direct investment have had mixed results[11] as despite attracting investment, the employment opportunities have often been low skilled and low value (Hill & Munday, 1991 and Evans, 2015). Economic planning in Wales has Wales over the last two decades has included 'Winning Wales' in 2001 and in 2005 'Wales: A Vibrant Economy' (Welsh Assembly Government, 2005). The latest economic plan from Welsh Government, 'Prosperity for All: Economic Action Plan' (The EAP), was introduced in 2017. The EAP comes at a turbulent time in Wales with stagnant wages, Brexit and structural economic issues highlighted earlier in this chapter. The EAP acknowledges the problems facing Wales, particularly the case of

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[11] https://gov.wales/sites/default/files/statistics-and-research/2018-12/090617-foreign-direct-investment-en.pdf

low productivity and is ambitious in scope, focusing on the foundational economy and incorporation of well-being into economic planning.

Wales is home to radical legislation in the form of the Future Generations Act 2015 (FGA). Distinct from the rest of the UK, the FGA has a significant impact on investment and regional economic development policy. The FGA requires public bodies to practice sustainable development whereby decisions made consider the needs of those in the future. The FGA is the first legislation of its kind and has been recognised by the UN:

> *"What Wales is doing today we hope the world will do tomorrow – action more than words is the hope for our future generations" Nikhil Seth Head of Sustainable Development, United Nations (Welsh Government, 2015)*

With sustainable development principles enshrined in law improving well-being for the population and future generations is effectively of greater importance than pursuing economic growth. The Act puts in place seven well-being goals be achieved through the following of five 'ways of working' Table 3.5:

Table 3.5 Well-being goals and ways of working (Future Generations Act)

Well-being Goals	Ways of Working
Prosperous Wales	Long-term
Resilient Wales	Integration
Healthier Wales	Involvement
More Equal Wales	Collaboration
Cohesive Communities	Prevention
Vibrant Culture and Welsh Language	
Globally Responsible Wales	

3.4.1.1   The Foundational Economy

The foundational economy has, in Wales, become a political buzzword after it was debated in the National Assembly for Wales in 2017 (Welsh Assembly, 2017). The foundational economy is an area that the Welsh Government have expressed support for with the £4.5 million Foundational Economy Fund (Welsh Government, 2019). The foundational economy approach designed by researchers at Manchester University aims to rebalance the economy away from wealthy urban pockets to a more holistic and inclusive model. The foundational economy is so-called because it encompasses the daily necessities for everyday modern life regardless of wealth, age or social

class. The activities that make up the foundational economy are; housing, education, childcare, healthcare and utility supply (Bentham et al., 2013). The foundational economy is employment-intensive, typically employing 40% (Bentham et al., 2013) of the workforce; slightly less in economically prosperous cities like London and much more in some areas where the economy has declined (such as rural Wales).

The Foundational economy is a prerequisite to society and therefore is often all that is left after an economic collapse. In large parts of Wales post-mining and manufacturing collapse of the last century, the foundational economy is the sole employer of the remaining citizens. The crux of the foundational economy proposal is that if government policy focuses on improving the foundational economy, economic resilience and improved social outcomes for the least fortunate in society will follow. The Bevan Foundation has argued for inclusive growth to be a high priority for Wales and accepts the foundational economy as a route to this and solving issues facing the region, such as in-work poverty (Bevan Foundation, 2017a). Engelen et al. (2017) recognise the Welsh Government's 2014 programme of introducing a skills system to Wales and the development of the SW Metro as a step towards improving the foundational economy.

3.4.1.2   The Impact of Brexit in Wales

The consensus amongst large economic bodies suggests that the economic impact of Brexit on the UK economy will be reduced growth potential in the medium term (Bank of England, 2017; IMF, 2018). Early data from the ONS (2021) shows significant falls in UK/EU export and import volumes, falling 38 per cent and 16 per cent, respectively. There are important caveats to these numbers; firstly, a significant proportion of this impact is likely due to the COVID-19 pandemic (non-EU exports and imports fell by 8 per cent and 9 per cent, respectively). Secondly, a significant proportion of this shock is likely to be temporary and due to practical issues adjusting to the new arrangements at short notice.

The economic impact of Brexit on Wales is equally difficult to forecast; however, there is a growing consensus among economists that argue the impacts will be negative. From a financial perspective, Wales is one of the greatest beneficiaries in the UK from EU funds which when aggregated equal £680 million annually (Morgan, 2017). The Institute for Government (2020) find that Wales is a recipient of five times the level of funding per capita from EU Structural Funds between 2014-2020, further highlighting the concerns of a funding deficit.

A report by the Welsh Economy Research Unit (2017) found that the impact of Brexit was already being felt due to uncertainty around the terms of Brexit. The report suggested that large and

medium firms that act as anchor employers in Wales were at considerable risk. The two main mechanisms that put these firms at risk were; EU tariffs, making UK/Welsh firms uncompetitive with other EU firms reducing exports. Additionally, EU non-tariff barriers such as regulatory requirements.

A Welsh Government (2018) report 'Trade Policy: Issues for Wales' explored the potential impacts of Brexit. The report found that, Wales exports more than the UK average to the EU 61 per cent versus the UK average 49 per cent. This makes Wales more vulnerable to the trade barriers that exist due to being outside of the customs union. The report's analysis shows that the result of the UK exiting the EU without a trade deal and resorting to WTO trade rules could reduce the size of the Welsh economy between 8-10 per cent. The Welsh Government (2018) report anticipates the impact of changing regulatory requirements to effect foundational economic activity in Wales. Transport: Ports could be negatively affected by the increased regulatory requirements imposed after Brexit; this could badly affect the local community dependent on employment from the port and knock-on effects throughout the national economy.

The impact Brexit of on the creative industries as a globally competitive sector is centred on migration. Some areas of the creative sector are affected by domestic skills shortages (more detail in chapter 3). An early example of the impact of Brexit on the creative industries was the barriers to UK based performing artists touring in the EU (Musicians Union, 2021). Employers are likely to see a significantly reduced ability to attract talent from the EU due to the loss of free movement between the UK and EU and international reputation damage to 'Brand UK'. Creative businesses in the UK will no longer qualify for funding previously provided directly by the EU and through initiatives such as Creative Europe. Additionally, issues such as the loss of data roaming and access to the digital single market, intellectual property and copyright enforcement (The DCMS Committee, 2018). A report by (The Welsh Economy Research Unit, 2019) found that 'ICT & Creative' in Wales could see some benefits from Brexit:

> *"ICT and creative services in Wales have experienced significant growth; whilst exports from Wales are below those in other service sectors, global imports of these services are relatively high, and there may be some future potential to displace some EU imports to the UK post Brexit, and to develop activity in other global markets including the NAFTA, APTA and ASEAN areas."* (The Welsh Economy Research Unit, 2019)

3.5 Conclusion

This chapter provides an overview of the economic and policy context of the geographic area of focus of this study, the Cardiff Capital Region. The economic context of the CCR is typified by

post-industrial decline, geographic inequality and productivity, output and skills lagging behind other regions of the UK (see: Figure 3.4 and Figure 3.5). The creative industries are a fast-growing (if small) part of the of the CCR economy and a potential route for economic development of the city-region. The creative industries sit awkwardly in the CCR policy framework. There is an apparent focus on 'creative' as part of the CCR board strategy for economic development yet creative is scarcely mentioned in the Wales level economic action plan. The establishment of Creative Wales and successful creative cluster bids suggest the relative policy importance of the sector. This raises the question about the relative policy importance of the sector.

Regional inequality has been a feature of the UK for generations. Over the past few decades, various policy approaches have sought to address the issue to varying degrees of success. Regional inequality remains topical, with the current Conservative UK Government has indicated that 'levelling-up' UK regions is a policy priority (Johnson, 2020).

The literature suggests that the UK is one of the most centrally governed countries in Europe and that this, alongside other factors, is contributing to regional inequality (Davenport & Zaranko, 2020; Martin et al., 2021). The City Deals are the latest incarnation of UK policy to address the increasing regional inequality the country faces by seeking to devolve some power from central government to the city-region level. The Cardiff Capital Region is one such City Deal and sits in a unique position as the capital of a devolved nation with various tiers of governance; UK Government, Welsh Government, Local authority and now, the Cardiff city-region.

The City Deals seek to provide jobs and GVA uplift to the city-regions they cover (HM Treasury, 2016). Their critics argue the City Deals propagate the notion of a city first economic development strategy that may not benefit the hinterland and instead create the UK in miniature with the geographic inequality furthered within city-regions (Etherington & Jones, 2009 & 2016). This is an area of concern given the geographic inequality seen within the CCR (Figure 3.7). There is little economic intelligence available at the city-region scale to monitor and evaluate the CCR City Deal against its proposed benefits.

Chapter 4. Creative Industries in the UK and Wales

4.1.1 Creative Industries: Economic Statistics

The creative economy is a small but significant and growing part of the world economy. Lhermitte et al., (2015) estimate the cultural and creative industries (CCIs) generate US \$2,250bn of output (equivalent to 3 per cent of world GDP) and 29.5 million jobs worldwide (equivalent to 1 per cent of the economically active population), suggesting higher than average GDP per job in creative industries. UNCTAD (2019) detailed the very high growth rate for creative goods, with the global market doubling from '\$208 billion in 2002 to \$509 billion in 2015'. National Assembly of State Arts Agencies (NASAA, n.d.) found in the USA that *"Between 1998 and 2016, the arts and culture sector's contribution to GDP grew by 69.5%".* The findings suggest that despite the downturn in global trade after the 2007 financial crisis, the creative economy is amongst the most resilient and outperforming other sectors of the worldwide economy. These trends of rapid and robust growth in the creative industries have been mirrored in the United Kingdom.

In the UK, creative industries achieved the largest percentage increase in GVA of all sectors between 2008 and 2014; this appears along with the backdrop of an otherwise sluggish rise in productivity in the UK economy (shown in Figure 4.1). More recent figures from the DCMS (2018a) show GVA in the creative industries exceeded £100bn in 2017 (6.5 per cent of the total UK GVA in 2017 (1.55 trn). The DCMS (2018b) found the creative industries in the UK has "*grown at nearly twice the rate of the economy since 2010*". The DCMS (2018c) found that the creative industries account for 2.5 million jobs in 2017 (7.8 per cent of total UK employment). A key DCMS (2016) finding is that the creative industries are an export-intensive sector, exporting 11 per cent of total UK services exports and 4.3 per cent of total goods exports[12].

[12] Figures partially updated in (DCMS, 2018d)
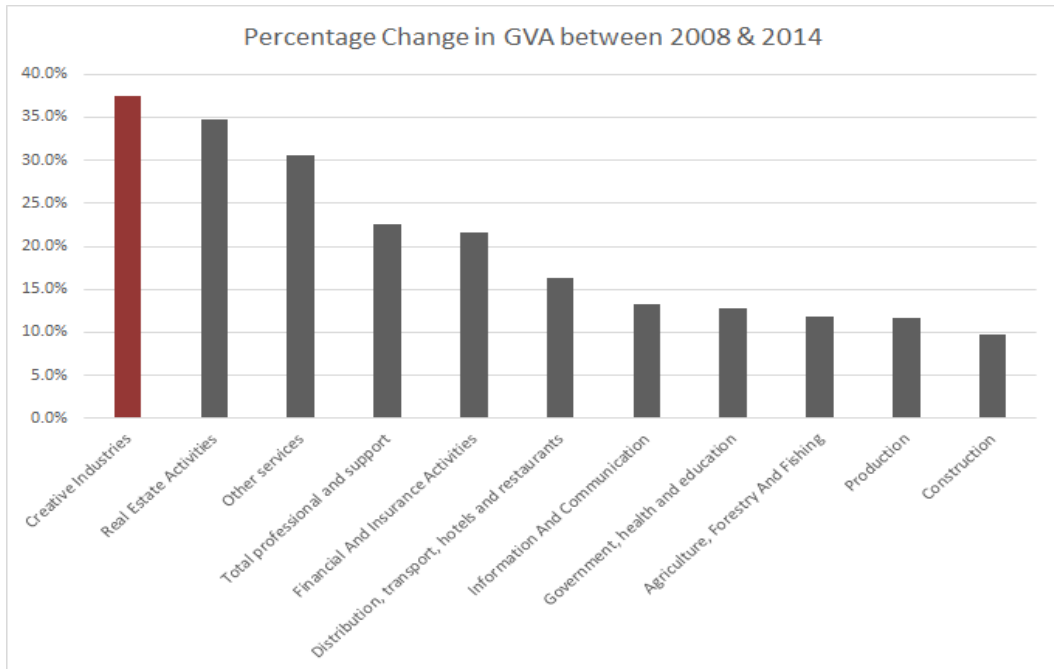
Figure 4.1 Percentage change in GVA of all sectors in the UK between 2008 and 2014 (DCMS, 2016b)

The breakdown of growth in the creative industries shows a different growth trajectory for different sub-sectors and for different SICs within these sub-sectors. In the sub-sector music, performing & visual arts the growth is not homogenous for all SICs within this already small grouping. The SICs Support activities to performing arts (90.02) and Sound recording and music publishing activities (59.2) have grown significantly. Activities that would be considered central to the music, performing and visual arts sub-sector, Performing arts (90.01) have seen little growth. Finally, operation of arts facilities (90.04) has seen dramatic decline.
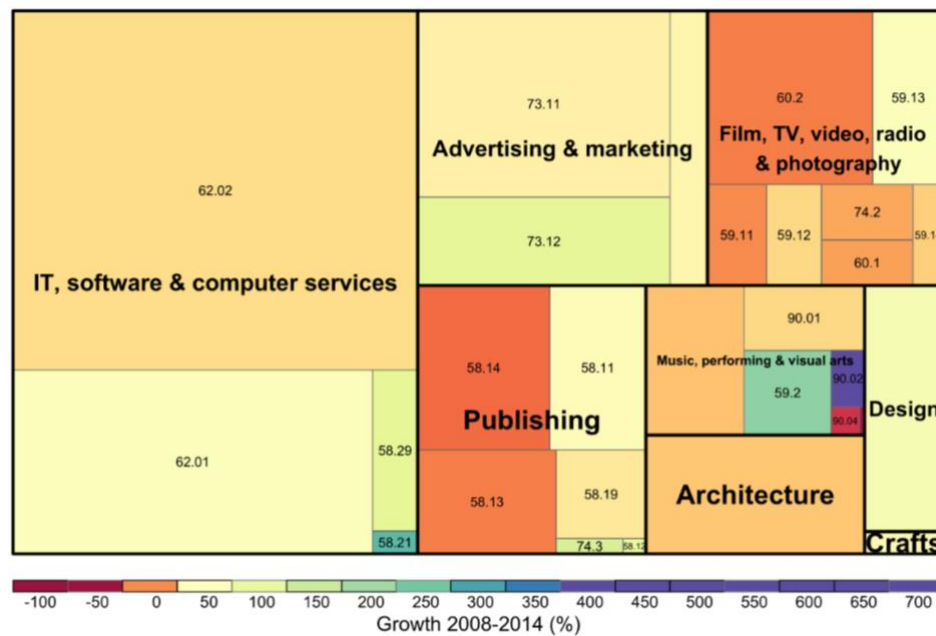
The highly varied nature of the creative industries activity makes defining the sector a challenge, a central thread in this thesis. Section 2.2 described the tension between cultural and commercial activity with some areas more economically productive than others. The creative industries businesses tend to have a traditional product or service delivery based business models. Whereas businesses in the cultural sector are more likely to have different priorities and outputs which makes direct economic evaluation more difficult (Metro Dynamics, 2020). Figure 4.3 details the direct economic contribution of the creative industries vs the sub-set of cultural sectors in the UK. The figure shows that creative industries support significantly more employment and GVA than cultural sectors. The higher overall figure is to be expected due to the wider range of activities included in the creative industries. However, the creative industries have also grown faster in employment and GVA terms than the cultural sector despite the cultural sector receiving greater public spending. It is important to reiterate the cultural sector delivers a host of other benefits to the economy and society that are not captured in this framework (see section 2.2.1).

	Creative Industries	Cultural Sector

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[13] SICs detailed in Appendix 2, museums, galleries and libraries are not included in this figure.

Employment	6.2% of UK jobs in 2018	2.0% of UK jobs in 2018
	30.6% employment growth (2011-2018)	21.0% employment growth (2011-2018)
GVA	£111.7bn in 2018	£32.3bn in 2018
	7.4% increase since 2017	2.7% increase since 2017

The creative industries in Wales have been of growing interest to local policymakers. Numerous attempts have been made to measure the size and economic value of the creative industries in Wales. DCMS (2015) figures estimate creative industries jobs in Wales at 76,000, of which 22,324 are in the 'Cardiff Travel to Work area' (Creative Cardiff, 2016) [14]. Welsh Government (n.d.) indicates that the trend of a fast-growing sector is replicated in Wales:

> *"As a result of Welsh Government support, the creative industries is one of our fastest growing sectors, with an annual turnover of over £1.9 billion. It employs over 58,000 people, 52% more than ten years ago." (Welsh Government, n.d.)*

A standard measure of the size of an industrial sector is to review the figures of full-time equivalent employment (FTEs). Figure 4.4 shows the number of creative industries FTEs in Wales for 2018 by subsector of the creative industries. The Business Register and Employment Survey (BRES) figures show 27,245 total FTEs of which 16,955 (62%) were in the CCR. This shows three dominant subsectors: Architecture; Film, TV, Video, Radio & Photography; and IT, software and computer services. Creative industries are defined by particular SIC codes. The list of SICs is published by the DCMS and detailed in appendix 1.

[14] The Cardiff Travel to work area refers to the Valleys and the neighbouring city of Newport
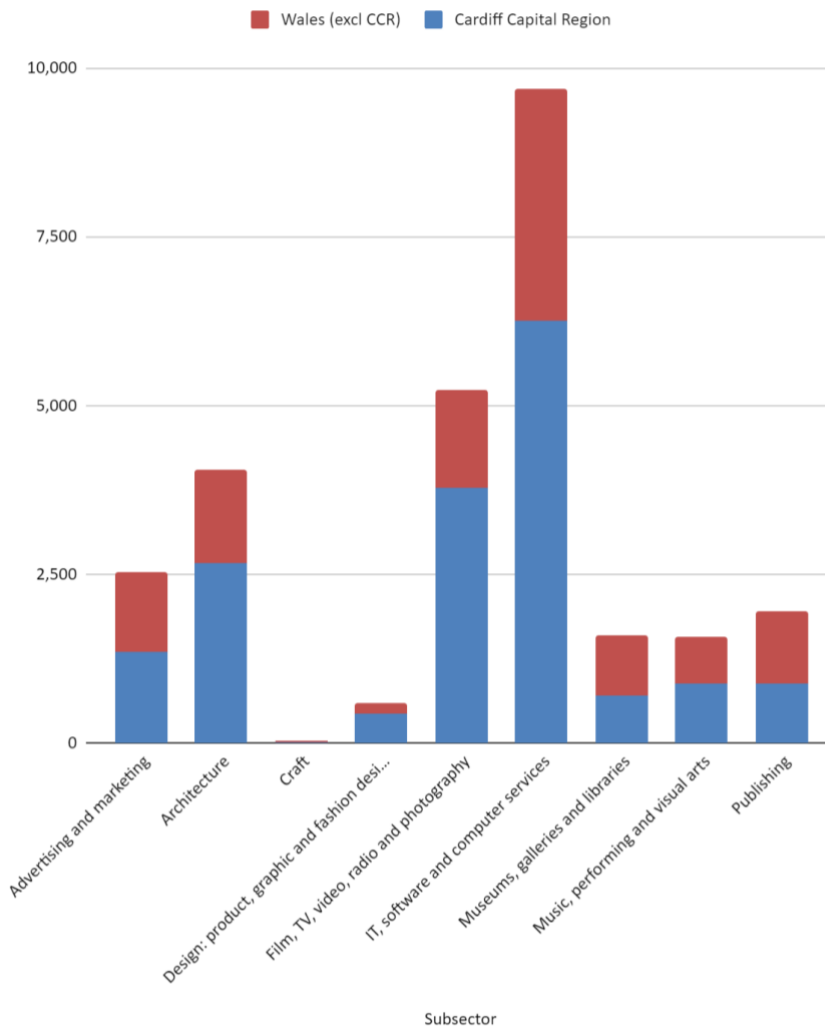
Figure 4.4 FTE employment by creative industries subsector in the CCR in 2018. Source ONS

Table 4.1 shows the relative concentration of employment in each of the creative industries sub-sectors in Wales relative to Great Britain by using employment location quotients (ELQs). An ELQ greater than 1 shows that that sector has a higher concentration in Wales than in Great Britain as a whole. The 'Film TV, video, radio and photography' sub-sector has an ELQ of 2.4 meaning the sector has significantly more concentrated employment in the sector, and therefore, a specialisation in the sector. Table 4.2 shows ELQs for the CCR compared to Wales. An ELQ of 1.2 in the 'Film TV, video, radio and photography' sub-sector shows that the CCR has a relative specialisation compared to Wales. Wales has a long history of television broadcasting (Davies, 1994), housing large public sector broadcasters since the mid 20th century. This history has contributed to Wales having a relative specialisation in the 'Film, TV, video, radio and photography' sector and Cardiff, which is home to BBC Wales to have a specialisation within Wales.

Creative sub-sector	ELQ
Advertising and marketing	0.7
Architecture	0.7
Craft	0.4
Design: product, graphic and fashion design	1.0
Film, TV, video, radio and photography	2.3
IT, software and computer services	0.8
Museums, galleries and libraries	2.4
Music, performing and visual arts	1.1
Publishing	0.5

Table 4.2 Creative Industries sub-sector employment location quotients CCR vs Wales in 2019. Source ONS.

Creative sub-sector	ELQ
Advertising and marketing	0.9
Architecture	1.0
Craft	0.7
Design: product, graphic and fashion design	1.2
Film, TV, video, radio and photography	1.2
IT, software and computer services	1.0
Museums, galleries and libraries	0.7
Music, performing and visual arts	0.9
Publishing	0.8

Self-employment is significant component of the labour market in the creative industries (Easton & Cauldwell-French, 2017). ELQs which only consider FTE employment may paint a misleading picture by under-estimating the number of jobs (casual and part-time) supported. Table 4.3 details estimates of creative employment from official and secondary sources in the Cardiff Capital Region. The table shows that there is a considerable divergence between the figures calculated by the ONS and those by local organisations that consider freelance employment and survey data. Creative Cardiff (2016) estimated creative industries employment to be 22,324 in 2016. The geography is not defined yet the figure is nearly double the ONS estimated FTE employment in the creative industries 11,370. At a sub-sector level the importance of freelance and part time workers is clear. The music sector is estimated by Sound Diplomacy (2019) to employ 600 part-time workers 71% of all workers in the sector. Fodor et al., (2021) estimated there to be 2,800 freelance workers in the 'media sector', 61% of the FTE estimated figure. It is not known how many

freelance or part-time employees add up to 1 FTE employee and the estimates for each sub-sector are subject to considerable noise at this spatial scale. It is therefore, valuable to conduct some sensitivity analysis of results generated on this FTE figure (see section 10.2.1)

Table 4.3 Creative employment in the Cardiff Capital Region.

	Employment estimate
ONS BRES	11,370 FTE creative industries in Cardiff Capital Region based on creative SIC codes in 2018.
Sound Diplomacy, 2019	Music sector direct employment in Cardiff 1,440. 840 full time (39%) and 600 part time (71%).
Creative Cardiff, 2016	22,324 in the 'Cardiff travel to work area' Creative Cardiff, 2016
Fodor et al., 2021	4,590 FTE in the CCR 'media sector' additional 2,800 freelancers working in the sector

4.1.1.1 Industrial Demography in the Creative Industries

The relative size and composition of firms in the creative industries in the CCR is understood by analysing the ONS Business Register and Employment Survey (BRES) data. Of the activity in the private sector[15] in the CCR the number of businesses by turnover bracket is detailed in Figure 4.5. Figure 4.5 shows that there are a small but, significant number of micro businesses, a larger proportion of small and medium sized businesses and very few large businesses.

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[15] In the CCR, most of the activity in the creative industries occurs in the private sector. However, Museums Galleries and Libraries are almost entirely in the public sector. Additionally, there is a small but significant number of not-for-profit enterprises in the Music and performing arts.

Figure 4.5 Number of private sector firms by turnover bracket, CCR 2020. Source (Nomis, 2020)
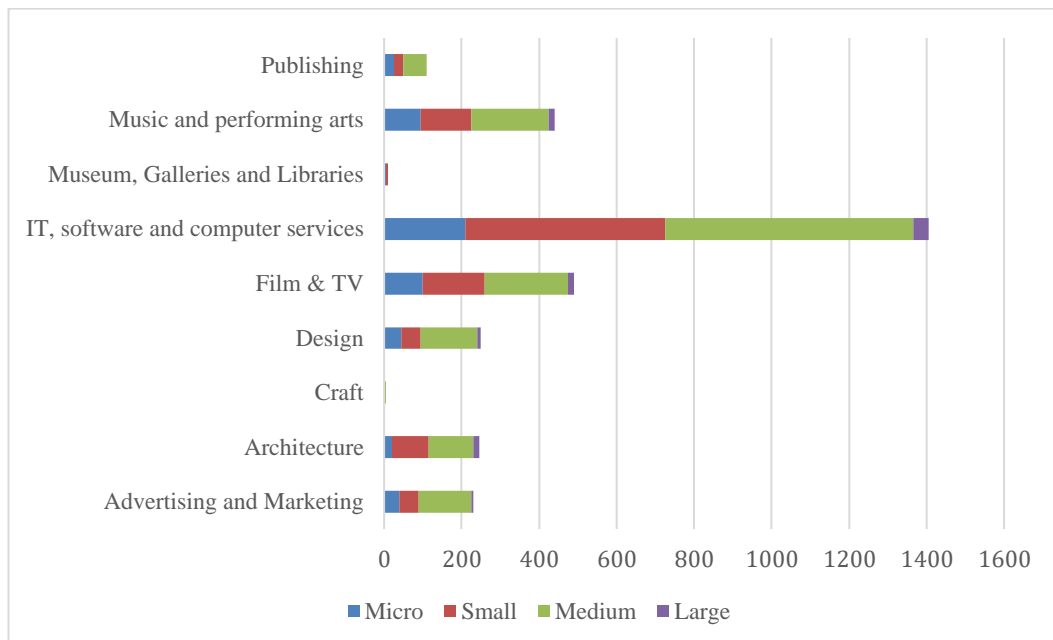
The CCR has a higher proportion of larger creative industries firms than the rest of Wales. The CCR has a different creative industries profile than other parts of the Wales, with more firms in the screen sector. The concentration of larger firms in higher value-added industries within the CCR raises questions for policymakers as they seek to spend public money on supporting the creative industries. Public investment in the creative industries that disproportionately goes to the screen sector that is concentrated within the CCR may widen disparities between the CCR and the rest of Wales (see Figure 3.7).

4.1.1.2   Evaluating the Impact of creative Industries: Prior work in Wales

The creative economy in Wales was estimated by O'Brien & Feist (1995 and 1997) to employ between 22,000 and 25,000 people in 1991, approximately 2.1 per cent of the workforce[16]. Bryan et al., (2000) conducted economic analysis on the impact of arts and cultural activities in Wales. The study used input-output tables to derive the impact that these industries had both directly in terms of employment and output and indirect impacts; the input requirements from other industries in Wales to produce these arts and cultural outputs and the multiplier effects arising from the supplier effects (impacts arising via industry purchases) and income induced effects (spending by those employed in arts and culture industries in the economy).

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[16] Pratt (1997) has suggested, however, that these figures could vary considerably due to the methods used and data available -

The paper's key findings showed; a comparatively high level of 'embeddedness' within arts and cultural industries, characterised by a high level of intra-industry spending in Wales with much spend occurring within the creative industries themselves:

> *"over £153 million, or almost 30% of all arts and cultural industry nonlabour purchases was made from within the industry itself, amounting to approximately 18% of the value of arts and cultural industry gross output. The visual arts, craft, and design sector purchased nearly £27 million from within its own sector, and nearly £15 million from the media sector."* (Bryan et al., 2000, p.1402)

Their results show that the sector contributed directly to £836m in output (equivalent to 3 per cent of total output in 1996), 16,134 in FTE employment, and £261m in employee compensation. The results also showed that arts and culture significantly impacted the economic activity and employment of other industries, supporting £310 million of other Welsh industry output and an estimated 6,674 FTE employees. Therefore, they estimated the total economic significance of arts and cultural industry in Wales at £1.1 billion and nearly 23,000 FTE jobs (p1402, Bryan et al., 2000). Their input-output table was further used to generate multipliers which show how changes in one arts and cultural sector affect the economy as a whole. The multipliers shown in Table 4.4 highlight that Media, in particular, has a strongly positive multiplier with each extra £1 million invested in the sector the final output generated via supplier and induced income effects would lead to a total output of £ 1.66 million. The income effect is even larger with an £1 increase in media wage income leading to an additional £1.07 of wage income in other Welsh industries. The employment multiplier is larger still with a new job created in media supporting an additional 1.47 jobs in other industries.

Table 4.4 Arts and cultural sector multipliers (adapted from table 7 (Bryan et al., 2000, p.1403)

Sector	Output	Income	Employment
Performing arts	1.61	1.45	1.49
Visual arts, craft, and design	1.74	1.64	1.60
Literature and publishing	1.63	1.63	1.59
Media	1.66	2.07	2.47
Libraries, museums, and heritage	1.60	1.31	1.37
General cultural	1.83	1.71	1.62
Total	1.68	1.68	1.74

Bryan et al., (2000) provided some of the most in-depth analysis of the cultural sector in Wales, albeit these data are now obsolescent for a sector as dynamic as the creative industries: dating to before widespread use of the internet, smartphones, drones and action cameras. The creative

industries have been heavily influenced by the emergence of new technologies in the past two decades, radically changing production, distribution and consumption in the sector (Salvador et al., 2019). Consequently, historic economic analysis cannot be trusted to be an accurate representation of the current state of the creative industries.

In the past two decades, there has been limited economic analysis of creative industries for Wales and less still for the Cardiff city-region beyond some aggregate employment and output figures. This lack of high-quality and detailed economic analysis for such an important and fast-growing sector appears to be a significant gap in the economic intelligence of the Welsh Government and Cardiff Capital Region board.

4.1.1.3   Inequalities in employment: Creative Industries in the UK

It is well established in the academic literature that considerable inequalities exist in creative industries employment (Oakley et al., 2017). Table 4.5 presents the socio-economic inequalities faced in creative industries employment in the UK using the National Statistics Socio-economic Classification (NS-SEC) [17]. The table shows that more advantaged groups to be significantly overrepresented and disadvantaged groups are less likely to be employed in the creative industries (DCMS, 2015).

Table 4.5 Employment in the creative industries by socio-economic classification in the UK (DCMS, 2014)

Group	UK population	% of total population	Creative Workers*	% of total creative workers
More advantaged NS-SEC groups 1-4	29,151,047	62%	1,423,000	91%
Less advantaged NS-SEC groups 5-8	17,727,068	38%	139,000	9%
Totals	46,878,115		1,561,000	

*Employment in creative industries, by socio-economic classification, 2011.

Source: Creative Industries focus on Employment tables 2011-2014 (DCMS, 2014)

Figures for census year 2011: Total population: All usual residents aged 16 to 74 NeS - Sec by measures

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[17] Data on the makeup of CE by region, ethnicity, gender, etc disaggregated for Wales only partial (DCMS, 2015)

Table 4.6 shows employment in creative occupations by qualification level, 2013. The figures show that 61 per cent of those employed have a degree or equivalent. ONS (2013) figures for qualification levels show that 53 per cent of the employed population are degree holders illustrating that those employed in the creative industries are more likely to have degrees.

Table 4.6 Employment in creative occupations by qualification level, 2013

	Number employed 2013	% of total
Degree or equivalent	1,097,000	61%
Higher Education	175,000	10%
A Level or equivalent	260,000	14%
GCSE A*-C or equivalent	171,000	10%
Other	43,000	2%
Don't Know	13,000	1%
No Qualification	34,000	2%
UK Total	1,799,000	

Source: Creative Industries focus on Employment tables 2011-2014 (DCMS, 2014)

4.1.2 Higher Education Institutions and Creativity in the Cardiff city-region

In the Cardiff city-region higher education institutions (HEIs) are a significant part of the economy with direct and indirect economic impacts as a result of procurement, wage and student spending affecting the supply chains across industries (Kelly et al., 2015 and Kelly & McNicoll, 2018). Input-output analysis conducted by the author [18]found the impact of Cardiff University on the economy of Wales for the year 2018 to be highly significant. Cardiff University supported £484 million output in Wales (0.65 per cent of the output in Wales 2018), 8,250 jobs[19] and added £320 million in GVA (more detail in Table 4.7 and Table 4.8.

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[18] Data sources for this analysis include Wales I-O tables for 2013, Cardiff University procurement data, ONS employment data and wage and pensions estimates.

[19] The analysis assumes all workers live in Wales however, best estimates suggest 87% reside in the Cardiff Capital Region (Halterbeck, et al., 2018).

Table 4.7 The impact of Cardiff University on the Welsh economy 2018.

	Direct	Direct, indirect & induced
Output (£millions)	270	484
GVA (£millions)	245	320
Employment (FTE)	5,679	8,250

Table 4.8 Cardiff University economic impact in Wales 2018 Type-II multipliers

Multipliers	Type-II
Output	1.40
Employment	1.45
GVA/Income	1.30

The regional impact of HEIs within the creative economy is more difficult to quantify with multiple indirect routes of impact; knowledge transfer, physical and virtual network building (Comunian et al., 2015). Dovey et al. (2016) investigated these impacts in the South West of England and South Wales and found universities to be a creative conduit for the local economy.

Table 4.9 Universities and the local creative economy key findings of the REACT report (Dovey, et al., 2016)

- "Universities can play a pivotal role in the growth of multidisciplinary hubs which enhance innovation and productivity in the creative economy.

- A creative hub is an insurgent process, a culture change project that challenges the 'business as usual' thinking of all partners.

- University-led hubs benefit from 'third spaces' that provide an open, accessible and neutral meeting ground, perceived as neither university nor commercial.

- Creative hubs succeed when they are driven by values rather than output. These values will vary, but may include: enhanced know-how and skills; generosity and mentoring; inspiration and leadership.

- Productivity in a creative hub (and so raising the value of hub members' individual outputs) arises from the relationships between the people working within the hub's network.

- Successful networks can produce many different kinds of impact, ranging from start-up firms and new teaching programmes to further research and commercial investment.

- Arts and Humanities approaches are key to maintaining the human experience at the heart of technological innovation"

The role of universities as a creative conduit in the Cardiff city-region is exemplified by the Clwstwr Creadigol creative bid, which was a direct result of the work by Creative Cardiff, an organisation founded in 2015 by Cardiff University. Creative Cardiff aims to bolster the creative economy in Cardiff by providing a network and support for the creative businesses and freelancers in the city and wider city-region. Clwstwr represents one of the most significant parts of the policy implementation strategy in the creative industries in the CCR and Wales. The stated focus of Clwstwr is primarily on the screen sector:

> *"The Cluster will involve the Cardiff City Region's screen industries and related supply chains, as well as the wider regional creative economy. This will create a platform for independent companies, SMEs, micro-businesses and freelancers to compete with global, highly integrated media companies."* *(Creative Industries Cluster Programme, n.d.)*

4.1.3   Criticism of the Welsh Government's Policy Approach to the Creative Industries

The Welsh Government has faced some criticism for its approach to policy implementation in the creative industries. The Creative industries were established as one of nine priority sectors in 2010. Each sector had a panel providing advice to the Welsh Government. In 2018 the Welsh Government moved away from a priority sector approach removing sector panels and replacing them with a ministerial advisory board. The advisory board has since been criticised for not featuring creative industries expertise (National Assembly for Wales, 2019).

An Inquiry into Film and Major Television Production in Wales (National Assembly for Wales, 2019) raised questions about how the Welsh Government has conducted investment in the screen sector. A key feature of the Welsh Government's investment strategy, the media investment budget, was criticised, with stakeholders arguing that the Welsh Government was "struggling to spend" the budget. Further criticism addressed the tendency for the government to invest based on anticipated financial return, which has led to smaller independent producers failing to gain funding. In response to criticism of the current approach, the Welsh Government has suggested a new strategy is required:

> *"Going forward, we need to consider what has worked in the past against the context of the changing industry landscape. A strategic shift is needed to shift from the current funding to traditional film and TV and move towards funding for 'screen' (which could include video on demand content and platforms, games and animation)".* (National Assembly for Wales, 2019)

A tension found in the literature review relates to the uneasy grouping of creative commercial projects with cultural ones (Oakley et al., 2017). In Wales, some have criticised the Welsh Government for valuing commercial projects over cultural projects, leading to small firms and

particularly Welsh Language productions are losing out (National Assembly for Wales, 2019). On this issue the Cabinet Secretary for Economy, Infrastructure and Investment, Ken Skates, said:

> *"How do you bridge the gap between official art, the subsidised arts, which are often associated with a high level of cultural value, and commercial arts, which can be universally culturally acceptable, often global, which are associated with a lower degree of cultural value, but which appeal, perhaps, to a more global audience? ... That's a real key question, I think, at the moment, and although academics have been deliberating over this for some time, I'm not sure that politicians have."* (National Assembly for Wales, 2019)

On this same issue the Minister for Culture, Tourism and Sport, Dafydd Elis-Thomas, said:

> *"But I don't accept that there is a distinction between the cultural and the material in these matters. We're dealing with businesses, we're dealing with industries, but we are also dealing with a framework in which Government may invest in order to ensure that cultural objectives are being reached within the media sector in a way that generates business as well as generating an improved cultural product. The product is cultural, but the way it's produced has to be commercial, whether it's through direct investment from companies or capital raised on the market, or whether it's through an element of Government support."* (National Assembly for Wales, 2019)

Another key issue found in the literature is the skills gap in some creative industries (Dass et al., 2015 and Livingstone & Hope, 2011). This skills gap is found in Wales too with the lack of skills potentially constraining the creative output in Wales, a key stakeholder in the screen sector warned:

> *"If we keep growing too much without developing our talent and our skills, we will stop being able to deliver for the industry".* (National Assembly for Wales, 2019)

In recent years essential organisations that could help close this skills gap have disappeared, such as Creative Skillset Cymru. However, some organisations have appeared (Screen Alliance Wales). Whilst there has been some warning issued of a potential skills gap, there is insufficient quality data to inform this conclusion with one stakeholder explaining:

> *"TAC is working with S4C on a long-term training programme to restore the skills where we have identified gaps. We've carried out research among our members, but we can't find any meaningful statistics from the industry specific to Wales".* (National Assembly for Wales, 2019)

This view is supported by other stakeholders that gave evidence to the committee:

> *"One of the big problems is that we haven't got good baseline data".* (National Assembly for Wales, 2019)

The support offered to creative businesses in Wales is detailed on the Business Wales website section for creative industries signposts where support is available to various sub-sectors of creative industries (detail in Table 4.10). The coverage for creative businesses appears partial and scant on detail; It is not clear from this the level of awareness of the support available and the level of engagement between government and creative industries.

Table 4.10 Government support available to creative industries businesses in Wales. Source (Business Wales, n.d.)

Creative Industries Support for Creative Industries Businesses in Wales
"advice on international trade innovation support finding new business premises advice on improving workforce skills tendering for public sector contracts making the most of online technology to grow your business business mentoring business wales one stop shops advice on starting a business advice on business finance"
Funding Available to Creative Industries Businesses in Wales
"Creative Europe Desk UK Wales - helping Welsh cultural, creative and audio-visual sectors to access funding from Creative Europe" "Wales Screen - the film and TV location services for Wales, helping to connect productions with the locations, crew and facilities they need" "Momentum Music Fund - funding is available to support the development of Welsh musicians. Welsh Government and the Arts Council of Wales have collaborated with PRS Foundation, PPL and Spotify to offer grants to talented Welsh artists/bands to break through to the next level of their careers... ...Momentum funding of between £5,000 and £15,000 can support activities such as recording, touring and marketing."

4.2 Conclusion

This chapter has detailed the facts and figures and policy approach behind creative industries in the UK, Wales and the area of focus for this study, the Cardiff Capital Region. The CCR has reflected the global trend of growth in the creative industries. Figure 4.4 shows the creative industries to be particularly important for the CCR with a higher proportion of creative employment present. The evidence suggests a fast-growing sector in Wales, albeit from a small base. Issues facing the creative sector in Wales have included: a skills gap potentially restraining the sector, criticism of the Welsh Government for failing to value smaller and less commercial businesses within the creative sector, a lack of understanding of how firms are engaging with support in the industry. The

focus of creative policy in the UK and Wales is detailed in the creative industries sector deal (HM Government, 2018) as part of the UK Government industrial strategy. The sector deal highlighted nine creative clusters that will be the recipients of £20 million Cultural Development Fund. The CCR is the beneficiary of one of these such clusters, Clwstwr Creadigol. Clwstwr and Creative Wales, a new agency within the Welsh Government, are tasked with ensuring the growth of the sector within Wales and are the key mechanisms for bolstering the sector in Wales (Welsh Goverment, 2020). The review has also revealed the lack of quality economic data and analysis available for the creative sector in Wales and the CCR, with little data and analysis available beyond headline employment and growth figures.

Chapter 5. <u>Regional Economic Analysis</u>

5.1 Introduction

"All models are wrong, but some are useful" (Box, 1976).

The previous chapters have set out that the creative industries are an increasingly important part of regional economic development plans including for the CCR. The literature and analysis of the presently available data has revealed that there is currently a lack of granular sub-sector creative industries detail on inter-industry transactions, output, GVA and employment effects are all areas where economic modelling could shed light. This thesis will evaluate how useful input-output tables can be for producing economic statistics at the sub-regional scale for a non-traditional sector. The first section of this chapter describes the analytical tools that could be used to address the research aims. The sections that follow explain the rationale for using input-output tables, explore the mechanics, applications, and limitations of IO in the literature and in Wales.

Economic models build a simplified version of reality that can be used to illustrate complex processes. A model can be used to; understand the impact of shocks on an economic system, test an economic theory or forecast the economic future. Armstrong & Taylor (2000) consider regional models to be useful if they satisfy three criteria; Firstly, that the model is internally consistent. Secondly, the model is sufficiently detailed. Thirdly, the model treats the region as a set of interdependent elements so that the full effects of any exogenous shocks on the system can be estimated. The field of economics has come under scrutiny in recent years for its overuse of economic models and the mathematisation of economic reality based on flawed models and unrealistic assumptions (Raworth, 2017). Therefore, before using a tool to analyse an economy, it is important to scrutinise the assumptions being made and the real-world applicability of these models.

Many factors determine the choice of modelling technique. These factors include what data are available, what expertise is present, what modelling has already been undertaken and what questions will be answered. This study is concerned with modelling the creative industries at the city-region level and understanding inter-industry relationships, requiring, therefore, a model that can satisfy these conditions.

National economies have for a long time had good quality data and analysis. Regional economies, however, are frequently stymied by insufficient economic data with reduced autonomy, expertise

and resources to develop the required analysis. Therefore, the economic models been limited in scope by the data available. Regional economies have a different set of analytical challenges to national economies. Regional economies are more interdependent than national economies and have a higher degree of specialisation. Regions have more mobile labour and capital as there are fewer social, political and logistical barriers (Miller & Blair, 2009).

Over the past few decades, as the availability of economic data and computational power has improved, modelling capability has also improved at the regional level, allowing for more sophisticated modelling at a less prohibitive cost with sub-regional analysis (Miller & Blair, 2009). Regional modelling has taken place in the UK at academic institutions; the Fraser of Allander Institute at the University of Strathclyde, City-REDI at the University of Birmingham, WERU at Cardiff University.

5.2 Regional Economic Analysis: The Options

5.2.1 Keynesian Multiplier Analysis

Keynesian Multiplier Analysis (KMA) is a modelling technique used to analyse the impact on income of an economic shock on a local economy by understanding the different orders of effect induced from an initial change in spending. The model is generally associated with fiscal stimulus and modelling how far the IS curve shifts to the right in an IS-LM model.

In an illustrative example, KMA was used to evaluate the impact of a new power plant on a regional economy (Glasson et al., 1988). Power plants have different economic impacts at different points in their life cycle. Initially, construction and surveying companies would experience increased demand for their services in the long-term new power plant workers would be required and would spend into the local economy for leisure, food and other activities of daily life. The impacts are measured for construction and operational phases and further sorted into; direct, indirect and induced impacts. Despite this, KMA does not estimate all separately; instead it estimates the total effect using this equation (Armstrong and Taylor, 2000):

$$\kappa = \frac{1}{1 - (c - m)(1 - t)}$$

(c-m) = marginal propensity to consume local goods

t = income tax

The KMA equation is highly sensitive to mpc which is problematic as attaining an accurate figure for mpc would require costly surveys. A convenient solution is to use multipliers already gathered from other studies (Bishop, 1998).

Several limitations affect the accuracy of KMA (Keast, 2010): Firstly, KMA assumes no capacity constraints, an unrealistic assumption that may lead to overestimation of impacts. Secondly, money and savings are not included within the model. Third, timeframes are largely ignored. Fourthly, KMAs highly aggregative approach loses sector specific detail. Finally, interregional feedback effects are ignored.

KMA is useful for estimating the impact of an economic shock to a regional economy on income and employment. KMA is most appropriate for 'quick and dirty' impact studies where its relatively short and straightforward data and modelling process allow for indicative estimates to be generated quickly. KMA cannot provide a set of detailed estimations on the impact and interrelations within a regional economy. Additionally, the high degree of aggregation does not provide enough granular detail to draw sub-sector specific conclusions. Therefore, KMA is not appropriate for this study. KMA would have been suitable for this study if it sought to estimate the impact of increased investment in creative industries on the regional economy. However, the study demands a more detailed understanding of the inter-industry relationships within the creative industries, an issue outwith the scope of KMA

5.2.2 Cost-Benefit Analysis

Cost-benefit analysis (CBA) dates back to the 19th century by Jules Dupuit (Prest & Turvey, 1965) and later formalised by Alfred Marshall. CBA is often overlooked by regional scientists as an analytical method for planning at the sub-national level (Schofield, 2018). CBA is used to compare the total costs of a project or policy with the total benefits of this activity, typically in monetary terms. The analysis includes both the tangible and intangible returns to the immediately affected and those outside. CBA analysis is generally used before the commencement of an activity as a rough cost forecast and appraisal of options. The application of CBA is wide both in and outside of government, with typical projects including transport economics, welfare economics and public policy.
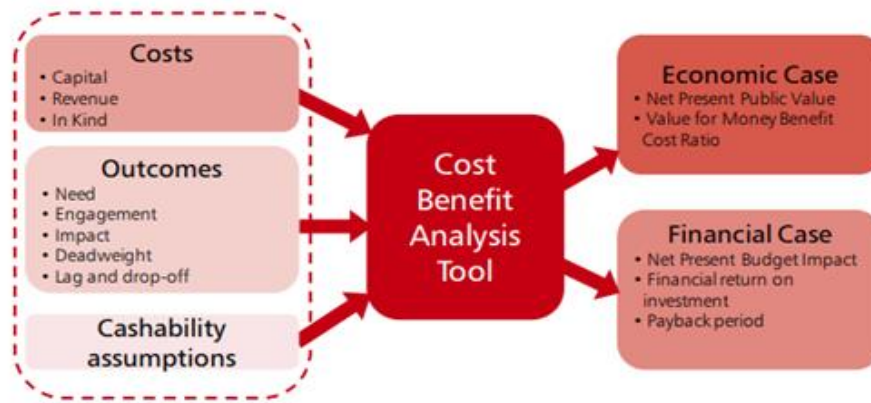
Figure 5.1 Cost Benefit Analysis framework (p 15, (HM Treasury, 2014)

Figure 5.1 shows how the HM Treasury advises local partnerships on the use of the CBA tool based on the HM Treasury Green Book (HM Treasury, 2018).

The first consideration for the use of CBA is at what stage is the analysis to be applied. CBA can either be applied; before a project (ex-ante), throughout a project at regular intervals, or after a project is complete (ex-post). The analysis applied depends on the purpose whether that is to decide on what course of action to take, analyse whether a project or policy is on target or evaluate the impact of a past project.

The second step is to understand what type of costs and benefits are to be characterised. 'Costs' are detractions from and 'benefits' are movements towards the objectives of a particular project or programme being analysed (Schofield, 2018). These costs and benefits can be purely financial as is often appropriate for a profit-maximising firm or even for the public sector seeking optimal results within budget parameters. Particularly in public projects, these goals may be financial but with interest in the distribution of these benefits. The parameters can be far broader than purely financial terms. They may seek to analyse broader economic effects such as efficiency or economic growth or a more comprehensive array of social and societal objectives.

CBAs can be conducted to focus on economic or social issues. Economic CBAs focus on welfare and utility based on different consumption and production opportunities, with the ultimate goal of economic efficiency. Social CBAs focus on the distributional impacts as well as economic efficiency. An example CBA can be found in HM Treasury (2014). The HM Treasury example has two categories of benefits: Fiscal benefits, which reflect financial benefits such as reduced costs to services. Additionally, public value benefits, reflecting social benefits such as improvements in health and education.

	Outcome	Unit cost associated with outcome	Volume (number of incidents	Total cost (=unit cost x volume)
Business as Usual		£64	100	£6,400
New Delivery Model	Avoidable A&E attendance	£64	75	£4,800
Difference between BAU and NDM			25	£1,600
Fiscal Benefit				£1,600

Figure 5.2 Cost benefit analysis example adapted from (p 18, (HM Treasury, 2014)

Figure 5.2 shows an example of CBA by the HM Treasury (2014). The example shows what a new programme attempting to reduce avoidable A&E visits looks like. This includes 'business as usual', evaluating what would have happened if no action would have taken place *the counterfactual condition* (Schofield, 2018). The example shows the fiscal benefit of following the new delivery model as £1,600 due to the reduction in avoidable A&E visits.

Cost benefit analysis could be of value to this study by analysing the wider social benefits of investment in creative industries. King (2003) uses a social cost benefit analysis to evaluate the impact of the Stan Rogers Folk Festival. The CBA considers the economic costs and benefits (labour costs and revenue) but, also expands to include wider social benefits and costs. The social element of the CBA considers the social benefits, sociability, the content effect and conviviality effect. These benefits include the value derived from socialising and expanding social networks, the benefit of consuming the content (music, art or other culture). Finally, the conviviality effect the value of the shared experience between festival goers. King (2003) summarises the benefits of social cost benefit analysis over other traditional measures of economic value:

> *"Using cost-benefit analysis, (rather than impact analysis, for example) redirects our attention from local job creation and spending, and toward the social benefit of the music performed and the broader festival-going experience." (King, 2003, p. 67)*

CBA, like any other economic model, has its limitations (Prest & Turvey, 1965). Firstly, models often rely on data from previous studies affecting reliability. Secondly, CBA can be affected by

subjective impressions, confirmation bias and optimism bias (Flyvbjerg, 2008). Thirdly, there is the temptation for practitioners to calculate 'intangible' values often through the use of inappropriate heuristics (HM Treasury, 2014). Fourth, a severe and common issue for CBA is double-counting costs and benefits (Schofield, 2018). There are different ways of framing the same effects as both a cost and benefit. Mishan (1982) provides the example of an irrigation project where the costs element reduces as savings in resource cost of production are made. These reduced costs can also be double-counted by reflecting as a benefit from farmers to marketing agents as increased profits.

CBA can be utilised to assess policy efficacy within an economy. CBA is considered a valuable tool for smaller-scale financial estimates (Prest & Turvey, 1965). CBA has also been used to estimate the impact of cultural events (Fleischer and Felsenstein, 2002). However, the focus of this study requires an economy-wide analysis and an understanding of inter-industry relationships that CBA is unable to provide.

5.2.3 Social Accounting Matrices

Social Accounting Matrices (SAMs) are used to analyse a national, regional or sub-regional economy with a static snapshot of the economy over a period of time, typically one year[20]. A SAM is a matrix of national accounts represented by a square with an equal number of columns to rows and where each related column and row totals are equal. What makes this a 'social' accounting matrix is the emphasis on the household:

> *"An overriding feature of a SAM is that households and household groups are at the heart of the framework; only if there exists some detail on the distributional features of the household sector can the framework truly earn the label 'social' accounting matrix."* (Round, 2003, p.14)

The SAM aims to model the socio-economic impact of an injection to the economy by analysing its distribution across different institutions and sectors through multiplier effects. Nations, NGOs and other third sector organisations frequently use SAMs to understand the effects of exogenous shocks on income distribution and poverty. SAMs are generally used as an initial rough ex-ante analysis of economic shocks on the circular flow using multipliers and benefiting from treating income endogenously rather than as a comprehensive behavioural model (Round, 2003).

Social accounting matrices were first developed during the 1960s Cambridge Growth Project, with the first account built in 1962 (Stone & Brown, 1962). Economist Graham Pyatt developed SAMs

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[20] SAM and CGE models share a basis with input-output tables. For a detailed description of the mechanics of I-O see section 5.4

further at the World Bank to help address poverty and distribution issues. SAMs have become integral to analysis, particularly as a presentational device for CGE modelling. SAMs, while similar to input-output accounts, have important differences highlighted by Round (2003):

> *"it is important to stress that the results differ from input-output by virtue of the fact that input-output multipliers are augmented by additional multiplier effects induced by the circular flow of income between activities, factors and households."* (Round, 2003, p.14)

SAMs have a number of features that make them useful. Firstly, the construction of a SAM is useful for gathering a wide variety of data and highlighting gaps in available data for further analysis (Keuning & de Ruuter, 1988). Secondly, SAMs are a useful visual tool for displaying the interdependence within an economy, particularly income distribution. The level of detail provided in the analysis can be increased through disaggregation into more specific categories of household or other groupings. Disaggregation within a SAM like I-O, however, does come at an increased cost. Thirdly, the SAM can directly feed into other models such as CGE analysis by providing benchmarking data (Pyatt, 1988). Fourth, they can be easily deconstructed, aiding the transparency of analysis, which is essential given the sensitive nature of socio-economic analysis.

5.2.3.1   SAM Model Framework

	Activities	Commodity	Factors	Households	Investment	Government	World	Totals
Activities		output						
Commodity	Intermediate inputs			consumption	investment	consumption	exports	
Factors	Value added						Foreign value added	
Households			Distribution of value added			Transfer payments	Foreign transfer and savings	
Investment				savings				
World		imports						
Government	Use and sales tax			Income and property tax		Intergovernmental transfer payments		
Totals								

Figure 5.3 Social Accounting Matrix (Schwarm & Cutler)

The construction of the SAM matrix includes the use of I-O matrices and, therefore, shares some limitations with I-O (Loveridge, 2004). SAMs (like I-O) assume fixed technical coefficients and constant returns to scale and fixed prices (other assumptions of I-O are detailed in section 5.7). While SAMs create a comprehensive structure of production activities like an I-O table, the focus is not on inter-industry relationships but the household. Therefore, the model is extended to include data that concerns the household income and the distribution of household income (Loveridge, 2004). Emonts-Holley et al., (2014) argue the substantial benefits of a SAM for the Scottish economy:

> *"A key benefit of extending the Input-Output system to a SAM stems from the added ability of modelling households in more detail. When examining the income effects of an external policy shock on households, IO models allow for analysing different effects on household income. SAM-based multiplier models, however, can additionally detail distributional effects on households. The main utility, however, of a SAM is that it provides a comprehensive and consistent record of the interrelationships of an economy at the level of individual production sectors, factors and institutions. Thereby, the SAM makes available an internally consistent statistical foundation, or benchmark, for the creation of plausible economic models (e.g. Computable General Equilibrium models) which simulate changes to the economy."* (Emonts-Holley et al., 2014)

Table 5.1 Aggregate 2009 Social Accounting Matrix for Scotland, 2009 basic prices (£million). Source: Emonts-Holley et al., (2014)

Incomes → / Expenditures ↓	1. Energy	2. Financial & Business	3. Manufacturing	4. All other Industries	5. Labour	6. Other Value Added	7. Households	8. Corporations	9. Government	10. Capital	11. RUK	12. ROW	Total:
1. Energy (including renewables)	6,274	591	1,031	3,372	-	-	4,555	-	393	458	11,466	3,037	31,178
2. Financial & Business Services	736	4,117	538	4,187	-	-	2,973	-	29	213	10,374	2,161	25,328
3. Manufacturing	744	155	5,174	5,105	-	-	3,820	-	0	1,613	5,628	6,949	29,189
4. All other Industries	2,758	2,551	3,235	23,039	-	-	38,454	-	29,064	11,697	9,411	5,018	125,226
5. Labour	4,673	7,027	7,872	43,989	-	-	-	-	-	-	-	-	63,561
6. Other Value Added	6,998	6,566	3,162	21,715	-	-	-	-	-	-	-	-	38,442
7. Households	-	-	-	-	63,561	5,289	-	15,103	19,835	-	1,853	2,237	107,877
8. Corporations	-	-	-	-	-	29,456	6,401	-	5,722	-	7,784	4,14 4	53,507
9. Government	632	836	509	2,802	-	3,697	27,947	5,248	-	1,495	20,234	129	63,530
10. Capital	-	-	-	-	-	-	5,070	14,740	119	-	-	-	19,931
11. RUK	5,641	2,993	4,954	16,686	-	-	14,113	10,638	8,368	3,358	-	-	66,750
12. ROW	2,722	492	2,714	4,331	-	-	4,544	7,778	-	1,097	-	-	23,675
Total:	31,178	25,328	29,189	125,226	63,561	38,442	107,877	53,507	63,530	19,931	66,750	23,675	

Table 5.1 shows an aggregated SAM for Scotland in 2009 developed by Emonts-Holley et al., (2014). Row and column 7 show the 'Households' account, which gives the size and sources of household income. The row and column totals show that total household income is £107,877 million. Row (7) shows the sources of household income with the largest source, 'Labour'

(representing wage payments) of £63,561 million. Other sources show 'Government' representing welfare and state pension payments and 'Corporations' representing self-employment and dividends.

A SAM could provide greater detail than I-O by providing detail of different shocks to the economy such as policy changes, tax rates and price inflation (Van Wyk et al., 2015) and how these changes affect the household. SAMs can delineate outcomes for different 'household types' in much more detail than is shown in the Scottish example. These households can be based on various socio-economic characteristics. Van Wyk et al., (2015) detail an example SAM for the North West province in South Africa in which 12 'household types' and 4 ethnic groups are disaggregated for multiplier analysis.

For this thesis, a benefit of a SAM would be the ability to distinguish between self-employed freelancers and employees. Chapter 2 has highlighted that freelancers make up a significant proportion of employment in the creative industries and it would be greatly beneficial to understand wage rates by this employment classification. Another area that was highlighted in chapter 2 was the importance of socio-economic characteristics in creative industries employment. It would be of great interest to policymakers to provide a SAM to understand the income effects in this sector.

The SAM is effectively an extended I-O table; therefore, the first stage of construction for a SAM either requires building a new I-O table or the adaptation of an existing one. For the area of focus for this study (the CCR), the I-O tables currently available are for Wales or the UK. Before a SAM could be complied for the CCR a the Wales table would have to be regionalised (more detail on regionalisation in section 5.4.5). Once the I-O is developed to create the SAM, the three steps that remain are to; link primary incomes and final demand, disaggregate primary incomes and collect supplementary information on savings, taxes and other government transactions (Keuning & de Ruuter, 1988). The data required for the development of a SAM include detail on the structure of the labour market of the creative industries, sub-regional income statistics and household income and expenditure statistics.

The focus of this study is understanding how well the current city-region approach within economic development policy fits with creative industries. The focus on the household of the SAM account while a useful extension of the study is not the primary focus and would create an additional data gathering burden beyond the scope of the study yet, provide a potential area for future development.

5.2.4 Computable General Equilibrium Models

Computable general equilibrium (CGE) models conform to, however loosely, the general theory of equilibrium (GE) (Shoven, & Whalley, 1992). The GE theory, first developed by Leon Walras in the 19th century, attempts to explain the interactions between demand, supply and prices within a whole economy[21]. The GE theory was developed decades before the technology was capable of computing a general equilibrium for a whole economy. CGE has evolved as computing power and data availability has facilitated the necessary calculations to achieve a complete model (with some simplifying assumptions).

CGE acts effectively as a simulation of the effects of a policy change, attempting to explain what happens to a regional, national or multiregional (multinational) economy before and after an economic shock (Burfisher, 2011). CGE can provide detail on the distributional effects of this shock and the winners and losers. The ability to run these 'what if' scenarios is particularly relevant for policymakers considering a large-scale change such as a tax change, regulatory change or subsidy that would lead to a significant shift in the economy. CGE is an 'economywide' model as it describes the interactions between all producers and consumers in an economy. It abstracts the economy as a circular flow of income and spending where a change a demand affects firms investment in factor inputs. These spending decisions can increase or decrease household incomes, which affects spending, taxes, and saving, which in turn affects government spending, taxation, investment, and firm's spending decisions to complete the circle (Burfisher, 2011).

5.2.4.1   CGE Model Framework

CGE models build on detailed actual economic datasets derived from input-output transactions tables. These tables are put into the structural model to find the parameters required for supply to equal demand in each market. The solution is a set of prices that ensure equilibrium in all markets.

Table 5.2 Example CGE Model adapted from (Burfisher, 2011)

Model Equations Type	General Notation	Numerical Function

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[21] Walrasian GE theory contrasts with Alfred Marshall's partial equilibrium which instead analyses specific industries of an economy.

Supply equation:	$Q_s = G(P_i, P)$	$Q_s = -4P_i + 2P$
Demand equation:	$Q_d = F(P, Y)$	$Q_d = 2Y - 2P$
Market clearing constraint	$Q_s = Q_d = Q$	

Endogenous Variables

  Q = Quantity of bikes

  P = Price of bikes

Exogenous Variables

  P_i= Prices of inputs (e.g. tires, steel)

  Y= Income

Table 5.2 shows a single industry model to illustrate the framework behind a CGE model (Burfisher, 2011). CGE is built up from microeconomic theory with supply and demand equations explained in a standard equilibrium model. The general notation here shows that the quantity of bikes supplied has a causal relationship to the price of inputs and the market price of bikes (the direction of this relationship is not known). Likewise, there is a causal relationship between the price of bikes, consumers income and the quantity of bikes demanded. The solution to a CGE model demands that all markets clear and therefore, the market clearing constraint is thus, $Q_s = Q_d = Q$. This model treats input prices (P_i) and consumer income (Y) as exogenous. Therefore, the solution variables are the endogenous variables; equilibrium quantity (Q) and the price (P).

The bicycle model is a useful illustration; however, a full CGE model is highly complex, including many more industries, households demand, government activity & foreign markets. CGE builds a macroeconomic picture by focusing on modelling microeconomic activity which once aggregated makes up GDP, aggregate savings, investment and government balance sheets.

The assumptions in a standard CGE model are the labour supply is fixed, the availability of capital is fixed, households seek to maximise utility and firms seek to maximise profit. Each of these assumptions can be critiqued. In the real world, the labour supply can change with migration or training. Capital can change with investment. Firms can pursue other goals to profit maximisation.

The CGE model has an increased level of complexity as prices are not fixed and quantities adjust to clear all markets. Some argue that the CGE model's advantage over input-output tables is that CGE has more realistic assumptions about the production process (Partridge & Rickman, 2010). The CGE model is more flexible & allows for the modelling of distributional effects of policy. The

model, however, does have some disadvantages over I-O. CGE typically includes fewer sectors than I-O and, therefore, loses some inter-industry detail. CGE modelling can be non-transparent and often can only estimate the direction of change rather than magnitude. Therefore, CGE is most applicable to large-scale policy change, such as a large tax change or industrial shift, at a relatively large regional scale (Loveridge, 2004 p 10).

Some attempts have been made in Wales to develop CGE-based modelling approaches (Crawley, 2015 & Zhou, 2019). The data requirements for CGE modelling are significant, demanding the specification of numerous coefficients and parameters (Keast, 2010). The pitfall of CGE being capable of incorporating variable pricing is the requirement for price elasticities. Price elasticity data is not routinely published and depends on survey data that is frequently missing or outdated, particularly at smaller spatial scales. Consequently, at smaller spatial scales, input-output tales with lower data requirements are often the preferred option for sub-regional analysis (West, 1995; Partridge & Rickman, 2010). CGE modelling was not deemed appropriate for this study due to the poor availability of data at the small spatial scale of the study (see Chapter 9). However, CGE could be explored further if data availability begins to cover this area.

5.3 Rationale for Using Input-output Tables

This chapter has detailed some of the regional analysis techniques available to economic geographers and highlighted the importance of selecting an appropriate method. The model choice is informed by many factors; the economic intelligence sought, the geography and industry in focus and the data available.

This study has two important constraints: Firstly, the small spatial scale of the city-region (sub-regional scale). Sub-regions depend more heavily on external trade and have fewer barriers to trade (political, language, currency, culture) than nations. Sub-regions also have less economic autonomy, are more economically specialized and have more limited economic data available. Secondly, the focus on a non-traditional sector, the creative industries. Chapter six will detail the specific challenges that face modelling the creative industries and where I-O can be of particular value.

The economic models suggested in this chapter are all common models used for similar analyses however, for this study input-output tables were selected (further discussed in section 5.4). Table 5.3 provides a summary of the models considered in this chapter. The KMA and CBA models are dismissed for use in this study because of their lack of detail and not being economy-wide modelling techniques. Input-output tables can provide a detailed picture of sub-regional economies

and, for this study, can provide significantly enhanced economic intelligence at the CCR level. I-O can be disaggregated to provide great detail of sub-sectors of interest, particularly the creative industries. The application of I-O to the creative industries analysis is discussed in section 6.2.1 . SAM and CGE modelling techniques are usually constructed after an input-output table is present for the geography of study. Therefore, the starting point for both CCR SAM and CGE would involve building an input-output table. The construction of a SAM for the CCR would be a valuable extension of an initial I-O account, enabling distributional impacts to be modelled. However, the data required for the construction of a SAM is not available at the city-region scale. CGE modelling would also be a useful extension of I-O. However, the data requirements are very high, particularly at smaller spatial scales where data is not available (West, 1995).

Table 5.3 Summary of potential modelling techniques for the study of the CCR

Model	Advantage	Limitation
Keynesian Multiplier	Time and cost-effective analysis of the city-region.	Not sufficiently accurate, lack of detail at industry level.
Cost-benefit Analysis	Can help narrow a variety of policy options. Can provide distributional detail.	Project beyond scope of CBA.
Input-output analysis	Provides a static image of the city-region in terms of inter-industry relationships in great detail.	Will require a further extension to capture creative industry detail, Some theoretical & practical issues.
Social Accounting Matrices	I-O extended to provide household and distributional effects.	Data requirements beyond scope of study at this scale.
Computable general equilibrium	I-O extended to provide distributional effects, more realistic model assumptions (supply behaviour) includes prices, dynamic model.	Data requirements beyond scope of study at this scale.

5.4 The Input-Output Table

> *"...we can't pretend to have a complete understanding of real economies until*
> *we can show that the detailed implications of our theories provide sufficiently*
> *accurate representations of the real world that we could take our models*
> *seriously for forecasting and policy analysis." (Rust, 1997, p.38)*

Input-output analysis (I-O) is a macroeconomic modelling technique used to measure the interdependencies between industries or economic sectors for a given economic area over a given time period. An 'economic area' can be a nation, a region or in some cases, a sub-region. Pioneered by Wassily Leontief in 1936, input-output tables imagined national economic activity as an accounting system of inputs and outputs of all industries. Throughout his career, Leontief worked extensively improving and extending the input-output tables, publishing for four successive decades on his method and earned a Nobel prize for his contribution to economic science. I-O built on Simon Kuznets (1937) national income accounts in what (Baumol 2000) considers a revolution in economic modelling.

> *"Leontief's contribution is revolutionary, not incremental. It transforms closely*
> *targeted abstractions of doubtful applicability into operational, widely*
> *employable analytic instrument" (Baumol 2000)*

Input-output tables have been used for decades by countries and international organisations worldwide and are considered a valuable empirical tool for economic research and structural analysis.

5.4.1 Mechanics

The transaction table details all the interlinkages between different sectors (industries) being analysed in the economy Table 5.4.

Table 5.4 sample input-output transactions table

	Industry i	Industry n	Total intermediate demand		Final Consumption Expenditure	Gross Capital Formation	Exports
Industry i							
Industry n							
Total domestic purchases							
Imports							
Taxes on products							
Taxes less subsidies on production							
Gross operating surplus							
Compensation of employees							
GVA at basic prices							
Output at basic prices							

The structure of the transactions table is split into four quadrants, as can be seen in Table 5.4. The first quadrant (top left) shows 'intermediate demand' or the inter-industry flows of products. This quadrant enumerates the goods and services produced within and sold between these industries to produce goods and services. Leontief's (1986) double-accounting system requires that gross inputs will equal gross outputs and therefore, the row and column totals in the transaction table will be equal. These sectors may be as broad as one industry (e.g. agriculture) or as specific as a class of products (e.g. root vegetables). These inter-industry flows are typically measured over a year and value is denominated in monetary terms (Miller & Blair, 2009).

The second quadrant (top right) shows 'final demand' for the output of each industry. Final demand is the demand for goods that are not used to produce other goods. Final demand includes goods consumed locally, in different geographies and by other non-industry consumers. The demand from such groups is generally unrelated to the production of such goods. An example could be the demand from the government for military drones. The factors that influence the demand for such military spending will likely be political and entirely separate from the production process. Final demand can be denoted as x_i total output of industry i and fi the total final demand for sector i's products. The equation showing how sector i's products disperse throughout all the other sectors j (Z_{ij}) representing intermediate demand and through to final demand is (Miller & Blair, 2009):

$$x_i = z_i 1 + \cdots + z_{ij} + z_{in} + f_i = \sum_{j=1}^{n} z_{ij} + f_i$$

The same equation must apply to every other sector included for analysis ($Xi\ I\ Xn$). These equations can then be compiled into a matrix:

$$X = [x1 \cdots x_n], Z = [z_1 \cdots z1_n\ etc]\& F = [f1 \cdots f_n]$$

$$X = [x2 \cdots x_n], Z = [z_2 \cdots z2_n\ etc]\& F = [f2 \cdots f_n]$$

$$X = [x3 \cdots x_n], Z = [z_3 \cdots z3_n\ etc]\& F = [f3 \cdots f_n]$$

$$X = [x4 \cdots x_n], Z = [z_4 \cdots z4_n\ etc]\& F = [f4 \cdots f_n]$$

For quadrant two, each row total, therefore, comprises total use for industry output. The third quadrant (bottom left) shows industries; primary inputs (i.e., those additional to intermediate products produced locally, including imports). This quadrant also includes the compensation of labour, GVA and taxes on products. The fourth quadrant (bottom right) shows primary inputs to direct consumption. These are inputs similarly to the third quadrant, which are not used to produce other goods but instead are directly consumed (Pissarenko, 2003). An example of such would be a good imported from outside the region to direct consumption by households.

5.4.2 Production Functions

The production function in an I-O table shows the relationship between inputs into an industry to the production outputs from that industry. The impact of a change in demand for a particular good

on final demand is reflected by the good's technical coefficient (aij). Where i input of wood bought by furniture producers j

$$aij = \frac{zij}{xij=} \frac{Value\ of\ wood\ bought\ last\ year\ by\ furniture\ producers}{value\ of\ furniture\ production\ last\ year} \quad (3)$$

$$aij = \frac{5,500}{500,485} = 0.0109 \quad (4)$$

In this example (e.q. 4) furniture producers bought £5,500 worth of wood last year and the value of furniture produced in the same year was £500,485 making the technical coefficient [0.01]. The technical coefficient for an industry is fixed; implying constant returns to scale. There will be technical coefficients between each sector which together forms a matrix (Table 5.5).

Table 5.5 Technical coefficients table

	1	2	3	4	5
1	α_{11}	α_{12}	α_{13}	α_{14}	α_{15}
2	α_{21}	α_{22}	α_{23}	α_{24}	α_{25}
3	α_{31}	α_{32}	α_{33}	α_{34}	α_{35}
4	α_{41}	α_{42}	α_{43}	α_{44}	α_{45}
5	α_{51}	α_{52}	α_{53}	α_{54}	α_{55}

5.4.3 Interdependence Coefficient

To calculate the effect on intermediate demand one must calculate the interdependence coefficient.

$$xij = aijXj$$

$$X1 = a_{11}X1 + \cdots + a_{15}X5 + Y1$$

$$Y \ldots final\ demand$$

$$X \ldots output\ from\ sector$$

Once all the technical coefficients (aij) are calculated the matrix can be inverted in order to give the interdependence coefficients $zi, \cdots, zn$

$$X1 = z_1Y1 + z_2Y2 + z_3Y3$$

or

$$X1 = f(Y1, Y2, Y3)$$

The output of sector 1 depends on the final demand for products in sectors 1, 2 & 3. The interdependence coefficient expresses the extent of the interdependence. The interdependence coefficients will capture both intermediate and final demand.

If final demand increases for a certain good intermediate demand will also increase due to the interdependence of industries in producing goods. This change is referred to as the first order effect. However, it does not show the full impact that the initial change in final demand for that one good has had on the whole economy. There will be second and third order effects that further increase demand (while there will be a number more orders of effect when X>3 the effect is small) (Miller and Blair 2009).

5.4.4 Input-Output Analysis: Data Collection

Three methods can be used to gather the data required to build a transactions table: primary survey-based technique, non-survey econometric, or a hybrid of the two techniques.

Primary survey-based data has the potential to create an accurate representation of the economic area being analysed. This is because the data gathered are bespoke to the region being analysed. A survey-based method requires firms to complete detailed surveys regarding their sales and purchases from and to all other industries under analysis. Provided the researcher could gain sufficiently detailed survey responses from enough firms to ensure robustness, the I-O table would be of high quality. However, there are obvious pitfalls with this method; First, responses to such surveys may not be accurate as firms may not know the exact numbers and the response rates to surveys are likely to be low. Second, this method is hugely time and resource intensive which puts it beyond the scope of many research projects.

> *"Past estimates suggest that this 'bottom up' survey approach can be up to 20 times more expensive than non-survey techniques (Mattas et al., 1984)."*

Despite this initial high cost of a primary survey-based approach, Dewhurst (1992) found during the construction of the Scottish I-O tables once an economy is mapped in this way only large changes need to be collected to update the account which can be achieved at a relatively low cost.

Non-survey econometric methods attempt to collect the same data showing the relationships between inputs and outputs within an economy but in a more cost-effective way. This is typically achieved by modifying older tables to reflect more recent economic conditions or adapting pre-existing economic analysis for one area and changing it for a different geographic space (Miller & Blair, 2009).

There are a number of difficulties with this method of data collection. The accuracy of the account is highly dependent on how good a fit the data being adapted is to the new application. This is partly due to the underestimation of interregional interdependence that such data collection

methods tend to underestimate (Harris & Liu, 1998). Regional economies have high levels of interdependence for three main reasons. Firstly, regional economies are frequently more specialised than national economies, sometimes with a dominant industry or even a dominant firm. Secondly, unlike nations, regions within a country are not subjected to the same barriers to tra–e - customs, culture, language and currency. Finally, labour and capital mobility is much higher at a regional level due to the lack of cultural and political boundaries. The higher levels of interdependence within regional economies mean intra-regional purchasing is likely to be higher than expected. Fundamentally, this type of analysis's accuracy depends on how widely the regional economy differs from the national economy (Hewings and Jensen, 1986).

A hybrid approach seeks to use a mixture of the superior accuracy of the survey-based approach without the cost and burden of the intensity that a purely survey-based approach would entail. For a regional table, for instance, this would typically involve the adaptation of national tables as a framework, with estimates refined and complemented with survey data. The hybrid method is discussed further in section 5.1.5.2.

5.4.5 Regionalising Input-Output Tables

The construction of a sub-regional input-output table requires re-estimating regional or national data to the smaller spatial scale of focus. The re-estimation of national tables is called regionalisation. Similar to the process of data collection for inter-industry spending, data can be re-estimated through primary survey-based techniques, through econometric and mathematical derivation or using a hybrid of the two. A summary of such methods is shown in Table 5.6. This section will cover a general overview of the literature on these techniques detailing the strengths and weaknesses of each approach.

Table 5.6 Summary of regionalisation techniques

Technique	Detail	Comment
Simple location quotient (SLQ)	Non-survey method to determine regional industrial concentration relative to national using output figures	Basic method, Low data requirements, Restrictive assumptions about regional structure
Employment location quotient (ELQ)	SLQ using employment figures as the proxy for industrial concentration	Basic method, Low data requirements, Restrictive assumptions about regional structure

Cross-industry quotients (CIQ)	An extended SLQ to incorporate relative size of sector	Basic method, Low data requirements, Less restrictive assumptions than SLQ and ELQ
Semilogarithmic quotient (FLQ)	The inclusion of semilogarithmic formula allows for extension of CIQ to include relative size of region	More complex method, Low data requirements, Less restrictive assumptions than ELQ, SLQ and CIQ
Survey Method	Surveys to determine the geography of economic activity	Basic method, Highly time and resource intensive, Accurate
Hybrid Method	Combining targeted surveys with mathematical techniques	Moderately time and resource intensive, Accurate
Gravity models	Non-survey technique that can take different forms such as commuter patterns, mass & attraction, purchasing activity, to estimate economic activity	Moderate data requirements, Accurate

5.4.5.1   Survey technique

The survey technique involves gathering data to estimate the firm (or plant) production function in a 'bottom-up' approach. Surveys require local participants to provide expenditure by industry and location to build a picture of economic activity within a region. The objective of surveys is to understand the proportion of the input supplied locally to the proportion imported and adjust the local purchasing propensities of each cell in an input-output table to reflect this. The strength of surveys is that they can give the actual numbers for the local economy provided those surveyed have the correct information and are willing to offer it.

Riddington et al., (2006) review the options available when building local-area I-O tables. They summarise that a purely survey-based method, while accurate, is often beyond the scope of small studies due to prohibitive time and cost requirements. In practice, survey techniques are likely to be combined with other methods to form a hybrid approach.

5.4.5.2   Hybrid approach

The Hybrid approach has had support in the literature for decades with seminal papers in the 1990s (Lahr, 1993; Harris & Liu, 1998 & Brand, 1998) and more contemporary literature (Bishop & Brand, 2013 & Hermannsson, 2016). This approach takes advantage of targeted surveys to gain primary data to fill in the gaps and improve the accuracy of the tables through triangulation as other mathematical techniques are applied. A strength of this approach is using surveys to gain accurate information without being fixed to this time and resource-intensive method.

85

"A key assumption of the hybrid approach is that economies tend to have a similar 'shape' that can be sensibly modified" (Riddington et al., 2006, p.1076)

When utilising a hybrid approach, it is important to decide which sectors will be surveyed and which can instead be filled in with secondary data. The 'key sector' approach can be used to determine which sectors should be surveyed. This approach takes into account different factors with different researchers targeting other metrics such as industries with a high degree of forward linkages or weighted by their proportionate contributions to GDP. The 'sensitivity analysis of imports' is an alternative approach that looks at sectors that are most likely to impact Leontief inverse and the table as a whole by looking at industries with the highest sensitivity to change in intermediate input proportion.

To ensure accuracy within this type of account, the researcher must address what Lahr (1993) describes as the 'data source credibility and the reconciliation problem'. That is to say that the quality and credibility of data gathered through surveys must be assessed for reliability and reconciling this with data from different sources also requires a degree of thought.

5.4.5.3 Location Quotients and Gravity Models

The use of mathematical and econometric techniques to re-estimate models can be used in conjunction with surveys to form a hybrid approach or separately. Non-survey methods have been met with some criticism in the literature, with Lahr (1993) describing them as having 'inherent inaccuracies'. More recently, with the introduction of new or refined non-survey techniques, some claim non-survey techniques to be as accurate as hybrid approaches (Flegg et al., 2016).

Location quotients (LQs) are a method that can be used to quantify how concentrated particular industries are within the region being examined when compared with the base region or nation. LQs are established by calculating the local economies difference in employment or output concentration within an industrial sector between the areas compared. A location quotient is shown mathematically with the following equation (Miller & Blair, 2009, p. 349):

$$SLQ_i^r = \left(\frac{x_i^r / x^r}{x_i^n / x^n} \right)$$

The equation shows a simple location quotient (SLQ) where the top of the equation x_i^r denotes gross output of sector i in region r and x^r denotes total output of all sectors in region r. The bottom of the equation represents the same but at the national level. This is a standard measure of

regional specialisation, however; employment numbers are often more popular due to the readily available data especially, at smaller region scale example shown in the following equation:

$$SLQ_i^r = \left(\frac{E_i^r/E^r}{E_i^n/E^n}\right)$$

The top of the SLQ equation effectively shows the proportion of total output within the local region r of a particular industry, for example, agriculture (i) and the bottom of the equation shows the proportion of agriculture (i) of the total output of the national economy. This can be calculated to be $SLQ_i^r = (0.017)/(0.0085) = 2$, what this shows is that agriculture is more concentrated (or specialised) in the region r than it is at the national level. Provided $SLQ_i^r > 1$ the local region is more concentrated if $SLQ_i^r < 1$ the region has a relatively lower concentration of the given industry. If the latter is true, this has implications for the regions ability to satisfy regional demand for output in this industry.

Cross-industry quotients (CIQ) are a popular extension of SLQs that add in the extra element of relative sector size where sector j is receiving inputs from sector i (Hermansson, 2016):

$$CIQ_{ij}^r = SLQ_i^r /SLQ_j^r$$

The CIQ quotients have been extended to incorporate a measure of the relative size of the region in what is termed semilogarithmic quotients and its variants, the Flegg location quotient (FLQ) introduced by Flegg et al., (1995) and more recently the AFLQ approach (Flegg et al., 2016). McCann and Dewhurst (1998) are critical of FLQ approach as it does not consider regional specialization. In defence Flegg & Webber (2000) respond to McCann & Dewhurst with Scottish I-O data and find that the FLQ is accurate enough with real-world data. Most recent extensions of LQ theory by Flegg include the AFLQ approach which, in a summary of techniques by Flegg et al., (2016) was slightly more accurate than the FLQ approach and almost as accurate as a survey-based approach[22].

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[22]Flegg & Tohmo (2019): further refine formula with South Korea regional example

LQ approaches are used by nations with the US Bureau of Economic Analysis using location quotients for even small regions in their Regional Impact Modelling system (RIMS) database. Their accuracy for smaller spatial scales is however, in question (Miller & Blair, 2009 p 359). In a study by Riddington et al., (2006) a comparison of three approaches; LQ, hybrid and gravity model the authors found the LQ approach to be 'simple and cheap'; however, they were strongly critical of the accuracy of the approach[23]:

> *"..it is difficult not to agree with the detractors who consider it to be potentially dangerous and misleading" (Riddington et al., 2006, p.1078)*

Criticisms of the LQs approach are based on the argument that they rely on restrictive assumptions such as identical productivity and consumption in the region as the nation, no cross hauling of products (Norcliffe, 1983 and Hermannsson, 2016).

Riddington et al., (2006) favoured gravity models in a comparative study of regionalisation techniques. Gravity models take information on industry and labour market structure in a region along with travel times which can help determine trade flows. The debate on the most accurate method is not settled, Flegg & Tohmo (2013) argue there is not strong enough evidence to support the view that gravity models are more accurate than an FLQ approach. Furthermore, gravity models require more data and can, therefore, be more cost and time-intensive.

Once an input-output table is calculated, automated techniques can be used to balance the table, such as iterative proportional fitting (the RAS method). This method credited to Edwards Deming is a commonly used iterative scaling method for achieving consistency in non-negative matrices such as within an input-output framework. Commonly the technique uses another region or nation with a pre-existing input-output table that is expected to be similar in structure to the area of focus and then scaled to this new area (more detail Miller and Blair p 313, 2009). RAS is a relatively quick and straightforward technique that can be used to adapt a national model to a regional one in a cost and resource-effective manner.

The poor availability of survey data at the sub-regional level and the increased demand for locally relevant I-O models has seen increased utilisation of non-survey regionalisation techniques (Hermannsson, 2016). A detailed summary of the different types of location quotients available to

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[23] Flegg & Tohmo (2013) respond to this critique reaffirming the validity of the FLQ approach

researchers can be found in Miller & Blair (2009, p. 349-360)[24] and a useful summary of techniques can be found in (Hermannsson, 2016).

5.5   Impact Analysis

The value of input-output analysis is its ability to analyse economic shocks to the economy that are exogenous to the model with so-called impact analysis (Miller & Blair, 2009). For example, if final demand were to increase for products from the automotive industry due to a change in demand resulting from a new government initiative (a car scrappage scheme), there would be direct, indirect and induced effects throughout the economy. This is due to the interdependence between industries detailed earlier. Impact analysis allows the relationship between the initial spending and the total effects generated, known as the 'multiplier effect' to be modelled. Multipliers used for impact analysis are most commonly used for modelling shocks to derive activity outcomes relating to; changes in output, income effects for households, employment, value added and changes in demand. There are different types of multipliers: simple output multipliers, total output multipliers, income multipliers, Type-I & Type-II multipliers, physical employment multipliers, regional & interregional and Miyazawa multipliers. For more detail on each type of multiplier, see (Miller & Blair, 2009). Despite the many options available and the possibility of producing the multipliers concurrently the most commonly used in I-O impact studies are Type-I & Type-II[25].

A Type-I multiplier shows the direct effects of the initial spending creating additional activity. A Type-II multiplier shows direct effect but also includes indirect and induced effects. Indirect effects, occur as a result of business-to-business spending consequent on the direct effects. Induced effects are caused by increased personal income and household wage spending from the direct and indirect effects.

The car scrappage scheme mentioned earlier could be used as an example. Consider a the scheme leads to a £20m increase in demand for 'Manufacturing'. The Manufacturing sector would need to increase total output accordingly by £20m as a direct effect of the increased demand. The multiplier effects calculate the indirect effects of this increase. To calculate the Type-I multiplier the direct

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[24] Since the publication of this summary, further ground has been made in improving the accuracy of semi-logarithmic location quotients (Flegg et al., 2016 and Flegg & Tohmo, 2019).

[25] Type-I and Type-II models: The industrial sectors included define whether the model is a Type-I or Type-II. Type-I models assume households to be exogenous and include only the productive industries. Type-II models, however, assume households to be endogenous and include rows and columns to represent households. Type-I models can only generate Type-I multipliers. Type-II models can generate both Type- I & II multipliers (Hermansson, 2012).

increase (£20m) must be multiplied by the Type-I multiplier for the Manufacturing sector. In this example the Type-I multiplier is, 1.4. The demand increase multiplied by the Type-I multiplier calculates the total direct and indirect impact of the change in demand to be £28m. The increased output in the Manufacturing sector would lead to increased employment in industries that supply the sector and an increase in household spending. To calculate this the direct impact (£20) is multiplied by the Type-II multiplier for the Manufacturing sector. In this example the Type-II multiplier is, 1.5. The Type-II multiplier is higher than the Type-I multiplier as it takes into account the direct, indirect and induced effects of the change in demand. Therefore, Type-II multiplier multiplied by the £20m increase in demand gives £30m. The value of impact analysis to industry and policymakers is clear with economic strategies often targeting jobs, incomes and productivity.

5.6   Applications of Input-Output Analysis

> *"With the introduction of the input-output model, analysis of interdependence receives a new burst of freedom. It offers us a tool with a vast array of uses. Moreover, there seem to be few arenas on which the analysis can shed no light, no matter how great their divergence from Leontief's initial concerns. The techniques have been applied to subjects as heterogeneous as international trade, economics of the environment and productivity issues. (Baumol 2000)*

I-O analysis can be used to assess a variety of different economic areas, policies and scenarios. The I-O framework has been applied to non-monetary uses, notably for evaluating the environment. Leontief extended and modified I-O over the decades and in 1970 considered incorporating externalities into his models. The externalities covered in his 1970 paper were various types of pollution. Leontief was optimistic in suggesting such analysis would facilitate the "elimination of pollution". Leontief regarded pollution as directly linked to the network of relationships identified in his I-O table. Leontief argued pollution could be captured as physical units and factored into a regular model of I-O:

> *"The technical interdependence between the levels of desirable and undesirable outputs can be described in terms of structural coefficients similar to those used to trace the structural interdependence between all the regular branches of production and consumption" (Leontief, 1970, p.262)*

Sugino (2013) and Sasai et al. (2012) provide two more recent examples of non-monetary I-O analysis. Using an I-O table of the Japanese economy Sugino (2013) analyses the effects of carbon pricing on the Japanese economy. Using a dynamic econometric I-O based model, Sasai et al. (2012) compare the current state of thermal power generation on the level of CO_2 emissions by industry and households with a scenario nuclear power as the sole source of thermal power generation.

I-O can be used to show a detailed account of the impacts of shocks on one industry can have on the wider economy. The level at which this analysis occurs can be addressed through aggregation/disaggregation. As sectors within an I-O table are aggregated together they can conveniently show a general picture of an industry, for example hospitality. However, if the researcher seeks to understand an industry in detail they may use a more disaggregated approach. Hospitality could be split to show hotels, hostels, and restaurants separately. The applications of this form of I-O are diverse, they could include a one-time tourism event such as the Olympics (Zhang & Zhao, 2007 and Somerville & Taylor, 2014), or equally a one-time negative event such as a natural disaster (Okuyama & Santos, 2014). Furthermore, they can show a detailed look at a specific industry that may be of use to private industry or local government.

As highlighted in section 5.5, an important feature of the I-O analysis is its ability to conduct impact analysis. This analysis can be used to measure the impact of exogenous shocks to an economy, whether they be due to a new industry formation, a change in government policy, or geopolitical or environmental shocks. These shocks can be analysed by assessing the impact on economic indicators; the labour market, economic growth and productivity.

5.6.1 I-O Applications at National Scale

Government economic policy relies on having good quality economic assessments that can inform the potential consequences of various policies. I-O is one such form of assessment that is routinely applied to a national economy in order to improve economic intelligence and help monitor and evaluate policy.

I-O has been used widely by a number of countries with frequently updated tables used to improve the reliability of GDP and GVA estimates. Input-output tables are also widely used by nations to evaluate different policy interventions. For example, Keogh & Quill (2009) analysed the structural change in the Irish economy since 1975; Tsoukalas (2011) conducted analysis on the manufacturing industry in the UK; and Epstein et al., (2009) constructed an I-O table for Madagascar to identify sectors that generate value added and employment. In the UK, the ONS (n.d.) describes the application of input-output tables as a source of data to determine macroeconomic indicators and reveal the inter-industry relationships that makeup supply and demand.

International organisations increasingly produce input-output tables for national and regional analysis. EU wide analysis is conducted by Eurostat (2020) with the I-O tables used for business cycle and macroeconomic policy analysis, particularly by the European Central Bank, and also for analysis of regional, structural and sectoral policies (Meinen et al., 2021). Increasingly there have been efforts to link together national tables to provide international analysis. The World input-

output database (WIOD) produces interlinked national input-output tables to address global issues such as climate change and inequality which require a detailed understanding of the interconnectedness of industries across national boundaries (Dietzenbacher et al., 2013a). WIOD also includes extensive satellite accounts and extensions to cover environmental indicators.

5.6.2 Sub-national Input-output Tables

Regional agents often have a degree of control over economic development policy. States, counties, city-regions and cities often have economic agendas that rely on well informed economic policy. I-O is one such tool that can be used at this scale with relatively simple datasets to provide robust analysis. There has been growing interest in the power of I-O to provide impact analysis at smaller spatial scales, even down to the neighbourhood (Cole, 1999), city-scale (Cole, 1987) or other novel scales such as a four-region metropolitan area model (Hewings et al., 2001). Miller & Blair (2009) identify two basic features of regional economies that changes the characteristics of the I-O:

> *"First, although the data in a national input-output coefficients table are obviously some kind of averages of data from individual producers located in specific regions, the structure of production in a particular region may be identical or it may differ markedly from that recorded in the national input-output table". (Miller & Blair, 2009, p. 69)*

An example of this could be energy production which can vary across a country as different regions may have different natural resources. Coal, gas, hydropower and wind may all be forms of electricity generation for a nation. Still, only one may be produced at the regional level with a very different mix of inputs to a nationalised average. A common way this issue is avoided is by using a survey-based I-O table which allows the researcher to gather locally specific data that could be missed through a 'top down' approach.

> *"Secondly, it is generally true that the smaller the economic area, the more dependent that area's economy is on trade with "outside" areas- transactions that cross the region's borders - both for sales of regional outputs and purchases of inputs needed for production" (Miller & Blair, 2009, p. 69)*

Therefore, what appears on a national table as exogenous to final demand (such as exports) will have a greater significance at the regional level. Smaller urban regions exaggerate this because export figures are routinely published at national levels but not regional and sub-regional scales[26]. Equally, tax, imports and other administrative data available at the national level are not available at regional and sub-regional scales.

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[26] A sub-region can be defined as a region more than one level below the nation for example below NUTS1 in the UK or below state level in the USA.

I-O conducted at a smaller spatial scale facilitates the answering of different policy questions and for different organisations. For example, at the national scale, the economic impact of a new semiconductor plant hiring 1,000 workers is of relatively less consequence than at the sub-regional scale, where this could constitute a significant restructuring of the local industry. Equally when considering the creative industries, a relatively small but, highly clustered sector input-output tables constructed at smaller scales can reveal the characteristics of the sector.

In Wales, the creative industries have a different presence in different regions. For example, in Gwynedd compared to Cardiff. Gwynedd is a rural county in North Wales with a majority of the population Welsh speaking. In Gwynedd the creative industries consist primarily small cultural institutions like regional theatres, libraries museums and galleries. The objectives of Gwynedd county council are different to those in Cardiff. In Gwynedd, the objectives are to promote arts for everyone in Gwynedd. There is a greater emphasis on Welsh language and local engagement. This contrasts with objectives in Cardiff that have a greater emphasis on growth and commerce.

The makeup and distribution of the creative industries is also different between the two regions. In Cardiff creative employment by sub-sector as a proportion of total creative employment reveals that there is greater employment in Film & TV, Music & performing arts and Architecture Table 5.7.

Table 5.7 Employment in Creative industries sub-sectors as a proportion of total creative industries employment. Cardiff vs Gwynedd (2019). Source ONS

93
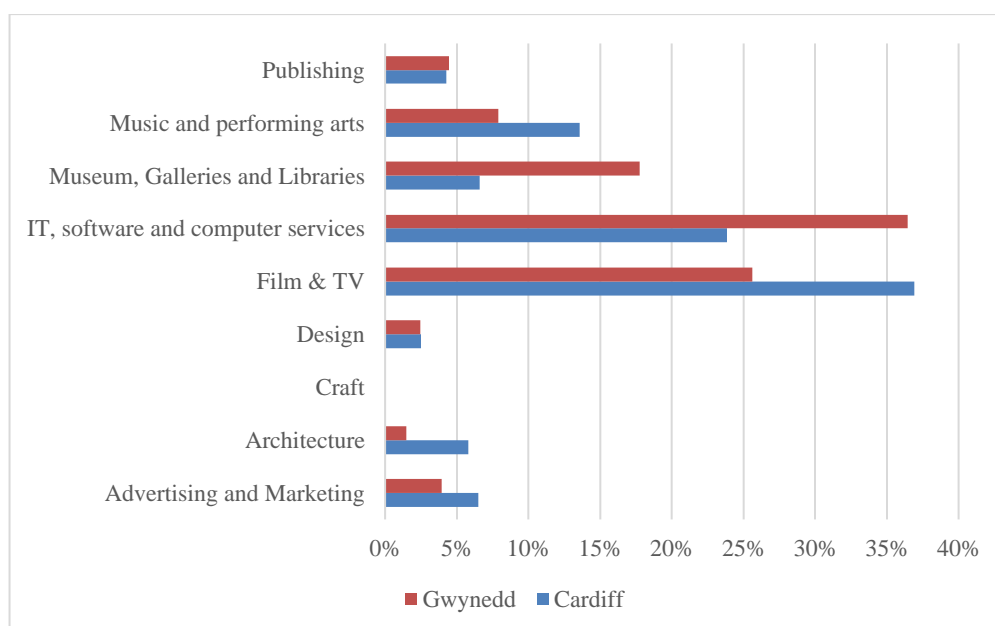
The type of creative businesses are quite different between the two areas with Gwynedd having very few large turnover businesses in the creative industries and a proportionately greater number of micro businesses Table 5.8.

Table 5.8 Creative industries businesses in Cardiff and Gwynedd by turnover bracket. Source (ONS)
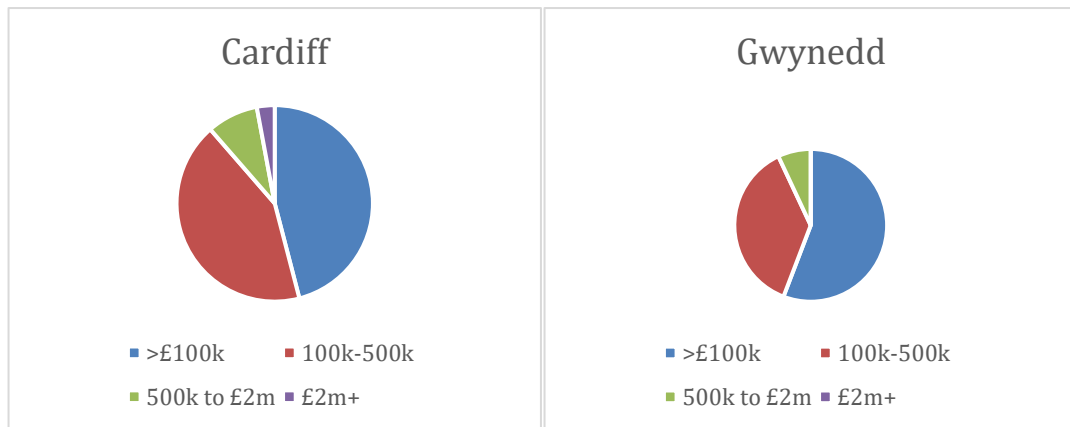
The different nature and composition of the creative industries between the sub-regions in Wales necessitate a more granular approach to analysing the creative industries than could be achieved through national tables.

A recent example of analysis at this scale was conducted by Hermannsson (2012), which investigated the overall impact of higher education institutions (HEIs) on a sub-regional scale. A novel 3-region I-O (further extended as a CGE model) was constructed to focus on the Glasgow city-region. The findings from the I-O revealed the share of economic activity (Gross Regional Product, GRP) in Glasgow for the year 2006, which could be attributed to the expenditures of HEIs and that of the consumption expenditure of their students. Additionally, in Scotland city-region input-output tables are an emerging framework for city-region economic analysis[27]. The Glasgow City Region (GCR) Intelligence Hub is developing a Glasgow City-region input-output table with the Fraser of Allander Institute. The value-added gleaned from producing a table at the city-region level is that scenarios can be modelled within the scale of governance that is relevant to policy makers in this area. Policy relevant analyses at this scale can be more granular than at the national level. One stated analysis is analysing the impact of job losses at Rolls Royce in Renfrewshire. Future uses of the city-region I-O include modelling the potential economic impacts of COVID-19 lockdowns on the City Deal's policy objectives.

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[27]https://www.glasgow.gov.uk/councillorsandcommittees/viewSelectedDocument.asp?c=P62AFQDNDXDNDNZ3NT

Despite the change in the policy landscape of the UK, with the city-region the current scale of regional governance and policy implementation, there has been limited use of tables at this scale. The London I-O tables represented an early attempt to construct a table at the city-region scale in the UK. The London I-O tables used cross-industry location quotients (CILQS) to regionalise the UK tables to the London level. The authors of the subsequent report argue the benefits to economic intelligence that linking sub-national I-O tables within the UK and ultimately to a global database:

> *"A significant next step to support the development of sub-national IO tables for the UK would be improved modelling of inter-regional trade flows. Ultimately, it would be positive if the ONS produced sub-national IO tables for the UK as this would allow comparison between the structure of the London economy, and those for other parts of the UK. If it was possible to link a London IO table into a global database then it would be possible to do more complex analysis, such as to estimate London's role in global value chains, or produce environmental accounts, such as the household carbon consumption of imports." (Wingham & Hope, 2019)*

5.7   Limitations of Input-Output Analysis

This chapter has detailed some of I-O's numerous applications to address many different and important issues for various organisations at different scales. I-O, however, like any other method seeking to quantify complex, interrelated systems, has limitations. The limitations facing I-O have evolved; in the 1950s, computational power was a significant restriction. In the following decades, enhanced computational power and data availability has overcome some of these issues; however, some limitations and assumptions are unavoidable. This section describes these limitations by dividing them broadly into; practical limitations in constructing the tables and theoretical limitations of I-O.[28]

5.7.1 Theoretical Limitations

Input-output tables, like other economic modelling techniques, use assumptions to distance the model from the real world. In a standard linear I-O table as industry output increases, it is assumed that input proportions will remain unchanged in what is referred to as constant returns to scale. Constant returns to scale have been a noted assumption from the model's inception with Christ (1955) summarising the arguments of the day:

> *"It is defended chiefly on grounds of simplicity. One need observe a productive process just once, say at one point in time, to obtain estimates of all the parameters of a simple-proportion production function, and computations are*

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[28] For limitations specific to the use of I-O for the analysis of creative industries see section 10.6.

simpler with this form than with almost any other. It is quite possible that analyses based on it will lead to empirically satisfactory results in some problems—of course this remains to be seen; if they do, that will be a splendid defence. Another defence sometimes offered is the argument that not enough is known to suggest what type of function should be used if proportions are rejected." (Christ, 1955, p.140)

If this were to apply to a 5 per cent increase in demand for cars, there would be a 5 per cent increase in inputs to the car production sector. The reality may be that there are increasing or diminishing returns to scale, production technologies may not be linear and may benefit from economies of scale or suffer from diseconomies of scale.

Constant returns to scale imply that as the car industry sector expands, supplying industries such as gearbox manufacturers and steel producers will meet the new increased level of demand. In other words, there are no limits on supply. In this example, this may be possible for the steelworks that can quickly increase production. However, for the gearbox manufacturers finding and training new workers might not be possible. In this case, the predictions made by the model are now incorrect. This assumption, while potentially very theoretically significant if a tectonic shift were to occur within a regional economy, in reality, for most purposes, the errors from this assumption are likely to be less significant than general estimating errors from the transactions table (Loveridge, 2004). In such circumstances that more flexible production functions are necessary, it is possible they can be calculated using econometric techniques (Rey, 2000).

A further assumption from the I-O framework is that prices are constant. Constant prices, similarly to the constant supply assumption, is unlikely to hold in all labour markets. For example, the 5 per cent increase in the demand for cars was able to be filled by the manufacturers of gearboxes, however, at an increased cost. This is because higher wages were required to attract the workers in the tight labour market that exists for gearbox manufacturers. This new price may change the relationship between suppliers and producers as substitutes for different products may change their production functions. Due to the assumption of fixed technical coefficients, however, goods and services substitutions are dismissed on the grounds of simplicity (Christ, 1955).

The static nature of I-O also requires households to spend their income in fixed proportions. Such behaviour is unrealistic as it implies that income levels do not affect household spending patterns. Once again, a 5 per cent increase in income levels will mean a 5 per cent increase in transport spending (Vukina et al., 1995). In reality, increases in income levels affect spending in very different ways depending on the circumstances of the household to a level of complexity beyond the I-O model.

I-O is generally used to look at the monetary economy and, therefore, can miss economic activity that is not captured in this way: social care, community groups, and parenting. Environmental and ecological concerns require extended tables which are often not included in the basic analysis. If I-O were employed to analyse the impact a new manufacturing plant could have on employment and GVA in a basic I-O, this would miss the impact of transport emissions, plant emissions and environmental degradation. However, it should be noted that these limitations are not exclusive to I-O, they also apply to CGE and econometric modelling in general.

5.7.2 Practical Limitations

Data quality, availability and age are all paramount when constructing I-O tables. Leontief (1955) noted that the lack of 'requisite quantitative data' represented the main hurdle to I-O construction. Data issues are often particularly acute for smaller spatial scales and developing countries where there hasn't been the infrastructure employed to collect relevant data. A common issue in economic modelling is outdated data, particularly where surveys are costly and, therefore, infrequently undertaken. Time-lags between data collection and publication are a common problem (particularly when the industry of focus is rapidly changing) and as I-O shows the economy as a static picture at the time of data collection (Miller & Blair, 2009). Even with sufficient quality and quantity of data available, I-O tables require a considerable amount of time and expertise to construct. As detailed earlier, data collection methods can make an impact on the time required to construct a table with this increased time issue comes an increased cost (Mattas et al., 1984). In summary, there are theoretical and practical limitations that shape; how I-O can be used effectively when it should be applied and what conclusions can be drawn from the data.

There are additional limitations to using I-O when regarding the creative industries. These limitations are linked to the difficulty in defining the creative industries in an I-O framework (see section 6.3) and additionally interpreting the results from such tables given some of the features of the sector. The limitations are covered in more detail in section 10.6.

5.8   The Input-output Tables for Wales

Economic analysis in Wales has been stymied by the poor availability of data and sporadic publication of analysis (Crawley & Munday, 2017). Input-output has been the favoured approach for impact modelling in Wales due to the lack of data available to build more comprehensive analysis such as computable general equilibrium (CGE) modelling (detailed in chapter four). Input-output tables are regularly published at the UK level produced by the ONS (ONS, 2020). In Scotland, input-output tables are periodically updated and easily updated for study (Scottish Government, 2020). Northern Ireland has recently constructed input-output tables for 2016 (NISRA, 2020).

I-O tables have a long history in Wales, with the method used by Nevin et al., (1966) to produce an I-O table for Wales for 1960. An I-O table later followed this for 1968 by Ireson and Tomkins (1978). Since then, input-output tables for Wales have been developed by Cardiff Business School with initially a base year of 1994 and tables updated to 1995, 1996 (Hill, & Roberts, 2001), 2000 (Bryan et al., 2003) and 2007 (Jones et al., 2010). Jones et al. (2010) review the methodological developments that have taken place in Wales since the initial input-output table was developed for 1994. In 1994 the UK input-output framework was adjusted to the Welsh context and regional specialisation and while including some preliminary work, the project was primarily a non-survey one. In 1995 a more primary survey technique was used, which left some 'gaps' where some industrial sectors were covered by a small number of survey responses (Jones et al., 2010). Regional industry surveys have informed the construction of input-output tables in Wales throughout the 90s and 00s. These tables have been applied to various industries and projects detailed in Table 5.9:

Table 5.9 Applications of I-O in Wales. Adapted from (Jones et al., 2010, p.6)

Study Types	Groups supporting the research
Economic impact studies for manufacturing sectors including evaluations of steel industry closures, the coal industry, and the electronics sector	Welsh Assembly Government, Celtic Energy, National Power, WDA
Assessment of forest industry transactions in the Welsh economy	Forestry Commission, Pren Cymru, WDA
Examination of the economic role of foreign manufacturing in the Welsh economy, analysis of productivity spillovers	Economic and Social Research Council, WDA
examination of role of arts and cultural industries in the regional economy, and development of new strategies	Arts Council for Wales, National Museums and Galleries Wales, BBC, HTV, S4C, Brecon Jazz
Evaluation of new and developing road infrastructure	British Road Federation, Brown and Root, Welsh Office, Welsh Assembly Government
Evaluation of the role of specific infrastructure, including housing and incubator space	Cardiff County Council, Cardiff Business, Technology Centre, Cardiff Medicentre, Community Housing Cymru
Evaluation of regional policy and grants frameworks	Countryside Council for Wales, WDA

Evaluation of the higher and further education sectors in the regional economy	Visit Wales, National Museums and Galleries Wales, Locum Destination Consulting, National Science Museum
Tourism Satellite Account	Countryside Council for Wales, Observatory for a Sustainable Knowledge Based Region (OsKAR), Cardiff Business School, Environment Agency Wales
Evaluation of the economic and environmental impacts of sporting and cultural events	Welsh Government, National Museums & Galleries of Wales; UK Sport
Socio-economic returns on visitor infrastructure	Welsh Government; Dwr Cymru-Welsh Water; European Commission
Economic impact of cultural infrastructure	National Museums & Galleries of Wales; Wales Millennium Centre
SME & Social enterprise business Impacts of Superfast Broadband	Welsh Government; European Regional Development Fund
Covid-19 Welsh government financial interventions: an analysis of Welsh beneficiaries.	Economic Intelligence Wales

The input-output tables for Wales in 2007 (Jones et al., 2010) are the most recently published national tables for Wales. The comprehensive project covers all industries in Wales and provides a valuable statement of account. The authors detail the applications:

> *"The tables allow comparisons between industries in terms of their pattern of resource use, and the sectoral and geographical destinations of their outputs including the level of export activity...*
>
> *...These latest Input-Output tables provide a useful and detailed financial map of Wales in 2007. This map plots the flow of goods and services between industries, consumers and government, highlighting the intricate inter-relationships between industries in the contemporary Welsh economy." (Jones et al., 2010)*

The tables have been used by policymakers in Wales with the Welsh Government explaining their applications in 2018:

> *"They [I-O tables] have been used by the Welsh Government, alongside other information, to provide estimates of the short-run impacts (actual and potential) of economic events e.g. from a major plant opening or closure."* (Welsh Government, 2018c)

The methodology for the 2007 tables included a hybrid approach to data collection. Primary data was gathered through surveys designed by The Welsh Economy Research Unit (WERU). The

surveys targeted specific sectors in which Wales had a specialisation. Secondary data was gathered through a commissioned analysis of Welsh results of the ONS Annual Business Inquiry. Additional data was gathered from ONS and Welsh Assembly Government (WAG) sources. To calculate elements of final demand.

5.9   Satellite Accounting Techniques

Satellite accounts are supplementary statistics that allow for economic analysis of particular aspects of the economy that aren't captured in core national accounts such as environmental, transport, tourism and household accounts (ONS, n.d.).

A well-developed example of satellite accounts in the UK are tourism satellite accounts (TSAs). For example, a standard I-O model cannot capture the economic impact of tourism as tourism itself isn't an industrial sector. For instance, a tourist may stay for the night in a hotel, dine out in a restaurant, participate in outdoor activity and then drive home. In this example, the tourist's spending would be classified as 'tourism' in an ideal account; however, this expenditure would have been recorded as hospitality and forestry in a standard I-O table. Hotel stays and outdoor activities are not exclusively tourist activities to capture this hidden part of the economy, a satellite account that can capture greater nuance is required. The ONS (2019) provided a detailed methodology for constructing TSAs and published TSAs for the UK. Satellite accounts are data intensive, the UK TSAs are informed by a series of large surveys, on the demand side; The International Passenger Survey[i], the Great Britain Tourism Survey[ii] and the Great Britain Day Visits Survey[iii]. On the supply side, the Annual Business Survey, the Annual Population Survey and Annual Survey of Hours and Earnings.

In Wales, the tourism satellite account (TSA) was developed as an extension to the 2007 Wales I-O tables to enable for the first time:

> *"a consistent comparison of the value of tourism with other economic activities,*
> *and with tourism elsewhere." (Jones, 2005)*

This was achieved in part by the highly nuanced level of disaggregation including: disaggregation of tourism products, reporting of guest houses/B&Bs and non-serviced accommodations separately, disaggregated by the purpose of the visit (Jones, 2005). The TSA was important as perhaps the first regions globally to become consistent with EUROSTAT, World Tourism Organization definitions and methodology. The findings of the TSA showed how significant the tourism industry is for Wales, with £1.1 billion (3.7%) of all value-added for Wales from direct tourism value-added. The TIPM model extended the model to capture indirect impacts found £1.7 billion direct & indirect impacts (5.6%) of total Welsh value-added, accounting for 80,000 FTE jobs (7.5% of all employment). The significance of this industry would not have been captured in a standard I-O

table and particularly in an area like Wales; this would constitute a dearth of economic intelligence in a key policy area.

In a sub-regional context Wales, like many other parts of the UK, is highly uneven in terms of; accessibility, deprivation and availability of employment. Tourism is an unevenly spread activity throughout Wales. In rural valley areas and coastal regions where alternative economic opportunities are lacking, tourism makes up a significant share of sub-regional GVA. While the TSA itself cannot feasibly be produced at the sub-regional scale investigation into methodologies that could facilitate this analysis is an important future extension.

The TSA has been combined with environmental research and data for Wales to address the environmental impact of different tourism activities and events (Jones & Munday, 2007 and Jones, 2013). More recent developments in Wales have highlighted the value of regional TSAs to look at inward investment in areas where tourism makes up a significant proportion of the local economy (Xu et al., 2020).

This study focuses on creative industries that are like tourism, not a traditional sector and, therefore, would benefit from a satellite account (cultural satellite accounts are examined in chapter 6). The creative industries are relatively small and highly diverse, requiring a level of data and understanding that could not be achieved through secondary data alone. These conditions fit what Lahr (1993) would describe as 'in need of the full range of superior data'; therefore, surveys should be used to gather this.

> *"When producing a relatively accurate regional IO model, some sectors (those that have technologies that vary radically from the nation's average) will need the full range of superior data so that their technology is properly represented, at least the first time that a model is produced for a region." (Lahr, 1993)*

Chapter 6.   Economic Analysis in the Creative Industries: Techniques and Definitional Issues

6.1 Introduction

The previous chapters have outlined the case for analysing the creative industries in the Cardiff Capital Region and detailed why input-output tables are an appropriate framework for analysis. This chapter will look at how input-output tables have been used to analyse the creative industries and detail the methodological challenges that impact creative industries economic analysis.

6.2 Economic Modelling Practices in The Creative Industries

The creative industries as an economic phenomenon have been an area of special research interest for many years (Adorno & Horkheimer, 1979; O'Connor, 2010). Research in the late 1990s and early 2000s highlighted that the creative industries had a positive impact on GDP, GVA and employment rates as well as having positive spill-over effects into other sectors (Howkins, 2001). This has led to the creative industries being viewed as a key component of economic development plans at all levels of Government (Mikić, 2012). Despite this perceived importance however, the evidential basis for the creative industries is lacking, with creative industries not identified in national input-output tables (more detail in section 0). The case for developing a detailed understanding of the inter-industry relationships in the creative industries has been made for a long time. Pratt (2004) argues that the economic and non-economic character of the creative industries is not fully understood and that the lack of adequate data is a key issue in addressing this shortfall.

In recent years, there has been a steady increase in the number of economic impact studies of the creative industries using input-output frameworks. A UNESCO report by Mikić (2012) reviews the different methodological approaches taken from nations and international organisations (EU, OECD, WIPO, UNESCO). The report finds three main approaches to measuring the creative industries economic impact[29]: Firstly, economic size and structural analysis, a method used to determine the amount of direct economic activity related to the creative industries by measuring the economic size of the sector by estimating economic aggregates for the sector such as GDP or employment. This method provides a general picture of the sector and can be achieved at relatively low expense with often available data. The second approach, cultural (creative) satellite accounts (CSAs), is a statistical framework used to estimate the contribution of the cultural industries to an economy. This method reveals supply and demand relationships within the creative economy and

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[29] Two other less popular methods are detailed, disequilibrium economic models and economic models based on Cobb Douglas production functions.

can provide a comprehensive understanding of the sector (CSAs are detailed in 6.2.2). Thirdly, multiplier analysis, analysis based of the I-O framework (detailed in section 5.5) can generate a diverse range of direct, indirect and induced multipliers for employment, output, and productivity. Multiplier analysis has been used in the creative industries to review the impact of a particular sub-sector of the creative industries or for a particular geography[30].

Different countries and organisations have differing practices on economic analysis of the creative industries summarized in Table 6.1.

Table 6.1 Summary of projects analysing the creative industries

Project	Geography	Methodology
Cultural and Creative Activity Satellite Accounts: (Australian Bureau of Statistics, 2014)	Australia	CSA
Culture Satellite Account (Government of Canada, n d.)	Canada	Comprehensive CSAs
A Satellite Account for the European Union Creative Industries (EUIPO, 2019).	European Union	CSA
Mexican Culture Satellite Account 2008-2011 (Gobierno de Mexico, 2016)	Mexico	CSA
Satellite Account on Culture in Spain: 2008-2012 (Ministry of Education Culture and Sport ,2014)	Spain	CSA
Contribution of the arts and culture industry to the UK economy (CEBR, 2019)	United Kingdom	Bespoke I-O analysis
Culture Satellite Accounts 2008-2018 (Statistics Finland, 2015)	Finland	CSA
Interactive Database of State Creative Economy Studies (National Assembly of State Arts Agencies, n.d.)	United States	Comprehensive database

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[30] Zudhi (2014) uses multiplier analysis to review the impact of creative industries on the Japanese economy and in a separate example the Indonesian economy (Zudhi, 2015).

Table 6.1 shows two things firstly, that cultural satellite accounts are the preferred approach to national economic analysis in the creative industries. Secondly, there is a large variation in the level of development of economic analysis in the creative industries across countries. The United States, for example, benefits from a well-developed body of economic research on the impact of creative industries with an Interactive Database of State Creative Economy Studies (IDSCES) combining 109 studies from 45 states (National Assembly of State Arts Agencies, n.d.). For some countries, however, including the UK, creative industries analysis is much more ad hoc. It is notable that while the UK has a longer history of gathering and codifying creative industries data, it appears to lag behind the EU and USA in producing contextualised analysis.

> *"In Europe, national approaches to measuring the economic contribution of different cultural domains (e.g. cultural and creative industries) have a relatively short tradition. While there has been a slightly longer UK experience in measuring the economic and social impact of cultural domains at the systematic level, an analysis at the economic level has been only sporadically the subject of research by academics interested in management, business or economic aspects of different cultural domains."* (Mikić, 2012)

There is no creative industries satellite or region-specific input-output table reporting the creative industries to date in the UK. The input-output tables produced in Scotland, Northern Ireland and the UK do not separately reveal the nine DCMS defined creative sub-sectors. There is, however, a 'bespoke input-output analysis' produced by The Centre for Economics and Business Research (CEBR, 2019), a private company commissioned by the Arts Council for England. The initial report was produced in 2013, with subsequent updates in 2015, 2017 and 2019 (CEBR, 2019). The methodology used a top-down technique drawing on data available from the ONS to produce analysis at the UK level. Within the UK, there are smaller-scale studies often focusing on specific sub-sectors of the creative industries such as Museums (Arts Council England, 2015), Film & TV (BFI, 2018b), Music in Cardiff (Sound Diplomacy, 2019), amongst others.

A notable development area is the increasingly important role international organisations have in producing creative industries economic analysis. In 2019, the European Union intellectual property office saw the construction of a satellite account for the creative industries in the EU (EUIPO, 2019). The project highlighted the interest that policymakers have in getting high-quality analysis in this area and the relatively nascent practice of addressing this shortfall. The report highlights two of the main difficulties: firstly, difficulty in classifying the creative industries within traditionally published sectors and secondly, the non-market nature of some creative industries activity.

6.2.1   Applications of Input-output Tables in the Creative Industries

Input-output tables have been used to understand the economic contribution and inter-industry relationships within the creative industries to varying degrees for decades. I-O studies of creative

and cultural industries often evaluate the economic contribution of a one-time event such as a music festival. The impacts of such events consider the impact of tourist expenditure as an economic evaluation on publicly subsidized cultural events.

Tohmo (2005) uses an I-O framework to evaluate the economic impact of the Kaustinen Folk Music Festival in Finland. The overall impacts are reported at €1.6 million directly and €61,984 indirectly and supported 27 employees. The benefits are offset against the subsidies for the event and find the event to be a benefit to the economy. Herrero et al., (2006) use input-output tables to measure the economic impact of the European Capital of Culture in 2002 Salamanca, Spain. The European Capital of Culture is an EU initiative in which a city is annually designated the capital of culture and hosts of a series of cultural events such as music festivals. The method for evaluating economic impact is valued in this study is shown in Table 6.2. Once more there is an evaluation of tourism and public spending.

Table 6.2 Economic impact of Salamanca 2002, European Capital of Culture. Source: Herrero et al.,p,46
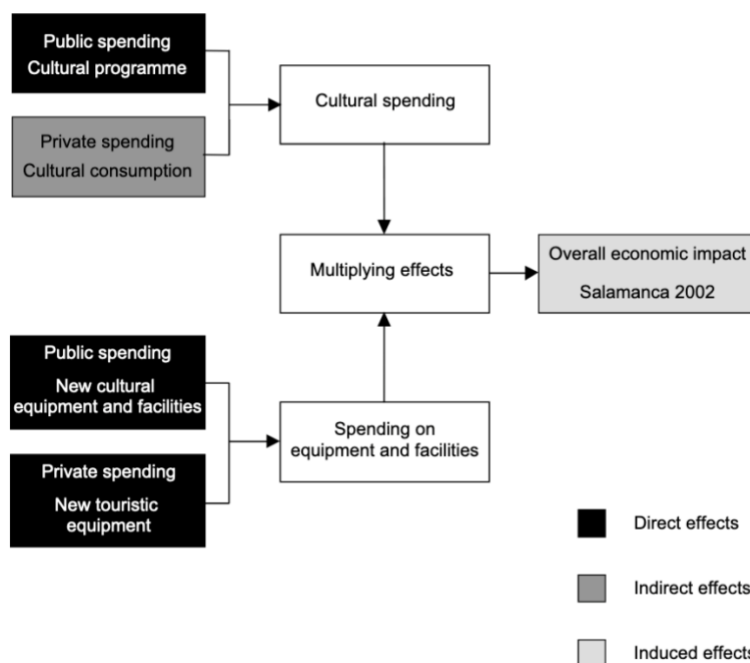
Studies that attempt to value the economic contribution of the various sub-sectors of the creative industries are less common. In section 0 Bryan et al., (2000) use input-output tables to understand arts and cultural activity in Wales. The geography and nature of this study are valuable contribution for the context of this study however, the study is outdated. A more recent study by Ngo et al., (2019) attempt to measure the economic impact of culture on the Vietnam economy using input-

output tables. They produce a highly aggregated table displaying five industries including 'Culture'. Zudhi (2014) uses an I-O approach to evaluate the role of the creative industries in the Japanese economy between 1995-2005. Other studies have looked at the economic contribution of one creative sector, motion picture and TV in the USA (Rickman & Wang, 2020), museums in Finland (Piekkola et al., 2014) video games in the USA (Siwek, 2007) and others (Zudhi, 2015 and Seaman, 2020).

Throsby (2008) regards there to be two factors that impinge on the ability of input-output tables to be utilised for understanding cultural sectors. Firstly, few I-O tables are sufficiently disaggregated to reveal arts and cultural industries. In most cases if cultural sectors are included within I-O tables they will be characterised under a characterisation too broad to enable meaningful analysis. Secondly, the stringent data requirements required for all I-O studies (see section 5.4.4). In the Welsh context both considerations are valid. The I-O tables available are not sufficiently disaggregated. In the 2007 input-output tables for Wales (Jones et al., 2010) some aspects of the creative industries are partially covered in the most recently published tables (Publishing, Market research & advertising, Other recreation media and film, Museums and galleries). Therefore, any future analysis will necessitate further disaggregation and in turn significant new data inputs.

Throsby (2008) regards improving statistical definitions of cultural sectors and early projects to develop creative satellite accounts in Finland as important next steps in the practice of producing economic analysis in the sector:

> *"The combination of these two problems has so far placed a serious constraint on the extent to which input-output analysis can be used for studying economic impacts in the cultural industries.5 Nevertheless, the advent of improved statistical specifications for these industries is likely to lead in due course to dramatic improvements in the possibilities for applying input-output analysis in this field, especially if efforts underway towards deriving satellite accounts for culture prove successful."* (Throsby, 2008, p.226)

Input-output tables are being increasingly used to evaluate the contribution of creative and cultural industries on national economies. There is little however, at the sub-regional level a level of arguably greater significance for creative industries, due to the highly clustered nature of the sector. This thesis will seek to fill this gap by evaluating the creative industries at the sub-regional level.

6.2.2 Creative Satellite Accounts

The creative (or cultural) satellite accounts approach dates back to 1986 with the first proposed CSA produced by the French National Institute for Statistics and Economic Studies (Mikić, 2012).

CSAs, like other satellite accounts (detailed in section 5.9) seek to understand the size and role of sector-specific (creative) economic activity, which is usually hidden within standard I-O tables. In the UK I-O tables, the creative industries are not disaggregated and are instead found within other sectors (Appendix 1). Uncovering this hidden creative activity would be of significant value for policymakers. A creative CSA would estimate the impact creative sectors have on output, employment, value-added and incomes throughout the economy. Table 6.3 shows the Culture Satellite Account for Finland 2018[31] produced by Statistics Finland (n.d.). The table shows the contribution of 'Cultural industries' as well as a 17 cultural industries sub-sectors to the whole economy of Finland. The largest sub-sector shown in terms of output and GVA is 'Motion pictures, videos and computer games' showing an output figure of €3.3 billion and a GVA figure of €1.3 billion.

Table 6.3 Culture Satellite Account for Finland 2018. Source: Statistics Finland

	Output	GVA (million euros)	Employment (100 persons)	Share of output (%)	Share of GVA (%)	Share of employment (%)
Whole economy, total	436590	201628	26261	100.0	100.0	100.0
Cultural industries	14396	6720	811	3.3	3.3	3.1
Architectural and industrial design	717	412	60	0.2	0.2	0.2
Motion pictures, videos and computer games	3295	1322	50	0.8	0.7	0.2
Amusement parks, games and other entertainment	1067	453	65	0.2	0.2	0.2
Libraries, archives, museums, etc.	602	353	86	0.1	0.2	0.3
Production and distribution of books	815	513	45	0.2	0.3	0.2
Education and cultural administration	427	228	49	0.1	0.1	0.2
Organisation of cultural events and related activity	537	201	25	0.1	0.1	0.1
Advertising	1430	670	86	0.3	0.3	0.3
Printing and related activities	927	329	53	0.2	0.2	0.2
Radio and television	1005	368	42	0.2	0.2	0.2
Newspapers, periodicals and news agencies	1876	859	91	0.4	0.4	0.3
Manufacture and sale of musical instruments	19	15	4	0.0	0.0	0.0
Art and antique shops	11	10	2	0.0	0.0	0.0
Artistic, theatre and concert activities	1109	655	112	0.3	0.3	0.4
Photography	167	77	15	0.0	0.0	0.1
Manufacture and sale of entertainment electronics	171	109	20	0.0	0.1	0.1
Sound recordings	220	146	8	0.1	0.1	0.0

Table 6.3 is referred to as a Culture Satellite Account however, the outputs are general rather than the more detailed commodity level data from a traditional satellite account. A commodity level account was described as a 'perfect culture account' (Ministry of Education of Finland, 2009, p. 71). However, the difficulties in achieving such detail as the comprehensive data required was not

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[31] Culture Satellite Account Finland
https://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin__kan__klts/statfin_klts_pxt_12av.px/

available. An additional consideration is how useful the data is at the national level. Data at the regional has been perceived as more useful (Ministry of Education of Finland, 2009, p. 69).

There are three main limiting factors for the development of CSAs. Firstly, the lack of a codified structure (Hara, 2015). Tourism Satellite Accounts and Sports Satellite Accounts have a well-developed structure and have defined methodologies (ONS, 2019). TSAs can link internationally for global comparisons of tourism activities with Eurostat and the World Tourism Organisation[32]. The published methodologies for TSAs create an easily replicable structure at different geographic scales. CSAs lack such a codified definition with the most developed frameworks detailed in the UNESCO Framework for Cultural Statistics (2009) and subsequent handbook (Mikić, 2012).

Part of the difficulty in establishing an internationally recognised framework for a CSA is related to the second limiting factor: the challenges in characterising creative employment. Measuring creative employment is a substantial challenge for analysing creative activities. Definitions are fuzzy, require frequent updating and vary significantly across different countries, making comparisons internationally problematic (Kemeny et al., 2018). Difficulties defining the creative industries are discussed in section 6.3.

The third limiting factor is the intensive data requirements, particularly at smaller spatial scales. TSAs in the UK rely on multiple published surveys conducted routinely (see section 5.9)[33]. Surveys must provide information on the expenditure of sub-sectors of the creative industries on other creative industries sub-sectors and the geographic location of the expenditure.

Despite the relatively long history of CSAs, there has been limited use of this technique in the UK. The development of creative and cultural industries satellite account was discussed in a report for the ONS (Smith & White, 2014). The report concludes that while no framework exists for developing a CSA and there are substantial barriers for international comparison, a national CSA is possible. There have not yet been any CSAs developed at regional and sub-regional levels in the UK.

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[32] WTO Tourism Satellite Account Methodological Framework: https://www.e-unwto.org/doi/book/10.18111/9789284404377

[33] Statistics Canada list the surveys used for the construction of the Culture Satellite Account, Canada for 2010 https://www150.statcan.gc.ca/n1/pub/13-604-m/2014075/appe-anne-eng.htm

6.3 Methodological Challenges: Defining the Creative Industries

Defining a creative activity is a subjective issue and open to interpretation, as has been evidenced in section 3.2.1, which showed the differing conceptual definitions of the creative industries and the creative economy. The creative economy is regarded in the literature as fuzzy and ill-defined with a lack of consensus on who and what makes a creative worker or a creative occupation (Cruz & Teixeria, 2012 and Bakhshi, 2020).

> *"Despite the reasonable amount of literature produced on the topic, several challenges remain for anyone undertaking empirical and quantitative analyses of creative activities. Fuzzy and all-embracing definitions of which occupations should be included in the creative class" (Cruz & Teixeira, 2012, p.42)*

Definitions of creative industries must start from what qualities or outputs make an individual or activity creative. Cruz & Teixeira (2012) review the different methodologies used to define creative employment and group the approaches into those in the psychological field and those in the economic geography field.

> *"In the psychological field (e.g., Amabile, 1983, 1998; Csikszentmihalyi, 1997, 1999), we find creative individuals described as those who reveal original thinking and stimulate others through unusual perspectives, who express pioneering visions and a novel perception of the usual reality, who make significant discoveries in their field of expertise, or who develop knowledge that leads to structural changes in general understanding and ways of thinking."*
> *(Cruz & Teixeira, 2012, p.3)*

Once a definition of creativity has been conceptualised, there is the practical issue of capturing creative activity in aggregate to construct economic models. In practical terms, approaches to defining the creative industries fall into three main categories, an industry-based approach, an occupation-based approach or a hybrid of the two, sometimes combining other metrics.

6.3.1 Defining the Creative Industries: Industry Approach

One approach to defining creative activity is to take the industry-based approach centred around standard industrial codes (SICs) by selecting which outputs are creative and then characterising those sectors as creative. An example of this approach is the early approach adopted by the UK Government's Department for Culture, Media and Sport (DCMS), which in 1998 published Creative Industries Mapping Documents (updated in 2001) (DCMS, 1998 & 2001). The DCMS defined the 13 areas of activity that represented creative industries; advertising, architecture, the arts and antiques market, crafts, design, designer fashion, film, interactive leisure software, music, performing arts, publishing, software, television and radio. The definition of creativity given as:

> *"Those industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property". (DCMS, 2016a)*

The DCMS (1998 & 2001) approaches have been criticised for their reliance on 'scarce, low-resolution data' Higgs and Cunningham (2007), leading to poor accuracy in estimations. (Markusen et al., 2008; Potts et al., 2008 and Granger & Hamilton, 2010). The reliance on broad industry classifications as 'creative' can overestimate the creative work taking place with employees within the same classification not working on creative endeavours (Markusen et al., 2008). A related issue is that freelance and microbusinesses are overlooked by industry-based approaches and can appear invisible to analysis, a significant oversight when many creative businesses are small.

> *"It has been proved that the results provided by simple industry-based methods lead to inaccurate estimations of creative employment, since they consider the total number of employees working within what are regarded as creative industries when only a part of them may be actually involved in the production of creative contents (Markusen et al., 2008:36)". (Cruz & Teixeira, 2012, p.10)*

6.3.2 Defining the Creative Industries: Occupation approach

The occupation-based approach is where occupations are characterised into creative groupings based on the level of creativity involved in the work process. This approach focuses on "what workers do rather than what they make" (Markusen et al., 2008). Creative employment in the field of economic geography generally involves refinements of Florida's (2002a) creative class definition, an example of an occupation-based approach based on Standard Occupational Codes (SOCs) (Cruz & Teixeira, 2012). Florida's (2002a) creative class definition is shown in Table 6.4 (the creative class is discussed in more detail in section 3.2).

Table 6.4 Defining the creative class (Florida,2002) & (Florida, 2017)

Creative Class	Occupations which span: Computer science and mathematics Architecture and engineering The life, physical and social sciences The arts design, music, sports and media Management, business and finance Law, healthcare, education and training *Florida further sub-divides the creative class into a super-creative core, creative professionals and bohemians*
Working Class	Blue collar occupations including: Factory production extraction, installation and maintenance Production, transportation and material moving Construction
Service class	Workers in routine service occupations: Food preparation and food services Building and grounds cleaning and maintenance Personal care and service Low end sales Office and administrative support Community and social services

The Florida creative class definition has faced intense criticism with particular focus on the methodological underpinnings of the class definitions (Markusen, 2006 and McGranahan & Wojan, 2007).

> *"Markusen (2006) also raises questions on Florida's (2002a) methodology, on the grounds that it is reliant on vast categories that do not take into account functional details and the level of creativity embedded in the range of occupations. The statistical data (Census data) used in his study associates creative occupations with those involving high educational attainment thereby intertwining creative with human capital."* (Cruz & Teixeira, 2012, p.7)

A further methodological criticism of Florida (2002a) is Glaeser's (2005) criticism that the creative class is merely a proxy for educational attainment. Glaeser's analysis finds a 75 per cent correlation between Florida's creative class and workers with high levels of education.

6.3.3 Defining the creative industries: Hybrid & creative trident approach

More recent developments in measuring creative employment are refinements of this occupation-based approach or a hybrid of the occupation and industry approaches[34]. In these cases, an industry can be defined as part of the creative industries when the share of creative occupations within an industry meets a set threshold. An approach favoured in the literature (Cruz & Teixeira, 2012) has been the 'creative trident approach' developed by Higgs et al., (2008). Table 6.5 shows a basic model of the creative trident where creative employment is highlighted in the shaded areas. Creative Employment according to this model, includes all occupations in the creative industries as well as creative occupations within other non-creative industries:

Table 6.5 The creative trident (Higgs et al., 2008)

Employment in Creative Industries	Other Industries
Creative Occupations	Creative Occupations
Other Occupations	Other Occupations

*shaded areas represent creative economy employment

Kemeny et al., (2018) note that while the creative trident approach has been adopted as the 'state of the art' methodology for measuring creative employment they argue that a lack of academic

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[34] A novel approach was taken by Granger and Hamilton (2010) to analyse creative employment using social networks.

scrutiny. The DCMS (2016) has introduced an updated methodology including a SIC/SOC matrix and using 'creative intensities' of industries to aid statistical definition while acknowledging that they are an approximation that requires updating periodically:

> *"To allow the Creative Industries to be measured DCMS has worked with others to develop a statistical definition of the Creative Industries which reflects this definition. DCMS uses a "Creative Intensity" to determine which industries (at 4 digit SIC) are Creative. The Creative Intensity is the proportion of occupations in an industry that are creative." (DCMS, 2016a)*

Table 6.6 shows the DCMS defined creative industries SIC/SOC matrix

Table 6.6 A 2007 SIC/SOC table of the DCMS defined creative industries. Source DCMS

	Standard Occupational Classification (2007)	Standard Industrial Classification (2007)
Advertising and marketing	1132 Marketing and sales directors 1134 Advertising and public relations directors 2472 Public relations professionals 2473 Advertising accounts managers and creative directors 3543 Marketing associate professionals	70.21 Public relations and communication activities 73.11 Advertising agencies 73.12 Media representation
Architecture	2431 Architects 2432 Town planning officers 2435 Chartered architectural technologists 3121 Architectural and town planning technicians	71.11 Architectural activities
Crafts	5211 Smiths and forge workers 5411 Weavers and knitters 5441 Glass and ceramics makers, decorators and finishers 5442 Furniture makers and other craft woodworkers 5449 Other skilled trades not elsewhere classified	32.12 Manufacture of jewellery and related articles
Design: product, graphic and fashion..	3421 Graphic designers 3422 Product, clothing and related designers	74.10 Specialised design activities
Film, TV, video, radio and photography	3416 Arts officers, producers and directors 3417 Photographers, audio-visual and broadcasting equipment operators	59.11 Motion picture, video and television programme production activities 59.12 Motion picture, video and television programme post-production 59.13 Motion picture, video and television programme distribution 59.14 Motion picture projection activities 60.10 Radio broadcasting 60.20 Television programming and broadcasting activities 74.20 Photographic activities

IT, software and computer services	1136 Information technology and telecommunications directors 2135 IT business analysts, architects and systems designers 2136 Programmers and software development professionals 2137 Web design and development professionals	58.21 Publishing of computer games 58.29 Other software publishing 62.01 Computer programming activities 62.02 Computer consultancy activities
Publishing	2471 Journalists, newspaper and periodical editors 3412 Authors, writers and translators	58.11 Book publishing 58.12 Publishing of directories and mailing lists 58.13 Publishing of newspapers 58.14 Publishing of journals and periodicals 58.19 Other publishing activities 74.30 Translation and interpretation activities
Museums, galleries and..	2451 Librarians 2452 Archivists and curators	91.01 Library and archive activities 91.02 Museum activities
Music, performing and visual arts	3411 Artists, 3413 Actors, entertainers and presenters 3414 Dancers and choreographers 3415 Musicians	59.20 Sound recording and music publishing activities 85.52 Cultural education 90.01 Performing arts 90.02 Support activities to performing arts 90.03 Artistic creation 90.04 Operation of arts facilities

In the DCMS (2016) methodology, industries are defined as creative when the creative intensity of the sector is greater than 30 per cent. Where sectors fall below this threshold, they are considered by consultation. Creative intensity is provided by the calculation: they are considered by consultation. Creative intensity is provided by the calculation:

$$\frac{\text{number of creative jobs within industry } i}{\text{total number of jobs within industry } i}$$

Despite the refinement in the methodology from the earlier codification in DCMS mapping documents (DCMS, 1998 & DCMS 2001), some challenges remain. Firstly, data available are often 'scarce' and 'low-resolution'[35] SOC codes are restricted to population census data (Higgs & Cunningham, 2007). Secondly, defining creative employment is a fuzzy and open question that SIC and SOC codes fail to answer adequately. SIC and SOC are all-inclusive heterogeneous codes that fail to spot creative and non-creative workers in the same occupation or industry[36]. Bakhshi (2019) argues that the SIC codes present a 'partial' or even 'severely distorted' picture of reality in the creative industries. Thirdly, the increasing mobility between occupations in creative industries poses new challenges for measuring creative employment (Cruz & Teixeira, 2012).

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[35] Higgs & Cunningham (2007) regard the data to be 'low resolution' as the most detailed codes available are at the three-digit level, missing out important granularity when reviewing the creative industries.

[36] Cruz & Teixeira (2012) found that 60% of creative employees worked in non-core creative sectors.

6.3.4 Methodological Limitations: International Comparisons

Policymakers and international organisations seek to make international comparisons on creative employment and output among countries. There are, however, significant differences in the quality and kind of data collected and how creative industries are defined and classified. In a 2009 study of creative employment in Portugal, Cruz & Teixeira (2012) find that different approaches give very different figures of creative employment. Kemeny et al. (2018) evaluate the approaches to measuring creative employment in the USA and UK and find that these accounting processes make international comparisons difficult. They suggest that there are important issues with regards to how creative employment is distributed within national economies finding that creative employment in the UK is far more urbanised than the USA and more unevenly distributed:

> *"Overall, subnational results highlight how each nation's creative employment is distributed in a spatially uneven manner. More importantly, fundamental differences in urban hierarchy shape the contrasts between these distributions. Just as the UK is unipolar, structured around the capital, the US is multipolar, with New York, Los Angeles, Washington and other large cities playing functionally different, but nonetheless relatively equivalently important roles in the national space economy."* (Kemeny et al., 2018, p.19)

Table 6.7 details how different countries classify the cultural or creative industries highlighting the subjective and culturally contextual nuances visible in this sector (Mikić, 2012) [37].

Table 6.7 Classification framework for cultural industries in selected European countries: Source (p51 (Mikić, 2012)

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[37] Note that Italy is the only country listed to consider the Wine and Food Industry as part of its cultural and creative industries.

Countries	Denmark	Finland	TFYR Macedonia	Norway	Poland	Slovenia	Spain	Switzerland
Concept	Cultural industries/ experience economy[1]	Culture sector	Creative industries	Cultural industries	Culture sector and creative industries	Creative industries	Culture sector	Creative industries
Architecture	×	×	×	×	×	×	×	×
Film and video	×	×	×	×	×	×	×	×
Archives		×	×		×	×	×	×
Libraries		×	×		×	×	×	×
Museums		×	×		×	×	×	×
Heritage sites and places		×	×		×	×	×	
Broadcasting (radio and TV)	×	×	×	×	×	×	×	×
Performing arts (theatre, dance, festivals)	×	×	×	×	×	×	×	×
Design (product, fashion, graphic)	×	×	×	×	×	×		×
Visual arts and art market	×	×	×	×	×	×	×	×
Publishing (book, press, journals)	×	×	×	×	×	×	×	×
Music industry	×	×	×	×	×	×	×	×
Software, computer games, multimedia	×		×	×			×	×
Advertising	×	×	×		×		×	×
Education and training, consulting		×	Only foreign language schools				×	Only music schools, included in music industry
Cultural-educational activities			×					
Recreation, entertainment and other cultural activities	×[2]	×				Only other cultural activities		
Botanical gardens and zoos	×	×				Included in other cultural activities	×	
Discos, night clubs								Included in music industry
Wine and food industry								
Audio industry (manufacturing of radios and TV, retail trade of radio and TV equipment)		×			×		×	×
Sport industries	×[2]	×					×	
Interdisciplinary activities							×	
Tourism	×[2]		×					
Toys/amusement					×		×	
Public administration							×	
Other auxiliary activities		×					×	×

Country	Austria	France	Estonia	Germany	Italy	Latvia	Lithuania	Serbia	UK
Concept	Creative industries	Cultural industries	Creative industries	Cultural and creative industries	Cultural and creative industries	Creative industries	Creative industries	Creative industries/ creative sector[1]	Creative industries
Architecture	×		×	×	×	×	×	×	×
Film and video	×	×	×	×	×	×	×	×	×
Archives	×		×		×	×	×	×[3]	
Libraries	×		×		×	×	×	×[3]	
Museums	×		×	×	×	×	×	×[3]	
Heritage sites and places	×		×		×	×	×	×[3]	
Broadcasting (radio and TV)	×	×	×	×	×	×	×	×	×
Performing arts (theatre, dance, festivals)	×		×	×	×	×	×	×	×
Design (product, fashion, graphic)	×		×	×	×	×	×	×	×
Visual arts, and art market	Included in Vienna mapping studies, 2004		Visual and applied arts	×		Visual arts	Visual and applied arts, heritage	×[3]	×
Publishing (book, press, journals)	×	×	×	×	×	×	×	×	×
Music industry	Included in performing arts	×	×	×	×	×	×	×	×
Software, computer games, multimedia	×		Entertain-ment IT		×	Entertain-ment IT	Entertain-ment IT	×	×
Advertising	×		×	×	×	×	×	×	×
Education and training, consulting	×						×	×[3]	
Cultural-educational activities						×			
Recreation, entertainment and other cultural activities						×		×[3]	
botanical gardens and zoos							×		
Discos, night clubs					×				
Wine and food industry					×				
Audio industry (manufacturing of radios and TV, retail trade of radio and TV equipment)	Included in Vienna mapping studies, 2004								
Other auxiliary activities	×								
Research and development								×[3]	

It is clear from the variation between definitions and the dynamic nature of the creative industries that achieving an internationally recognised creative industries policy intervention is problematic. While there is limited ability to evaluate the creative industries within a nation internationally, a uniform definition is achievable and valuable for policy evaluation.

6.4 Conclusion

Creative industries economic analysis is regularly published in the United States and also by international organisations. There are different approaches to evaluating the economic impact of

the creative industries. Input-output tables have been used widely to evaluate the economic contribution of the creative industries in different countries. Cultural Satellite Accounts (CSAs) appear to be gaining traction as the preferred approach, having been applied widely across different countries and international organisations. This CSA approach is typically used at the national scale and has not yet been adopted for use at the sub-regional scale in the UK.

A key issue for economic analysis of the creative industries is the difficulty of providing a universal definition of creative employment. This chapter has explained the evolution of methods to measure creative employment, which has been the subject of global policy interest in part due to Florida's (2002a) 'creative class' theory that linked the notion of attracting creative workers to renewed economic prosperity. The favoured methodology for measuring creative employment, Higgs et al., (2008) creative trident, while considered more accurate than early developments, remains reliant on insufficient census data.

Kemeny et al., (2018) argue that definitions of creative employment are not of sufficient universality to apply to international comparisons of the creative industries on their own. It is apparent when the subjective nature of what constitutes creativity changes dependent on the culture in question as is shown in Table 6.7. Despite this, for regional and national comparisons, the creative trident approach is the 'state of the art'. It can provide a theoretically robust underpinning for creative industries analysis at the sub-regional scale that is the focus of this study.

Chapter 7.   Research Methods

7.1 Introduction

This chapter will set out how the research aims stated in chapter 1 were addressed using mixed methods. This chapter starts by stating the research aims and detailing philosophical underpinnings and approach. Section 7.4 details the qualitative interviews data collection and analytical approach. Section 7.5 describes the *intended best-case* approach to the quantitative methods, a creative industries satellite account for the CCR. Difficulties with both primary and secondary data collection (detailed in section 9.2) in part due to the COVID-19 pandemic resulted in revised approach.

7.2 Research Aims

This thesis seeks to answer the research question:

How far can input-output approaches help us understand the actual and potential contribution of creative industries at a city region scale?

In doing so the research will be guided by four research aims:

1. To reveal the economic value and character of the creative industries in the Cardiff city-region
2. To understand the extent to which creative industries fit with the CCR City Deal policy framework
3. To examine how creative industries businesses engage with Government policy at the varying spatial scales.
4. To evaluate the effectiveness of input-output tables for sub-regional creative industries analysis

7.3 Research Underpinnings & Approach

The literature on the philosophical underpinnings of research differ by discipline, Saunders & Lewis (2012) provide a useful overview of research philosophy from a business studies perspective informed by previous works such as Guba & Lincoln (1994). They define four facets that underpin research; Ontology, how the world is perceived and what constitutes reality. Epistemology, follows on from ontology with what constitutes knowledge under this reality. Methodology, the process that describes the 'logical inquiry' how knowledge can be discovered and validated. Finally,

methods, which specific techniques can be used to fulfil the requirements of the subsequent facets of the research philosophy or 'tiers of research meaning'.

There is some debate in research philosophy literature about the order in which these steps must be understood. With some arguing researchers should understand the philosophical underpinnings of the research to be undertaken to ensure the methods and processes used to acquire knowledge are consistent with the researcher's perception of reality and valid knowledge (Bryman, 2012 and Saunders & Lewis, 2012). Others argue that there are frequently practical considerations that dictate the methods used for a study and in turn the underpinning research philosophy. Thus, the approach is reversed with the research question and other parameters given and the accompanying research philosophy discovered rather than defining the question and method. Table 7.1 adapted from Saunders & Lewis (2012) displays some commonly used research philosophies, detailing how they view reality and the methods often consistent with these approaches.

Table 7.1 Research philosophies adapted from (Saunders & Lewis, 2012)

	Pragmatism	**Interpretivism**	**Positivism**	**Critical realism**
Ontological (nature of reality)	Reality can be interpreted in different ways.	Reality is subjective and socially constructed	Reality is external and independent.	Reality is independent from the individual yet layered by human experience
Epistemology (acceptable knowledge)	The most appropriate approach is informed by what is practically needed	Reality cannot be measured objectively. Narratives, stories and interpretations are valid	Knowledge is determined through objective and measurable facts	Knowledge can be derived through objective methods whilst giving weight to human experience
Associated Methods	Mixed or multiple method designs, can be quantitative and qualitative	Low structure, In-depth qualitative methods, Small samples	Highly structured, Primarily quantitative methods (qualitative to a lesser extent), Large samples	Methods chosen to meet the subject matter can be either qualitative or quantitative

Other factors constrain the methods used and the research questions answered beyond the philosophical stance held by the researcher. Edmondson & McManus (2007) detail four main elements that affect the methods used by the researcher. Firstly, the research question. The question must be manageable and answerable within the time and practical restraints. Secondly, the current state of the literature and prior work conducted in the area determine what questions are relevant.

119

Thirdly, the research design, the type of data collected must fit the research question and not contradict the current state of the literature. Finally, the researcher must understand the contribution to the literature the research will have. These four elements must be tackled concurrently and are integral to the validity of the study.

This research seeks to gain economic intelligence through quantitative economic analysis to measure the impact of creative industries. The research also aims to provide some insight into how creative businesses engage with present creative policy. The use of mixed methods and giving weight to both approaches rules out interpretivism and positivism. Pragmatism appears to be a better fit for this study than critical realism, with methods chosen based on the practical requirements of the study.

Understanding whether the study takes a deductive or inductive approach to gathering knowledge is an important to understanding the research underpinnings. A deductive approach is when research begins with a hypothesis and conducts research to test the theory. A deductive approach starts generally and distils down to a specific conclusion from which generalisations are drawn. An inductive approach does not begin with a hypothesis but generates theories through data analysis (Bryman, 2012). Chapters 2 and 3 have generated themes for analysis that will be carried over into the interviews and input-output table construction. The way in which these themes have been arrived at is consistent with an inductive approach (O'Leary, 2004).

7.4   Using Interviews to Address the Research Aims

Interviews were used to address the research aims 1 and 2 by providing a narrative account of the issues facing creative businesses. The interviews were conducted with stakeholders and businesses in the creative industries in Wales. These interviews are used to gather an overview of the current state of the creative industries and provide important financial information that would feed into the input-output table. The interviews were conducted from mid-2019 to early 2020 (prior to the COVID-19 lock-down restrictions.

Interviews followed a semi-structured approach that allowed open-ended questions to gather a broad range of responses in self-selected areas of focus. Yet, some structure was provided to allow for consistency in the findings for coding and thematic analysis. The rich data generated was then coded and organised into major themes. The two research aims to be addressed with interviews were:

1. To understand the extent to which creative industries fit within the CCR/City Deal policy framework?
2. To examine how creative industries businesses engage with Government policy at the varying spatial scales?

The questions asked were adjusted dependent on the interviewees area and level of expertise. The interviewees were grouped into three categories: creative businesses, stakeholders at universities and stakeholders in third sector organisations. Some example questions are given in Table 7.2 along with their corresponding investigation and the section from which this stems.

Table 7.2 Interview questions for qualitative analysis

Section	Investigation	Interview question
Section 4.1.1	The figures suggest the creative industries is growing rapidly globally. We seek to understand the trend within the CCR on a more granular level.	How would you describe the state of the screen sector in South Wales? How has it changed and what do you think the next 5-10 years look like?
Section 2.4	Are the trends towards freelance employment visible in the creative industries in the CCR?	Have you seen a change in the structure of employment in your sector?
Section 4.1.3	There is criticism in the CCR that creative policy is failing to support smaller less commercially oriented parts of the creative industries. It would be valuable to understand evaluate creative policy in the CCR from a business perspective.	Do you feel creative industries are adequately valued by the Government and in government policy?
Section 6.3.1	Are creative industries businesses being correctly defined? SIC codes don't always represent the industry involved.	Does your business's Standard Industrial Classification (SIC) accurately capture your business's activity?
Section 2.2.1	There is an identified tension in the creative industries between commercial and cultural outputs.	Is your business purely an economic endeavour?
General context	Seeking to gain a wider understanding of the issues that face sub-sectors of the creative industries in the CCR	What challenges do you think the [creative industries or sub-sector] are facing?
		Theme specific question (depending on interviewee expertise). Example: How has being part of a creative hub impacted the business?

The interviewees sought were required to have expertise in the creative industries. Examples of creative expertise could be; an operator of a creative business, a government or third sector organisation involved in the creative industries, or a local stakeholder in the creative sector. A representative sample of creative businesses was sought to understand the whole creative industries

context in the CCR. The goal was to gather respondents to represent; all sub-sectors of the creative industries, businesses of all sizes from freelance to large enterprises, and all geographies within the CCR from Cardiff to the valleys. The sampling approach, therefore, could be described as purposeful heterogeneous sampling (Neuman, 2005).

The FAME database was used to find relevant interviewees this database allowed for the filtering of businesses based on creative sub-sector, size and geography. The FAME database, while useful for larger firms, misses a large number of small and freelance businesses. To source interviewees for micro and freelance businesses, online networks and creative co-working spaces were used. Sector experts were reached through referral with contacts within Cardiff Business School and snowballing (Biernacki & Waldorf, 1981). Interviews were conducted in-person, by telephone and via video conferencing at the request of the participant. Interviews were audio-recorded and transcribed.

The optimal number of participants is argued to be when 'saturation' is reached and no new knowledge is being gathered (Bryman, 2012 and O'Reilly & Parker, 2013). This number of interviews to reach this point is difficult to quantify, particularly with semi-structured interviews and broad remit. Guest et al., (2006) have argued the number to be approximately 12. For this study, 29 people were interviewed Table 7.3 gives a breakdown of the categories of respondents.

Table 7.3 Interviewees by type

Interviewees	Count
Businesses	18
Architecture	1
Crafts	4
Design: product, graphic and fashion design	1
Publishing	2
Film, TV, video, radio and photography	3
Advertising and marketing	2
Music, performing and visual arts	4
Museums, galleries and libraries	1
Stakeholders (universities)	4
Stakeholders (third sector)	7
Total	**29**

18 creative industries businesses were interviewed from across the nine creative industries sub-sector of which 2 were large businesses (20%), 6 were SMEs (33%) and 10 were freelance and micro businesses (56%). When compared with the industrial demography of the creative industries in the CCR see Figure 4.5 of 3% large businesses, 80% SMEs and 17% micro businesses this suggests an underrepresentation of SMEs and an overrepresentation of large and micro businesses.

The transcribed interview data were coded and, through an iterative process, summarised under broad themes. This thematic analysis approach (Nowell et al., 2017) found three main themes; Growth and structural dynamics, structural issues in the labour market and interactions with policy. Chapter 8 presents the interview findings by grouping quotes from respondents under these broad themes. Chapter 10 sees these themes discussed further and their relation to the academic and policy context in the CCR.

7.4.1 Research Ethics

Robson & McCarton (2016) assert completing research is of less importance than upholding human rights, morals and safety. Research ethics are an essential consideration for all research and should be considered before research commences. Interviewees and participants in this study have all read and agreed to the terms of the research under informed consent (Appendix 5). The research ethics form detailed what was required of participants, explained participants right to withdraw at any time from the study, detailed anonymity and data protection in line with the standards set by the Cardiff Business school. Ethical approval was gained from Cardiff Business school before research commenced. Respondents' transcripts are anonymised, data is stored carefully and will be destroyed in accordance with the Data Protection Act 1998.

7.4.2 Validity & Reliability of the Research Approach

In qualitative research, reliability and validity are replaced with the concept of building 'trustworthiness' (Guba & Lincoln, 1994). Trustworthiness in qualitative research is built on four criteria; confirmability, credibility, dependability and transferability (Golafshani, 2003). Table 7.4 explains these concepts and how the qualitative part of the study seeks to address these criteria.

Table 7.4 Concepts in building trustworthiness

Concept	Definition	Provision

Credibility	Refers to how well a study's findings fit with reality. This notion is comparable to the concept of internal validity in quantitative research (Lincoln & Guba, 1985)	This study makes use of appropriate research methods and uses some triangulation through 'overlapping methods'. Data gathered is coded effectively and highlighted by level of confidence
Confirmability	Refers to the neutrality of research by the extent the research is affected by the author's personal bias. This is comparable to objectivity in quantitative research (Shenton, 2004).	Efforts have been made to gather respondents from different geographies and sectors. Transparency in questioning and the triangulation with other published works is used to increase confirmability
Dependability	Comparable to the notion of reliability in quantitative research with a focus on the stability and consistency of research.	The use of two 'overlapping methods' of data collection (IO & Interviews help establish consistency (Shenton, 2004)
Transferability	The degree to which evidence generated in one context can be transferred or generalized to another	The figures provided by the input-output table will be location specific the approach and methodological evaluation will however, be highly transferable to other agencies seeking to construct similar analysis.
		A 'thick description' is used to establish a rich context and allow for others to validate its transferability

Reliability is defined, in quantitative research, as the extent to which results are consistent and can be replicated (Golafshani, 2003). Quantitative research is considered valid if an appropriate instrument is used to measure a phenomenon. Chapter four laid out the different options available to conduct regional analysis. Chapter five detailed the method selected (input-output tables) and, therefore, their validity. Section 7.5 details the method used and the decisions made in order to develop the table. This will allow for the replication of the study and, therefore, demonstrate its reliability.

7.5   The Cardiff Capital Region Input-output Table and Creative Industries Satellite Account

This project sought initially to construct a creative satellite account (see section 6.2.2 of the CCR economy to provide granular detail on the creative industries, a policy-important sector in the CCR. However, due to difficulties with data collection (detailed in section 9.2) in part due the COVID-19 pandemic, this section details a 'best case' analysis and section 9.3 details the alternative approach that was ultimately undertaken.

In Wales, the creative industries are recognised as a priority sector with the establishment of Creative Wales and the creative cluster bid (see Chapter 3). Despite this, there is limited data and analysis at the local economy level in the UK due to a paucity of economic data and the difficulties of characterising and defining creative work (see Chapter 6). At present, the creative sector analysis relies on top-level figures for employment, GVA and output. The 'best case' account sought to provide a more nuanced view of the value of the creative industries sub-sectors, particularly the local areas of specialisation. A detailed CSA for the CCR would establish a detailed evidence base for policy implementation in a CCR priority area.

Input-output tables have been used to analyse regional and sub-regional economies; however, there is to date just one city-region I-O table constructed in the UK (Wingham & Hope, 2019), although others are in the pipeline[38]. This project, therefore, reflects the use of a well-established methodology at a novel scale in a non-traditional sector. The expansion to include creative sectors will further allow for evaluating the impact of creative industries policy.

7.5.1 The 'Ideal' Case: A CCR I-O Table with a Creative Industries Satellite Account (CSA)

A detailed review of the options available for regional economic analysis is conducted in chapter four and a detailed review of the input-output tables can be found in chapter five. Input-output tables were selected through a process of elimination: KMA and CBA were eliminated due to their inability to provide an economywide analysis and the relevant inter-industry detail. SAM and CGE analysis may be justifiable future extensions of analysis; however, the lack of data available at the spatial scale rendered them inappropriate at this stage. The history of I-O use in Wales alongside the development of a Wales level I-O for 2018 provides a convenient and robust basis for regionalisation to the CCR scale.

I-O analysis has both theoretical and practical limitations (covered in chapter five). I-O is a robust method of analysis and limitations and caveats are provided in the results to ensure it is understood what conclusions can and cannot be drawn from the data.

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[38] The Glasgow City Region (GCR) Intelligence Hub is developing a Glasgow City-region input-output table with the Fraser of Allander Institute:
https://www.glasgow.gov.uk/councillorsandcommittees/viewSelectedDocument.asp?c=P62AFQDNDXDND NZ3NT

This study sought to provide a bespoke analysis of the creative industries, a sector that does not appear in the Wales or UK I-O tables and instead requires further analysis. Approaches used for creative industries economic analysis can be found in chapter six however, for this study a creative industries satellite account (CSA) was deemed the best approach (data permitting).

7.5.2 Constructing the Cardiff City-Region Input Output Table

This section will detail the process used to construct the CCR input-output table for 2018 and an accompanying creative industries satellite account. The construction of the Cardiff city-region table will be achieved by regionalising the latest available table at the Wales level. The publishing of tables at the Wales level has been sporadic (see chapter 5), with the latest formally published in 2010 for the financial year ending in 2007 (Jones et al., 2010). Unpublished tables are available for 2013 and there are tables anticipated for 2018 to be produced by Cardiff University.

Regionalising national tables to the city-region scale is a novel approach in the UK. Wingham & Hope (2019) use simple location quotients (SLQ) and cross-industry location quotients (CILQs) to regionalise the UK SUT tables to the London city-region level. This study follows the technique established by (Hermansson, 2016) whereby, through an iterative process, a Flegg Location Quotient (FLQ) is developed from a simple employment location quotient (SLQ) and a cross-industry location quotient (CILQ).

As discussed in section 5.4.5 , the simple location quotient measures the relative concentration of an industry in the region of study (the numerator of the equation) in comparison to the concentration of that industry in the nation (or host region) of study. The SLQ assumes that industries with an LQ greater than 1 can satisfy regional demand for their output.

$$SLQ_i^r = \left(\frac{E_i^r / E^r}{E_i^n / E^n} \right)$$

FLQs add in the extra element of relative sector size of the buying sector and the relative size of the region Flegg et al (2016). FLQs allow for the adjustment down of national coefficients for larger regions following the assumption that larger regions import less than smaller regions (p355, Miller & Blair, 2009):

$$a_{ij}^{rr} = \begin{cases} (FLQ_{ij}^r)a_{ij}^n & \text{if } FLQ_{ij}^r < 1 \\ a_{ij}^n & \text{if } FLQ_{ij}^r \geq 1 \end{cases}$$

7.5.3 Data Collection for the Construction of the CCR Input-output table and CSA

A hybrid approach to data collection was used for the construction of the CSA. The hybrid approach (detailed in section 5.4.5.2) is regarded as a practical and accurate approach to data collection, benefitting from the speed secondary data can be gathered with additional accuracy from primary survey data (Jones et al., 2010 and Hermansson, 2016). Table 7.5 provides a summary of the (best-case) sources of data for the study[39].

Table 7.5 Data collection: Source, type and function for the CCR CSA

Data Type	Source	Purpose
Primary	Interviews with key stakeholders	Dual purpose: Narrative detail Inter-industry spending creative industries sectors
Primary	CCR Economic Impact Survey. (Appendix 2)	Inter-industry spending for creative industries sectors
Secondary (protected access)	Annual Business Survey[40]	Inter-industry spending creative industries sectors Household expenditure
Secondary (Publicly Available)	Business Register and Employment Survey (BRES)[41]	Provide creative industries employment data Provide data required for regionalisation
Secondary (Publicly Available)	Financial Statements from public firms	Inter-industry spending Pensions Salary calculations
Secondary (Publicly Available)	The UK Treasury's Online System for Central Accounting and Reporting[42]	To provide the estimated government spend by industry.

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[39] Data collection issues detailed in section 9.2 render some data sources unavailable. Section 9.3 details alternative data sources accessed.

[40]https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/annualbusinesssurvey

[41] https://www.nomisweb.co.uk/datasets/newbrespub

[42] https://www.gov.uk/government/collections/the-online-system-for-central-accounting-and-reporting-oscar-tool

Secondary (Publicly Available)	Local Government Finance Statistics	To provide estimated local government spend by sector.
Secondary (Publicly Available)	Regional Accounts[43]	GVA data will allow output to be deflated for regionalisation of the Wales table
Secondary (Publicly Available)	FAME database	To provide local creative industry business size estimations

Secondary data would be sought from publicly available data sets: Business Register and Employment Survey (BRES), ONS Regional Accounts, Trade Surveys for Wales, Financial Statements from local businesses and Local Government Finance Statistics. Some secondary data sought required special access. The ONS's annual Business Survey (ABS) data will be sought through the UK Data Service. ABS is a protected dataset and requires secure researcher training and gaining the necessary permissions from the data provider to gain access (see section 9.2).

Primary survey data was sought to provide a more detailed understanding of the inter-industry relationships in the creative industries, an area lacking in the literature. A Cardiff Capital Region creative industries survey was sent out via Qualtrics to businesses that fall within DCMS defined creative industries. Businesses were identified using the FAME database filtered by the SICs linked to the creative industries (link SICs in appendix 1). This Initial survey reached 538 businesses of these 538, 77 responses were gathered, 21 were complete or mostly complete 11 were fully completed. A second streamlined survey was sent out supported by Clwstwr and focused on creative projects within larger businesses. This survey sent via Qualtrics in English and Welsh received 28 responses, of which five were complete or mostly complete and two were fully completed. Of the 29 interviews conducted, 18 were conducted with creative businesses. These interviews had a dual purpose; to provide a narrative account and to gather quantitative data. The face-to-face interviews yielded more detailed survey responses of the 18 interviewed 10 provided quantitative data.

The data gathered from the surveys and interviews was intended to be used to aid in the construction of disaggregated creative industries production functions (more detail on the

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[43] https://www.ons.gov.uk/economy/regionalaccounts

composition of I-O tables can be found in chapter 5). Due to data collection issues detailed in section 9.2. the I-O table constructed was altered from the table proposed in section 7.5.4.

7.5.4 'An Ideal' Creative Industries Satellite Account for the CCR

The construction of a creative industries satellite account (CSA) would provide the opportunity for a detailed economic evaluation of the creative industries that goes beneath the nine DCMS defined creative industries sub-sectors. This section provides a rationale for further disaggregation of the creative industries into the most locally relevant sub-sectors.

Table 7.6 shows the breakdown of the DCMS creative industries sub-sectors in Wales and the CCR in FTE employment in 2018. It is apparent that some sub-sectors are of greater economic significance than others, with the sub-sectors: 'Film, TV, video, radio and photography' and 'IT, software and computer services' making up over half of all creative industries employment in the CCR.

Table 7.7 shows the relative concentration of the creative industries sub-sectors in the CCR for 2018; it shows the relatively highest concentrations in sub-sectors with SICs that could be characterised as part of the screen sector. It is also apparent that some sub-sectors of the creative industries are much broader than others containing multiple SICs (discussed in chapter nine and example in Table 9.2), on this a priori basis these sectors are candidates for further disaggregation.

Table 7.6 FTE employment by creative industries subsector 2018. Source ONS

Creative Industries Subsector	Cardiff Capital Region	Wales
Advertising and marketing	1,360	2,525
Architecture	2,675	4,050
Craft	15	35
Design: product, graphic and fashion design	425	600
Film, TV, video, radio and photography	3,785	5,230
IT, software and computer services	6,250	9,690
Museums, galleries and libraries	695	1600
Music, performing and visual arts	875	1,575
Publishing	875	1,940
Total	**16,955**	**27,245**

Table 7.7 Creative industries sub-sector location quotients CCR 2018 compared to Wales. Source ONS

Creative sub-sector	ELQ
Advertising and marketing	0.9
Architecture	1.0
Craft	0.7
Design: product, graphic and fashion design	1.2
Film, TV, video, radio and photography	1.2
IT, software and computer services	1.0
Museums, galleries and libraries	0.7
Music, performing and visual arts	0.9
Publishing	0.8

Clwstwr Creadigol highlights its own priority sectors with some overlap with Creative Wales (Clwstwr, n.d.). Table 7.8 shows the policy focus of creative organisations in Wales alongside the nine DCMS creative industries sub-sectors. Table 7.8 shows that there is a focus within local creative policy on the so-called 'screen sector' and related activities.

Table 7.8 Creative sub-sectors of policy focus in Wales

DCMS sub-sectors of the creative industries	Creative Wales key sub-sectors	Clwstwr key sub-sectors
Advertising and marketing Architecture Crafts Design: product, graphic and fashion design Film, TV, video, radio and photography IT, software and computer services Publishing Museums, galleries and libraries Music, performing and visual arts	Film & TV Digital & Gaming Music. *special mention of publishing	Gaming Animation Online Television Visual effects Film Immersive

Other sub-sectors of policy interest are music and publishing. Music is a policy-relevant sector in the CCR with Cardiff announced as the UK's first music city (Sound Diplomacy, 2019). Creative Wales has recognised publishing as a sub-sector of special interest (Creative Wales, n.d.). These sub-sectors also contain several different SICs which would usefully be looked at in more detail as disaggregated sectors. In the DCMS defined sub-sectors, music creation is found in the same sector as sound recording, music publishing and cultural education. These broad sub-sectors pose a challenge for analysis. Within the UK I-O tables, a significant proportion of what might be classed as 'Music' FTE encompasses a substantial amount of activity that is at best tertiary to the music sector.

Table 7.9 Creative Industries Standard Industrial Classifications DCMS

Creative Industry	Standard Industrial Classification (2007) Code Description
Advertising and marketing	70.21 Public relations and communication activities 73.11 Advertising agencies 73.12 Media representation
Architecture	71.11 Architectural activities
Crafts	32.12 Manufacture of jewellery and related articles
Design: product, graphic and fashion design	74.10 Specialised design activities
Film, TV, video, radio and photography	59.11 Motion picture, video and television programme production activities 59.12 Motion picture, video and television programme post-production 59.13 Motion picture, video and television programme distribution 59.14 Motion picture projection activities 60.10 Radio broadcasting 60.20 Television programming and broadcasting activities 74.20 Photographic activities
IT, software and computer services	58.21 Publishing of computer games 58.29 Other software publishing 62.01 Computer programming activities 62.02 Computer consultancy activities
Publishing	58.11 Book publishing 58.12 Publishing of directories and mailing lists 58.13 Publishing of newspapers 58.14 Publishing of journals and periodicals 58.19 Other publishing activities 74.30 Translation and interpretation activities
Museums, galleries and libraries	91.01 Library and archive activities 91.02 Museum activities
Music, performing and visual arts	59.20 Sound recording and music publishing activities 85.52 Cultural education 90.01 Performing arts 90.02 Support activities to performing arts 90.03 Artistic creation 90.04 Operation of arts facilities

The screen sector is a clear focus of creative industries policy in the CCR, as evidenced by the priority areas of Creative Wales and Clwstwr Creadigol (Table 7.8). Therefore, it is justified to provide a more detailed view of the screen sector through disaggregation in the CCR CSA. The creative industries sub-sectors that are not highlighted as priority areas for the CCR (by Clwstwr and Creative Wales) will not require the same level of disaggregation as sub-sectors of policy focus.

It is important to understand the screen sectors economic characteristics in terms of supply chains, labour inputs, ownership and output to best capture the economic impact of the different parts of the sector. This understanding will allow for the most effective disaggregation of the sector. The screen sector does not have a set definition; however, it usually encompasses services to Film, TV, video games and animation. Thus, the sector straddles DCMS creative industries sectors: Film, TV, video, radio and photography and IT, software and computer services. Table 7.10 details differing definitions for the screen sector. The left column shows the Clwstwr Creadigol defined sub-sectors (Hannah & McElroy, 2020). The right column shows how the screen sector is defined in a report by the British Film Institute (BFI, 2018a).

Table 7.10 Screen sector definitions

Clwstwr Defined Screen Sector	British Film Institute Defined Screen Sector
Film	The Film Sector
High End TV	The High-end Television Sector
Television	The Video Games Sector
Games	The Animated Programme Sector
Animation	The Children's Television Sector
VFX	The VFX Sector
Post-Production	

The BFI report used a bespoke economic impact model based on the ONS UK input-output tables to understand the economic contribution of the UK's screen sector. Within these sectors, the report noted that there are apparent differences in the value chains with significant differences between production, at the beginning of the value chain and post-production at the end. Production activity includes: VFX, music & audio, and picture. Post-production activity includes; acquiring the right to sell IP in different markets, distribution, advertising, scheduling and promotion. The BFI (2018a) note the significant impact on the industry of modern technology with video on demand (VoD) having changed the value chain in the sector radically. The change in the value chain has offered new revenue streams to content owners; however, the impacts are complex for independent business (Olsberg SPI, 2017).

This section has highlighted the value in further disaggregation of the creative sub-subsectors to include a more detailed view of the screen and music sectors. The screen sector for this analysis would be taken from the Clwstwr definition. The Music sector would be defined by the SIC 90.03 'Artistic creation' and scaled using secondary sources (Sound Diplomacy, 2019). These sectors take from three 'parent' DCMS defined creative industries sub-sectors: Film, TV, video, radio and photography, IT, software and computer services, Music, performing and visual arts. These three sectors remain in the CSA with selected SICs removed. The sectors: Film, High-End TV, TV, Animation, VFX and Post-production share SICs with other sectors and need a weighting of their respective SIC to apportion sector size. The BFI (BFI, 2018b) provide a methodology for weighting

each sector. However, these numbers are for the UK level and will require further tailoring the CCR level through the use of survey and interview data.

A conceptual outline of the creative industries satellite account (CSA) is shown in Table 7.11.

Table 7.11 Conceptual Outline of the Cardiff Capital Region Creative Industries Satellite Account

Supply of Creative Industries Products (basic prices)	Adjustments
Advertising and Marketing *Architecture* *Crafts* *Design*: *product, graphic and fashion design* *Museums, galleries and libraries* *Music* *Publishing* *The Clwstwr Defined Screen Sector* *Film* *High-end TV* *TV* *VFX* *Animation* *Games* *Post-production* *Remainder: Film, TV, video, radio and photography* *Remainder: IT, software and computer services* *Remainder: Music, Performing and visual arts*	Households, Government, GCF, Exports
Total Output of Creative Industries Products in Basic Prices	
Inputs to Production *Material & other Inputs* *Labour inputs - creative* *Labour inputs – non-creative* *Labour inputs - freelance* *Taxes on production & other*	
Total Output of Creative Industries Products in Basic Prices	

There are additional considerations for a CSA. Firstly, A feature of the creative industries is the proportion of creative industries suppliers acting voluntarily, potentially due to non-economic motivations or in the hope of gaining experience for future paid creative work. Secondly, illegal activity such as pirated media content should be included when considering the size of the sector although reliable data in this area is sparse (EUIPO, 2019). Thirdly, consumers can also be producers that cannot be effectively captured in a traditional I-O table (EUIPO, 2019).

7.5.5 Conclusion

This chapter has highlighted the study research aims, research philosophy and methods used to address the research aims. This study seeks to address four research aims:

1. What is the current state of the creative industries in the Cardiff city-region?
2. How well do creative sectors fit within the CCR/City Deal policy framework?
3. How do creative businesses engage with Government policy at varying spatial scales?
4. What are the practical issues with using input-output tables to analyse the creative industries?

The study adopts a pragmatist research philosophy with the view that knowledge can be interpreted in different ways. The methods used to gather knowledge equally reflect a pragmatist philosophy as they are informed by the practical needs of the study (Saunders & Lewis, 2012). Two overlapping methods are used: qualitative and quantitative. The qualitative interviews and survey are used in tandem to gather policy discussion and data to support the construction of the CCR I-O tables. The conceptual 'best case' creative industries satellite account is described, which includes a high level of disaggregation to show in granular detail the inter-industry relationships within the 'screen sector'. The screen sector is an area of specialisation in the CCR creative industries and a policy priority. However, the 'best case' creative satellite account could not be constructed for this study due to primary and secondary data issues detailed in section 9.2. Despite these issues and the change of approach, this conceptual account is a useful way to frame the creative industries in the CCR for future analysis in the sector. A revised I-O approach to analysing the creative industries in the CCR is detailed in section 9.3.

Chapter 8.   Findings: Creative Industries Policy Analysis in the Cardiff Capital Region

8.1 Introduction

This chapter presents the findings of a series of semi-structured interviews with creative businesses and key stakeholders (detailed in chapter 7, Table 7.3). The interviews seek to address two research aims:

- Research Aim 2: To understand the extent to which creative industries fit with the CCR City Deal policy framework.
- Research Aim 3: To examine how creative industries businesses engage with Government policy at the varying spatial scales.

The interviews were informed by the literature review in chapter 2 and chapter 3. Chapter 2 described the economic, geographic and policy context in which the CCR sits. The Government argues the CCR will boost output, GVA and create jobs for the city-region (HM Government, 2016). Others regard the City Deals as contributing to uneven economic development (Beel et al., 2016; Etherington & Jones, 2009, Haughton, et al., 2014; Harrison & Heley, 2014 and Jonas, 2012). Chapter 3 revealed three main themes in terms of the character of the creative industries in Wales and elsewhere most relevant to this thesis. Firstly, the creative industries appear to be a fast growing sector (DCMS, 2018a). Secondly, there are skills shortages in the sector, which threaten to restrict future growth (NaFW, 2019). Thirdly, the policy approach taken to bolster the creative industries in Wales appears to be a 'creative cluster' approach (HM Government, 2018).

From the interviews, a series of themes and sub-themes emerged. This chapter outlines each theme with extracts from the interviews.

8.2 Growth and Structural Dynamics in the Creative Industries

The interest in the creative economy has stemmed largely from the rapid growth found in the sector (detail in Chapter 3). The Welsh Government has recognised this phenomenon:

> *"As a result of Welsh Government support, the creative industries is one of our fastest growing sectors, with an annual turnover of over £1.9 billion. It employs over 58,000 people, 52% more than ten years ago."*
> (Welsh Government, n.d.)

This theme seeks to describe how this growth is distributed within the creative industries and how the sector has evolved. Respondents were asked how they viewed the current state of the creative

135

industries or a more specific sub-sector of interest, how this has changed over time and how they perceive it changing in the future.

Some respondents echoed the Welsh Government's narrative of a fast-growing creative sector. Businesses in the screen sector reported that they were experiencing very high levels of demand:

> *"I would say the screen sector in relation to TV and film and particularly to high end television has never seen such a busy period ever."*
> *(R1, screen sector expert)*

This message of growth is supported by the statistics on creative industries in Wales when taken as a whole; however, there are sub-sectors of the creative industries experiencing a different trajectory. One respondent for the crafts sub-sector described three factors that were negatively affecting business: Brexit, austerity and the online marketplace. The respondent reported that Brexit was having a severely negative impact on their business on both the supply side and the demand side. The supply side by driving up the price of materials. The uncertainty that surrounded the financial impact of Brexit was affecting demand causing customers to not commit to events such as marriage and engagement and as a result feeding into lower demand for rings and presents. The responded reported that austerity was pushing individuals to pawn their gold and was further pushing up materials prices. The respondent also suggested they had seen online jewlelry stores increasingly taking away their business.

The publishing sub-sector is an interesting case as it shows the extent to which structural changes in the economy are affecting a longstanding industry. Some parts of the sector are facing significant decline with long-stable incumbents Gomer Press closing after 127 years (BBC, 2019). This decline is influenced by structural changes such as a decline in physical book sales and increased small scale and digitally enabled self-publishing. On the other side of the coin, the publishing sub-sector has seen growth in online magazines and e-publishing. When asked, one respondent described the shift seen in the publishing sector:

> *"I'm not so sure about growth, but there's certainly been quite a lot of shift in, in publishing. So, most recently one of the, I think the oldest publishers, one of the oldest publishers in Wales Gomer press, they decided to stop publishing. So they're a printer and a publisher and they've decided to pull out of publishing. So we lost one of the oldest publishers in Wales, this summer.[.]Having said that, there's also a new publisher just recently was established ... down in Cardiff that, both illustrators and designers and they started the new children's publisher."*
> *(R7, publishing business)*

The publishing sector in Wales is also heavily supported by the Welsh government, with two large businesses, The Books Council Wales (Rolph, 2014) and University of Wales Press[44] supported by Government grants. Another part of the publishing sector that has seen a dramatic decline is traditional print journalism. The decline in local journalism has been well reported, with the Cairncross Review (2019) detailing the precipitous fall in print sales of newspapers. Respondents raised the collapse of local newspapers affecting the publishing sector overall:

> *"My sense is that the numbers of journalists in Wales, I think I've read that somewhere that they have declined dramatically and that of course creates a democratic deficit in terms of the sort of the way, news gets reported and things like that. And, and I think to some extent there has been some efforts made of addressing that by fund putting funding into hyperlocal news. [.] but that doesn't address the absence of, for example, investigative journalism in Wales, we just don't have a lot of that."*
> *(R7, publishing business)*

When asked about the reason for the growth in the screen sector, 'the need for content' was often cited. This need is driven by businesses of traditional businesses affected by digital disruption and by the advent of large streaming companies. Two local creative industries experts agreed that they were seeing rapid growth in the screen sector in particular that was being driven by changes that are affecting the whole economy:

> *"Growth is certainly one part of it that is a very obvious metric in terms of the number of people working in that environment and that largely maps onto the obvious things that you will be aware of like digital disruption and the need for content. The growth of digital consumption. Audiences wanting different things and then businesses also wanting to engage with that"*
> *(R3 creative industries expert)*

> *"Not only are we seeing all sorts of positive notes in the growth story about creative industries. We are in an age of very evident technological revolution seeing a growing space for the value of creativity across the whole economy."*
> *(R4, creative industries expert)*

Two businesses in the screen sector corroborate this view noting that there is significant demand for screen sector businesses in the CCR from new streaming services from large international companies like Apple and Netflix:

> *"The creative industries were the one thing that kept [stopped] the UK going into recession last year [2018], that's pretty powerful statement to make and you know, we, we do need to recognize that it probably is the future because we will all, we all consume massive amounts of content and with the opportunities that the, you know, Apple TV, Netflix, you know, the particularly one being launched at rate every other minute on platform that we are happy to pay for."*
> *(R1, screen sector business)*

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[44] University of Wales Press consolidated financial statements 2019: https://www.uwtsd.ac.uk/media/uwtsd-website/content-assets/documents/finance/university-of-wales-financial-statements-july-2019.pdf

8.2.1 Consequences of a Growing Sector

The apparent rapid growth in the creative industries in recent years raises some questions about the drivers of the growth, the distribution of the associated benefits and the sustainability of this growth. When asked about the sustainability of the growth, one respondent was unconcerned:

> *"No. I do not think that there is a bubble, as long as you've got your tax credits and as long as the pound remains the low against the dollar, I don't think the bubble will burst. We had this conversation out in LA about three weeks ago and I don't think the bubble will burst."*
> *(R1, screen sector business)*

Other respondents shared a less optimistic view on the sustainability of the growth in the sector. The reliance on government tax credits as stated by R1 to keep screen businesses in Wales is a concern with businesses vulnerable to changing Government priorities. Another threat to the sustainability of the sector raised was the issue of eroding broadcaster budgets. Respondents noted that budgets for major PSBs were being eroded over time markedly post-2010 as a result of UK government austerity in response to the 2007-8 financial crisis. Relatedly, the threat of changes to the BBC budgets as a result of changes to the TV license.

There are serious concerns around changes to funding in the sector. Respondents reported that there was a persistent worry about the funding environment in the future. Despite this, the sector on respondent reports that the sector is resilient and well diversified having faced and overcome other funding challenges over the years such as the rise of online advertising:

> *"ITV's recovery in advertising is phenomenal. If you think about typically that one time the 'threats' that I probably say threats in inverted commas because the perceived maybe perceived threats or maybe the kind of encroaching threats from. advertising money moving online. It seems at one point to be your kind of pointing towards doom, but it seems that that hasn't happened…*
>
> *…across the piece over the last 10 years. budget cuts have been just phenomenal. and yet it seems to have made the sector more resilient. I think everybody knows that they need to make less money go further."*
> *(R13, Screen sector expert)*

With the expansion of streaming services in Wales producing more content, there is some concern that this displaces the viewing share from the other UK & Wales-based broadcast television productions that are less international and supply chains more local:

> *"We may be going through a boom period in investment in content because of the competition between Netflix, Amazon prime, Hulu, Disney coming into the market now in a big way [.]. That means that that means there is money being generated of course, for production. Some of that may find its way to Wales. and we know, some series have been shot here. On the other hand, a lot of this is international content, which could be, which is being made anywhere, and is as it undermines, the viewing shares of BBC and ITV"*
> *(R12, local policy expert)*

The concerns raised about how local creative industries supply chains are now and how they might change due to the introduction of international streaming services are a key concern. To understand the extent to which of creative industries investment is benefiting local economic development goals supply chains must be mapped. Evaluating these key questions is something that input-output tables can shed some light on.

8.2.2   Growth, Foreign Ownership and Distributional Impacts

The impact of the growth of the creative industries is being felt throughout the local economy. Creative businesses reported that they supported local foundational economy businesses such as taxi firms, maintenance and construction firms, and that they are seeing significant benefit from the growth of the creative sector:

> *"The taxi company that come here to [production studio], their turnover increased last year by 100,000. You're looking at a local customer, you know, look looking at a local non-specific supplier to one particular company;[construction firm], [scaffolding firm]. So, it's a massively important story[....]You know, the house prices are up, everybody's in work" (R1, Screen sector expert)*

It was particularly noted that the role of the creative sector in supporting the foundational economy was apparent outside of the city in rural areas as employers but also as supporters of the broader supply chain:

> *"The really tangible role that publishers play as employers particularly in rural communities [.]they are often really important employers. They offer relatively well-paid white collar jobs. They offer employment opportunities that are flexible in terms of where they work. They also draw on a pool of freelancers who tend to be very evenly spread. They tend to use the local supply chain. So a lot of publishers in Wales use printers in Wales to print the books. They would use a printer in Wales to print leaflets. They would use catering businesses in Wales locally to cater for their launches. [.] there's loads and loads of examples of how they feed into the local economy. Obviously, the products, the Welsh books either language go to bookshops locally, they go to heritage sites locally and therefore, again, contribute to the local economy." (R7, publishing business)*

Some respondents note that despite a desire to source goods and services locally this is not always possible. For some industries, goods are highly specialised and are not produced locally:

> *"Generally speaking, in terms of assets and equipment if we can do it locally, we will do. But things like equipment and stuff it's always going to be a tough bet because it is all niche so you're not going to be able to find someone who has access to loads of different equipment within a retail space that's based in Cardiff or South Wales it's just not going to happen. most of the production companies here get stuff in Bristol."*
> *(R17, screen sector business)*

I-O can help reveal the interconnectedness of supply chains in the local economy detailing what individual sectors are sourcing locally. I-O could shed some light on where there are sub-sectors that are important to the local economy and others which are more import intensive.

For other creative businesses, the skills required are not available in sufficient quantities in Wales and have to be imported from elsewhere:

> *"When it comes to kind of Welsh director producers we struggle, self-shooting DPs [director producers] are really really few and far between in South Wales we tend to use the same crop of people over and over again. And then we end up inevitably getting people in from outside of Wales because we just can't find people with that enough people with that skill base to satisfy our need "*
> *(R5, screen sector business)*

The nature and domicile of the recipients of any growth in creative industries spending will have important consequences for local sector prospects (Feldman et al., 2021). There is some concern regarding the extent to which employment generated from creative industries investment is benefitting the local economy. Respondents noted that TV productions might have significant benefits to the local foundational economy. However, despite this valuable investment, local creative sectors did not share in this benefit. that employers in the screen sector are claiming to be Wales-based but, the high-value creative industries employment occurred outside the city-region:

> *"There was a trend, kind of, I don't know, maybe starting from beginning of the last decade, maybe, where production companies would brass plate or they'd lift and shift, so they'd get a commission for the nations or you know, say, Oh, we're based in Cardiff or whatever to get grants or money or whatever it was. Come in, make the projection, bring their own talent in. Again, there you would have the hospitality sector and taxis and you know, skilled craftsmen and so on benefiting from that. But then they would go away again and there would be no legacy. They wouldn't, they wouldn't contribute to the skills pool at all while they were there because they would bring their own talent in and that didn't help." (R13, Screen sector expert)*

Some businesses were less sure about how much of their spending stayed local with a high proportion of their spending going to freelancers who could be located anywhere:

> *"From a publishing perspective, we could be anywhere really. And you know, a lot of our spend goes to freelances again. So that could be, they could live anywhere… …So a lot of our money will go all over the place. And of course authors, we have royalties, we pay our authors to royalties. So again, they are everywhere from Wales down the road to China, to Brazil." (R15, publishing business)*

There is a lack of understanding about the extent to which this increased creative activity is benefitting the local creative sector with additional high productivity employment. Input-output tables could shed some light highlighting how local inter-industry relationships are in creative sub-sectors. There is however, a second concern regarding the distribution of creative activity within the Cardiff city-region. There is evidence that creative industries activity is concentrated in the city of Cardiff (see Chapter 2). However, some effort to spread the activity in the production sector throughout the city-region has been made. One respondent noted that where production activity has successfully spread to other areas, the economic impact on the local economy has been significant:

> *"I think the breadth of production, the production sector in, Wales and throughout Wales at where it's not just, I know you're, you're concentrating on,*

on the Southeast, but in other areas on Wales like Caernarfon, you know, the
production sector is still quite a big employer. probably second only to, you
know, councils and stuff. So, it does have an economic impact still, even though
the budgets are smaller, they're kept in the communities where the programs
are made."
(R13, Screen sector expert)

8.3 Structural Issues in the Labour Market

Respondents were asked more generally about the challenges their business faced. Responses could be grouped generally to issues with employment and skills. The growth of freelancers was discussed, with some finding that freelance work fostered precarity in the industry. Others noted that freelance work accommodated flexible work patterns that fit creatives' lifestyles. Industry experts often raised concerns about the lack of appropriately skilled workers in specific roles and levels of seniority.

8.3.1 Freelance Workforce

The rapid growth of freelancers in the creative industries as noted in the literature (Easton & Cauldwell-French, 2017) was noted by respondents. Respondents were asked what they thought was driving the growth of freelancers in their industry and what the consequences of this change were. Some respondents reported that people are choosing to work flexibly and freelance is part of that:

> *"We've seen a huge growth in the number of freelance workers and actually*
> *that's not just about 'that's what the sector needs' although there is part and*
> *parcel of that but also because people are choosing to work in that way"*
> *(R3, creative industries expert)*

One respondent in the publishing sector said that freelance working in their sector afforded workers the benefit to locate where they want and work with whom they choose. One respondent added that creative freelancers in the CCR were in preferable employment to other work available outside of the creative sector. They argued that despite the risk of unemployment that there is a sufficient amount of work to go around and the rate of pay is higher than in alternative employment:

> *"Most freelancers I know have just gone from one job to the other, there's,*
> *there's enough work around to cover that and they may be out of work for*
> *maybe a month or two, between jobs....*
>
> *.. the majority of the time within this industry, the salaries are pretty good. So*
> *compared to, you know, working a zero contract hours, job where you're on*
> *minimum wage compared to working as a freelancer in this industry making*
> *substantially more, it's swings and roundabouts isn't it?"*
> *(R2, screen sector business)*

I-O can shed some light on where salaries in an industry are higher than others and provide an empirical backing to such observations.

The number of freelancers is growing and dominant in the broadcast sector even in large public sector broadcasters with one respondent noting a major broadcaster had said 70 per cent of their workers were freelancers. Freelance is common for production studios that run a relatively skeleton staff between major productions. However, respondents noted that freelance contractors are increasingly used by traditional businesses that are in the film & TV sector supply chain:

> *"The production itself, will probably employee on a day-to-day basis here is probably about 200 people here every day. That can then swell to four hundred people.*
>
> *…Yes, so [TV & Film Construction firm] do employ, a core team I think their core team is probably [.] in the region of 40 to 50 people full time on the books, but they, they swell every day then to maybe 200, 300, 400 people depending on how many productions are on".*
> *(R2, screen sector business)*

In some cases, organisations were perceived as moving employees involuntarily from permanent jobs to freelance positions. This is particularly concerning as there is insufficient research on the impact of freelance work on the individual:

> *"I know the BBC recently made some people redundant but then potentially reemployed people on a freelance basis..*
>
> *..There's not been a huge amount of research actually done in that area and it is interesting that to me because we, as I say in one breath, governments are prioritizing creative industries as a priority sector but there has been very little work done to understand that group."*
> *(R3, creative industries expert)*

The move from permanent jobs with the rights and protections these roles are afforded such as sick pay, pensions and holidays to jobs without these protections is an important change in the labour market. Some respondents reported concern about the rise in freelance workers with often young workers attracted into small companies which are often not unionised sometimes attracted by tax opportunities with an entrepreneurial start-up culture. One business in the publishing sector consciously funds permanent positions for specific roles in response to the precarity of the sector:

> *"We fund at the [publishing business] we support posts in publishers for creative editors for example, because we feel that that's actually very precarious. You know, people who, who know how to edit consumer books, you know, books that are interesting and entertaining, for people to read. And we fund those because we feel that, again, the market doesn't take care of that. And I do think in Wales that the provision is not very robust in part because the publishing industry as a whole depends on funding." (R7, publishing sector business)*

While there has been an observed rise in freelancers in the creative sector, some respondents suggested the rise in freelance is not a creative industries phenomenon and the rise in freelance and precarity whilst a concern is accepted as a part of modern work. Additionally, some respondents regard the work in Cardiff's hinterland where there is much less alternative work available should embrace any employment opportunities that are provided:

8.3.2 Skill & Worker Shortages

Skills shortages are an issue facing the CCR as a whole exacerbated by the tendency for graduates to leave Wales for London and the south-east of England. Respondents discussed the presence of skills shortages in their specialisms and reviewed policy efforts being made to address them. The demand for skilled creative industries workers, particularly temporary freelancers for productions is very high within the screen sector:

> *"The freelance sector in Wales is in, is in rude health I mean there's there's no,*
> *you know, in the sense that, demand is struggling to keep up with supply. So,*
> *even though that's not an ideal situation, because obviously you want to be able*
> *to supply all the demand"*
> *(R13, Screen sector expert)*

The demand for a creative workforce is being seen increasingly across even traditional sectors in what is referred to as the 'embedded creative environment'. The embedded creative environment refers to creative workers that are based within traditional employers such as web designers and content creators within an insurance firm. One respondent noted how the demand in traditional sectors for creative workers has grown in recent years:

> *"Initially we had lots of jobs that were, come and work in this theatre company,*
> *come and [.] work on this television or film production. Now we are seeing, I'm*
> *looking for a communications lead at the intellectual property office, I am*
> *looking for, this bank is looking for "are you a brilliant designer come and*
> *work". So, this is what I find interesting, that spread, that need for creative*
> *skills and creative workers across the whole of the economy no matter what*
> *sector you are in you need people to produce good quality content."*
> *(R3, creative industries expert)*

One respondent noted that the supply of appropriately skilled workers was a concern for screen sector productions and a potential constraining factor for the growth of the sector:

> *"There employment needs and supply of workforce needs are significant I mean*
> *when you are shooting a kind of movie on the size and scale they are*
> *producing, when you are producing the [international-scale production] for*
> *Sky or [international scale production] one of the latest that will be coming out,*
> *I think this autumn you can have up to three, five hundred people on set at a*
> *time we don't have that volume just knocking about the streets"*
> *(R3, creative industries expert)*

An additional challenge is the change in emphasis on where the training for creative employment is undertaken from employers to individuals and universities. Traditionally, training in creative industries such as TV and Film or Journalism would be from internships provided by employers. Practical training conducted by employers is regarded to be the gold standard. In recent years, there has been a fall in the availability of employer based training:

"So, you know, we are slowly trying to kind of shift the balance in terms of that. But it's very difficult because you know, you need to look at things like apprenticeships and you should look at, on the job training, which is, you know, generally agreed to be the most desirable option. but those things, once they disappear, take a long time to build up again."
(R13, Screen sector expert)

Universities have had an increasing role in providing training and skills for the creative workforce. University courses are not held in as high a regard by creative employers. One respondent discusses how universities are trying to address this challenge, however, noting that these changes are slow:

"I think a lot of universities are now realizing that they need to be doing more in terms of perhaps more vocational, if I can use that word. training as in, you know, practical training. but of course, these things, again, take time to bed in."
(R13, Screen sector expert)

One respondent links the skills shortage with austerity suggesting that cutbacks across the board have affected the level of training offered by broadcasters and third sector training organisations. Furthermore the respondent criticises the view taken from some of the new production companies to be ahistorical, regarding the skills shortage to be a function of similar firms not investing in a legacy of skills and training 10 years ago:

"It's the drop off in the investment in training five, ten years ago had created the gaps in the market that we see now. So I don't know how people think if they don't invest in creating that pool they need for the future, how are they going to find it? [.] the scarcity of training is now being bemoaned, but looking back and seeing how it happened, I don't understand why more companies don't want to try and avoid it happening again."
(R13, Screen sector expert)

The risk of local skills shortages impacting the growth prospects of different sub-sectors of the creative industries is a key concern. There were some reports of skills shortages which are highly nuanced with some oversupplies in some sub-sectors and gaps at different career levels:

"Skills and talent are an issue for film and television sector you know because we talk about the creative economy here so it is different things for different bits you know if you look at the music sector, I'm not sure we would have the same causation that we don't have enough music techs we probably have an oversupply of those so the challenges will be different across the board"
(R3, creative industries expert)

Mapping where these skills gaps are is an important next step for understanding whether creative investment is likely to be effective. When asking respondents about trends in employment in the city, the 'talent drain' was raised. The general view seemed to be that as Cardiff became more successful and attractive in recent years, this talent drain started to reverse. Respondents added that they had anecdotal evidence that creatives were coming back to Cardiff later in their careers after upskilling in London and other creative clusters. Understanding graduate pathways to employment in the creative industries is important potential extension of this work.

8.4 Evaluating Creative Industries Policy in Wales

To address the third research aim, it was important to understand how businesses are engaging with creative policy. Respondents were asked how their business or sub-sector engaged with Government policy at the various layers that cover their area; local authority, city-region, Welsh Government and UK Government. Respondents were asked how policy has changed over time and how it could be changed to serve the sector better. Themes that emerged from the discussions in this area were threefold. Firstly, discussion of local authority and the Cardiff Capital Region board. Secondly, tensions between the city and elsewhere in the city-region. Thirdly, discussion of the Welsh Government's effort in supporting the creative sector and hopes for Creative Wales.

8.4.1 Local Authority and City-Region Level Policy

Respondents were asked to discuss how their business or sector engages with local Government. Almost universally, respondents reported not knowing about the Cardiff Capital Region and what it can offer creative businesses:

> *"I think no one really understands what it [The CCR Board] does." (R24, creative business)*

Businesses had often never heard of the CCR and those that had did not seen the CCR involved in their sector. One respondent referenced the issues facing the music sector in Cardiff particularly in 2017 with the closure of cornerstone music venues of high cultural value as one example of where the CCR was not visible:

> *"I genuinely don't know much about what goes on with, the Cardiff city region level in terms of the creative industry support. [.] I don't think they had any involvement whenever people were, at their most stressed about Womanby Street and that sort of thing. They, they weren't visible. The no noise there were Westminster MPs were involved. There were AMs who were involved, there's Cardiff city councillors involved, no one that's visible I saw from Cardiff city-region." (R19 Music sector expert)*

Other respondents regard local government to have little involvement in the creative sector apart from when large projects make the headlines:

> *"Do you know what the, in terms of Cardiff city council and the city region and what have you? I don't see anything coming out of that and in the sense of, you know, the only time I hear about the creative industries in it a council or kind of any kind of political, you know, local political context is when there's a big event or when you know, for example, Cardiff made a bid for the Channel Four hub, all those kinds of things. It just seems to me that it's a bit of a political football and once expedient they'll, they'll refer to it and say how marvellous. But actually, I don't think they contribute to it." (R13, Screen sector expert)*

When asked about policy engagement at the local level, respondents were generally encouraged by the Cardiff City Council understanding that austerity has played a role in dampening funding opportunities. One respondent for the music sector regarded the CCC to have had a hand in supporting the sector where the CCR board did not, on the issue of music venue closures:

> *"They did put the money where their mouth is. They have stepped in and helped one or two venues as well."*
> *(R19 Music sector expert)*

Outside of Cardiff there was less evidence of creative industries policy at the Local Authority level nor the CCR level, the lack of creative leadership for local areas outside the city is likely to let these areas fall further behind. One respondent notes that the lack of support for creativity has held back some regions from recognising some of the positive externalities that creative spaces lead to:

> *"At local authority level I'll be honest with you. apart from maybe Cardiff and I might be totally wrong here, but my experience tells me that I doubt there are many local authorities in Wales with a creative industry strategy as part of their regeneration program."*
> *(R14, local authority)*

8.4.2 The City and the Valleys

An underlying philosophy of the Cardiff Capital Region is the notion of the city as an engine of growth for its hinterland (see section 3.3.3). With creative industries activity clustered in the already more prosperous areas of the CCR there is a concern that investment in these sectors could further widen the gap between the core and the periphery. Respondents were asked to comment on whether they saw investment and support in their sector prioritizing the city and what were consequences of this. Interviewees regarded the focus of creative policy to be in Cardiff, exemplified by the majority of funding for large cultural institutions based in Cardiff and large public employers like the BBC based in central Cardiff. Respondents for large screen sector firms thought that governments did appear motivated to support businesses outside of Cardiff, however, were forced by the limited options available to support a majority of firms in Cardiff and the Bay.

One respondent representing the music sector noted that the focus of support for music sector business did focus on the city and regarded this to be appropriate due to the highly location specific nature of the sector:

> *"You know, it's a lot of times just a city thing, so it's got a city focus and in Cardiff that is only on this one street rather than across the region. So, it might be less of a priority for them, quite, and that might be quite reasonable. But, if you think of the overall things like, music tourism benefits it's the region that*

benefits from big events"
(R19 Music sector expert)

When discussing investments that could improve the music sector one respondent noted that they would necessarily disproportionately benefit Cardiff and that the political challenges associated with this was holding back investment. Additionally, the respondent noted that the lack of sufficient transport infrastructure was hampering the music sector. One example of this is that public transport was not available late enough to support the night-time economy in the sector:

> *"Then you're into, things that would improve music in the, in the region that would end up being very political I would've thought. Cause you'd be probably talking about funnelling more people into Cardiff, and that's very controversial in itself politically. Cause there's lots of talk of a lack of East West links in the region and all the things already being North to South. but you still can't get home from a gig. If you, if you lived in Pontypridd... [y]ou've probably gotta leave at like quarter past ten halfway through a gig before an 11 o'clock curfew because the trains don't align basic things."*
> *(R19 Music sector expert)*

When discussing the role of local creative leadership one respondent raised the Cardiff Music Board an independent institution established by the Cardiff Council to support and grow the cities music ecosystem. It is noted that the remit for the board ends in Cardiff and does not directly support the wider city-region:

> *"It's a Cardiff city board at the moment. It's not a region board. So, there's a gap there is a gap there if it falls outside Cardiff there is a gap. Yeah. and the other thing I would probably highlight is it was probably 18 people already. all giving their time voluntarily, and It's, it's unwieldy enough to deal with the Cardiff issues never mind bringing in the rest of the wider region."*
> *(R19 Music sector expert)*

The nature of having champions for growth in specific sectors of the creative industries is that if they are successful the city will again be the main beneficiary. The gap in support between the city and the wider hinterland has been noted not just in terms of investment and growth opportunities but, in the accessibility of cultural activities. One respondent argued that areas outside of the city of Cardiff are overlooked in culture offer.

> *"The Cardiff arts, culture, creative economy relies somewhat as well on taking product out to the wider region. It's not kind of exclusively only performed, developed and for Cardiff. So there is a relationship, but I'm keen that we fit into that so that the Cardiff city region is far more than Cardiff not, you know, not just in kind of Metro and transport terms, but in, in cultural terms as well."*
> *(R14, local authority)*

The respondent is highly critical of the Cardiff focused policy in the culture sector. They argued that policy and cultural institutions could broaden their remit and consider how particularly small and mid-scale venues might be better supported:

> *"I do think that a lot of the national organizations based in Cardiff [.] should be more heavily scrutinised on what they do, outside of Cardiff. So, for example,[national dance company], they do do work elsewhere, but we're not,*

I don't see a lot of that maybe in some of the small to mid-scale venues or outreach work.."
(R14, local authority)

The support for places outside of the city goes beyond financial support for institutions but includes communication and leadership. The same respondent argued that places outside of the city are not being communicated to about creative employment opportunities and this is disadvantaging local young people:

"How was somebody in Maesteg supposed to know about that or somebody in Ebbw Vale or somebody in Treorchy , unless you're in those circles, you're not going to get to know about it what are they doing to communicate that to, to other areas..

..I think that if you asked people you know, surveyed 16-year-olds or what have you in some of the valleys, areas that within this Cardiff city-region, they would not know a lot about the career opportunities that, were available to them in the creative industries."
(R14, local authority)

Some respondents pointed towards efforts being made by third sector organisations to spread the investment in creative industries and organisations doing outreach:

"We're doing our best, I think you know, that programs like It's My Shout[45], I think those programs are trying, but there hasn't yet been a, it hasn't become policy driven it's what we're doing because we want to do it to what Roger Goodell is doing cause he believes in it rather than there being a concerted policy driven effort to improve access."
(R14, local authority)

Some respondents representing smaller freelance businesses saw that there were more networking and events taking place in Cardiff than elsewhere in the CCR. They regarded these events to be in some cases an important avenue to gaining new work and funding opportunities. One small advertising and marketing business found that after relocating from Newport to Cardiff they saw an increase in business and a massive increase in the number of job applications received. Furthermore, they observed that the Cardiff postcode made their business appear more serious.

8.4.3 Welsh Government Creative Industries Policy

Welsh Government policy creative industries policy has been the source of much discussion for businesses and key stakeholders in the industry. Respondents were asked how seriously they

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[45] It's My Shout Ltd work to connect people from local communities in South East Wales with job opportunities in TV & Film through outreach and support.

perceived the Welsh Government take the creative industries, how they engage with Welsh Government policy, and their hopes and initial impressions of Creative Wales[46].

Some businesses rely on the Welsh Government to fund their activities and are, therefore, vulnerable to budget cuts. Respondents had varying views on this issue; some were happy with the level of funding they received; others saw an opportunity to do things differently due to a drop in Government funding. One respondent representing a museum found this particularly worrying as the museum was dependent on increasingly hard-fought Government funding and diminishing voluntary support. The impact of further cuts to funding would likely be the closure of the museum. The economic impact of the museum's closure would be small; however, the socio-cultural implications of the loss of a heritage museum would be hugely significant to the local area.

When asked about Creative Wales, respondents were unsure what to expect from the new agency. In general, there was frustration at the delay of the agency's launch and cautious optimism that the agency would deliver funding and training support to creative businesses.

Respondents detailed their hopes for the future direction in creative policy in Wales. One area that emerged was the hope that creative policy would be able to provide funding to facilitate capital expenditure and training programmes. The key to all of the ambitions, however, was the to speed up the decision-making process allowing support to be accessed quicker than has previously been the case.

> *"Yes. I'd say they are supportive on the whole. [.] I think that can be frustrating sometimes. trying to convey that to, to the government and sort of at that level of, you know, decisions need to happen quickly. Certainly, when we're talking about producers about future productions that might come into Wales and they might need an answer can this happen, you know, whatever that question may be, they will probably expect their response in, in a week, whereas the government might not work in, in that sort of quick time. all the time."*
> *(R2, screen sector business)*

One respondent was highly critical of the governments funding approach describing an extreme case where the slowness of the Welsh Government had significantly detrimental impacts on a production:

> *"No, I think, you know, they, they had millions of pounds certified in various media funds but trying to get hold of any of it was an absolute bureaucratic nightmare one production that I know of had, they'd said that they were going*

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[46] Creative Wales was launched in February 2020. Interviews were conducted across 2019 and 2020 with some interviews conducted prior to the full details of Creative Wales were public.

to support them to the tune of a fairly substantial sum of money. and it took so long to do the paperwork. never mind release the funds that the production almost went bankrupt." (R13 screen sector expert)

One respondent for the screen sector describes their hopes that Creative Wales will be more responsive to industry needs:

"I'm hoping it's something with a big pot of money that we can all access and push the industry forward. In reality. We in Wales have to be able to react quickly to what's happening in industry trends...,

...So I'm hoping this new form of government, whatever they would be, will be able to react quickly and to really to grow with us at the same time...

..There's a broad range though of how the government can help though. And in terms of training, funding for training, things like that, that doesn't, those schemes might sometimes take a while to get off the ground. Whereas really you know, we need crew, now."
(R2 screen sector business)

Some respondents were critical of the past performance of the Welsh Government in the sector. One popular criticism from respondents was that the Welsh Government was thought to be prone to supporting glamorous and overlooking smaller, less commercial projects:

"I do think you know, Welsh Government to be fair they like the sexy stuff that's the film and the music at the high level. But they divorced it from arts funding, and I don't think you can do that. They're one of the same. And you know, the, the, the amount that's coming into the creative industries, a small slice of that back into the arts funding pot can make a massive difference."
(R14, local authority)

The Welsh Government failing to support smaller scale grass-roots creative activity is argued to undermine future development in the sector. One respondent suggests that smaller productions is local theatres gradually feed through to the high-end, high-value productions and that cutting funding at the grassroots level could impact future commercial projects:

"At a Welsh government level, they have clearly grasped creative industries and we welcome that. We've been banging about for many years though is there seems to be a separation around what the creative industries are and what the arts are [.] You can't have one without the other. So, you're not going to have anybody in film unless you're supporting youth theatre at the grassroots level. And I think almost you're robbing Peter to pay Paul. And if you, if you take away the base of the pyramid, the top's going to topple and you've got all the grassroots stuff that has been kind of more starved of funding over the last couple of years."
(R14, local authority)

An additional criticism of the focus on large commercial projects is the extent to which these productions benefit the local economy and leave a legacy. Respondents critical of the Welsh Government's approach to funding in the creative industries argue that funding targeted at different parts of the creative industries could have a longer lasting legacy which is less measurable in hard economic terms. For example, investing in engagement with the media and creative activity for

schools could have a significant and lasting affect beyond which could be achieved by supporting a large-scale production:

> *"Say for example bringing in a Channel Four series to film two scenes in Wales and saying supported by Welsh Government that cuts no ice with me at all. If they want to invest, for example in the skills base, then they should be, targeting, socially deprived areas and bringing people on. And you know, if that's what they're for is to improve the lives of the people of Wales. I mean, let's face it, engagement with the media and the creative industries needs to start at schools level. And we're not seeing that anywhere except with Bad Wolf because they have like an education officer and they get schools in and which is fantastic."*
> *(R13 screen sector expert)*

An expert on the music sector felt the initial announcements from Creative Wales on the music sector were disappointing. Noting that whilst there has been acknowledgement of the sector, the funding offered is insufficient:

> *"There is only a fairly small pot of money for the grassroots music side of things. It's only 120 grand for the whole of Wales, which is bugger all to be honest and especially when it's been broken down into five grand max grants. So, you know, do your toilets, or do part of a mixing desk and that's five grand gone…*
>
> *…We gave strong evidence to the music inquiry at the Senedd, and lobbied long and hard for years about, the need for them to fund the sector and treat it as seriously or even a proportion, a small proportion of the way they treat other, what they perceive to be sort of the main industries they took very seriously."*
> *(R19 music sector expert)*

An issue for music venues in particular which have been closing in central Cardiff is unaffordable business rates. One respondent called on the Welsh Government to provide rate relief for such venues as has been seen in parts of England to safeguard these important cultural venues:

> *"The day before yesterday we'd made two music venues trusted two really good results in terms of business rates. So, in England, grassroots music venues could qualify for a 50% reduction in business rates, which is probably seven and a half grand a venue over the whole of England, so a little bit up in the air, probably how that translates into Wales, Scotland Northern Ireland as well. So that's, awaiting a response to that and also in Oxford street, the hundred Club got defined as a sort of, I can't remember the exact phrase, but yesterday it got defined as a key asset, which means it's got a hundred percent reduction of business rates, which is phenomenal, it saves them something like 75 grand a year. That's phenomenal so just shows you exactly what the government can do when they want to."*
> *(R19 music sector expert)*

8.5 Motivations in the Creative Industries

Motivations in the creative industries are not always economic, which is an important differentiation from traditional industries where the central motive is profit maximisation. This

poses a challenge for policymakers who must balance the economic development opportunities without 'stifling the integrity and freedom of art forms' (Bryan et al., 2000). Respondents were asked about whether their business was an 'economic endeavour' and what impacts this has on them.

The creative industries were regarded by participants as one of the few industries where people work for free because the work is not always regarded as an economic endeavour. Numerous creative freelancers mentioned that if they weren't getting paid they would still be doing their creative pursuit. There are obvious benefits to being motivated by a passion to work in an industry; however, this does raise potential issues of exploitation and self-exploitation (Bain & McLean, 2013; De Peuter, 2014 and Kim, 2019). Respondents noted that there is poor working culture in the creative industries led to exploitation not seen in other sectors. The poor working culture, included the large degree of working for free. This could include working for free as an unpaid intern on a film set or working additional unpaid hours as an animator for the Film and TV sector. One respondent compared their experience as a design business when working for Film or TV compared with other sectors:

> *"On a film set there are generally one or two people who are there that are working for free like the interns or runners, or if there not working for free, they are working for nearly free. And that's because film and TV is a glamorous endeavour that people find exciting or romantic or glamorous so there is no shortage of people who can probably who will work for free. In contrast, I've done lots of jobs for kind of very mundane engineering companies and they just would never expect anyone to work for free" (R22, design business)*

The expectation in some parts of the creative industries that workers are 'lucky' to be working in their role facilitates some of the exploitation seen in the sector. Workers that may be expected to work additional hours on projects which is problematic for the largely freelance workforce that may not be in the position to charge extra for this time:

> *"Probably the thing that is universally true in creative industries, to me is that there is a distinct lack of value in the time it takes to do things. So, I very often work what most people regard as ridiculously long hours and it's quite common in, because I've worked in a few design companies over the years it's a quite common expectation because generally everything in the creative industries is based on deadlines and that inevitably means that things need to be rushed towards the end and that means they will always end up working overtime without pay."*
> *(R22, design business)*

Some respondents within the creative industries viewed their creative work primarily as an economic endeavour. As noted in the literature and by respondents, the expectation that some sectors regard unpaid positions as standard practice creates a serious issue. Working for free is a barrier to entry to the industry to those that cannot afford not to get paid:

> *"That's one of the problems that I see in terms of writing, it's, it's largely in terms of published writers, very much dominated by middle class white people because they can afford the hobby almost because very few people who make a living out of being creative. And that brings its own dynamic. You know that it tends to favour people who can afford the luxury. And the question is whether we should entrust our cultural output to people who can afford it rather than the people that are most talented."*
> *(R7, publishing sector business)*

When discussing the economic impact of their industry or business respondents often raised that the value was beyond economic and beyond what could be traditionally valued. Respondents often cited, well-being and mental health benefits from taking part in creative activity or being in creative environments. Respondents also noted important cultural and societal benefits such as providing a boost to Welsh language communities. Additionally, this supports the Welsh Government in reaching their targets related to the Welsh Language Act of reaching a million Welsh speakers by 2050.

> *"It depends what you mean by value as well. Cause, you know, there's plenty of happy places that people value and there's not a lot of income or whatever generated from it, but people do value them."*
> *(R19 music sector expert)*

8.6 Conclusion

The findings of the semi-structured interviews with creative businesses and stakeholders fell broadly into four themes; growth and change, labour market structural issues, critique of creative policy and motivations in the creative sector.

Growth and change in the creative industries were raised repeatedly by respondents echoing the statistics suggesting rapid growth in the past decade. However, growth in this sector is nuanced, with some sub-sectors seeing growth, others change or decline. In the CCR, respondents reported the 'screen sector' and specifically Film and TV production to be a growth area. The Film and TV sector, taken as a whole and with a historical perspective, is more complex. Historically television in Wales was dominated by the large broadcasters in the 1980s and 1990s. Since then, there has been a long-term decline in broadcaster budgets and these budgets remain under threat from government cuts[47]. In recent years with the rise of OTT services and demand for video content, smaller production studios have proliferated. Global trends of digital disruption have reshaped other creative sectors. Publishing is one such example in the CCR. Respondents noted the dramatic fall in print journalism and some cornerstone publishers closing. Yet, with the rise of self-

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[47] The TV license fee model has been continued until 2038. .https://www.bbc.co.uk/news/entertainment-arts-56507215

publishing and online magazines, other areas of the sector are growing. The music sector has equally seen shifting dynamics as revenue streams for bands are disrupted by streaming services and venues impacted by rising rents. The sustainability and distribution of the benefits of the growth seen in the CCR creative industries are other areas of concern. It is unclear how sustainable the growth in the sector is. The recent boom in content demand from overseas streaming services has been a significant driver of demand. Whether this trend will continue is not yet known. Additionally, with the reliance on public funds in the shape of tax credits and the TV license fee, there is certainly room to question the sustainability of the sector's growth.

Labour market and structural issues refer to two phenomena, the rise of freelancers and skills gaps. The growth of freelance employment in the creative sector is evident (Easton & Cauldwell-French, 2017). Respondents noted the shift towards a freelance workforce. Some noted areas where the supply of freelancers was failing to meet demand. The large scale of the screen sector in the CCR has led to the development of an ecosystem of freelancers in non-creative businesses that serve the screen sector. The impacts of potentially precarious employment spreading into other sectors of the economy is an important area for future research. Some respondents were not concerned by the rise of freelance working, noting the benefits of flexible working and a higher pay rate in these contracted roles. Others were concerned but considered freelance work to be better than the alternative with the lack of other more permanent options and the sense that there is enough work to go around[48]. Some interviews contradicted these benefits with one respondent noting that people are often willing to work under poor conditions and low wages because they enjoy the work and the 'glamour' attached to the sector. The examples given from respondents give some local context to the drivers of inequalities in the sector noted in the literature (Oakley et al., 2017).

The issue of skills gaps in the creative industries in the CCR has been noted by a NaFW inquiry into the film sector (NaFW, 2019). Some respondents were concerned about skills gaps and described the facets of the skills gap. Firstly, there is a huge demand for crews that come together and disband quickly. Secondly, the skills gap is often highly specific with undersupplies and oversupplies in workers with skills appropriate for particular occupations and sub-sectors. This skills gap is also 'vertical' with gaps at different levels of expertise. Thirdly, there is the reported issue of a 'talent drain', whereby skilled workers leave the CCR for jobs in London, exacerbating skill shortages. However, some suggest that the talent drain may have started to reverse with

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[48] The impact of COVID-19 on freelancers in the creative industries has been hugely significant. A survey from Creative Cardiff conducted shortly after the lockdown restrictions were imposed in Wales found 60 percent of freelancers had seen that their work had 'dried up completely': https://creativecardiff.org.uk/covid-19-self-employment-income-support-scheme-how-will-it-help-creative-freelancers-wales

workers returning to Wales at different stages of their career. The issue of a skills shortage is implicitly linked to the issue of declining training opportunities. There is a trend of reducing on-the-job training due to the structural changes being seen within the creative industries. Some suggest there is now more emphasis on training being provided by universities. Others indicated that third sector organisations should be supported in addressing the gap in an industry-led approach.

Creative policy in Wales can appear awkward with different legislative bodies and institutions covering the same area. Respondents had not had any involvement with the CCR board and were unclear about the role it played. The Cardiff City Council was regarded as helpful at the local authority level, although impaired by low budgets. Other local authorities in the CCR did not stand out for having a strategy for the creative industries. Respondents noted a lack of support for the valleys and concern that areas outside Cardiff are being overlooked. Some respondents gave examples of where Cardiff has had disproportionate investment and support. Despite this asymmetry, some viewed the disproportionate investment in Cardiff and the Bay to be in the best interests of the CCR as it would attract investment and jobs.

The Welsh Government was regarded as very visible on its policy involvement in the creative industries. There was the general view that the Welsh Government grasps the potential of the creative industries. Respondents saw a key strategy of the Welsh Government was to get productions to locate in Wales. Respondents thought the incentives for productions to locate in Wales are working; however, there is a question about whether incentives are being exploited and local economic gains are in low value-added sectors. There is a question about whether government incentives in this area promote private sector investment (crowding in) or whether they are driving down private investment (crowding out). The Welsh Government was criticised for two main issues. Firstly, for being slow and overly bureaucratic. Secondly, for overvaluing the glamorous projects and not sufficiently valuing smaller businesses in the sector whose value extends beyond purely economic terms. Respondents expressed hope that the newly established body, Creative Wales would address some of the shortfalls in Welsh Government creative policy in recent years.

The interviews have provided a valuable context of the issues facing the creative industries in the CCR. Some issues raised by respondents could helpfully be addressed through the use of I-O and other accounting approaches. A reoccurring theme appeared to be the desire amongst creative businesses to spend money locally. In many cases, creative industries jobs were all that was left, particularly for areas outside Cardiff, and some mentioned the significance for the foundational economy (Bentham et al., 2013) (see Chapter 3). There is some question about the extent to which

the higher value jobs are being conducted in Wales, such as CGI on the productions and how much money stays in Wales with these productions.

Chapter 9.   The 2018 Cardiff Capital Region Input-Output tables with Creative Industries Extension

9.1 Introduction

This chapter presents the *2018 Input-Output table for the Cardiff Capital Region* extended to include an analysis of the creative industries. The first section of this chapter details the challenges faced when constructing an I-O table. The second section details how the tables were regionalized and compiled. The third presents the CCR I-O and details the estimates the economic significance of the creative industries on the CCR economy.

9.2 Constructing the Cardiff Capital Region Creative Table: Key Issues

9.2.1 Secondary Data Collection Issues

This study followed a hybrid method to construct input-output tables, a method with a history of use in Wales and considered a superior methodology to other top-down or bottom-up methods (Harris & Liu, 1998 and Hermannsson, 2016) (more detail in Chapter Five). This hybrid approach relies on gathering secondary data, in this case annual business survey (ABS) data from the Office for National Statistics (ONS). The ABS data would be valuable to the construction of creative industries vectors providing detailed spending data by industrial sector.

Access to the Annual Business Survey, 2008-2017: secure access data was sought (over an extended period) via the UK Data Service (UKDS), although ultimately unsuccessful. There were series of difficulties in accessing the ABS data. Table 9.1 details the timeline of engagement with the ONS and UKDS and the ultimate stalemate whereby data was not accessible within the 3 years relevant to this PhD. It is important to note that the coronavirus pandemic has increased the measures required to access the data. The lockdown restrictions introduced in early 2020 closed the secure data access points (the Secure Lab or University office). Alternative arrangements via home access were supported, however, with new permissions and university devices required. Coronavirus notwithstanding, the process proved impractically long for an independent researcher to access, analyse and present from restricted data in a reasonable timeframe.

Table 9.1 Timeline for ONS ABS data application

Date	Process
24/04/2019	Secure researcher certification required. Training in person in Titchfield, UK only one date per month
26/05/2019	Secure Research Service Training undertaken
20/08/2019	ONS secure access agreement Institutional signature gathered
17/09/2019	UKDS application submitted
05/11/2019	Followed up the UKDS application and notified of delays:
28/04/2020	Notified by the ONS they have received my application. No clarity on reason for interim delays:
22/05/2020	UKDS suggest that the delays must be internal to the ONS:
Summer 2020	A number of Coronavirus restrictions affected various aspects of the sequence • ONS secure lab closed • Cardiff University closed • Cardiff University limited travel rule, unable to access data in the university, unable to travel to access data Home access to data required.
08/07/2020	Homeworking data security conditions require researchers to have an institution provided device. Device requested from Cardiff University
23/09/2020	ONS data access approved.
29/09/2020	Due to the coronavirus restrictions, it is not possible to access ONS data at the university or in the secure lab. A new process has been established for homeworking. ONS homeworking application submitted.
29/09/2020	University unable to provide laptop.
29/09/2020	Table compilation needed to start in order to meet PhD thesis submission deadline, therefore ABS data no longer pursuable.
Hypothetical future date	Long delays advised on research output clearances from the ONS and the UKDS

9.2.2 Alternative Approach to Secondary Data Collection

Without access to the ABS data, the creative industries sub-sector spending proportions rely on the best-fit production functions available from published sources. Production functions for each sub-sector are derived from the four-digit SIC that is the closest fit to the creative industries sub-sector

published in the UK Supply and Use tables (ONS, 2020)[49]. For some creative sub-sectors, this fit is closer than others. Table 9.2 shows the closeness of fit between the DCMS defined: Museums, Galleries and libraries is defined and its 'parent sector'.

Table 9.2 DCMS defined Museums, Galleries and Libraries vs UK supply and use 'parent sector'

DCMS defined sub-sector: Museums, Galleries and Libraries

Four-digit SICs

9101: Library and archive activities

9102: Museum activities

The closest fit 'parent' sector in the UK SUT Table is:

91: Libraries, Archives, Museums And Other Cultural Activities

Which contains the four-digit SICs

9101: Library and archive activities

9102: Museum activities

9103: Operation of historical sites and buildings and similar visitor attractions

9104: Botanical and zoological gardens and nature reserve activities

In the Museums, Galleries and Libraries example there is a large crossover in the DCMS defined sub-sector and the data published in the UK SUT table. Other creative sub-sectors do not fit as closely with their 'parent' sector. Table 9.3 shows Craft and the corresponding parent sector, Other Manufacturing. It is apparent that Other Manufacturing covers a much broader group of industries than the relatively minor area represented by the SIC, 3212: Manufacture of jewellery and related articles.

Table 9.3 DCMS defined Craft vs UK supply and use 'Other Manufacturing'

DCMS Creative Sub Sector: Craft

SICs:

3212: Manufacture of jewellery and related articles

'Parent' sector in the UK SUT Table: Other Manufacturing

SICs:

3211: Striking of coins

3212: Manufacture of jewellery and related articles

3213: Manufacture of imitation jewellery and related articles

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[49] The reconciliation between creative industries sub-sectors and the designated 'parent sector' are given in appendix 3.

3220: Manufacture of musical instruments

3230: Manufacture of sports goods

3240: Manufacture of games and toys

3250: Manufacture of medical and dental instruments and supplies

3291: Manufacture of brooms and brushes

3299: Other manufacturing n.e.c.

It is clear that access to non-published expenditure data that the ABS would allow for a more tailored creative industries spending vector and subsequently a more accurate table. In some other UK areas additional data would be available to plug this gap: Scotland and Northern Ireland benefit from routinely published national input-output tables. At a city-region level, Birmingham and the West Midlands are covered by a data observatory, City-region Regional Economic Development Institute (City-REDI)[50], which publishes regular reports on the state of the city-region economy.

Data was additionally sought from third sector organisations and Government sources, including local Government and Creative Wales. However, no data was provided by these sources.

9.2.3 Primary Data Collection Issues

The other component of the hybrid methodology is the gathering of primary data through interviews and online surveys. The complete method, including a breakdown of those reached, is covered in chapter seven. This section details some of the challenges that faced primary data collection.

The online survey sought to reveal the economic characteristics of creative industries sub-sectors in the CCR. Creative businesses were identified by their SIC code being consistent with those defined by the DCMS (Appendix 1). The SIC codes provided by these businesses were not always an accurate representation of the activity conducted by the business. The issues surrounding definitions of creative employment and activity reflected those discussed in section 6.3. The initial survey targeted creative businesses in the 'Cardiff Capital Region'. Feedback from some participants revealed that the 'Cardiff Capital Region' was not a well understood geographic area, with some participants located outside of Cardiff but within the city-region not recognising that they were within the 'Cardiff Capital Region'. Therefore, the survey was renamed the 'South East Wales Creative Survey' with marketing displaying the local authorities within the city-region.

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[50] City-REDI and WM-REDI are based at the University of Birmingham
https://www.birmingham.ac.uk/news/latest/2018/11/launch-of-the-midlands-engine-economic-observatory.aspx

Primary survey work is understood to be time and resource-intensive for researchers Riddington et al. (2006). An issue faced when carrying out the survey is that it can be time-intensive for businesses to collate the numbers required. Despite the initial positive contact with a business, in many cases, either time or difficulty gaining internal permission lead to insufficient data being provided. An additional issue for businesses of all sizes were defining spending into categories. The survey (Appendix 2) necessitates categorising business spending into first the 'top 10' costs for the business and separately disaggregating creative industries sub-sectors spending. Furthermore, businesses must report the cost and geography of spending. Table 9.4 presents an example of the business spending question, the survey question which requires the most time to complete and was most often left incomplete in the surveys sent. In this example, a business has reported that the business has spent £10,000 on transport. The spend on transport included £3,000 on taxis in the CCR, £1,000 on local taxi services in other parts of Wales and £6,000 on flights from Bristol Airport.

Table 9.4 Business spending survey question

	Expenditure (£)	% purchased within the CCR	% purchased in Wales but, outside the CCR	% purchased outside Wales
Transport	£10,000	30%	10%	60%
Cost item …				

The information required to complete a full spending survey is likely present within a business's accounts; however, the geography of spend at sub-regional detail is less often available. When businesses are asked to consider their spend on creative industries activity this requires detailed information on the spend category and destination which is highly particular. Below are three quotes taken from incomplete surveys highlighting the issues for businesses:

> *"Wish I could be more helpful but I just can't justify the time it would take" – survey respondent*

> *"Again, this isn't a realistic ask of a small business: it's a day or more of someone's time. Sorry" – survey respondent*

> *"It would take a very long time to calculate this and a lot of the allocations would be arbitrary" – survey respondent*

The financial data requested from creative businesses is potentially sensitive and requires authorisation from senior figures within the business. Successfully gaining access to this data presents two issues; firstly, the gatekeeper to the data required must be identified. Secondly, the

gatekeeper will need convincing that the data will be handled carefully and in accordance with data protection. The complexity of the ask contributes to the high drop-out rate on surveys.

Interviews conducted with creative businesses had a dual purpose; firstly, to provide a narrative account of the issues facing the creative industries in the CCR. Secondly, to gather the spending data sought by the online survey (more detail in chapter 7). Under interview conditions collecting business spending data was far more successful, with a much higher likelihood of gathering complete and detailed responses. Interviewees, when unsure of precise numbers, were willing to provide approximations. Additionally, the interviewees highlighted nuances and detail that would not be possible to gather via an online survey. A considerable proportion of those approached for interviews were freelancers and micro-businesses, which posed different challenges. Firstly, some smaller creative businesses did not keep formal accounts and did not know their spending figures. Secondly, in some cases, freelancers did not see themselves as operating a business, with money moving between other non-creative work to support their part-time creative work. The tension between economic endeavour and cultural creation has been noted in the interview findings (section 8.5). This issue is well reflected in the literature; Kubacki & Croft (2005) note the tension with some musicians viewing 'business and art are mutually incompatible'. Eikhof & Haunschild (2007) refer to this tension as a 'central paradox in creative production'.

Table 9.5 details the creative sub-sector coverage of the primary data gathered. A sub-sector would be considered to have good coverage where the survey responses gathered to cover a representative cross-section of the businesses in the sub-sector in the CCR.

Table 9.5 Primary survey data Sub-sector coverage

Creative sub-sector	Detail	Data Coverage
Architecture	2 Architecture businesses completed the survey. Architecture includes just one SIC code and therefore, requires fewer businesses to provide an acceptable sample of the sector.	Moderate
Craft	4 Craft businesses completed the survey. The businesses included a good cross-section of the Craft sector. The majority of businesses in the sector are micro-businesses and there is only one SIC code that represents Craft. Therefore, four businesses of similar size and composition represents good coverage.	Good
Design: product, graphic and fashion design	3 businesses in this sub-sector completed the survey. This sector is represented by 1 SIC code and would therefore, require fewer businesses to provide sufficient sampling. However, the surveys in this sector were all	Poor

	from small and micro businesses and lacked any coverage of the medium and large businesses present in the sub-sector.	
Publishing	1 business in this sub-sector completed the survey. This is inadequate to provide a good representation of business spending within the sub-sector.	Poor
Film, TV, video, radio and photography	2 businesses in this sub-sector completed the survey. This sub-sector represents 6 SIC codes and is therefore, too diverse to be even partially represented by these responses.	Poor
Advertising and marketing	2 businesses in this sub-sector completed the survey. The survey responses all covered the same SIC code. There are three SIC codes in this diverse sub-sector.	Poor
Music, performing and visual arts	2 businesses in this sub-sector completed the survey. The businesses were both micro businesses and therefore, do provide a good cross-section of the diverse sector.	Poor
Museums, galleries and libraries	1 business in this sub-sector completed the survey. This is inadequate to provide a good representation of business spending within the sub-sector.	Poor
IT, software and computer services	1 business in this sub-sector completed the survey. This is inadequate to provide a good representation of business spending within the sub-sector.	Poor

As is demonstrated by Table 9.5 the data coverage provided by the surveys and interviews were largely inadequate to inform a hybrid input-output table. The difficulty gathering completed responses by a broad enough cross-section of creative businesses led to the survey data gathered being of limited used to support, rather than inform the table construction.

The secondary data access issues and the limited primary data gathered has important consequences for the construction of the I-O tables. The hybrid approach proposed detailed in section 5.4.5.2 is dependent on high-quality primary and secondary data. The approach used in constructing the I-O tables instead relied on published I-O tables at the UK level to satisfy gaps in the data in a more 'top-down' approach. The change in approach will impact the reliability of the numbers produced by the tables, with more assumptions being made on the creative industries production functions.

9.3 Constructing the Cardiff Capital Region Input-Output Table for 2018

The CCR table was built by regionalising the Wales 2018 table developed at Cardiff Business School and combining it with information from secondary sources and limited survey data. This section will detail the process followed to construct the CCR I-O table. Table 9.6 shows the basic

outline of the Extended CCR I-O table. Each cell is colour coded with each colour corresponding to the data source detailed in Table 9.7. A more detailed schematic is given in Appendix 6.

Table 9.6 CCR creative industries input-output table schematic

	Industry	Industry	Creative sub-sectors	Total intermediate demand		Final Consumption Expenditure	Government	Exports
Industry	🟧	🟧	🟩			🟧	🟧	🟦
Industry	🟧	🟧	🟩			🟧	🟧	🟦
Creative sub-sectors	🟩	🟩	🟩			🟧	🟪	🟦
Total domestic purchases								
Imports	🟧	🟧	🟦			🟪		
Taxes on products	🟧	🟧	🟩			🟧	🟧	🟧
Taxes less subsidies	🟧	🟧	🟩			🟧	🟧	🟧
Gross operating surplus	🟧	🟧	🟩					
Compensation of employees	🟧	🟧	🟩					
GVA at basic prices			🟥					
Output at basic prices								

Table 9.7 Data sources for the construction of the CCR I-O table 2018

Purpose	Key	Data Source
Base table for the CCR I-O table		Input-output tables for Wales 2018 (Cardiff Business School) regionalised with FLQs
FTE Employment by industrial sector	N/A	(Nomis, 2020) Business Register and Employment Survey (BRES)
Government spending in the creative industries		Secondary data provides estimates of government spending into creative industries. (more in section 9.3.4)
Creative industries imports direct to consumers		Secondary data provides estimates of creative industries imports from outside the CCR to direct consumption by households
Creative industries inter-industry vectors		(ONS, 2020) UK SUT tables
GVA proportions within subsectors of Wales for 2015		(ONS, 2017c) Constrained regional gross value added (GVA) estimates for Department for Culture, Media and Sport (DCMS) Creative Industries sub-sectors
Creative Industries GVA total for Wales in for 2018		(DCMS, 2020) DCMS Economic Estimates: Regional GVA sectors Tables – Current Prices
Creative Industries Imports and Export Demand		(DCMS, 2020a) DCMS Sectors Economic Estimates 2018: Trade in Services (£m))
Export share Rest of Wales, Rest of UK		Primary survey detailed in Chapter 7: *"Methods"*

Colour coding linking data sources with CCR I-O schematic

The best-case CCR I-O table with creative satellite account disaggregated to show the screen sector (proposed in chapter seven) was not feasible with the data available detailed in section 9.2 of this chapter. The lack of primary and secondary data (in part due to the pandemic) meant that producing production functions for highly disaggregated creative sub-sectors was impossible. The tables constructed use the 9 DCMS defined creative sub-sectors rather than the greater screen sector disaggregation proposed in chapter 7. The revised table includes an aggregated sector of the Welsh economy, "non-creative aggregated" (detailed in appendix 4), the non-creative 'parent sectors' (detailed in appendix 3) and the creative industries sub-sectors as defined by the DCMS presented in Table 9.8.

Table 9.8: Creative industries sector disaggregation: Cardiff Capital Region extended I-O table 2018

	Supply of Creative Industries Products (basic prices)
Non-creative sectors	All other sectors
	Public Admin
	Education
'Parent' sectors of creative industries	Other Manufacturing
	Publishing
	Computer and related activities
	Other professional services
	Market research, advertising
	Other recreation, media & film
Creative industries sub-sectors	Craft
	Publishing
	Film, TV, video, radio and photography
	IT, software and computer services
	Architecture
	Advertising and marketing
	Design: product, graphic and fashion design
	Music, performing and visual arts
	Museums, libraries and galleries

9.3.1 Regionalizing the Input-output tables for Wales

Figure 9.1 shows an overview of the process of regionalisation for the CCR I-O. The Wales SUT for 2018 is regionalised to the CCR by using a series of location quotients (LQs) following the methodology from (Hermannsson, 2016). More detail on location quotients and regionalisation techniques is covered in Chapter 5. Employment data gathered from Business Register and Employment Survey is used to calculate a simple employment location quotient (SLQ):

$$SLQ_i^r = \left(\frac{E_i^r/E^r}{E_i^n/E^n} \right)$$

The simple location quotient measures the relative concentration of an industry in the CCR, the numerator of the equation in comparison to the concentration of that industry in Wales. The SLQ assumes that industries with an LQ greater than 1 can satisfy regional demand for their output. The SLQs are then adapted to form Flegg FLQs to add in the extra element of relative sector size of the buying sector and the relative size of the region Flegg et al. (2016). FLQs allows for the adjustment down of national coefficients for larger regions following the assumption that larger regions import

less than smaller regions. The regional input coefficients are then calculated based on the value of the FLQ. An FLQ less than 1 requires that the national coefficient is adjusted by the FLQ. If the FLQ is greater than 1 the national coefficient is applied to the region. The notation for this is presented in Miller & Blair (p355, 2009):

$$a_{ij}^{rr} = \begin{cases} (FLQ_{ij}^r)a_{ij}^n & \text{if } FLQ_{ij}^r < 1 \\ a_{ij}^n & \text{if } FLQ_{ij}^r \geq 1 \end{cases}$$

The regional input coefficients are then multiplied by industry outputs to obtain interregional intermediate transactions matrices. The following sections detail how the various components of supply and demand are derived in the CCR account.

Figure 9.1 Cardiff City Region Extended I-O, Regionalisation approach.
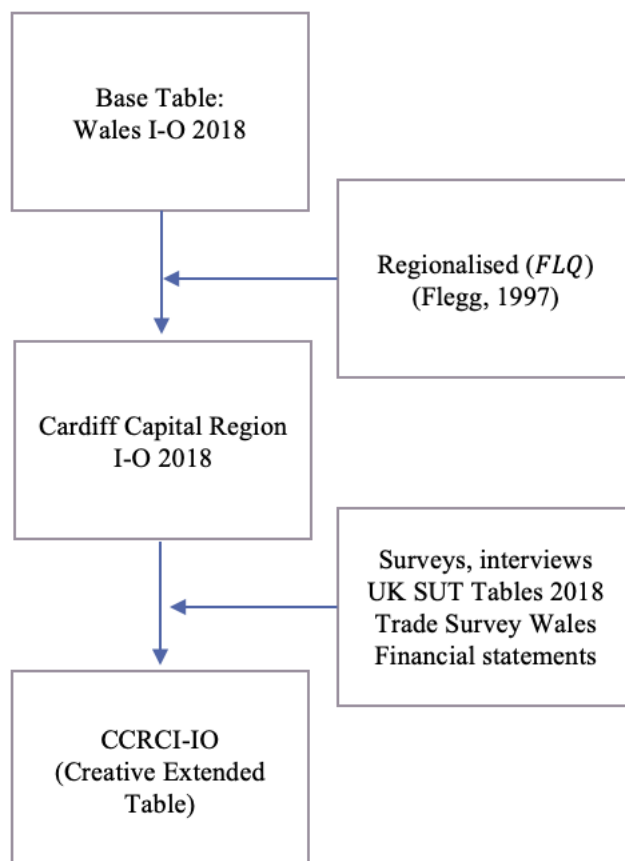
9.3.1.1   Alternative Regionalisation Approaches: Sensitivity of the Multipliers

Sensitivity analysis is conducted to assess the model's robustness to changes in the model's parameters. The accuracy of the various techniques used to regionalise input-output tables are an area of active debate (Lahr et al., 2020 and Flegg et al., 2021). A consideration for the FLQ

167

approach used in this study is assigning an appropriate value for the δ parameter. Altering δ changes the allowance for inter-regional imports with a higher δ supposing greater imports. A criticism of the FLQ approach is the difficulty in knowing the δ parameter makes FLQs 'impractical' (Lahr et al., 2020, p. 1591). A key study on the determining the appropriate value for δ suggests 0.3 to be reasonable (Flegg & Webber, 1997). Since this study several empirical studies have been conducted across different countries and suggest a range of values 0.3±0.1 (Flegg & Tohmo, 2013; Kowalewski, 2015 and Flegg & Tohmo, 2019). Flegg et al., (2021) note that the suitable value for δ remains an open question. Given the uncertainty it is worthwhile to conduct some sensitivity analysis.

Table 9.9 Sensitivity of Multipliers to alternative regionalisation approaches.

	CILQ		FLQ ($\delta = 0.2$)		Q ($\delta = 0.3$)		FLQ ($\delta = 0.4$)	
	Type-I	Type-II	Type-I	Type-II	Type-I	Type-II	Type-I	Type-II
1 All other sectors	1.38	1.78	1.32	1.69	1.30	1.66	1.29	1.62
2 Public Admin	1.14	1.65	1.12	1.61	1.12	1.59	1.11	1.57
3 Education	1.19	1.97	1.17	1.89	1.16	1.87	1.15	1.84
4 Other manufacturing	1.35	1.59	1.32	1.53	1.30	1.50	1.28	1.48
5 Publishing (remainder)	1.26	1.74	1.20	1.63	1.18	1.61	1.17	1.58
6 Telecomms	1.23	1.65	1.19	1.58	1.18	1.55	1.17	1.53
7 Computer and related activities	1.31	2.06	1.25	1.93	1.23	1.90	1.21	1.87
8 Other professional Services	1.36	2.22	1.33	2.12	1.31	2.09	1.29	2.05
9 Market research, advertising	1.13	1.49	1.12	1.46	1.11	1.45	1.11	1.43
10 Other Recreation, media & film	1.35	1.88	1.29	1.76	1.27	1.73	1.25	1.69
11 Museums & Galleries	1.06	1.76	1.06	1.72	1.05	1.70	1.05	1.69
12 Craft	1.58	2.56	1.56	2.49	1.56	2.46	1.55	2.43
13 Publishing	1.54	2.40	1.52	2.34	1.52	2.32	1.51	2.30
14 Film, TV, video, radio and photography	1.40	1.94	1.39	1.90	1.39	1.89	1.39	1.87
15 IT, software and computer services	1.49	2.52	1.47	2.45	1.47	2.43	1.47	2.41
16 Architecture	1.57	2.92	1.56	2.84	1.56	2.81	1.56	2.78
17 Advertising and marketing	1.50	2.28	1.49	2.22	1.49	2.20	1.48	2.19
18 Design: product, graphic and fashion design	1.58	2.83	1.57	2.75	1.57	2.73	1.57	2.70
19 Music, performing and visual arts	1.56	2.32	1.55	2.27	1.55	2.25	1.54	2.23
20 Museums, galleries and libraries	1.55	2.70	1.53	2.62	1.53	2.59	1.52	2.57

The CCR I-O table is estimated using CILQ and FLQ with a range of values for δ (δ=0.2, 0.3 & 0.4). The resulting impact on the Type-I and Type-II multipliers shown in Table 9.9. Considering the sector 1 'All other sectors' we can see the variation in Type-I multipliers is significant between the CILQ and FLQ approaches. There is a significant change between CILQ and FLQ and a more modest change as δ is adjusted. For sector 1 we can see the Type-I multiplier is 1.38 for the CILQ approach, dropping significantly to 1.29 for the FLQ with the lowest value for δ (0.2). As the δ rises less inputs are sources locally and the multiplier falls 1.30 at δ=0.3 and 1.32 δ=0.4. For smaller regions there is a tendency for greater sensitivity to the δ value to reflect the higher import propensity of smaller regions (Hermansson, 2016).

For this study, an FLQ approach with a δ value of 0.3 has been used. The FLQ approach contains more realistic assumptions for the regionalisation of national tables allowing for the extra element of relative sector size of the buying sector and the relative size of the region (Flegg et al., 2016). A δ value of 0.3 is considered a reasonable value (Flegg & Webber, 1997) and the sensitivity analysis reflects that changes to the δ parameter do not significantly change the multipliers calculated.

9.3.2 Industry Demand for Creative and Non-creative Products in the Cardiff Capital Region

The industry demand in the Wales I-O table for 2018 consists of 88 sectors. These sectors have been shaped organically to meet the needs of projects within Cardiff Business School. This can be seen in the divergence between the Wales 88 sectors and the UK SUT sectors. In the Wales 88 sectors include greater disaggregation of electricity and tourism sectors[51]. The Wales 88 sectors require reconciliation with the published figures within the UK SUT tables (ONS, 2020) and the Business Register and Employment Survey (Nomis, 2020). The CCR I-O table seeks to provide accurate information on the creative industries with less focus on the non-creative industries sectors. Therefore, the table presented in this chapter features considerable aggregation from the Wales 88 to 20 sectors (in appendix 4)[52]. The aggregated sectors were not the focus of this study and those that were left disaggregated were public administration, education and the 'parent' sectors of the creative industries.

The nine DCMS defined creative industries were represented by using the 2007 four-digit SIC codes (in Appendix 1) that are used in the UK Supply and Use tables for 2018 (ONS, 2020). The UK supply and use table was used to construct creative industries sub-sector vectors for inter-industry spending, imports, and some elements of final demand.

To estimate the size of the creative industries in the CCR, published GVA figures for Wales by creative industry sub-sector were used[53]. No published figures show GVA by creative sub-sector for the CCR for 2018; therefore, available data was tailored to provide estimates. DCMS (2020)

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[51] Electricity in the Wales 88 sectors is disaggregated to reveal: 'Coal', 'Gas', 'Nuclear', 'Hydro', 'Other Renewables' and 'Transmission, Distribution & Supply'. Tourism is disaggregated to include: 'Large Hotels', 'Small Hotels', 'B&B and Guest House'.

[52] Two other Cardiff Capital Region tables have been constructed, one complete for the Wales 88 sectors and a second complete for the 88 sectors extended to include the nine DCMS creative industries sub-sectors.

[53] An alternative approach to estimate the size of the creative industries would be to use FTE employment estimates. However, as detailed in chapter 3 and 6 employment estimates in the creative industries can be less accurate than in other traditional sectors.

figures provide a figure for total creative industries GVA in Wales for 2018 of £1.02bn. The Wales figure does not show the sub-sectoral breakdown. To gather the sub-sectoral figure (ONS, 2017b) figures provide a sub-sectoral breakdown of creative industries GVA for Wales in 2015. Using these two datasets we estimate the sub-sectoral breakdown of creative industries GVA for Wales in 2018. To estimate the proportion of the £1.02bn Wales GVA that corresponds to the CCR, the GVA calculated for each sub sector is multiplied by the proportion of sub-sector FTE in the CCR[54]. Table 9.10 displays the result of these calculations, GVA for each of the nine DCMS creative sub-sectors for the CCR for 2018.

Table 9.10 GVA by creative sub-sector Cardiff Capital Region 2018[55]

Creative Sub Sector	GVA (£ millions)
Craft	2.4
Publishing	21.9
Film, TV, video, radio and photography	104.1
IT, software and computing services	281.1
Architecture	42.3
Advertising and marketing	21.9
Design: product, graphic and fashion design	90.0
Music, performing and visual arts	81.8
Museums, galleries and libraries	14.0
Total	659.5

9.3.3 Imports and Consumer Demand

Imports are an important consideration for a sub-regional table with a much greater level of trade than at a regional or national level. Imports are split into three groups: imports from the rest of wales (RWales), from the rest of the UK (RUK) and the rest of the world (RoW). For non-creative sectors, RUK and RoW import figures were taken from an a matrix of the Wales 2018 table whereby imports are divided by total output to give the share imports make of total output. For the CCR, imports from the rest of Wales must be calculated. Where CCR demand is greater than the

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[54] In the Architecture sub-sector, it is calculated that there is £67.7m in GVA in Wales. The CCR makes up 63 per cent of Wales FTE in the sub-sector. Therefore, Architecture in the CCR makes up an estimated £42.3m of GVA.

[55] The GVA figure here does not include taxes on products at £64 million

CCR supply modelled using FLQs the import propensity is adjusted to gather more supply from RWales.

Table 9.11 Deriving creative import for the CCR creative industries input-output table 2018

	Imports from RWales	Imports from RUK	Imports from RoW
Non-creative sectors	Where CCR demand is greater than supply imports are taken from RWales.	Scaled using an matrix of the Wales 2018	Scaled using an matrix of the Wales 2018
Creative sectors	Interview and survey data (Appendix 2) provided proportions of creative sub-sectors spending from within the CCR, RWales and outside Wales. The proportion for Rwales was multiplied by the RoW import figure.	Interview and survey data (Appendix 2) provided proportions of creative sub-sectors spending from within the CCR, RWales and outside Wales. The proportion for outside was split between RoW and RUK using import totals from the Wales I-O table for 2018	(DCMS, 2020a) figures provided creative industries sub-sector import estimates to Wales. These were scaled using FTE figures by sub-sector.

Imports data for the creative disaggregated sectors used DCMS trade figures for creative sub-sectors in Wales (DCMS, 2020a). Imports to Wales were scaled to the CCR by dividing by the FTE share to give a CCR row import figures by each sub-sector. The survey and interview data gathered for this study were used to determine a CCR, RWales and outside Wales proportion for each sub-sector[56]. Creative intermediate totals were then used to multiply up to imports. Imports from outside Wales were split between RUK and RoW by the proportions given by the Wales I-O table import totals. Import figures are shown in Table 9.12.

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[56] Data was available for advertising & marketing, craft, architecture and Film & TV an average was used for the remaining creative-subsectors

Table 9.12 Imports, Wales and the CCR 2018

Imports (£ billions)	Wales	CCR
Imports Rest of the UK	33.8	17.0
Imports Rest of the World	12.0	5.2
Imports Rest of Wales	N/A	21.1

Imports to consumers relate to spending from consumers purchased within the CCR but imported from elsewhere. A significant component of this is over-the-top (OTT) subscriptions such as; Netflix, Amazon Prime and Now TV.

9.3.4 Exports and Final Demand Estimates

In the CCR I-O tables, final demand consists of Consumer Demand, Demand for products for investment purchases (also called capital expenditure) in the table represented by Gross Fixed Capital Formation (GFCF) and Stock 2000. Demand for products from the government (central and local) and Export (RWales, RUK and RoW) demand.

The demand for capital expenditure from the non-creative sectors is calculated using the same process used to calculate industry demand by using the scaling the Wales I-O table for 2018 to the CCR by using the FLQs. Demand from the creative industries sectors for capital expenditure was calculated using scaled estimates from the UK SUT tables (ONS, 2020).

Government demand for the non-creative sectors is handled using the same technique as for capital expenditure; by scaling the Wales 2018 table to the CCR using FLQs. For the creative sectors, however, it is important to provide a CCR specific figure as the level of Government funding can vary significantly across regions. The impact of this funding will be of particular relevance for non-market sectors such as; Museums, Galleries and Libraries which receive a much higher proportion of their income from the government than market sectors such as Advertising and Marketing. Table 9.13 details the secondary sources used and the figures attributed.

Table 9.13 Central and Local Government funding in the CCR by creative sub-sectors, 2018

Creative Sub Sector	Description
Museums, galleries and libraries	National Wales library funding £6.1m (The National Library of Wales, 2020)
	Museum Wales public subsidy £10.5m (National Museum Wales. 2018)
	Figures scaled to the Cardiff Capital Region using secondary sources
Publishing	Books Council Wales public grant £1.2m
Film, TV, video, radio and photography	Media Investment Budget £1.5m (scaled)
	Wales Screen Fund £9m over 5 years
	Clwstwr funding £1m over 2 years
Music, performing and visual arts	Arts Council for Wales £15m
	National Theatre Wales grant £0.3m (The National Theatre of Wales. 2018)
Craft, Advertising & Marketing, Architecture, IT and Software	SUT values used no secondary sources

Exports demand, like import demand, is split into three destinations: exports from the CCR to the rest of the world (RoW), to the rest of the UK (RUK) and the rest of Wales (RWales).

Export estimates for 2018 provide a Cardiff city-region to RoW export total figure of £3.9bn (DCMS, 2020a) and an EU (excluding the UK) figure of £1.6bn. The Trade Survey for Wales: 2018 (Welsh Government, 2020) finds that the Wales whole economy RoW export figure represents 8 per cent of Wales exports and that the RUK figure is 30 per cent of all exports. The Trade Survey for Wales 2018 suggests 50 per cent of sales occur within Wales, calculating by population CCR vs RWales, which gives the Rest of Wales export figure (detail in Table 9.14).

Table 9.14 Cardiff Capital Region exports 2018

	Exports £m
RoW exports	3,928
EU (excluding UK) exports	1,645
Rest of UK exports	14,730
Rest of Wales exports	12,275

The headline figures are then attributed across the non-creative sectors using the proportions given in the Wales 2018 table and the creative sectors using proportions calculated from the UK SUT tables. The CCR IO table was balanced with differences taken out of the imports. It is expected that the CCR will have different import proportions to Wales as is assumed in the FLQ.

9.4 The Creative Economy in the Cardiff Capital Region in 2018

The previous sections have explained the issues faced during the construction of the CCR I-O table and the method to construct the table. This section uses the input-output tables compiled to describe the Cardiff Capital Region Economy.

Table 9.15 presents a summary of the CCR economy with the economy aggregated into 20 sectors. Table 9.15 is split into four quadrants. Quadrant 1 (top left) shows the inter-industry transactions. Quadrant 2 (top right) shows final demand. Quadrant 3 (bottom left) shows imports, taxes and value-added. Quadrant 4 (bottom right) shows inputs to direct consumption. For example, in Quadrant 1 the column labelled 'Architecture', we can see Architecture bought £9.8m of output from 'Other professional services'. Meanwhile in the row labelled '6 Telecoms' we can see Telecoms sells £8.3m to 'IT, software and computer services'. Additionally, 'Music, performing and visual arts' sell £74m directly to consumers. A more detailed guide on how to read an I-O table can be found in chapter five.

9.4.1 Presenting the Cardiff Capital Region Input-Output Table 2018

Table 9.15 industry by industry table, Cardiff Capital Region 2018 (£ millions)

Input of Industry (columns 1–20) / **Final use**

Column key:
1 All other sectors · 2 Public Admin · 3 Education · 4 Other manufacturing · 5 Publishing (remainder) · 6 Telecomms · 7 Computer and related activities · 8 Other professional Services · 9 Market research, advertising · 10 Other Recreation, media & film · 11 Museums & Galleries (remainder) · 12 *Craft* · 13 *Publishing* · 14 *Film, TV, video, radio and photography* · 15 *IT, software and computer services* · 16 *Architecture* · 17 *Advertising and marketing* · 18 *Design: product, graphic and fashion* · 19 *Music, performing and visual arts* · 20 *Museums, galleries and libraries*

Industry	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total Intermediate use	Consumers	NPISH	Government	Total	Stock2000	GFCF	Total	ROW exports	EU (excluding UK) exports	rest of UK exports	Rest of Wales exports	Total	Total final use	Total use for industry output
1 All other sectors	12931.8	652.8	204.4	237.2	33.8	106.0	51.9	109.2	14.5	30.0	0.9	1.7	6.2	12.0	76.5	7.4	6.9	14.6	16.2	5.8	**14519.7**	13586.5	459.1	7206.3	**21252.0**	-538.3	1518.5	**980.2**	3332.1	1303.7	12694.9	10343.3	**27674.0**	**49906.2**	64425.9
2 Public Admin	100.3	9.7	0.3	1.2	0.0	0.0	0.0	5.8	0.0	0.0	0.3	0.0	0.0	0.0	0.1	2.7	0.0	0.0	0.1	0.0	**120.6**	190.5	0.0	9074.0	**9264.5**	0.0	0.0	**0.0**	0.0	0.0	244.6	293.5	**538.1**	**9802.5**	9923.1
3 Education	113.0	81.7	86.8	0.9	0.1	4.1	1.8	5.7	0.5	1.1	0.0	0.0	0.0	0.0	2.8	0.1	0.3	0.7	0.0	0.0	**299.6**	263.1	405.3	1442.0	**2110.4**	-0.6	0.0	**-0.6**	0.1	0.1	296.4	355.7	**652.3**	**2762.2**	3061.8
4 Other manufacturing	22.1	1.2	1.0	2.6	0.2	0.4	0.1	0.2	0.0	0.2	0.0	0.1	0.0	0.7	0.2	0.0	0.1	0.2	0.8	0.1	**30.0**	55.3	0.0	0.0	**55.3**	4.0	1.9	**5.9**	48.2	20.2	942.5	785.4	**1796.3**	**1857.5**	1887.5
5 Publishing (remainder)	247.8	39.3	24.6	3.0	11.5	2.6	1.1	10.9	0.7	0.1	0.1	0.0	4.5	0.0	2.4	0.0	0.0	0.0	0.1	0.5	**349.2**	1.2	0.0	0.0	**1.2**	0.0	0.0	**0.0**	9.7	4.0	2.9	2.4	**19.0**	**19.0**	369.5
6 Telecomms	207.5	18.5	5.9	2.7	1.0	29.3	1.3	3.5	0.8	1.2	0.0	0.0	0.4	0.4	8.3	0.3	0.5	1.3	1.0	0.1	**284.0**	286.2	0.0	0.0	**286.2**	1.1	2.4	**3.5**	169.7	71.0	102.2	122.6	**465.4**	**755.1**	1039.1
7 Computer and related activities	268.6	50.5	33.5	1.5	0.5	10.7	3.1	11.7	0.5	2.7	0.0	0.0	0.5	0.5	58.4	0.6	0.4	1.0	0.9	0.3	**446.1**	0.4	0.0	0.0	**0.4**	0.0	0.0	**0.0**	9.4	3.9	8.3	6.9	**28.5**	**28.9**	475.0
8 Other professional Services	283.5	13.0	2.4	3.5	0.3	2.4	6.3	26.0	1.0	1.8	0.1	0.1	0.5	1.5	9.8	9.8	3.7	18.7	3.5	0.2	**379.1**	22.6	0.0	0.0	**22.6**	-1.6	55.8	**54.1**			241.0	200.8	**457.3**	**534.1**	913.2
9 Market research, advertising	135.7	19.2	3.4	1.4	1.1	1.9	2.3	2.5	3.0	12.0	0.1	0.1	1.3	5.0	14.4	0.5	1.2	3.1	2.4	0.7	**211.2**	0.1	0.3	0.0	**0.4**	-0.3	0.0	**-0.3**	13.5	5.6	38.9	32.4	**90.5**	**90.6**	301.8
10 Other Recreation, media & film	113.8	31.2	10.8	0.7	10.3	5.1	2.6	1.4	6.4	49.3	0.2	0.0	0.2	16.5	0.0	0.0	0.3	0.0	12.8	0.7	**262.2**	25.8	18.5	50.7	**95.0**	0.1	3.5	**3.6**	44.4	18.6	0.0	0.0	**63.0**	**161.5**	423.7
11 Museums & Galleries (remainder)	2.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.3	**4.0**	4.2	0.0	18.6	**22.8**	0.0	0.0	**0.2**	0.1	0.0	0.3	0.3	**0.7**	**23.7**	27.6
12 *Craft*	119.1	0.8	2.2	17.7	0.1	0.2	0.1	0.3	0.1	1.6	0.0	0.2	0.0	1.9	0.3	0.0	0.1	0.4	1.7	0.1	**147.1**	304.5	0.0	0.0	**304.5**	0.0	5.9	**5.9**	11.2	13.3	6.3	5.3	**36.0**	**346.5**	493.6
13 *Publishing*	22.8	4.5	5.4	0.7	7.4	0.0	1.0	0.0	0.0	0.0	0.0	0.0	4.6	0.0	4.0	0.0	0.0	0.0	0.1	0.2	**50.8**	165.5	0.0	1.2	**166.7**	0.0	0.0	**0.0**	0.2	0.2	0.5	0.4	**1.3**	**168.0**	218.8
14 *Film, TV, video, radio and photography*	4.8	3.6	1.3	0.0	0.0	0.0	0.0	0.0	0.0	29.5	0.1	0.0	0.0	43.8	0.0	0.0	0.0	0.0	4.7	0.5	**88.9**	169.5	0.0	4.4	**173.9**	0.0	0.0	**0.0**	7.8	6.4	2.6	2.2	**19.0**	**192.9**	281.8
15 *IT, software and computer services*	339.0	28.4	8.9	2.9	1.6	18.4	25.2	4.8	1.7	2.1	0.1	0.0	0.9	1.5	100.3	1.2	0.7	2.2	2.0	0.5	**542.4**	2.2	0.0	0.0	**2.2**	0.0	0.0	**0.0**	246.6	148.6	6.0	5.0	**406.2**	**408.4**	950.7
16 *Architecture*	267.8	14.2	1.8	0.8	0.0	0.1	0.0	58.3	0.4	0.6	0.0	0.0	0.0	0.5	0.1	19.3	0.0	1.5	1.1	0.1	**366.6**	8.3	0.0	0.0	**8.3**	0.0	0.0	**0.0**	4.1	11.8	35.3	29.4	**80.7**	**89.0**	455.6
17 *Advertising and marketing*	112.1	1.6	1.0	5.9	0.4	0.8	0.2	0.5	0.1	0.3	0.1	0.1	1.7	12.8	11.5	0.3	1.2	5.3	4.5	0.5	**161.0**	1.6	0.0	0.0	**1.6**	0.0	0.0	**0.0**	0.0	0.0	27.4	22.8	**50.2**	**51.8**	212.8
18 *Design: product, graphic and fashion*	164.0	2.4	1.5	8.6	0.6	1.1	0.4	0.8	0.1	0.5	0.2	0.0	0.8	3.8	1.2	0.0	6.1	41.0	6.5	0.1	**239.9**	12.0	0.0	0.0	**12.0**	0.0	0.0	**0.0**	10.3	16.8	75.1	62.6	**164.9**	**176.9**	416.7
19 *Music, performing and visual arts*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.9	0.0	0.0	0.0	0.0	22.8	0.4	**26.6**	74.0	38.1	15.7	**127.8**	0.0	0.0	**0.0**	8.1	11.4	4.7	3.9	**28.2**	**156.0**	182.6
20 *Museums, galleries and libraries*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**2.2**	38.0	4.3	16.7	**59.1**	0.0	0.0	**0.0**	0.0	1.6	4.6	0.1	**6.4**	**65.5**	67.6
Total domestic use (Basic prices)	15455.8	972.8	395.2	291.3	69.1	183.1	97.4	241.7	29.8	133.0	2.4	2.4	21.9	104.1	281.1	42.3	21.9	90.0	81.8	14.0	**18531.1**	15211.5	925.7	17829.6	**33966.8**	-535.7	1588.3	**1052.6**	3928.0	1645.0	14730.0	12275.0	**32578.0**	**67597.4**	86128.5
Imports Rest of Wales	14174.7	2711.8	1333.6	267.7	77.8	179.0	121.2	210.3	45.7	76.4	7.5	2.8	58.6	28.8	80.2	20.7	1.9	92.0	3.5	15.9	**19510.2**	13723.4													
Imports Rest of UK	11040.2	3492.5	253.6	571.3	48.7	114.2	35.4	8.8	9.0	87.3	4.3	485.7	82.7	3.7	113.2	312.4	53.4	129.7	5.0	22.4	**16873.7**	4060.3													
Imports Rest of World	3603.1	408.8	77.9	376.9	17.8	57.2	29.3	20.9	163.2	0.2				32.6	159.4	32.8	110.9	4.5	1.5		**5128.1**	3011.0													
Total intermediate (Basic prices)	44273.7	7586.0	2060.3	1507.2	213.3	533.4	283.4	481.7	247.7	296.9	14.2	490.9	194.5	169.2	634.0	408.1	188.1	316.4	91.8	52.2	**60043.1**	36006.2													
Taxes less subsidies on production	739.8	29.3	29.7	14.5	2.8	7.7	3.5	10.5	0.9	0.0	0.0	0.0	0.1	-6.7	2.3	0.7	0.1	0.9	0.3	0.0	**836.4**														
Compensation of employees	6079.5	1728.0	757.8	50.7	64.5	148.1	116.4	230.3	37.2	83.1	13.3	1.5	12.0	45.1	211.2	34.8	10.6	67.2	35.6	10.6	**9737.6**														
Gross operating surplus	11369.6	418.4	151.4	272.7	75.4	315.7	58.5	159.4	13.3	32.4	0.0	0.0	9.8	65.7	67.6	6.7	11.2	21.9	45.9	3.3	**13099.9**														
Taxes on Products	1223.5	132.2	32.9	27.8	10.7	26.6	9.8	20.6	1.7	11.3	0.1	0.2	2.4	15.1	33.3	4.4	2.6	9.4	8.7	1.4	**1575.0**														
Gross value added at basic prices	19412.4	2307.9	971.8	365.8	153.4	498.0	188.2	420.9	53.1	126.8	13.4	2.7	24.2	119.2	314.4	46.7	24.5	99.4	90.5	15.4	**25248.9**	0.0													
Total output at basic prices	64425.9	9923.1	3061.8	1887.5	369.5	1039.1	475.0	913.2	301.8	423.7	27.6	493.6	218.8	281.8	950.7	455.6	212.8	416.7	182.6	67.6	**86128.5**	36006.2													

Table 9.16 compares the headline figures for the economy of Wales to the economy of the Cardiff Capital Region. The analysis finds that the CCR contributes £88bn in output, £25bn in GVA and 419,000 FTE employment representing 51%, 39% and 51% respectively to the Welsh economy.

Table 9.16 Comparing Wales to the Cardiff Capital Region: Headline figures

	Wales	CCR
Output (£ billions)	166	86
GVA (£ billions)	64.7	25.2
Employment (FTE)	816,000	419,000

Table 9.17 shows that the creative industries represent a relatively small proportion of the economy of the CCR. Creative industries represent £2.9bn in output (3.5% of CCR total) £737 million in GVA (2.9%) and sustain 11,095 FTE jobs (2.6% of all FTE employment). 11,095 creative FTE represents 63% of all creative FTE in Wales (17,510 FTE).

Table 9.17 Economic contribution of the Creative Industries in the CCR 2018

	Non-creative Industries	Creative Industries
Output (£ billions)	86.07	2.9
GVA (£ billions)	24.51	.74
Employment (FTE)	408,095	11,095

Table 9.18 shows the distribution of GVA within the creative industries in the CCR. These figures highlight the relative importance of the 'screen sector' with Film & TV and IT, software and computer services, representing 58 per cent of the creative industries in the CCR.

Craft	2.7	0.4%
Publishing	24.2	3.3%
Film, TV, video, radio and photography	119.2	16.2%
IT, software and computer services	314.4	42.7%
Architecture	46.7	6.3%
Advertising and marketing	24.5	3.3%
Design: product, graphic and fashion design	99.4	13.5%
Music, performing and visual arts	90.5	12.3%
Museums, galleries and libraries	15.4	2.1%
Total	737.1	100%

Table 9.18 shows the distribution of gross output (£m) in the CCR within the creative industries. The IT, software and computers services sub-sector represents the largest single creative sub-sector. This is followed by Film, TV, video radio and photography. This is not that surprising and reflects earlier data on creative sub-sectors see Figure 4.2. More detailed interrogation of these figures will follow in section 10.2.1 .

Table 9.19 Distribution of Gross Output in the Creative Industries CCR 2018
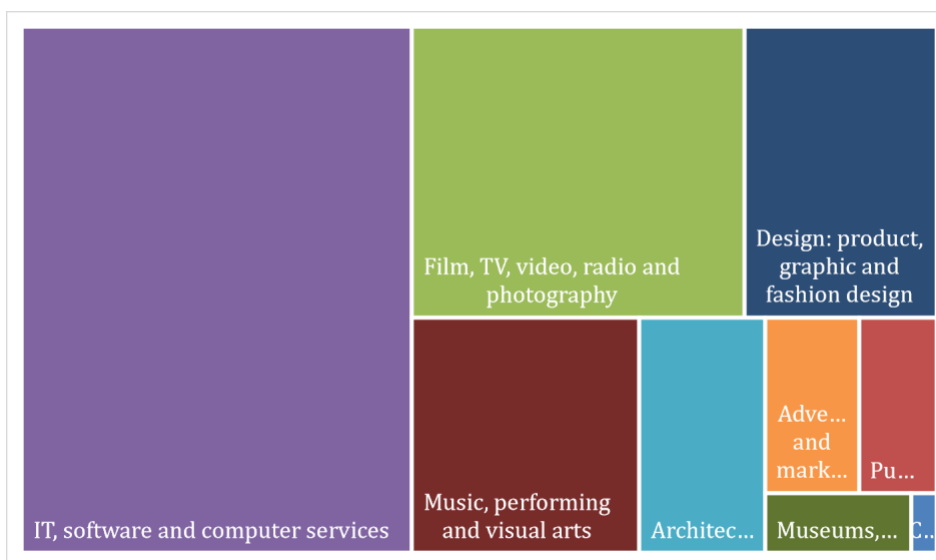
The total compensation of employees in the creative industries was £429m. The tables show that compensation was highest in the IT, software and computer services sector £211m and lowest in

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Craft £1.5m. Figure 9.2 provides a breakdown of the compensation of employees as a percentage of GVA by sector in the CCR creative industries in 2018; this shows the relative labour intensity of different sub-sectors of the creative industries. The Architecture sub-sector had the highest labour intensity £35m.The lowest labour intensities are found in Music, performing and visual arts 39 per cent.
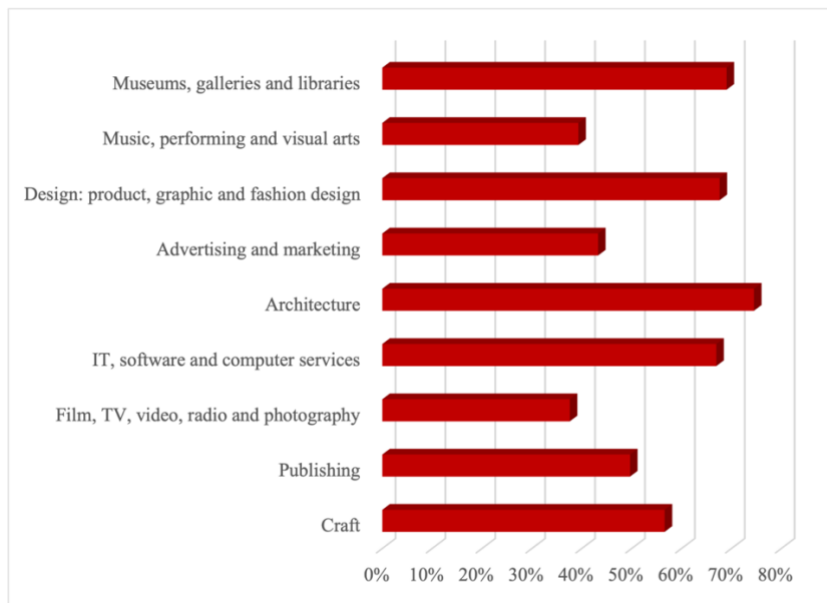
Figure 9.2 Compensation of employees as a percentage of GVA by sector

Table 9.20 shows the inter-industry relationships within the CCR creative industries[58]. The table reveals the relationships within the creative industries and other sectors of the economy. For example, 46 per cent of inter-industry purchases in the Architecture sub-sector are within the sector and a further 23 per cent are within other professional services. This paints the picture of a high-value sector with a large degree of sub-contracting. Film, TV, video, radio and photography like architecture purchases a high proportion of goods and services from its own sector at 42 per cent. Even with this highly disaggregated table there is a significant degree of detail that is remains hidden within these cells.

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[58] A full breakdown by sector is shown in Appendix 7

Table 9.20 Inter-industry relationships in the CCR. Percentage of total domestic purchases by sector

Regional Purchases (£millions)	Craft	Publishing	Film, TV, video, radio and photography	IT, software and computer services	Architecture	Advertising and marketing	Design: product, graphic and fashion design	Music, performing and visual arts	Museums, galleries and libraries
1 All other sectors	71%	28%	12%	27%	17%	31%	16%	20%	41%
2 Public Admin	0%	0%	0%	0%	6%	0%	0%	0%	0%
3 Education	0%	0%	0%	1%	0%	1%	1%	0%	0%
4 *Other manufacturing*	6%	0%	1%	0%	0%	0%	0%	1%	0%
5 *Publishing*	0%	20%	0%	1%	0%	0%	0%	0%	4%
6 *Telecomms*	1%	2%	0%	3%	1%	2%	1%	1%	1%
7 *Computer and related activities*	1%	2%	1%	21%	1%	2%	1%	1%	2%
8 *Other professional Services*	3%	2%	1%	0%	23%	17%	21%	4%	1%
9 *Market research, advertising*	4%	6%	5%	5%	1%	5%	3%	3%	5%
10 *Other Recreation, media & film*	0%	1%	16%	0%	0%	1%	0%	16%	5%
11 *Museums & Galleries*	0%	0%	0%	0%	0%	0%	0%	0%	9%
12 **Craft**	7%	0%	2%	0%	0%	1%	0%	2%	1%
13 **Publishing**	0%	21%	0%	1%	0%	0%	0%	0%	2%
14 **Film, TV, video, radio and photogra**	0%	0%	42%	0%	0%	2%	0%	6%	4%
15 **IT, software and computer services**	1%	4%	1%	36%	3%	3%	2%	2%	3%
16 **Architecture**	0%	0%	1%	0%	46%	0%	2%	1%	1%
17 **Advertising and marketing**	2%	8%	12%	4%	1%	6%	6%	5%	4%
18 **Design: product, graphic and fashion**	3%	4%	4%	0%	0%	28%	46%	8%	1%
19 **Music, performing and visual arts**	0%	2%	3%	0%	0%	0%	0%	28%	3%
20 **Museums, galleries and libraries**	0%	0%	0%	0%	0%	0%	0%	0%	13%
Total Domestic Purchases	100%	100%	100%	100%	100%	100%	100%	100%	100%

The 42 per cent that the Film & TV sector purchases from its own sector could include sub-contracting production companies, and other parts of the film & TV ecosystem. Additionally, the Film & TV sector includes a significant variety of activity within which there is a variation in the level of associated value-added (Olsberg, SPI, 2015). For example, Film & TV sector includes activity such as computer-produced graphics, animation, and special effects a highly skilled activity with high levels of value-added (SIC 59.12)[59]. The sector however, also includes activities such as activities of radio networks (SIC 60.01) or programme distribution activities (SIC 59.13). The value-added associated with these latter activities is likely significantly different than for post-production. The breakdown of this critical information is hidden within the 42 per cent figure. In the CCR we see large-scale TV productions such as *Doctor Who* or *His Dark Materials* yet from this analysis it is not clear whether high value added activity such in the post-production is being conducted locally or from post-production companies elsewhere in the UK or abroad. Chapter 7 set

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[59] See breakdown of activity in SIC 59.12

out an 'ideal' disaggregation of this sector which would have allowed greater insight into these transactions.

Table 9.21 shows the proportion of purchases by sector that is made up of domestic purchases or imports by the three geographies in this study (Rest of Wales, Rest of UK excluding Wales and the Rest of the World). Within the Film & TV sub-sector example total domestic purchases represent 63 per cent of all purchases. Therefore, a significant proportion of the purchases in the sector are not shown in inter-industry detail.

Table 9.21 Creative industries purchases vs imports

Creative sub-sector	Total domestic use	Imports	
Craft		1%	99%
Publishing		11%	89%
Film, TV, video, radio and photography		63%	37%
IT, software and computer services		45%	55%
Architecture		12%	88%
Advertising and marketing		16%	84%
Design: product, graphic and fashion design		50%	50%
Music, performing and visual arts		98%	2%
Museums, galleries and libraries		27%	73%

An additional consideration is that the BBC is a significant employer in the CCR. BBC Wales directly employs 1,000 people in the Central Square offices in Cardiff alone (BBC, 2019c). Representing a significant proportion of the employment within the Film & TV sector which employs 3,135 FTE in the CCR. The BBC is a dominant employer in the sub-sector and yet it will not report resourcing from its other offices in London, Glasgow, Belfast, and others as imports. Therefore, there is important detail missing from a significant proportion of the spend in the sector. Multi-regional firms are a problem for compiling input-output tables at small spatial scales. Therefore, this is an example of where I-O is not adequate enough to indicate whether it is worth investing in production companies in Cardiff because we don't know whether the money in this cell is public money from the BBC or it is private sector high-value investment.

9.4.2 Modelling the Impact of Creative Industries on the Cardiff Capital Region Economy: Multiplier Analysis

Input-output tables show the internal workings of an economy by revealing its inter-industry transactions, income and spending, output and GVA by sector. The I-O tables also allow for the

calculation of some basic economic modelling. The analytical tables derived from the domestic use table can be used to calculate the impact of changes in the economy (see detail in chapter 5). Multiplier analysis shares limitations with the I-O, which are *inter alia*, fixed technical coefficients, no supply constraints and industrial homogeneity (see section 5.7). Table 9.22 shows the output multipliers for 20 sectors of the CCR economy. These multipliers are split into three groups: Non-creative sectors, creative 'parent' sectors and creative industries.

Table 9.22 Output multipliers for the CCR 2018[60]

	Type-I	Type-II
Non-creative sectors	1.30	1.66
All other sectors	1.12	1.59
Public admin	1.16	1.87
Education		
Creative Parent Sectors	1.30	1.50
Other manufacturing	1.18	1.61
Publishing	1.18	1.55
Telecomms	1.23	1.90
Computer and related activities	1.31	2.09
Other professional services	1.11	1.45
Market research, advertising	1.27	1.73
Other Recreation, media & film	1.05	1.70
Museums & Galleries		
Creative industries		
Craft	1.56	2.46
Publishing	1.52	2.32
Film, TV, video, radio and photography	1.39	1.89
IT, software and computer services	1.47	2.43
Architecture	1.56	2.81
Advertising and marketing	1.49	2.20
Design: product, graphic and fashion design	1.57	2.73
Music, performing and visual arts	1.55	2.25
Museums, galleries and libraries	1.53	2.59

The output multipliers in Table 9.22 can be read as follows. Consider a £20m increase in final demand for exports of 'Film, TV, video, radio and photography' produced in the CCR. The 'Film, TV, video, radio and photography' sector would need to increase total output accordingly by £20m as a direct effect of the increased demand. The multiplier effects calculate the indirect effects of this increase. To calculate the Type-I multiplier, the direct increase (£20m) must be multiplied by the Type-I multiplier for the Film & TV sector (1.39); this calculates the total direct and indirect impact of the change in demand to be £27.8m.

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[60] Details on the different multiplier effects can be found in Chapter 5 and more detail in (Miller & Blair, 2009)

The increased output in the 'Film, TV, video, radio and photography' sector would increase employment in industries that supply the sector and increase household spending. To calculate this, the direct impact (£20m) is multiplied by the Type-II multiplier for the 'Film, TV, video, radio and photography' sector (1.89) to give £37.7m. This figure is typically higher than the Type-I multiplier as it takes into account the direct, indirect and induced effects of the change in demand.

The output multiplier value in Table 9.22 reflects the degree of vertical integration within an industry and the level of localization in the supply chain. The Type-I and II multipliers typically lie in a small range from 1.30 to 1.50 in the Other Manufacturing sector (a capital-intensive sector with a high level of imports). To between 1.55 and 2.25 in the Music, performing and visual arts sector (a sector with a more local and labour-intensive supply chain). Table 9.22 shows that the creative sectors have relatively higher multipliers than the other sectors of the economy. Thus, indicating that investments in the creative industries will have a greater impact on the local economy.

Comparing with the most recent evaluation of the Arts and cultural sector in Wales conducted by Bryan et al., (2000) (detailed in Table 4.4). Focusing on the output multipliers, the range in 2018 is broader from 1.39 to 2.73 than in 2000 1.60 to 1.83. There are several possible explanations for this difference. The Bryan et al., (2000) study was analysing the "arts and cultural sector" a different definition to the creative industries of this study. The way sub-sectors are defined in this study (and the SICs included) have changed in some cases significantly in the proceeding years. The "Libraries, museums and heritage" figure calculated by Bryan, et al. (2000), 1.60, is close to the comparable sector calculated in the 2018 table "Museums, galleries and libraries", 1.53. This comparison is helpful for triangulation as this sub-sector is less dynamic with a lot of the same libraries, museums and galleries operating in a similar way in 2018 to 2000 and more comparable than other sectors.

The Scottish Government (2020) supply and use tables give some insight to creative industries spending. Table 9.23 shows the Type-I and Type-II multipliers for relevant sectors of the Scottish economy. It can be noted that the Type-I multipliers at the CCR level are higher than for their nearest sector in Scotland.

Table 9.23 Scottish Input-output tables 2017 Type-I and Type-II multipliers (Scottish Government, 2020)

	Type-I	Type-II
Other manufacturing	1.34	1.61
Publishing services	1.19	1.50
Film video & TV etc; broadcasting	1.29	1.50
Telecommunications	1.21	1.43
Computer services	1.14	1.39
Information services	1.14	1.32
Architectural services etc	1.33	1.57
Advertising & market research	1.14	1.32
Creative services	1.29	1.48
Cultural services	1.39	1.71
Sports & recreation	1.32	1.62

Another important facet of understanding the impact of the creative industries is the issue of ownership. OTT services made up a substantial portion of creative spending in the CCR and this is mostly to a small number of typically American owned businesses: Netflix, Amazon Prime, Disney Plus. The household imports figure given for the CCR was calculated to be £355 million, £552 per household in the CCR[61].

Impact analysis involves more than the impact on output alone; employment, compensation of employees (income) and gross value added can also be calculated. These impacts can be calculated as multipliers; however, difficulties in interpreting these multipliers (Jones et al., 2010) mean that it is often more meaningful to examine employment, income and GVA 'effects' generated (directly, indirectly and induced) per unit change in final demand.

Table 9.24 presents a detailed breakdown of the impact of creative industries in the CCR showing Type-I (direct and indirect) and Type-II (direct, indirect and induced) Output, Employment, GVA and Income effects. Employment effects show the change in FTE employment for each additional unit (£1million) of final demand.

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[61] Estimates suggest household spending on streaming services is £552 per year. For the 642,600 households in the CCR (ONS) this equals a total of £354.7 million. https://www.thisismoney.co.uk/money/bills/article-8662397/Households-spend-552-year-subscription-services.html

In the Film & TV sector, a £1m increase in final demand would lead to the creation of 9 new FTE jobs in the Film & TV sector with an additional 4 FTE jobs created indirectly and an induced impact (Type-II) of another 4 FTE jobs leading to a total impact of 17 FTE jobs created. The £1m increase in final demand in the Film & TV sector would lead to a direct GVA effect of £0.34m, of £0.13 indirectly and an additional £0.17m induced impact to lead to a total GVA effect of £0.64m. The income effect is found within the GVA effect; hence the income effect figure will be lower than the GVA effect figure. In this Film & TV example, the £1m final demand increase leads to a £0.05m Type-I income effect and a £0.06 Type-II income effect.

Table 9.24 CCR Creative Industries output, employment, GVA and income effects.

	Output £m				Employment (FTE total)				GVA £m				Income £m			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Craft	5.6	3.1	5.0	13.7	6	4	6	15	0.48	0.27	0.43	1.18	0.27	0.15	0.25	0.67
Publishing	54.5	28.1	43.6	126.2	13	7	11	30	0.44	0.23	0.36	1.03	0.22	0.11	0.18	0.51
Film, TV, video, radio...	350.1	137.0	173.3	660.3	9	4	4	17	0.34	0.13	0.17	0.64	0.13	0.05	0.06	0.24
IT, software and computer...	769.8	362.3	736.5	1868.6	9	4	8	21	0.41	0.19	0.39	0.99	0.27	0.13	0.26	0.67
Architecture	102.4	57.3	128.3	288.1	20	11	24	55	0.46	0.26	0.57	1.28	0.34	0.19	0.43	0.96
Advertising & marketing	59.8	29.1	43.0	131.8	21	10	15	47	0.41	0.20	0.29	0.90	0.18	0.09	0.13	0.39
Design: product, graphic…	217.7	123.9	252.2	593.7	3	2	3	8	0.46	0.26	0.53	1.25	0.31	0.18	0.36	0.84
Music, performing and…	202.3	110.3	142.7	455.3	8	4	5	18	0.45	0.24	0.32	1.01	0.18	0.10	0.12	0.40
Museums, galleries & ...	33.6	17.7	35.7	87.0	48	25	51	124	0.46	0.24	0.49	1.19	0.32	0.17	0.34	0.82
Total	1795.6	868.8	1560.2	4224.7	136.0	70.1	128.0	334.1	3.9	2.0	3.5	9.5	2.2	1.2	2.1	5.5

Table 9.24 provides some valuable economic impact analysis of the creative industries. The figures produced can indicate the impact various investments can have throughout the creative industries and on to the CCR economy as a whole. There are, however, some outliers that require attention. The FTE figures for, Museums, galleries and libraries indicate that a £1m increase in final demand would create 124 FTE jobs; this number is likely a significant overestimation. The overestimation is likely because the total output of Libraries, museums and galleries is underestimated as non-market income (such as public spending grants detailed in Table 9.13) is not counted. However, all FTEs are counted and therefore, the FTE to £1m final demand increase ratio is overestimated.

Chapter 10.   Policy Discussion & Conclusion

10.1 Introduction

This thesis was funded to provide economic evaluation at the sub-regional scale in Wales. The work has sought to answer the research question:

How far can IO approaches help us understand the actual and potential contribution of creative industries at a city region scale?

This chapter will evaluate the extent to which the study has answered this question and how far input-output tables can inform creative policy in Wales. This chapter is structured to answer two questions:

1. How has the thesis helped understand whether the creative industries are likely to fulfil the policy objectives that have been placed on them?
2. How far can input-output table processes and evaluations reliably and usefully inform policy at the sub-regional spatial scale?

10.2 Can the Creative Industries Address the Policy Objectives of the CCR?

The policy objectives placed on the creative industries in the CCR have been detailed throughout the thesis. To summarise there are three key organisations developing and creative policy in the CCR and supporting creative sectors; Clwstwr Creadigol, Creative Wales and the Cardiff Capital Region City Deal. The aims and objectives of each of these organisations differ and are summarised in Table 10.1.

Table 10.1 Creative policy in the Cardiff Capital Region

	Policy Objective
Clwstwr	Create a culture of innovation
	Move the screen sector to a 'position of leadership'
	Grow sustainably and compete internationally
Creative Wales	Drive growth across the whole of the nation, and plan targeted regional activity.
	Focus will be on three key sub-sectors: Film and TV, digital and gaming, and music. For each of these sectors, we will develop a comprehensive action plan with key stakeholders.
	Gain global profile for sub-sectors
Cardiff Capital Region	5% GVA uplift
	Create 20,000 jobs
	Leverage £4bn in private investment 'Creative' an area of focus
Media Cymru 2021-2026	Drive inclusive, sustainable economic growth and deliver £236m in GVA by 2026 in the

The objectives can be grouped into unquantifiable *soft* objectives targeting competitive development and quantifiable *hard* economic objectives. Soft objectives include leadership, sustainability, and international competitiveness. Hard objectives include growth in terms of output, employment, and productivity. The section that follows will detail where the creative industries can achieve these policy objectives.

10.2.1 Policy Objective: Achieving Productivity Uplift, Growth and Generating Jobs.

Achieving productivity uplift is an explicit goal for policy in the CCR. The Cardiff Capital Region seeks to generate GVA uplift of 5 per cent in the city-region. Media Cymru have the goal of achieving £236m in GVA in the 'media sector' (Cardiff University, n.d.). The productivity goals raise important questions; are creative sectors more productive than other sectors in the CCR? What are the productivity differences between sub-sectors of the creative economy? How do the

creative industries in the CCR compare to other geographies? Answering these questions will allow evaluation of whether the current focus on creative (and particular sub-sectors of creative) is likely to achieve the productivity uplift sought for the sector.

The literature has detailed that the creative industries are not a homogenous set of activities which can be neatly grouped into the category high productivity or low productivity (see section 2.2.1). There are sub-sectors with a strong emphasis on cultural output which have low levels of productivity in terms of GVA (Metro Dynamics, 2020). Conversely, there are sub-sectors focused more on commercial output which observe much higher productivity. Input-output tables can shed some light on these differences at the sub-sector level. Table 10.2 shows the productivity per FTE employee of each of the creative industries sub-sectors as calculated by the CCR I-O.

Table 10.2 GVA per FTE in the CCR creative sub-sectors

	GVA per FTE
Craft*	£178,305
Publishing	£67,731
Film, TV, video, radio and photography	£47,126
IT, software and computer services	£72,507
Architecture	£33,855
Advertising and marketing	£34,475
Design: product, graphic and fashion design	£220,007
Music, performing and visual arts*	£99,403
Museums, galleries and libraries	£21,198
CCR All other sectors	£68,552
Wales all sectors average	£79,303

*indicate low confidence in the numbers

The craft sub-sector usefully demonstrates the difficulty with analysing GVA at ever more granular scales both sectorally and geographically. The craft sub-sector contains activity in the narrow industry of 'Manufacture of jewellery and related articles' this activity at the city-region scale can lead to significant noise. The ONS data reports FTE employment in the craft sector to be just 15. This number appears to be a significant undercount with one interview respondent commenting:

> *"I'd say that figure [15 FTE employees in the Craft sub-sector] is very low and way off the mark!" (R21, Craft sector expert)*

The issue of categorising creative activity and the difficulties of SIC codes discussed in section Methodological Challenges: Defining the Creative Industries6.3 described how they can often be inaccurate. This very small figure for Craft helps highlight the issue with one respondent commenting:

> *"This low Craft FTE figure] is very often based on the fact that they will fall under retail, if they have a shop outlet. So, or they can fall under manual skills. So that's woodcraft, he might fall under the knife skills category. So we had the same problem in Scotland off and categorising people." (R32, Cardiff Capital Region representative).*

The employment number being so small will mean any inaccuracy will have a significant impact on the final GVA per FTE figure. Changing the FTE figure by 1 to 16 changes the GVA per FTE figure by 6.7 per cent to £167,161. The high degree of sensitivity in this number is further complicated by the very high number of workers in the sector that do not work full-time or perhaps do not consider their activity as work. At the UK level there are an estimated 10,000 employed in the craft sector. A population share of this would leave the CCR with 228 craft employees. Assuming a majority of these workers are likely to be part-time estimating an accurate figure is not possible without survey data. Using three estimates a lower, middle and upper estimates a range of possibility can be produced. Table 10.3 shows three crude FTE employment scenarios for the CCR craft sector. The estimates produce a range of £19,451 to £48,691 GVA per employee. These figures appear much more realistic that the ONS FTE generated £178,305.

Table 10.3 GVA per employee estimates Craft sub-sector

	Lower	Middle	Upper
	50 FTE	75 FTE	125 FTE
Craft	£48,629	£32,419	£19,451

The Music, performing and visual arts sub-sector suggests a relatively high GVA per FTE figure £99,403 this figure, like craft, may be an overestimation. FTE figures may be failing to capture the number of freelancers working in the sub-sector:

> *"For much of the music industry – producers, publishers, technicians, musicians, managers, composers, live performers – working freelance is almost the default" (Easton & Cauldwell-French, 2017, p. 35)*

Sound Diplomacy (2019) figures include 600 part-time just for the city of Cardiff. Without knowing how many part-time workers make up one full time worker an estimate range must be

used. Once more using lower, middle and upper bounds to account for uncertainty we have a range of £58,207 to £67,868 GVA per employee Table 10.4.

Table 10.4 GVA per employee estimates Music, performing and visual arts.

	Lower 1205 FTE	**Middle** 1305 FTE	**Upper** 1405 FTE
Music, performing and visual arts	£67,868	£62,668	£58,207

For the CCR, the screen sector consisting of the Film, TV, video, radio and photography and IT, software and computer services is an area of policy focus. Table 10.2 reports a GVA per head figure of £47,127 and £72,507 respectively for these sectors. The figures for Film & TV are lower than might be expected for a priority sector achieving a lower GVA per FTE than the average for all sectors (£68,552). A figure that may yet be an overestimate with freelancers a significant part of employment in the film and TV sector. Fodor et al., (2021) estimate the 'media sector' to have an additional 2,800 freelancers directly working in the sector an additional 61% of the total employment in the sector. Using some sensitivity on this number the GVA per employee range becomes £32,956 to £38,948 Table 10.5.

Table 10.5 GVA per employee estimates Film, TV, video, radio and photography sub-sector.

	Lower +10% FTE	**Middle** +20% FTE	**Upper** +30% FTE
Film, TV, video, radio and photography	£38,948	£35,702	£32,956

Upon review of the findings for Film & TV one expert in the sector was surprised to find the figure to be so low. The respondent's view was that because there are a number of jobs in the Film & TV sector are part of the knowledge economy GVA per FTE should be higher, hypothesising it may be related to some workers in the sector being low paid.

These relatively low GVA per employee figures might reflect the large numbers of workers in the sector working in low-skilled crew occupations[62]. However, as noted in section 9.4, the Film & TV sector captures a lot of different activities. This could include post-production animation with very high levels of value added or support activities to production. A detailed breakdown of the kind of roles and workers that are counted in the Film & TV sub-sector would was considered an important area where intelligence was required by the respondent for the Cardiff Capital Region. Disaggregating activity in the Film & TV sub-sector was one of the aims of this study that could not be achieved due to the primary and secondary data concerns detailed in section 9.2.

The Architecture and Advertising & marketing sub-sectors suggest GVA per FTE figures of £33,855 and £34,475 respectively, significantly below the average for all other sectors. The Architecture and Advertising & marketing sub-sectors are much less dependent on freelancers than those previously discussed in this sector. A creative industries federation report suggests that freelancers make up 6 per cent of the architecture sector (Easton & Cauldwell-French, 2017, p.32). An explanation for this figure could be estimated GVA figure failing to capture the productivity differences between the CCR and the rest of Wales. Figure 3.6 detailed the productivity differences observed in Wales. To account for these differences Table 10.6 estimates three different GVA scenarios for the two sub-sectors. The resulting ranges are more realistic and yet still fall short of the average GVA of all sectors in Wales.

Table 10.6 GVA per employee estimates Architecture and Advertising and marketing sub-sectors.

	Lower +20% GVA	Middle +30% GVA	Upper +40% GVA
Architecture	£40,626	£44,011	£47,397
Advertising and marketing	£37,609	£40,743	£43,877

The publishing sector shows a GVA per head figure of £67,731 lower than the average for all other sectors at £68,552. This is not unexpected, the publishing sector in Wales includes a significant amount of activity that is culturally very important but without a large export market such as Welsh language books. Museums, galleries and libraries report a GVA per FTE of £21,198 significantly

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[62] Average salaries in SOCs in the DCMS defined sub-sector are: Production runner £20,252[62], Actor £22,880, Arts Officer £31,461, Photographer £22,763[62].

lower than the average for all other sectors. This is not unexpected, museums are a non-market and low direct economic value activity.

Figure 10.1 shows the GVA per FTE of the creative industries sub-sectors. Sub-sectors; Craft, Film, TV, video and photography, Architecture, Advertising and Marketing have been adjusted using the sensitivity analysis conducted earlier in this section. The figures shows that GVA per employee in the creative industries are generally lower than the average for all sectors with some exceptions notably design. The higher GVA per FTE figures in design and IT sectors may be driven by high pay in industries that value skills in 'Createch' (Bahskshi et al., 2019).

Figure 10.1 GVA per FTE of creative sub-sectors adjusted (CCR 2018)
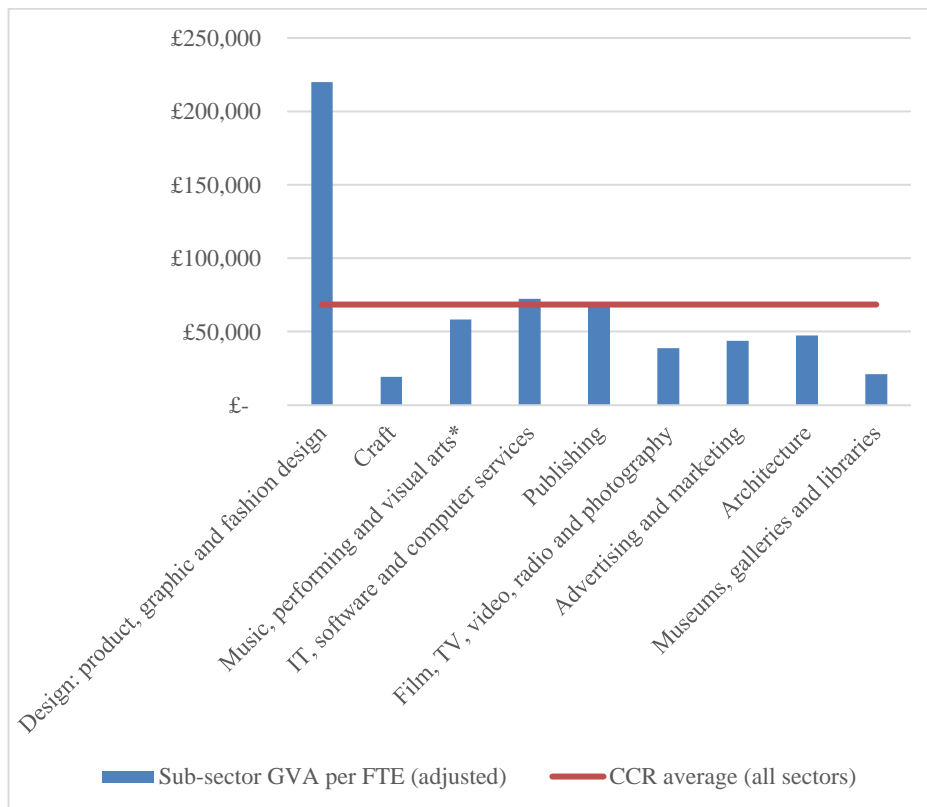
In showing the GVA per FTE figures to sources involved with creative policy in Wales it was noted that some figures were surprising. One respondent was surprised to find the Film, TV, video and photography sub-sector so far below the average for all other sectors:

> *"Film and TV. I mean, I'm not sure I just would have expected it to be a bit higher, or at least in line with the average, because it's quite far below, below the average.[..], design we'd like we don't, we don't really cover. But it's interesting to see that that always seems to come out on top", (R31, creative policy stakeholder)*

One explanation for the lower levels of GVA per employee could be the relatively labour-intensive nature of activity in the sub-sector. Large industrial sectors like electricity and gas are likely to achieve very high GVA per employee figures due to their high capital to employee ratio. This section has revealed the sub-sectors that are more productive than the average CCR sector as: Design: product, graphic and fashion design and IT, software and computer services.

Figure 10.2 shows the Comparing the figures produced with available GVA figures from ONS (2018). The regional GVA statistics do not reveal all two-digit SICs (2007). However, a comparison of sectors most closely related to the nine DCMS creative sub-sectors is compiled. The figure shows GVA per FTE for the CCR and a comparator region, West Midlands. At an All Industries level the GVA per FTE is higher than calculated in the CCR I-O (£77,872 vs £68,552). The lower GVA for the CCR is an expected quirk of the FLQ regionalisation process. The figure for Architecture and Engineering Activities in the CCR is close (£35,000 vs £33,855) yet significantly below that of the comparator region. The Arts, Entertainment and Recreation figure groups SICs 90-93[63] which collects a significant amount of activity outside the arts making meaningful comparisons with the creative industries not possible. Information and Communication groups SICS 58-63 capturing the DCMS sub-sectors publishing, IT, software and computer services, Film & TV and a fraction of the Music sub-sector. The significant differences do not allow for detailed comparisons yet do confirm that these sectors are likely to provide a higher-than-average GVA per FTE.

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[63] 2007 two digit SICS: 90 : Creative, arts and entertainment activities, 91 : Libraries, archives, museums and other cultural activities, 92 : Gambling and betting activities, 93 : Sports activities and amusement and recreation activities
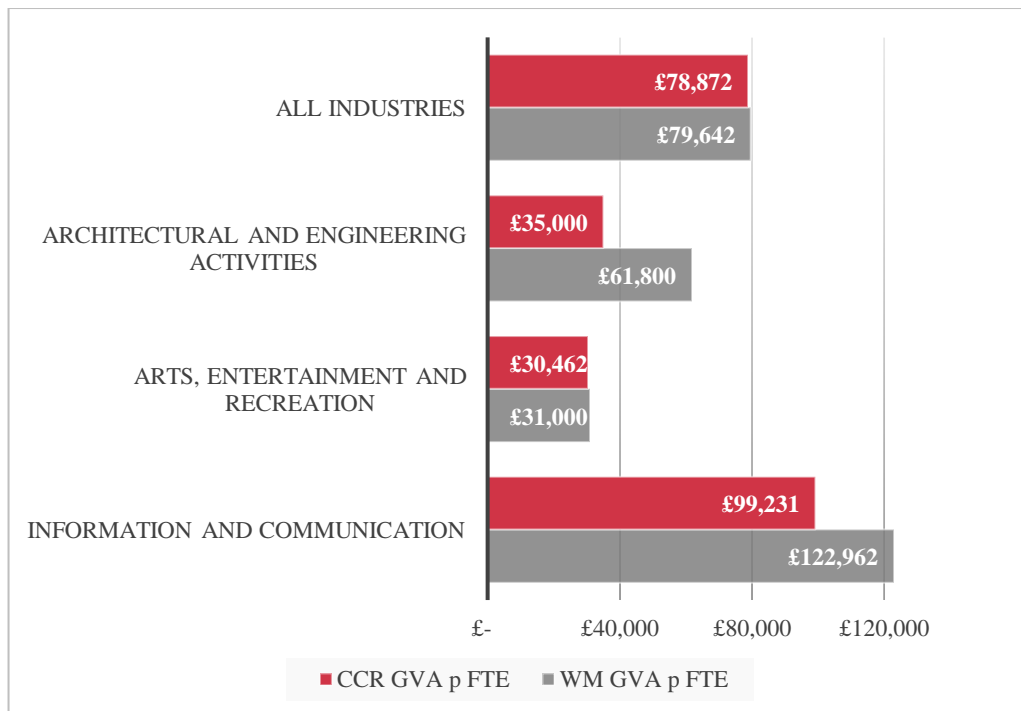
This section has revealed the difficulties with gathering detailed productivity statistics at the sub-sectoral and sub-regional level. It has detailed that some areas of the creative industries are likely to achieve higher levels of GVA per employee than the average sector of the economy. It has also highlighted that not all areas of the creative industries are highly productive. From a policy perspective in the CCR the focus on the Film and TV sector may actually drive down GVA. In response, to this finding a representative for the CCR stated that the long-term strategy for the sector would focus on improving the skills available to the sector:

> *"The intention is that we know we've got the retain more of our best talent in the region. So, the intention is longer term that we want to see that GVA per FTE come up by having more people at the upper end of talent probably particularly in post-production". (R32, Cardiff Capital Region representative)*

The data is not sufficient to detail what parts of the Film & TV sub-sector are high GVA and the evidence produced suggests the sector as a whole is lower GVA than the average sector. Investment in the Design: product, graphic and fashion design and IT, software and computer services sub-sectors is likely to yield the biggest impact in terms of productivity uplift.

Generating growth is an explicit objective of the Cardiff Capital Region. The growth of the creative industries has been well documented in published statistics (section 4.1.1 . The interview findings in section 8.2 further evidence that the creative sector is a growth sector although with a significant degree of variation and structural change. Some aspects of the sector are growing (film and TV

production), others changing others shrinking (print publishing and journalism). Input-output tables and the findings in section 9.4 do not provide an understanding of whether the sector is growing or not due to the static nature of I-O. The CCR I-O shows a static picture for 2018 and to understand growth would require time-series data and tables not typically produced. However, as detailed, I-O when combined with the interviews can describe how productive the sub-sectors are that are growing. Interviewees noted that the screen sector particularly related to film and high-end TV production has been noted as a growth area for the CCR. The screen sector while not well defined relates most closely to the sub-sectors; Film, TV, video, radio and photography and IT, software and computer services. Table 10.2 shows that the screen sector sub-sectors have higher GVA per employee than some but, not all, creative sub-sectors and are lower than the GVA per employee of the average CCR employee. It is important to note that these sectors contain a wide range of activities (see appendix 1). Within the Film & TV sub-sector there are aspects that are likely more productive than others which are not adequately captured in the CCR IO and would require greater disaggregation as detailed in section Table 7.11.

Creating jobs is another defined policy objective of the CCR seeking to generate 20,000 jobs. Impact analysis generated as part of modelling of the I-O analysis can shed some light on the job creating potential of creative industries investment. Using the employment effects displayed in Table 9.24 it is possible to estimate the level of investment required to generate the 20,000 FTE jobs in each creative sub-sector (see appendix 10).

Enhancing elements of competitive development is another explicit if less quantifiable goal of local policy. Exports numbers give some indication of international competitiveness and export potential versus other sectors. Table 10.7 shows the export intensity of each of the creative industries sub-sectors and an aggregated *all other sectors*. The table shows a number of creative industries sub-sectors are significant exporters.

Table 10.7 Final Demand, exports and export intensity in the CCR creative industries (purchases £ millions).

Industry	Consumers, NPISH and Government	Total Intermediate Demand	EU+ROW exports	Export Intensity
All other sectors	2679.9	14491.5	3813.3	22%
Craft	20.1	146.2	26.4	16%
Publishing	12.1	48.9	8.8	14%

Film, TV, video, radio and photography	15.6	79.8	35.5	37%
IT, software and computer services	0.1	520.8	90.1	17%
Architecture	0.6	363.8	13.7	4%
Advertising and marketing	0.1	153.7	796.9	518%
Design: product, graphic…	0.8	228.0	602.6	263%
Music, performing and visual arts	21.1	21.6	90.6	212%
Museums, galleries and libraries	19.3	1.8	42.4	201%

A key factor in defining the success of a regional economic policy is the spatial distribution of the impact of any investment. Investment in the creative industries in the CCR is likely to go where creative industries activity is already taking place. Creative investment is being targeted towards the screen sector most notably Film & TV. Komorowski & Lewis, (2020, p. 22) map the distribution of employees in the Film & TV sector in Wales. The circles on the map represent post code areas. The circle's size indicates the number of employees in the Film & TV sector in the post code area. It is apparent that employment in this sector is heavily concentrated in Cardiff. Creative industries employment (FTE in 2018) is estimated at 11,095 representing 63% of all creative industries employment in Wales. Investment in the creative industries particularly in this sector is therefore likely to lead to the economic benefits accruing in Cardiff further widening the gap between Cardiff and its hinterland.

Table 10.8 Distribution of employees in the Film & TV sector (Komorowski & Lewis, 2020, p. 22).
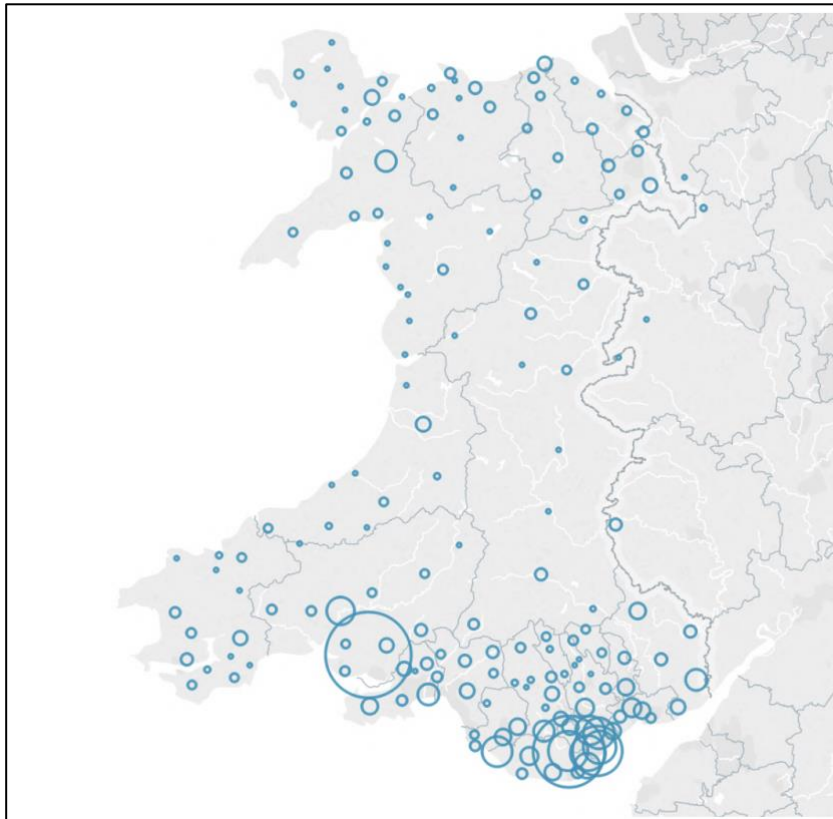
The spatial distribution of any benefits resulting from a productive and growing creative industries is critical to determining its success as a strategy for regional economic development. I-O cannot determine whether the benefits of investment in these sectors will be result primarily in new jobs and higher GVA in Cardiff, let alone whether these jobs will go to existing residents, attracted immigrants, or commuters from Bristol or the wider (and poorer) CCR. Accounting for GVA in geographies with high commuting levels is a challenge for analysts (Prothero, 2018).

There are potential unintended consequences to consider that may result from investment in creative industries. The issue of house price rises and gentrification has become an increasing issue in recent years. House prices in Newport have risen 12.9 per cent between May 2020 and May 2021 (Zoopla, n.d.), outpacing the UK average. The consequences of this are being felt through the changing fabric of the town (The Guardian, 2020). The issues surrounding gentrification, such as household displacement and community conflict, are well-cited (Glass, 1964; Atkinson, 2004 and Lees, Slater et al., 2013). The evidence for the link between rising creative industries activity and gentrification is an active area of research (Matthews, 2010, Hutton, 2015 and Behrens et al., 2018). Gentrification is just one such issue that a purely I-O framework fails to capture. Additional issues such as; socio-economic inequalities and the structure of the creative labour market have important implications for regional economic policy in this area.

The issue of geographic inequality related to creative industries investment is an area that is actively considered by policymakers. One respondent noted that while there may be more creative businesses centred in Cardiff there isn't sufficient evidence to say where there employees are coming from. It may be the case they travel from the valleys, the centre or over the border from Bristol as the region is geographically quite small. The respondent argues that more data is required and gives the example of a creative business in the north of the region:

> *"We have a film studio complex [..] which is just on the border of Rhondda Cynon Taff, and Bridgend, [.] from the foundational aspect, [.]in terms of the drivers and caterers, the cleaners, the joiners, they would probably come from Bridgend. With the knowledge economy aspect, the techs who live and work in the region, the on-set people, they might live in Cardiff, or they might live in the South Wales coast. We've got to get that level of intelligence. It's not about the working places is where people live as well." (R32, Cardiff Capital Region representative).*

There appears to be uncertainty about the how effective distributing investments in sites like film studios across the region might be in solving the problem. Ultimately it is down to who is working on these sites, and this is driven by more than geography but, skills too.

10.3 Barriers to Achieving Policy Objectives in the CCR

Two main features characterise the state of the labour market in the creative industries in the CCR. Firstly, employment in the creative industries is increasingly comprised of self-employed freelancers, mirroring trends seen in the rest of the UK (Easton & Cauldwell-French, 2017). Creative industries and freelance work is characterised by precarity which presents a risk to policymakers that seek to build a larger creative sector. Secondly, the lack of workers with the relevant skills and training has contributed to a 'skills gap'.

Freelancers are estimated to make up 60 per cent of employment in the CCR screen sector (Hannah & McElroy, 2020). Interviewees noted the growth of freelancers in the creative industries across numerous sub-sectors and large employers such as the BBC (see section 8.3). The reaction of interviewees to the increase in freelance working was mixed. Some respondents regarded freelance employment to bring benefits such as flexibility and a perceived higher rate of pay than alternative employment. There were, however, respondents that were concerned about the consequences of an increasingly self-employed sector. The central concerns were that the workforce is largely non-unionised and in precarious employment. The precarity of employment is particularly concerning in the creative industries due to the inequality of access to opportunities in the sector based on socio-economic factors (Oakley et al., 2017). The creative industries have been noted in the literature to feature exploitation and self-exploitation (Bain & McLean, 2013; De Peuter, 2014 and Kim, 2019). Freelance employment in the creative industries links to broader issues in the 'gig

economy'. There are concerns that self-employed workers for tech-based taxi and food delivery services are not benefiting from the same workers-rights as permanent employees (Minter, 2017). The COVID-19 crisis has exposed the precarity of creative freelancers to economic instability. A survey from Creative Cardiff conducted after the lockdown restrictions were imposed in Wales found 60 per cent of freelancers reported their work had 'dried up completely' (Creative Cardiff, 2020).

Skills gaps and shortages have stymied productivity in Wales for decades (Sloane et al., 2005). In the CCR screen sector, the presence of a 'skills gap' has been well-cited (NaFW, 2019 and Hannah & McElroy, 2020). The lack of skilled workers for specific roles in sub-sectors of the CCR creative industries is an apparent constraining factor on the growth of the sector. Addressing the skills gap is essential to increasing growth and productivity and is, therefore, a policy priority. The skills gaps in the creative industries are nuanced, with gaps in different roles and career stages. One respondent noted a shortage of Wales-based self-shooting director producers. Another respondent noted a shortage of film crew and yet an oversupply of music techs.

Closing the skills gap is a persistent challenge and constraining factor on growth in the sector. Interview respondents urged an employer-led approach to address the skills gap supported by Government funding. This links with the literature on skills in the creative economy, showing that university training is not as highly valued as on-the-job training (Allen & Hollingworth, 2013). One creative business that was interviewed regarded the Welsh Government scheme *Jobs Growth Wales*[64] to be a highly effective way of closing the skills gap:

> *"One of the better schemes that we tapped into that we, we, we think would be good to continue as the jobs growth Wales scheme [.]they [Welsh Government] essentially pay 50% of minimum wage salary[…] for six months with the intention that you then go onto employee them full time. So, we took him on part time three days a week, and he was essentially cost us half the money that he should have."*
> *(R24, creative business)*

The scheme encourages employers to create new jobs for young people between 16-24 by reimbursing 50 per cent of the wage cost for six months. Another possible way to address the skills shortage is to introduce creative apprenticeships (Giles, 2021). The Jobs for Growth and apprenticeship schemes would help address the skills shortages at the entry-level addressing the gap at the other end of the scale would require a different approach. Two interviewees noted that they had seen a shift towards skilled professionals relocating to Wales in some cases from London

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[64] Detail on the Jobs Growth Wales scheme: https://careerswales.gov.wales/getting-a-job/jobs-growth-wales

to start new businesses or take up senior roles. Gathering data to understand if and why this shift is occurring is important to ascertain whether it could be a viable policy approach to addressing the skills gap.

The linked issues of skills gaps and lower GVA per FTE in Film and TV sector might have shared solutions. An interview with a local policy organisation discussed their strategy which focussed on bolstering creative skills through further education an approach that is more likely to retain talent in a region and would lead to workers achieving higher salaries:

> *"We're pushing towards growth in the media sector and Film, TV and video. Interestingly, that's also partly based on upward mobility and again, that's longer term. So if you put a bunch of, you know, 40 kids in a further education college and you give them skills in, for example, technical skills, which may lead to place on a film set." (R32, Cardiff Capital Region representative).*

10.4 Contribution: Can I-O Influence Creative Policy in the CCR?

A primary contribution of this thesis is the new economic statistics generated through the compilation of the CCR I-O. The statistics produced are novel for three reasons. Firstly, timeliness as the tables produced are for the year 2018 representing the most up to date input-output tables in Wales (see section 5.8). Secondly, the focus on creative industries provides contemporary analysis that has not previously been the focus of analysis in Wales. Thirdly, these tables provide detail at the CCR scale a change in geographic focus from previously published I-O tables in Wales (Jones et al., 2010).

To assess the value of these newly produced statistics and overall contribution it is important to gather an insight into whether and how they may be useful to policy makers. Participants were sought that held expertise in the internal management of regional government and with a particular interest in the creative industries. The three participants recruited included one representative of the Cardiff Capital Region, one sub-regional policy expert based in England and one expert on Welsh creative policy. The three stakeholders provide a valuable base of understanding of sub-regional government institutions to help answer:

- Are the economic statistics produced useful to policymakers?
- Are policymakers likely to be able to understand and act on the findings?

Respondents agreed that the numbers produced provided helpful insights into the creative industries. In some cases, the numbers produced were more granular both in terms of sectoral disaggregation and geography than figures available to the institutions. Some figures were found to

be particularly useful: GVA by sub-sector, output and employment multipliers. Though one respondent noted that multipliers were often not understood by policymakers. The intra-creative industry purchasing relationships were also found to be useful. How much production stays within a region is key for understanding whether local investment in the creative industries represents good value for a region. This helps answer some of the concerns raised in section 8.4 about whether investment in particularly the film and TV industry had any legacy locally or whether the investment was being captured by firms domiciled outside the region.

Respondents saw value in the geography that the statistics were generated. There was however, interest in greater disaggregation within the city-region and particularly for comparison between different geographies. One respondent noted that the numbers were in some ways without context as they don't show how the CCR is comparing to its neighbours. A further issue is the emphasis on growth for sub-regional governments.

> *"The single most single imperative of the LEP [Local Enterprise Partnership[65]]*
> *is to work towards growth.[…] and they're interested, something like, how*
> *would these numbers indicate there some growth happening? And how would*
> *these numbers show where we need to invest to get even more growth out of it"*
> *(R30, sub-regional policy expert)*

Both the focus on comparing sub-regions and focusing on growth are problematic. The focus on narrow metrics like growth and GVA uplift overlook other consequences of investment (Beel et al., 2018). These concerns were echoed by one respondent who was concerned more subtle long-term changes would not be effectively picked up in this framework:

> *"Ultimately growth deals are tracked against GVA, it can be a sledgehammer*
> *to crack a nut, and it won't pick up some of the subtleties around about you*
> *know, longer tailed activities. So that's one worry, [.] are we going to miss out*
> *some of the benefits that we are creating. If we're just counting for counting's*
> *sake." (R32, Cardiff Capital Region representative).*

Further to this there is the issue well documented in the literature of the wider benefits of creative investment on well-being or other societal benefits (see section 2.2.1). One respondent argued that while important these metrics cannot be viewed without a wider understanding of the potential impacts of the investment:

> *"What about the wider benefits? Well-being benefits, benefits related to SDG,*
> *benefits that we should be articulating, but we're not. So, it could well be that*
> *the growth of the Creative Industries has negative impacts on our ecosystems.*
> *[..]a better system is by having a range of metrics, and choosing ones which are*
> *appropriate for each intervention [and] understand that we are not causing*

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[65] LEPs are non-statutory bodies responsible for local economic development in England.

negative consequences accidentally." (R32, Cardiff Capital Region representative).

The emphasis on comparing regions can also be problematic as policymakers may seek to find data that reports the biggest numbers:

> *"Growth deals are significant investments generally - in the £1 billion plus range very often and they want to create impact. So, each deal will develop metrics, and sometimes they will have a bias towards developing metrics that best demonstrate their impact." (R32, Cardiff Capital Region representative).*

Defining creative activity has been highlighted throughout this thesis as a challenge for producing valuable economic analysis of the sector. Clwstwr and Creative Wales define the creative industries differently suggesting even within Welsh organisations definitions are in flux. The interviews with policy stakeholders revealed that defining the creative industries continues to be a challenge for policy. None of the organisations that were interviewed used the nine DCMS defined creative sub-sectors instead using their own local definitions that best fit the sub-sectors in their cluster. One respondent noted that the focus on the DCMS defined sub-sectors was no longer their policy focus.

> *"We don't actually follow the DCMS definitions anymore. So things like architecture, IT software, Computer Services, we we don't really cover." (R31, Welsh creative policy stakeholder)*

Additionally, the respondent noted that some of the creative industries sub-sectors that sit within culture were not in their remit as an organisation to cover:

> *"DCMS, Film, TV, video radio, they're all very similar to our sector of Film and TV. But things like so museums, galleries and libraries sit within the culture sector within Welsh Government so it isn't part of creative. So, I'd say some are more relevant than others and some are just not relevant to Creative Wales." (R31, Welsh creative policy stakeholder)*

The definitional issue poses a particular challenge for producing relevant economic statistics where the effort to disaggregate for some sub-sectors will not be policy relevant. The note that the organisation had once used DCMS definitions but had since moved away suggested that definitions could be fluid further challenging the compilation of economic statistics. Despite this challenge the statistics were found to provide a useful benchmark.

On the question of whether such statistics could help shape creative industries policy respondents noted that there were constraints that impacted the focus of their support. One respondent found that COVID-19 had completely altered the organisations approach to emergency support overriding other priorities like growth, productivity and jobs created:

> *"Our funding at the moment, or recently has all been sort of emergency recovery funding on the pandemic. So they've all gone out. They've all had their own kind of eligibility criterias to meet within their sectors. But we've obviously tried to support as many of those sectors as we can." . (R31, Welsh Creative policy stakeholder)*

One respondent thought creative policy at the sub-regional scale had external constraints linked to national imperatives but could be influenced by local statistics telling a consistent story over time. Another respondent thought that the interventions their organisation would make were very large and necessarily only used on large scale projects. Within the CCR most of the nine creative sub-sectors are too small to be relevant to such large investment. It is interesting to note then that the organisations with power to change the direction of creative policy while interested in the nuances of local GVA, growth and inter-industry relationships in the sub-sectors are unlikely to take significant action based on these inputs alone.

10.4.1 Conclusion

On the first question *"Are the economic statistics produced useful to policymakers?"* The answer is *"Yes, But".* The statistics at the city-region scale are valuable to city-region focused entities and to an extent national governments. However, in the absence of comparable statistics for other city-regions the full value is not realised. The creative industries disaggregation is considered highly valuable in the CCR due to the policy focus on the sector. The definitional issue that has been a theme of this thesis does show that the fluid nature of the definition of creative industries becomes no less complex at the sub-regional level. The DCMS definitions used are not used by the main area of creative policy in Wales, Creative Wales. Despite this there is sufficient overlap for the statistics to be valuable for sectors of interest notably Film & TV.

On the second question *"Are policymakers likely to be able to understand and act on the findings?".* It is apparent that some statistics are more easily understood and applicable than others. To be useful to policymakers the commentary is vital. For example, a raw table of multiplier effects is unlikely to be understood and could be misinterpreted (Gretton, 2013). An additional consideration is the external constraints on sub-regional governments that often dictate where money can be spent. These competing objectives alongside constrained budgets means that there is limited ability for policymakers to act on such evidence. From 2020 through 2021 all funding in the creative industries has been focused on emergency COVID-19 support rather than on investment in sectors by their capacity to generate growth, jobs or increase GVA.

As has been highlighted throughout the thesis, economic analysis such as I-O fail to capture the non-pecuniary aspects of investment in the creative industries. There are significant potential benefits to city-regions that do invest in the creative industries. The sub-sectors that may deliver the widest social and well-being benefits are likely not be the same as those which deliver the most jobs, GVA and output. Therefore, using I-O to sway where creative industries investment towards high GVA sectors might not be the optimal solution. There is also the consideration that the areas

that look set to benefit most from this kind of investment tend to be the more prosperous city and suburbs.

Regional economic policy has changed its spatial emphasis with successive governments (see section 3.3). Since the 2010s, the focus of regional policy shifted from larger regions to sub-regional city-regions. The policy commitment to city-regions as the focus of future regional economic policy is uncertain. In 2019 Boris Johnson's government signalled a new commitment to regional policy with the 'levelling up' agenda. Little is published to date on the 'levelling up' agenda and whether the focus will remain on city-regions as engines of growth or whether it will shift in scale or emphasis once more. The historically variable nature of regional economic policy is a concern for those seeking to develop city-region I-O tables. The considerable sunk time and cost to develop robust city-region input-output tables are risks as the scale may lose relevance.

10.5 Policy Recommendations

If policymakers are pursing investment in the creative industries, more must be done to boost productivity in the Film & TV sector. The growth of the creative industries in the CCR is clear, particularly in the Film and TV sector. It is apparent in policy that it is a priority for Welsh Government economic strategy. However, this research has revealed the sector to have relatively low levels of GVA per FTE job filled. For the sector to achieve levelling up in the city-region efforts should be made to increase the productivity of the sector.

Investment in the creative industries will likely further inequalities in Wales. There is growing recognition in the creative industries literature that investment in the sector can achieve growth in output, productivity and incomes. However, there is also caution that investment in such sectors can broaden inequalities (Boix et al., 2021). The spatial distribution of the creative industries within the CCR means that investment in the sector will accrue in the already most productive and prosperous areas of the city-region. Investment in these sectors is likely to disproportionately benefit the city of Cardiff and widen the gap between the city and the hinterland. Furthermore, the literature and interviews acknowledge that those that tend to fill these jobs are skewed male, white and middle class. Caution and mitigating policies should be considered to manage the inequalities that are likely to follow creative industries investment. Ffilm Cymru (2020) have shown leadership in this area at the micro level however, there is little in terms of policy to this end.

Investment in the creative industries may reduce regional resilience. The creative industries labour market has a significant share of those in precarious freelance employment. The COVID-19

pandemic has exposed the precarity in the sector and may have permanently reduced the labour pool in the sector. The tight labour market even before the pandemic has been noted as a constraining factor for the growth of the sector. Therefore, an economic development strategy that relies on the growth of this sector is likely to require more workers to move into precarious employment contracts lowering resilience to future economic stability.

10.6 Limitations of the CCR IO and Future Development

This study has highlighted the challenges involved in the construction of sub-regional, sub-sector I-O tables at a practical level. The study has detailed the barriers to gather secondary data on the creative industries (see section 9.2) A significant additional barrier to data collection for this study has been the lockdown restrictions introduced due to the COVID-19 pandemic, which prevented access to ONS secure data access points. The study has additionally detailed the challenges faced when gathering primary data in the creative industries. Challenges such as the large number of freelance and microbusinesses that do not always consider themselves to be a business. Many freelancers supplement their income with non-creative industries work, such as a touring musician working as a delivery driver.

The spatial scale of the study added additional complications for data collection. Despite the growing emphasis on city-regions in UK policy, there are limited detailed economic accounts published at city-region level. ONS regional accounts provide GVA and GDHI figures for regions and sub-regions of the UK[66]. ONS Busines Register and Employment Survey data provide employment figures by region and sub-region[67]. However, the ONS regional accounts do not provide the inter-industry detail and other components of final demand that are available in the UK supply and use tables. These data, therefore, require estimation from secondary sources and using some restrictive assumptions.

The focus on the creative industries a sector that is *hidden* in the published I-O tables creates an additional methodological challenge. Bryan et al., (2000) highlighted the data gaps in the arts and cultural industries.

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[66]
https://www.ons.gov.uk/economy/grossvalueaddedgva/datasets/nominalandrealregionalgrossvalueaddedbalancedbyindustry

[67]
https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/bulletins/businessregisterandemploymentsurveybresprovisionalresults/previousReleases

"Ultimately, research is still hampered by a paucity of economic data on this industry which will effectively hinder planning processes for many years to come. The collection of appropriate arts and cultural industry data, even covering mundane issues such as employment structure, earnings, and scale, continues to be a research priority." (Bryan et al., 2000, p.1406)

Since 2000 a great deal of attention paid to characterising creative industries employment. The publication of DCMS mapping documents in 2001 and more recently 2016 (DCMS, 2016b) show the progress made in characterising creative activity. This study has shown a possible approach to quantifying creative economic activity in an extended input-output framework. However, this study has shown particularly at smaller spatial scales and within dynamic sub-sectors of the creative industries, data remains sparse. Poor data availability will continue to pose challenges for constructing robust creative industries economic analysis at small spatial scales.

Chapter 7 presented a conceptual CSA for the CCR providing a high level of disaggregation for the screen sector. Data issued described in sections 9.2 and 9.3, however, meant that an alternative approach was used for this study. This study presents an experimental approach to analysing the creative industries with a bespoke I-O at a sub-regional scale. The study shows a more 'top-down' approach than the hybrid method proposed due to the difficulties in gathering sufficient survey data. Despite the data issues, this method presents an important step in methodological development showing the challenges in developing an accurate analysis of a novel sector.

Additionally, to the practical challenges theoretical limitations apply to input-output analysis and this study. The theoretical limitations are covered in full in section 5.4.1. The assumptions of: constant returns to scale, households spending their income in fixed proportions and prices remaining constant are limitations of the model that should be noted before policy recommendations can be drawn. The standard I-O framework assumes that workers can always be found to fill new jobs (Miller & Blair, 2009). This assumption is, however, unrealistic when it comes to using the I-O account for modelling. Interviewees highlighted a 'skills gap' in the creative industries in the CCR (see section 10.1.1). The lack of appropriately skilled individuals in specific roles in sub-sectors of the creative industries is cited as a constraining factor for growth in the creative industries (NAfW, 2019).

As section 9.4.2 shows, non-market factors are not captured in a standard I-O table. Sub-sectors of the creative industries ('Libraries, museums and galleries') are significantly funded by non-market funding such as Government grants. The 'Libraries, museums and galleries' example shows that a £1m increase in final demand would create 94 FTE jobs. A £1m increase in final demand for any other sub-sector would create between 6 and 37 FTE jobs. This shows how impact analysis figures

for sectors with high levels of non-market income can significantly overestimate employment effects.

The non-traditional nature of the sector complicates economic impact analysis of the creative industries. Creative freelancers and micro-businesses can have incomes from non-creative activities. For example, the earlier example of a touring musician who works as a delivery driver. Income from the delivery driving should be treated as separate from income from the creative work. Practically, however, this is not always possible. This accounting issue would be a particular concern when relying on large surveys targeted at freelance workers.

Work in the creative industries can be seasonal; large music festivals tend to take place over the summer hiring many workers on short contracts. A standard I-O table cannot account for seasonality. It can instead produce misleading multipliers whereby 1 FTE job might be representing 50 people working for a couple of weeks for a festival (D'Hernoncourt, 2011). The failure to represent seasonality has modelling implications as employment multipliers are likely to underrepresent the reality of jobs created significantly. In the Film and TV sector in Wales, crews of up to 400 are required for large scale productions; however, these can be temporary productions that appear and dissipate seasonally. An interviewee mentioned that there was concern in the industry that there would not be a sufficient supply of labour to fulfil multiple simultaneous large-scale productions in the CCR.

A significant portion of consumer spending in the creative industries is on streaming services (section 9.3.3). Pirated and illegally streamed content is not captured in the CCR I-O tables. The dimensions of piracy extend across the creative industries affecting book publishing, music, television, film and computer software. The impact of piracy on revenue in each sub-sector is an open question, with some evidence from China suggesting that the figures could range from 43 per cent to 64 per cent (Yue, 2020). Figures from Statistica (2018) estimate the impact of illegal book downloading in the USA to $315 million. Illegal creative industries activity should be included when considering the sector's size, although reliable data in this area is sparse (EUIPO, 2019). Without accounting for piracy across the creative industries, any estimates about the scale of the creative industries are likely underestimates.

Motivations in the creative industries are not always purely economic, with individuals and organisations pursuing non-economic objectives. Motivations in the creative industries were a key theme that surfaced in the interviews (see section 8.5) with one respondent adding:

> *"On a film set there are generally one or two people who are there that are working for free like the interns or runners, or if there not working for free, they are working for nearly free. And that's because film and TV is a glamorous endeavour that people find exciting or romantic or glamorous so there is no shortage of people who can probably who will work for free." (R22, design business)*

Focusing on the economic impact of the creative industries as indicated by macroeconomic statistics risks overlooking the grassroots creative activity on which commercial creative output relies. An interviewee noted (see section 8.4):

> *"You're not going to have anybody in film unless you're supporting youth theatre at the grassroots level. And I think almost you're robbing Peter to pay Paul. And if you, if you take away the base of the pyramid, the top's going to topple and you've got all the grassroots stuff that has been kind of more starved of funding over the last couple of years 'cause that tends to be local authority funding or charitable funding yet we're ploughing money into the likes of, you know, Bad Wolf and Pinewood and what have you. But without actually putting those firm foundations into place." (R14, local authority)*

The respondent's comment reflects the NAfW (2019) discussion into Film and Major Television Production in Wales where concerns were raised about support for smaller and Welsh language productions.

The importance of the creative industries to culture, local heritage, and well-being is also underestimated in this framework. An interview with a small museum presents a poignant example of this issue (section 8.4.3). Without adequate funding, the loss of the museum would be immaterial in economic terms; however, the loss to culture would not be calculated. The presence of cultural institutions, galleries, museums, libraries, regional theatres and other economically low-value creative activities have significant non-economic benefits such as social, educational, health value (Armbrecht, 2014). Additionally, cultural institutions are important for establishing vibrant places that attract creative workers (Florida, 2002). Florida (2002) argues that creative places are central to attracting the 'creative class' and economic growth (see section 2.5.3).

The limitations of input-output tables to capture the less quantifiable contributions of creativity is not a new observation and is reflected in Bryan et al., (2000):

> *"The methodology adopted in this paper, however, ignores some of the most important and unmeasurable social impacts of the arts and cultural industries on regional and national life" (Bryan et al., 2000)*

The failure to adequately capture the non-quantifiable nature of some creative activity has consequences for economic development policy. The effects of the post-2008 financial crisis austerity in the UK were particularly acute in the arts and cultural sector (O'Brien, 2011). Cuts to spending in the arts sector remain an area of concern in the UK, particularly in the aftermath of the

economic damage caused by COVID-19 (Oxford Economics, 2020). These cuts risk taking an all-encompassing view of the benefits of arts and culture to society.

10.6.1 Future I-O Development

The first steps in future research would be to address some of the data challenges and develop the table's robustness. The lack of available data for regional economic analysis in Wales is a stumbling block for data-driven policy in Wales. A statistics office for the CCR akin to the data observatory at City-REDI (University of Birmingham) would be a significant asset to addressing the data gap. Alternatively, access to Annual Business Survey data would allow for more disaggregation and increase the confidence in the creative industries vectors and, in turn, analysis. More data gathered from the ONS or Welsh Government could allow for greater disaggregation of the creative sectors. For example, with more data, the Film & TV sector could be disaggregated to show the impact of the different areas that sit within this sector, production, post-production and animation.

The CCR table can be exploited to simulate the impacts of shocks to different parts of the economy. In the future it could be exploited to simulate changes in the creative economy such as new investment or demand for different creative sub-sectors.

The input-output tables for Wales diverge from those produced by the ONS at the UK level showing different industrial sectors. The Wales tables list 88 sectors, some of which are outdated and do not reconcile to 99 industries in the UK level tables. The divergence between the two tables posed some challenges when reconciling between the Wales tables and ONS published GVA and employment figures. Amending the 88 sectors in Wales to map to those used by the ONS more closely would be valuable to the future development of sub-regional I-O tables in Wales. The regionalisation of the Wales I-O table to the Cardiff City Region has provided valuable learning and could be replicated for other geographies within Wales. Sub-regional I-O tables could be used for analysis for the other City Deals in Wales: The Swansea Bay City Deal, the Mid Wales growth deal and the North Wales growth deal.

Social Accounting Matrices (SAMs) described in section 5.2.4 could build on the CCR I-O tables and would be able to provide some valuable insight into the distributional impacts in the creative industries that would be highly useful to policymakers. A SAM could give evidence of the socio-economic inequalities present in the creative industries. In a SAM households could be disaggregated by socio-economic classification as defined by National Statistics Socio-economic

Classification (NS-SEC). From this, we could gather locally relevant data to show the socio-economic consequences of investment in the creative industries adding to the currently sparse evidence (see section 3.3.1.2). Another issue that I-O fails to capture is the dependence of the creative industries on freelancers. Easton & Cauldwell-French (2017) in their report describe the higher levels of self-employed in the creative industries relative to other traditional sectors. A SAM could be used to separate employment type disaggregating freelancers from full-time employed. Interviewees described the growing influence of large streaming services on the CCR film and TV production sector. The majority of these services are based overseas, raising questions about how local economic benefit is to investment in the sector. A SAM could show ownership in the creative industries and how this impacts the local economy as a result of the changing demand from the coronavirus.

10.7 Final Thoughts and Reflections on Using Sub-regional Input-output tables to Analyse the Creative Industries

The work undertaken in pursuit of this thesis strongly suggests that the development of high-quality city-region tables in the UK which are sufficiently detailed to disaggregate for sub-sectors of interest would require a team of experts at a large creative organisation rather than an individual researcher. The main reason for this is the poor availability of data and the barriers to gathering it to the individual.

The secondary data available for constructing I-O tables from the ONS is not sufficiently disaggregated to allow for sub-sectoral analysis. If access was granted to the secure access ABS data, there would still have been the need for supplementary data. Due to the significant time and data requirements for survey respondents, a high drop-out rate was observed. To gather sufficient data through a survey method effective incentives would have to be offered which are beyond that which an individual researcher can provide. Therefore, to gather sufficient data, a sustained effort from a team of researchers would be required. For organisations such as Clwstwr Creadigol or Creative Wales gathering such data would be possible. Clwstwr supported the study by circulating the survey which gained substantial reach; however, without incentives, the completion rate of the survey was very low (see section 7.5.3). Creative Wales have the reach and sway to persuade creative businesses to provide the complex survey data required. However, despite repeated requests, Creative Wales were unable to assist in data collection. This may suggest that issues of (economic) statistical rigour and progress are insufficiently valued or visible, even in creative organisations with an explicitly economic-developmental role.

As discussed in chapter 6, techniques for analysing the creative industries in an input-output framework are not yet well established. National governments are increasingly using creative Satellite Accounts; however, there is no internationally recognised methodology. In the UK, tourism and environmental satellite accounts are regularly published at the national level along with detailed methodology documents. The lack of an international standard CSA approach is in part due to the difficulties and national subjectivities in characterising creative activity in a way that would allow for meaningful international comparisons (Kemeny et al., 2018). The value of such analysis would be most significant for local policymakers who could use the analysis to inform the future direction of investment. As discussed in this chapter, constructing robust input-output tables for new geographies (such as city-regions) is a costly exercise. Additionally, economic analysis in the creative industries is an emerging field with definitions of creative shifting rapidly. Therefore, the successful development of such analysis relies on the extent to which the policy focus remains on both city-regions and the creative industries.

Input-output tables fail to measure the less quantitative dimensions of the creative industries. The interviews described three essential areas for policy intervention. Firstly, the labour market issues that arise out of skills shortages and a largely self-employed workforce. Secondly, the highly uneven nature of creative activity and employment across the city-region. Thirdly, socio-economic inequalities in the creative industries (Oakley et al., 2017 and Carey et al., 2021). For I-O to be most effective for policymakers, they must be accompanied by a wider contextual and narrative account, as this work has shown.

Despite the difficulties described, the study has provided valuable economic evidence of the economic value of the creative industries. It adds to the literature of economic analysis in the sector, addressing a gap acknowledged by Bloom et al., (2020). There will be an increased focus on economic accounting at the sub-regional scale, whether they are city-regions or some other spatial imagining, in the future. This study provides the first step for sub-regional I-O in Wales.

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Appendices

Appendix 1: SIC 2007 codes of the creative industries

Creative Industry	Standard Industrial Classification Code Description
Advertising and marketing	70.21 Public relations and communication activities 73.11 Advertising agencies 73.12 Media representation
Architecture	71.11 Architectural activities
Crafts	32.12 Manufacture of jewellery and related articles
Design: product, graphic and fashion design	74.10 Specialised design activities
Film, TV, video, radio and photography	59.11 Motion picture, video and television programme production activities 59.12 Motion picture, video and television programme post-production 59.13 Motion picture, video and television programme distribution 59.14 Motion picture projection activities 60.10 Radio broadcasting 60.20 Television programming and broadcasting activities 74.20 Photographic activities
IT, software and computer services	58.21 Publishing of computer games 58.29 Other software publishing 62.01 Computer programming activities 62.02 Computer consultancy activities
Publishing	58.11 Book publishing 58.12 Publishing of directories and mailing lists 58.13 Publishing of newspapers 58.14 Publishing of journals and periodicals 58.19 Other publishing activities 74.30 Translation and interpretation activities
Museums, galleries and libraries	91.01 Library and archive activities 91.02 Museum activities
Music, performing and visual arts	59.20 Sound recording and music publishing activities 85.52 Cultural education 90.01 Performing arts 90.02 Support activities to performing arts 90.03 Artistic creation 90.04 Operation of arts facilities

Economic Impact of Creative Industries in South East Wales

The aim of this research is to understand the economic impact of creative industries in the Cardiff city-region a new administrative region made up of the 10 local authorities of South East Wales; Blaenau-Gwent, Bridgend Caerphilly, Cardiff, Newport, Merthyr, Monmouthshire, Rhondda, Torfaen, Vale of Glamorgan (more details about this project are available on request). This research will form the substantive part of the author's PhD project and feed into wider Cardiff University economic analysis. Your answers to the questions in this survey will help us determine how important creative industries are to the local economy. Whilst taking part in this survey will involve detailing your business expenditure these data will be held confidentially and securely such that only the researcher, Matthew Lyons can trace this information back to you individually. The information will be retained for up to 1 year and will then be anonymized, deleted or destroyed in accordance with the Data Protection Act 1998. Your participation in this study is entirely voluntary, and you can withdraw from the study at any time without giving a reason. To discuss any concerns or to withdraw from the project contact Matthew Lyons (LyonsM1@cardiff.ac.uk) or the project supervisor Prof. Calvin Jones (JonesC24@cardiff.ac.uk)

Contact Information

Business Name	
Contact Name	
Email	
Business Postcode	

Which sector(s) best sum up the business? Tick all that apply

Advertising and marketing, Architecture, Craft, Design: product, graphic and fashion design, Film, TV, video, radio and photography, IT, software and computer services, Publishing, Museums and libraries, Music, performing and visual arts.

Is it difficult to fit your business in one of these categories? If so suggest one below

_____

What percentage of the business's activities would you say are 'creative'?

0-25%

25-50%

50-75%

75-100%

The following questions will ask about the business's employment and financials

Please indicate the financial year this information will relate to

Can you tell us how many people work at the company?

Please count all employees for whom you pay National Insurance contributions including working directors, partners and owners.

If you are a freelance worker or sole trader enter 1 in the relevant box

	Full Time	Part Time	Other
Number employed			

 Use this box for further clarification if required

_____

<u>What were your gross staff costs for this period?</u>

Include National Insurance, overtime, and other staff costs such as directors', partners' remuneration or personal salary taken.

_____

<u>What was your total turnover, or income, net of VAT?</u>

(for the period in question)

_____

Please, could you list your sources of revenue for this period, and estimate their contribution to total turnover. This could include sales of goods and services, revenue grants etc.

Example: source of revenue: = Sales of X, % of turnover: = 50

	Source of Revenue	% of turnover
1.		
2.		
3.		
4.		
5.		

In 2016 The Cardiff Capital Region City Deal was signed creating a new government structure.

The city-region consists of 10 local authorities: Blaenau Gwent, Bridgend, Caerphilly, Cardiff, Merthyr, Monmouthshire, Newport, Rhondda, Torfaen, Vale of Glamorgan

<u>Were you aware of the City Deal or the Cardiff Capital Region?</u>

Yes	

No	

For the following two sections could you please exclude VAT and direct staff costs?
 (If unable to exclude VAT please indicate here)

What has the business spent and where?

Please provide your best estimate of the amount spent and destination of operational expenditure for the top ten costs in the financial year chosen. In the first two columns provide a brief description of the cost (e.g. Travel Costs) and expenditure estimate (£s)

In the next three columns indicate the percentage of this spending that occurred; in the Cardiff city-region, in Wales but not in the city-region and how much occurred outside of Wales. Columns should sum to 100%

 Best guesses are of course acceptable and there is a free text box at the bottom for any further detail or clarification

Example:
 if £1,000 of your spending was on travel costs, 50 per cent of which was on taxis in Cardiff and 50 per cent on flights from Bristol then '£1000' should go in the appropriate expenditure column. '50%' should go in the city-region column, 0% in the Rest of Wales column and 50% in the Outside Wales column.

	Cost Item	Expenditure (£)	% Purchased in the CCR	% Purchased in Wales but Outside the CCR	% Purchased outside Wales
1.					
2.					
3.					

4.					
5.					
6.					
7.					

Free text box for further detail/clarification if required

_____

Last but very important section. What does your business spend within Creative Industries?

Please provide your best estimate of the amount spent and destination of operational expenditure for the below creative industries in the financial year chosen. Some will be 0 feel free to leave blank.

As before, provide an expenditure estimate (£s) and in the three columns to the right indicate the percentage of this spending that occurred; in the Cardiff city-region, in Wales but not in the city-region and how much occurred outside of Wales. Columns should sum to 100%

Best guesses are of course acceptable and there is a free text box at the bottom for any further detail or clarification

Example:
if £1,000 of your spending was on Advertising, 50 per cent of which was provided by a local business in Cardiff and 50 per cent from a London based firm then '£1000' should go in the appropriate expenditure column. '50%' should go in the City-region column, 0% in the Rest of Wales column and 50% in the Outside Wales column.

	Cost Item	Expenditure (£)	% Purchased in the CCR	% Purchased in Wales but Outside the CCR	% Purchased outside Wales
IT skilled activities (consulting, programmers, web design)					
Education (training courses)					
Advertising and marketing (PR, account management, media representation)					
Facebook, Google, social media and online advertising					
Architectural activities					
Craft costs (set design, furniture, other skilled craft activity)					
Design: product, graphic and fashion design					
Film, TV and video					
Radio and podcast					
Photography					
Technical support (sound engineers, camera operators, recording, music publication)					
Publishing (book and print media publishing, mailing lists, translation services)					
Museums galleries and libraries					
Performing & visual arts (musicians, actors, entertainers, artists)					
Other (please specify below)					

If you entered anything in 'other' please specify here

_____

Survey Ends

Appendix 3: Parent Sectors to the Creative Industries

Wales 88 Parent sector	Parent Sector SIC 2007 Codes	DCMS defined creative sector
Market research, advertising	Advertising And Market Research	Advertising and marketing
Other professional services	Architectural And Engineering Activities; Technical Testing And Analysis	Architecture
Other Manufacturing	Other Manufacturing	Crafts
Other professional services	Other Professional, Scientific And Technical Activities	Design: product, graphic and fashion design
Other recreation media and film	Motion Picture, Video & TV Programme Production, Sound Recording & Music Publishing Activities & Programming And Broadcasting Activities	Film, TV, video, radio and photography
Computer and related activities	Computer Programming, Consultancy And Related Activities	IT, software and computer services
Publishing	Publishing Activities	Publishing
Museums & Galleries	Libraries, Archives, Museums And Other Cultural Activities	Museums, galleries and libraries
Other recreation media and film	Creative, Arts And Entertainment Activities	Music, performing and visual arts

Appendix 4: Wales 88 sectors aggregated

	Wales 88 Sectors	Aggregated 1=Y 0 = NO
1	Agric & fish	1
2	Forestry	1
3	Coal & other primary extraction	1
4	Other mining & quarrying	1
5	Meat	1
6	Dairy	1
7	Fish products, vegetables, grain mill products	1
8	Bread & biscuits	1
9	Misc Foods	1
10	Confectionery	1
11	Drinks and Tobacco	1
12	Textiles	1
13	Clothing	1
14	Wood Products	1
15	Paper and Pulps	1
16	Publishing	0
17	Oil Processing	1
18	Chemicals	1
19	Pharmaceutical	1
20	Soaps	1
21	Rubber products	1
22	Plastics	1
23	Glass and Ceramics	1
24	Cement/plaster	1

25	Iron and Steel	1
26	Aluminium & non-ferrous metals	1
27	Forging/pressing	1
28	Structural metals	1
29	Machinery	1
30	Domestic appliances	1
31	Office machinery	1
32	Electrical motors and transformers	1
33	Wires and Cables	1
34	Industrial electrical equipment	1
35	Electronic Components	1
36	TVs	1
37	Control equipment	1
38	Motor Vehicles	1
39	Other Vehicles	1
40	Furniture	1
41	Other manufacturing	0
42	Electricity - Coal	1
43	Electricity - Gas	1
44	Electricity - Nuclear	1
45	Electricity - Hydro	1
46	Electricity - Other Renewables	1
47	Electricity - Transmission, Distribution & Supply	1
48	Gas	1
49	Water	1

50	Construction	1
51	Distribution and Repairs	1
52	Wholesale	1
53	Retail	1
54	Large Hotels	1
55	Small Hotels	1
56	B&B and Guest House	1
57	Self Catering	1
58	Other Accom	1
59	Restaurants etc	1
60	Railways	1
61	Road transport	1
62	Sea and Air transport	1
63	Transport services	1
64	Travel Agents	1
65	Postal services	1
66	Telecomms	0
67	Banking and Finance	1
68	Insurance	1
69	Other Financial services	1
70	Real estate	1
71	Ownership & Rental of Dwellings	1
72	Renting of moveables	1
73	Legal services	1
74	Accountancy services	1
75	Computer and related activities	0

76	R&D	1
77	Market research, advertising	0
78	Other business services	1
79	Other professional Services	0
80	Public Admin	0
81	Education	0
82	Health and social work	1
83	Museums & Galleries	0
84	Attractions, Gardens & other entertainment nec.	1
85	Theme parks and stadia	1
86	Other Recreation, media & film	0
87	Sanitary Services	1
88	Other Services	1

Appendix 5: Interviews Cover Letter

Cardiff Business School
Ysgol Busnes Caerdydd

Economic Impact of Creative Industries within the Cardiff City Region

The aim of this research is to understand the economic impact of creative industries in the Cardiff city-region (*more details about this project are available on request*). This research will form the substantive part of the author's PhD project and feed into wider Cardiff University economic analysis.

I understand that my participation in this project will involve:

An interview which will take up to an hour of my time detailing; the monetary expenditure of my business/organisation by the industrial sector and by location. Discussing the geographic and political context in which my business sits.

I understand that participation in this study is entirely voluntary and that I can withdraw from the study at any time without giving a reason.

I understand that the information provided by me will be held confidentially and securely, such that only the researcher Matthew Lyons can trace this information back to me individually. The information will be retained for up to *1 year* and will then be anonymized, deleted or destroyed. I understand that if I withdraw my consent I can ask for the information I have provided to be anonymised/deleted/destroyed in accordance with the Data Protection Act 1998.

I, _____(*NAME*) consent to participate in the study conducted by Matthew Lyons LyonsM1@Cardiff.ac.uk PhD student of Cardiff Business School, Cardiff University, under the supervision of Calvin Jones.

Signed:

Date:

Appendix 6: Data Sources for Summary Domestic Use Table CCR 2018

Summary Domestic Use Table Cardiff Capital Region 2018 £m

Regional Purchases (£millions)	All other sectors	Public Admin	Education	Other manufacturing	Publishing	Telecomms	Computer and related activities	Other professional Services	Market research, advertising	Other Recreation, media & film	Museums & Galleries	Craft	Publishing	Film, TV, video, radio and photography	IT, software and computer services	Architecture	Advertising and marketing	Design: product, graphic and fashion design	Music, performing and visual arts	Museums, galleries and libraries	Total Intermediate Demand	Consumers	NPISH	Government	Total	Stock2000	GFCF	Total	ROW exports	EU (excluding UK) exports	rest of UK exports	Rest of Wales exports	Total	Total final use	Total use for industry output
1 All other sectors	12931.8	652.8	204.4	237.2	33.8	106.0	51.9	109.2	14.5	30.0	0.9	1.5	4.7	9.8	61.3	6.6	5.7	11.6	13.2	4.7	14491.5	945.8	3.6	1730.5	2679.9	26.5	293.6	320.1	2687.7	1125.6	12565.6	9677.7	16378.9	19378.9	33870.4
2 Public Admin	100.3	9.7	0.3	1.2	0.0	0.0	0.0	5.8	0.0	0.0	0.3	0.0	0.0	0.0	0.1	2.4	0.0	0.0	0.1	0.0	120.3	1.7	0.0	3470.2	3472.0	0.0	0.0	0.0	0.3	0.1	21.0	25.2	21.5	3493.4	3613.7
3 Education	113.0	81.7	86.8	0.9	0.1	4.1	1.8	5.7	0.5	1.1	0.0	0.0	0.0	0.0	2.2	0.1	0.3	0.5	0.0	0.0	298.8	3.3	6.9	87.6	97.8	0.0	0.0	0.0	0.0	0.0	1.7	2.1	1.8	99.6	398.4
4 Other manufacturing	22.1	1.2	1.0	2.6	0.2	0.4	0.1	0.2	0.0	0.2	0.0	0.1	0.0	0.5	0.1	0.0	0.1	0.1	0.7	0.0	29.6	0.1	0.0	0.0	0.1	0.0	0.1	0.1	16.1	6.7	45.6	54.8	68.4	68.7	98.3
5 Publishing	247.8	39.3	24.6	3.0	11.5	2.6	1.1	10.9	0.7	0.1	0.1	0.0	3.4	0.0	1.9	0.0	0.0	0.0	0.1	0.1	347.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	1.9	344.8	413.8	351.3	351.3	698.9
6 Telecomms	207.5	18.5	5.9	2.7	1.0	29.3	1.3	3.5	0.8	1.2	0.0	0.0	0.3	0.3	6.6	0.2	0.4	1.1	0.8	0.1	281.6	3.9	0.0	0.0	3.9	0.0	0.0	0.0	2.1	0.9	199.8	239.8	202.8	206.6	488.2
7 Computer and related activities	268.6	50.5	33.5	1.5	0.5	10.7	3.1	11.7	0.5	2.7	0.0	0.0	0.4	0.4	46.8	0.5	0.4	0.8	0.7	0.3	433.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.8	57.0	68.3	59.7	59.7	493.3
8 Other professional Services	283.5	13.0	2.4	3.5	0.3	2.4	6.3	26.0	1.0	1.8	0.1	0.1	0.4	1.3	0.6	8.7	3.1	14.8	2.9	0.1	372.3	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	2.1	0.9	147.8	177.4	150.8	150.8	523.1
9 Market research, advertising	135.7	19.2	3.4	1.4	1.1	1.9	2.3	2.5	3.0	12.0	0.1	0.1	1.0	4.0	11.5	0.4	1.0	2.5	1.9	0.6	205.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.5	100.9	121.1	102.6	102.6	308.2
10 Other Recreation, media & film	113.8	31.2	10.8	0.7	10.3	5.1	2.6	1.4	6.4	49.3	0.2	0.0	0.2	13.5	0.0	0.0	0.2	0.0	10.4	0.5	256.5	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.5	0.2	14.4	17.3	15.2	15.3	271.8
11 Museums & Galleries	2.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.2	3.4	39.4	47.3	51.1	51.1	54.9
12 Craft	119.1	0.8	2.2	17.7	0.1	0.2	1.0	0.3	0.1	1.6	0.0	0.1	0.0	1.5	0.2	0.0	0.1	0.3	1.4	0.1	146.2	20.1	0.0	0.0	20.1	0.0	0.0	0.0	18.6	7.8	48.7	58.4	75.1	95.2	241.4
13 Publishing	22.8	4.5	5.4	0.7	7.4	0.0	1.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	3.2	0.0	0.0	0.0	0.1	0.2	48.9	10.9	0.0	1.2	12.1	0.0	0.0	0.0	6.2	2.6	3.1	3.7	11.9	24.1	73.0
14 Film, TV, video, radio and photography	4.8	3.6	1.3	0.0	0.0	0.0	0.0	0.0	0.2	29.5	0.1	0.0	0.0	35.8	0.0	0.0	0.3	0.0	3.9	0.4	79.8	11.2	0.0	4.4	15.6	0.0	0.6	0.6	25.0	10.5	85.5	102.6	121.1	137.2	217.0
15 IT, software and computer services	339.0	28.4	8.9	2.9	1.6	18.4	25.2	4.8	1.7	2.1	0.1	0.0	0.7	1.3	80.4	1.1	0.6	1.8	1.6	0.4	520.8	0.1	0.0	0.0	0.1	0.0	0.0	0.0	63.5	26.6	155.2	186.3	245.4	245.5	766.3
16 Architecture	267.8	14.2	1.8	0.8	0.0	0.1	0.0	58.3	0.4	0.6	0.0	0.0	0.0	0.0	0.0	17.2	0.0	1.2	0.9	0.1	363.8	0.6	0.0	0.0	0.6	0.0	0.0	0.0	2.8	3.4	16.5	17.1			380.9
17 Advertising and marketing	112.1	1.6	1.0	5.9	0.4	0.8	0.2	0.5	0.1	0.3	0.1	0.0	1.3	10.4	9.3	0.3	1.0	4.2	3.6	0.4	153.7	0.1	0.0	0.0	0.1	0.0	0.0	0.0	561.7	235.2	368.6	442.3	1165.5	1165.5	1319.2
18 Design: product, graphic and fashion design	164.0	2.4	1.5	8.6	0.6	1.1	0.4	0.8	0.1	0.5	0.2	0.1	0.6	3.1	1.0	0.1	5.1	32.6	5.3	0.1	228.0	0.8	0.0	0.0	0.8	-0.1	0.2	0.1	424.7	177.9	301.2	361.4	903.8	904.7	1132.7
19 Music, performing and visual arts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.4	0.0	0.0	0.0	18.6	0.3	21.6	4.9	0.5	15.7	21.1	0.0	0.1	0.1	63.9	26.7	50.4	60.5	141.0	162.1	183.8
20 Museums, galleries and libraries	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.5	1.8	2.5	0.1	16.7	19.3	0.0	0.1	0.1	29.9	12.5	176.4	211.7	218.8	238.2	239.9
Total Domestic Purchases	15455.8	972.8	395.2	291.3	69.1	183.1	97.4	241.7	29.8	133.0	2.4	2.0	16.7	84.9	225.4	37.6	18.1	71.5	66.5	11.3	18405.7	1006.2	11.1	5326.5	6343.8	26.3	294.8	321.0	3928.0	1645.0	14730.0	12275.0	20303.0	26967.8	45373.5
Imports Rest of Wales	18053.4	171.0	1398.6	136.8	142.3	313.5	181.2	331.2	53.3	177.9	26.0	0.0	2.8	53.6	37.4	0.9	0.2	11.9	11.0	1.9	21104.8	14917.5													
Imports RUK	15622.6	114.9	266.0	292.0	89.1	199.9	52.9	13.9	10.5	203.1	14.7	0.6	3.9	7.0	52.8	13.0	4.2	16.8	15.6	2.6	16996.1	4060.3													
Imports ROW	4243.7	75.3	81.7	192.6	32.6	100.1	43.8	32.8	190.2	0.3	0.0	0.0	1.9	74.3	92.7	1.5	10.5	0.7	5.7	0.0	5180.6	354.7													
Total intermediate use at basic prices	53375.4	1334.0	2141.4	912.8	333.1	796.5	375.4	619.6	283.7	514.3	43.1	2.6	25.3	219.8	408.4	53.0	33.0	100.9	98.9	15.8	61687.1	20338.7	11.1	5326.5		26.3	294.8								
Taxes less subsidies on production	764.6	4.4	29.7	14.5	2.8	7.7	3.5	10.5	0.9	0.0	0.0	0.0	0.1	-5.5	1.9	0.7	0.1	0.7	0.2	0.0	836.9	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0
Compensation of employees	7721.2	86.4	757.8	50.7	64.5	148.1	116.4	230.3	37.2	83.1	13.3	1.3	9.2	36.8	169.3	31.0	8.8	53.4	29.0	8.6	9656.2	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0
Gross operating surplus	11736.6	51.5	151.4	272.7	75.4	315.7	58.5	159.4	13.3	32.4	0.0	0.8	7.5	53.6	54.2	6.0	9.2	17.4	37.3	2.7	13055.6	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0
Taxes on Products	1346.6	9.1	32.9	27.8	10.7	26.6	9.8	20.6	1.7	11.3	0.1	0.2	1.8	12.9	27.5	3.9	2.2	7.5	7.2	1.2	1561.8	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0
Gross Value Added at basic prices	21569.0	151.4	971.8	365.8	153.4	498.0	188.2	420.9	53.1	126.8	13.4	2.2	18.5	97.9	252.9	41.6	20.3	79.0	73.7	12.4	25110.4	0.0	0.0	0.0		0.0	0.0								
Total Output	75709.0	1489.8	3142.9	1293.1	489.4	1302.2	567.0	1051.1	337.8	641.1	56.6	4.9	43.9	312.2	663.1	95.2	53.4	180.6	172.8	28.2	87634.4	20338.7	11.1	5326.5		26.3	294.8								

1	Derived from UK SUT tables for 2018 (ONS) detailed in 9.3.1
	https://www.ons.gov.uk/economy/nationalaccounts/supplyandusetables/datasets/inputoutputsupplyandusetables
2	Derived from unpublished I-O tables for Wales 2018 using location quotients (LQ, CILQ & FLQ) as detailed in section 9.3.1
3	Exports derived from trade data for Wales (section 9.3.4)
	https://gov.wales/trade-survey-wales-2018
4	Government spending data gathered from secondary sources such as financial statements for Museums, libraries and Arts Council Wales funding (9.3.4)
5	Imports data estimated in section 9.3.3
	https://www.gov.uk/government/statistics/dcms-sectors-economic-estimates-2018-trade-in-services
6	Totals and calculations within the table.
7	GVA estimates calculated from ONS published figures section 9.3.2.
	https://www.ons.gov.uk/economy/grossvalueaddedgva/adhocs/006815constrainedregionalgrossvalueaddedgvaestimatesfordepartmentforculturemediaandsportdcmscreativeindustriessubsectors

Appendix 7: Inter-industry Detail

	Other Manufacturing	Publishing Activities	Motion Picture, Video & TV Programme Production, Sound Recording & Music Publishing Activities & Programming And Broadcasting Activities	Computer Programming, Consultancy And Related Activities	Architectural And Engineering Activities; Technical Testing And Analysis	Advertising And Market Research	Other Professional, Scientific And Technical Activities	Creative, Arts And Entertainment Activities	Libraries, Archives, Museums And Other Cultural Activities
Other mining & quarrying	1%	0%	0%	0%	0%	0%	0%	0%	0%
Bread & biscuits	0%	1%	0%	0%	0%	0%	0%	0%	0%
Drinks and Tobacco	0%	0%	1%	0%	0%	0%	0%	0%	1%
Textiles	2%	0%	0%	0%	0%	0%	1%	0%	0%
Wood Products	3%	0%	0%	0%	0%	0%	0%	0%	0%
Paper and Pulps	1%	11%	0%	0%	0%	1%	1%	1%	1%
Publishing	0%	20%	0%	1%	0%	0%	0%	0%	4%
Oil Processing	1%	0%	0%	0%	0%	0%	0%	0%	1%
Chemicals	3%	3%	0%	0%	2%	0%	0%	0%	0%
Pharmaceutical	2%	0%	0%	0%	0%	0%	0%	0%	0%
Rubber products	5%	0%	0%	0%	0%	0%	0%	2%	0%
Glass and Ceramics	0%	0%	0%	0%	0%	0%	0%	0%	1%
Cement/plaster	0%	0%	0%	0%	0%	0%	0%	0%	1%
Iron and Steel	2%	0%	0%	0%	1%	0%	0%	0%	1%
Forging/pressing	20%	0%	0%	0%	1%	0%	0%	0%	0%
Machinery	6%	0%	0%	0%	1%	0%	0%	0%	0%
Office machinery	2%	2%	4%	1%	2%	0%	1%	1%	2%
Electrical motors and transformers	3%	0%	0%	0%	0%	0%	0%	0%	0%
Other manufacturing	6%	0%	1%	0%	0%	0%	0%	1%	0%
Electricity - Transmission, Distribution & Supply	1%	0%	0%	1%	0%	0%	1%	1%	2%
Water	0%	0%	0%	0%	0%	0%	0%	0%	1%
Construction	0%	0%	0%	0%	1%	0%	1%	0%	3%
Distribution and Repairs	1%	0%	0%	0%	0%	0%	0%	1%	1%
Large Hotels	0%	0%	0%	1%	0%	2%	1%	0%	0%
Restaurants etc	0%	0%	0%	1%	0%	1%	1%	1%	6%
Road transport	3%	2%	0%	0%	0%	0%	1%	0%	0%
Sea and Air transport	0%	0%	0%	0%	0%	4%	1%	0%	0%
Postal services	2%	2%	0%	2%	0%	0%	0%	1%	0%
Telecomms	1%	2%	0%	3%	1%	2%	1%	1%	1%
Banking and Finance	5%	1%	0%	1%	2%	4%	2%	2%	0%
Other Financial services	0%	0%	0%	1%	1%	0%	0%	0%	0%
Ownership & Rental of Dwellings	0%	2%	1%	3%	1%	7%	1%	0%	1%
Renting of moveables	1%	0%	0%	1%	1%	0%	0%	1%	1%
Legal services	1%	1%	1%	2%	0%	1%	1%	1%	0%
Accountancy services	1%	1%	0%	4%	0%	3%	1%	2%	3%
Computer and related activities	1%	2%	1%	21%	1%	2%	1%	1%	2%
R&D	0%	0%	0%	0%	0%	0%	0%	0%	0%
Market research, advertising	4%	6%	5%	5%	1%	5%	3%	3%	5%
Other business services	0%	0%	1%	5%	0%	1%	0%	1%	3%
Other professional Services	3%	2%	1%	0%	23%	17%	21%	4%	1%
Public Admin	0%	0%	0%	0%	6%	0%	0%	0%	0%
Education	0%	0%	0%	1%	0%	1%	1%	0%	0%
Theme parks and stadia	0%	0%	0%	0%	0%	0%	0%	0%	1%
Other Recreation, media & film	0%	1%	16%	0%	0%	1%	0%	16%	5%
Sanitary Services	1%	0%	0%	0%	0%	0%	0%	0%	1%
Other Services	2%	1%	1%	3%	2%	5%	1%	1%	5%
Other Manufacturing	7%	0%	2%	0%	0%	1%	0%	2%	1%
Publishing Activities	0%	21%	0%	1%	0%	0%	0%	0%	2%
Motion Picture, Video & TV Programme Production, Sound Re	0%	0%	42%	0%	0%	2%	0%	6%	4%
Computer Programming, Consultancy And Related Activities	1%	4%	1%	36%	3%	3%	2%	2%	3%
Architectural And Engineering Activities; Technical Testing An	0%	0%	1%	0%	46%	0%	2%	1%	1%
Advertising And Market Research	2%	8%	12%	4%	1%	6%	6%	5%	4%
Other Professional, Scientific And Technical Activities	3%	4%	4%	0%	0%	28%	46%	8%	1%
Creative, Arts And Entertainment Activities	0%	2%	3%	0%	0%	0%	0%	28%	3%
Libraries, Archives, Museums And Other Cultural Activities	0%	0%	0%	0%	0%	0%	0%	0%	13%

	Other Manufacturing	Publishing Activities	Motion Picture, Video & TV Programme Production, Sound Recording & Music Publishing Activities & Programming And Broadcasting Activities	Computer Programming, Consultancy And Related Activities	Architectural And Engineering Activities; Technical Testing And Analysis	Advertising And Market Research	Other Professional, Scientific And Technical Activities	Creative, Arts And Entertainment Activities	Libraries, Archives, Museums And Other Cultural Activities
Agric & fish	0%	0%	0%	0%	0%	0%	0%	0%	0%
Forestry	0%	0%	0%	0%	0%	0%	0%	0%	0%
Coal & other primary extraction	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other mining & quarrying	1%	0%	0%	0%	0%	0%	0%	0%	0%
Meat	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dairy	0%	0%	0%	0%	0%	0%	0%	0%	0%
Fish products, vegetables, grain mill products	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bread & biscuits	0%	1%	0%	0%	0%	0%	0%	0%	0%
Misc Foods	0%	0%	0%	0%	0%	0%	0%	0%	0%
Confectionery	0%	0%	0%	0%	0%	0%	0%	0%	0%
Drinks and Tobacco	0%	0%	1%	0%	0%	0%	0%	0%	1%
Textiles	2%	0%	0%	0%	0%	0%	1%	0%	0%
Clothing	0%	0%	0%	0%	0%	0%	0%	0%	0%
Wood Products	3%	0%	0%	0%	0%	0%	0%	0%	0%
Paper and Pulps	1%	11%	0%	0%	0%	1%	1%	1%	1%
Publishing	0%	20%	0%	1%	0%	0%	0%	0%	4%
Oil Processing	1%	0%	0%	0%	0%	0%	0%	0%	1%
Chemicals	3%	3%	0%	0%	2%	0%	0%	0%	0%
Pharmaceutical	2%	0%	0%	0%	0%	0%	0%	0%	0%
Soaps	0%	0%	0%	0%	0%	0%	0%	0%	0%
Rubber products	5%	0%	0%	0%	0%	0%	0%	2%	0%
Plastics	0%	0%	0%	0%	0%	0%	0%	0%	0%
Glass and Ceramics	0%	0%	0%	0%	0%	0%	0%	0%	1%
Cement/plaster	0%	0%	0%	0%	0%	0%	0%	0%	1%
Iron and Steel	2%	0%	0%	0%	1%	0%	0%	0%	1%
Aluminium & non-ferrous metals	0%	0%	0%	0%	0%	0%	0%	0%	0%
Forging/pressing	20%	0%	0%	0%	1%	0%	0%	0%	0%
Structural metals	0%	0%	0%	0%	0%	0%	0%	0%	0%
Machinery	6%	0%	0%	0%	1%	0%	0%	0%	0%
Domestic appliances	0%	0%	0%	0%	0%	0%	0%	0%	0%
Office machinery	2%	2%	4%	1%	2%	0%	1%	1%	2%
Electrical motors and transformers	3%	0%	0%	0%	0%	0%	0%	0%	0%
Wires and Cables	0%	0%	0%	0%	0%	0%	0%	0%	0%
Industrial electrical equipment	0%	0%	0%	0%	0%	0%	0%	0%	0%
Electronic Components	0%	0%	0%	0%	0%	0%	0%	0%	0%
TVs	0%	0%	0%	0%	0%	0%	0%	0%	0%
Control equipment	0%	0%	0%	0%	0%	0%	0%	0%	0%
Motor Vehicles	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other Vehicles	0%	0%	0%	0%	0%	0%	0%	0%	0%
Furniture	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other manufacturing	6%	0%	1%	0%	0%	0%	0%	1%	0%
Electricity - Coal	0%	0%	0%	0%	0%	0%	0%	0%	0%
Electricity - Gas	0%	0%	0%	0%	0%	0%	0%	0%	1%
Electricity - Nuclear	0%	0%	0%	0%	0%	0%	0%	0%	0%
Electricity - Hydro	0%	0%	0%	0%	0%	0%	0%	0%	0%
Electricity - Other Renewables	0%	0%	0%	0%	0%	0%	0%	0%	0%
Electricity - Transmission, Distribution & Supply	1%	0%	0%	1%	0%	0%	1%	1%	2%
Gas	0%	0%	0%	0%	0%	0%	0%	0%	0%
Water	0%	0%	0%	0%	0%	0%	0%	0%	1%
Construction	0%	0%	0%	0%	1%	0%	1%	1%	3%
Distribution and Repairs	1%	0%	0%	0%	0%	0%	0%	1%	1%
Wholesale	0%	0%	0%	0%	0%	0%	0%	0%	0%
Retail	0%	0%	0%	0%	0%	0%	0%	0%	0%
Large Hotels	0%	0%	0%	1%	0%	2%	1%	0%	0%
Small Hotels	0%	0%	0%	0%	0%	0%	0%	0%	0%
B&B and Guest House	0%	0%	0%	0%	0%	0%	0%	0%	0%
Self Catering	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other Accom	0%	0%	0%	0%	0%	0%	0%	0%	0%
Restaurants etc	0%	0%	0%	1%	0%	1%	1%	1%	6%
Railways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Road transport	3%	2%	0%	0%	0%	0%	1%	0%	0%
Sea and Air transport	0%	0%	0%	0%	0%	4%	1%	0%	0%
Transport services	0%	0%	0%	0%	0%	0%	0%	0%	0%
Travel Agents	0%	0%	0%	0%	0%	0%	0%	0%	0%
Postal services	2%	2%	0%	2%	0%	0%	0%	1%	0%
Telecomms	1%	2%	0%	3%	1%	2%	1%	1%	1%
Banking and Finance	5%	1%	0%	1%	2%	4%	2%	2%	0%
Insurance	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other Financial services	0%	0%	0%	1%	1%	0%	0%	0%	0%
Real estate	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ownership & Rental of Dwellings	0%	2%	1%	3%	1%	7%	1%	0%	1%
Renting of moveables	1%	0%	0%	1%	1%	0%	0%	1%	1%
Legal services	1%	1%	1%	2%	0%	1%	1%	1%	0%
Accountancy services	1%	1%	0%	4%	0%	3%	1%	2%	3%
Computer and related activities	1%	2%	1%	21%	1%	2%	1%	1%	2%
R&D	0%	0%	0%	0%	0%	0%	0%	0%	0%
Market research, advertising	4%	6%	5%	5%	1%	5%	3%	3%	5%
Other business services	0%	0%	1%	5%	0%	1%	0%	1%	3%
Other professional Services	3%	2%	1%	0%	23%	17%	21%	4%	1%
Public Admin	0%	0%	0%	0%	6%	0%	0%	0%	0%
Education	0%	0%	0%	1%	0%	1%	1%	0%	0%
Health and social work	0%	0%	0%	0%	0%	0%	0%	0%	0%
Museums & Galleries	0%	0%	0%	0%	0%	0%	0%	0%	9%
Attractions, Gardens & other entertainment nec.	0%	0%	0%	0%	0%	0%	0%	0%	0%
Theme parks and stadia	0%	0%	0%	0%	0%	0%	0%	0%	1%
Other Recreation, media & film	0%	1%	16%	0%	0%	1%	0%	16%	5%
Sanitary Services	1%	0%	0%	0%	0%	0%	0%	0%	1%
Other Services	2%	1%	1%	3%	2%	5%	1%	1%	5%
Other Manufacturing	7%	0%	2%	0%	0%	1%	0%	0%	0%
Publishing Activities	0%	21%	0%	1%	0%	0%	0%	0%	2%
Motion Picture, Video & TV Programme Production	0%	0%	42%	0%	0%	2%	0%	6%	4%
Computer Programming, Consultancy And Related A	1%	4%	1%	36%	3%	3%	2%	2%	3%
Architectural And Engineering Activities; Technical T	0%	0%	1%	0%	46%	0%	2%	1%	1%
Advertising And Market Research	2%	8%	12%	4%	1%	6%	6%	5%	4%
Other Professional, Scientific And Technical Activitie	3%	4%	4%	0%	0%	28%	46%	8%	1%
Creative, Arts And Entertainment Activities	0%	2%	3%	0%	0%	0%	0%	28%	3%
Libraries, Archives, Museums And Other Cultural Act	0%	0%	0%	0%	0%	0%	0%	0%	13%

Appendix 8: Creative Policy Bodies UK and Wales

DCMS sponsored non-departmental bodies:

Arts Council England
British Film Institute
British Library
British Museum
Equality and Human Rights Commission
Gambling Commission
Geffrye Museum
Historic England
Horniman Museum
Horserace Betting Levy Board
Imperial War Museum
Information Commissioner's Office
National Gallery
National Heritage Memorial Fund
National Maritime Museum
National Museums Liverpool
National Portrait Gallery
Natural History Museum
Royal Armouries
Science Museum Group
Sir John Soane's Museum
Sport England
Sports Grounds Safety Authority
Tate
UK Anti-Doping
UK Sport
Victoria and Albert Museum
VisitBritain
VisitEngland

Assembly Government sponsored bodies:

The Arts Council of Wales;
Amgueddfa Cymru - National Museum Wales;
Creative Wales
National Library of Wales;
Royal Commission on the Ancient and Historical Monuments of Wales;
Sport Wales
Welsh Language Board

Appendix 9: DCMS Defined Creative industries and Culture Sectors.

DCMS (2016):

SIC07	Description	Creative Industries	Cultural Sector
1820	Reproduction of recorded media		*
3212	Manufacture of jewellery and related articles	*	*
3220	Manufacture of musical instruments		*

Code	Activity		
4763	Retail sale of music and video recordings in specialised stores		*
5811	Book publishing	*	
5812	Publishing of directories and mailing lists	*	
5813	Publishing of newspapers	*	
5814	Publishing of journals and periodicals	*	
5819	Other publishing activities	*	
5821	Publishing of computer games	*	
5829	Other software publishing	*	
5911	Motion picture, video and television programme production activities	*	*
5912	Motion picture, video and television programme post-production activities	*	*
5913	Motion picture, video and television programme distribution activities	*	*
5914	Motion picture projection activities	*	*
5920	Sound recording and music publishing activities	*	*
6010	Radio broadcasting	*	*
6020	Television programming and broadcasting activities	*	*
6201	Computer programming activities	*	
6202	Computer consultancy activities	*	
7021	Public relations and communication activities	*	
7111	Architectural activities	*	
7311	Advertising agencies	*	
7312	Media representation	*	
7410	Specialised design activities	*	
7420	Photographic activities	*	*
7430	Translation and interpretation activities	*	
8552	Cultural education	*	*
9001	Performing arts	*	*
9002	Support activities to performing arts	*	*
9003	Artistic creation	*	*
9004	Operation of arts facilities	*	*
9101	Library and archive activities	*	*
9102	Museum activities	*	*
9103	Operation of historical sites and buildings and similar visitor attractions		*

https://www.gov.uk/government/publications/dcms-sectors-economic-estimates-methodology

Appendix 10: Investment Required to Reach 20,000 new FTE by Creative Sub-sector

	Total Employment effect (T1 &T2)	Investment to achieve 20,000 FTE (millions)	£ Investment per FTE	Estimated GVA per FTE
Craft	10	£ 1,982	£ 99,082	£178,305
Publishing	20	£ 978	£ 48,904	£67,731

256

Film & TV	13	£ 1,576	£ 78,804	£47,126
IT	13	£ 1,540	£ 77,000	£72,507
Architecture	32	£630	£ 31,516	£33,855
Advertising And Market Research	32	£ 616	£ 30,780	£34,475
Design	4	£ 4,452	£ 222,603	£220,007
Performing Arts	12	£ 1,623	£ 81,161	£99,403
Libraries, Museums And Galleries	76	£ 265	£ 13,237	£21,198

Appendix 11: Interview Schedule

Phase I Interview Schedule

Phase I interviews were designed to gather an insight into the issues facing creative businesses in the Cardiff Capital Region. The interviews were semi-structured and based on the following questions.

How would you describe the state of the screen sector in South Wales? How has it changed and what do you think the next 5-10 years look like?

Have you seen a change in the structure of employment in your sector?

Do you feel creative industries are adequately valued by the Government and in government policy?

Does your business's Standard Industrial Classification (SIC) accurately capture your business's activity?

Is your business purely an economic endeavour?

What challenges do you think the [creative industries or sub-sector] are facing?

Theme specific question (depending on interviewee expertise). Example: How has being part of a creative hub impacted the business?

Phase II Interview Schedule

In phase II key stakeholders with expertise in sub-regional policy and the creative industries in Wales were presented with the figures generated from the input-output tables. Interviewees were asked to comment on whether the figures generated seemed correct and whether they were valuable. The interviews were semi-structured and based on the following questions:

1. Do the numbers look right? Employment & GVA by sector
2. How do you think growth in the creative industries will affect the wider Cardiff economy? Prompt: Will it be through direct employment? Tourism? What challenges are there?
3. How far do you have a strategy to enhance productivity and skills within the creative industries? Prompt: precarity is a well-established feature of employment in the creative industries. Is there a danger that increasing the size of the sector will lead to more precarious employment?
4. How does the policy process work in the creative industries? What information/data do you see and how does it influence the board of directors/WG/etc
5. GVA uplift is a theme in creative policy from the CCR to Media Cymru. From a policy perspective how useful are timely figures on GVA, employment and output? Would surprise figures about high GVA design sector change the sub-sectors of focus for Government?

[i] International Passenger survey:
https://www.ons.gov.uk/surveys/informationforhouseholdsandindividuals/householdandindividualsurveys/internationalpassengersurvey
[ii] Great Britain Tourism Survey
https://www.visitbritain.org/great-britain-tourism-survey-latest-monthly-overnight-data
[iii] Great Britain Day Visits Survey
https://www.visitbritain.org/gb-day-visits-survey-latest-results