

# Economic Value of the Screen Sector in Scotland in 2019

**Saffery Champness**  
CHARTERED ACCOUNTANTS



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# Executive Summary

## Background

Scotland is home to a vibrant ecosystem of content creators, writers, independent producers and production companies creating a wide range of television programming and films for audiences within Scotland, across the UK and around the world.

Scotland also has several post-production facilities and animation studios of scale, specialising in both production and visual effects (VFX) work for television and games. It has long been a popular location for the filming of inward-investment films produced by the global studios. Notably, the *James Bond*, *Harry Potter*, *Avengers* and *Fast & Furious* franchises have partly filmed in Scotland. It is also home to the long-running TV series *Outlander*, *Shetland*, and *Location, Location, Location*, among many more.

Much of the television production in Scotland is enabled by the fact that it has an ecosystem of PSBs based locally. There is BBC Scotland and BBC Alba. As the home to STV, Scotland is the only part of the UK with its own national 'affiliate' of ITV. Channel 4 and Channel 5 also have operations within Scotland.

The Scottish Government is committed to supporting the growth of Scotland's film and TV production sector. Beginning in 2017, it significantly increased the funding for film and TV production and development. This was followed by the formation of Screen Scotland in August 2018.

As part of this commitment to grow the film and TV production sector as well as the wider screen sector in Scotland, Screen Scotland commissioned the following study of the **Economic Value of the Screen Sector in Scotland**.

The objective of the study is to quantify the contribution that the screen sector makes to Scotland's economy – where the screen sector has been defined as inclusive of **film and TV development and production; animation, VFX and post-production; film and TV distribution; TV broadcast; film exhibition; film and TV skills and education; and film and TV production facilities**. The study covers film, TV and other audiovisual content; it does not cover the video games sector, nor does it include all of the commercials/corporate sector or online video production. In that regard, the report focuses on film and TV that is intended for initial release in cinemas, on broadcast or multichannel TV or related catch-up services, or subscription video on demand (SVOD) services. Video content made primarily for video sharing platforms (e.g. YouTube or TikTok) may not be captured.

It also looks only at calendar year 2019, the year before the onset of the global pandemic. It is the intention of Screen Scotland to update this study in 2022 by surveying 2021, the year after the most comprehensive lockdowns closed cinemas and shutdown production. Once this second survey is complete, a picture will be provided of the economic value of "screen" to Scotland immediately prior to the pandemic and as we emerged from Covid-19 restrictions across 2021.

The study focuses on quantifying the overall **economic footprint** of the screen sector in Scotland – that is, the total number of people employed (on a full-time equivalent basis) and the monetary value of all economic activity within the screen sector – rather than assessing the additional or net economic impact of the screen sector in Scotland.

## Employment impact

The screen sector in Scotland generated an estimated 10,280 FTEs of employment for Scotland's economy in 2019 (Table E - 1). Of this total employment impact, the direct employment impact was 7,070 FTEs. These **direct impact** FTEs include the crew and cast employed on film and TV production projects and people employed at production companies, distributors, cinema exhibitors and film festivals, and at TV broadcasters in Scotland.

The direct impact also includes people in those industries or sectors that benefit from screen sector spillovers. The best examples are screen tourism, and screen education and training. These are two

industries that lie outside the screen content value chain but still benefit from the creation of screen content, which ultimately generates demand for the products and services offered by these industries.

The infrastructure sub-sector, namely studio facilities, could also be considered a beneficiary of spillovers from the screen content value chain. In particular, rising levels of screen production generate demand for the construction of new studio facilities – thereby creating a spillover for the construction and property development industries. Our research found very little evidence of this type of studio investment in Scotland in 2019, other than around Ward Park in Cumbernauld, though we note that since then studios/production facilities have been developed in Leith, Bathgate and in Glasgow. Any subsequent study of 2021 will reflect the impact of those more recent developments.

The sub-sectors that comprise both the screen sector value chain and the spillover industries all purchase supplies and services from other industries. Whilst some of these supply chain purchases are directed outside of Scotland, a very significant portion of these supply chains are located within Scotland. This type of economic impact is often referred to as the **indirect impact**. The impact of further re-spending of employment income by workers employed at both the direct and indirect phases of impact is often referred to as the **induced impact**. The screen sector generated an additional 3,210 FTEs of indirect and induced impact employment within Scotland in 2019. This excludes the indirect and induced impacts that would have been generated outside of Scotland.

The development and production of screen content accounted for the largest share of the screen sector's total employment impact. In 2019 it accounted for 5,120 FTEs of employment, or nearly half of the sector's overall employment impact. The exhibition and festivals sub-sector (2,000 FTEs), as well as screen tourism (1,220 FTEs), and education, skills and talent development (1,170 FTEs) were also significant sources of employment impact.

**Table E - 1 Employment impact generated by Screen sector in Scotland, 2019 (FTEs)**

		Direct	Indirect/ Induced	Total
Screen content value chain	Development and production	3,290	1,830	5,120
	Distribution	30	30	60
	Exhibition and film festivals	1,420	580	2,000
	TV broadcast (support operations)	420	290	710
Spillovers	Screen tourism	910	310	1,220
	Education, skills and talent development	1,000	170	1,170
	Infrastructure	--*	--*	--*
<b>Total</b>		<b>7,070</b>	<b>3,210</b>	<b>10,280</b>

Source: Saffery Champness / Nordicity estimates based on data from Screen Scotland, Screen Commission, BFI, public financial reports, Ofcom, producers/distributors survey (2021), Comscore, ONS, ABS, ASHE, IDBR, BRES, D&B, EIFF, Glasgow Film Festival, Tourism Resources Company, VisitScotland, VisitBritain, the Moffat Centre for Travel & Tourism Business Development, HESA, ESFA, SQA, TRC Media and BECTU Vision

\* Research indicates that there was no substantial investment in studio facilities in 2019 in Scotland that would have generated employment impacts in that year – see note above regarding subsequent infrastructure developments in 2020 and 2021.

Note: Figures may not sum to totals due to rounding

### Gross value-added impact

The monetary contribution that the screen sector makes to Scotland's economy can be measured through GVA. In 2019, the screen sector in Scotland generated a total GVA impact of £567.6 million (Table E - 2). Out of this total impact, £367.2 million was generated directly within the various sub-sectors of the screen sector value chain and the spillover industries.

As with employment, the development and production of screen content was the largest single source of GVA – contributing just over half of the sector's total and direct GVA. In 2019, development and production accounted for £315.1 million in total GVA and £195.0 million in direct GVA. It was followed by the exhibition and film festivals sub-sector, which contributed £88.9 million in total GVA.

**Table E - 2 GVA impact generated by Screen sector in Scotland, 2019 (£ millions)**

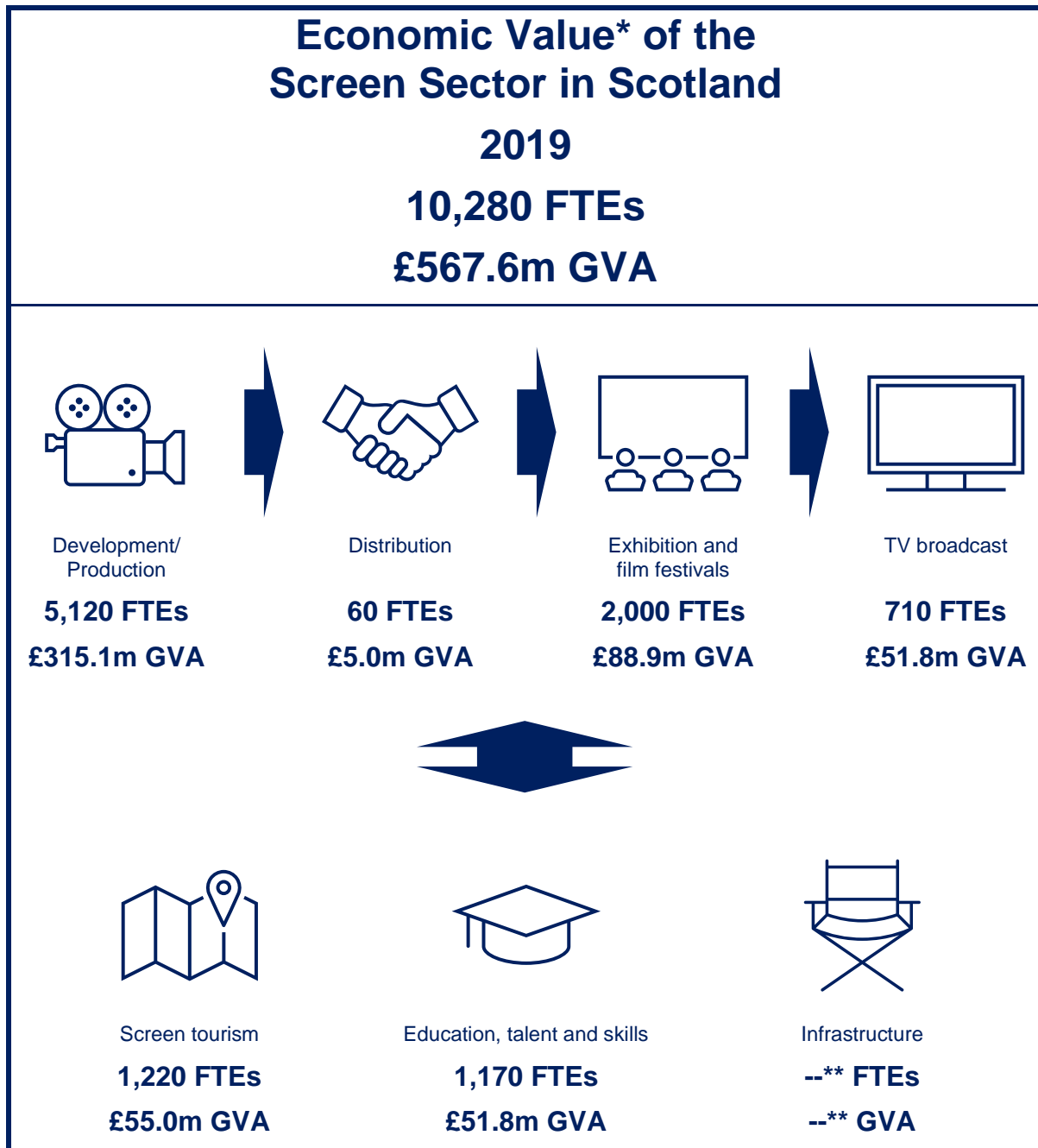
		Direct	Indirect/ Induced	Total
Screen content value chain	Development and production	195.0	120.0	315.1
	Distribution	3.0	2.0	5.0
	Exhibition and film festivals	59.6	29.2	88.9
	TV broadcast (support operations)	31.6	20.2	51.8
Spillovers	Screen tourism	35.9	19.1	55.0
	Education, skills and talent development	42.0	9.8	51.8
	Infrastructure	--*	--*	--*
<b>Total</b>		<b>367.2</b>	<b>200.4</b>	<b>567.6</b>

Source: Saffery Champness / Nordicity estimates based on data from Screen Scotland, Screen Commission, BFI, public financial reports, Ofcom, producers/distributors survey (2021), Comscore, ONS, ABS, ASHE, IDBR, BRES, D&B, EIFF, Glasgow Film Festival, Tourism Resources Company, VisitScotland, VisitBritain, the Moffat Centre for Travel & Tourism Business Development, HESA, ESFA, SQA, TRC Media and BECTU Vision

\* Research indicates that there was no investment in studio facilities in 2019 in Scotland that would have generated GVA impacts in that year – see note above regarding subsequent infrastructure developments in 2020 and 2021

Note: Figures may not sum to totals due to rounding

## Key Findings



Source: Saffery Champness / Nordicity research and analysis

\* Total economic contribution, including direct, indirect and induced impacts

\*\* Research indicates that there was no investment in studio facilities in 2019 in Scotland that would have generated employment and GVA impacts in that year – see note above regarding subsequent infrastructure developments in 2020 and 2021

# 1. Introduction

## 1.1 Background

Over the past decade, the creative industries<sup>1</sup> have been one of the key drivers of economic growth in the UK. In 2019, the creative industries generated just under £116 billion in gross value added (GVA) for the UK and employed just over 2.1 million people – giving them a 5.9% share of the UK's total GVA and a 6.3% share of total employment.<sup>2</sup> Indeed, between 2010 and 2019, GVA in the UK's creative industries grew at an annual average rate of 5.9%<sup>3</sup> – significantly faster than the 3.5% rate observed across the entire UK economy during that period.<sup>4</sup>

In Scotland, the creative industries employed over 90,000 people in 2019 and generated £4.6 billion in GVA and £4.0 billion in exports in 2018.<sup>5</sup>

The screen sector has played an important role in the creative industries' growth story over the past decade. According to statistics published by the Department for Digital, Culture, Media & Sport (DCMS), GVA in the UK's audiovisual sub-sector<sup>6</sup> grew by 45% between 2010 and 2019, adding £6.8 billion in GVA to the UK economy along the way.<sup>7</sup>

### Box 1 What is GVA?

GVA is the standard measure used by the Office for National Statistics (ONS) and other national statistical agencies for measuring the monetary value of economic activity and the economic performance of industries.

Unlike turnover, which measures the income collected by a firm or industry from the sale of its final product or service, GVA essentially measures the value 'added' by that firm or industry to the inputs purchased from other firms or industries in order to create its final products or services for sale.

GVA can be calculated by either summing the value of payments to workers and suppliers of capital or deducting the value of purchase of goods, materials and services from total turnover.

GVA provides a much more indicative measure of economic activity, particularly when summing activity across different industries. GVA removes the double counting inherent in other measures such as turnover. When a firm's turnover is summed with the turnover of its upstream suppliers, the turnover of the latter is counted twice. However, because GVA measures the unduplicated value of economic activity, there is no such double counting.

<sup>1</sup> The creative industries: advertising and marketing; architecture; crafts; design and designer fashion; film, TV, video, radio and photography; IT, software and computer services; publishing; museums, galleries and libraries; music, performing and visual arts.

<sup>2</sup> DCMS (2020a); DCMS (2020b), "[DCMS Sectors Economic Estimates 2019: Employment](#)".

<sup>3</sup> DCMS (2020a), "[DCMS Sectors Economic Estimates: Gross Value Added](#)".

<sup>4</sup> DCMS (2020a).

<sup>5</sup> Office of the Chief Economic Advisor (2021). "[Growth Sector Briefing - Creative Industries](#)". 23 September 2021.

<sup>6</sup> The audio-visual sub-sector includes the following industries: SIC 59.11 Motion picture, video and television programme production activities; SIC 59.12 Motion picture, video and television programme post-production activities; SIC 59.13 Motion picture, video and television programme distribution activities; SIC 59.20 Sound recording and music publishing activities; SIC 60.10 Radio broadcasting; SIC 60.20 Television programming and broadcasting activities; SIC 63.91 News agency activities; SIC 63.99 Other information service activities n.e.c.; SIC 77.22 Renting of video tapes and disks; SIC 77.40 Leasing of intellectual property and similar products, except copyrighted works.

<sup>7</sup> DCMS (2020a).



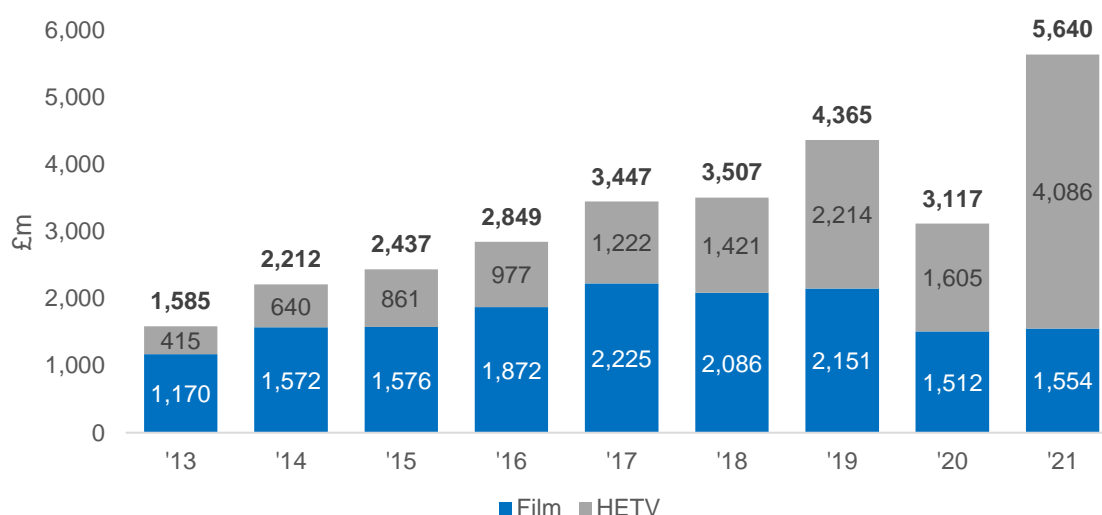
## Economic Value of the Screen Sector in Scotland

Between 2010 and 2019, annual spending on films in the UK grew by 75% – reaching well over £2 billion (Figure 1). Meanwhile, the introduction of tax relief for high-end TV (HETV) production in 2013 helped propel that segment of the industry from £415 million in annual production spending in 2013 to over £2 billion in 2019. In total, film and HETV production spending stood at just under £4.4 billion in 2019.

While this study is focused on 2019, the last complete year before the onset of the pandemic, it is worth noting that the COVID-19 pandemic led to a five-month shutdown of the UK's film and TV production industry between March and August 2020. The recovery in production that followed the industry's reopening has been incredibly robust. Despite the four-month shutdown, the overall level of film and HETV production in the UK in 2020 still ended the year at over £3.1 billion. In 2021, film and HETV rebounded sharply, climbing to a record £5.64 billion.

It is Screen Scotland's intention to repeat this study in 2022, looking at the economic contribution of film and TV production in Scotland in 2021 in the same level of detail as 2019 is presented in this study.

**Figure 1 UK expenditures on production supported by Film Tax Relief and High-End TV Tax Relief (£ millions)**



Source: BFI

All indications are that film and TV production in the UK will continue to grow. This sustained growth in film and TV production reflects not only the UK's talented filmmakers, crews and performers, and world-class infrastructure, but also central government's ongoing commitment to ensuring that the UK production sector is globally competitive. However, the exhibition sub-sector – including cinemas and film festivals – is experiencing a much slower recovery from the Covid-19 pandemic.

The Scottish Government is also committed to supporting the growth of Scotland's film and TV production sector. Beginning in 2017, it significantly increased the funding for film and TV production and development. This was followed by the formation of Screen Scotland in August 2018.<sup>8</sup>

In 2016/17, there was an estimated £69.4 million spent on film and TV production in Scotland. For the Scottish Government and Screen Scotland, the over-arching goal is to increase this level of annual production to £140 million by the end of the 2022/23 fiscal year, whilst increasing from two to six the number of screen sector companies operating in Scotland that achieve more than £10 million in annual turnover.<sup>9</sup>

<sup>8</sup> Screen Scotland (2019). *Business Plan 2019/20*. p. 5.

<sup>9</sup> Screen Scotland (2019). *Business Plan 2019/20*. p. 6.

This study estimates that approximately £400 million was, in fact, spent on film and TV production in Scotland in 2019, when spending by the public service broadcasters (PSBs) is combined with the value of inward production, independent film production funded by Screen Scotland, animation and VFX work and other forms of audiovisual production for which data was available (see Section 2.3.6).

This level of production and the goals previously set by the Scottish Government and Screen Scotland will have been impacted by the pandemic. A follow-up study looking at film and TV production in Scotland in 2021 will reveal the extent of that impact and the degree to which the feasibility of the production goal might be affected.

## 1.2 About this report

As part of its commitment to grow the film and TV production sector as well as the wider screen sector in Scotland, Screen Scotland commissioned Saffery Champness LLP and Nordicity to prepare the following study of the **Economic Value of the Screen Sector in Scotland**.

The objective of the study is to quantify the contribution that the screen sector makes to Scotland's economy – where the screen sector has been defined as inclusive of film and TV development and production; animation, visual effects (VFX) and post-production; film and TV distribution; TV broadcast; film exhibition; film and TV skills and education; and film and TV production facilities. The study only covers film, TV and other audiovisual content; it does not cover the video games sector, nor does it include all of the commercials/corporate sector.

In recent years, several studies have sought to estimate economic activity within Scotland's screen sector. A 2017 report concluded that there was a total of 487 Scottish companies operating in the screen sector in 2016, earning £294 million in total turnover and employing 2,333 people.<sup>10</sup>

The Scottish Annual Business Survey (SABS) also provides annual industry-by-industry data on employment, turnover, GVA and compensation of employment (COE). According to the SABS, the film, video, and TV and radio broadcasting sector employed 5,500 people in 2018, earned £593 million in turnover and generated £370 million in GVA in that year. However, because the SABS is only published for four-digit (or fewer) Standard Industrial Classification (SIC) codes, it is not possible to, for example, untangle TV broadcasting from radio broadcasting. Moreover, data based strictly on SIC codes would not necessarily capture the whole range of economic activity in the screen sector in so far as that activity falls outside of the SICs specific to the audiovisual sector – for example, screen tourism.

In keeping with the recommendations of Scotland's Screen Sector Leadership Group (formed to advise on the potential establishment of a screen agency for Scotland), the following study draws upon a variety of different sources – the Annual Business Survey (ABS), other data from the Office for National Statistics (ONS), the British Film Institute (BFI), Ofcom, industry surveys and interviews – to provide a comprehensive estimate of the contribution that the entire screen sector value chain and its spillover impacts – particularly screen tourism and screen education and skills development – make to Scotland's economy.

## 1.3 Summary of results

The screen sector in Scotland generated an estimated 10,280 FTEs of employment for Scotland's economy in 2019 (Table 1).

Of this total employment impact, the direct employment impact was 7,070 FTEs. These direct impact FTEs included the production teams, crew and cast employed directly in film and TV production and people employed at production companies, distributors, cinema exhibitors and film festivals, and at TV broadcasters in Scotland. The Scottish screen sector also generated 3,210 FTEs of indirect and induced impact employment within Scotland in 2019.

The development and production of screen content accounted for the largest share of the screen sector's total employment impact. In 2019, it accounted for 5,120 FTEs of employment, or nearly half

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<sup>10</sup> Olsberg-SPI (2017). *Scotland's Screen Sectors – Economic Baseline*.

## Economic Value of the Screen Sector in Scotland

of the sector's overall employment impact. The exhibition and festivals sub-sector (2,000 FTEs); as well as screen tourism (1,220 FTEs); and education, skills and talent development (1,170 FTEs) were also significant sources of employment impact.

**Table 1 Employment impact generated by Screen sector in Scotland, 2019 (FTEs)**

		Direct	Indirect/ Induced	Total
Screen content value chain	Development and production	3,290	1,830	5,120
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Spillovers	Screen tourism	910	310	1,220
	Education, skills and talent development	1,000	170	1,170
	Infrastructure	--*	--*	--*
<b>Total</b>		<b>7,070</b>	<b>3,210</b>	<b>10,280</b>

Source: Saffery Champness / Nordicity estimates based on data from Screen Scotland, Screen Commission, BFI, public financial reports, Ofcom, producers/distributors survey (2021), Comscore, ONS, ABS, ASHE, IDBR, BRES, D&B, EIFF, Glasgow Film Festival, Tourism Resources Company, VisitScotland, VisitBritain, the Moffat Centre for Travel & Tourism Business Development, HESA, ESFA, SQA, TRC Media and BECTU Vision

\* Research indicates that there was no investment in studio facilities in 2019 in Scotland that would have generated employment impacts

Note: Figures may not sum to totals due to rounding

In 2019, the screen sector in Scotland generated a total GVA impact of £567.6 million for Scotland's economy (Table 2). Out of this total impact, £367.2 million was generated directly within the various sub-sectors of the screen sector value chain and the spillover industries.

**Table 2 GVA impact generated by Screen sector in Scotland, 2019 (£ millions)**

		Direct	Indirect/ Induced	Total
Screen content value chain	Development and production	195.0	120.1	315.6
	Distribution	3.0	2.0	5.0
	Exhibition and film festivals	59.6	29.2	88.9
	TV broadcast (support operations)	31.6	20.2	51.8
Spillovers	Screen tourism	35.9	19.1	55.0
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	Infrastructure	--*	--*	--*
<b>Total</b>		<b>367.2</b>	<b>200.4</b>	<b>567.6</b>

Source: Saffery Champness / Nordicity estimates based on data from Screen Scotland, Screen Commission, BFI, public financial reports, Ofcom, producers/distributors survey (2021), Comscore, ONS, ABS, ASHE, IDBR, BRES, D&B, EIFF, Glasgow Film Festival, Tourism Resources Company, VisitScotland, VisitBritain, the Moffat Centre for Travel & Tourism Business Development, HESA, ESFA, SQA, TRC Media and BECTU Vision

\* Research indicates that there was no investment in studio facilities in 2019 in Scotland that would have generated GVA impacts

Note: Figures may not sum to totals due to rounding.

As with employment, the development and production of screen content was the largest single source of GVA – contributing just over half to the sector's total and direct GVA. In 2019, development and production accounted for £315.1 million in total GVA and £195.0 million in direct GVA. It was followed by the exhibition and film festivals sub-sector, which contributed £88.9 million in total GVA.

## 1.4 Approach and methodology

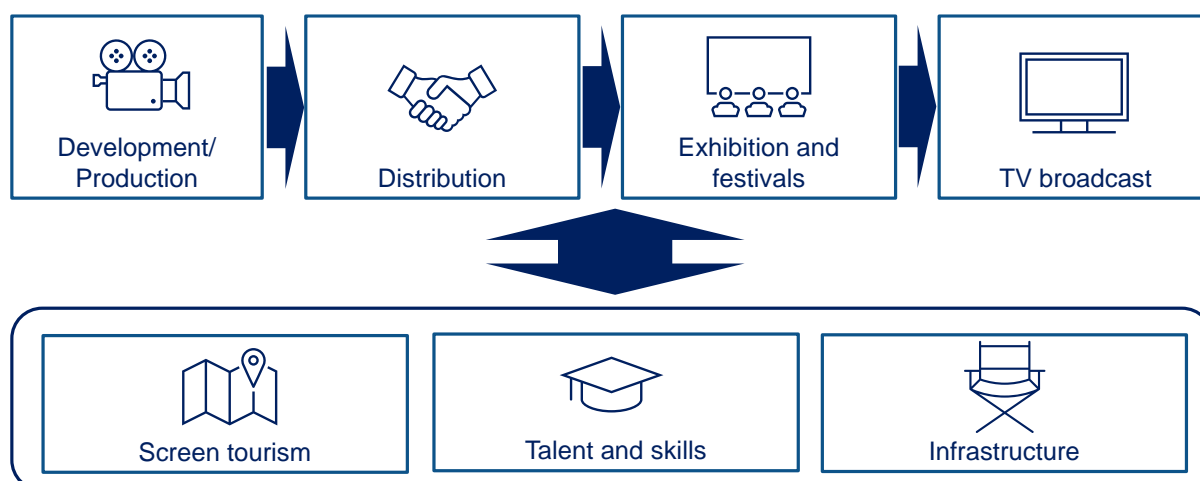
To prepare this study, we collaborated with Screen Scotland to develop an over-arching framework for the definition of the screen sector and the key sub-sectors for inclusion in the study. A combination of desk research and primary research was then used to gather the data to derive estimates of production spending, business activity, employment and GVA across the various sub-sectors of the screen sector.

### 1.4.1 Definition of screen sector

As noted above, this study analyses the economic contribution of both the screen sector value chain and the wider impacts that fall outside of that value chain – in some cases referred to as spillover impacts”. In that regard, the study follows the framework outlined in Figure 2.

With respect to the screen sector value chain, the analysis covers: (i) the development and production of film and TV content; (ii) the distribution of screen content, (iii) the exhibition sub-sector, including cinemas and film festivals, and (iv) the TV broadcast sub-sector within Scotland. This value chain and the various sub-sector components of it trace the path of screen content: from its formulation as idea or screen-based story to the points at which it is made available to audiences – either at festival screenings, in cinemas, on television or via online subscription video on demand (SVOD) platforms.

**Figure 2 Framework for screen sector economic contribution analysis**



The screen content value chain’s impact also extends into the supply chains that provide supplies and services to each stage of the value chain. For example, the production of film and TV content stimulates demand, income and employment within a variety of supplier industries such as timber and other building materials, transport, catering and accommodation.

Outside of this screen content value chain, the screen sector can also stimulate economic activity elsewhere in the Scottish economy. Firstly, Scotland’s tourism industry benefits from screen tourism – as people from inside and particularly outside of Scotland visit locations featured in films and TV programmes made in Scotland or about places in Scotland.

The provision of education and training programmes related to the screen sector also generates additional income and employment for public and private education and training institutions and organisations within Scotland. Finally, the construction industry within Scotland benefits when screen sector production stimulates the development of studio facilities (i.e. infrastructure) within Scotland.

### 1.4.2 Desk research

The desk research consisted of the review and compilation of data and other information supplied by Screen Scotland and Screen Scotland’s Screen Commission and sourced from the BFI, ONS, Ofcom,

the annual reports of the public service broadcasters (PSBs), VisitScotland, Companies House filings and D&B Hoovers.

**Screen Scotland:** Data from Screen Scotland's funding awards, as well as the cost reports Screen Scotland received from funded projects, were used to estimate the total value of development and production spending supported by Screen Scotland.

**Screen Commission:** The Screen Commission (as part of Screen Scotland) provided data on the number of filming days for projects supported by Film Tax Relief (FTR) or High-End Tax Relief (HETR). These filming days data were combined with a new rate card developed for BFI's *Screen Business 2021* to estimate the total spending on production in Scotland (supported by FTR or HETR), where spending data was not otherwise available from Screen Scotland.

**BFI:** Data for cinema admissions was sourced from the BFI. The BFI's new production daily spending rate card was also used to estimate total spending on FTR and HETR production Scotland, where spending data was not available from Screen Scotland.

**ONS:** Data was sourced from various ONS surveys, including the ABS, Inter-Departmental Business Register (IDBR), Annual Survey of Hours and Earnings (ASHE) and Business Register and Employment Survey (BRES) to estimate the economic contribution of certain screen sub-sectors or develop other assumptions for estimating employment, COE or GVA within certain screen sub-sectors.

**Ofcom:** Data from the *Media Nations 2020 Scotland* report (which included data for 2019) and *Made-Outside-London Register* were used to estimate TV production in Scotland, identify TV projects made in Scotland and production companies operating in Scotland.

**Annual reports of PSBs:** Data from the annual reports published by BBC, STV, Channel 4, MG Alba and ITV<sup>11</sup> was used to estimate the PSBs' spending on TV production and broadcasting operations in Scotland.

**VisitScotland:** Certain data on visitors to Scotland and admissions to castles and other monuments in Scotland was used to model the economic contribution from screen tourism.

**Companies House and D&B:** In some cases, turnover, employment and other financial data for specific companies operating in Scotland's screen sector was sourced from public accounts available from Companies House or D&B Hoovers.

### 1.4.3 Primary research

The primary research consisted of a survey of production companies and consultation interviews with a wide range of stakeholders within the Scotland's screen sector.

In collaboration with Screen Scotland, an online survey of production companies was conducted between May and August 2021. The main purpose of the survey was to collect data on production activity in 2019 that would not otherwise be captured by data available from Screen Scotland, BFI, Ofcom or the PSBs. The online survey was also used to gather data on development and distribution – two segments of the screen content value chain for which comprehensive data is not necessarily available from other sources. Screen Scotland invited over 200 production companies to participate in the online survey research. A total of 71 production companies submitted completed responses to the survey.

Alongside this online survey, the study team also interviewed a total of 52 individuals from 45 organisations across the wider screen ecosystem in Scotland, including representatives from production companies, the PSBs, the education and training sub-sector, film festivals, exhibitors, studio facilities and the tourism sector. A full list of consultees can be found in Appendix A.

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<sup>11</sup> Data for Channel 5 was sourced from Ofcom, *Media Nations 2020 Scotland* report.

## 1.4.4 Economic impact modelling

The data collected through the desk and primary research was used in combination with Nordicity's MyEIA™ Model to generate estimates of economic impact in terms of full-time equivalent (FTE) employment, COE and GVA. The general MyEIA™ Model is based on the input-output tables and other economic statistics published by ONS. The MyEIA™ Model used for this study was based on the input-output tables published by the Scottish Government for Scotland's economy.

The bespoke nature of the MyEIA Model™ means that it can provide reliable estimates for any industry, even if that industry is not among the 64 industries that comprise the Scottish Government's 2016 input-output tables. With detailed data on expenditures within an industry or any type of economic shock, the MyEIA Model™ can generate estimates of direct, indirect and induced economic impacts (see Box 2 for definitions).

### Box 2 Types of economic impact

**Direct economic impact** refers to the employment, COE and GVA generated directly within the screen sub-sectors in Scotland.

**Indirect economic impact** refers to the increased employment, COE and GVA experienced by the businesses located in Scotland that provide supplies and services to businesses and other organisations operating in the screen sub-sectors.

**Induced economic impact** refers to the increased employment, COE and GVA experienced across the wider Scotland economy, when workers employed on account of the direct and indirect impacts proceed to spend their earnings within Scotland on purchases of consumer goods and services.

**Spillover impacts** occur when industries outside of the screen sector value chain (e.g. the tourism sector) benefit from screen content. For example, screen tourism can generate additional spending on accommodation, meals, transport and shopping within Scotland's economy, thereby raising employment, COE and GVA.

A more detailed description of the MyEIA™ Model can be found in Appendix C.

## 1.5 Report outline

The report has been organised to correspond with the screen sector framework found in Figure 2.

**Section 2** summarises the research and analysis of the development and production sub-sector.

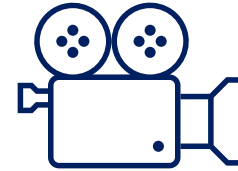
**Section 3** examines the distribution sub-sector. **Section 4** summarises the research and analysis of the exhibition sub-sector and film festivals. **Section 5** presents our analysis of the contribution of the TV broadcast sub-sector – beyond the portion of its contribution associated with TV production already counted in Section 2.

In **Section 6**, we examine the economic impact of screen tourism. **Section 7** assesses the contribution of education and skills development related to the screen sector. **Section 8** examines the impact of infrastructure investment. **Section 9** presents a regional analysis of the economic impact of the screen sector within Scotland.



## 2. Production and development

- £398.6 million in production expenditures
- 3,290 FTEs of direct employment in cast, crew and other creative roles within the production industry
- Including indirect and induced impacts, total employment impact of 5,120 FTEs
- £315.1 million in GVA for the Scotland economy



### 2.1 Overview

The following section analyses the economic contribution that film and TV production and development make to Scotland. Whereas previous economic analyses of film and TV production have relied on company-based data from the SABS, Companies House or D&B, this study focuses on the derivation of estimates of spending on production and development. These estimates were derived by collecting, compiling and reconciling data from Screen Scotland, the Screen Commission, PSBs, an online survey of production companies based in Scotland, and other sources.

This section concludes with an analysis of the economic contribution of production and development activity in Scotland in 2019, based on the estimates of production and development spending (Section 2.4).

### 2.2 Development

In the film and TV sector, “development” includes the research and writing that goes into creating ideas for new films and TV programmes and then writing the outlines, treatments and screenplays for those productions. TV executive producers, film and television producers, development executives and screenwriters often lead the development process and once they have a treatment or screenplay they find a broadcaster, public funder, or distributor/sales agent (in the case of films) to financially support the production of the project. In many cases, the development leads will fund or underwrite the development process from the income earned from other projects that have gone into production. In other cases, a broadcaster will help fund a producer or screenwriter’s development in exchange for a ‘first refusal’ on the project or a certain period of exclusivity over the production of the screenplay. In television, distributors may also advance development support against future rights income.

In many jurisdictions – including Scotland – public funding is available to producers and screenwriters to undertake development, especially if they are unable to self-fund the development or obtain development funding from broadcasters. With Public Service Broadcaster development and production budgets under pressure and production an increasingly marginal business for independent producers, this public funding is often essential in “priming the pump”.

In Scotland, Screen Scotland provides grants to filmmakers resident in Scotland for the development of feature films or documentaries through the Film Development and Production Fund. Producers who would like to develop TV projects can access project or slate funding through the Broadcast Content Development Funding stream of Screen Scotland’s Broadcast Content Fund.

During the 2019/20 fiscal year, Screen Scotland disbursed just under £1.1 million in funding the development of 40 film projects. Screen Scotland also disbursed £1.3 million for the development of 23 TV projects. In total, Screen Scotland provided £2.4 million in development funding to Scotland-based filmmakers, producers and screenwriters in 2019/20.

Data collected through the survey of Scotland-based producers indicates that an estimated total of £11.2 million was spent on the development of films and TV programmes in Scotland (Table 3). This

included not only Screen Scotland's £2.4 million in funding, but also self-funding by production companies (£6.8 million), funding from broadcasters (£1.3 million), funding from distributors (£0.3 million), funding from the BFI (£0.1 million) and other sources (£0.3 million).

**Table 3 Estimated spending on film and TV programme development in Scotland, 2019 (£ millions)**

	Amount
Production companies (self-funding)	6.8
Screen Scotland	2.4
Broadcasters	1.3
Distributors	0.3
BFI	0.1
Other	0.3
<b>Total</b>	<b>11.2</b>

Source: Saffery Champness / Nordicity estimates based on data from Screen Scotland and producer survey (2021)

Note: Figures may not sum to totals due to rounding

## 2.3 Production

Scotland has a vibrant independent production ecosystem. STV Studios, Raise the Roof Productions, Tern Television, Synchronicity, Firecrest Films, Sigma Films, Hello Halo, Happy Tramp North, Wild Child Animation, Bandicoot, Black Camel, Axis Animation, Two Rivers and IWC Media represent just some of the leading independent film and television production companies based in Scotland.

Alongside these Scotland-based companies, several leading UK production companies based outside Scotland, such as World Productions, Tinopolis and Objective Media Group, maintain a business base in Scotland.

In recent years, these production companies have been responsible for making a variety of scripted and unscripted content in Scotland, including recently *Vigil*, *The Masked Singer*, *Elizabeth is Missing*, *Guilt* and *Murder Case*.

### 2.3.1 PSB content

The PSBs represent the core source of demand, financing and commissioning of TV programmes and documentary films made by Scotland-based producers. By and large, this consists of TV programmes and films commissioned by PSBs from external, independent and so-called "non-qualifying independent" producers (e.g. drama, documentary, specialist factual, factual entertainment and entertainment programmes) or made in-house by the PSBs (e.g. news and current affairs programmes). To estimate the total value of spending on PSB content, we reviewed the PSBs' public financial reports and Ofcom data on TV production in the nations. We also conducted research interviews with the PSBs.



The data gathered through this desk research and research interviews indicates that PSBs' operating expenditures in Scotland totalled an estimated £257.7 million in 2019 (Table 4). This included not only the PSBs' spending on content production, but also other aspects of their broadcasting support operations in Scotland, such as transmission, sales and marketing, administration and other overhead. After making adjustments to remove expenditures on broadcasting support operations, payments made between PSBs (e.g. BBC Scotland contributions to BBC Alba) and content already supported by tax relief (see Section 2.3.2), we conclude that the PSBs spent an estimated £196.6 million on content production in Scotland in 2019. This included PSBs' spending on news, current affairs, sports, children's, arts, entertainment and factual entertainment programming.

**Table 4 PSB's estimated spending on TV production in Scotland, 2019 (£ millions)**

	Gross operating expenditures in Scotland	Content spending in Scotland <sup>1</sup>
BBC Scotland <sup>2</sup>	87.7	60.1
BBC Network <sup>3</sup>	84.8	84.8
BBC Alba <sup>4</sup>	20.3	16.9
STV <sup>5</sup>	29.0	9.2
ITV	2.7	2.7
Channel 4	31.0	20.7
Channel 5	2.2	2.2
<b>Total</b>	<b>257.7</b>	<b>196.6</b>

Source: Saffery Champness / Nordicity estimates based on data from public financial reports and Ofcom

1 Excludes estimated spending on broadcasting support operations

2. Gross operating expenditures and content spending amounts adjusted to remove BBC Scotland's contributions to BBC Alba; figures exclude operating expenditures for BBC Scotland's radio operations and the Scottish Symphony Orchestra.

3 Gross operating expenditures for BBC Network have been adjusted to remove value of spending on content supported by tax relief

4. Includes contributions to gross operating expenditures and content spending from MG Alba and BBC Scotland

5. Gross operating expenditures and content spending have been adjusted to remove programming payments made to ITV (est. £43.4m); figures exclude STV Productions

### 2.3.2 Inward production<sup>12</sup>

Producers based outside of Scotland – particularly those based outside the UK – also made significant contributions to production activity within Scotland. In most cases, this inward production was supported by the Film Tax Relief (FTR) or High-end Tax Relief (HETR). In some cases, projects also received funding from Screen Scotland's Production Growth Fund (PGF).

In 2019, films such as *1917* and *Eurovision Song Contest: The Story of Fire Saga* were filmed in Scotland, along with TV series such as the long-running *Outlander* (season 5), as well *Succession* (season 2) and *The Nest*.

To estimate the total spending generated by inward production in Scotland, data on the number of filming days was sourced from Scotland's Screen Commission. These filming days were multiplied by a rate card developed for the BFI for average daily production spending for different types of film and HETV projects. These rate-card rates included estimates of spending on Scotland-based elements used on inward production, as well as elements based outside of Scotland.

Producers based outside of Scotland spent an estimated £165.3 million on the inward production of films and HETV programmes filmed on location or in studio facilities in Scotland in 2019 (Table 5).

<sup>12</sup> In this report, the term 'inward production' refers to films and TV programmes made by producers based outside of Scotland, including other parts of the UK and outside the UK.

This included £60.4 million in spending on FTR-supported films and £104.9 million on HETR-supported TV programmes.

**Table 5 Estimated spending in Scotland on inward production, 2019 (£ millions)**

	Amount
Film Tax Relief projects	60.4
High-end Tax Relief projects	104.9
<b>Total</b>	<b>165.3</b>

Source: Saffery Champness / Nordicity estimates based on data from Screen Scotland, Screen Commission and BFI

### 2.3.3 Independent film production

In addition to the TV programmes and films commissioned by PSBs and inward production supported by tax relief, data from Screen Scotland indicated that there were also several fiction and documentary films made by Scotland-based producers in 2019 (i.e. started principal photography in 2019) with support from Screen Scotland's Film Development and Production Fund – and not likely counted elsewhere. These films, including *Nobody Has to Know* and *Exposure: The Hamish MacInnes Story*, generated an estimated **£3.9 million in production** spending in Scotland.

### 2.3.4 Animation, VFX and post-production

Scotland is also home to several production companies that focus on the creation of animation content as well as studios engaged in VFX and post-production work. Axis Studios, Wild Child and TG Entertainment are among Scotland's leading animation companies. Notable post-production companies include Serious, Blazing Griffin, Edit 123 and Arteus, as well as the BBC's facility within its Glasgow base.

Through the survey research, Scotland based producers reported £28 million in turnover earned from animation, VFX and post-production work – most of which was earned on a service basis for projects ultimately created by producers based outside of Scotland (Table 6).

**Table 6 PSB's estimated spending on TV and film content production in Scotland, 2019 (£ millions)**

	Scotland-based producers	Service work	Total
Animation	0.5	19.8	20.3
VFX	0.3	5.0	5.3
Post-production	2.3	0.1	2.4
<b>Total</b>	<b>3.1</b>	<b>24.9</b>	<b>28.0</b>

Source: Saffery Champness / Nordicity estimates based on data from producers' survey (2021)

### 2.3.5 Other audiovisual production

Through the survey of producers, we also collected data on the production of advertising and other live action screen content (e.g. corporate or educational content). As Screen Scotland's relationship with the purely corporate sector is limited, this figure is likely an underestimate. Surveyed producers reported a total of £4.8 million spent on these other forms of live action audiovisual production (Table 7).

**Table 7 Estimated spending in Scotland on other live action audiovisual production, 2019 (£ millions)**

	Amount
Advertising	4.7
Other live action screen content	0.1
<b>Total</b>	<b>4.8</b>

Source: Saffery Champness / Nordicity estimates based on data from producers survey (2021)

### 2.3.6 Summary

In total, an estimated £398.6 million was spent on the production of film, TV and other audiovisual content in Scotland in 2019 (Table 8). This included content made by Scotland-based producers, producers based outside of Scotland filming in Scotland and PSBs.

**Table 8 Estimated spending in Scotland on film, TV and other audiovisual production, 2019 (£ millions)**

	Amount
PSB content	196.6
Inward production <sup>1</sup>	165.3
Independent film production <sup>2</sup>	3.9
Animation, VFX and post-production	28.0
Other live action audiovisual content	4.8
<b>Total</b>	<b>398.6</b>

Source: Saffery Champness / Nordicity estimates based on data from Screen Scotland, Screen Commission, BFI, producers survey (2021)

1. All of the inward production projects were supported by tax relief. A subset of inward production projects received funding from Screen Scotland's Production Growth Fund

2. These films projects received production funding from Screen Scotland's Film Development and Production Fund but have not been counted under the other categories of film, TV and other audiovisual production.

## 2.4 Economic impact

The total expenditures on development and production in Scotland in 2019 generated a total of 5,120 FTEs of employment, £225.1 million in COE and £315.1 million in GVA for Scotland's economy in 2019 (Table 9). This total impact included 3,290 FTEs of employment in the film and TV production sub-sector (i.e. cast, crew and other creative roles in development) along with £165.0 million in direct COE and £195.0 million in direct GVA.

**Table 9 Economic impact of development and production in Scotland, 2019**

	Direct	Indirect	Induced	Total
<b>Employment (FTEs)</b>				
Development	220	10	20	<b>250</b>
PSB content	1,720	600	470	<b>2,790</b>
Inward location production <sup>1</sup>	940	280	220	<b>1,440</b>
Independent film production	30	20	10	<b>60</b>
Animation, VFX and post-production	360	100	70	<b>530</b>
Other audiovisual content (live action)	20	20	10	<b>50</b>
<b>Total</b>	<b>3,290</b>	<b>1,030</b>	<b>800</b>	<b>5,120</b>
<b>COE (£m)</b>				
Development	9.0	0.4	0.7	<b>10.1</b>
PSB content	95.4	19.3	15.8	<b>130.5</b>
Inward location production <sup>1</sup>	42.6	9.2	7.4	<b>59.2</b>
Independent film production	1.0	0.6	0.4	<b>2.0</b>
Animation, VFX and post-production	16.1	3.2	2.2	<b>21.5</b>
Other audiovisual content (live action)	1.0	0.6	0.3	<b>1.9</b>
<b>Total</b>	<b>165.0</b>	<b>33.3</b>	<b>26.8</b>	<b>225.1</b>
<b>GVA (£m)</b>				
Development	9.0	0.7	1.3	<b>11.0</b>
PSB content	113.4	42.4	28.9	<b>184.7</b>
Inward location production <sup>1</sup>	51.3	20.2	13.5	<b>85.0</b>
Independent film production	1.2	1.4	0.7	<b>3.3</b>
Animation, VFX and post-production	19.1	6.3	4.0	<b>29.4</b>
Other audiovisual content (live action)	1.0	0.4	0.3	<b>1.7</b>
<b>Total</b>	<b>195.0</b>	<b>71.4</b>	<b>48.6</b>	<b>315.1</b>

Source: Saffery Champness / Nordicity estimates based on data from Screen Scotland, Screen Commission, BFI, public financial reports, Ofcom and producers survey (2021)

1. The economic impact of inward location production assumes that 55% of total spending in Scotland is paid to Scotland-based personnel and suppliers. This local-spend share of 55% was derived from research of actual and illustrative production budgets.

## 3. Distribution

- £8.0 million in turnover
- 30 FTEs of direct employment and a total employment impact of 60 FTEs
- £3.0 million in direct GVA and a total GVA impact of £5.0 million



### 3.1 Turnover and direct employment

The distribution segment of the screen sector value chain encompasses the business activities associated with the acquisition, licensing and sale of audiovisual content. Film and TV distribution companies will often advance financing to film or TV projects in exchange for rights to license that content to cinema exhibitors, TV broadcasters in the UK or overseas, or home video platforms. Distributors do not always provide upfront financing for production. They may also acquire exhibition or broadcast rights in already completed – and even released – films and TV programmes, with a view to re-selling those rights.

Distribution companies can be distinct from production companies. In Scotland, Park Circus, Cosmic Cat Films and All the Anime (Anime Limited) are examples of such companies. In some cases, production companies themselves will operate distribution arms to oversee the monetisation of the exhibition and broadcast rights they hold in their produced content or to manage their share of revenue remitted by the distributors from their content. In Scotland, production companies such as Raise the Roof Productions, Synchronicity Films, Hopscotch Films and Friel Kean Films maintained significant distribution operations in 2019, according to the industry survey.

Data collected from D&B and Companies House for Park Circus and Anime Ltd. combined with distribution revenue data collected from through the survey from Cosmic Cat and other production companies with distribution arms indicates that companies based in Scotland earned an estimated £8.0 million in distribution revenue in 2019.

Whilst comprehensive employment data was not available for all these companies, the employment data available for the largest distribution companies in Scotland indicates that distribution sub-sector in Scotland generated an estimated 30 FTEs of direct employment in 2019 (Table 10).

According to the Annual Survey of Hours and Earnings (ASHE), full-time workers employed in SIC 5913 in the UK earned a median weekly salary (excluding overtime) of £937. This implies a median annual salary of £48,700 and median employment cost of approximately £55,000. This implies that distribution sub-sector generated direct COE of £1.7 million in 2019.

According to the ONS's Business Register and Employment Survey (BRES), the GVA-to-turnover ratio in SIC 5913 was equal to 0.37 in 2019. Applying this ratio to total estimated turnover of £8.0 million implies that distribution sub-sector generated an estimated £3.0 million in direct GVA for Scotland's economy in 2019.

**Table 10 Direct economic impact of the film and TV distribution sub-sector in Scotland<sup>1</sup>, 2019**

	Amount
Turnover (£m)	8.0
Direct GVA (£m) <sup>2</sup>	3.0
Direct COE (£m) <sup>3</sup>	1.7
Total employment (FTEs)	30

Source: Saffery Champness / Nordicity estimates based on data from producers/distributors survey (2020), D&B, ASHE and ABS

Notes:

1. SIC 5913 Motion picture, video and television programme distribution activities
2. Scotland GVA estimated by applying GB-wide GVA-to-turnover ratio (0.37) to Scotland turnover (£8.0 million)
3. Scotland COE estimated by multiplying 30 FTEs by average full-time employment cost of £55,000

## 3.2 Economic impact

Through the purchase of advertising and marketing services as well as other business services, the film and TV distribution sub-sector also generates significant indirect and induced impacts across the economy. In total, Scotland's film and TV distribution sub-sector generated 60 FTEs of employment, £2.7 million in COE and £5.0 million in GVA for Scotland's economy in 2019 (Table 11). This included 30 FTEs, £1.7 million in COE and £3.0 million in GVA directly within the distribution sub-sector.

**Table 11 Economic impact of film and TV distribution sub-sector in Scotland, 2019**

	Direct	Indirect	Induced	Total
Employment (FTEs)	30	20	10	<b>60</b>
COE (£m)	1.7	0.6	0.5	<b>2.7</b>
GVA (£m)	3.0	1.2	0.8	<b>5.0</b>

Source: Saffery Champness / Nordicity estimates based on data from producers/distributors survey (2020), D&B, ASHE and ABS

## 4. Exhibition

- 14 million admissions and £99.8 million in box office revenue
- 177,000 audience across 30+ film festivals
- 2,040 persons employed in exhibition sector, representing 1,290 FTEs
- Direct employment impact of 1,420 FTEs and total impact of 2,000 FTEs across cinemas and film festivals
- £88.9 million in GVA for Scotland's economy, including £59.6 million in GVA generated directly within the exhibition sub-sector



### 4.1 Overview

In Scotland and, indeed, across the UK, the cinema sub-sector is dominated by the major multiplex chains – Cineworld, Odeon and Vue – which collectively held 70% of the market in 2019. While these cinema chains are domiciled outside of Scotland, they still have a significant economic impact within Scotland. Cinema chains maintain large workforces and it is largely through this employment and employment income that these cinema chains contribute to the Scottish economy.

In this section, we estimate the economic contribution of the cinema chains and independent cinemas located in Scotland. As part of the exhibition sub-sector, we also examine the economic contribution associated with alternative cinema and screen festivals.

### 4.2 Cinemas

#### 4.2.1 Admissions and revenue

According to data from Comscore and certain cinemas and arts venues that do not report to Comscore<sup>13</sup>, cinemas in Scotland earned total box office revenue of £99.8 million (including VAT) in 2019 (Table 12). Box office and admissions data for the entire UK published by the BFI indicate that this box office revenue was earned from an estimated 14.0 million admissions.<sup>14</sup>

**Table 12 Estimation of cinema box office and admissions in Scotland, 2019**

	Amount
Box office (incl. VAT) (£m)	99.8
Cinema admissions (est.) (millions)	14.0

Source: Saffery Champness / Nordicity estimates based on data from BFI, Comscore and ONS

In 2019, the cinema box office revenue in the UK totalled £1,254 million. Excluding the VAT on cinema tickets, total revenue was £1,045 million. Financial statistics published in the ABS for SIC

<sup>13</sup> Two cinemas were identified that did not report to Comscore. The total admissions and estimated box office for these two cinemas were added to the data provided by Comscore.

<sup>14</sup> Box office data published by BFI for the entire indicates that the average ticket price (i.e. average box office per admission) was £7.12 in 2019.

5914 *Motion picture projection activities* suggest that the cinema sub-sector in the UK earned a total of £1,714 million in revenue 2019 – from ticket sales, food and beverage sales, advertising, and other sources. In other words, cinemas earned £0.64 in other revenue for every £1.00 of box office revenue. Based on that ratio, we estimate that cinemas in Scotland earned £136.4 million in total revenue (excluding VAT) in 2019 (Table 13).

**Table 13 Estimated cinema revenue in Scotland, 2019 (£m)**

	Amount
Gross box office (excl. VAT) <sup>1</sup>	83.2
Other revenue <sup>2</sup>	53.2
<b>Total revenue</b>	<b>136.4</b>

Source: Saffery Champness / Nordicity estimates based on data from BFI, Comscore and ABS

1. £99.8m ÷ 1.20 = £83.2m

2. £83.2m x 0.64 = £53.2m

### Box 3 Regional Screen Scotland

#### Bringing the screen experience to all corners of the Highlands and Island

Regional Screen Scotland (RSS) aims to enable more people in more places to share great screen experiences. It provides advice and information on setting up local screen facilities, operates the Screen Machine mobile cinema, manages devolved grant aid programmes, and is an advocate of the social and economic benefits of cinema for local communities.

The core initiative bringing exhibition into communities without any screen provision is *Screen Machine* – the UK's only 80-seat, air-conditioned, mobile, digital cinema – which has been operating since 1998. It conducts 12-week tours of more than 40 communities in the Highlands and Islands.<sup>15</sup> The initiative is funded by Creative Scotland and Highlands & Islands Enterprise, and is sponsored by Caledonian Macbrayne. Screen Machine partners with the INDY Cinema Group, to draw up a film programme and an on-demand streaming service (Small Screen Machine), as well as manage all marketing, promotion and fund-raising.

The most recent annual report indicated that there had been 42 communities and 14 islands visited, that 20,253 miles had been travelled by road and ferry, where 47 films had been exhibited in 577 screenings, with 21,460 admissions earning a box office gross of £137,982 at 47% of filled seat capacity. Local communities place a very high value on the service provided for the artform itself (85% have a strong emotional response to attending films at Screen Machine) and for the community impact (76% regard Screen Machine as extremely important to their local area).<sup>16</sup>

RSS takes an inclusive approach to programming Screen Machine visits, recognising that every community is made up of a range of ages, genders, and backgrounds, as well as individuals and groups with particular needs and interests.

In conclusion, RSS provides, via digital projection technology, complementary provision to that provided by the exhibition sector (from multiplexes to film societies) to those communities, across Scotland, which have no access (or only very limited access) to cinema.

<sup>15</sup> Screen Machine screening locations: <https://www.screenmachine.co.uk/visiting-us/>.

<sup>16</sup> Screen Machine Annual Performance & Impact Report 2015/16



## 4.2.2 Economic impact

A similar approach was used to estimate the direct employment, COE and GVA contribution of the cinema sub-sector in Scotland. Data sourced from the Inter-Departmental Business Register (IDBR) indicated that 2,040 people, or 1,290 FTEs, were employed in the cinema sub-sector in Scotland in 2019. To this, we added an estimate of 140 employees, or 90 FTEs, associated with arts venue screens. In total, we estimate that the cinema sub-sector in Scotland employed 2,040 people in 2019 and generated 1,290 FTEs of employment, £27.7 million in COE and £55.7million in GVA (Table 14).

**Table 14 Direct economic impact of cinema sub-sector in Scotland, 2019**

	Amount
Total employment <sup>1</sup>	2,040
FTE employment <sup>2</sup>	1,290
COE <sup>3</sup>	27.7
GVA <sup>4</sup>	55.7

Source: Saffery Champness / Nordicity estimates based on data from BFI, Comscore, Screen Scotland, ABS, IDBR and BRES

1. Total employment counts for Scotland sourced directly from IDBR (2,040).

2. Total employment multiplied by an FTE conversion factor of 0.63 to account for part-time employment in the cinema exhibition industry.

3. UK-wide average annual COE (£13,278) multiplied by total employment in Scotland.

4. UK-wide GVA-to-turnover ratio (0.43) multiplied by total cinema revenue in Scotland.

Including indirect and induced impacts, the cinema sub-sector generated an estimated 1,800 FTEs of employment, £43.3 million in COE and £81.5 million in GVA for Scotland's economy in 2019 (Table 15).

**Table 15 Total economic impact of cinema sub-sector in Scotland, 2019**

	Direct	Indirect	Induced	Total
Employment (FTEs)	1,290	310	200	<b>1,800</b>
COE (£m)	27.7	9.0	6.6	<b>43.3</b>
GVA (£m)	55.7	13.8	12.0	<b>81.5</b>

Source: Saffery Champness / Nordicity estimates based on data from BFI, Comscore, Screen Scotland, ABS, IDBR and BRES

Note: Figures may not sum to totals due to rounding

## 4.3 Film festivals

### 4.3.1 Audience, visitors and expenditures

Film and TV festivals contribute to economic activity in several different respects. The operation of the festival itself generates income and employment as the festivals hire screens, produce festival events and an industry development programmes, and employ people to run the screenings and events. Many festivals attract attendees and delegates from outside Scotland and thereby stimulate tourism spending on accommodation, meals and other retail outside of festival venues. Finally, some festivals that also operate as markets can help local producers increase the sales of their content or secure financing for future projects.

Scotland currently has two major international festivals: the Edinburgh International Film Festival (EIFF) and the Glasgow Film Festival. Prior to the Covid-19 pandemic, Scotland also hosted just over 30 film festivals on an annual basis (see Box 4).

#### Box 4 Film festivals in Scotland, 2019

Africa in Motion Film Festival	French Film Festival
Artists' Moving Image Festival	Glasgow Film Festival
Cinema Attic	Glasgow Short Film Festival
Cromarty Film Festival	Havana Glasgow Film Festival
Dead by Dawn	Hebrides International Film Festival
Discovery	Hippodrome Silent Film Festival
Document Human Rights Film Festival	IberoDocs
Dundee Mountain Film Festival	Inverness Film Festival
Dunoon Film Festival	Italian Film Festival Scotland
Edinburgh International Film Festival	Play Poland
Edinburgh Iranian Film Festival	Scotland Loves Anime
Edinburgh Short Film Festival	Scottish Queer International Film Festival
Edinburgh Spanish Film Festival	Screen.Dance Festival
Femspectives	Screenplay
Fokus – Films From Germany	Sea Change: Powering Women in Film
Folk Film Gathering	Take One Action Film Festivals
Fort William Mountain Film Festival	

Source: Screen Scotland

The 2019 edition of the EIFF had total audience of 70,000, nearly 1,800 delegates and a cash operating budget of £1.8 million. During the two-week festival, the EIFF employs 18 FTEs. During the rest of the year, it maintained 8 full-time staff. Approximately 22% of attendees were from England, Wales or Northern Ireland; 9% were from outside the UK.

The 2019 edition of the Glasgow Film Festival had a total audience of 42,224 and 10,803 unique visitors. The festival had a total operating budget of £722,000, of which £534,000 was spent within Scotland. Festival visitors spent nearly £1.4 million on accommodation and other tourism expenses. Approximately 9% of festival attendees were from England, Wales or Northern Ireland; 4% were from outside the UK.

According to data from Screen Scotland and our own research, Scotland's other festivals combined for a total annual operating budget of £1.8 million and attracted an estimated combined audience of approximately 80,400 (Table 16).

**Table 16 Key performance indicators for film festivals in Scotland, 2019**

	<b>EIFF</b>	<b>Glasgow Film Festival</b>	<b>Other film festivals in Scotland</b>	<b>Total</b>
Core attendance*	55,000	42,224	80,400	<b>177,624</b>
Screenings per visitor	6.2	3.9	3.9	--
Number of unique visitors	8,871	10,803	20,570	<b>40,244</b>
Scotland residents	6,121	9,366	17,834	<b>33,322</b>
Other UK residents	1,952	1,015	1,934	<b>4,901</b>
Overseas residents	798	421	802	<b>2,022</b>
Festival operating expenditures (£)	1,771,820	722,000	1,792,285	<b>4,286,105</b>
Gross visitor spending (£)	1,570,189	986,971	<b>1,879,321</b>	<b>4,436,480</b>
Scotland residents	163,395	250,025	476,079	<b>889,499</b>
Other UK residents	736,148	383,040	729,358	<b>1,848,546</b>
Overseas residents	670,645	353,906	673,884	<b>1,698,435</b>
Spend by media and other delegates (£)	88,481	67,927	64,671	<b>221,079</b>

Source: Saffery Champness / Nordicity estimates based on data from EIFF, Glasgow Film Festival, Tourism Resources Company, and Screen Scotland

In total, Scotland's film festivals attracted a core audience of over 177,000 in 2019 and an estimated 40,244 unique visitors (Table 17). These film festivals made operating expenditures of nearly £4.3 million to produce the festivals. Festival attendees and media delegates spent an estimated £4.7 million in Scotland outside of festival venues.

**Table 17 Summary of key performance indicators for film festivals in Scotland, 2019**

	<b>EIFF</b>	<b>Glasgow Film Festival</b>	<b>Other film festivals in Scotland</b>	<b>Total</b>
Core attendance*	55,000	42,224	80,400	<b>177,624</b>
Number of unique visitors	8,871	10,803	20,570	<b>40,244</b>
Festival operating expenditures (£)	1,771,820	722,000	1,792,285	<b>4,286,105</b>
Gross visitor and media delegate spending (£)	1,658,669	1,054,898	1,943,992	<b>4,657,560</b>

Source: Saffery Champness / Nordicity estimates based on data from EIFF, Glasgow Film Festival, Tourism Resources Company, and Screen Scotland

Note: Figures may not sum to totals due to rounding

### 4.3.2 Economic impact

With nearly £4.3 million in operations expenditures in 2019, Scotland's film festivals generated 100 FTEs of employment, £2.6 million in COE and £3.4 million in GVA (Table 18). This included 60 FTEs employed in festival operations – both on a temporary basis during the festival and on a permanent basis throughout the year.

The spending by visitors and media delegates outside of festival venues (£4.7 million) generated a further 100 FTEs, £2.2 million in COE and £3.9 million in GVA for Scotland's economy in 2019. This included 70 FTEs of employment in the accommodation, food & beverage, transport, and other tourist-facing industries benefitting from festival-visitor spending.

Combining the impacts of festival operations and visitor spending indicates that Scotland's film festivals generated a total of 200 FTEs of employment, £4.8 million in COE, and £7.4 million in GVA for Scotland's economy in 2019.

**Table 18 Total economic impact of film festivals in Scotland, 2019**

	Direct	Indirect	Induced	Total
<b>Festival operations</b>				
Employment (FTEs)	60	30	10	<b>100</b>
COE (£m)	1.4	0.9	0.4	<b>2.6</b>
GVA (£m)	1.4	1.3	0.7	<b>3.4</b>
<b>Visitor and media delegate spending</b>				
Employment (FTEs)	70	20	10	<b>100</b>
COE (£m)	1.4	0.4	0.3	<b>2.2</b>
GVA (£m)	2.6	0.8	0.6	<b>3.9</b>
<b>Total</b>				
Employment (FTEs)	130	50	20	<b>200</b>
COE (£m)	2.8	1.3	0.7	<b>4.8</b>
GVA (£m)	3.9	2.1	1.3	<b>7.4</b>

Source: Saffery Champness / Nordicity estimates based on data from EIFF, Glasgow Film Festival, Tourism Resources Company, and Screen Scotland

Note: Figures may not sum to totals due to rounding

## 4.4 Summary

Summing the impact of the cinema exhibition industry in Scotland with the impact of film festivals indicates that Scotland's exhibition sub-sector generated 2,000 FTEs of employment, £48.1 million in COE and £88.9 million in GVA for Scotland's economy in 2019 (Table 19).

**Table 19 Total economic impact of exhibition sub-sector in Scotland, 2019**

	Direct	Indirect	Induced	Total
<b>Cinemas</b>				
Employment (FTEs)	1,290	310	200	<b>1,800</b>
COE (£m)	27.7	9.0	6.6	<b>43.3</b>
GVA (£m)	55.7	13.8	12.0	<b>81.5</b>
<b>Film festivals</b>				
Employment (FTEs)	130	50	20	<b>200</b>
COE (£m)	2.8	1.3	0.7	<b>4.8</b>
GVA (£m)	3.9	2.1	1.3	<b>7.4</b>
<b>Total</b>				
Employment (FTEs)	1,420	360	220	<b>2,000</b>
COE (£m)	30.5	10.3	7.3	<b>48.1</b>
GVA (£m)	59.6	15.9	13.3	<b>88.9</b>

Source: Saffery Champness / Nordicity estimates based on data from BFI, Comscore, Screen Scotland, ABS, IDBR, EIFF, Glasgow Film Festival, Tourism Resources Company and Screen Scotland

Note: Figures may not sum to totals due to rounding

### Box 5 Glasgow Film

#### Extending and deepening exhibition, whilst drawing in new talent

Glasgow Film is an important national centre for film and moving image in Scotland, that strives to transform how people view the world through film, either as a cinema goer or filmmaker. At the same time, however, Glasgow Film increases the economic impact of screen by increasing audiences, by developing more cine-literate audiences, by cultivating new entrants into the sector and by developing talent. These impacts are achieved over the short and longer terms. Glasgow Film has four primary channels of impact.

- i. **Glasgow Film Theatre (GFT):** purpose-built arthouse cinema.
- ii. **Film festivals** (held at GFT):
  - a. Glasgow Film Festival (GFF): international and domestic, started 2005.
  - b. Glasgow Short Film Festival (GSFF): at the same time as GFF, started 2008.
  - c. Glasgow Youth Film Festival (GYFF) – innovative festival, started in 2009.
- iii. **Film Hub Scotland:** supports over 200 film exhibitors – from film societies to multiplexes – to ensure reach into Scotland's diverse population.
- iv. **Learning and engagement** – an extensive outreach and educational programme.

GFT is a specialised three-screen cinema, previously known as the Cosmo, which was the first arts cinema in Scotland, that offers a programme of world and independent cinema, artists' experimental work, issue-based content, thematic seasons, repertory programmes and Scottish produced work. There are development initiatives to increase audience diversity including Deaf and hard of hearing audiences and socially/economically disadvantaged audiences. 2018/19 saw 193,218 admissions over 700 films with 126 Q&As.

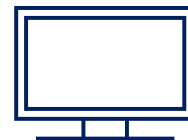
The GFT is the host to three important festivals: the GFF and GSFF in the spring and the GYFF in the autumn. 2019 had been GFF's most successful to date then with 42,224 admissions, 428 screenings and events, 166 premieres, extending into 22 venues across Glasgow. The GYFF is co-programmed by Glasgow Film and GYFF Young Programmers, who are aged 15 to 19 and mentored through a summer school. It is part of a wider learning and education programme at Glasgow Film, which seeks to nurture a collaborative and inclusive space for young people with teachers, film education organisations and funders in a fun and relevant programme for ages 5-25.

Film Hub Scotland is part of the BFI's Film Audience Network (funded by BFI and Screen Scotland) that seeks to *increase and broaden film audiences, and enhance opportunities for audiences to engage with and learn about film*. It provides Scotland's exhibitors of all sizes with a range of funding opportunities, screening programmes, training, networking events and audience research to become truly inclusive, and to reach as many new and existing audiences as possible. There are 223 members of the network (2019) and it has achieved a total audience of 56,168. It has supported capacity building in the exhibition sector through the *Amplify* programme (seven local venues from Stornoway to Bo'ness to Campbelltown) and extending exhibition with the *Fabric* programme of three rural touring networks.

Together, Glasgow Film provides a holistic offer, coupling deeper and greater exhibition of screen content in Glasgow and across Scotland, whilst nurturing and developing new talent from Scotland.

## 5. TV broadcast

- £61.1 million spent on broadcasting support operations
- 420 FTEs of direct employment and 710 FTEs of total employment
- £31.6 million in direct GVA and £51.8 million in total GVA



### 5.1 Broadcasting support operations

In Section 2, we estimated the portion of PSBs' gross operating expenditures in Scotland that were devoted to the creation of TV content – both in-house and through external commissioning – and the economic impact of that content production. In this section, we consider the economic impact generated by the balance of PSBs' operating expenditures: that is, their spending on broadcasting support operations such as transmission infrastructure, sales and marketing, administration, and other overhead expenses.

As with the rest of the UK, households in Scotland can access PSB TV content broadcast by the BBC (network), ITV, Channel 4, Channel 5 and S4C; however, ITV programming is rebroadcast by STV within Scotland. Scotland is also home to BBC Scotland and BBC Alba, as well as opt-outs on the Channel 3 service operated by ITV for STV programming. BBC Scotland and STV have the largest operations in Scotland, and along with BBC Alba account for the broadcasting support operations in Scotland, including terrestrial and digital operations.

After removing content spending, the PSBs spent an estimated £61.1 million on broadcasting support operations in Scotland in 2019, or 24% of their total estimated gross operating expenditures in Scotland in 2019 (£257.7 million) (Table 20).

**Table 20 PSB's estimated spending on broadcasting support operations in Scotland, 2019 (£ millions)**

	Gross operating expenditures in Scotland	Content spending in Scotland	Expenditures on broadcasting support operations <sup>1</sup>
BBC Scotland	87.7	60.1	27.6
BBC Network	84.8 <sup>2</sup>	84.8 <sup>2</sup>	0.0 <sup>3</sup>
BBC Alba	20.3	16.9	3.4
STV <sup>4</sup>	29.0	9.2	19.8
ITV	2.7	2.7	0.0
Channel 4	31.0	20.7	10.3
Channel 5	2.2	2.2	0.0
<b>Total</b>	<b>257.7</b>	<b>196.6</b>	<b>61.1</b>

Source: Saffery Champness / Nordicity estimates based on data from public financial reports and Ofcom

1. Includes spending on transmission infrastructure, sales and marketing, administration and other overhead

2. Gross operating expenditures have been adjusted to remove value of spending on content supported by tax relief

3. BBC Network only has content production and commissioning operations in Scotland; it has no broadcasting support operations in Scotland

4. Gross operating expenditures and content spending have been adjusted to remove programming payments made to ITV (est. £43.4m); figures exclude STV Productions

## 5.2 Economic impact

These expenditures on broadcasting support operations generated an estimated 710 FTEs of employment, £34.2 million in COE and £51.8 million in GVA in Scotland in 2019 (Table 21). This included 420 FTEs of employment, £23.5 million in COE and £31.6 million in GVA generated directly within the TV broadcasting sub-sector – namely at the broadcasters themselves.

**Table 21 Economic impact of broadcasting support operations in Scotland, 2019**

	Direct	Indirect	Induced	Total
Employment (FTEs)	420	150	140	<b>710</b>
COE (£m)	23.5	6.2	4.6	<b>34.2</b>
GVA (£m)	31.6	11.8	8.4	<b>51.8</b>

Source: Saffery Champness / Nordicity estimates based on data from public financial reports, PSBs, Ofcom and ASHE

### Box 6 Public reporting of PSBs' employment in Scotland

Our estimates of the direct employment impact of the TV broadcast sub-sector are based on the compilation and analysis of employment data gathered from public financial reports and interviews with PSBs. In particular, we note that the PSBs have publicly reported the following staff levels within Scotland:

- The BBC employed 1,203 persons in Scotland across all its services including support functions, of which 988 were employed to directly support the BBC service in Scotland. This includes persons employed in TV and radio operations.<sup>17</sup>
- STV employed 456 persons in 2019.<sup>18</sup>
- MG Alba employed 35 persons in 2019.<sup>19</sup>
- Channel 4 employed an estimated 50 persons at its Glasgow Creative Hub office.<sup>20</sup>
- ITV employed under 50 persons in Scotland in 2019, largely in news gathering functions.<sup>21</sup>

Together, these reported employment statistics point to as many as 1,700 persons directly employed in TV (and BBC radio) broadcasting in Scotland. Through the research conducted for this study, we removed employment in BBC radio operations. We also removed employment in TV content production (already estimated in Section 2.3.3) and converted the headcount statistics to FTEs. After making these adjustments, we concluded that an estimated 420 FTEs were employed in TV broadcasting support operation in Scotland in 2019.

<sup>17</sup> BBC (2020). *BBC Group Annual Report and Accounts 2019/20*. P. 146. Available at:

<http://downloads.bbc.co.uk/aboutthebbc/reports/annualreport/2019-20.pdf>

<sup>18</sup> STV (2020). *Annual Report and Accounts 2019*. P. 90. Available at: <http://www.stvplc.tv/files/download/866a01eb4f42f07>

<sup>19</sup> MG Alba (2020). P. 79.

<sup>20</sup> Mediatique (2021). *ITV in the Nations and Regions: Storied past, dynamic present, challenges ahead*. May 2021. P. 23.

Available at: [https://www.itv.com/presscentre/sites/default/files/210510\\_mediatique\\_report\\_itv\\_nations\\_and\\_regions.pdf](https://www.itv.com/presscentre/sites/default/files/210510_mediatique_report_itv_nations_and_regions.pdf)

<sup>21</sup> Mediatique (2021). *ITV in the Nations and Regions: Storied past, dynamic present, challenges ahead*. May 2021. P. 36.

Available at: [https://www.itv.com/presscentre/sites/default/files/210510\\_mediatique\\_report\\_itv\\_nations\\_and\\_regions.pdf](https://www.itv.com/presscentre/sites/default/files/210510_mediatique_report_itv_nations_and_regions.pdf)



## 6. Screen tourism

- 656,000 overnight screen tourists<sup>22</sup> in 2019
- £316.5 million total spending by screen tourists of which £64.9 million was attributable to screen tourism activities and spent within Scotland
- 910 FTEs of direct employment and 1,220 FTEs of total employment impact
- £35.9 million in direct GVA and £55.0 million in total GVA impact



The economic contribution of the screen sector is not confined to the content value chain. Once films and TV programmes are released, they can continue to generate economic benefits for the countries and regions that hosted production or were the settings for the stories depicted in the films or TV programmes.

Scotland has, over the years, been a beneficiary of screen tourism. *Braveheart*, released in 1995, was set in Scotland and generated significant interest for tourists visiting Scotland. In recent years, the television series *Outlander* has garnered a strong audience following, and significant interest among tourists visiting Scotland.

In addition to *Outlander*, several other popular films and TV series, including *Harry Potter*, *Skyfall*, *Mary Queen of Scots* and *Outlaw King* have been partially filmed in Scotland and subsequently generated significant tourist interest.

In this section, we analyse the tourism spending and economic impact of *Outlander*, which is, by far, the most notable current screen tourism asset for Scotland. We then use data from the VisitScotland website to extrapolate the impact of *Outlander* to the wider screen tourism sector for Scotland in 2019

### 6.1 Annual visitors and spending

According to a survey conducted by VisitScotland in 2016, 6% of overnight leisure tourists in Scotland, including domestic and overseas overnight tourists, visited a film or TV location in Scotland during their trip. This was equivalent to a total of 525,000 overnight screen tourists in 2016.

However, between 2016 and 2019 screen tourism in Scotland likely grew significantly, mainly due to the popularity of *Outlander* – the first season of which began airing in 2014 in 87 territories.<sup>23</sup> In fact, an updated version of the difference-in-difference analysis of visits of historic sites featured in *Outlander* and first set out by VisitScotland indicates that *Outlander* probably led to an additional one million visits to 23 *Outlander* sites since 2013 (Figure 3).

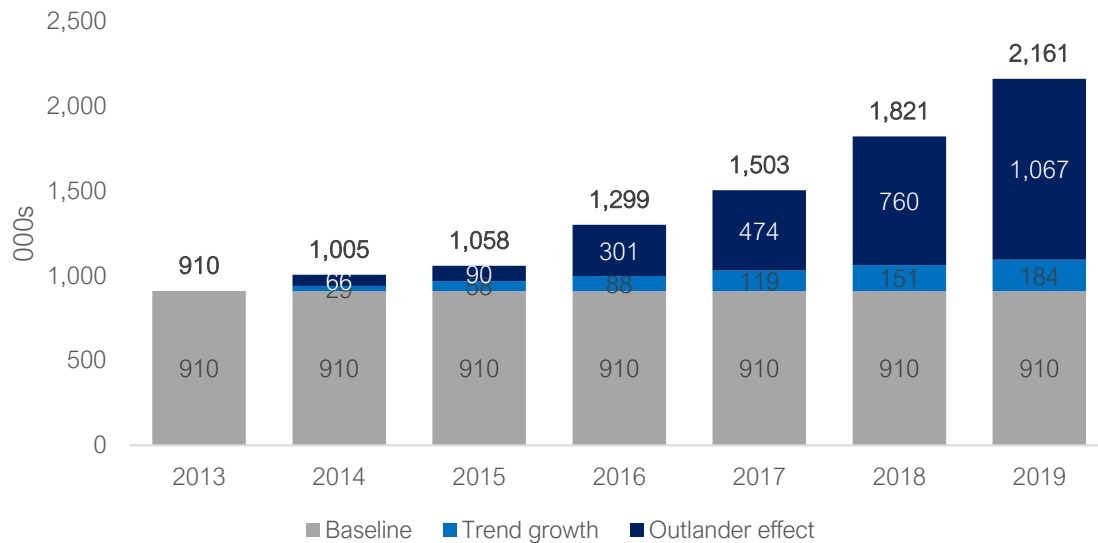
With that in mind, visitor data for *Outlander* sites in Scotland along with additional tourism data from VisitScotland, VisitBritain and VisitEngland were used to estimate the total number of screen tourists visiting Scotland in 2019, their gross tourism spending and the portion of that gross spending that can be attributed to screen tourism.

The methodology and calculations used to derive these estimates are summarised in this sub-section and detailed in Appendix B.

<sup>22</sup> In this study, 'screen tourist' refer to tourists who, as part of their visit to Scotland, visited a site in Scotland that was either a filming location or a setting for a film or TV programme. These site visits may not have been the prime motivation for that person's visit to Scotland.

<sup>23</sup> VisitScotland (2020), *Insight Department: The Outlander Effect & Tourism*. February 2020. p. 3.

**Figure 3 Annual visits to historic sites featured in Outlander**

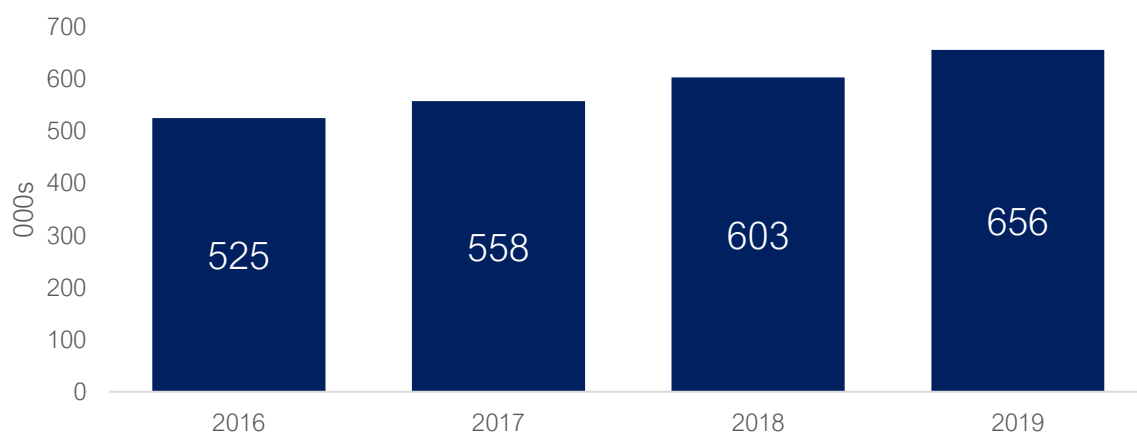


Source: Saffery Champness / Nordicity analysis based on data from the Moffat Centre for Travel & Tourism Business Development (2021)

An analysis of the annual increases in visits to *Outlander* sites indicates that the total number of unique overnight visitors to those sites was 71,000 higher in 2019 compared to 2016. Metrics from VisitScotland's website – particularly the web pages it maintains for *Outlander* and other TV programmes and films – suggest that *Outlander* likely accounted for 54% of interest in screen tourism in Scotland in 2019, when compared alongside other content such as *Harry Potter*, *Skyfall* and *Mary Queen of Scots*.

*Outlander's* share of screen tourism interest further suggests the total number of screen tourists in Scotland was 131,000 higher in 2019 than in 2016. In other words, the number of overnight screen tourists in Scotland increased from 525,000 in 2016 to 656,000 in 2019 (Figure 4).

**Figure 4 Estimated annual number of screen tourists in Scotland (domestic overnight and overseas visitors)**



Source: Saffery Champness / Nordicity analysis based on data from VisitScotland, Historic Houses, the Moffat Centre for Travel & Tourism Business Development, Glasgow Caledonian University (2021)

VisitScotland statistics for 2016 suggest that approximately half of Scotland's overnight screen tourists were domestic tourists – i.e. residing in Scotland or elsewhere in the UK – and half were from overseas. When these shares are applied to 2019 and combined with average tourism spending statistics, the results indicate that these 656,000 screen tourists spent an estimated £342.4 million during their trips – i.e. gross tourism spending.

### Box 7 Mary's Meanders Tour Operator

Mary's Meanders is a tour guide operator based in West Lothian offering film and TV location tours in the Lothians, Glasgow, Stirlingshire, Perthshire, Fife and Inverness. They are also a key partner in the Film Forth Project, alongside Visit West Lothian and Visit Falkirk, which aims to promote film tourism in the regions they operate in. Mary's Meanders is involved in a variety of activities which aim to accelerate the growth of screen tourism in Scotland, including:

- Hosting bloggers to promote *Mary Queen of Scots* on social media
- Hosting Diana Gabaldon (the author of *Outlander*) on an *Outlander* Tour
- Participating in a trade mission to Canada to promote *Outlander* Tours

In 2019, Mary's Meanders led 450 tourists on tours across Scotland and employed two people full time and three freelancers. Many tour customers who travel with Mary's Meanders are from beyond the UK, with many coming from the United States. Nevertheless, the number of tourists from within the UK is still significant and continues to grow consistently annually.

Furthermore, for Mary's Meanders *Outlander* has been the biggest driver of screen tourist numbers in recent years, with the series inspiring interest in Scottish history, music, Scottish clans, tartan, the Jacobites, Scottish Ancestry and, in some cases, in learning Gaelic. This growth attributed to *Outlander* is also contributing to the growth of sustainable tourism, and the adaptation of businesses practices, such as promoting new taxi routes in Fife.

Applying VisitBritain's tourism spending attribution model indicates that out of these gross expenditures of £316.5 million, £70.9 million can be attributed to the influence of visiting film and TV locations as opposed to other attractions or activities that draw people to Scotland (see Appendix B, Table A - 8). Out of this £70.9 million, **we estimate that £64.9 million can be attributed to businesses located in Scotland** (see Appendix B, Table A - 10).

## 6.2 Economic impact

These attributable Scottish tourism expenditures (£64.9 million) generated an estimated 1,220 FTEs of employment, £30.6 million in COE and £55.0 million in GVA in Scotland in 2019 (Table 22). This included 910 FTEs of employment, £20.1 million in COE and £35.9 million in GVA generated within the accommodation, food and beverage, transport, tour operators, retail, and culture and entertainment industries that directly benefit from tourist spending.

**Table 22 Economic impact of screen tourism in Scotland, 2019**

	Direct	Indirect	Induced	Total
Employment (FTEs)	910	170	140	<b>1,220</b>
COE (£m)	20.1	6.0	4.5	<b>30.6</b>
GVA (£m)	35.9	10.8	8.3	<b>55.0</b>

Source: Saffery Champness / Nordicity estimates based on data from VisitScotland, VisitBritain, VisitBritain the Moffat Centre for Travel & Tourism Business Development, Glasgow Caledonian University (2021)

## 7. Education and skills development

- £54.1 million in annual spending on the provision of film, TV and broadcast education and training
- 1,000 FTEs of direct employment and total employment impact of 1,170 FTEs
- £42 million in direct GVA and £51.8 million in total GVA impact



In Scotland there is an evolving education and skills development ecosystem in place that operates at three main junctures along the talent pipeline for film and TV:

- **Exposure:** introduces film and TV to young people as a potential career (pre-career);
- **Entry:** further education (FE), higher education (HE) and independent organisations provide academic or vocational courses, or experience to educate and prepare individuals for entry into the screen sector; and
- **Evolution:** a network of additional training services that support the continued development of screen sector workers, as they grow and advance their careers within their profession, as well as talent development opportunities for creatives to develop, especially early in their careers.

The support ecosystem is made up of public, private and not-for-profit organisations that largely operate in a complementary way endeavouring to ensure services are available to support the breadth of screen sector occupations as well as the geography of Scotland. Most of this provision originates from within Scotland but some of this is provided by UK-wide organisations and other provision is exported from Scotland to the rest of the UK.

Screen Scotland is part of Creative Scotland and partners with Scottish Enterprise, Highlands and Islands Enterprise, Skills Development Scotland, and the Scottish Funding Council as well as Glasgow City Council in funding, developing, and growing the screen sector in Scotland. Out of this role, Screen Scotland has a number of objectives that relate to education and skills development:

- Improving and expanding the provision of moving-image education in every context, increasing its reach, depth and inclusivity.
- Developing Scotland's screen talent and promoting that talent in domestic and international markets.
- Improving employment opportunities in the screen sector through increased and coordinated opportunities for work-based learning, training, and development.

This is funded by the Scottish Government through grant-in-aid and the National Lottery. Furthermore, BFI and ScreenSkills – each of which has a UK-wide remit – also operate within Scotland as part of the education and skills development ecosystem for the screen sector. Lastly, there is the education sub-sector which provides FE and HE qualifications for entry into the screen sector.

In the rest of this section, we estimate the total level of expenditures associated with the delivery of FE and HE courses in Scotland for the screen sector. We also estimate the annual expenditures on non-tertiary level exposure and training – either pre-career or in-career – and continuing professional development (CPD). These various estimates of expenditures on education and skills within the screen sector on Scotland provide the basis for our estimates of the contribution that this sub-sector made to Scotland's economy in 2019.

## 7.1 Higher education

Screen Scotland identified a small number of key HE institutions (HEIs) that provide courses for film, television and broadcast. In order to estimate the economic impact of the screen industries within HE, we took the approach of estimating the number of students studying courses for film, TV and broadcast in a single academic year at the identified HEIs and then applying an average cost incurred to educate a single HE student. In total, we estimate that there were 1,898 students enrolled in film, TV and broadcast courses at HEIs in Scotland in 2019 (Table 23). In estimating the total number of HE students we have included both undergraduates and postgraduates who were enrolled courses in film, TV or broadcast in 2019.

We know that across all HEIs (excluding the Open University), the average cost of HE provision was equal to approximately £16,500 per student. However, in separate research, we identified a smaller number of 18 HEIs that were notable for providing screen sector courses alongside a general portfolio of courses. Across these screen sector HEIs, the average cost per student was £12,400 in 2017/18. This was the multiplier used in our calculations.

Based on this average annual expenditure per learner, we estimate that total expenditures of £23.5 million were spent in 2019 to deliver film, TV and broadcast courses at HEIs in Scotland.

**Table 23 Estimated expenditures on screen sector HE courses in Scotland, 2019**

	Amount
Number HE students enrolled in film, TV or broadcast courses	1,898
Average expenditure per learner (£)*	12,400
Total HE expenditures (£m)	23.5

Source: Saffery Champness / Nordicity estimates based on data from HESA and consultations with the HEIs identified by Screen Scotland

Notes:

\* Based upon the data from the following HEIs: Abertay University Dundee, Arts University Bournemouth, Glasgow Caledonian University, Goldsmiths College, Leeds Beckett University, Ravensbourne University London, Solent University, Staffordshire University, Teesside University, University of Bolton, University of Edinburgh, University of Greenwich, University of Hertfordshire, University of Salford, University of Stirling, University of the Arts London, University of the Creative Arts and University of Westminster

### Box 8 Glasgow Caledonian University

#### **Industry-ready students for expanding the screen workforce**

Unlike many universities and their media or film study courses, Glasgow Caledonian University (GCU) takes a very vocational approach. GCU offers BAs in Media and Communications and Multimedia Journalism, as well as Masters in Television Fiction Writing and Multimedia Journalism, all within the Department of Media and Journalism in the Glasgow School for Business and Society.

The courses combine theory with practice and ensure students leave with digital media skills (both 3D and 2D), broadcast, writing and multimedia skills across all platforms used in studios and editing suites. Specialisms exist for students interested in games or film, as the two areas overlap and increasingly merge as virtual production develops at pace.

Facilities include a purpose-built television studio and gallery, radio studio, digital media studio and newsroom, all featuring modern digital equipment that enable students to use industry-standard software to produce television and radio packages. GCU actively helps set up internships and work placements, including funds from sponsors like Santander Bank and Sir Alec Ferguson.

The result is that GCU produces approximately 200 undergraduate and 10-15 master's postgraduates every year, who are trained to be creative and confident with a grounding in professional, social and ethical media industries issues, and who are perceived as being 'junior professionals' that can be employed by industry.

## 7.2 Further education

In FE, there is a large number of colleges that provide courses that prepare students for careers in film, TV and broadcast that were identified for the study team by the Scottish Qualifications Authority (SQA). These courses were at SCQF Levels 5-8 and were classified as either generalist or vocational. According to the data supplied by SQA, 3,809 students were enrolled in film, TV or broadcast courses at FE colleges in Scotland in 2019.

In a similar manner to HE, in order to calculate the economic impact of the screen sector education within FE, we took the approach of estimating the number of students enrolled on courses for film, TV and broadcast in a single academic year from the list provided by the SQA and then applying an estimate of the average cost incurred to educate a single FE student – i.e. the average expenditure per learner.

Using a large sample of 236 FE colleges reporting their financial data to the Education and Skills Funding Agency (ESFA), the average cost per learner was calculated to be approximately £6,500 in 2019. This was the multiplier used in our calculations.

Based on this average annual expenditure per learner, we estimate that total expenditures of £24.8 million were spent in 2019 to deliver film, TV and broadcast courses at FE colleges in Scotland in 2019 (Table 24).

**Table 24 Estimated expenditures on screen sector FE courses in Scotland, 2019**

	Amount
Number FE students enrolled in film, TV or broadcast courses	3,809
Expenditure per learner (£)	6,500
Total FE expenditures (£m)	24.8

Source: Saffery Champness / Nordicity calculations based on data from Education and Skills Funding Agency (ESFA) and SQA

## 7.3 Pre-career and in-career skills development

Prior to entering the screen sector, the aspirations of young people are exposed to the opportunities of a career in film, TV and broadcast by Screen Scotland and the BFI, through their Film Education and BFI Academy programmes, respectively.

In terms of developing creative talent and skills there are, in addition to schemes run by Screen Scotland and the BFI, a number of not-for profit or private organisations that deliver pre-career skills development or in-career CPD.

Through National Lottery and grant-in-aid funding from the Scottish Government, Screen Scotland funds three strands of pre-career and in-career skills development.

- **Film education** for improving and expanding the provision of film and moving-image education in every context, increasing its reach, depth and inclusivity.
- **Talent development** for developing Scotland's screen talent (as well as promoting Scotland's talent in domestic and international markets).
- **Skills development** for improving employment opportunities in the sector through increased and coordinated training.

To estimate the annual level of expenditures devoted to skills development within the screen sector in Scotland, we compiled data on the levels of funding and income for the leading providers of skills development programmes available in Scotland (

Table 25). This includes funding from Screen Scotland skills development programme strands, BFI, ScreenSkills and other organisations. In total, we estimate that just over £5.9 million was spent on the delivery of screen sector skills development in 2019.



### Box 9 Assessing the long-term economic impact of education and skills development in the screen sector

The [Economic Impacts of the Canadian Film Centre](#)<sup>24</sup> report offers a framework for educational institutions, screen agencies and governments for assessing the longer-term contribution that screen sector education and skills development makes to the economy. This study goes beyond estimates of the employment and GVA generated by the 'delivery' of education and skills development programmes. Instead, the economic analysis of the Canadian Film Centre uses pre- and post-programme data for graduates to quantify two key channels of impact:

- The **human capital (HC)** effects refer to the post-graduation increase in employment opportunities and earnings that graduates attribute to their participation in screen education or skills development.
- The **intellectual property (IP)** effects refer to the increase levels of employment and GVA within the economy that can be linked to screen-based content (i.e. IP) developed, created or commercialised by programmes graduates – either individually or through the formation of companies.

Estimating the economic impact of HC effects would require the screen education and training institutions to collect pre- and post-programme data on graduates' income and duration of work (i.e. weeks per year). Data from IMDb can also be used to track the ongoing creative records of graduates.

Estimating the economic impact of IP effects would require the research (e.g. from IMDb) or collection of information on the number and type of film and TV projects led by graduates.

For both HC and IP effects, surveys of graduates should also be conducted to assess the attribution of impact to education and skills programme. The modelling of programmes impacts should also recognise that this attribution, whilst potentially long-lasting, will diminish over time.

**Table 25 Funding and income for screen sector skills development programmes in Scotland, 2019**

Programme	Funding (£)
Screen Scotland Film Education	642,000
Screen Scotland Talent Development	883,000
Screen Scotland Skills	984,000
Screen Education Edinburgh BFI Film Academy	37,500
Screen Education Edinburgh BFI Film Academy Network	17,000
Station House Media Unit BFI Film Academy Network	17,000
Screen Argyll, BFI Film Academy Network	89,527
GMAC Film (Glasgow), BFI Film Academy	17,000
NFTS Scotland	85,408
TRC Media	406,579
BECTU Vision	2,079,022
Outlander programme (from Outlander, Screen Scotland and ScreenSkills)	411,345
Screen NETS	252,297
<b>Total</b>	<b>5,921,678</b>

Source: Creative Scotland, BFI, TRC Media, BECTU Vision

<sup>24</sup> Nordicity (2015). [The Economic Impacts of the Canadian Film Centre](#). June 2015.

## Box 10 TRC

***TRC: Scotland's own provider of CPD tailored to broadcast and digital sector employees working in the nations and regions.***

TRC is a Glasgow-based not-for-profit organisation that delivers professional development programmes, short courses and workshops to individuals and businesses in the broadcast, media and digital sectors across the UK's nations and regions, but with a focus on Scotland. The programme of activity is tailored in response to industry demand.

Since its launch in 1998, TRC has had a wide-reaching impact. It has helped well over 1,000 alumni and companies embrace change, risk, competition and innovation to improve their capacity and performance. TRC has worked with over 600 companies across Scotland and throughout the UK, and secured over 500 international meetings in Silicon Valley, New York, Sydney, Berlin and Amsterdam for its alumni.

With a full-time staff of six and a team of freelance trainers, TRC's current portfolio of professional development programmes includes:

- **SuperSizer** is a programme for production companies based in the Nations and Regions which has led to £3 million worth of commissions since 2017.
- **Special Edition** helps women boost their confidence, increase ambition, expand professional networks and progress careers in the digital and tech field.
- **Inspiring Digital Leaders** is an innovative internship programme which combines training with practical on-the-job experience for graduates in Scotland.
- **RAD** is an eight-month paid internship offered to people from under-represented groups in the TV industry and is aimed at improving diversity in the Scotland TV industry.
- **Cross Creative: Immersive** is a six-month programme aimed at senior professionals in the creative, technology digital sector in Scotland.
- **Leading Creatives** is a six-week programme for senior professionals run in a virtual classroom that targets heads of departments working in the Nations and Regions, and executives in the film industry looking to enhance their leadership skills.

In 2019 alone, TRC trained 71 people, met with 17 TV commissioners and ran events attended by 163 companies. With funding from Screen Scotland, Scottish Enterprise, Channel 4 and the BBC, as well as revenue from course fees, TRC spent a total £407,000 in 2019 on the delivery of training and its other operational costs. Through its provisioning of training to other nations and regions in the UK, TRC is also earning export revenue for the Scotland economy.



## 7.4 Economic impact

The research summarised in Sections 7.1 to 7.3 indicates that an estimated total of £54.2 million was spent to deliver screen sector education and skills development in Scotland in 2019 (Table 26).

**Table 26 Estimated expenditures on screen education and skills development in Scotland, 2019**

	Amount (£m)
Higher education	23.5
Further education	24.8
Pre-career and in-career skills development	5.9
<b>Total</b>	<b>54.2</b>

Source: Saffery Champness / Nordicity estimates based on data from Screen Scotland, Creative Scotland, HESA, HEIs, ESFA, SQA BFI, TRC Media and BECTU Vision

Scotland's supply and use tables and Nordicity's MyEIA Model were used to convert these estimated total expenditures into estimates of employment, COE and GVA. In total, screen sector education and skills development in Scotland generated 1,170 FTEs of employment, £37.9 million in COE and £51.8 million in GVA for Scotland's economy in 2019 (Table 27). This included 1,000 FTEs of employment, £32.3 million in COE and £42.0 million in GVA directly within Scotland's education and training sub-sector.

**Table 27 Total economic impact of screen sector education and skills development in Scotland, 2019**

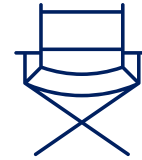
	Direct	Indirect	Induced	Total
Employment (FTEs)	1,000	70	100	<b>1,170</b>
COE (£m)	32.3	2.4	3.2	<b>37.9</b>
GVA (£m)	42.0	3.9	5.9	<b>51.8</b>

Source: Saffery Champness / Nordicity estimates based on data from Screen Scotland, Creative Scotland, HESA, HEIs, ESFA, SQA BFI, TRC Media and BECTU Vision

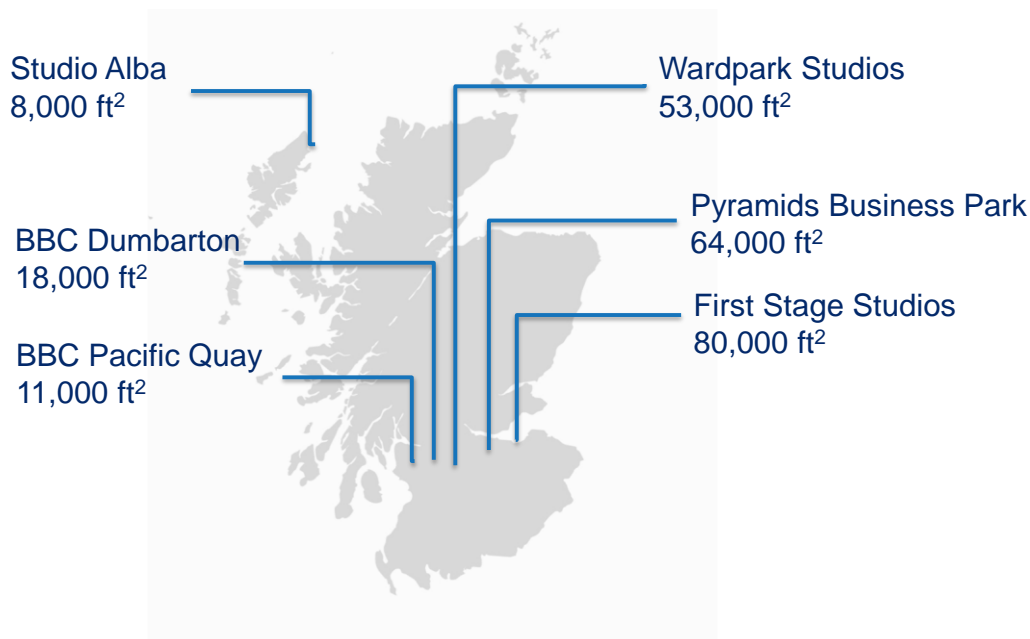
Note: Figures may not sum to totals due to rounding

## 8. Infrastructure

- 19 studio and build space facilities available
- 234,000 sq. ft. of stage space available for film and TV production across six facilities
- Potential to attract £5 million to £10 million in annual film and TV production spending for every 10,000 sq. ft. of new state of the art stage space



Within the screen sector, infrastructure is largely comprised of the studio facilities that are used by producers of films, TV programmes, TV commercials and other audiovisual content. According to information published by the Screen Commission, Scotland currently has 12 build spaces of under 10,000 sq. ft. and seven studio facilities or build spaces of over 10,000 sq. ft. Among these 19 facilities, six provide soundstages with suitable height available to film and TV producers: (i) BBC Dumbarton, (ii) Wardpark Studios, (iii) Pyramids Business Park, (iv) FirstStage Studios, (v) BBC Pacific Quay and (vi) Studio Alba.



From an economic impact perspective, the ongoing use of studio facilities is captured as an indirect impact of production. The revenue earned by studio facilities and used to cover their own operating expenditures and employment costs is already counted as stage-hire fees in production budgets. Even the capital investments made to build new studio facilities or convert existing buildings to suitable stage spaces is indirectly recovered as part of these stage-hire fees. Therefore, to avoid double-counting, we have not prepared a separate analysis of the economic value of the studio infrastructure sub-sector. In fact, our research indicated that there had been little capital investment in studio construction or conversion in 2019 in Scotland – with much of the current expansion of facilities starting in 2020 and continuing into 2021.

## Economic Value of the Screen Sector in Scotland

Looking forward, we note that research conducted by Saffery Champness and Nordicity of the wider studio market in the UK indicates that:

- The construction of new built stage facilities generates approximately £200 of capital investment (largely in the form of construction spending) for every square foot of stage space built.
- The conversion of existing buildings to suitable stage facilities generates approximately £100 of capital investment (largely in the form of construction spending) for every square foot of stage space converted.
- Once opened for use, every 10,000 sq. ft. of state-of-the-art stage space can accommodate £5 million to £10 million in annual production spending and thereby generate employment for 50 to 100 FTEs of cast and crew, plus additional employment at production services suppliers and other local suppliers.

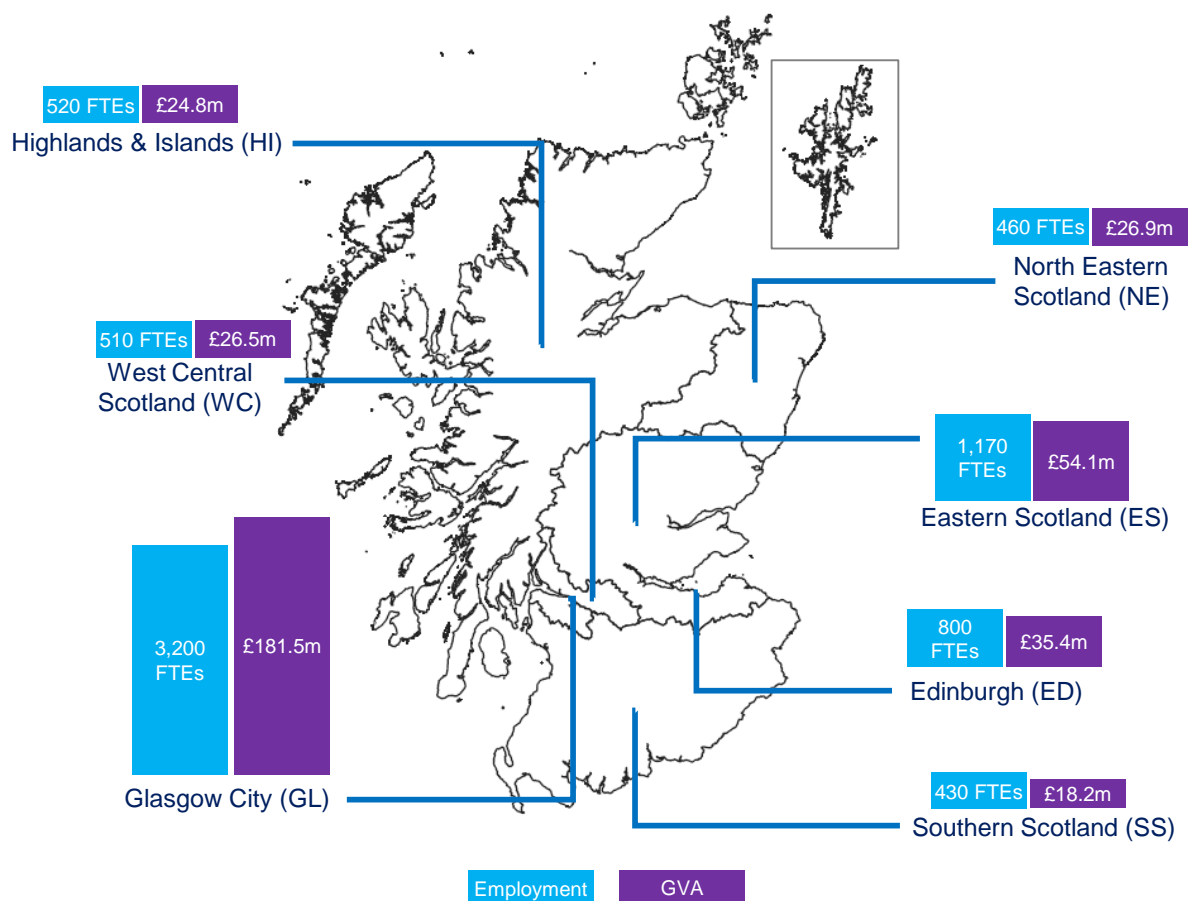
## 9. Regional analysis

In the following section we provide a regional breakdown of the economic impact of the screen sector in Scotland. This regional breakdown is based on a modified version of the International Territorial Levels Level 2 (ITL-2) regions of Scotland. We have estimated the economic impacts for each of Scotland's five ITL-2 regions; however, we have also estimated the impacts for Glasgow City and Edinburgh and removed those impacts from the ITL-2 regions that those two urban centres are located within (see Box 11).

Our regional analysis indicates that Glasgow accounted for the largest shares of direct employment and GVA in the screen sector in 2019 (Figure 5). In that year, Glasgow accounted for 45.2% of direct employment and 49.4% of direct GVA (Table 28). Glasgow's screen cluster generated 3,210 FTEs of direct employment and £181.8m in direct GVA in 2019.

Most of the employment generated within the Glasgow cluster is due to development and production; however, Glasgow also accounts for significant shares of employment in GVA in other sub-sectors, particularly TV broadcast, distribution, exhibition and festivals. In fact, with the exception of screen tourism, and education and skills development, Glasgow was Scotland's leading centre of economic activity within the screen sector.

**Figure 5 Direct economic impact of screen sector in Scotland, by region, 2019**



Source: Saffery Champness / Nordicity estimates based on data from Screen Scotland, Screen Commission, BFI, public financial reports, Ofcom, producers/distributors survey (2021), Comscore, ONS, ABS, ASHE, IDBR, BRES, D&B, EIFF, Glasgow Film Festival, Tourism Resources Company, VisitScotland, VisitBritain, the Moffat Centre for Travel & Tourism Business Development, HESA, ESFA, SQA, TRC Media and BECTU Vision

Glasgow was followed by Eastern Scotland (excluding Edinburgh), which accounted for 1,170 FTEs of employment and £54.1 million in GVA; and then Edinburgh with 800 FTEs of employment and

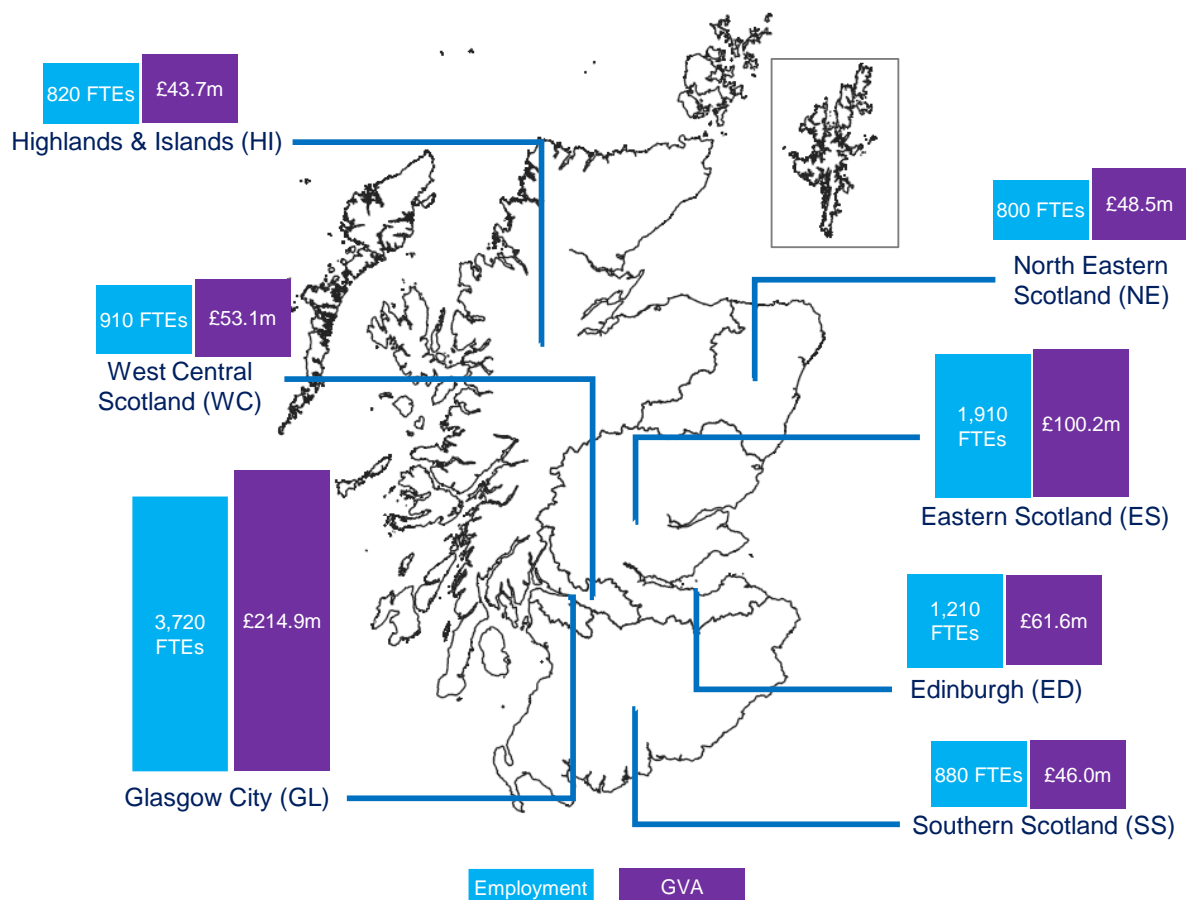
## Economic Value of the Screen Sector in Scotland

£35.4 million in GVA. We understand, however, that with the opening of FirstStage Studios in 2021, the levels of employment and GVA in Edinburgh are likely to be significantly higher in 2021 and future years than in 2019.

Highlands and Islands, West Central Scotland (excluding Glasgow City), North Eastern Scotland and Southern Scotland each accounted for 7.3% or less of direct employment and GVA in 2019.

Glasgow also accounted for the largest share of the total economic impact of the screen sector in 2019 (Figure 6), with a 36.4% share of the total employment impact and a 37.9% share of total GVA impact (Table 29). Glasgow's slightly lower share in relation to its share of direct impacts was due to the fact that many indirect and induced impact are spread across a wider range of industries that are less concentrated in Glasgow and more evenly distributed (in terms of business and economic activity) across Scotland.

**Figure 6 Total economic impact of screen sector in Scotland, by region, 2019**



Source: Saffery Champness / Nordicity estimates based on data from Screen Scotland, Screen Commission, BFI, public financial reports, Ofcom, producers/distributors survey (2021), Comscore, ONS, ABS, ASHE, IDBR, BRES, D&B, EIFF, Glasgow Film Festival, Tourism Resources Company, VisitScotland, VisitBritain, the Moffat Centre for Travel & Tourism Business Development, HESA, ESFA, SQA, TRC Media and BECTU Vision

**Table 28 Direct economic impact of screen sector in Scotland, by region and sub-sector, 2019**

	GL	ES	ED	HI	WC	NE	SS	Total
<b>Employment (FTEs)</b>								
Development and production	2,200	230	150	250	330	140	0	<b>3,290</b>
Distribution	30	<0	0	0	0	<0	0	<b>30</b>
Exhibition and film festivals	500	260	310	50	70	120	100	<b>1,420</b>
TV broadcast	150	70	10	0	40	150	10	<b>420</b>
Screen tourism	120	430	10	120	0	0	240	<b>910</b>
Education and skills development	200	180	310	90	70	50	80	<b>1,000</b>
Infrastructure	--	--	--	--	--	--	--	<b>--</b>
<b>Total</b>	<b>3,200</b>	<b>1,170</b>	<b>800</b>	<b>520</b>	<b>510</b>	<b>460</b>	<b>430</b>	<b>7,070</b>
Share	45.1%	16.5%	11.3%	7.3%	7.2%	6.5%	6.1%	100.0%
<b>GVA (£m)</b>								
Development and production	133.7	13.2	8.3	13.9	17.8	8.4	0.0	<b>195.0</b>
Distribution	2.6	0.2	0.0	0.0	0.0	0.1	0.0	<b>3.0</b>
Exhibition and film festivals	20.9	11.2	12.8	2.2	2.9	5.2	4.3	<b>59.6</b>
TV broadcast	11.1	5.0	0.6	0.0	2.8	11.1	1.1	<b>31.6</b>
Screen tourism	4.7	16.9	0.4	4.7	0.0	0.0	9.3	<b>35.9</b>
Education and skills development	8.4	7.7	13.3	4.0	3.0	2.1	3.4	<b>42.0</b>
Infrastructure								
<b>Total</b>	<b>181.5</b>	<b>54.1</b>	<b>35.4</b>	<b>24.8</b>	<b>26.5</b>	<b>26.9</b>	<b>18.2</b>	<b>367.2</b>
Share	49.4%	14.7%	9.6%	6.7%	7.2%	7.3%	5.0%	100.0%

Source: Saffery Champness / Nordicity estimates based on data from Screen Scotland, Screen Commission, BFI, public financial reports, Ofcom, producers/distributors survey (2021), Comscore, ONS, ABS, ASHE, IDBR, BRES, D&B, EIFF, Glasgow Film Festival, Tourism Resources Company, VisitScotland, VisitBritain, the Moffat Centre for Travel & Tourism Business Development, HESA, ESFA, SQA, TRC Media and BECTU Vision

GL – Glasgow City, ES - Eastern Scotland (excluding Edinburgh), ED - Edinburgh, HI - Highlands & Islands, WC – West Central Scotland (excluding Glasgow City), NE – North Eastern Scotland, SS – Southern Scotland

Note: Certain sums may not equal totals due to rounding

**Table 29 Total<sup>1</sup> economic impact of screen sector in Scotland, by region and sub-sector, 2019**

	GL	ES	ED	HI	WC	NE	SS	Total
<b>Employment (FTEs)</b>								
Development and production	2,510	650	380	420	570	330	250	<b>5,110</b>
Distribution	30	10	<10	<10	<10	<10	<10	<b>60</b>
Exhibition and film festivals	590	400	390	110	140	190	180	<b>2,000</b>
TV broadcast	190	130	50	30	70	180	60	<b>710</b>
Screen tourism	170	500	50	150	40	30	280	<b>1,220</b>
Education and skills development	230	220	340	110	90	70	100	<b>1,170</b>
Infrastructure	--	--	--	--	--	--	--	<b>--</b>
<b>Total</b>	<b>3,720</b>	<b>1,910</b>	<b>1,210</b>	<b>820</b>	<b>910</b>	<b>800</b>	<b>880</b>	<b>10,280</b>
Share	36.3%	18.6%	11.8%	8.0%	8.9%	7.8%	8.6%	100.0%
<b>GVA (£m)</b>								
Development and production	154.0	40.7	23.8	25.2	33.9	21.1	16.6	<b>315.1</b>
Distribution	2.9	0.6	0.3	0.2	0.3	0.4	0.3	<b>5.0</b>
Exhibition and film festivals	25.7	17.9	16.7	4.9	6.7	8.4	8.3	<b>88.9</b>
TV broadcast	14.4	9.7	3.3	1.9	5.4	13.3	3.9	<b>51.8</b>
Screen tourism	7.8	21.3	2.9	6.5	2.5	2.1	12.0	<b>55.0</b>
Education and skills development	10.0	9.9	14.6	4.9	4.3	3.2	4.8	<b>51.8</b>
Infrastructure								
<b>Total</b>	<b>214.9</b>	<b>100.2</b>	<b>61.6</b>	<b>43.7</b>	<b>53.1</b>	<b>48.5</b>	<b>46.0</b>	<b>567.6</b>
Share	37.9%	17.6%	10.8%	7.7%	9.3%	8.5%	8.1%	100.0%

Source: Saffery Champness / Nordicity estimates based on data from Screen Scotland, Screen Commission, BFI, public financial reports, Ofcom, producers/distributors survey (2021), Comscore, ONS, ABS, ASHE, IDBR, BRES, D&B, EIFF, Glasgow Film Festival, Tourism Resources Company, VisitScotland, VisitBritain, the Moffat Centre for Travel & Tourism Business Development, HESA, ESFA, SQA, TRC Media and BECTU Vision

GL – Glasgow City, ES - Eastern Scotland (excluding Edinburgh), ED - Edinburgh, HI - Highlands & Islands, WC – West Central Scotland (excluding Glasgow City), NE – North Eastern Scotland, SS – Southern Scotland

Note: Certain sums may not equal totals due to rounding

1. Includes direct, indirect and induced impacts



Box 11 Modified ITL-2 regions

As of January 2021, there were five ITL-2 regions in Scotland. For this study, those regions have been modified to create a total of seven regions within Scotland. Among urban centres in Scotland, our research indicates that Glasgow and Edinburgh account for significant amounts of production activity, business activity and employment within the screen sector (relative to Scotland’s other urban centres). For that reason, Glasgow City and Edinburgh were removed from their respective ITL-2 regions – West Central Scotland and Eastern Scotland, respectively.

ITL-2 regions	Modified ITL-2 regions
Eastern Scotland	Eastern Scotland (excluding Edinburgh)
Highlands and Islands	Edinburgh
North Eastern Scotland	Glasgow City
Southern Scotland	Highlands and Islands
West Central Scotland	North Eastern Scotland
	Southern Scotland
	West Central Scotland (excluding Glasgow City)

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## List of abbreviations

ABS	Annual Business Survey
ASHE	Annual Survey of Hours and Earnings
BFI	British Film Institute
BRES	Business Register and Employment Survey
COE	Compensation of employment
ESFA	Education & Skills Funding Agency
FE	Further education
FTE	Full-time equivalent
GBTS	Great Britain Tourism Survey
GVA	Gross value added
HE	Higher education
HEI	Higher education institution
HESA	Higher Education Statistics Agency
IDBR	Inter-Departmental Business Register
IPS	International Passenger Survey
NISRA	Northern Ireland Statistics and Research Agency
ONS	Office for National Statistics
PSB	Public Service Broadcaster
SABS	Scottish Annual Business Survey
SVOD	Subscription Video on Demand

## Appendix A: List of consultees

In addition to the 77 production companies that participated in the online survey, the following consultees were interviewed:

Organisation	Sector/ Sub-sector	First name	Surname
MG Alba	Broadcasting	Iseabail	Mactaggart
MG Alba	Broadcasting	Margaret	Cameron
BBC (Network)	Broadcasting	Helen	Blenkinsop
BBC Scotland	Broadcasting	Mark	Taylor
BBC	Broadcasting	Louise	Thornton
BBC Studios	Production	Kevin	McCormick
STV	Broadcasting	Stephen	O'Donnell
Channel 4	Broadcasting	Briony	Robinson
Channel 4	Broadcasting	Kevin	Blacoe
Ofcom	Broadcasting	Glenn	Preston
Ofcom	Broadcasting	Stefan	Webster
STV Studios	Production	Paul	Sheehan
ITV	Broadcasting	Magnus	Brooke
Association for Media Education in Scotland (AMES)	Education/Training	Wendy	Elrick
BECTU Vision	Education/Training	Linda	Fraser
Centre for the Moving Image	Exhibitors	Ken	Hay
Screen Scotland (Audience Development Officer)	Festivals	Katharine	Simpson
Screen Scotland (Head of Audience Development)	Festivals	Sambrooke	Scott
Directors UK	Other	Steve	Smith
Eden Court	Education/Training	James	Mckenzie-Blackman
Edinburgh College of Art, University of Edinburgh	Education/Training	Jonathan	Murray
Edinburgh International Film Festival	Festivals	Holly	Daniel
Edinburgh Napier University	Education/Training	Alistair	Scott
Film City Glasgow	Other	Tiernan	Kelly
Film Hub Scotland	Exhibitors	Nicola	Kettlewood
FirstStage Studios	Studio facilities	Bob	Last
Glasgow Caledonian University	Education/Training	Simon	Haslett
Glasgow Film Education	Education/Training	Rebecca	McSheffrey

## Economic Value of the Screen Sector in Scotland

Organisation	Sector/ Sub-sector	First name	Surname
Glasgow Film Festival	Festivals	Debbie	Aitken
GMAC	Education/Training	Paddy	Higson
Historic Environment Scotland	Tourism	Felicity	Nixon
INDY Cinema Group	Exhibitors	Ian	Brown
Into Film	Education/Training	Katie	Hamilton
Into Film (Scotland)	Education/Training	Kirsty	Gallacher
Mary's Meanders (Linlithgow)	Tourism	Anne	Daly
NFTS Scotland	Education/Training	Alison	Goring
Pyramids Business Park	Studio facilities	Steven	McGarva
Regional Screen Scotland	Exhibitors	Robert	Livingston
Scottish Funding Council	Education/Training	Andre	Reibig
Scottish Funding Council	Education/Training	Stuart	Fancey
Scottish Qualifications Authority (SQA)	Education/Training	Emma	Bratchell
Scottish Youth Film Foundation (SYFF)	Education/Training	David	Barras
Screen Scotland	Education/Training	Scott	Donaldson
Screen Scotland	Education/Training	Steven	Little
Skills Development Scotland	Education/Training	David	Martin
TRC Media	Education/Training	Margaret	Scott
University of Glasgow	Education/Training	Doris	Eikhof
University of Stirling	Education/Training	Dario	Sinforiani
University of West of Scotland	Education/Training	Nick	Higgins
VisitScotland	Tourism	Jenni	Steele
Wallace Monument (Stirling Council)	Tourism	Katie	McKay
Ward Park	Studio facilities	Terry	Thomson

## Appendix B: Screen tourism methodology

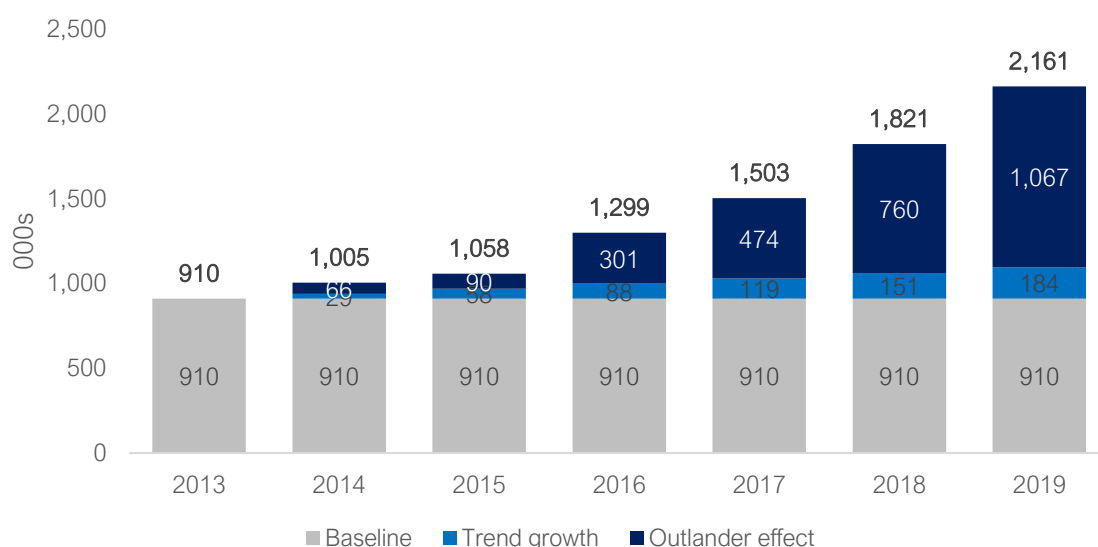
The following Appendix provides a detailed description of the data sources, assumptions and calculations used to derive the estimate of attributable screen tourism spending.

### 1. Growth in visits to *Outlander* sites

To assess the annual number of screen tourists<sup>25</sup> influenced by *Outlander*, we updated a simple difference-in-difference analysis first set out by VisitScotland. Many of Scotland's castles and historic monuments feature as locations in *Outlander* episodes. These 23 *Outlander* sites accounted for just under 2.2 million visits in 2019, or 3.9% of the over 55 million visits to 597 historic sites across Scotland.<sup>26</sup>

The first season of *Outlander* aired in 2014 and 2015; so, 2013 provides a baseline measurement of pre-*Outlander* visits. By 2019, total visits to all 23 sites reached just under 2.2 million. After removing the trend rate of growth in annual visits to historic sites – as indicated by the overall number of visits to non-*Outlander* historic sites between 2014 and 2019 – we conclude that *Outlander* led to 1,067,000 additional visits to these historic sites in 2019 in relation to 2013 – i.e. before the first airing of *Outlander* (Figure A - 1).

**Figure A - 1 Annual visits to historic sites featured in *Outlander***



Source: Saffery Champness / Nordicity analysis based on data from the Moffat Centre for Travel & Tourism Business Development (2021)

Since VisitScotland's Scotland Visitor Survey provided an estimate of screen tourists in 2016 (525,000), we used this analysis of visits to *Outlander* sites to derive estimates of the increase in visits to *Outlander* sites since 2016. So, while there were an estimated 1,067,000 additional visits to *Outlander* sites in 2019, once one removes the additional visits already achieved by 2016 (301,000), the net increase in visits to *Outlander* sites vs. 2016 was 766,000 (Table A - 1).

<sup>25</sup> In this study, 'screen tourist' refer to tourists who, as part of their visit to Scotland, visited a site in Scotland that was either a filming location or a setting for a film or TV programme. These site visits may not have been the prime motivation for that person's visit to Scotland.

<sup>26</sup> Moffat Centre for Travel & Tourism Business Development (2021).

**Table A - 1 Calculation of additional visits to *Outlander* sites since 2016**

	2016	2017	2018	2019
Total additional visits to <i>Outlander</i> sites (vs. 2013)	301,000	474,000	760,000	1,067,000
Additional visits to <i>Outlander</i> sites in 2016 (baseline year)	301,000	301,000	301,000	301,000
Additional visits to <i>Outlander</i> sites (vs. 2016)	0	173,000	459,000	766,000

Source: Saffery Champness / Nordicity estimates based on data from the Moffat Centre for Travel & Tourism Business Development (2021)

## 2. Conversion of visits to estimates of unique individuals

A review of web sites for *Outlander* tour operators indicated that most single-day multi-site location tours took in three castles. Based on this, we assumed that each visitor visited an average of three sites and used this average to convert the estimates of additional 'visitors' to *Outlander* sites to estimates of unique individuals visiting *Outlander* sites (Table A - 2).

**Table A - 2 Calculation of additional number of unique visitors to *Outlander* sites**

	2016	2017	2018	2019
Additional visits to <i>Outlander</i> sites (vs. 2016)	0	173,00	459,000	766,000
Average number of sites visited per visitor	3.0	3.0	3.0	3.0
Estimated number of additional <i>Outlander</i> visitors (vs. 2016)	0	58,000	153,000	255,000

Source: Saffery Champness / Nordicity estimates based on data from the Moffat Centre for Travel & Tourism Business Development (2021)

## 3. Origin breakdown of unique overnight visitors

Given the similarity of *Outlander* castle sites to historic attractions, data from DC Research<sup>27</sup> and research conducted by Saffery Champness and Nordicity<sup>28</sup> for Historic Houses for the origin of visitors to historic houses and gardens in the UK was used to prepare a breakdown of unique visitors by geographic origin (Table A - 3).

<sup>27</sup> DC Research (2015). The Economic and Social Contribution of Independently Owned Historic Houses and Gardens. Prepared for Historic Houses. P. 35.

<sup>28</sup> Saffery Champness and Nordicity (2018). Changes to the tax treatment of heritage maintenance funds: a cost benefit analysis. Prepared for Historic Houses. P. 18.



**Table A - 3 Geographic origin of number of unique visitors to Outlander sites**

	2016	2017	2018	2019
Estimated number of additional Outlander visitors (vs. 2016)	0	58,000	153,000	255,000
International (13%)	0	8,000	20,000	33,000
Domestic overnight (15%)	0	9,000	23,000	38,000
Domestic daytrip (72%)	0	41,000	110,000	184,000

Source: Saffery Champness / Nordicity estimates based on data from Saffery Champness / Nordicity (2018), DC Research (2015) and the Moffat Centre for Travel & Tourism Business Development (2021)

#### 4. Estimate of additional overnight *Outlander* visitors

The estimated number of international and domestic overnight visitors was summed to arrive at estimates of the additional overnight visitors to *Outlander* sites.

**Table A - 4 Calculation of additional number of unique overnight visitors to Outlander sites**

	2016	2017	2018	2019
International visitors	0	8,000	20,000	33,000
Domestic overnight visitors	0	9,000	23,000	38,000
Additional overnight visitors to Outlander sites (vs. 2016)	0	17,000	43,000	71,000

Source: Saffery Champness / Nordicity estimates based on data from Saffery Champness / Nordicity (2018), DC Research (2015) and the Moffat Centre for Travel & Tourism Business Development (2021)

#### 5. Total additional overnight screen tourists

The VisitScotland website contains a variety of individual pages promoting tourism related to different TV programmes and films, including *Outlander*. Website metrics provided by VisitScotland indicated that web site visits or sessions to the *Outlander* pages accounted for 54% of all sessions in 2019. The share of website sessions was used as a proxy for *Outlander's* ultimate share of screen tourists in Scotland. So, for example, in 2019, our estimate of 71,000 additional (vs. 2016) overnight tourists visiting *Outlander* locations would imply that all film and TV locations in Scotland likely attracted 131,000 overnight tourists ( $71,000 \div 54\% = 131,000$ ) (Table A - 5).

**Table A - 5 Estimate of total screen tourists in Scotland (domestic overnight and overseas visitors)**

	2016	2017	2018	2019
Additional overnight visitors to <i>Outlander</i> sites (vs. 2016)	0	17,000	43,000	71,000
<i>Outlander</i> share of web site traffic to VisitScotland screen tourism pages	--	51%	55%	54%
Estimated total number of additional overnight screen tourists in Scotland (vs. 2016)	0	33,000	78,000	131,000

Source: Saffery Champness / Nordicity estimates based on data from VisitScotland, Saffery Champness / Nordicity (2018), DC Research (2015) and the Moffat Centre for Travel & Tourism Business Development (2021)

## 6. Estimated number of overnight screen tourists in 2019

The estimates of the total annual number of additional screen tourists were added to the baseline figures of 525,000 overnight screen tourists in 2016, as per VisitScotland's Visitor Survey to arrive at an estimate of the overall number of overnight screen tourists (656,000) in Scotland in 2019 (Table A - 6).

**Table A - 6 Estimate of total screen tourists in Scotland (domestic overnight and overseas visitors)**

	2016	2017	2018	2019
Baseline number of screen tourists (2016)	525,000	525,000	525,000	525,000
Estimated total number of additional overnight screen tourists in Scotland (vs. 2016)	0	33,000	78,000	131,000
Estimated total number of overnight screen tourists in Scotland	0	558,000	603,000	656,000

Source: Saffery Champness / Nordicity estimates based on data from VisitScotland, Saffery Champness / Nordicity (2018), DC Research (2015) and the Moffat Centre for Travel & Tourism Business Development (2021)

## 7. Domestic-international split in screen tourists

An analysis of data contained in VisitScotland's Scotland Visitor Survey 2015 & 2016: TV and Film Extract indicated that overnight screen tourists in Scotland were split approximately 50-50 in terms of domestic vs. international visitors (Table A - 7).

**Table A - 7 Estimate of total screen tourists in Scotland (domestic overnight and overseas visitors)**

	2016	2017	2018	2019
Estimated total number of overnight screen tourists in Scotland	0	558,000	603,000	656,000
Domestic (50%)	0	279,000	301,500	328,000
International (50%)	0	279,000	301,500	328,000

Source: Saffery Champness / Nordicity estimates based on data from VisitScotland, Saffery Champness / Nordicity (2018), DC Research (2015) and the Moffat Centre for Travel & Tourism Business Development (2021)

## 8. Estimation of total spending by screen tourists

Data published by VisitScotland indicate that domestic overnight visitors in Scotland spent an average of £232 per trip in 2019, whilst international overnight visitors spent an average of £733.<sup>29</sup> These amounts were multiplied by the visitor estimates for 2019 to arrive at an overall estimate of tourism spending (Table A - 8).

**Table A - 8 Estimate of total screen tourists in Scotland (domestic overnight and overseas visitors)**

	Number of screen tourists	Average spend per trip (£)	Total spend (£m)
Domestic overnight	328,000	232	76.1
International	328,000	733	240.4
<b>Total</b>	<b>656,000</b>	<b>--</b>	<b>316.5</b>

<sup>29</sup> VisitScotland (2020). [Key Facts on Tourism in Scotland 2019](#). p. 5.

Source: Saffery Champness / Nordicity estimates based on data from VisitBritain, VisitScotland, GBTS/NISRA/IPS, Saffery Champness / Nordicity (2018), DC Research (2015) and the Moffat Centre for Travel & Tourism Business Development (2021)

### 9. Attributable spending

VisitBritain's model for estimating the portion of total tourist spending attributable to individual activities was used to attribute spending to screen tourism, i.e. visiting film and TV locations. Under VisitBritain's attribution model, tourists are asked to rate the importance of different activities as motivators for their decision to take a short break or holiday in the UK. These ratings are then used in the following manner to apportion total trip spending.<sup>30</sup>

- **Sole reason:** Percentage response is multiplied by total spending. For example, if 20% of respondents selected this rating for a particular activity, then total trip spending, say £1000, is multiplied by 20% and £200 is attributed to the particular activity.
- **Very important reason:** Percentage response is multiplied by total spending and then divided by the average number of total activities undertaken on a trip. For example, if 30% of respondents selected this rating for a particular activity and then also undertook an average of 10 different activities, then total trip spending, say £1,000, is multiplied by 30% and £300 and divided by 10 so that £30 is attributed to the particular activity.
- **Fairly important reason:** Treated in the same manner as 'Very important reason'.
- **Only a small reason:** 0% attribution.
- **Of no importance at all:** 0% attribution.

With regards to the activity of visiting film and TV locations, this type of ratings data was only available for research commissioned by VisitBritain for the UK in 2015.<sup>31</sup> The results of that research (summarised in Table A - 9) was applied to Scotland for 2019.

The results indicated that a spending attribution rate of 22.4% could be applied to screen tourism. In other words, out of the estimated total trip spending of £316.5 million made by screen tourists, £70.9 million (i.e. 22.4%) could be attributed to screen tourism as a motivator in relation to other trip motivators (Table A - 9).

**Table A - 9 Derivation of trip spend attribution rate for visiting film or TV locations in the UK**

	Share of responses (UK, 2015) <sup>1</sup>	Average number of activities undertaken during trip <sup>2</sup>	Attribution rate
Sole reason	16%	7.8	16.0%
Very important reason	23%	7.8	2.9% <sup>3</sup>
Fairly important reason	27%	7.8	3.5% <sup>3</sup>
Only a small reason	23%	7.8	0.0%
Of no importance at all	12%	7.8	0.0%
<b>Total</b>	<b>100%</b>	<b>7.8</b>	<b>22.4%</b>

Source: Saffery Champness / Nordicity calculations based on data from TNS (2015)

1. Response to the following question: 'Thinking about the most recent UK holidays or short breaks when you took part in these activities, how important was being able to undertake 'Visiting location of TV series, etc.' in your decision to take the holiday or short break?

2. Average number of activities for domestic holidays and short breaks by British residents in 2015

3. Share of responses divided by average number of activities undertaken during trip.

<sup>30</sup> TNS (2015). Valuing Activities: Final Report. Prepared for VisitScotland, VisitEngland and Visit Wales. 7 October 2015.

<sup>31</sup> TNS (2015). Valuing Activities: Final Report. Prepared for VisitScotland, VisitEngland and Visit Wales. 7 October 2015.

### 10. Allocation of attributable spending

Before analysing the economic impact generated by attributable screen tourism spending, the spending estimate was allocated across tourism-spending categories. This allocation was done in accordance with observed spending patterns published by VisitBritain for domestic tourists in Scotland (Table A - 10).<sup>32</sup>

**Table A - 10 Allocation of attributable screen tourism spending**

	Share of total spending	Allocation (£m)
Accommodation	39.0%	27.7
Food and beverage	20.0%	14.2
Culture	6.0%	4.3
Retail and other	18.0%	12.8
Transport (earned in Scotland) <sup>1</sup>	8.5%	6.0
<b>Scotland total</b>	<b>91.5%</b>	<b>64.9</b>
Transport (earned outside Scotland) <sup>1</sup>	8.5%	6.0
<b>Global total</b>	<b>100.0%</b>	<b>70.9</b>

Source: Saffery Champness / Nordicity calculations based on data from TNS (2015) and Kantar (2020)

1. 50% of the total allocated transport spending has been allocated to businesses in Scotland (eg. car hire, public transport), with the other 50% allocated to businesses (eg. airlines) located outside Scotland.

<sup>32</sup> Kantar (2020). The GB Tourist: 2019 Annual Report. Prepared for VisitScotland, VisitEngland, Cymru Wales. P. 93.

## Appendix C: MyEIA™ Model

### Indirect impact

Indirect impacts were estimated using Nordicity's MyEIA™ Model. This model utilises the 2016 input-output tables published by ONS, along with other economic data (e.g. median wages) to estimate how increased purchases of goods and services translate into incremental employment, COE and GVA.

#### *Construction of input-purchases vector*

Data collected through primary and secondary research was used to prepare a profile of input purchases. After removing expenditures on sources of value added (i.e. COE, mixed income), the remaining expenditures were mapped to a 64 x 1 vector ( $x$ ) of industries (corresponding with the industries listed in the 2016 input-output tables published by ONS).

#### *Estimation of indirect output*

The 2016 Leontief inverse matrix ( $L$ ) for the UK economy was derived from the 2016 input-output tables published by ONS. The following formula was then used to estimate a 1 x 64 vector ( $y$ ) containing the changes in output,  $y_i$ , in each industry as a result of the input purchases arising from each sector.

$$y = x'L$$

Where:

$y$  is a 1 x 64 vector of changes in output ( $y_i$ )

$x$  is 64 x 1 vector of input-purchase expenditures (by receiving industry)

$L$  is the 64 x 64 Leontief inverse matrix

#### *Calculation of indirect GVA*

The GVA ratio ( $a_i$ ) was calculated for each of the 64 industries listed in the ONS input-output tables and  $L$ . These ratios were calculated as:

$$a_i = GVA_i / z_i$$

where:

$GVA_i$  is the value of GVA generated in industry  $i$  as per the 2016 input-output tables

$z_i$  is the total value of output in industry  $i$  as per the 2016 input-output tables

The total indirect GVA impact across all industries ( $g^*$ ) was calculated in the following manner:

$$g^* = a'y$$

Where:

$a$  is a 64 x 1 vector of  $a_i$

$y$  is a 64 x 1 vector of  $y_i$

#### *Calculation of indirect COE*

The COE ratio ( $b_i$ ) was calculated for each of the 64 industries listed in the ONS input-output tables. These ratios were calculated as:

$$b_i = COE_i / z_i$$

where:

$COE_i$  is the value of COE generated in industry  $i$  as per the 2016 input-output tables

$z_i$  is the total value of output in industry  $i$  as per the 2016 input-output tables

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The total indirect COE impact across all industries ( $w^*$ ) was calculated in the following manner:

$$w^* = b'y$$

Where:

$b$  is a  $64 \times 1$  vector of  $b_i$

$y$  is a  $64 \times 1$  vector of  $y_i$

### *Estimation of indirect employment*

The number of indirect jobs (measured in FTEs) was estimated by dividing the COE impact in each industry ( $w_i$ ) by the average FTE cost in each industry ( $m_i$ ).

$$q_i = w_i / m_i$$

where:

$w_i$  is the total wage impact in industry  $i$

$m_i$  is the average FTE cost in industry  $i$

Total indirect employment ( $q^*$ ) was arrived at by summing the employment impacts ( $q_i$ ) across the 64 industries.

$$q^* = \sum_i q_i$$

## Induced impact

Nordicity's MyEIA™ Model also provides estimates of induced impacts; however, these estimates are not based directly on ONS's input-output tables. Instead, they are based on existing observations of the average ratio of Type II and Type I multipliers in the UK economy.

### *Estimation of induced output*

The values of direct and indirect output were summed to arrive at an estimate of Type I output.

$$Y_{\text{TYPE I}} = Y_{\text{DIRECT}} + Y_{\text{INDIRECT}}$$

The Type I output was then multiplied by a ratio of 1.25 to arrive at an estimate of Type II output. This ratio was obtained from research of the relationship between Type I and Type II ratios (see box below).

$$Y_{\text{TYPE II}} = 1.25 \cdot (Y_{\text{TYPE I}})$$

### **Relationship between Type II and Type I ratios**

In [The Economic Impact of the UK Film Industry \(September 2012\)](#), Oxford Economics reported that induced impact multiplier was 1.25. In other words, the ratio of the Type II to Type I multipliers for the UK economy was 1.25.

This is corroborated by the Type I and Type II multipliers published the Scottish Government for the Scottish economy (see ["Input-Output Tables 1998-2013 - Leontief Type 2 Table"](#)). For the Scottish economy, the Type II employment multipliers are on average equal to 1.20 times the Type I multipliers. The slightly lower induced impact multiplier for Scotland is understandable, given the likelihood that some portion of household spending will leak from the Scottish economy into the economies of England, Wales or Northern Ireland.

Based on these observations, Nordicity's MyEIA™ Model used an induced impact ratio of 1.25 and thereby assumed that induced impacts will add 25% in output to the sum of the estimates of direct and indirect output.

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For impacts at the regional level, lower multipliers were used.

### *Estimation of induced GVA*

The total value of induced impact GVA was estimated by multiplying the economy-wide GVA-to-output ratio (as per the 2016 input-output tables) by the estimate of Type II output.

$$g_{\text{INDUCED}} = (a^*) \cdot (y_{\text{TYPE II}})$$

Where:

a\* is the GVA-to-output ratio across all industries (0.53)

### *Estimation of induced COE*

The total value of induced impact COE was estimated by multiplying the economy-wide COE-to-output ratio (as per the 2016 input-output tables) by the estimate of Type II output.

$$w_{\text{INDUCED}} = (b^*) \cdot (y_{\text{TYPE II}})$$

Where:

b\* is the COE-to-output ratio across all industries (0.29)

### *Estimation of induced employment*

The number of induced impact FTEs ( $q_{\text{INDUCED}}$ ) was estimated by dividing the estimate of induced COE ( $w_{\text{INDUCED}}$ ) by the average FTE cost across the UK economy ( $m^*$ ).

$$q_{\text{INDUCED}} = w_{\text{INDUCED}} / m^*$$

Where:

m\* is the average FTE cost in the UK economy in 2019 (£34,026)

## **Total economic impact**

The total economic impact in terms of GVA, COE and employment was arrived at by summing the estimates of the direct, indirect and induced impacts.



### Regional and local economic impacts

The MyEIA™ Model can also be used to generate estimates of direct, indirect and induced impacts in terms of employment, COE and GVA for NUTS1, NUTS2 and local authorities within England, Scotland and Wales. This regionalisation of the model is based on location quotients (LQs) published by ONS.

The LQs are used to derive regional-supply ratios ( $\lambda$ ) for a given geographic jurisdiction. Where  $\lambda > 1$ , it is set equal to 1.

These regional-supply ratios are used to adjust the input purchase expenditures vector ( $x$ ) to approximate the portion of input purchases met by suppliers located within a given geographic jurisdiction.

$$X_{\text{REGIONAL}} = x_i \cdot \lambda_i$$

Where

$x_i$  input-purchase expenditures (by receiving industry  $i$ )

$\lambda_i$  is the supply ratio for industry  $i$ .

The regional-supply ratios are also used to create a regionalised Leontief inverse matrix ( $L_{\text{REGIONAL}}$ ) in the following manner:

$$L_{\text{REGIONAL}} = (\lambda' A)^{-1}$$

Where:

$\lambda$  is a 64 x 64 diagonal matrix of regional-supply ratios

$A$  is a 64 x 64 matrix of input-output coefficients

The regionalised Leontief inverse matrix is then used to calculate the indirect output vector.

$$y_{\text{REGIONAL}} = x' L_{\text{REGIONAL}}$$

Where:

$y_{\text{REGIONAL}}$  is a 1 x 64 vector of changes in output ( $y_i$ ) in a given geographic jurisdiction

$x$  is 64 x 1 vector of input-purchase expenditures (by receiving industry)

$L_{\text{REGIONAL}}$  is the 64 x 64 regionalised Leontief inverse matrix