XR Stories

Economic Impact Analysis

Final Report

December 2022

BOP Consulting

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Executive Summary

Yorkshire and Humber is an increasingly significant home for the Creative Industries – with XR Stories being a vital part of this regional strength.

XR Stories is a partnership between the University of York, Screen Yorkshire, and the British Film Institute (BFI) to support Research and Development (R&D) on immersive and interactive storytelling across Yorkshire and Humber.

This research demonstrates the economic impact that XR Stories has achieved in the region since 2019.

We surveyed 20 of the 53 businesses that have worked with XR Stories and established that XR Stories are:

— **Building business assets**

- 85% of surveyed businesses indicate that working with XR Stories has enabled them to create assets that will generate revenues for them into the foreseeable future.

— **Supporting business growth**

- 85% of respondents see XR Stories as important to their business growth – with 30% seeing XR Stories as very important and 25% seeing it as extremely important.

— **Growing revenues and employment**

- We estimate that businesses that have worked with XR Stories have generated revenues of £761,000 since they began doing so and anticipate increasing their revenues by a further £2.8m next year – which creates a combined total of generated and anticipated revenues of £3.6m.
- Growth in revenues is matched by increasing employment. Survey respondents report a combined increase in employment of 23 staff since beginning work with XR Stories. If employment continues to grow at the same rate as revenue across all businesses working with XR Stories, these businesses will benefit from 289 new jobs – with 61 of these jobs generated to date and a further 228 anticipated next year as revenues continue to increase.

— **Generating additionality**

- We have assessed the extent to which revenues and employment secured by businesses working with XR Stories would not exist without this partnership. We find that 46% of these revenues and employment have such additionality.
- We apply this rate of additionality to our estimates of direct revenue secured by businesses working with XR Stories (£3.6m) and increased employment by such businesses (289) to estimate the proportion of these direct impacts that are additional: £1.7m in revenue and 134 in employment.
- These additional revenues and employment unlock further economic benefit by spending along relevant supply chains, which we estimate by applying a multiplier. This indicates that the direct and indirect additional impacts of XR Stories are £3.2m in revenue and 254 in employment.

These economic benefits are contributing towards the Creative Industries, Screen Industries and IT, Software and Computer Services growing and deepening their clustering within the geographies served by XR Stories:

— The rate of creative clustering in York has dramatically increased in recent years – both IT, Software and Computer Services (1.3) and the Creative Industries (1.0) now have Location Quotients (LQs) in the city above the national average of 1.0, having grown by 77% and 23% respectively between 2015 and 2021.

— The Creative Industries now employ over 6,700 people in North Yorkshire and nearly 70,000 across Yorkshire and Humber – with all creative sectors assessed here (IT, Software and Computer Services (72%), Screen Industries (54%), and the Creative Industries (8%)) growing faster than total employment (4%) in Yorkshire and Humber between 2015 and 2021.

These sectors are growing in importance within Yorkshire and Humber – with the additionality of XR Stories contributing to this growth in ways that go above and beyond that which would otherwise be achieved. There are many reasons for the growth of these sectors within the region (e.g., the relocation of Channel 4 to Leeds) but the additionality of XR Stories means that it is making a distinct contribution to this regional growth.

This additionality makes sense next to the focus of XR Stories on creative R&D – with XR Stories being the leading centre for this activity in Yorkshire and Humber and this activity being complementary to other growth drivers, such as the clustering of relevant skills and expertise, which we measure through our LQ analysis.

1. Economic analysis of XR Stories

By developing R&D in partnership with businesses, XR Stories helps businesses in Yorkshire and Humber to grow – generating additional revenues and jobs. We worked with XR Stories and relevant businesses to quantify the scale of the economic benefit experienced by these businesses.

1.1 Survey and Methodology

We consulted and collaborated with XR Stories to:

— Understand the business base engaged by XR Stories.

— Design a survey that was circulated to these businesses by XR Stories.

XR Stories has worked with 53 businesses since 2019. XR Stories has deliberately targeted businesses that are similar in terms of:

— Location: Based in Yorkshire and Humber.

— Focus: Engaged with immersive and interactive technologies.

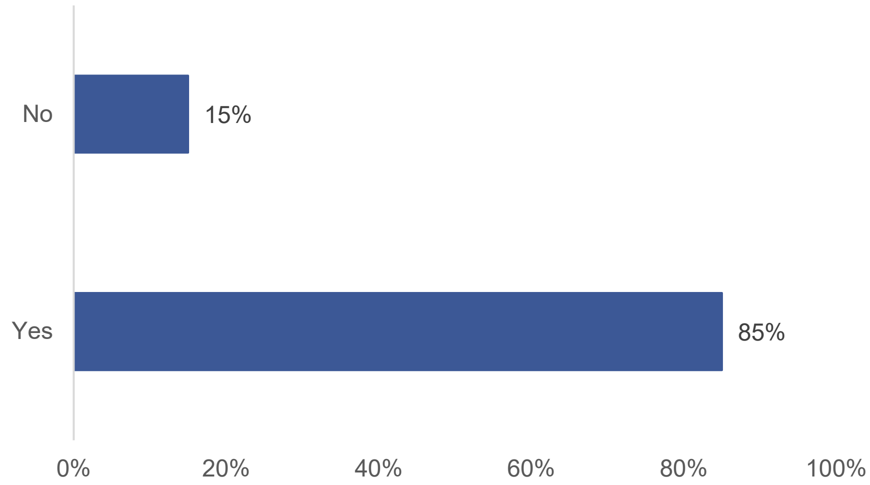
— Scale: Predominately small and micro businesses.

20 of these 53 businesses completed our survey over November and December 2022. Given the similarities between these 53 businesses, we assume that the experiences reported by these 20 businesses are representative of the total population of 53 businesses.

1.2 XR Stories is building business assets

Most businesses that worked with XR Stories now benefit from assets that enable them to generate revenues into the foreseeable future – as shown in the figure below.

Figure 1 Proportion of businesses answering 'yes' and 'no' when asked whether working with XR Stories has created assets that will generate additional revenue for them into foreseeable future

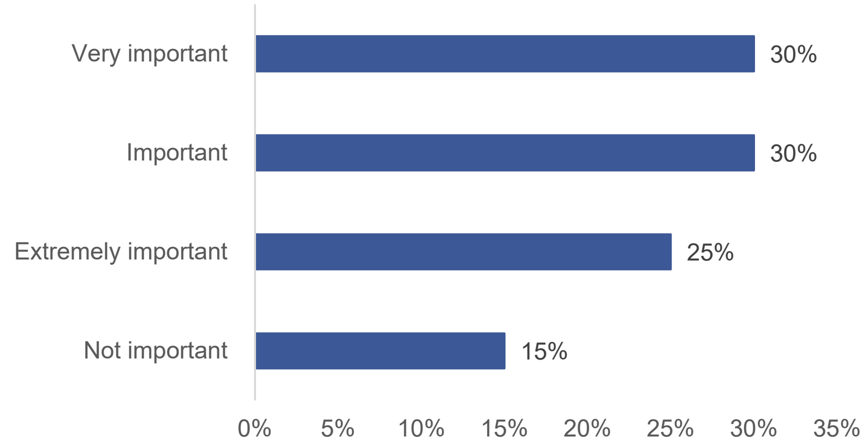


Source: BOP Consulting survey of businesses engaged by XR Stories

1.3 XR Stories is supporting business growth

85% of respondents see XR Stories as important to their business growth – with 30% seeing XR Stories as very important and 25% seeing it as extremely important.

Figure 2 Importance that businesses attach to XR Stories in relation to their future growth



Source: BOP Consulting survey of businesses engaged by XR Stories

1.4 XR Stories is growing revenues and employment

Businesses that worked with XR Stories have grown their revenues – on average by £14,300 since engagement with XR Stories began, as shown in Figure 3. This means that the businesses that replied to our survey experienced combined revenue growth of nearly £300,000 (£287,500) since beginning work with XR Stories. Assuming equivalent growth across the XR Stories business base implies revenue growth of £761,900.

Businesses are more optimistic about growing revenues next year. On average, these businesses assume that their revenues will grow by £53,800 next year. This creates anticipated revenue growth within our sample of £1.1m – with this implying growth of £2.8m across the XR Stories business base.

The XR Stories business base is estimated to have generated increased revenues of £761,900 since working with XR Stories and anticipates increased revenues of £2.8m next year – which creates a combined total of generated and anticipated revenues of £3.6m. This understates the likely economic impact of XR Stories. Assets developed with XR Stories are likely to generate revenue beyond next year – as evidenced in Figure 1. These future revenues are uncertain and cannot be quantified. They are likely, however, to run beyond next year and the £3.6m in increased revenue expected by then.

Figure 3 Analysis of business revenues generated and anticipated since working with XR Stories

	In survey sample	Across XR Stories business base
Average increase in revenue generated since working with XR Stories (£000s)	14.3	
Total increase in revenue generated since working with XR Stories (£000s)	287.5	761.9
Average increase in revenue anticipated next year (£000s)	53.8	
Total increase in revenue anticipated next year (£m)	1.1	2.8
Total increase in generated and anticipated revenue (£m)	1.4	3.6

Source: BOP Consulting survey of businesses engaged by XR Stories

As businesses increase their revenues, they typically also increase their employment. This is because more staff are required to service this increased demand. This positive relationship between revenues and employment is reflected in our survey responses:

- Survey respondents report a combined increase in employment of 23 staff since beginning work with XR Stories.
- This implies a total increase of 61 jobs across the XR Stories business base – sustained by increased revenues estimated at £761,900.
- Employment will increase by a further 228 jobs next year if the relationship between increased and employment remains consistent. Revenues are estimated to increase by £2.8m next year – suggesting a rapid growth in employment if jobs grow at the same pace as revenues.
- This implies a combined employment growth of 289 jobs among businesses working with XR Stories – with 61 of these jobs generated to date and a further 228 anticipated next year as revenues continue to increase.

This impressive employment contribution may understate the role of XR Stories in job creation. This is because – as discussed above – assets developed with XR Stories are likely to generate revenues beyond next year. As these future revenues are unlocked, more employment is likely to be required to service this demand – or, more conservatively, these future revenues will enable jobs created by revenue unlocked by assets developed with XR Stories over recent years or next year to be sustained further into the future.

1.5 XR Stories is generating additionality

We report in 1.4 on the strong record of XR Stories in generating revenues and employment. Some of this business growth depends on XR Stories and some would have been created without XR Stories. The growth that depends on XR Stories is the additionality of XR Stories, while that which would have been secured anyway is known as deadweight.

We estimate the additionality of XR Stories through the analysis shown in the figure below. The columns in this figure illustrate how we assess and quantify the additionality of XR Stories:

1. Survey options: These are the options given to survey respondents to this question: *In terms of revenues generated since working with XR Stories, which of the following best describes your view of these revenues?*
2. Proportion of survey responses: We have assessed survey responses and allocated proportions to the options.
3. Weighting factor: This reflects the likely additionality associated with the survey options. At one extreme, the option reflects complete deadweight and zero additionality. At another, the option captures full additionality. In between are options that equate to partial additionality.
4. Overall additionality: This derives from multiplying 2 (proportion of survey responses) by 3 (weighting factor) for each of the survey options, then summing across these options. This generates an overall additionality of 46% - implying that 46% of revenues generated through work with XR Stories would not exist without XR Stories.

Figure 4 Additionality analysis

Survey options	Proportion of survey responses (%)	Weighting factor (%)	Overall additionality (%)
We would have achieved similar results anyway (100% deadweight)	15	0	0
We would have achieved similar results, but not as quickly (partial additionality)	20	25	5
We would have achieved some but not all of the outcomes (partial additionality)	35	50	18
Probably would not have achieved similar outcomes (partial additionality)	25	75	19
Definitely would not have achieved similar outcomes (full additionality)	5	100	5
		Overall additionality	*46*

Source: BOP Consulting survey of businesses engaged by XR Stories

The gross direct impacts in Figure 5 are consistent with the revenue and employment discussed in 1.4 above across the XR Stories business base, covering both generated and anticipated impacts. The net direct impacts apply the 46% overall additionality ratio to these gross direct impacts – to estimate the revenues and employment generated to date and anticipated next year that would otherwise not exist. These additional revenues and employment sustain further revenues and employment, known as indirect impacts, through expenditure along related supply chains. These indirect impacts are estimated by applying a creative industries multiplier[1] and are added to the direct impacts to estimate net direct and indirect impacts.

Figure 5 XR Stories contribution to additional revenues and employment

Gross direct: Revenue (£m)	3.6
Gross direct: Employment	289
Net direct: Revenue (£m)	1.7
Net direct: Employment	134
Net direct and indirect: Revenue (£m)	3.2
Net direct and indirect: Employment	254

Source: BOP Consulting analysis of survey of businesses engaged by XR Stories and PEC multiplier

[1] Gutierrez Posada, D., Kitsos, T., Nathan, M. and Massimiliano, N. (2021) Do creative industries generate multiplier effects? Evidence from UK cities 1997 - 2018. Multiple: Creative Industries Policy and Evidence Centre; City-REDI, the University of Birmingham; University College London. Available from: https://www.pec.ac.uk/discussion-papers/do-creative-industries-generate-multiplier-effects

2. Analysis of employment and business base

This section analyses the state and growth of employment and businesses relevant to XR Stories. It does this by focusing on the Creative Industries, as well as two components of the Creative Industries (IT, Software and Computer Services, and the Screen Industries) at three geographical levels:

— City: York

— County: North Yorkshire[2]

— Region: Yorkshire and Humber[3]

This section begins by defining these sectors, within relevant data maintained by the Office of National Statistics (ONS), and then analyses growth within these sectors at city, county, and regional levels.

2.1 Definitions and Methodology

The Creative Industries were defined in the UK government's 2001 *Creative Industries Mapping Document* as "those industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property".

To allow the Creative Industries to be measured, the Department of Digital, Culture, Media and Sport (DCMS) worked with others to develop a statistical definition of the Creative Industries that reflects this definition. DCMS uses "creative intensity" to determine which industries (defined by 4 digit Standard Industrial Codes - SICs) are creative. The creative intensity is the proportion of occupations in an industry that are creative[4] and industries with more than 30 per cent of workers in creative roles form the Creative Industries.

We gathered and analysed Office of National Statistics (ONS) data[5] on the Creative Industries, as well as two component parts of the Creative Industries that are most relevant to the activities of XR Stories:

— IT, Software and Computer Services

— Screen Industries[6]

2.2 York workforce

The Creative Industries employed nearly 5000 people in York last year (4915 jobs) – with more than half of this employment being in IT, Software and Computer Services (2920 jobs) and a further 310 jobs being in the Screen Industries, as shown in the figure below.

[2] North Yorkshire is the county council that is composed of 7 district councils (Selby, Borough of Harrogate, Craven, Richmondshire, Hambleton, Ryedale, and Borough of Scarborough) and, therefore, does not include the city of York.

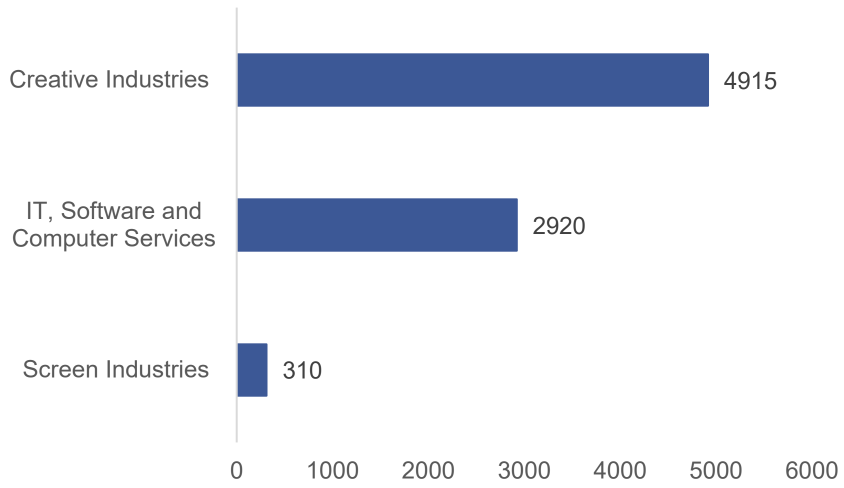
[3] Yorkshire and Humber includes York and North Yorkshire and the rest of the region.

[4] The analysis that informs the DCMS classification is based upon a review of the extent of creative activity involved with Standard Occupation Codes (SOCs)

[5] UK Business Register and Employment Services (BRES)

[6] This is a shorthand for the DCMS category of Film, TV, Video, Radio and Photography

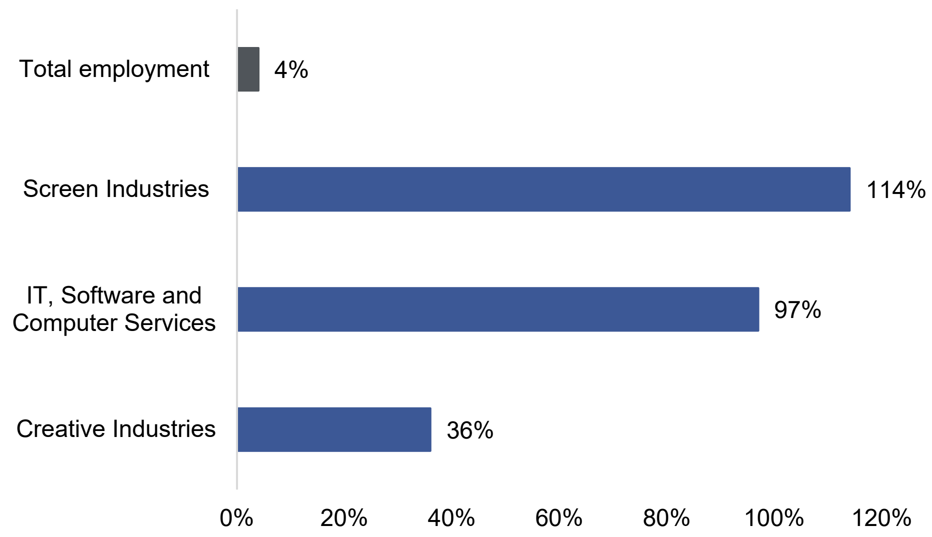
Figure 6 Number of workers by creative category in York (2021)



Source: BRES (ONS) and BOP analysis

As illustrated in the figure below, York experienced a spectacular increase in the number of people working in the Screen Industries and IT, Software and Computer Services between 2015 and 2021, (114% and 97% respectively) especially compared to the very modest growth of the total employment over that same period (4%).

Figure 7 Percentage change in number of workers by creative category in York (2015-2021)

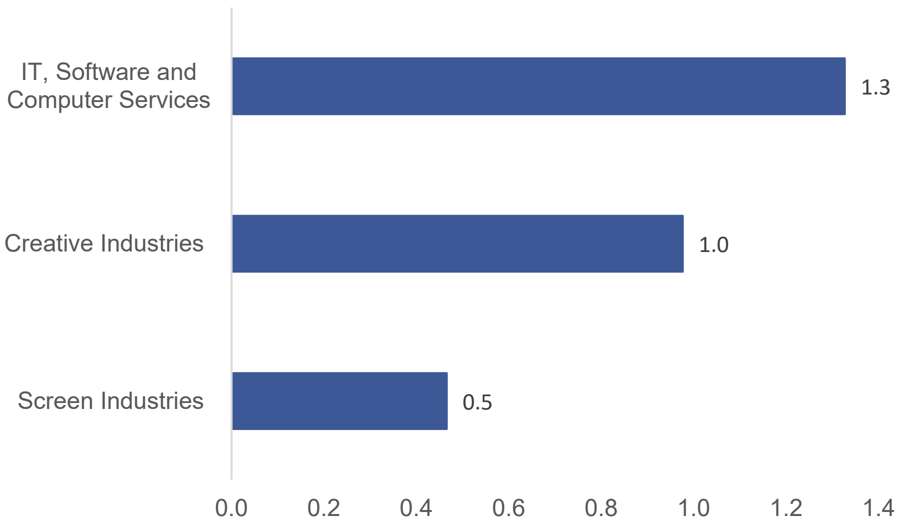


Source: BRES (ONS) and BOP analysis

Location Quotients (LQs) provide a measure of the local concentration of a kind of employment relative to the concentration across the country. LQs above 1.0 indicate higher rates of local concentration than the national average and are, therefore, a statistical indicator of clustering. This clustering tends to support further business growth – because pools of related skill, expertise and infrastructure tend to be brought together through the development of a cluster, encouraging the acceleration of business growth.

In 2021, both IT, Software and Computer Services (1.3) and the Creative Industries (1.0) statistically evidence clustering in York, while the Screen industries scores 0.5, as shown below.

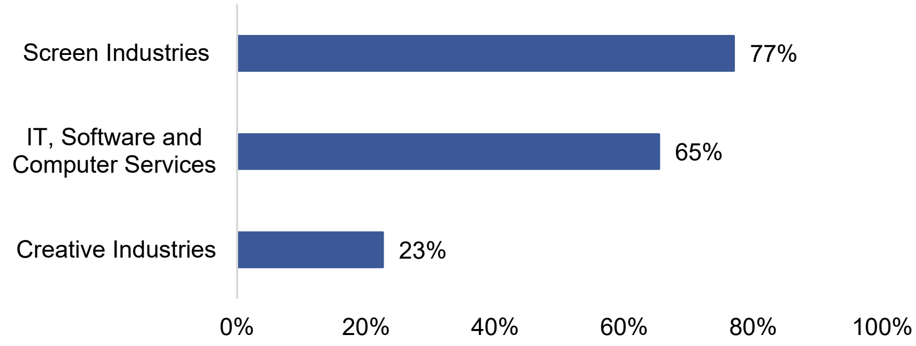
Figure 8 Location Quotients (LQs) by creative category in York (2021)



Source: BRES (ONS) and BOP analysis

Data on the change in LQ by creative category shows the Screen Industries have recorded the highest growth between 2015 and 2021 with a 77% increase, closely followed by IT, Software and Computer Services with 65%. These percentages indicate a rapid increase in the degree of creative clustering in York over the period that XR Stories has been operational.

Figure 9 Percentage change in Location Quotients (LQs) by creative category in York (2015-2021)

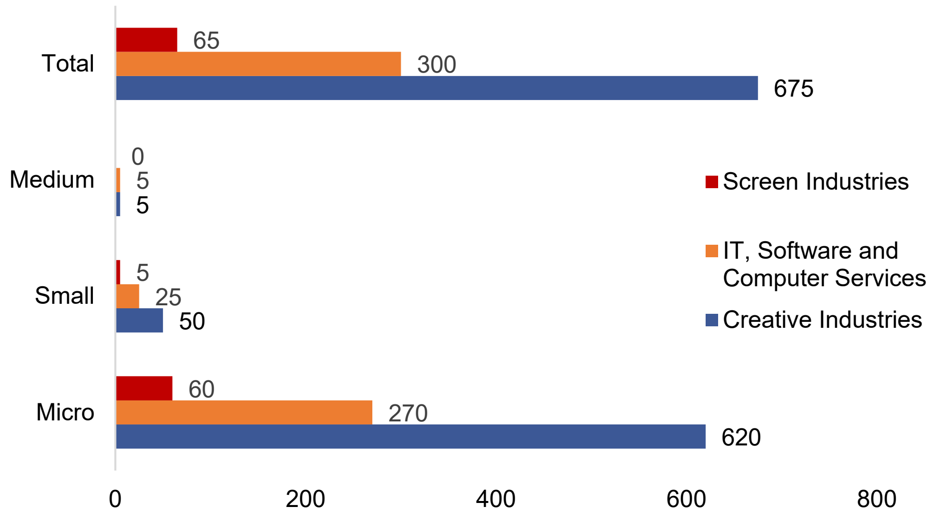


Source: BRES (ONS) and BOP analysis

York businesses

IT, Software and Computer Services represent almost half of the Creative Industries businesses in York, and most of the businesses in both the Screen Industries and IT, Software and Computer Services are microenterprises, as illustrated by Figure 5.

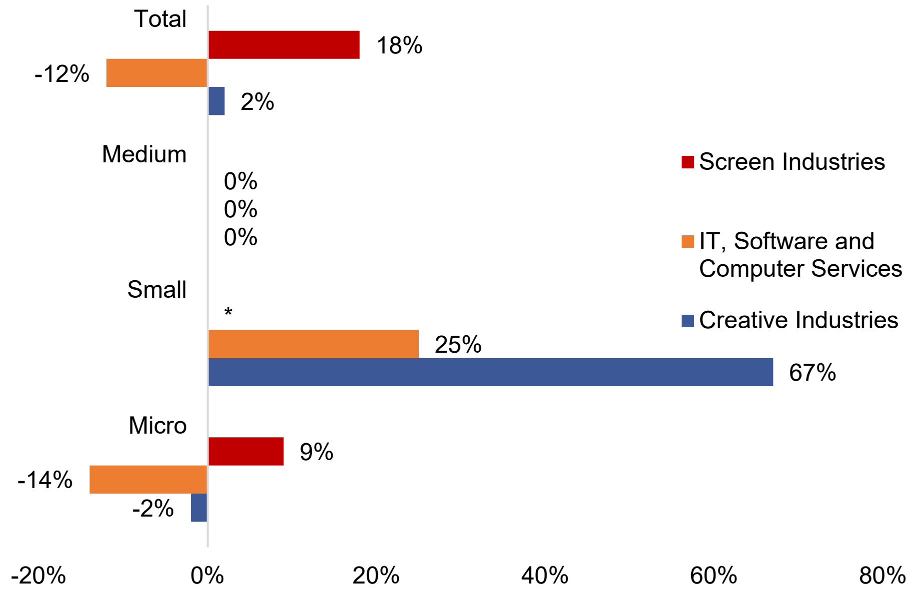
Figure 10 Number and size of businesses in York within creative sectors (2022)



Source: ONS Business Counts and BOP analysis

IT, Software and Computer Services experienced a contraction in the number of micro businesses between 2015 and 2022, while increasing the number of its small businesses, perhaps indicating the maturity of the field and the progression of some micro enterprises into small enterprises (Figure 11).

Figure 11 Percentage change in number of businesses in York within creative sectors (2015-2022)



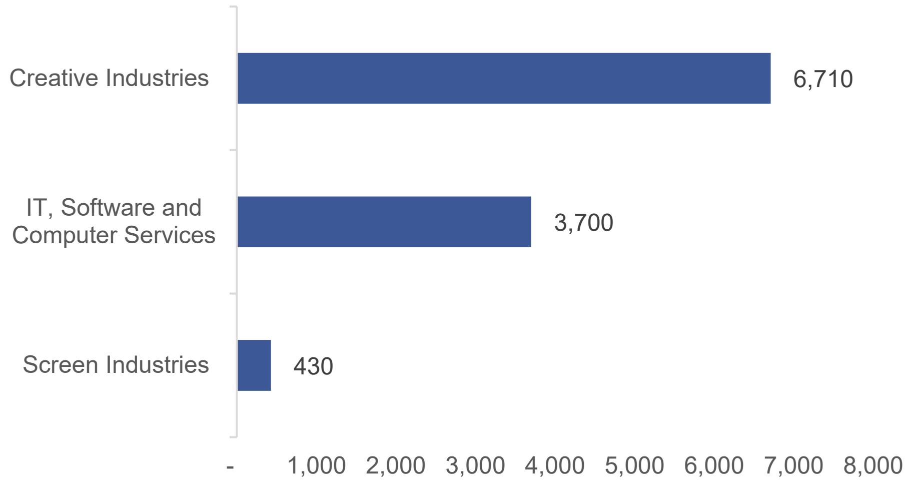
* Small screen industries businesses in York increased from 0 in 2015 to 5 in 2022

Source: ONS Business Counts and BOP analysis

2.3 North Yorkshire workforce

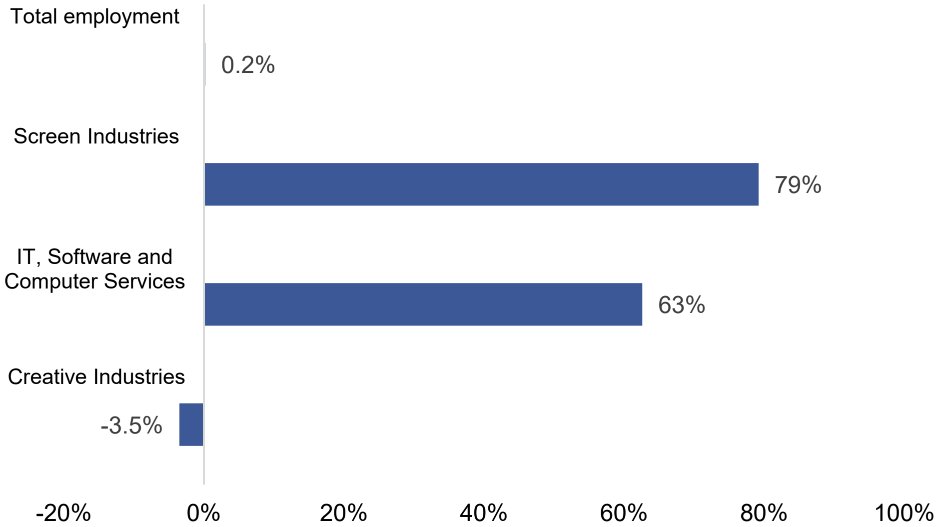
With a total of 3,700, the number of employees within IT, Software and Computer Services make-up almost half of the total number of the Creative Industries employees in North Yorkshire in 2021 (Figure 12). That number increased by 63% between 2015 and 2021 (Figure 13). The number of workers in the Screen Industries, while much smaller at 430 (Figure 12), registered a very strong growth of 79% between 2015 and 2021, especially considering total employment only grew by 0.2% during that period and the Creative Industries recorded a negative growth with -3.5% (Figure 13).

Figure 12 Number of workers by creative category in North Yorkshire (2021)



Source: BRES (ONS) and BOP analysis

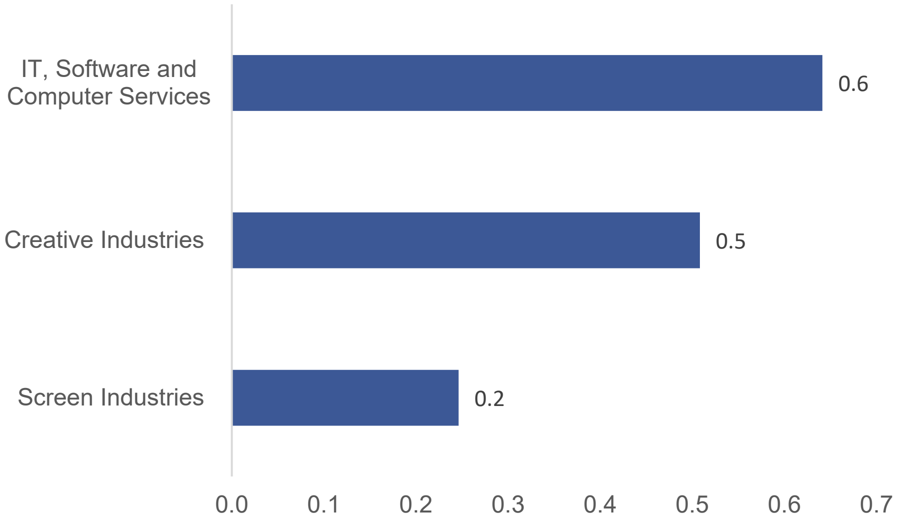
Figure 13 Percentage change in number of workers by creative category in North Yorkshire (2015-2021)



Source: BRES (ONS) and BOP analysis

LQs tend to be higher in smaller geographies, especially urban geographies (e.g., York) than larger geographies (e.g., North Yorkshire and Yorkshire and Humber) – because businesses of various kinds concentrate in towns and cities. As shown below (Figure 14), the North Yorkshire LQs are lower than those of York (Figure 8). However, the ranking in North Yorkshire mirrors the one identified in York: the LQ of its IT, Software and Computer Services is slightly above the Creative Industries, while the Screen Industries are further behind.

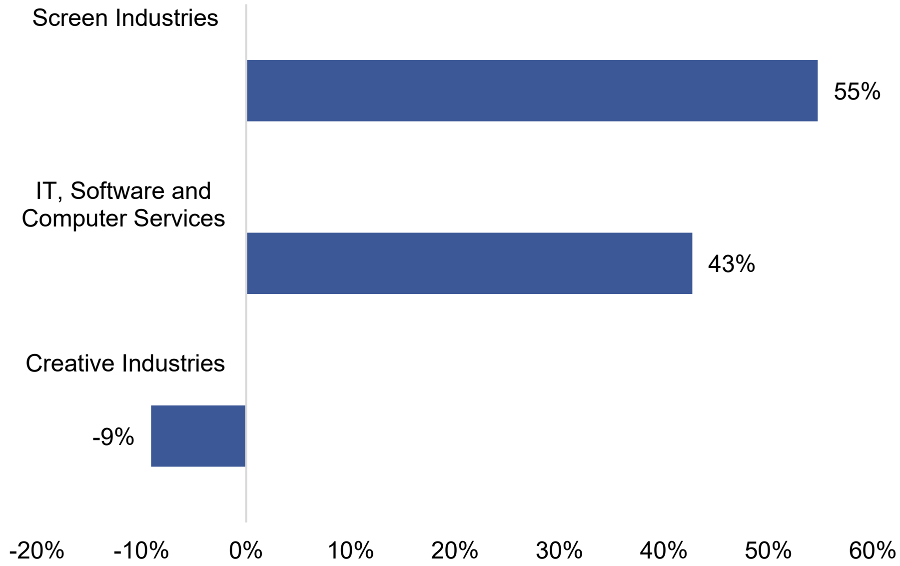
Figure 14 Location Quotients (LQs) by creative category in North Yorkshire (2021)



Source: BRES (ONS) and BOP analysis

The Screen Industries recorded the higher increase in their LQ with growth of 55% between 2015 and 2021, followed by IT, Software and Computer Services with 43% (Figure 15).

Figure 15 Percentage change in Location Quotients (LQs) by creative category in North Yorkshire (2015-2021)

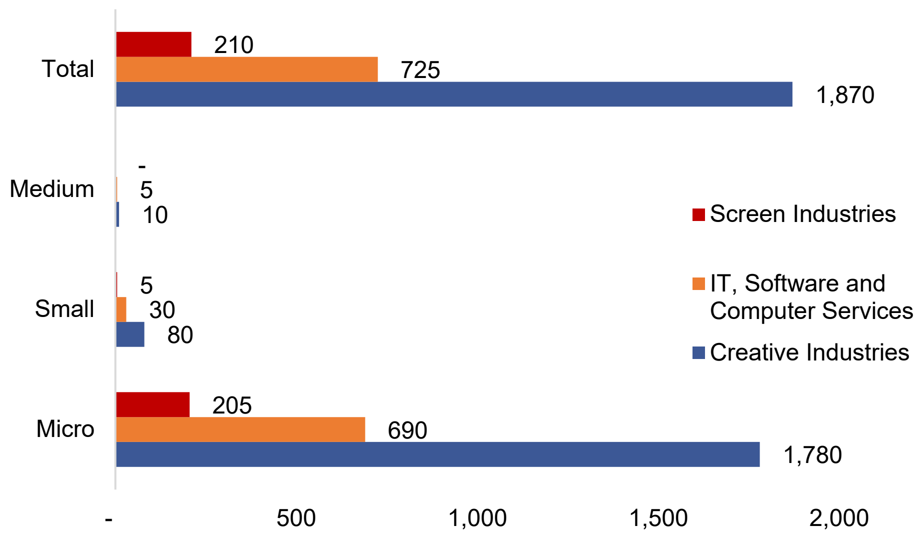


Source: BRES (ONS) and BOP analysis

2.3.1 North Yorkshire businesses

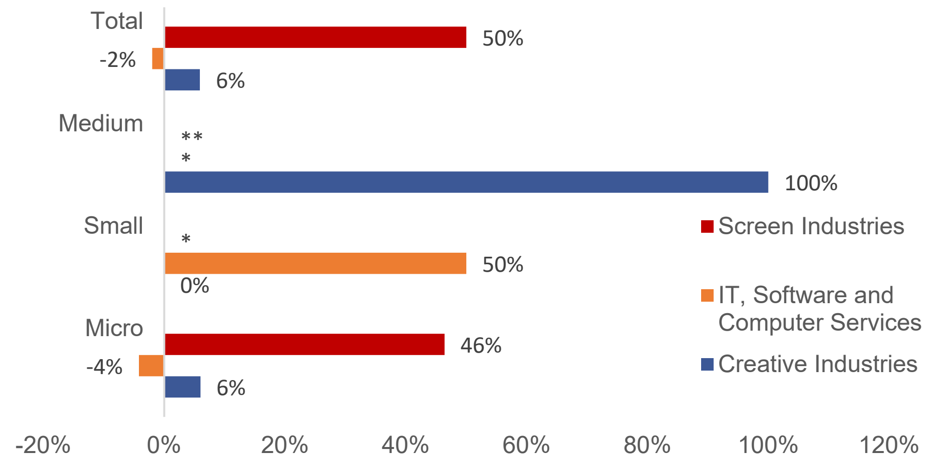
North Yorkshire has scope to grow its medium and small creative businesses, as micro enterprises largely predominate, as shown in the figure below.

Figure 16 Number and size of businesses in North Yorkshire within creative sectors (2022)



Source: Business Counts (ONS) and BOP analysis

Figure 17 Percentage change in number of businesses in North Yorkshire within creative sectors (2015-2022)



* Increased from 0 to 5

** unchanged at 0

Source: Business Counts (ONS) and BOP analysis

The most noticeable changes in business numbers by size and field between 2015 and 2022 in the county are the increases in:

— Medium-sized Creative Industries businesses (100%),

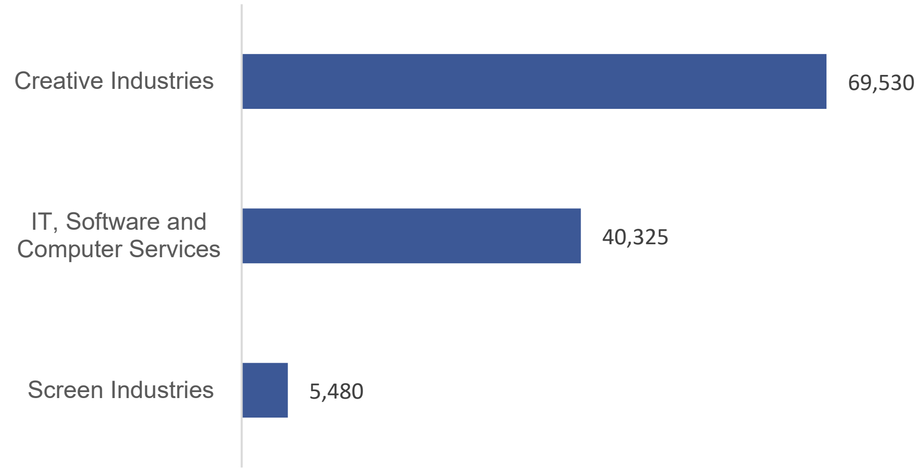
— Small IT, Software and Computer Services (50%); and

— Micro Screen Industries (46%).

2.4 Yorkshire and Humber workforce

The employment footprint of Yorkshire and Humber is similar to York and North Yorkshire. The numbers of workers in IT, Software and Computer Services (40,325) make-up almost half of the total number of the Creative Industries workers, while the Screen Industries employs many fewer people (5,480).

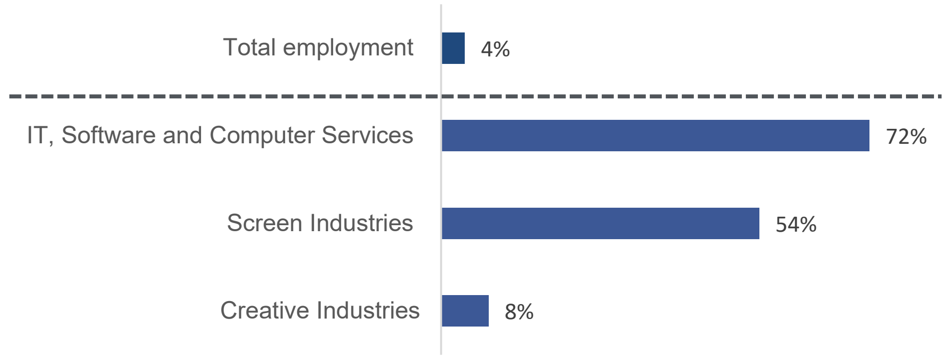
Figure 18 Number of workers by creative category in Yorkshire and Humber (2021)



Source: BRES (ONS) and BOP analysis

Yorkshire and Humber benefitted from increases in employment across all categories between 2015 and 2021 – with IT, Software and Computer Services enjoying the largest increase with 72%, larger than the more modest increase across the Creative Industries (8%). All these creative sectors outpaced the growth of total employment (4%) – as shown in Figure 19.

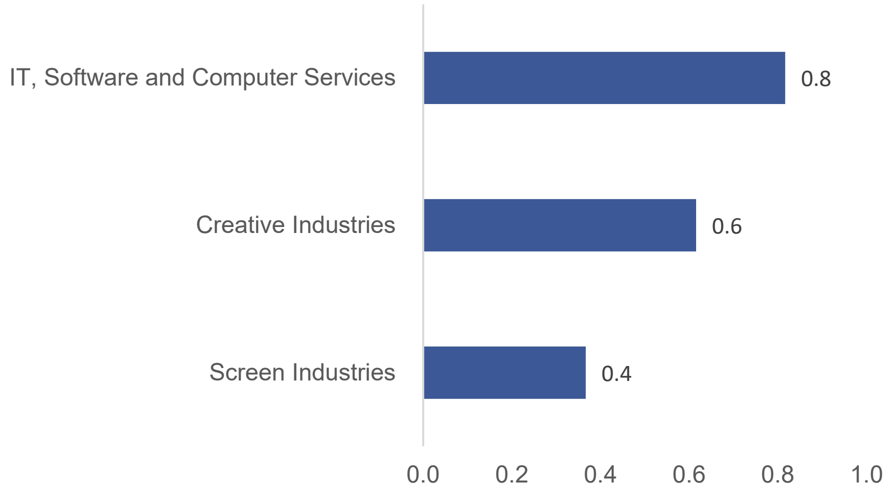
Figure 19 Percentage change in number of workers by creative category in Yorkshire and Humber (2015-2021)



Source: BRES (ONS) and BOP analysis

The IT, Software and Computer Services category is close to achieving an LQ, that is double to the one recorded by the Screen Industries and ahead of the Creative Industries, as shown in the figure below.

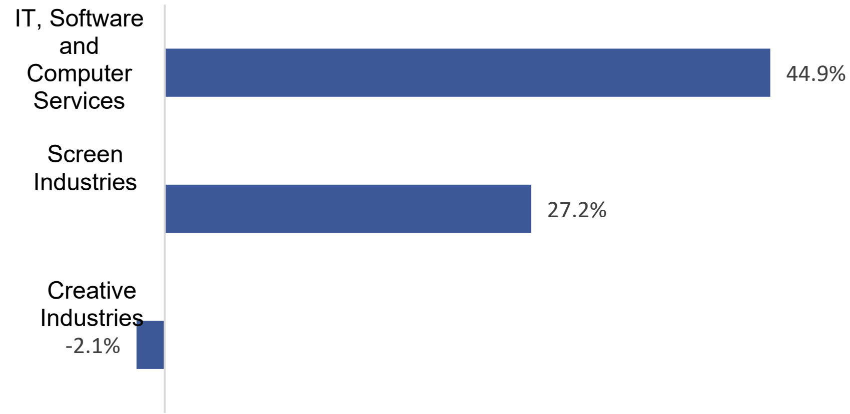
Figure 20 Location Quotients (LQs) by creative category in Yorkshire and Humber (2021)



Source: BRES (ONS) and BOP analysis

As illustrated by Figure 21, while the Creative Industries registered a negative change in LQ between 2015 and 2021, both the Screen Industries and IT, Software and Computer Services progressed with increases of 27% and almost 45% respectively.

Figure 21 Percentage change in Location Quotients (LQs) by creative category in Yorkshire & the Humber (2015-2021)

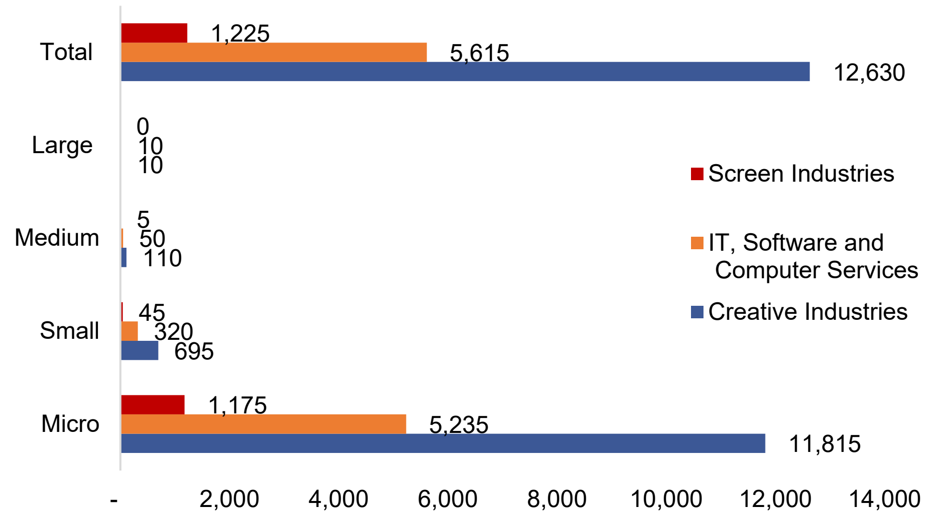


Source: BRES (ONS) and BOP analysis

2.4.1 Yorkshire and Humber businesses

As shown in Figure 22, microbusinesses dominate the Creative Industries of Yorkshire and Humber. IT, Software and Computer Services businesses have scaled to the greatest degree. All 10 large Creative Industries businesses belong to the IT, Software and Computer Services category.

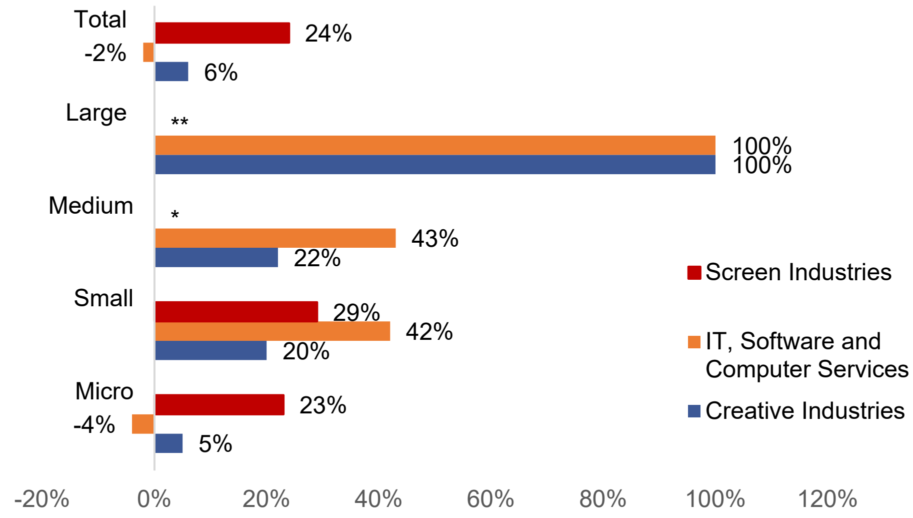
Figure 22 Number and size of businesses in Yorkshire and Humber within creative sectors (2022)



Source: Business Counts (ONS) and BOP analysis

Amid these creative categories, the Screen Industries experienced the biggest increase in total number of businesses in Yorkshire and Humber between 2015 and 2022 (24%) – but IT, Software and Computer Services may be scaling to the greatest degree: combining increases in large businesses (100%), medium businesses (43%) and small businesses (42%) with a contraction in micro businesses (-4%) – Figure 23.

Figure 23 Percentage change in number of businesses in Yorkshire and Humber within creative sectors (2015-2022)



*Increased from 0 to 5

**unchanged at 0

Source: ONS Business Counts and BOP analysis

BOP
Consulting

BOP Consulting is an international consultancy specialising in culture and the creative economy.

London
LABS, Southampton Place,
High Holborn, London WC1V 6LJ

Birmingham
SPACES, Mailbox,
Birmingham, B1 1RD

Web
www.bop.co.uk

Twitter
@BOP_Consulting

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