# Revisiting productivity and innovation in the West of England

## Analysis based on microdata

IPR Report

**Dr Chris Dimos, Dr Aida Garcia Lazaro, Mr Charles Carter**

November 2024

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# Acknowledgements

This research was conducted in consultation with the West of England Mayoral Combined Authority. We are very grateful to the West of England Mayoral Combined Authority's economic analysis team for their input into this research. In particular, we would like to thank George Margesson, Heather Blake, and Andy Reed for their invaluable suggestions. The interpretations and opinions within this report are those of the authors and may not reflect the policy positions of the West of England Mayoral Combined Authority.

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# 1

# Executive summary

# Executive summary

The West of England Mayoral Combined Authority (WofE CA) oversees economic development and strategic planning in the West of England region, including Bristol, South Gloucestershire, and Bath & North East Somerset. WofE CA aims to enhance productivity and foster innovation, driving economic growth, improving real wages, and raising living standards. This report offers a thorough analysis of the current productivity and innovation landscape in the region, designed to inform regional economic strategies, and facilitate the implementation of WofE CA's Plan for Innovation.

WofE CA supports a diverse and dynamic business environment, ranging from major corporations like Rolls Royce and Airbus to numerous small and medium-sized enterprises (SMEs). In a previous report (Dimos and Pearce, 2023), researchers of the Institute for Policy Research (IPR) provided insights in the innovation and productivity landscape of the WofE CA and the wider region utilising publicly available data at the (sub)regional level. As such, the analysis in Dimos and Pearce (2023) and their findings were constrained by the availability of data at certain regional levels not always corresponding to the WofE CA geographic boundaries (e.g., WofE Local Enterprise Partnership (LEP) data were also used).

This work extends the previous report by providing additional insights on the topic, utilising new data at the establishment level provided by the ONS. The use of microdata enabled the aggregation of establishment-level data to the desired regional level for a wider set of establishment characteristics including ownership, size and industrial affiliation (among others). This led to a more detailed analysis of how productivity and innovation vary across establishment characteristics. In addition, we further investigate the motivations and obstacles to innovation. The combination of microdata from the ONS with broader regional analysis makes this report a valuable tool for policymakers and stakeholders looking to enhance the WofE CA's business environment and regional competitiveness.

This report leverages establishment-level survey data from the Annual Business Survey (ABS) and the UK Innovation Survey (UKIS), both provided by the Office for National Statistics (ONS). The ABS offers detailed information on establishment productivity, including metrics such as establishment size, industrial sector, profitability, and geographical location. These variables are important for analysing the variations in productivity and innovation across different characteristics. The UKIS supplies comprehensive data on innovation within establishments. For a thorough analysis, data from both surveys were aggregated at local and combined authority levels to address the specified research questions:

- How does productivity and innovation diffusion in WofE CA compare with other combined authorities?

- What is the geographic distribution of productivity and innovation diffusion within the WofE CA?
- How is productivity spread across different industrial sectors in the WofE CA?
- What is the distribution of productivity among firms of varying sizes and profitability?
- Does higher productivity correlate with greater innovation?
- What drives firms to innovate in the WofE CA and other combined authorities?
- What obstacles do firms face when deciding to innovate?

Our findings indicate that although establishments operating within the WofE CA consistently exhibit higher productivity levels compared to other combined authorities, they show a somewhat lower propensity for innovation in their products or production processes. This finding could serve as a cautionary signal, necessitating further investigation (possibly through qualitative research) and potentially proactive measures to prevent potential discontent or challenges in the future. Less innovation could hinder WofE CA's ability to enhance productivity further, potentially causing it to lag behind other combined authorities in the future.

We find the most productive industries to be Construction / Energy and Manufacturing, foreign (non-GB) establishments to be more productive than domestic (GB-based) establishments, large establishments to be more productive than SMEs, and the most profitable establishments to be more than five times more productive than the least profitable establishments.

In examining the motivations and perceived barriers to innovation, we show that a significant obstacle to innovation for WofE CA establishments is the shortage of qualified personnel. This apparently contradicts Census and other data documenting the highly qualified skill force in the WofE CA, as it is also reported in Dimos and Pearce (2023). Our statistic, instead, is a self-reported assessment on behalf of establishments in answering the question appearing in the UKIS: 'During the preceding 3-year period, how important was the lack of available qualified personnel in constraining innovation activities?' In fact, this constraining factor, though prevalent among most combined authorities, was the most popular between WofE CA establishments and especially for micro establishments and SMEs. This apparent contradiction would necessitate further scrutiny in determining the extent to which the highly qualified personnel in the WofE CA is at the same time also qualified and fit for innovation purposes. Potential qualification (skills) / job mismatches could explain this apparent contradiction, with another potential explanation being that WofE CA establishments set the bar high.

Other key obstacles to innovation for WofE CA establishments are reported to be lack of finance and the high economic risk. Although these obstacles are pervasive across the nation, regional initiatives supporting the innovation activities of establishments and incentivising private research and development (R&D) investment would be key in raising innovation.

We hope this work will help the WofE CA tailor policies and funding opportunities to specific business needs. By identifying key drivers and barriers, the report equips WofE CA with the tools to make targeted decisions that can foster innovation, improve productivity, and drive economic growth. In practice, this could lead to highly paid jobs, real wage increases and prosperity, to the benefit of both residents and the broader community.

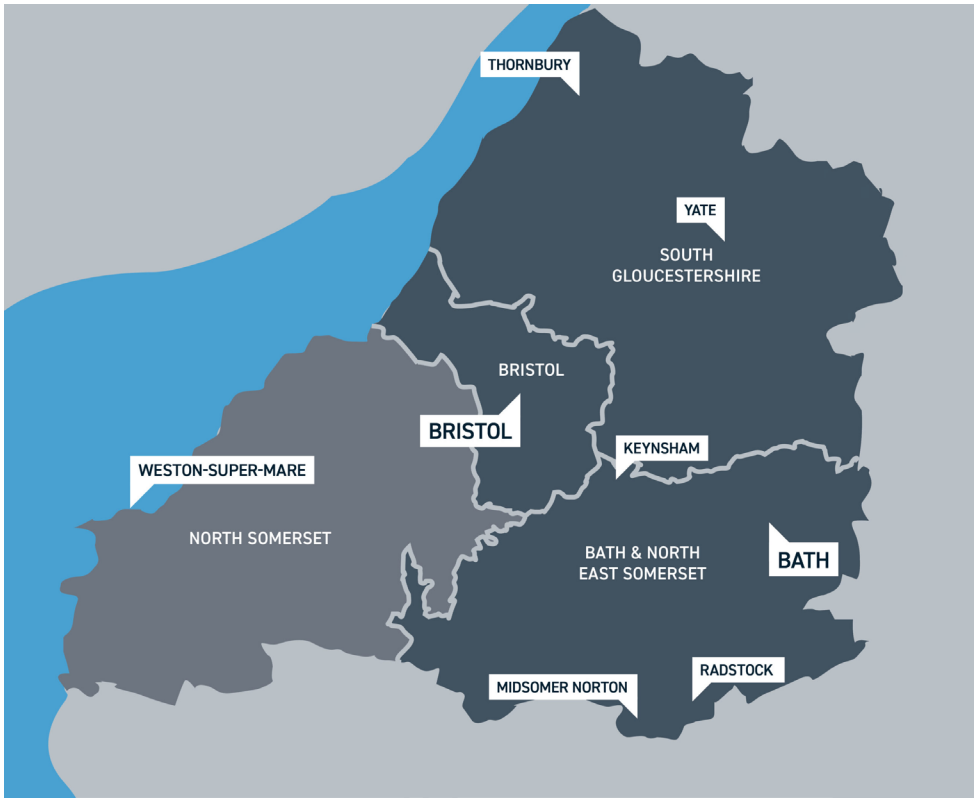
# 2

# Geography and data

# Geography and data

The geography of interest is the geographical area within the West of England Combined Authority (WofE CA) boundaries. The WofE CA includes the local authorities of the City of Bristol, South Gloucestershire, and Bath & North East Somerset. Figure 1 delineates the geographical boundaries for the WofE CA, its constituent local authorities, and the wider West of England Local Enterprise Partnership (LEP).

**Figure 1. Map of Local Authorities (Bristol, Bath & North East Somerset, South Gloucestershire) within the WofE CA. All areas shown are part of the West of England LEP.[1]**




This report also considers the relative performance of other Combined Authorities (CAs) in England whose location is presented in Figure 2. We principally consider the CAs which are most comparable to the WofE CA: Cambridgeshire & Peterborough, Greater Manchester, the West Midlands, and West Yorkshire.

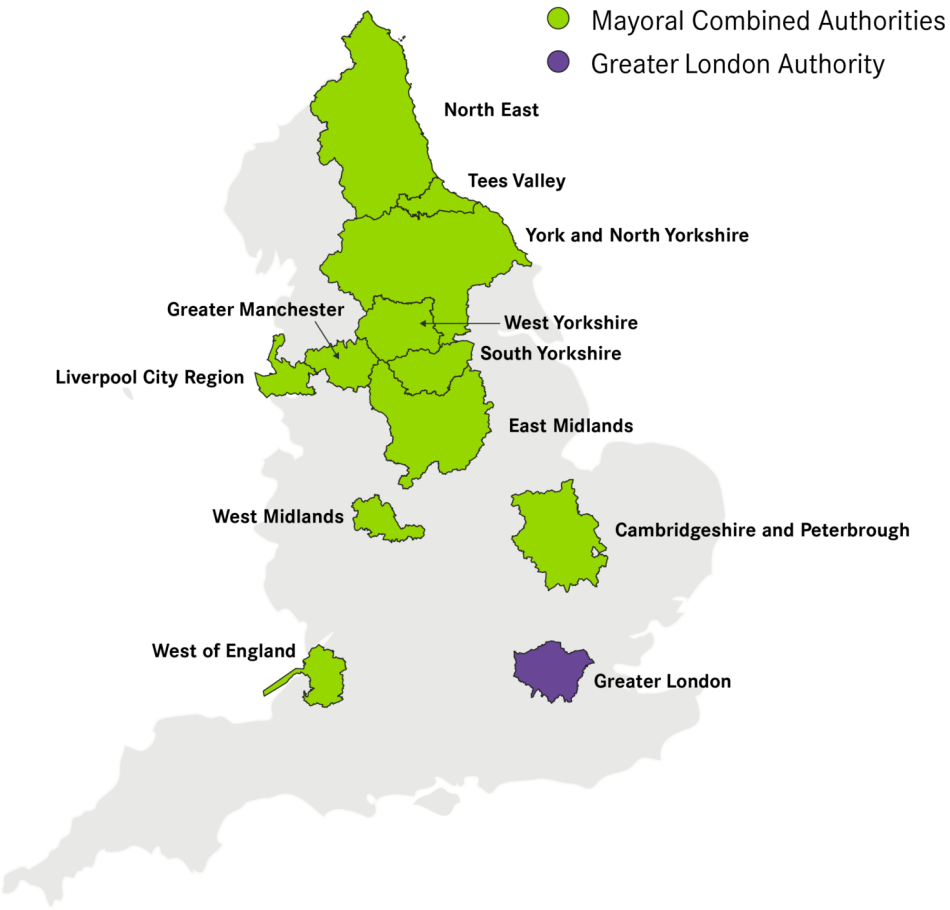
To address the research questions outlined in the Executive Summary, we utilise secure microdata from the Office for National Statistics (ONS). All data is referenced at the reporting unit level.[2] To analyse establishment-

1 Image source: West of England Mayoral Combined Authority, 2024. Who we are. https://www.westofengland-ca.gov.uk/about-us/who-we-are/

2 Across the text, we refer to the reporting units as establishments.

level productivity, we utilise establishment-level Gross Value Added (GVA) data, published in the Annual Business Survey (ABS) by the ONS between 2015 and 2021. The ONS defines GVA as the value generated by any unit in the production of goods or services. To ensure accuracy and representativeness, we trim the top and bottom one per cent of observations to remove potential measurement errors.

**Figure 2. Map of Combined Authorities within the UK as of May 2024.[3]**




The ABS reports GVA at nominal prices, so to ensure that we accurately compare real productivity values, we deflate the GVA data using the publicly available Consumer Price Index (CPI) published by the ONS. The ABS also includes establishment postcodes, which we cross-reference with geographic data to assign establishments to their respective local and combined authorities.

3 Image source: Centre for Cities, 2024. Everything you need to know about metro mayors. https://www.centreforcities.org/publication/everything-need-know-metro-mayors/

The ABS also contains data on establishment size, profitability, industrial sector, and nationality of the ownership of each reporting unit. Constraints to the sample size meant that reporting production and innovation measures for individual countries of ownership was not feasible. Therefore, we report productivity and innovation measures for establishments owned within Great Britain, which we call domestic establishments, as well as foreign-owned establishments. To account for establishment size in our analysis we use the measure of employment in the ABS and classify small- (0-100), medium- (101-250), and large- (251+) sized businesses. Firm level profitability is proxied using reporting units gross operating surplus which is broadly defined as the annual residual value to an establishment after subtracting inputs, workers compensation and taxes on production minus any subsidies. We look at establishment-level productivity and innovation across different quartiles of the gross operating surplus distribution to understand how these measures vary across the profitability distribution. Finally, the industrial sector of establishments was deduced from the 2007 Standard Industrial Classification (SIC) codes. We group industrial classifications using the first two digits of the code, which mitigates concerns over the quality of the data relating to small sample sizes per industry.

Innovation data was sourced from the UK Innovation Survey (UKIS), which tracks establishments' innovation behaviour every two years. Since the survey is biennial, each edition captures innovation activities from the current year and the previous two years. The three most recent survey waves correspond to the periods 2014-2016, 2016-2018, and 2018-2020. The data reports whether establishments introduced new or significantly improved goods and/or services (i.e., product innovation), and new or significantly improved methods for the production or supply of goods or services (i.e., process innovation) over the previous two-year period.

The UKIS also provides insight into the motivations for innovation and the barriers to achieving it. In each wave, establishments who engage in innovation are asked to rate a set of motivations as ‘not important’, ‘low’, ‘medium’ or ‘high.’ Symmetrically establishments who have not innovated are asked to rate a set of barriers as ‘not important’, ‘low’, ‘medium’, or ‘high’ reasons for not innovating.

# Productivity

# Productivity

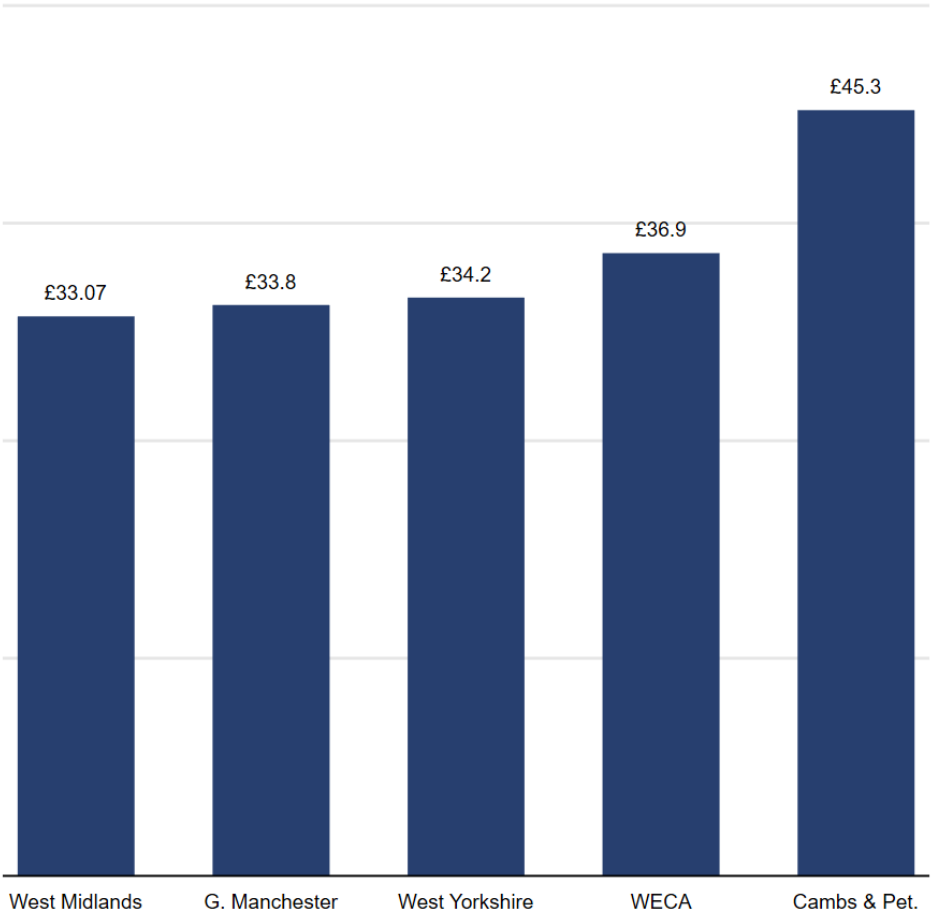
Productivity is tightly related to economic growth, higher real wages and the improvement of living standards. Furthermore, highly productive regions can better provide public services and infrastructure, contributing to overall economic prosperity and stability. As such, enhancing productivity should be the primary focus of policy initiatives aimed at promoting economic development in WofE CA.

We utilise the GVA and the employment data for each reporting unit for the 2015-2021 period (ABS data) to construct measures of labour productivity. We calculate GVA per hour worked by first dividing establishment-level GVA by the number of employees and then divide this number by 1,554. This corresponds to the approximate number of hours worked by employees in a year assuming a 7-hour workday with 250 - 28 = 222 working days a year. GVA per hour worked is calculated for each reporting unit within our sample and then averaged within local and combined authorities. Since the raw data are not adjusted for inflation, we deflate the GVA values using the Consumer Price Index (CPI) published by the Office for National Statistics (ONS).

To understand how productivity varies across businesses of different types, we categorise the reporting unit data across four categories: foreign ownership, industry, employment size, and profitability. The data for these categories were sourced from the Annual Business Survey (ABS). Each establishment's industrial sector was obtained using the 2007 Standard Industrial Classification (SIC) codes and profitability is approximated using gross operating surplus (GOS). We begin by comparing aggregate-level productivity across combined authorities and then proceed to analyse how sources of productivity vary across the aforementioned categories.

Figure 3 illustrates the average GVA per worker for establishments in WofE CA, Greater Manchester, West Yorkshire, West Midlands and Cambridgeshire & Peterborough. The average GVA per hour worked in the WofE CA over the 2015-2021 period is approximately £36.9. This value is notably higher than those of the West Midlands (£30.1), Greater Manchester (£33.8), and West Yorkshire (£34.2), indicating that workers in the West of England generate more economic value on average compared to these regions.

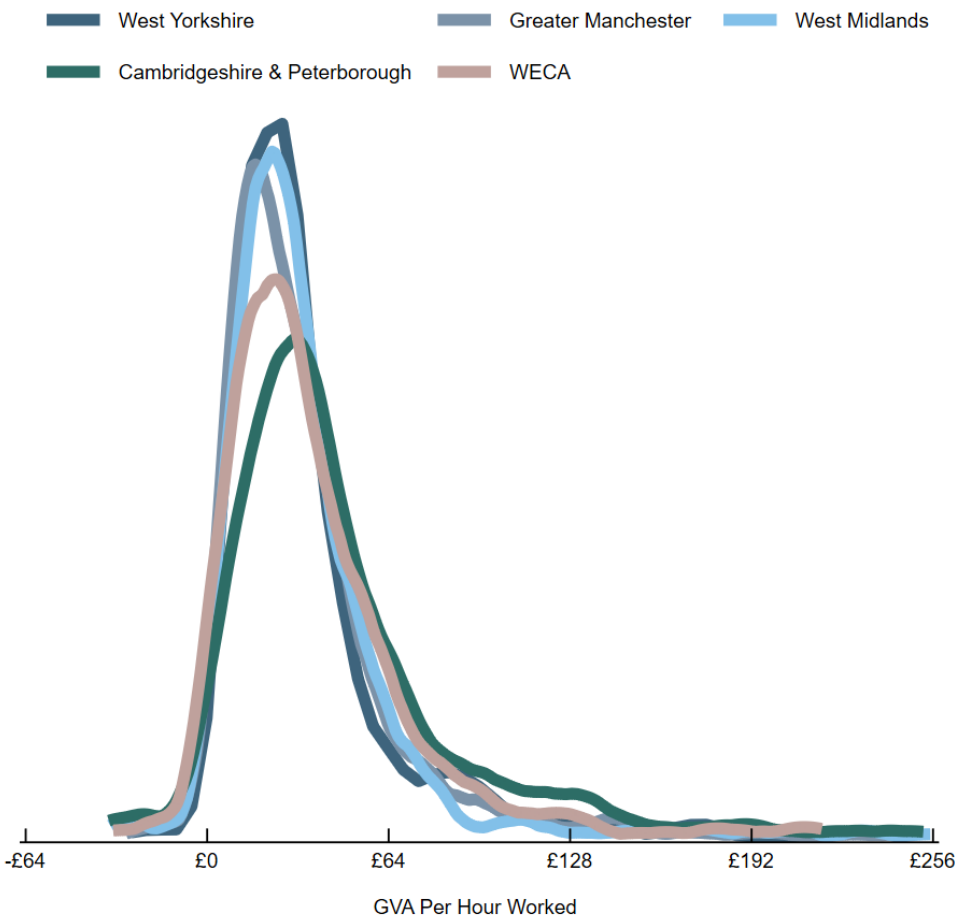
**Figure 3. Average GVA per employed workers for establishments in WofE CA, West Yorkshire, Greater Manchester, West Midlands, and Cambridgeshire & Peterborough between 2015 and 2021.**




However, it is important to highlight that Cambridgeshire & Peterborough significantly outperforms WofE CA, with a GVA per worker of £45.3. This indicates that while the WofE CA is performing well relative to several other key regions, Cambridgeshire & Peterborough remains a benchmark of high productivity and economic output per worker.

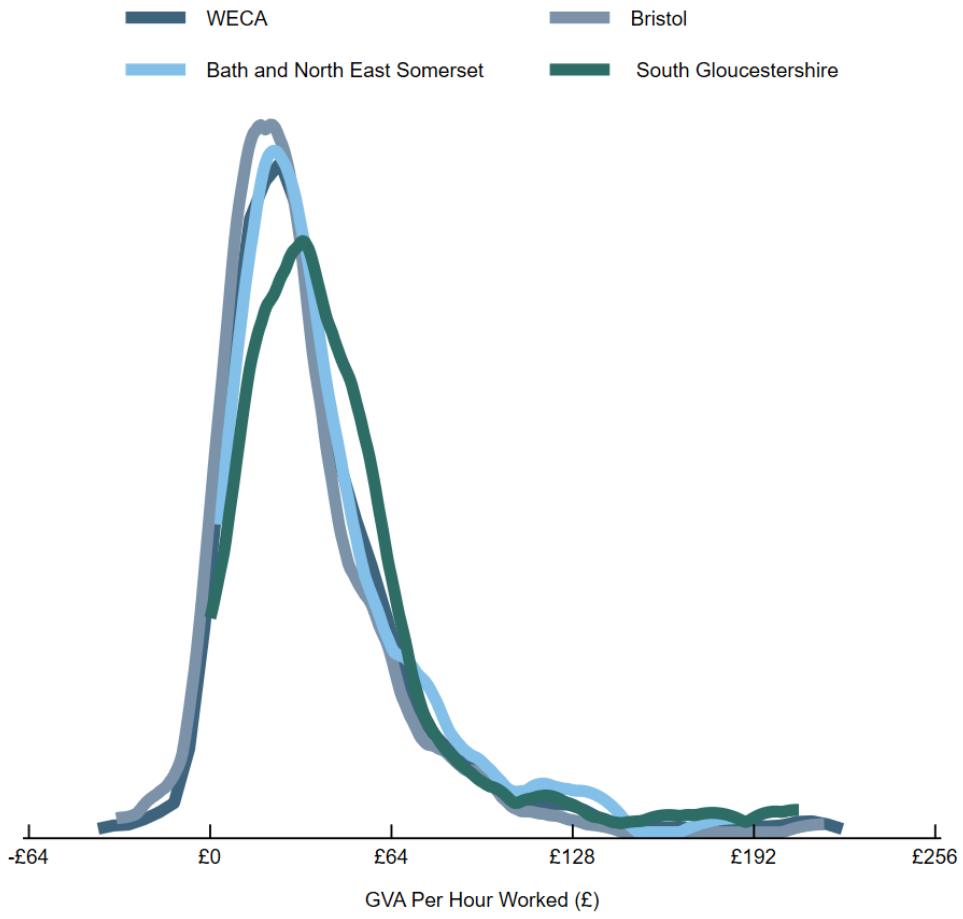
Figure 4 illustrates the distribution of GVA per hour worked in the WofE CA compared to those in West Yorkshire, Greater Manchester, West Midlands and Cambridgeshire & Peterborough. Across all combined authorities we see a large variance in the productivity of establishments ranging from approximately -£64 to £235. As noted in Figure 3, WofE CA has an average GVA per hour worked higher than the combined authorities of West Yorkshire, Greater Manchester, and the West Midlands, falling behind only Cambridgeshire & Peterborough, as represented by the green line. WofE CA, represented by the light pink line, has a distribution which follows a similar right-skewed pattern as other regions, although WofE CA's peak is slightly lower, indicating fewer workers around the most common GVA values, and its broader spread suggests greater variability in productivity levels. The extended tail on the right indicates a significant number of workers with higher GVA values, highlighting the presence of exceptionally productive establishments within WofE CA, although this is not as pronounced as in combined authorities such as Cambridgeshire & Peterborough, the West Midlands and Greater Manchester.

**Figure 4. Distribution of GVA per employed workers in WofE CA, West Yorkshire, Greater Manchester, West Midlands, and Cambridgeshire & Peterborough between 2015 and 2021.**



When looking at the distribution of GVA across the local authorities within WofE CA (Figure 5), we see the distributions for each region are notably similar, with a sharp peak around the £32 mark. One of the most notable features of the graph is the distribution of GVA per hour worked for South Gloucestershire, represented by the green line. This region exhibits a distinct pattern with a higher concentration of workers at the upper end of the GVA distribution compared to the other regions. The distribution for South Gloucestershire is positively skewed, with a noticeable tail extending towards higher GVA values, indicating that a significant number of workers in this region have relatively high GVA per hour worked.

**Figure 5. Distribution of GVA per employed workers in Bristol, Bath & North East Somerset and South Gloucestershire between 2015 and 2021.**

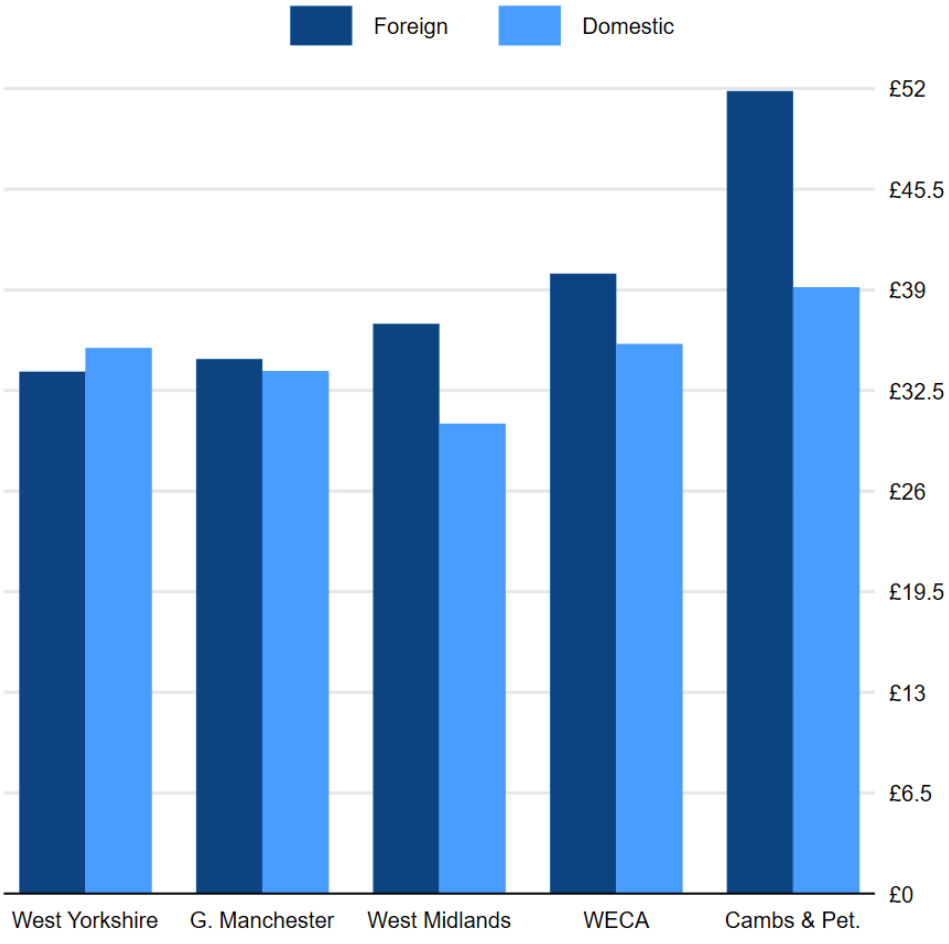



While the peak for South Gloucestershire is slightly lower compared to WofE CA and Bristol, the broader and more extended distribution towards higher GVA values suggests a greater variability and higher potential for economic output per hour worked in this area. This extended tail in the distribution indicates that South Gloucestershire has a substantial segment of its workforce contributing significantly higher value compared to the average.

In contrast, WofE CA and Bristol show higher peaks, indicating a denser concentration of workers around a similar GVA per hour worked range but with less variability towards the higher end. Bath & North East Somerset, represented by the light blue line, also shows a slightly broader peak, suggesting more variation in the GVA per hour worked within this region, but not as pronounced as South Gloucestershire.

We investigate how productivity levels vary between domestic and foreign-owned establishments across the five CAs (Figure 6). With the exception of West Yorkshire, where domestic establishments are more productive than foreign establishments, we observe that foreign establishments are more productive across all the other four CAs. This is in line with international evidence where we see that successful and highly productive establishments create new establishments outside their home country. For the WofE CA, we observe that foreign establishments are substantially more productive than domestic establishments. This suggests the key role foreign establishments have for the local economy and the need for further incentivising and attracting foreign direct investment (FDI) from abroad (expansion of foreign establishments within the WofE CA or even relocation).

**Figure 6. Average GVA per employed workers for foreign and domestically owned establishments in WofE CA, West Yorkshire, Greater Manchester, West Midlands, and Cambridgeshire & Peterborough between 2015 and 2021.**



When looking at average productivity across different industrial sectors in the WofE CA, we observe that Construction / Energy and Manufacturing exceed the combined authority average productivity of £36.9 per hour worked (Figure 7). Construction / Energy and Manufacturing have an average annual GVA per hour worked of £56 and £38 respectively in WofE CA. Technical services have an average productivity very close to the WofE CA average of £36.9 per hour worked. Conversely, non-technical services, retail and transport exhibit annual average productivity lower than the WofE CA average. Across all CAs in Figure 7, either Construction / Energy or Manufacturing is the most productive industry. The only exception is Cambridgeshire & Peterborough, where technical services are the most productive industry.

**Figure 7. Average GVA per employed workers across different industrial sectors in WofE CA, West Yorkshire, Greater Manchester, West Midlands and Cambridgeshire & Peterborough between 2015 and 2021.**

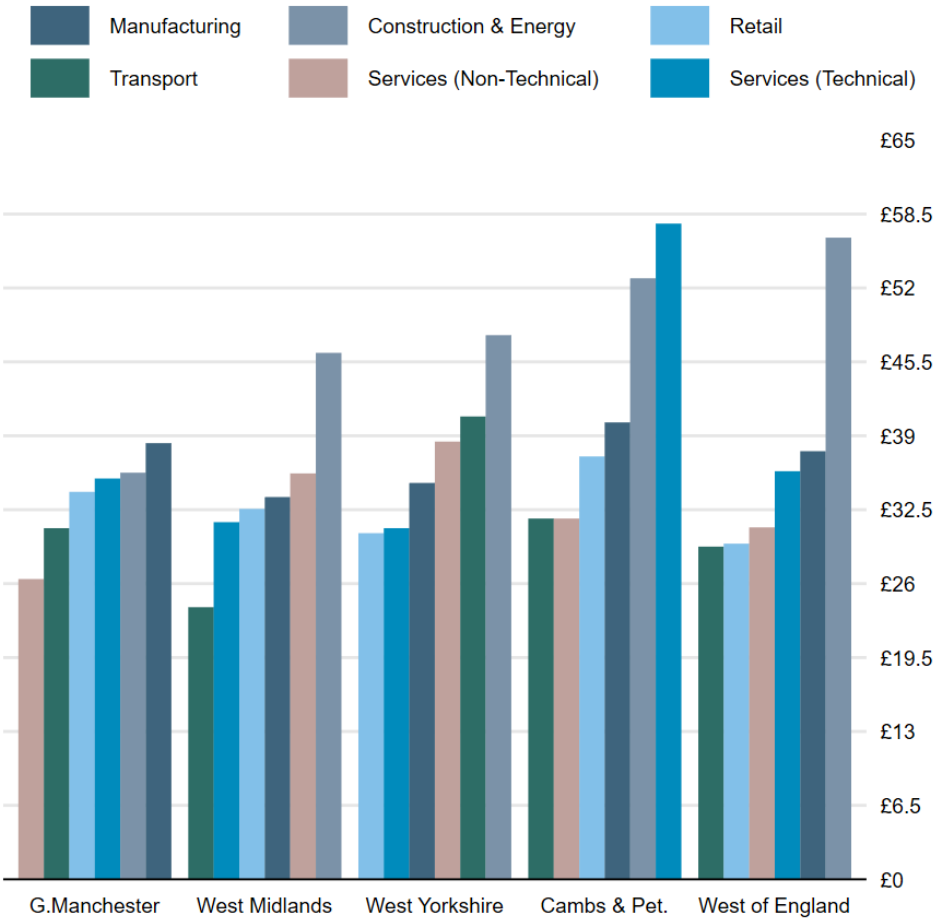
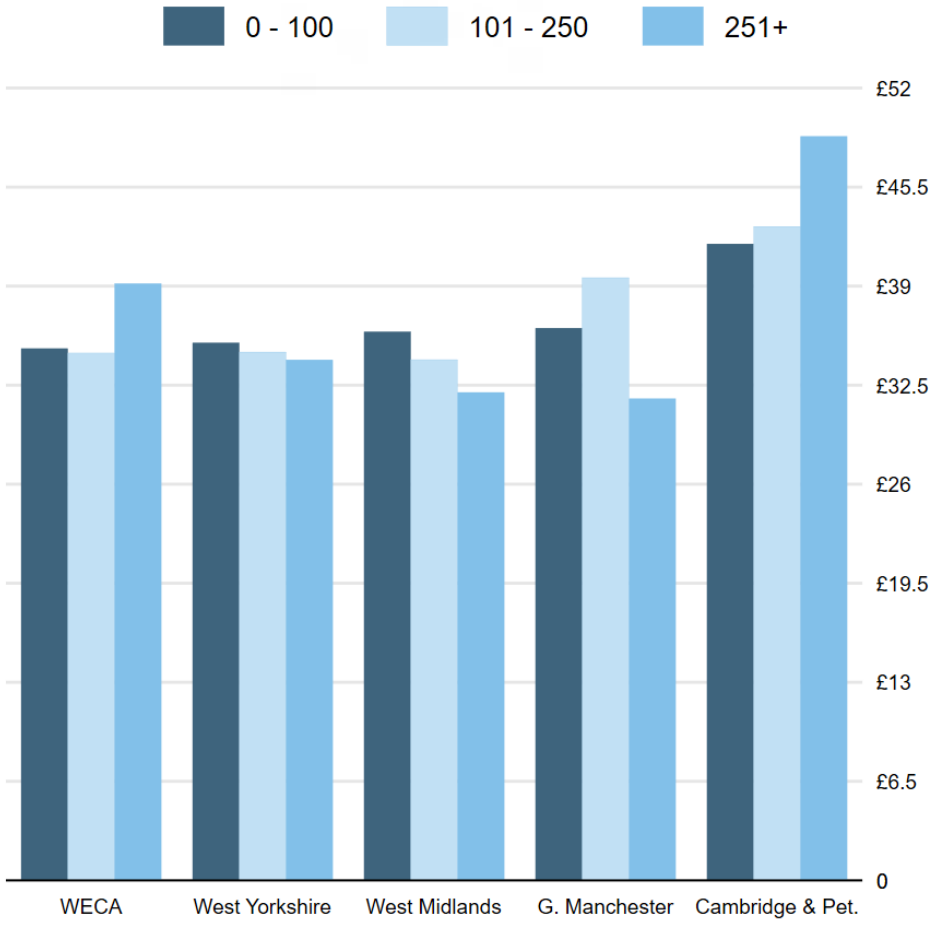


Figure 8 shows a relatively balanced distribution of GVA across small and medium enterprises (SMEs) (i.e., with 250 or fewer employees) within the WofE CA. Firms with 0-100 employees and those with 101-250 employees have similar GVA per hour worked, slightly above £32. Productivity is driven predominantly by large establishments in the region: the highest productivity is seen in establishments with 251+ employees, reaching approximately £39 per hour worked. This indicates that large establishments in the WofE CA contribute significantly more to economic productivity compared to smaller establishments. While this pattern is also observed in Cambridgeshire & Peterborough, this is not a trend that is observed across the other combined authorities. In West Yorkshire, Greater Manchester and the West Midlands, large establishments exhibit the lowest productivity.

**Figure 8. Average GVA per employed workers across various establishment sizes WofE CA, West Yorkshire, Greater Manchester, West Midlands, and Cambridgeshire & Peterborough between 2015 and 2021.**

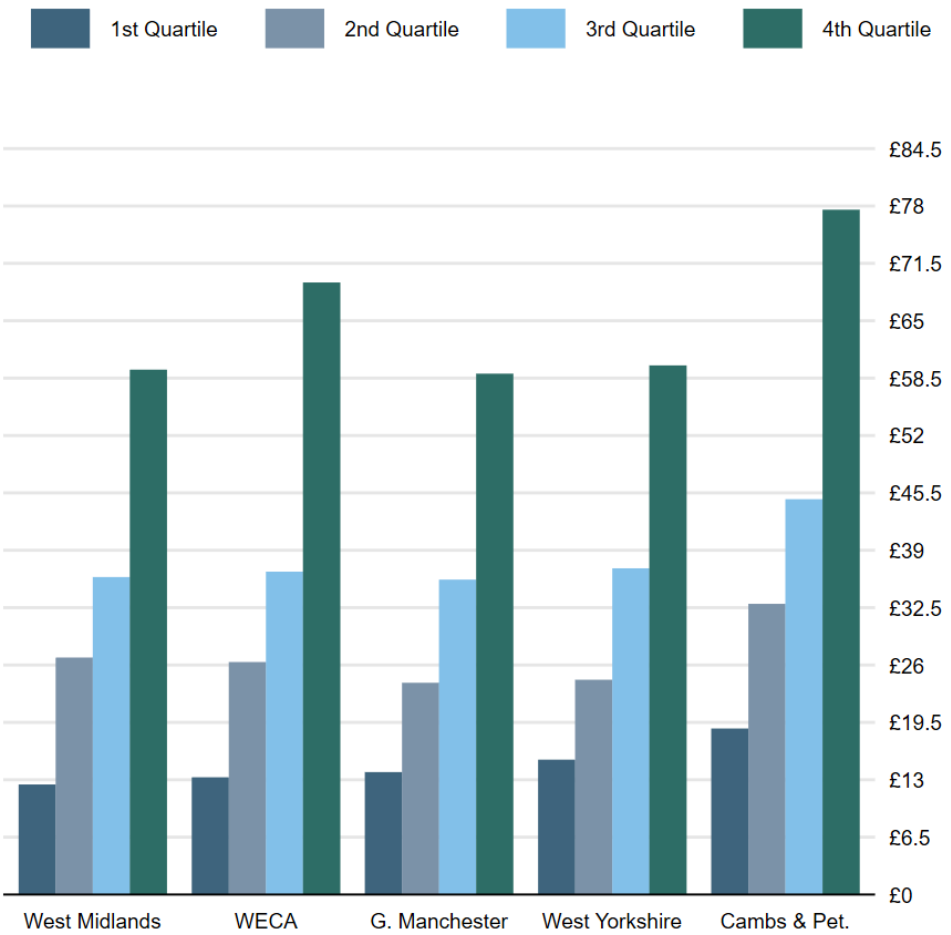



Turning our attention to how productivity varies across different levels of profitability, we find a strong link between productivity and profitability (Figure 9). Higher quartiles of profitability, as proxied by gross operating

surplus, exhibit higher productivity on average than those in the lower quartiles across all CAs. This is consistent with our theoretical expectations. More productive establishments will create more output for the same amount of inputs thereby reducing the per-unit cost of production (and operational costs) and increasing their profit margins. In addition, more profitable establishments will invest more in improving their processes and attract more productive employees, thereby becoming more productive.

For the WofE CA, the most profitable establishments (fourth quartile) have an average GVA per hour worked of just over £58.5 while the least profitable establishments (first quartile) have just under £13. This means that the most profitable establishments are more than five times more productive than the least profitable establishments. As a comparison, the relative ratio for the Cambridgeshire & Peterborough establishments is four times. There is also a large difference between establishments in the third quartile of profitability and those in the fourth quartile with those in the former achieving a GVA of £38.6, which is just above the WofE CA average (£36.9). We generally observe a very similar pattern across all CAs apart from Cambridgeshire & Peterborough where its second profitability quartile is just lagging to the third quartile of other CAs in terms of productivity.

**Figure 9. Average GVA per employed workers for establishments of differing profitability in WofE CA, West Yorkshire, Greater Manchester, West Midlands and Cambridgeshire & Peterborough between 2015 and 2021.**



# 4

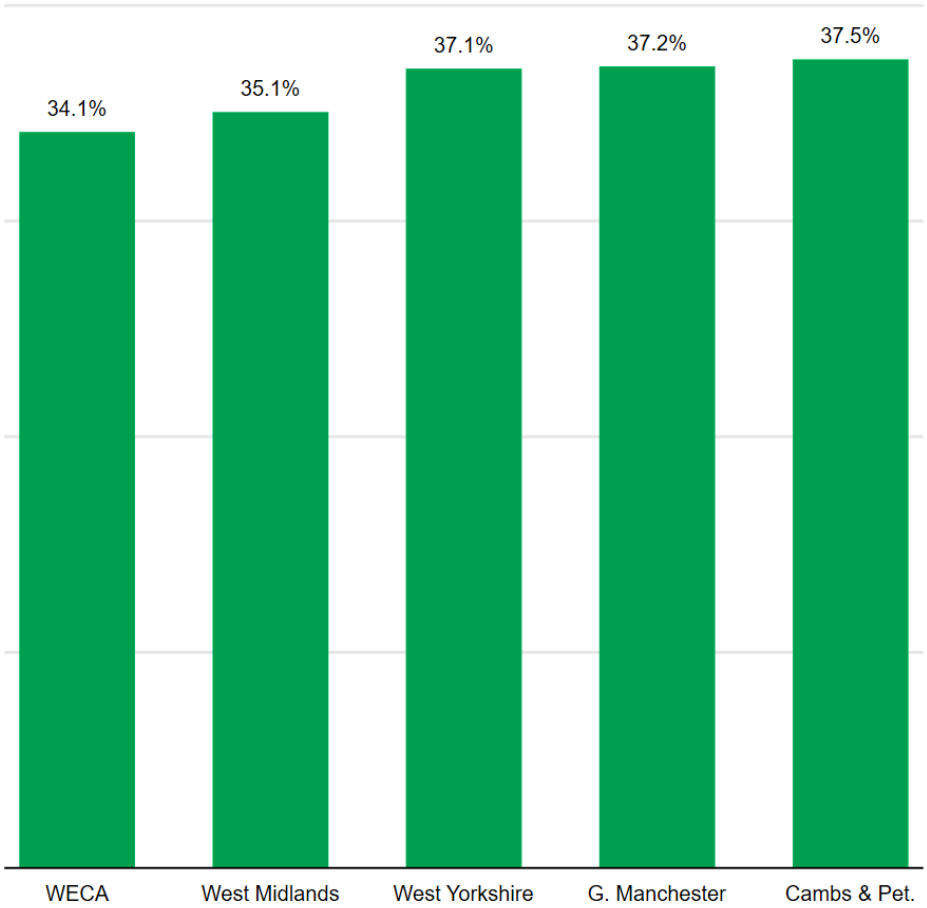
# Innovation

# Innovation

In this section, we examine the innovation behaviour of establishments within the WofE CA, Cambridgeshire & Peterborough, the West Midlands, West Yorkshire, and Greater Manchester between 2015 and 2021. By assessing the innovative activities of establishments across various local and combined authorities, we consider the proportion of establishments that have innovated in their products or processes within any two-year period.

As outlined in the 'Geography and data' section of the report, this data is derived from the UK Innovation Survey (UKIS), which offers biennial data waves from 2015 to 2021. Similar to our analysis in the Productivity section, we compare the propensity for innovation among establishments in WofE CA with those in other combined authorities. Our findings indicate that although WofE CA excels in productivity levels compared to other combined authorities, this success does not extend to innovation.

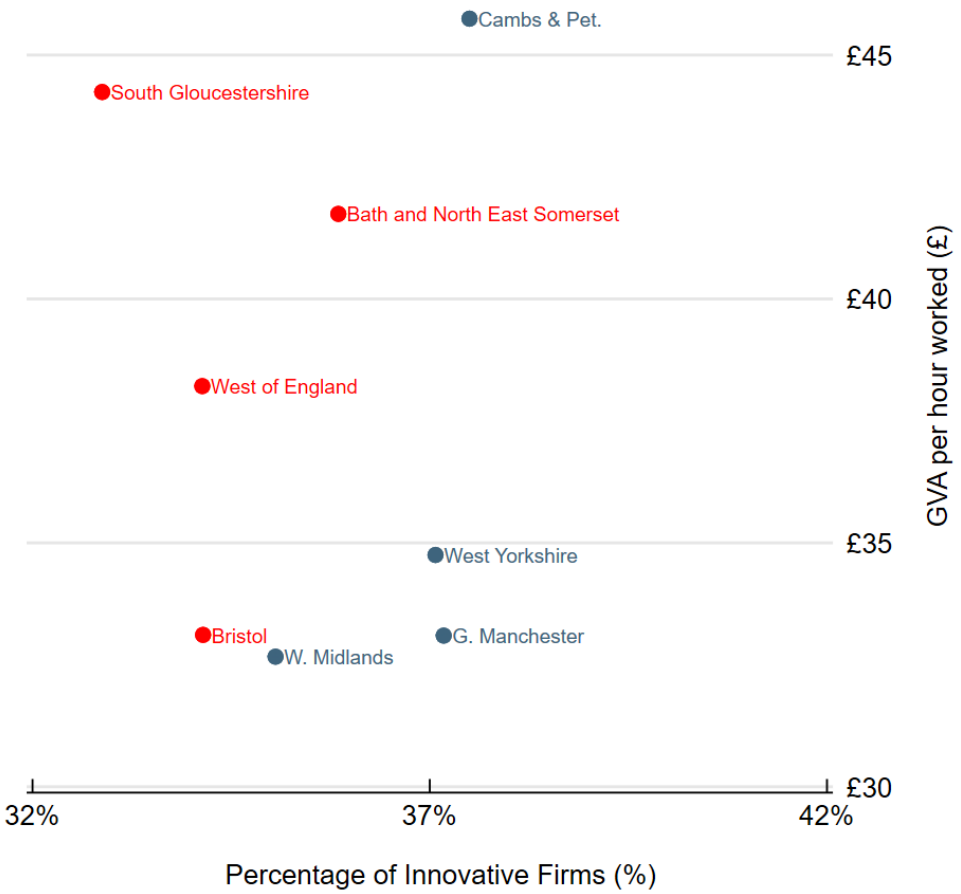
**Figure 10. Proportion of innovative firms within WofE CA, Greater Manchester, Cambridgeshire & Peterborough, West Yorkshire and the West Midlands between 2015 and 2021.**



As shown in Figure 10, WofE CA has small number of establishments who innovate in their product or process than other compared to other combined authorities. Within our sample only 34 per cent of establishments claimed to have innovated into improving their product or process in any given year. This means that WofE CA's innovation diffusion lags behind all comparable combined authorities despite its strong performance in productivity. Note that we find significantly lower levels of innovation diffusion in this report, as opposed to Dimos and Pearce (2023), who reported the West of England LEP innovation diffusion to be approximately 55 per cent for the 2018-2020 period. This difference is largely attributable to differences in the definition of innovation we use in this report. We only account for innovation into product and process, which are the most important aspects of innovation for productivity, and do not account for other types of innovation including strategic and marketing innovation.

We illustrate the link between innovation and productivity in Figure 11, which plots the GVA per hour worked for all combined authorities against their levels of innovation diffusion. The chart also illustrates the productivity and proportion of innovative establishments in the local authorities within Bristol, South Gloucestershire, and Bath & North East Somerset.

**Figure 11. Average GVA per worker against the percentage of establishments who have innovated for all combined authorities and local authorities within WofE CA between 2015 and 2021.**



The per hour worked GVA in Bristol is significantly lower (£34) compared to South Gloucestershire (£43) and Bath & North East Somerset (£42). However, this is not accompanied with more innovation, as establishments in South Gloucestershire are the least likely to innovate. Although Bath & North East Somerset exhibits the highest levels of innovation among local authorities within the WofE CA, it still lags in innovation compared to other combined authorities.

We proceed by presenting insights on the correlation between productivity and the propensity to innovate in their product or process for our sample of five CAs. In doing so we control for year and geographical region and regress the GVA per hour worked against an innovation dummy variable. We find a positive relationship between productivity and innovation with establishments that innovate being, on average, £3.2 per hour worked more productive than those that do not. This relationship, although not necessarily causal, is strongly significant.

# Motivation and barriers to innovation

# Motivation and barriers to innovation

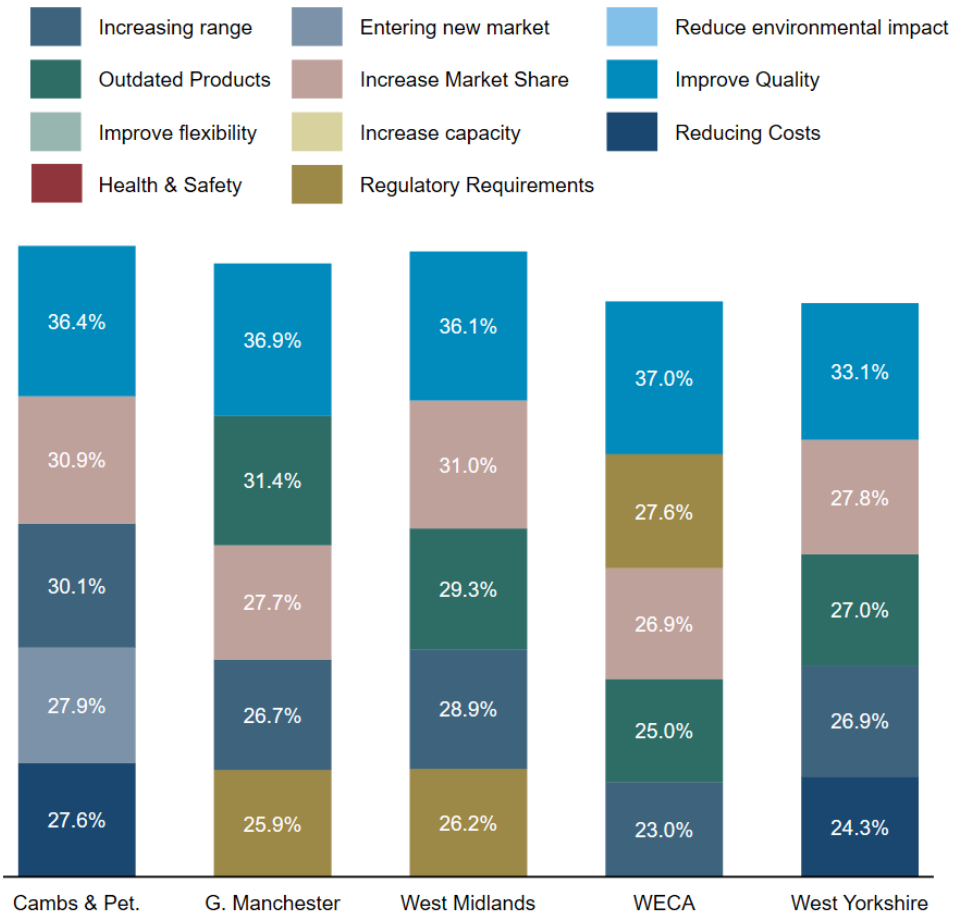
We proceed by reporting insights on the motivations and barriers to innovation that establishments reveal in each wave of the UKIS. The UKIS surveys establishments that have innovated within a two-year period about their motivations for innovating, providing valuable insights into their motivation in doing so. This allows us to present the top motivations for innovation by combined authority.

The UKIS also highlights the factors that hinder establishments from innovating. As detailed in the 'Geography and data' section of the report, the UKIS asks establishments to rank each specified motivation for innovating as 'not important', 'low', 'medium' or 'high.' We report the proportion of establishments that rated a particular motivation or barrier to innovation as 'high.'

We first consider the question: what motivates establishments to innovate? Our research suggests that a few factors consistently emerge regardless of region, establishment size, profitability, industry, and ownership. Figure 12 plots the percentage of establishments that describe any given reason as a 'high' motivation for innovating. To avoid clutter, we restrict the reported reasons to the top five.

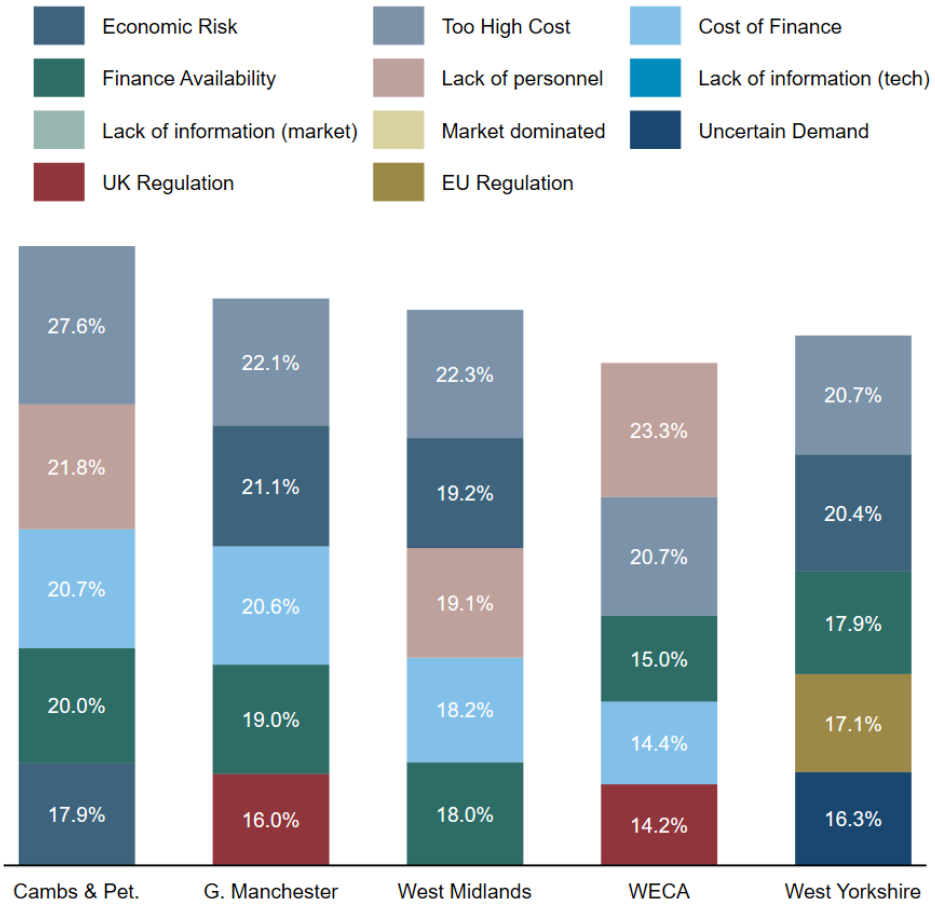
'Improving quality' consistently ranks as the number one reason for innovation across all combined authorities, with 33 per cent to 37 per cent of establishments ranking it as a 'high' reason. In the WofE CA, 'meeting regulatory requirements' ranks second with 27.6 per cent, and 'increasing market share' ranks third with 26.9 per cent. Notably, 'meeting regulatory requirements' is a more significant motivation in WofE CA compared to other combined authorities. 'Increasing market share' consistently ranks among the top three reasons for all combined authorities. Other notable motivations include 'increasing range' and 'replacing outdated products.' Policy initiatives aimed at stimulating innovation should cater to these motivations.

**Figure 12. Percentage of establishments who classify each reason as a 'high' reason for innovating within WofE CA, Greater Manchester, Cambridgeshire & Peterborough, West Yorkshire and the West Midlands between 2015 and 2021. Only the top five reasons are shown.**



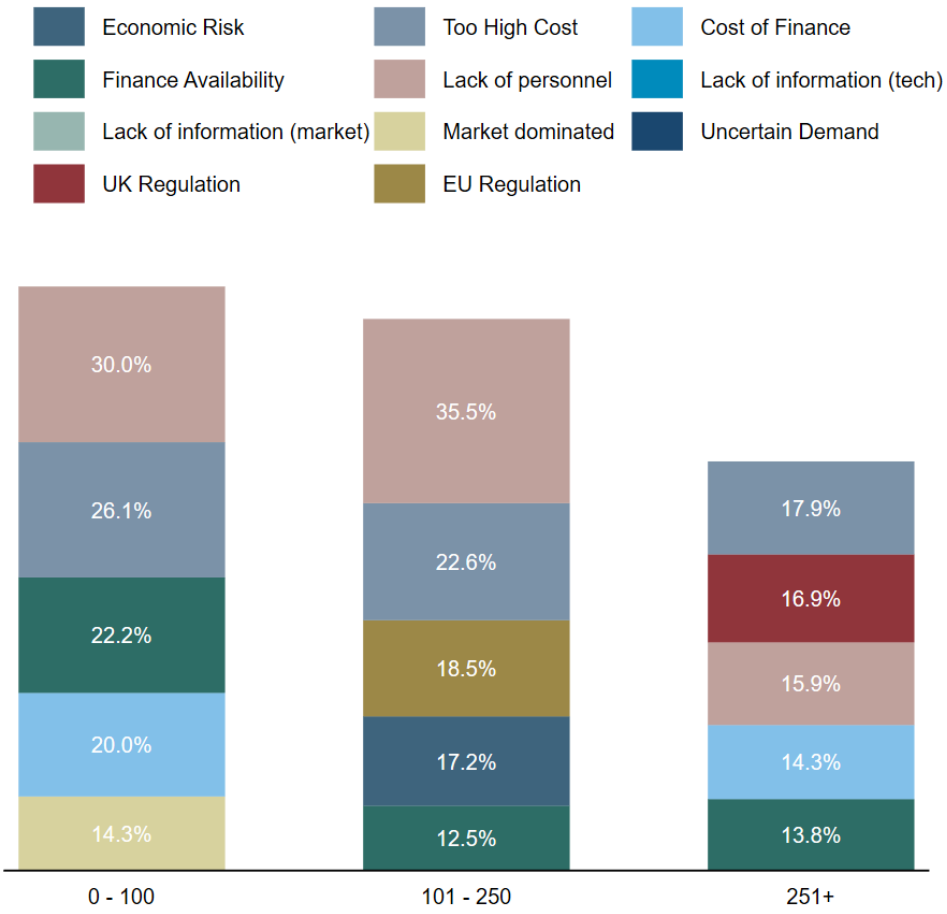
We now report the factors that establishments most commonly identify as barriers to innovation (Figure 13). The most notable finding is that establishments in the WofE CA consistently cite a 'lack of qualified personnel' as the primary barrier to innovation. This concern, while varying in prominence depending on the type of establishment, consistently ranks very highly among establishments in WofE CA, more so than in other combined authorities. Notably, 23.3 per cent of establishments within WofE CA rate a 'lack of qualified personnel' as a 'high' barrier to innovation. This percentage is higher than in Cambridgeshire & Peterborough, the West Midlands, Greater Manchester, and West Yorkshire. Other common barriers to innovation in WofE CA include the high cost (20.7 per cent), availability of finance (15 per cent), cost of finance (14.4 per cent), and UK regulation (14.2 per cent).

**Figure 13. Percentage of establishments who classify each reason as a 'high' reason for not innovating within WofE CA, Greater Manchester, Cambridgeshire & Peterborough, West Yorkshire and the West Midlands between 2015 and 2021. The top five reasons are shown.**



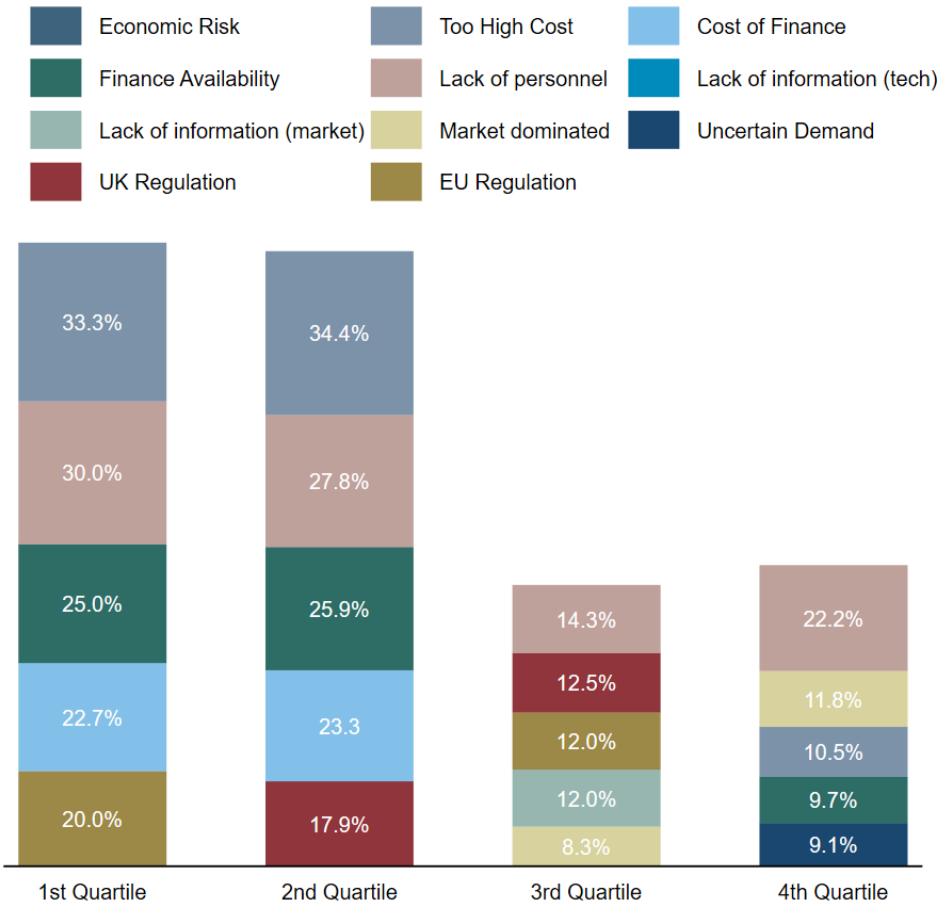
Looking at reasons for not innovating across different establishment sizes shows that 'lack of qualified personnel' is a particularly pertinent problem for small (0-100) and medium-sized (101-250) establishments. Specifically, 30 per cent of small establishments and 35.5 per cent of medium-sized establishments report 'lack of qualified personnel' as a 'high' reason for not engaging in innovation in their product or process.

**Figure 14. Percentage of establishments who classify each reason as a 'high' barrier to innovating within WofE CA, categorised by establishment size between 2015 and 2021. Only the top five reasons are shown.**



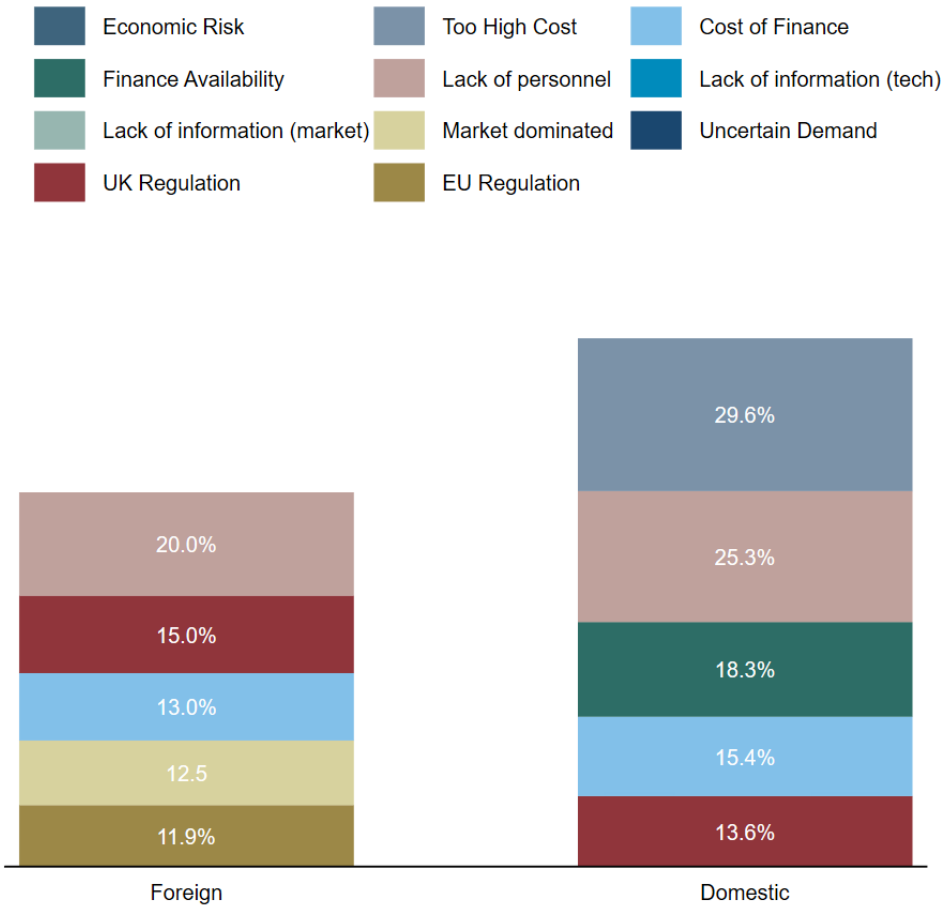
Firms with lower levels of profitability rank 'too high cost' as the number one reason for not innovating, while 'lack of qualified personnel' ranks second among establishments in the first and second quartile of gross operating surplus. These establishments also cite 'finance availability' as a significant problem. It stands to reason that establishments with higher levels of profitability find the cost of innovation less of a constraint than establishments with lower profitability, which explains why more profitable establishments seldom cite 'too high cost' as a barrier to innovation. Although the concern over 'lack of qualified personnel' decreases markedly between the second and third quartile, it still ranks as the largest concern among establishments with high levels of profitability. Firms in the third quartile often struggle with UK regulation, while the most profitable establishments (fourth quartile) reporting market domination as a major barrier.

**Figure 15. Percentage of establishments who classify each reason as a 'high' barrier to innovating within WofE CA, categorised by profitability between 2015 and 2021. Only the top five reasons are shown.**



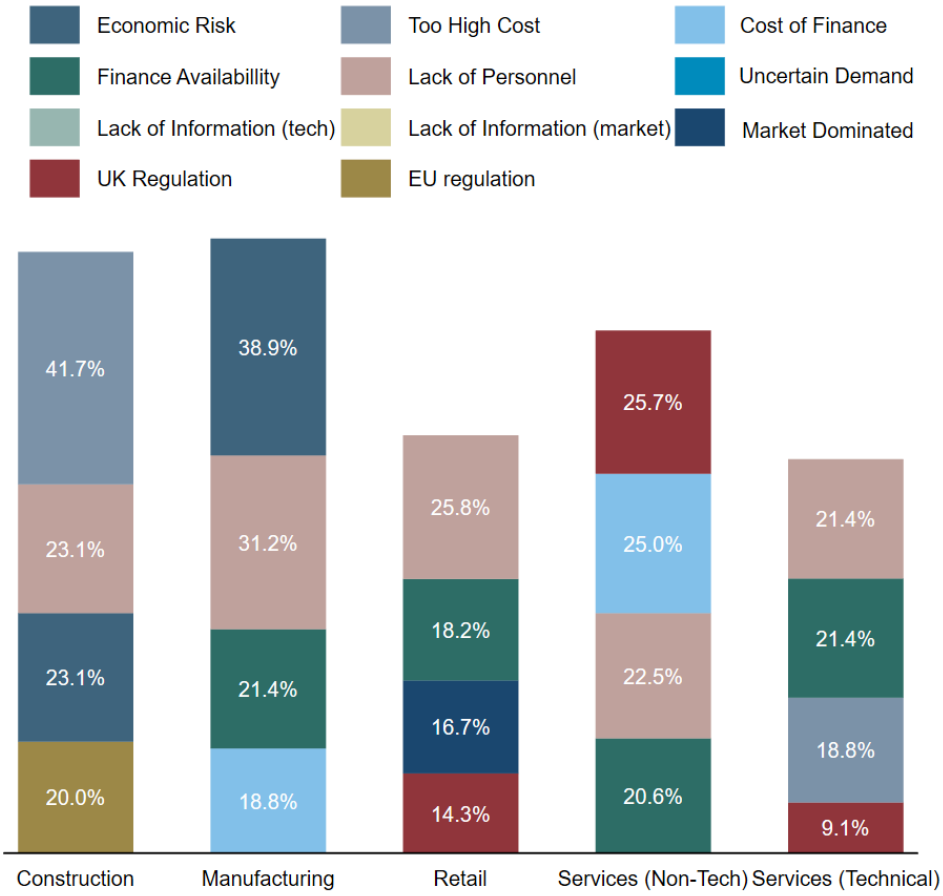
This story is also broadly consistent when comparing foreign and domestically owned establishments. Both types of establishments are constrained by a 'lack of qualified personnel,' with 20 per cent of foreign establishments and 25 per cent of domestic establishments citing it as a 'high' constraining factor on innovation. The most significant difference is that domestically owned establishments more frequently cite 'too high cost' and 'finance availability' as 'high' reasons for not innovating compared to their foreign-owned counterparts. This discrepancy is likely because foreign establishments generally have more abundant financial resources than domestic establishments, given their ability to move operations abroad.

**Figure 16. Percentage of establishments who classify each reason as a 'high' reason for not innovating within WofE CA, categorised by ownership between 2015 and 2021. Only the top five reasons are shown.**



'Lack of qualified personnel' ranks among the top three reasons for not innovating across all industrial sectors in WofE CA. In terms of percentages, it is most commonly cited as a 'high' reason among manufacturing (31.2 per cent) and retail (25.8 per cent) establishments. Technical services and retail establishments have the highest proportion of establishments citing 'lack of qualified personnel' as a 'high' reason for not innovating. It ranks second among manufacturing establishments and third for construction and food services establishments. Consistent with previous findings, cost-related issues also rank highly among establishments in all sectors, with 'too high cost' and 'finance availability' being frequent barriers. 'UK regulation' is a significant problem for establishments in the food services industry in the WofE CA.

**Figure 17. Percentage of establishments who classify each reason as a 'high' reason for not innovating within WofE CA, categorised by industrial sector, between 2015 and 2021. Only the top four reasons are shown.**




The exact reason that establishments may find a lack of workers a hindrance to innovation is speculative, but innovation often requires specialised skills and knowledge, particularly in fields such as technology, engineering, and research and development (R&D). Without sufficient qualified personnel with this expertise, establishments struggle to develop new ideas and products. Additionally, R&D activities are labour-intensive

and require a dedicated workforce; a shortage of personnel limits an establishment's ability to conduct comprehensive R&D, thus slowing down the pace of innovation. Human capital is crucial for creative problem-solving and the implementation of innovative processes. When establishments cannot attract or retain skilled workers, their capacity to innovate and remain competitive is severely compromised.

The pervasive issue of 'lack of qualified personnel' in the WofE CA apparently contradicts Census and other data documenting the highly qualified skill force in the WofE CA, as it is also reported in Dimos and Pearce (2023). Our statistic, instead, is a self-reported assessment on behalf of establishments in answering the question appearing in the UKIS: 'During the preceding 3-year period, how important was the lack of available qualified personnel in constraining innovation activities?' In fact, this constraining factor, though prevalent among most combined authorities, was the most popular between WofE CA establishments and especially for micro establishments and SMEs. This apparent contradiction would necessitate further scrutiny in determining the extent to which the highly qualified personnel in the WofE CA is at the same time also qualified and fit for innovation purposes. Potential qualification (skills) / job mismatches could explain this apparent contradiction, with another potential explanation being that WofE CA establishments set the bar high.

# 6

# Summary and conclusion

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This report has examined productivity and innovation in the WofE CA and made comparisons with comparable combined authorities, including the Greater Manchester, Cambridgeshire & Peterborough, West Yorkshire and the West Midlands Combined Authorities. We also investigated how productivity varies across industries, firm size, ownership status (domestic vs foreign) and profitability levels. We show that while the WofE CA exhibits the highest productivity levels across all comparable combined authorities except for Cambridgeshire & Peterborough, it falls behind in the diffusion of innovation. Here it must be emphasised that we only focus on 'quantity' measures of innovation and not of 'quality' measures (such as the benefits of innovation).

This finding could serve as a cautionary signal, necessitating further investigation (possibly through qualitative research) and potentially proactive measures to prevent potential discontent or challenges in the future. Less innovation could hinder WofE CA's ability to enhance productivity further, potentially causing it to lag behind other combined authorities in the future.

In examining the motivations and perceived barriers to innovation, we show that a significant obstacle to innovation for WofE CA establishments is the shortage of qualified personnel. This apparently contradicts Census and other data documenting the highly qualified skill force in the WofE CA. This apparent contradiction would necessitate further scrutiny in determining the extent to which the highly qualified personnel in the WofE CA is at the same time also qualified and fit for innovation purposes. Potential qualification (skills) / job mismatches could explain this apparent contradiction with another potential explanation being that WofE CA establishments set the bar high. In any case, a key message of this report is the indispensable value of supporting and prioritising education and on-the-job training programmes to improve skill formation and mitigate firms' barriers to innovation.

Other key obstacles to innovation for WofE CA establishments are reported to be lack of finance and the high economic risk. Although these obstacles are pervasive across the nation, regional initiatives supporting the innovation activities of establishments and incentivising private R&D investment would be key in raising innovation.

We hope this work will help the WofE CA tailor policies and funding opportunities to specific business needs. By identifying key drivers and barriers, the report equips WofE CA with the tools to make targeted decisions that can foster innovation, improve productivity, and drive economic growth. In practice, this could lead to highly paid jobs, real wage increases and prosperity, to the benefit of both residents and the broader community.

# References

Dimos, C. and Pearce, N., 2023. *Understanding Productivity, R&D, and Innovation in the West of England*. Institute for Policy Research, November 2023. https://www.bath.ac.uk/publications/understanding-productivity-r-d-and-innovation-in-the-west-of-england/

# Appendix

Standard Industrial Classification (SIC) codes:

Manufacturing – C

Construction and Energy – D, E, F

- Electricity, gas, steam and air conditioning supply
- Water supply; sewerage, waste management and remediation activities
- Construction

Retail – G

- Wholesale and retail trade; repair of motor vehicles and motorcycles

Transport – H

- Transportation and storage

Services (non-technical) – I, L, N, O, R, T, U

- Accommodation and food service activities
- Real estate activities
- Administrative and support service activities
- Public administration and defence; compulsory social security
- Arts, entertainment and recreation
- Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
- Activities of extraterritorial organisations and bodies

Services (technical) – J, K, M, P, Q, S

- Information and communication
- Financial and insurance activities
- Professional, scientific and technical activities
- Education
- Other service activities
- Human health and social work activities

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